## CF-1: Ultrafast Spectroscopy and Imaging 1

Chair: Ming-Chang Chen, National Tsing Hua University, Hsinchu, Taiwan

Time: Monday, 8:30–10:00 Location: ICM - Room 1

**Invited** CF-1.1 8:30 ICM - Room 1

**Nanoscale Petahertz-Electronics for Field-Resolved Spectroscopy** — •Phillip D. Keathley — Research Laboratory of Electronics at MIT, Cambridge, MA, USA

Electrically-connected nanoscale antenna structures are proving attractive for the development of efficient and compact petahertz electronics. I will review our work developing nanoscale petahertz electronics with a particular focus on their use for field-resolved spectroscopy.

**Oral** CF-1.2 9:00 ICM - Room 1

**Two-Octave-Spanning Dual-Oscillator Field-Resolved Infrared Spectrometer Recording at kHz Rates** — •Dionysios Potamianos[1,2], Philipp Steinleitner[3], Aleksandar Sebesta[2,3], Amaj Chamankar[1], Hojjat Heydarian[1], Behnam A. Jahedi[1], Pragya Verma[3], Claudio Cavecchi[1,2], Gabriele Politi[1,2], Sebastian Gröbmeyer[1,2], Vladimir Pervak[1], Ferenc Krausz[1,2,3], and Alexander Weigel[1,2,3] — [1]Ludwig-Maximilians-Universität München, Garching, Germany — [2]Center for Molecular Fingerprinting, Budapest, Hungary — [3]Max-Planck-Institut für Quantenoptik, Garching, Germany

This work presents a field-resolved infrared spectroscopy system using Cr:ZnS lasers, with 3.0-12.5 $\mu$m spectral coverage. It enables multi-kHz time-domain waveform acquisition with high signal-to-noise ratio, and precise timing calibration for molecular fingerprinting measurements.

**Oral** CF-1.3 9:15 ICM - Room 1

**Field-resolved Infrared Differential Molecular Fingerprinting of Liquid Samples** — •Zheng Wei[1,2], Sanchi Maithani[2], Wolfgang Schweinberger[1,3], Lorenzo Gatto[2], Sebastian Gröbmeyer[1], Igor Kukhtevich[1], Aleksandar Sebesta[1,3], Claudio Cavecchi[1,3], Abhijit Maity[1,3], Csaba Liber[3], Ferenc Krausz[1,2,3], and Alexander Weigel[1,2,3] — [1]Ludwig-Maximilians-Universität München, Physics Institute, Garching, Germany — [2]Max Planck Institute of Quantum Optics, Garching, Germany — [3]Center for Molecular Fingerprinting, Molekuláris-Ujjlenyomat Kutató Közhasznú Nonprofit Kft., Budapest, Hungary

We demonstrate octave-spanning field-resolved infrared spectroscopy of liquids with interferometric cancellation of the excitation-pulse background at early times. Reducing the excitation-pulse by this differential molecular fingerprinting allows to uncover the pure molecular response.

**Oral** CF-1.4 9:30 ICM - Room 1

**Flexible ultrafast single-shot imaging based on acousto-optical shaping and hyperspectral capture** — •Alisson Rodrigues De Paula, Saïd Idlahcen, Denis Lebrun, Pierre-Henry Hanzard, Ammar Hideur, and Thomas Godin — CORIA UMR 6614 CNRS - Université de Rouen Normandie - INSA Rouen, Rouen, France

We demonstrate a versatile single-shot ultrafast imaging technique that combines simple electronically-controllable pulse shaping with tailored hyperspectral image acquisition.

**Oral** CF-1.5 9:45 ICM - Room 1

**Practical pump-probe spectroscopy considerations for high-speed and low-noise measurements** — •Matthias Velsink[1,2], Maksym Illienko[1], and Stefan Witte[1,2] — [1]Advanced Research Center for Nanolithography, Amsterdam, Netherlands — [2]Delft University of Technology, Delft, Netherlands

Pump-probe spectroscopy is a powerful method, but typical signals are weak, making fast acquisition challenging. We show optimization strategies such as time-delay modulation, low-noise detection, and repetition rate tuning, which our high-performance setup optimally combines.

## CI-1: Space-Division Multiplexing 1

Chair: Sonia Boscolo, Aston University, Birmingham, United Kingdom

Time: Monday, 8:30–10:00 Location: ICM - Room 4a

**Oral** CI-1.1 8:30 ICM - Room 4a

*withdrawn*

**Invited** CI-1.2 8:45 ICM - Room 4a

*moved from CI-1.2*

**Experimental Demonstration of a Low-Cost Petabit-per-Second SDM Network Node** — •Divya A. Shaji[1,2], Ruben S. Luis[1], Benjamin J. Puttnam[1], Daniele Orsuti[1,3], Manuel S. Neves[1,4], Budsara Boriboon[1], Giammarco Di Sciullo[2], Qi Wu[2], Simon Gross[5], Andrew Ross-Adams[5], Micheal J. Withford [5], Satoshi Shinada[1], Fernando P. Guiomar[4], Paulo P. Monteiro[4], Luca Palmieri[3], Andrea Marotta [2], Antonio Mecozzi[2], Cristian Antonelli [2], and Hideaki Furukawa[1] — [1]National Institute of Information and Communications Technology, Koganei, Japan — [2]University of L'Aquila, L'Aquila, Italy — [3]University of Padova, Padova, Italy — [4]Universidade de Aveiro, Aveiro, Portugal — [5]Macquarie University, Syndey, Australia

We demonstrate a low-cost SDM network node supporting petabit-per-second traffic using 2×2 MEMS switches, enabling a 2 line-side ROADM for a 22-core MCF. We demonstrate full add & drop, full express and partial add & drop scenarios.

**Oral** CI-1.3 9:15 ICM - Room 4a

**Design for Ultra-Low Birefringence in Trench-Assisted Multicore Fibers via Stress Rod Implementation** — •Gustavo Ocampo and Kunimasa Saitoh — Hokkaido University, Sapporo, Japan

We present a method for reducing birefringence in trench-assisted multicore fibres through the implementation and optimization of a stress rod. Numerical analysis demonstrates the potential for birefringence characteristics comparable to those of single-mode fibers.

**Oral** CI-1.4 9:30 ICM - Room 4a

**Digital Precoding for Improved Transmission in Multi-Mode Fiber using Photonic Lanterns** — Samina Rajbhandari[1], Neethu Mariam Mathew[1], Metodi Plamenov Yankov [1], Deming Kong[1], Lars Grüner-Nielsen [1,2], Leif Katsuo Oxenløwe[1], and •Søren Otto Forchhammer[1] — [1]Denmark Technical University, DTU Electro, Ørestds Plads, Building 340 2800, Kgs. Lyngby, Denmark — [2]Danish Optical Fiber Innovation, Åvendingen 22A, 2700, Brønshøj, Denmark

Digital precoding enables a 2-mode experimental PAM-4 transmission over 1.6-km multi-mode fiber using photonic lanterns as (de)multiplexers. The precoding withstands time-variant crosstalk at -5.69 dB achieving a BER performance under the HD-FEC BER threshold ($3.8 \times 10^{-3}$).

**Oral** CI-1.5 9:45 ICM - Room 4a

*withdrawn*

## EA-1: Quantum Dynamics and Entanglement

Chair: Philippe Boyer, University of Amsterdam, Amsterdam, The Netherlands

Time: Monday, 8:30–10:00 Location: ICM - Room 4b

**Keynote** EA-1.1 8:30 ICM - Room 4b

**Ultrafast Dynamics of Individual Quantum States in Condensed Matter** — •Ralph Ernstorfer[1,2], Alexander Neef[2], Tommaso Pincelli[1,2], Lawson Lloyd[2], Shuo Dong[2,3], Samuel Beaulieu[2,4], Sebastian Hammer[5], Jens Pflaum[5], Andreas Knorr[1], Martin Wolf[2], and Laurenz Rettig[2] — [1]Technische Universität Berlin, Berlin, Germany — [2]Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin, Germany — [3]Chinese Academy of Sciences, Beijing, China — [4]Université de Bordeaux, Talence, France — [5]Julius-Maximilian-Universität, Würzburg, Ger-

Time- and angle-resolved photoemission spectroscopy captures the ultrafast dynamics of individual many-body quantum states like excitons, revealing their fundamental properties, microscopic interactions, and scattering pathways in nanoscale quantum materials and heterostructures.

**Oral** EA-1.2 9:15 ICM - Room 4b

**Two-Electron Quantum Walks Probe Entanglement and Decoherence In an Ultrafast Electron Microscope** — Offek Tziperman[1], David Nabben[2], •Ron Ruimy[1], Yiqi Fang[2], Ethan Nussinson[1], Jacob Holder[2], Alexey Gorlach[1], Daniel Kazenwadel[2], Aviv Karnieli[3], Ido Kaminer[1], and Peter Baum[2] — [1]Technion, Haifa, Israel — [2]Universität Konstanz, Konstanz, Germany — [3]Stanford University, Stanford, USA

We experimentally investigate coherence and entanglement in a strongly-interacting free-electron gas, created by femtosecond photoemission. Laser-driven quantum walk of electron pairs enables their quantum state tomography, revealing creation and loss of their coherence and entanglement.

**Oral** EA-1.3 9:30 ICM - Room 4b

**Entanglement and coherence in the resonance fluorescence of a two-level quantum emitter** — •Jürgen Volz, Xinxin Hu, Gabriele Maron, Luke Masters, and Arno Rauschenbeutel — Department of Physics, Humboldt-Universität zu Berlin, Berlin, Germany

Here, we experimentally study photon pair scattering from a single two-level atom and demonstrate the realization of a single-atom-based source of entangled photon pairs.

**Oral** EA-1.4 9:45 ICM - Room 4b

**Base-Independent Photon Entanglement in Superradiance of Multilevel Atoms** — •Amir Sivan[1,2] and Meir Orenstein[1,2] — [1]Andrew and Erna Viterbi department of Electrical & Computer Engineering, Technion-Israel Institute of Technology, Haifa, Israel — [2]Helen Diller Quantum Center, Technion-Israel Institute of Technology, Haifa, Israel

Superradiant ensembles of multilevel atoms emit entangled multiphoton states. Base-independent entanglement arises from partially degenerate four-level atoms, with atomic structure and initial excitation governing both multiphoton states and their entanglement.

## CD-1: LiNbO3 Nonlinear Waveguides

Chair: Nathalie Vermeulen, Vrije Universiteit Brussel, Brussels, Belgium

Time: Monday, 8:30–10:00 Location: ICM - Room 13a

**Invited** CD-1.1 8:30 ICM - Room 13a

**Nonlinear nanophotonics in thin-film lithium niobate: How many octaves, how few photons?** — •Martin Fejer — Stanford University, Stanford, CA, USA

The tight confinement, low-loss, dispersion engineering, and quasi-phase-matching available in thin-film lithium niobate (TFLN) enable multi-octave/few-cycle nonlinear interactions at pJ/fJ energies (perhaps even the few-photon regime). Supercontinua, OPA and OPO applications will be described.

**Oral** CD-1.2 9:00 ICM - Room 13a

**Monolithic millimeter wave generation and detection from resonant lithium niobate circuits** — •Jiawen Liu, Tianyi Zhang, Ghalia Dhaoui, Yazan Lampert, Aleksei Gaier, and Ileana-Cristina Benea-Chelmus — École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

We implemented thin-film lithium niobate photonic circuits for cavity-enhanced mmWave/THz generation and detection on the same chip using optical methods, highlighting the potential for system-level integration of high-frequency sources and detectors on a chip-scale platform.

**Oral** CD-1.3 9:15 ICM - Room 13a

**Broadband Mid-Infrared Generation at mW-Power Level in Periodically Poled Lithium Niobate Waveguides** — •Riccardo Brameri[1], Valerio Vitali[1], Ludovic Gauthier-Manuel[2], Cosimo Lacava[1], Federico Pirzio[1], Antoniangelo Agnesi[1], Mathieu Chauvet[2], and Ilaria Cristiani[1] — [1]Department of Electrical, Computer and Biomedical Engineering, University of Pavia, Pavia, Italy — [2]Université Marie et Louis Pasteur, CNRS, institut FEMTO-ST, Besancon, France

We report a broadband mid-infrared source based on a periodically-poled lithium niobate ridge waveguide with high damage threshold, low coupling and propagation losses, capable of generating mW-level power in the 3 – 3.5 $\mu$m range.

**Oral** CD-1.4 9:30 ICM - Room 13a

**Backward Wave Second-Harmonic Generation in X-Cut Thin Film Lithium Niobate** — Ozan Yakar[1], •Yesim Koyaz[1], Furkan Ayhan[2], Victor Brasch[3], Guillermo Villanueva[2], and Camille-Sophie Brès[1] — [1]École Polytechnique Fédérale de Lausanne, Photonic Systems Laboratory (PHOSL), STI-IEM, Station 11, CH-1015, Lausanne, Switzerland — [2]École Polytechnique Fédérale de Lausanne, Advanced Nano Electromechanical Systems Laboratory (ANEMS), STI-IGM, Station 9, CH-1015, Lausanne, Switzerland — [3]Q.ANT GmbH, 70565, Stuttgart, Germany

We demonstrate backward-wave second-harmonic generation for the first time in x-cut thin film lithium niobate waveguides and show that it can span the entire telecommunication-band via dispersion engineering and temperature tuning.

**Oral** CD-1.5 9:45 ICM - Room 13a

*withdrawn*

## CJ-1: Pulsed Fiber Sources 1

Chair: William Kerridge-Johns, University of Southampton, Southampton, United Kingdom

Time: Monday, 8:30–10:00 Location: ICM - Room 13b

**Oral** CJ-1.1 8:30 ICM - Room 13b

**Efficient high energy frequency-doubled nanosecond Yb-doped 49-core fiber laser** — •Mehran Bahri[1], Saeid Sarvarzadeh[1], Arno Klenke[1,2,3,4], Cesar Jauregui[1,4], Johannes Nold[4], Nicoletta Haarlammert[4], Thomas Schreiber[4], and Jens Limpert[1,2,3,4] — [1]Friedrich-Schiller-University, Institute of Applied Physics, Jena, Germany — [2]Helmholtz-Institute, Jena, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [4]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

This work demonstrates efficient energy and average power scaling of second harmonic generation using a nanosecond 49-core Ytterbium-doped fiber laser. The preliminary result showed 18-mJ pulse energy and 27-W average power of green, corresponding to 57% efficiency.

**Oral** CJ-1.2 8:45 ICM - Room 13b

**976 nm Swept-Source FDML-MOPA Laser for Multiphoton Microscopy** — •Stefan Reinhards[1,2], Tonio Kutscher[1], Kimberley Goodwin[1], Jan Wenzel[3,4], and Sebastian Karpf[1] — [1]Institute of Biomedical Optics, Universität zu Lübeck, Lübeck, Germany — [2]Medical Lasercenter Lübeck, Lübeck, Germany — [3]Institute of Experimental and Clinical Pharmacology and Toxicology, Center of Brain, Behavior and Metabolism, Universität zu Lübeck, Lübeck, Germany — [4]German Research Centre for Cardiovascular Research (DZHK), partner site Hamburg/Lübeck/Kiel, Lübeck, Germany

This work presents a newly developed ytterbium based FDML-MOPA laser with a center wavelength of 977.8 nm. The laser lays the groundwork for ultrafast multiphoton imaging of green fluorescent biological samples with kHz frame rates.

**Oral** CJ-1.3 9:00 ICM - Room 13b

**Dispersion-less picosecond soliton fiber laser** — •Mostafa Mohamed[1,2], Aurélien Coillet[1], and Philippe Grelu[1] — [1]Université Bourgogne Europe, Dijon, France — [2]Alexandria University, Alexandria, Egypt

Our fiber laser incorporates spectral filtering and energy-managed soliton concepts to generate flexible, scalable narrowband pulses immune to chromatic dispersion. It generates 88-ps self-starting mode-locked pulses of 0.34 $\mu$J at 1.9 MHz repetition rate.

**Oral** CJ-1.4 9:15 ICM - Room 13b

**Efficient multiphoton microscopy at microwatt power levels employing a GMN amplifier** — •Katarzyna Kunio, Grzegorz Soboń, and Jakub Bogusławski — Wrocław University of Science and Technology, Wrocław, Poland

We present a compact, fiber-based laser system with a gain-managed nonlinear amplifier and pulse picker for multiphoton microscopy. It enables long-term imaging of delicate samples by reducing power to minimize photodamage while preserving fluorescence signals.

**Oral** CJ-1.5 9:30 ICM - Room 13b

**Repetition-controllable Gain-managed Nonlinear Fiber Amplifier for Biological Imaging** — •Duanyang Xu[1], Jikun Yan[1], James Read[2], Sumeet Mahajan[2], and Lin Xu[1] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]Institute for Life Sciences, University of Southampton, Southampton, United Kingdom

A novel GMNA laser system achieves versatile biological imaging through flexible repetition rate tuning from 1-20 MHz while maintaining high pulse energy (150 nJ) and short duration (50 fs), enabling flexibility in nonlinear microscopy.

**Oral** CJ-1.6 9:45 ICM - Room 13b

**Study of the dynamics of a high-energy normal-dispersion fiber optical parametric chirped-pulse oscillator** — •Tristan Guezennec[1,2], Saïd Idlahcen[1], Laurent Provino[2], Adil Haboucha[2], Thomas Godin[1], and Ammar Hideur[1] — [1]CORIA, CNRS UMR 6614 - Université de Rouen Normandie - INSA Rouen, Rouen, France — [2]Photonics Bretagne, Lannion, France

We focus on the dynamics of a normal-dispersion fiber optical parametric chirped-pulse oscillator (FOPCPO), producing high-energy, widely tunable ultrashort pulses. We demonstrate the superiority of FOPCPOs compared to equivalent parametric amplifiers in terms of stability.

## CH-1: Spatial Resolution Enhancement Methods

Chair: Meritxell Vilaseca, Universitat Politècnica de Catalunya, Barcelona, Spain

Time: Monday, 8:30–10:00 Location: ICM - Room 14a

**Invited** CH-1.1 8:30 ICM - Room 14a

**Time modulated illumination for single molecule localization microscopy** — Abigail Illand[1], Francisco Matos[1], Maximilian Lengauer[1,2], Pierre Jouchet[1], Emmanuel Fort[2], and •Sandrine Lévêque-Fort[1] — [1]ISMO, University Paris Saclay,CNRS, Orsay, France — [2]Institut Langevin, ESPCI, University PSL, Paris, France

Time-modulated structured illumination improves spatial precision for the localization of single molecules. By applying a continuous sweep of the illumination frequency, uniqueness between frequency and emitter position in wide-field is achieved with a fast monodetector.

**Oral** CH-1.2 9:00 ICM - Room 14a

**Beyond Abbe-Rayleigh: Better Resolution is Achievable with Smaller Objects** — Taeyong Chang[1], •Giorgio Adamo[1], and Nikolay Zheludev[2,3] — [1]Nanyang Technological University, Singapore, Singapore — [2]University of Southampton, Southampton, United Kingdom — [3]Texas A&M University, Texas, USA

We show that knowledge of the object's size is a fundamental information resource for resolution beyond the Abbe-Rayleigh diffraction limit and report a new super-resolution imaging technique that achieves higher resolution for smaller objects.

**Oral** CH-1.3 9:15 ICM - Room 14a

**Three-photon image-scanning-microscopy enabling deep super-resolution imaging** — Anton Classen, Stanislav Vitha, Mia Pacheco, Dylan McCreedy, Alexei Sokolov, Girish Agarwal, •Aart Verhoef, and Alma Fernández — Texas A&M University, College Station, USA

We demonstrate sub-diffraction-limited simultaneous three-photon imaging, using a high-power ultrafast fiber laser and SPAD array. We achieve 125 nm lateral and 190 nm axial resolution, and continuous imaging over a depth range exceeding 100 $\mu$m.

**Oral** CH-1.4 9:30 ICM - Room 14a

**Super-resolution microscopy via photon statistics and structured light** — Fabio Picariello[1], Elena Losero[1], Sviatoslav Ditalia Tchernij[2], Pauline Boucher[3], Marco Genovese[1], Ivo P. Degiovanni[1], and •Ivano Ruo-Berchera[1] — [1]INRIM, Torino, Italy — [2]University of Torino, Torino, Italy — [3]Quantonation, paris, France

We implement an advanced quantum super-resolution imaging technique based on photon statistics that adapts to any kind of non-Poissonian emitters at any brightness, outperforms corresponding classical methods and can be combined with structured illumination

**Oral** CH-1.5 9:45 ICM - Room 14a

**Structured Detection for Enhanced Resolution and Optical Sectioning Microscopy** — •Alessandro Zunino[1], Giacomo Garrè[1,2], Eleonora Perego[1,3], Sabrina Zappone[1,2], Mattia Donato[1], Nadine Vastenhouw[3], and Giuseppe Vicidomini[1] — [1]Istituto Italiano di Tecnologia, Genoa, Italy — [2]University of Genoa, Genoa, Italy — [3]University of Lausanne , Lausanne, Switzerland

Laser-scanning microscopes with an array detector collect enough information to achieve optical and digital super-resolution and enhanced optical sectioning. We developed an image reconstruction algorithm to achieve the theoretical benefits while boosting the signal-to-noise ratio.

## CK-1: Integrated Optical Devices 1

Chair: Robert Halir, University of Málaga, Malaga, Spain

Time: Monday, 8:30–10:00 Location: ICM - Room 14b

**Invited** CK-1.1 8:30 ICM - Room 14b

**Massively Multi-layer Photonic Integrated Circuits Using Sputtered Metal Oxides** — Aaron T. Schreyer[1], William D. Houck[2], Mark A. Foster[1], and •Amy C. Foster[1] — [1]Johns Hopkins University, Baltimore, USA — [2]VIAVI Solutions, Inc., Santa Rosa, USA

Sputtered metal oxides and their alloys combine ease of deposition, high index, and low loss making them an attractive platform that is scalable to massively multi-layer integrated photonics.

**Oral** CK-1.2 9:00 ICM - Room 14b

**DC-assisted reconfigurable integrated silicon-organic terahertz detectors** — •Francesco Bertot, Alessandro Tomasino, and Ileana-Cristina Benea-Chelmus — EPFL, Lausanne, Switzerland

Nonlinear optical polymers have been recently combined with photonic integrated circuits to realize electro-optic terahertz detectors. We prove the reconfigurability of these devices applying DC fields across their active regions while performing THz sensing.

**Oral** CK-1.3 9:15 ICM - Room 14b

**Hollow-Core Waveguides for Spectroscopy in the Extreme Ultraviolet** — •Muhammad Thariq[1,2], Theodor Strobl[1,2], Takashi Sukegawa[3], Theodor W. Hänsch[1,2], Thomas Udem[1,2], and Akira Ozawa[1] — [1]Max-Planck-Institut für Quantenoptik, Garching, Germany — [2]Ludwig-Maximilians-Universität München, Munich, Germany — [3]Canon Inc., Tokyo, Japan

We demonstrate hollow-core waveguides for XUV light, enabling transmission, beam splitting, and focusing. The waveguide is fabricated via precision mechan-

ical machining. They hold promise for XUV spectroscopy and quantum optics applications.

**Oral** CK-1.4 9:30 ICM - Room 14b

**TMOKE Coupled Waveguide System: a New Approach for Non-Reciprocal Transmission** — Kimhong Chao, •Fei Mao, Nathalie Bardou, Vy Yam, Laurent Vivien, and Beatrice Dagens — Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, Palaiseau, France

Guided optical isolators or circulators are among the main missing devices for photonic circuits. We present here designs of TMOKE-coupled waveguide system, which enable broadband isolation ratio up to 20dB with reduced insertion losses.

**Oral** CK-1.5 9:45 ICM - Room 14b

**Efficient phase shifter with inkjet-printed liquid crystal on an integrated photonics platform** — •Lukas Van Iseghem[1,4], umar khan[1], Ewout Picavet[1], Pierre Edinger[2], Alain Yuji Takabayashi[3], Peter Verheyen[4], Niels Quack[3], Kirstin B. Gylfason[2], Klaartje De Buysser[1], Jeroen Beeckman[1], and Wim Bogaerts[1,4] — [1]Universiteit Gent, Gent, Belgium — [2]Kungliga Tekniska högskolan, Stockholm, Sweden — [3]École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland — [4]IMEC, Leuven, Belgium

We demonstrate a new electro-optic phase shifter architecture with inkjet printed liquid crystal on a silicon on insulator platform. Results show a world record $V_\pi$ of 2.2V with an insertion loss below 1dB.

## CM-1: Laser-Induced Periodic Surface and Volume Structures

Chair: Francois Courvoisier, FEMTO-ST Institute - CNRS, Paris, France

Time: Monday, 8:30–10:00 Location: ICM - Room Osterseen

**Oral** CM-1.1 8:30 ICM - Room Osterseen

*withdrawn*

**Invited** CM-1.2 8:45 ICM - Room Osterseen

**Coherent LIPSS propagation in Transparent Conductive Oxides (TCOs)** — Gonzalo Gomez-Munoz[1], Rocio Ariza[1,2], Fernando Nuñez-Galvez[3,4], Juan Francisco Ramos-Justicia[1,5], Belen Sotillo[5], Paloma Fernandez[5], Christian Kaufmann[6], Carlos Prieto[7], Jose Gonzalo[1], and •Javier Solis[1] — [1]Instituto de Óptica "Daza de Valdés" - CSIC, Madrid, Spain — [2]Centre of Membrane Separation, Adsorptions, Catalysis and Spectroscopy for Sustainable Solutions - KU Leuven, Leuven, Belgium — [3]Departamento de Física Aplicada I - US, Seville, Spain — [4]Instituto de Ciencia de Materiales de Sevilla - CSIC, Seville, Spain — [5]Departamento de Física de Materiales - UCM, Madrid, Spain — [6]PVcomB - Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany — [7]Instituto de Ciencia de Materiales de Madrid - CSIC, Madrid, Spain

FTO, AZO and YbZO films have been processed with fs-lasers and different LIPSS have been induced depending on the irradiation conditions and the composition of the films (amount of linear absorption at the laser wavelength).

**Oral** CM-1.3 9:15 ICM - Room Osterseen

**Photo-patterned plasmonic multilayers exhibiting different vivid colors in specular and diffuse reflection** — Nicolas Jacquot[1,2], William Ravisy[2], Laurent Dubost[2], Christophe Hubert[1], Jialin Hu[3], Kevin Vynck[3], and •Nathalie Destouches[1] — [1]Laboratoire Hubert Curien, Université Jean Monnet, Saint-Etienne, France — [2]IREIS, Groupe HEF, Andrézieux-Bouthéon, France — [3]Institut Lumière Matière, CNRS-Université Claude Bernard Lyon 1, Villeurbanne, France

Plasmonic multilayers processed by nanosecond lasers exhibit vivid, complementary colors in specular and diffuse reflections, enabling scalable, tunable structural colors for advanced applications. Morphological transformations and electromagnetic simulations reveal mechanisms coupling cavity and plasmonic resonances

**Oral** CM-1.4 9:30 ICM - Room Osterseen

**Tailoring the properties of the electromagnetic modes excited by Mid-IR fs pulses at the interface between Si and SiO2 coatings by adjusting the thickness of the dielectric material** — •George Tsibidis[1] and Emmanuel Stratakis[1,2] — [1]Institute of Electronic Structure and Laser (IESL), Foundation for Research and Technology (FORTH), N. Plastira 100, Greece , Heraklion, Crete, Greece — [2]Department of Physics, University of Crete, Heraklion, Greece

We investigate the conditions for surface plasmon (SP) excitation on the interface between SiO2 and Si and the influence of the film thickness on the SP features upon irradiating the complex with Mid-IR laser pulses

**Oral** CM-1.5 9:45 ICM - Room Osterseen

**Ultrafast laser surface nanostructuring with programmable temporal polarization shaping** — •Thirunaukkarasu Kuppan, Anthony Nakhoul, Huu Dat Nguyen, Rajeev Dviwedi, Ciro D'Amico, and Razvan Stoian — Hubert Curien Laboratory, CNRS UMR 5516, IOGS, University of Lyon, University Jean Monnet, Saint Etienne, France

Programmable femtosecond polarization pulse shaping enables precise control over light-driven nanostructuring. Using a two-layer LC-SLM, we tailor time-dependent polarization to influence laser-induced periodic structures, unlocking new possibilities for advanced laser-based material processing and surface engineering.

## CA-1: Modelocked Solid-State Lasers and Frequency Combs

Chair: Weidong Chen, Fujian Institute of Research on the Structure of Matter - Chinese Academy of Sciences, Fuzhou, China

Time: Monday, 8:30–10:00 Location: Hall A1 - Room A12

**Oral** CA-1.1 8:30 Hall A1 - Room A12

**High-Resolution Spectroscopy Using an Interleaved Single-Cavity 1 GHz Dual-Comb Laser** — •Moritz Seidel, Benjamin Willenberg, Alexander Nussbaum-Lapping, Justinas Pupeikis, Hayk Soghomonyan, Ursula Keller, and Christopher R. Phillips — ETH Zurich, Zurich, Switzerland

We show high-resolution gas spectroscopy of acetylene using a spatially multiplexed, single-cavity, dual-comb Yb:$CaF_2$ laser operating at 1 GHz. Leveraging spectral interleaving, we achieve a resolution of 50 MHz with a 1 GHz dual-comb laser.

**Oral** CA-1.2 8:45 Hall A1 - Room A12

**High-power 4.5-GHz Repetition-rate Diode-pumped Kerr-lens Mode-locked Laser** — •Jie Tao[1], WenLong Tia[1], Li Zheng[2], Peng Ye[3], Zhiyi Wei[3], and Jiangfeng Zhu[1] — [1]School of Optoelectronic Engineering, Xidian University, Xi'an 710071, China, Xi'An, China — [2] School of Physics and Telecommunication Engineering, Shaanxi University of Technology, Hanzhong, 723001, China, Hanzhong,, China — [3] Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Science, Beijing 100190, China, Beijing , China

We report on a multimode laser-diode (LD) pumped 4.5-GHz Kerr-lens modelocked laser, which can directly deliver 360 fs pulses with an average power of over 3.7 W.

**Oral** CA-1.3 9:00 Hall A1 - Room A12

**Watt-level multi-gigahertz-repetition-rate femtosecond optical parametric oscillator** — •Hua Wang[1], Hui Tong[1], Wenlong Tian[1], Li Zheng[2], Qizhen Luo[1], Zhiyi Wei[3], and Jiangfeng Zhu[1] — [1] School of Optoelectronic Engineering, Xidian University, Xi'an, China — [2]School of Physics and Telecommunication Engineering, Shaanxi University of Technology, Hanzhong, China — [3]Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing , China

A watt-level multi-GHz repetition-rate femtosecond optical parametric oscillator (OPO) is demonstrated, with a tuning range of 1.41 to 1.64 $\mu$m, 1.58 W average power, 139 fs pulse duration, and 1-4 GHz repetition rate.

**Oral** CA-1.4 9:15 Hall A1 - Room A12

**1.06-GHz Diode-Pumped Modelocked 2.4-$\mu$m Cr:ZnS Laser** — •José Miguel Pereira, Christian Pedersen, and Ajanta Barh — DTU Electro, Department of Electrical and Photonics Engineering, Technical University of Denmark, Roskilde, Denmark

The first diode-pumped modelocked Cr:ZnS laser with a GHz repetition rate is presented. An average output power of 272mW at an operating central wavelength of 2364nm was achieved.

**Oral** CA-1.5 9:30 Hall A1 - Room A12

**Ultra-low-noise frequency comb at 2.3 $\mu$m** — •Maciej Kowalczyk, Karolina Suliga, Jakub Jaworski, and Jarosław Sotor — Wroclaw University of Science and Technology, Wroclaw, Poland

We present a low-noise Cr:ZnS frequency comb operating at 2.3 $\mu$m. Optimization of the stabilization scheme and the pump source provides unprecedented phase stability (6 mrad residual noise), and minimizes the relative intensity noise (<0.007%).

**Oral** CA-1.6 9:45 Hall A1 - Room A12

**Octave spanning supercontinuum generation in Ta2O5 waveguides driven by femtosecond 2.1-$\mu$m laser** — •Sergei Tomilov[1], Yicheng Wang[1], Mykyta Redkin[1], Michael Müller[1,2], David R. Carlson[3], Martin Hoffmann[1], and Clara J. Saraceno[1] — [1]Photonics and Ultrafast Laser Science, Ruhr Universität Bochum, Bochum, Germany — [2]RayVen Laser, Ruhr-University Bochum, Bochum, Germany — [3]Octave Photonics, Louisville, USA

We demonstrate supercontinuum generation in a Ta2O5 waveguides pumped by a 2.1 $\mu$m femtosecond laser. The spectrum spans 1.2-3.2 $\mu$m with 61 mW of output power, showing the potential for carrier-envelope frequency detection in the mid-infrared.

## CE-1: Optical Fibre Fabrication and Characterisation

Chair: Luca Vincetti, University of Modena and Reggio Emilia, Modena, Italy

Time: Monday, 8:30–10:00 Location: Hall B1 - Room B11

**Invited** CE-1.1 8:30 Hall B1 - Room B11

**Print-and-Draw: From 3D-Printed Fused Silica Preforms to Microstructured Hollow-core Optical Fibres** — •Azim-Onur Yazici[1], Thomas Stelzer[1], Patrick Risch[2], Frederik Kotz-Helmer[2,3,4], and Michael H. Frosz[1] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Glassomer GmbH, Freiburg, Germany — [3]Laboratory of Process Technology, NeptunLab, Department of Microsystems Engineering (IMTEK), University of Freiburg, Freiburg, Germany — [4]Freiburg Materials Research Center (FMF), University of Freiburg, Freiburg, Germany

This work demonstrates 3D-printing of photopolymer-based resin containing silica nanoparticles to make transparent fused silica preforms of sufficient length for fibre drawing. The preforms are drawn to hollow-core fibres having complex cladding geometries.

**Oral** CE-1.2 9:00 Hall B1 - Room B11

**Drill-and-draw: microstructured hollow-core optical fibres from laser-drilled fused silica preforms** — •Michael H. Frosz[1], Thomas Stelzer[1], Linda Uta[1], and Dominik Esser[2] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Fraunhofer-Institut für Lasertechnik ILT, Aachen, Germany

We demonstrate inverse laser drilling of fused silica preforms with shapes impossible to make using stacking. The preforms are drawn to hollow-core fibres having complex cladding geometries.

**Oral** CE-1.3 9:15 Hall B1 - Room B11

**Measurement of Radiation-induced Attenuation in Visible-guiding Hollow Core Optical Fibres** — •Hans Christian H Mulvad[1], Ian A. Davidson[1], Thomas W. Kelly[1], Jing Meng[1], Konstantin Vidiajev[1], Tim Hoad[1], Victoria Smith[2], Taraneh B. Moghim[2], Austin Taranta[1], Yongmin Jung[1], Francesco Poletti[1], and Natalie V. Wheeler[1] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]Amentum Clean Energy, Harwell Oxford, United Kingdom

We report measurements of radiation-induced attenuation in visible-guiding anti-resonant hollow-core fibres exposed to 659kGy of gamma radiation. While silica-related increased attenuation appears negligible, radiolytic formation of Nitrogen Dioxide is evident via absorption and Raman spectroscopy.

**Oral** CE-1.4 9:30 Hall B1 - Room B11

**Composite fibers made of glass with embedded $Yb^{3+}$ doped crystals** — •Natalia Vakula[1], Matiss Bardins[1], Khaldoon Nasser[1], Catherine Boussard-Plédel[2], Johann Troles[2], Wilfried Blanc[3], and Laeticia Petit[1] — [1]Tampere University, Tampere, Finland — [2]Université de Rennes, Rennes, France — [3]Université Côte d'Azur, Nice, France

Composites were prepared by adding $Yb^{3+}$ doped crystals, synthesized using solid state reaction in glass, the composition of which is selected based on its drawability and successfully drawn into composite fibers.

**Oral** CE-1.5 9:45 Hall B1 - Room B11

**Fabrication of Precise Fiber Bragg Grating Filters for Astronomy** — •Xijie Luo[1,2], Aashia Rahman[1,2], Anna Maria Weiß[1,2], Kalaga Madhav[1,2], and Martin M. Roth[1,2] — [1]Astrophotonics (innoFSPEC), Leibniz institute für Astrophysik, Potsdam, Germany — [2]Institute of Physics and Astronomy, University of Potsdam, Potsdam, Germany

In this work, we present a significant improvement over our previous work by achieving a wavelength accuracy within 51 pm in the inscription of fiber Bragg grating (FBG) filters for astronomical applications.

## CF-2: Harmonic and Attosecond Sciences

Chair: Nicolas Forget, INPHYNI, Nice, France

Time: Monday, 10:30–12:00 Location: ICM - Room 1

**Invited** CF-2.1 10:30 ICM - Room 1

*moved from CF-2.2*

**Optimising resonant dispersive wave generation in hollow capillary fibre for few-femtosecond soft X-ray transient absorption spectroscopy** — Tim Klee[1], Jacob P. Lee[1], Miguel Manresa Nalda[1], Christian Brahms[2], John C. Travers[2], John W.G. Tisch[1], Jon P. Marangos[1], and •Clement Ferchaud[1] — [1]Department of Physics, Blackett Laboratory, Imperial College London, London, United Kingdom — [2]School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, United Kingdom

The optimised generation of few-fs RDW pulses tuneable from vacuum-UV to near-infrared extends the pump capabilities for soft X-ray transient absorption spectroscopy studies.

**Oral** CF-2.2 11:00 ICM - Room 1

*moved to CF-2.1*

**Oral** CF-2.3 11:15 ICM - Room 1

**High-harmonic generation directly driven with 250 MW thin-disk oscillator system** — •Moinuddin Kadiwala, Yasmin Kopp, Nazar Kovalenko, Semyon Goncharov, and Oleg Pronin — Helmut-Schmidt University, Hamburg, Germany

We report the first experiments on high harmonic generation in argon and krypton gases using our compressed thin-disk oscillator delivering 170 W, 40 fs, 14 MHz average power, and 250 MW peak power.

**Oral** CF-2.4 11:30 ICM - Room 1

**High repetition rate, high average power XUV sources based on High Harmonic Generation** — •Bastian Manschwetus[1], Thomas Braatz[1], Sebastian Starosielec[1], Supriya Rajhans[2], Esmerando Escoto[2], Malte Sumfleth[3], Dominic Laumer[3], Hossein Goudarzi[2], Christoph M. Heyl[2,4,5], Marek Wieland[3], Mark J. Prandolini[1,3], Tais Gorkhover[3], Markus Drescher[3], Michael Schulz[1], and Robert Riedel[1] — [1]Class 5 Photonics, Hamburg, Germany — [2]Deutsches Elektronen Synchrotron (DESY), Hamburg, Germany — [3]Universität Hamburg, Hamburg, Germany — [4]Helmholtz-Institut Jena, Jena, Germany — [5]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany

We present recent results of high harmonic generation based XUV sources driven by post compressed Yb lasers of up to 50 W average power and our next steps to scale to 500 W.

**Oral** CF-2.5 11:45 ICM - Room 1

**Recent Upgrades of ELI-ALPS High Repetition Rate Lasers** — •Imre Seres[1], Barnabás Gilicze[1], Tamás Bartyik[1], Zsolt Bengery[1], Zsolt Kovács[1], Bernát Vinkó[1], Zoltán Várallyay[1], Péter Jójárt[1], Ádám Börzsönyi[1], Evgeny Shestaev[2], Maxim Tschernajew[2], Nico Walther[2], Christian Grebing[2], Sven Breitkopf[2], Tino Eidam[2], and Jens Limpert[2] — [1]ELI-ALPS, Szeged, Hungary — [2]Active Fiber Systems GmbH, Jena, Germany

The ELI-ALPS High Repetition Rate laser laboratory provides millijoule, few-cycle pulses at 100 kHz rate. HR-2 reached 4 mJ, 6.8 fs pulses with excellent beam profile. Lasers are available through ELI ERIC user calls.

## CI-2: Space-Division Multiplexing 2

Chair: Divya Shaji, University of L'Aquila, L'Aquila, Italy

Time: Monday, 10:30–12:00 Location: ICM - Room 4a

**Oral** CI-2.1 10:30 ICM - Room 4a

**Broadband and High-Density Interposer based on Ultrafast Laser Inscribed Waveguides** — Andrew Ross-Adams[1], Michael J. Withford[1], and •Simon Gross[2] — [1]School of Mathematical and Physical Sciences, Macquarie University, Sydney, Australia — [2]School of Engineering, Macquarie University, Sydney, Australia

An ultrafast laser inscribed glass interposer is demonstrated as interface between standard optical fibres and silicon photonic inverse tapers. The interposer features coupling losses of 3.6 dB operating across 200 nm spectral bandwidth.

**Oral** CI-2.2 10:45 ICM - Room 4a

*withdrawn*

**Oral** CI-2.3 11:00 ICM - Room 4a

**All-dielectric Metasurface System for Sorting and Shaping of Orbital Angular Momentum Modes** — •Jimmy D. Tran[1], Andrei Lavrinenko[1], Toshio Morioka[1], Leif K. Oxenløwe[1], and Radu Malureanu[1,2] — [1]DTU Electro, Department of Electrical and Photonics Engineering, Technical University of Denmark, Kongens Lyngby, Denmark — [2]DTU Nanolab, National Centre for Nano Fabrication and Characterization, Technical University of Denmark, Kongens Lyngby, Denmark

A system of structured light beam shaping in free-space is proposed for spatially sorting optical modes multiplexed with orbital angular momentum (OAM) using three silicon-based metasurfaces in series.

**Oral** CI-2.4 11:15 ICM - Room 4a

**Twisted Talbot effect: Self-Imaging in Angle and Orbital Angular Momentum** — • Matias Eriksson[1], Jianqi Hu[2], Benjamin Stickler[3], Sylvain Gigan[4], and Robert Fickler[1] — [1]Physics Unit, Tampere University, Tampere, Finland — [2]Institute of Physics, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [3]Institute for Complex Quantum Systems, Ulm University, Ulm, Germany — [4]Laboratoire Kastler Brossel, 'Ecole Normale Sup'erieure - Paris Sciences et Lettres (PSL) Research University, Sorbonne Universit'e, Centre National de la Recherche Scientifique, Paris, France

We investigate the Talbot effect in azimuthal angle and orbital angular momentum degrees of freedom. We realize conversions between fields of different numbers of angular petals and the corresponding OAM combs, modulo OAM sorting, and high-order beamsplitting.

**Oral** CI-2.5 11:30 ICM - Room 4a

**Brownian-Bridge integrated Kramers-Kronig framework for Orbital Angular Momentum mode demultiplexing and demodulation in Turbulence** — •Mariam Alkhateri, Ramzil Galiev, Ravi K. Saripalli, Rashed AlBlooshi, Faheem Ahmad, and Felix Vega — Directed Energy Research Center, Technology Innovation Institute, Abu Dhabi, United Arab Emirates

Employment of Brownian-Bridge Neural Network-based Denoising Diffusion Probabilistic Model for turbulence mitigation on multiplexed orbital angular momentum modes with an integrated Kramers-Kronig framework for phase-amplitude recovery and demodulation of the multiplexed orbital angular momentum modes.

**Oral** CI-2.6 11:45 ICM - Room 4a

*withdrawn*

## EA-2: Quantum Sensing

Chair: Ralph Ernstofer, Technical University of Berlin, Berlin, Germany

Time: Monday, 10:30–12:00 Location: ICM - Room 4b

**Keynote** EA-2.1 10:30 ICM - Room 4b

**Quantum Sensor with Matter-Waves: From Lab to Field** — •Philippe Bouyer — University of Amsterdam, Amsterdam, Netherlands — Technical University Eindhoven, Eindhoven, Netherlands — Quantum Delta NL, Delft, Netherlands

Quantum sensors based on matter-wave interferometry are transitioning from laboratory experiments to real-world applications. Their unprecedented precision in gravity, acceleration, and rotation measurements enables breakthroughs in geophysics, navigation, and fundamental physics, driving next-generation technologies.

**Oral** EA-2.2 11:15 ICM - Room 4b

**Imaging Single Quantum Excitations by Light-Enhanced Electron Microscopy** — •Rotem Elimelech[1], Tomer Bucher[1], Michael Yannai[1], Ward Yahya[1], Ofer Neufeld[2], and Ido Kaminer[1] — [1]Solid State Institute, Technion, Haifa, Israel — [2]Schulich Faculty of Chemistry, Technion, Haifa, Israel

We introduce the concept of functional transmission electron microscopy (fTEM), enabling imaging of individual quantum excitations selectively activated by light. Subtracting light-on/off electron images enhances phase-contrast, distinguishing excited/ground states reconstructed by advanced computational methods.

**Oral** EA-2.3 11:30 ICM - Room 4b

**Photon Number Resolution via Multi-Photon Subtraction in a Waveguide-QED Setting** — •Abdolreza Pasharavesh[1,2], Sai Sreesh Venuturumulli[1,2], and Michal Bajcsy[1,2] — [1]Institute for Quantum Computing (IQC), University of Waterloo, Waterloo, Canada — [2]Department of Electrical and Computer Engineering, University of Waterloo, Waterloo, Canada

We demonstrate how a cascade of Λ-type emitters in a waveguide-QED setting enables photon-number-resolving detection of few-photon quantum light pulses. Our analysis includes scattering properties, generated correlations, and detector precision in both linear and nonlinear regimes.

**Oral** EA-2.4 11:45 ICM - Room 4b

**Reference-free scattering compensation for entangled photons via Schmidt number manipulation** — •Shaurya Aarav and Hugo Defienne — Sorbonne Universite, CNRS, Institut des NanoSciences de Paris, Paris, France

We measure the transmission matrix of scattering media using a low Schmidt-number two-photon beam, eliminating the need for classical reference light and enabling the transmission of high-dimensional entangled states through scatterers.

## CD-2: Integrated Nonlinear Optics 1

Chair: Vasanthan Devara, Paderborn University, Paderborn, Germany

Time: Monday, 10:30–12:00 Location: ICM - Room 13a

**Invited** CD-2.1 10:30 ICM - Room 13a

**Quantum Nonlinear Optics with Quantum Emitters** — •Peter Lodahl — Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark

We review current progress on quantum nonlinear optics with quantum dots in nanophotonic waveguides including proof-of-concept demonstrations of quantum simulations and scaling to multiple emitters.

**Oral** CD-2.2 11:00 ICM - Room 13a

**All-Optical Poling of Ultralong Silicon Nitride Spirals** — •Ozan Yakar[1], Matthieu Borello[1], Xinru Ji[2], Tobias J. Kippenberg[2], and Camille-Sophie Brès[1] — [1]École Polytechnique Fédérale de Lausanne, Photonic Systems Laboratory (PHOSL), Lausanne, Switzerland — [2]École Polytechnique Fédérale de Lausanne, Laboratory of Photonics and Quantum Measurements (LPQM), Lausanne, Switzerland

We demonstrate second-harmonic generation in meter-long silicon nitride waveguides with milliwatt level continuous-wave generated second-harmonic power and analyse the effect of spiral design on the generated second-harmonic power.

**Oral** CD-2.3 11:15 ICM - Room 13a

**Polycrystalline zinc sulfide waveguides for second order nonlinear integrated photonics.** — •Antoine Lemoine, Lise Morice, Brieg Le Corre, Antoine Létoublon, Alex Naïm, Thomas Batte, Mathieu Perrin, Charles Cornet, Yannick Dumeige, Christophe Levallois, and Yoan Léger — Univ Rennes, INSA Rennes, CNRS, Institut FOTON - UMR 6082, F-35000, RENNES, France

In this work, we investigate sputtered zinc sulfide (ZnS) as a platform for integrated second-order nonlinear optics. Structural and optical characterizations confirm strong confinement and transparency, while fabricated ZnS nanowaveguides demonstrate efficient second harmonic generation, showcasing their potential.

**Oral** CD-2.4 11:30 ICM - Room 13a

**GaN PIC for Fceo Detection at Low Pulse Energy** — •Andrea Volpini[1], Ian Rousseau[2], Christopher Bonzon[1], Steve Lecomte[1], and Davide Grassani[1] — [1]CSEM, Swiss Center for Electronics and Microtechnology, Neuchâtel, Switzerland — [2]HEXISENSE SA, Lausanne, Switzerland

GaN on PIC waveguides for $f_{ceo}$ detection are simulated, fabricated with DUV lithography and measured. Strong $f_{ceo}$ is detected down to 67 pJ pulse energy, 8 folds lower than previously shown on GaN PICs.

**Oral** CD-2.5 11:45 ICM - Room 13a

**Colloidal Self-Assembly as Templating for 3D Second-Harmonic Photonic Crystals** — •Thomas Kainz[1], Helena Weigand[2], Rachel Grange[2], Ullrich Steiner[1], and Viola Vogler-Neuling[1] — [1]Adolphe Merkle Institute and NCCR Bio-inspired Materials, University of Fribourg, Fribourg, Switzerland — [2]Institute for Quantum Electronics, Department of Physics, ETH Zürich, Zurich, Switzerland

We present fully scalable 3D nonlinear photonic crystals using colloidal self-assembly for templating and sol-gel barium titanate chemistry for replication, overcoming z-direction limitations and facilitating second-harmonic generation within a tunable photonic bandgap.

## CH-2: Multidimensional and Multispectral Imaging

Chair: Meritxell Vilaseca, Universitat Politècnica de Catalunya, Barcelona, Spain

Time: Monday, 10:30–12:00 Location: ICM - Room 14a

**Invited** CH-2.1 10:30 ICM - Room 14a

**Multidimensional Coherent Imaging Spectroscopy of Transition Metal Dichalcogenides** — •Steven Cundiff — University of Michigan, Ann Arbor, MI, USA

The combination of imaging with coherent spectroscopy is enabled by using frequency-tagged pulses within a single beam that can be rapidly raster-scanned over a sample. This capability is demonstrated on transition metal dichalcogenide samples.

**Oral** CH-2.2 11:00 ICM - Room 14a

**Broadband Hyperspectral SRS Microscopy with Fiber and Solid-state Sources for Bioimaging and Semiconductor Inspection** — •Shun Takahashi[1], Kento Kamei[1], Kenichi Oguchi[2], Kazuhiro Kuruma[2], Spencer J. Spratt[2], Hikaru Akaboshi[1], Yusuke Wakamoto[1], Takuya Maeda[1], and Yasuyuki Ozeki[1,2] — [1]Department of Electrical Engineering and Information Systems, The University of Tokyo, Tokyo, Japan — [2]Research Center for Advanced Science and Technology, The University of Tokyo, Tokyo, Japan

We present broadband hyperspectral stimulated Raman scattering microscopy covering over 2000 $cm^{-1}$ with widely tunable fiber sources. We apply it to live cell imaging and electron density visualization of a wide bandgap semiconductor.

**Oral** CH-2.3 11:15 ICM - Room 14a

**Hadamard-Multiplexed Multispectral Fluorescence Microscopy** — •Emma X. Abbey and Hans-Peter Loock — University of Victoria, Victoria, Canada

We present a system which can spatially and spectrally separate dye emulsions under a microscope using a custom built Hadamard-multiplexed visible wavelength laser diode array and an eight-channel multispectral camera.

**Oral** CH-2.4 11:30 ICM - Room 14a

**NIR Multispectral Image Fusion Technique for Epigraphic Analysis of Archaeological Finds** — Yossef Danan[1,2], Amir Shemer[1,2], Wael Abed Al-Haq[1], Orel Shlezinger[1], Ori Gleisner[2], and •Ariel Schwarz[1,2,3] — [1]Department of Electrical and Electronics Engineering, Azrieli College of Engineering, Jerusalem, Israel — [2]Archaeological Science Laboratory, Jerusalem, Israel — [3]Department of Land of Israel Studies and Archaeology, Bar-Ilan University, Ramat-Gan, Israel

An advanced near-infrared multispectral image fusion technique is used with encoder-decoder deep neural network, image processing and AI techniques for reconstruction of epigraphic characters. The method improves natural language processing tools for ancient epigraphy.

**Oral** CH-2.5 11:45 ICM - Room 14a

**Development and performance characterization of a low-cost multispectral camera** — •Steven van den Berg, Arjan Lock, Angel Schraven, and Hedde van Hoorn — The Hague University of Applied Sciences, Delft, Netherlands

We developed a low-cost multispectral imaging instrument based on LED-illumination for < 350 euro hardware cost. Performance validation by comparison to a reference spectrometer with ceramic color standards shows agreement within 3% on reflectance measurement.

# CK-2: Integrated Optical Devices 2

Chair: Amy C. Foster, Johns Hopkins University, Baltimore, USA

Time: Monday, 10:30–12:00 Location: ICM - Room 14b

**Invited** CK-2.1 10:30 ICM - Room 14b

**Subwavelength metamaterials: from on-chip devices to free-space beams** — •Robert Halir[1], Miguel Barona-Ruiz[1], Alejandro Sánchez-Sánchez[1], Laureano Moreno-Pozas[1], Jose Manuel Luque-Gonzalez[1], Carlos Pérez-Armenta[1,2], Pablo Ginel-Moreno[2], Jose de-Oliva-Rubio[1], Alejandro Sánchez-Postigo[1], J. Gonzalo Wangüemert-Pérez[1], Pavel Cheben[3], and Íñigo Molina-Fernández[1] — [1]Telecommunication Research Institute (TELMA), Universidad de Málaga, Málaga, Spain — [2]AGPHOTONICS, Málaga, Spain — [3]Quantum and Nanotechnologies Research Centre, National Research Council Canada, Ottawa, Canada

Subwavelength structures enable the synthesis of metamaterials with controllable optical properties and are widely used in integrated optics. Here we present our latest advances in the field, with special emphasis on coupling light from the chip into large, free-space beams.

**Oral** CK-2.2 11:00 ICM - Room 14b

**Experimental Demonstration of Ultra-Wideband Tapers, Splitters and Crossings with sub-0.1dB Loss Through Computationally Efficient and Data-Driven Eigenmode Expansion** — •Mehmet Can Oktay[2,3], Bahrem Serhat Danis[1], Ujal Rzayev[1], and Emir Salih Magden[1] — [1]Department of Electrical & Electronics Engineering, Koç University, 34450, Istanbul, Turkey — [2]Photonics Research Group, Department of Information Technology, Ghent University-imec, Ghent, Belgium — [3]imec, Kapeldreef 75, 3001, Leuven, Belgium

This study demonstrates ultra-wideband silicon photonic devices—tapers, splitters, and crossings—with sub-0.1dB loss, designed using a data-driven eigenmode expansion approach. The method achieves rapid, near-lossless operation, significantly reducing computational design time.

**Oral** CK-2.3 11:15 ICM - Room 14b

**Compact, Low Loss Edge Couplers for Hybrid Integration of Blue Lasers** — •Han Wang[1,2,3], Konstantinos Akritidis[1,2], Pieter Neutens[1], Mateusz Hajdel[4], Henryk Turski[4], Bart Kuyken[2], and Pol Van Dorpe[1,3] — [1]IMEC, Kapeldreef 75, Leuven, Belgium — [2]Photonics Research Group, INTEC, Ghent University - imec, Ghent, Belgium — [3]Department of Physics and Astronomy, KU Leuven, Leuven, Belgium — [4]Institute of High Pressure Physics, Polish Academy of Sciences, Sokołowska 29/37, Warsaw, Poland

We demonstrated a compact fork-shaped edge coupler for a gallium nitride laser operating at 488 nm, achieving 2.1 dB/facet coupling loss, enabling hybrid integrated blue lasers through flip-chip bonding on silicon nitride platform.

**Oral** CK-2.4 11:30 ICM - Room 14b

**Grating Couplers for interfacing Ultra-Stable Laser Resonators with Photonic Integrated Chips** — •Max Schittenhelm[1,2], Mika Gaedtke[1,2], Steffen Sauer[1,2], Sebastian Häfner[1,2], and Stefanie Kroker[1,2,3] — [1]Institute of Semiconductor Technology, Braunschweig, Germany — [2]Laboratory of Emerging Nanometrology, Braunschweig, Germany — [3]Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

We present a framework for interfacing an ultra-stable laser resonator with photonic circuits via low-noise cavity mirrors. We show initial grating coupler designs for coupling light from the chip into the resonator.

**Oral** CK-2.5 11:45 ICM - Room 14b

**Optical Wavelength Interleaver using Cross-coupled and Direct-coupled All-Pass Filters** — •Sangwoo Kim and Kyoungsik Yu — Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea

We demonstrate an integrated optical wavelength (de)interleaver using cross-coupled and direct-coupled all-pass filters within a Mach-Zehnder interferometer, achieving periodic spectral responses, thermo-optic tunability, and potential for compact, reconfigurable WDM optical communications.

# CM-2: Laser-Based Additive Manufacturing

Chair: Mangirdas Malinauskas, Laser Research Center at Vilnius University, Vilnius, Lithuania

Time: Monday, 10:30–12:00 Location: ICM - Room Osterseen

**Oral** CM-2.1 10:30 ICM - Room Osterseen

**Fabrication of a metasurface "mirror" using Multiphoton Lithography for THz applications** — •Savvas Papamakarios[1,2], Jiaruo Yan[1], Ioannis Katsantonis[1,3], Panagiotis Konstantakis[1,3], Michalis Loulakis[1], Thomas Koschny[4], Maria Farsari[1], Stelios Tzortzakis[1,3], and Maria Kafesaki[1,3] — [1]Institute of Electronic Structure and Laser, Foundation for Research and Technology Hellas (FORTH), Heraklion, Greece — [2]Department of Physics, National and Kapodistrian University of Athens, Athens, Greece — [3]University of Crete, Department of Materials Science and Engineering, Heraklion, Greece — [4]Ames laboratory and Department of Physics and astronomy, Iowa State University, Ames, Iowa, USA

In this work we propose a simple but effective meta-atom composed from two identical metallic bars vertically oriented, fabricated using multiphoton lithography, that can lead to perfect cross-polarised reflection in THz frequencies.

**Oral** CM-2.2 10:45 ICM - Room Osterseen

**Miniaturized Two-photon Lithography Platform Via Metasurface** — •Xinger Wang[1], Xuhao Fan[1], Yuncheng Liu[1], Yining Zhou[1], Zexu Zhang[1], Hui Gao[1,2], and Wei Xiong[1,2] — [1]Wuhan National Laboratory for Optoelectronics and School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan, China — [2]Optics Valley Laboratory, Hubei, China

We present a miniaturized two-photon lithography platform based on the metasurface that integrates multiple functions,which effectively addresses the challenges associated with system size, weight, and flexibility, enabling the execution of complex and valuable printing tasks.

**Oral** CM-2.3 11:00 ICM - Room Osterseen

**3D laser printing based soft lattice mechanical metamaterial microrobots** — •Mingduo Zhang[1], Yuncheng Liu[1], Hui Gao[1,2], and Wei Xiong[1,2] — [1]Huazhong University of Science and Technology, Wuhan, China — [2]Optics Valley Laboratory, Hubei, China

In this study, we propose a fabrication method for soft microrobots that utilizes lattice mechanical metamaterials to enhance both deformation amplitude and response speed, achieving efficient multimodal locomotion and autonomous navigation.

**Oral** CM-2.4 11:15 ICM - Room Osterseen

**Sub-diffractional optical lithography beyond acrylates** — Georgii Gvindzhiliia, Sourav Islam, and •Thomas A. Klar — Institute of Applied Physics, Johannes Kepler University Linz, Linz, Austria

STED-inspired sub-diffractional nanolithography was so far restricted to free radical polymerizations, predominantly of (meth)acrylates. We now expand the STED-inspired toolkit to cationic and oxidative polymerizations, comprising the technologically important classes of epoxides and pi-conjugated polymers.

**Oral** CM-2.5 11:30 ICM - Room Osterseen

**Laser printing of luminescent YAG:Ce 3D microstructures** — •Artūr Harnik[1], Robertas Virkėtis[2], Dominykas Dapšys[1], Dimitra Ladika[1], Greta Merkininkaitė[2], Simas Šakirzanovas[2], and Mangirdas Malinauskas[1] — [1]Vilnius University, Faculty of Physics, Laser Research Center, Vilnius, Lithuania — [2]Vilnius University, Faculty of Chemistry and Geosciences, Vilnius, Lithuania

YAG and YAG:Ce precursor 3D objects were produced by a femtosecond laser lithography workstation using two-photon polymerization 3D printing method for enhanced resolution. The samples were then calcinated and their luminescence was measured.

**Oral** CM-2.6 11:45 ICM - Room Osterseen

**Use of Laser-induced forward transfer technology and laser soldering in assembling optoelectronic components for photonic applications** — •Nektaria Konstantina Protopappa[1], Marina Makrygianni[1], Kritikos Iakovos-Fanourios[1], Kostas Andritsos[1], Sohrab Kamyar[2], Karol Obara[3], Milan Milosevic[3], Erik Schreuder[2], Ronald Dekker[2], and Ioanna Zergioti[1] — [1]School of Mathematical and Physical Sciences, Physics Department, National Technical University of Athens, Iroon Polytechniou 9, 15772, Athens, Greece — [2]LioniX International B.V., Hengelosestraat 500, 7521 , AN Enschede, Netherlands — [3]PHIX B.V., Hengelosestraat 525, 7521 , AG Enschede, Netherlands

Laser-induced forward transfer (LIFT) enables precise, sustainable printing for various materials, including solder pastes and thin films. This study demonstrates LIFT and laser soldering to bond optoelectronic micro-components onto photonic chips, achieving reliable electrical and mechanical connections.

## CA-2: Applications of Solid-State Lasers

Chair: Mariastefania De Vido, STFC Rutherford Appleton Laboratory, Didcot, England

Time: Monday, 10:30–12:00 Location: Hall A1 - Room A12

**Oral** CA-2.1 10:30 Hall A1 - Room A12

**Space flight representative and life time optimised UV laser engineering model for the Aeolus-2 mission** — •Dominik Esser[1], Martin Giesberts[1], Benjamin Erben[1], Sebastian Nyga[1], Raphael Kasemann[1], Matthias Winzen[1], Heinrich Faidel[1], Marco Höfer[1], Jonas Eßer[1], Witalij Wirz[1], Sarah Klein[1], Martin Traub[1], Christian Girr[1], Jürgen Klein[1], Wolfgang Brandenburg[1], Marc-Till Boldt[1], Patrick Baer[1], Jenny Knöfelt[1], Jan Heuter[1], Dominik Mohr[1], Hans-Dieter Hoffmann[1], Christian Wührer[2], Sven Hahn[2], and Lucía Pérez Prieto[2] — [1]Fraunhofer Institut f. Lasertechnik, Aachen, Germany — [2]Airbus Defence & Space GmbH, München, Germany

A lifetime-optimised UV laser with 180 mJ pulse energy at 25 ns pulse duration and 50 Hz pulse repetition frequency for space applications, meeting the Aeolus-2 requirements, has been designed and is currently assembled.

**Oral** CA-2.2 10:45 Hall A1 - Room A12

**Coherent beam combining of four semiconductor optical amplifiers for high-peak-power acousto-optic imaging** — Sylvie Janicot[1], Qin Liu[1], François Figliolia[2], François Ramaz[2], Maïmouna Bocoum[2], Patrick Georges[1], and •Gaëlle Lucas-Leclin[1] — [1]Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, Palaiseau, France — [2]ESPCI Paris, PSL University, CNRS, Institut Langevin, Paris, France

We describe a laser system using coherent-beam-combining of four TSOAs in QCW mode for improved acousto-optic imaging in highly-scattering media. The laser source achieves 13.6 W peak power and 65% combining efficiency with excellent stability.

**Oral** CA-2.3 11:00 Hall A1 - Room A12

**Wavelength Agile, Narrow-linewidth, Nanosecond, 4mJ, Hybrid Yb3+ Fiber/Bulk 1030 nm Laser for LIDAR applications** — •Antoine Zheng[1], Xavier Délen[2], Jean-Baptiste Dherbecourt[1], Myriam Raybaut[1], Jean-Michel Melkonian[1], Patrick Georges[2], and Antoine Godard[1] — [1]DPHY, ONERA, Université Paris-Saclay, PALAISEAU, France — [2]Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, PALAISEAU, France

For differential absorption LIDAR detection of greenhouse gases, one can use a tunable high energy tunable pump coupled with an OPO/OPA system. We present a tunable hybrid fibered/bulk 1030nm, 4mJ, 20kHz, narrow linewidth laser source.

**Oral** CA-2.4 11:15 Hall A1 - Room A12

**Generation of temporally incoherent and arbitrarily shaped optical pulses using Semiconductor Optical Amplifier for fusion applications** — •Loïc Meignien[1], Jean-Christophe Delagnes[3], Marc Hanna[2], Pierre Lebegue[2], Marie Froidevaux[2], Dimitris Papadopoulos[2], Frédéric Druon[2], and Patrick Audebert[2] — [1]Luli, Palaiseau, France — [2]Laboratoire Charles Fabry, Palaiseau, France — [3]CELIA, Talence, France

This work demonstrates the use of Semiconductor Optical Amplifiers (SOAs) fiber seeder to generate temporally shaped, broadband incoherent optical pulses, showcasing significant potential for inertial confinement fusion experiments and high-energy laser applications.

**Oral** CA-2.5 11:30 Hall A1 - Room A12

**Diamond sodium guide star laser pulsed at Larmor frequency** — •Xuezong Yang, Yuxiang Sun, and Yan Feng — School of Physics and Optoelectronic Engineering, Hangzhou Institute for Advanced Study, UCAS, Hangzhou, China

We demonstrate a single-frequency diamond sodium guide star laser pulsed at a repetition rate of 350 kHz with a duty cycle of 19% and a high peak power of 179 W.

**Oral** CA-2.6 11:45 Hall A1 - Room A12

**Miniaturisation of diode-pumped solid-state lasers for nonlinear-optical augmented reality** — •Goronwy Tawy, Rex H Bannerman, Glenn Churchill, James C Gates, Corin B E Gawith, and Peter G R Smith — Optoelectronics Research Centre, Southampton, United Kingdom

Near-to-eye displays enabled by nonlinear wavemixing of near-infrared laser light in a nonlinear-optical material is demonstrated using diode-pumped solid-state lasers at 1313nm, 1030nm and 946nm to generate red, green and blue displays.

## CE-2: Hollow Core Optical Fibres

Chair: Ivan Chapalo, FORTH, Heraklion, Greece

Time: Monday, 10:30–12:00 Location: Hall B1 - Room B11

**Oral** CE-2.1 10:30 Hall B1 - Room B11

**Gas Flow Modelling of Hollow-Core Optical Fibre Evacuation through Laser-Machined Channels in the Cladding** — •Peter Horak, Kavitha Srinivasan, Radan Slavik, and Natalie Wheeler — University of Southampton, Southampton, United Kingdom

We develop fluid-dynamics models of gas flow within the core of hollow-core fibres and through holes in the cladding, allowing us to optimise hole shape and spacing for efficient evacuation or pressurisation of the fibres.

**Oral** CE-2.2 10:45 Hall B1 - Room B11

**Mode counting in multimode anti-resonant hollow core fibres** — •Robbie Mears, Kerrianne Harrington, James M Stone, William J Wadsworth, and Tim A Birks — Centre for Photonics and Photonic Materials, Department of Physics, University of Bath, Bath, United Kingdom

We determine the mode content of multimode anti-resonant hollow core fibres through simple measurements of their far field distributions. The fibre with the largest core guides roughly 50 spatial modes in the near-infrared.

**Oral** CE-2.3 11:00 Hall B1 - Room B11

**Anti-resonant hollow core optical fibres for the vacuum-ultraviolet** — •Robbie Mears[1], Dmitry Vorobiev[2], Kerrianne Harrington[1], Briana Indahl[2], James M Stone[1], Brian Fleming[2], Tim A Birks[1], and William J Wadsworth[1] — [1]Centre for Photonics and Photonic Materials, Department of Physics, University of Bath, Bath, United Kingdom — [2]Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, USA

We present vacuum ultraviolet optical fibres, guiding ~140–190nm over metre lengths. The hollow optical fibres use antiresonant guidance, fabricated in lengths of 100s metres. Structural parameters tune the guided band in deep-UV and VUV.

**Oral** CE-2.4 11:15 Hall B1 - Room B11

**Identification and Investigation of the Various Contributions to Confinement Loss in Hollow-Core Tube Lattice Fibers** — •Federico Melli[1], Kostiantyn Vasko[2], Lorenzo Rosa[1], Fetah Benabid[3], and Luca Vincetti[1] — [1]Università di Modena e Reggio Emilia, Modena, Italy — [2]GLOPHOTONICS, Limoges, France — [3]XLIM, Limoges, France

We show that the confinement loss in Hollow-Core Inhibited-Coupling Fibers is set by two mechanisms, the coupling with cladding modes and the power flux through the tubes and how nested tube only reduce the latter.

**Oral** CE-2.5 11:30 Hall B1 - Room B11

**Transmission bandwidth enlargement with elliptical cladding elements in Hollow Core Inhibited Coupling Fibers** — •Federico Melli[1], Nedjem Eddine Merabet[1], Kostiantyn Vasko[2], Lorenzo Rosa[1], Fetah Benabid[3], and Luca Vincetti[1] — [1]Università di Modena e Reggio Emilia, Modena, Italy — [2]GLOPHOTONICS, Limoges, France — [3]XLIM, Limoges, France

We show how the shape transition from circular to elliptical in the cladding elements of Hollow Core Inhibited Coupling Fibers can enlarge the fiber bandwidth thank to a variation of the Core-Dielectric Modes Coupling Loss.

**Oral** CE-2.6 11:45 Hall B1 - Room B11

**Twisted Anti-Resonant Hollow-Core Fiber as a Broadband Filter for the Sign of the Topological Charge** — •Christof Helfrich[1,2], Michael H. Frosz[2], and Francesco Tani[2,3] — [1]University of Erlangen-Nürnberg, Erlangen, Germany — [2]Max Planck Institute for the Science of Light, Erlangen, Germany — [3]University of Lille, CNRS, UMR 8523 - PhLAM - Physique des Lasers Atomes et Molécules, Lille, France

We report the first single-ring hollow-core fiber that exhibits helical dichroism for different vortex modes. Our work adds a new dimension to the topic of waveguides with unique polarization properties.

## EC-1: Topologically Structured Light

Chair: Albert Amo, Laboratoire PhLAM, Villeneuve-d'Ascq, France

Time: Monday, 10:30–12:00 Location: Hall B2 - Room B21

**Keynote** EC-1.1 10:30 Hall B2 - Room B21

**Structured Light and Darkness in Nanophotonics** — •Natalia Litchinitser[1], Hooman Barati Sedeh[1], Jiannan Gao[1], Dmitrii Tsvetkov[1], Danilo Gomes Pires[1], Maria Antonietta Vincenti[2], and Michael Scalora[3] — [1]Duke University, Durham, USA — [2]University of Brescia, Brescia, Italy — [3]US Army CCDC, Redstone Arsenal, USA

We discuss theoretical and experimental generation, propagation, and light-matter interactions of "structured light and darkness," or two- and three-dimensional knotted singularities, in complex environments such as atmospheric turbulence and engineered linear and nonlinear optical media.

**Oral** EC-1.2 11:15 Hall B2 - Room B21

*withdrawn*

**Oral** EC-1.3 11:30 Hall B2 - Room B21

**Generation of Attosecond Vortex Pulse Trains** — •Alba de las Heras[1,2,3], David Schmidt[4], Julio San Román[1,2], Javier Serrano[1,2], Jonathan Barolak[4], Bojana Ivanic[4], Cameron Clarke[4], Nathaniel Westlake[4], Daniel E. Adams[4], Luis Plaja[1,2], Charles G. Durfee[4], and Carlos Hernández-García[1,2] — [1]Grupo de Investigación en Aplicaciones del Láser y Fotónica, Departamento de Física Aplicada, Universidad de Salamanca, 37008 Salamanca, Spain, Salamanca, Spain — [2]Unidad de Excelencia en Luz y Materia Estructuradas (LUMES), Universidad de Salamanca, Salamanca, Spain — [3]Max Planck Institute for the Structure and Dynamics of Matter and Center for Free-Electron Laser Science, Hamburg, Germany — [4]Department of Physics, Colorado School of Mines, Golden, USA

We demonstrate the generation of attosecond vortex pulse trains, i.e., a succession of attosecond pulses with a helical wavefront, resulting from the coherent superposition of a comb of EUV high-order harmonics with the same orbital angular momentum.

**Oral** EC-1.4 11:45 Hall B2 - Room B21

**Phase Singularity in a Complex Rice-Mele Nanolaser Array** — •Kaiwen Ji[1], Melissa Hedir[2], Ramy El-Ganainy[3], Li Ge[4], and Alejandro Yacomotti[1] — [1]Laboratoire Photonique Numérique et Nanosciences, Institut d'Optique d'Aquitaine, Université Bordeaux, CNRS, Talence, France — [2]Laboratoire des technologies de la microélectronique, Université Grenoble Alpes, Grenoble, France — [3]Department of Electrical and Computer Engineering, Saint Louis University, Saint Louis, USA — [4]Department of Physics and Astronomy, College of Staten Island, the City University of New York, New York, USA

We show that chiral modes and phase singularities can be generated at exceptional points of a four-coupled-nanolaser-ring with alternating couplings and non-uniform pumping. This can be seen as a Rice-Mele model with complex onsite potentials.

## PP-1: Early-Stage Researcher (ESR) Poster Pitches - Session 1

Chair: Valdas Pasiskevicius, Royal Institute of Technology (KTH), and the European Optical Society (EOS)

Time: Monday, 12:00–12:56 Location: ICM - Room 4a

**Poster pitch** PP-1.1 12:00 ICM - Room 4a

*Poster pitch of JSIII-P.5*

**Miniaturised optical isolators for realising micro-integrated photonic modules in quantum technology applications** — •Marcel Bursy[1], Ahmad Bawamia[1], Thomas Flisgen[1,2], Nora Goossen-Schmidt[1], Charleen Luplow[1], Max Schiemangk[1], Christoph Tyborski[1,3], and Andreas Wicht[1] — [1]Ferdinand-Braun-Institut (FBH), Berlin, Germany — [2]Fachgebiet Theoretische Elektrotechnik, Brandenburgische Technische Universität Cottbus-Senftenberg, Cottbus, Germany — [3]CryLaS Crystal Laser Systems GmbH, Berlin, Germany

To realise our next-generation laser modules and our new light control units, we have developed a technology platform for ultra-compact optical isolators covering the entire desired wavelength range between 400 and 950 nm.

**Poster pitch** PP-1.2 12:04 ICM - Room 4a

*Poster pitch of JSIII-P.1*

**Modelling and fabrication of gallium nitride lasers for atomic clocks** — •Shuqiao Cai[1], Finlay Walton[1], Daehyun Kim[1], Simon Munro[1], Sean Mulholland[2], Ian Hill[2], Stephen P. Najda[3], Piotr Perlin[3,4], Tadek Suski[3,4], Lucja Marona[3,4], Mike Leszczynski[3,4], Szymon Stanczyk[3,4], Patrick Gill[2], Anthony E. Kelly[1], and Scott Watson[1] — [1]James Watt School of Engineering, University of Glasgow, Glasgow, United Kingdom — [2]National Physical Laboratory, Teddington, United Kingdom — [3]TopGaN Ltd, Warsaw, Poland — [4]Institute of High Pressure Physics PAS, Warsaw, Poland

This work explores the design and fabrication of gallium nitride distributed feedback lasers which can be used as compact, narrow line width sources for the cooling transitions in optical atomic clocks.

**Poster pitch** PP-1.3 12:08 ICM - Room 4a

*Poster pitch of CD-P.28*

**Rb two-photon transition in a rubidium chipcell for SBS microcomb stabilization** — •Kyung Bin Park[1], Hyun-Gue Hong[2], Jongcheol Park[3], Jae Hoon Lee[1,2], and Hansuek Lee[1,4] — [1]Department of Quantum Science and Technology, Korea Advanced Institute of Science and Technology, Daejeon, South Korea — [2]Korea Research Institute of Standards and Science , Daejeon, South Korea — [3]Nanostructure Application Team, National NanoFab Center, Daejeon, South Korea — [4]Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon, South Korea

We developed an Rb chip cell to utilize its two-photon transitions for stabilizing a turnkey Brilloun soliton microcomb. Doppler-free spectroscopy with a 1.52 MHz linewidth has been achieved, enabling the utilization of atomic accuracy for this miniaturized time precision platform.

**Poster pitch** PP-1.4 12:12 ICM - Room 4a

*Poster pitch of CB-P.4*

**Birefringence-induced polarization dynamics in multimode spin-VCSEL** — •Uliana Diiankova[1], Tobias Pusch[2], Rainer Michalzik[2], Mariusz Drong[3], Markus Lindemann[1], Nils C. Gerhardt[1], and Martin R. Hofmann[1] — [1]Ruhr-University Bochum, Bochum, Germany — [2]Ulm University, Ulm, Germany — [3]University of California, Berkeley, Berkeley, USA

We observed polarization oscillations in a spin-VCSEL emitting in several transverse modes. This could represent a novel approach to overcoming the bandwidth limitation, an important step for advancing short-reach communication networks.

**Poster pitch** PP-1.5 12:16 ICM - Room 4a

*Poster pitch of CB-P.1*

**Low-Power Optical Injection into Suppressed Longitudinal Modes for Wideband Optical Frequency Comb Generation in Gain-Switched Discrete Mode Lasers** — •Daniel Plaza-Vas[1,2,3], María Duque Gijón[4], Cristina Masoller[4], Jordi Tiana-Alsina[5], Ángel Valle[3], Nathalie Vermeulen[1], and Ana Quirce[1,3] — [1]Brussels Photonics (B-PHOT), Department of Applied Physics and Photonics, Vrije Universiteit Brussel (VUB), Brussels, Belgium — [2]Departamento de Física Moderna, Universidad de Cantabria (UC), Santander, Spain — [3]Instituto de Física de Cantabria (IFCA), Universidad de Cantabria (UC-CSIC), Santander, Spain — [4]Department de Fisica, Universitat Politecnica de Catalunya, Terrassa, Spain — [5]Department de Física Aplicada, Facultat de Física, Universitat de Barcelona, Barcelona, Spain

We demonstrate tunable single- and dual-frequency comb generation in gain-switched discrete-mode lasers via low-power optical injection into suppressed longitudinal modes, achieving high-quality combs over a 4 THz range with modulation-frequency-dependent behavior.

**Poster pitch** PP-1.6 12:20 ICM - Room 4a

*Poster pitch of CE-P.16*

**Nanoscale X-Ray Tomography of fs-Laser-Written Integrated Photonics** — •Karo Becker[1], Dmitry Karpov[2], Matthias Heinrich[1], Alexander Szameit[1], Pepijn W. H. Pinkse[3], and Tom A. W. Wolterink[1] — [1]Institute of Physics, University of Rostock, Rostock, Germany — [2]European Synchrotron Radiation Facility, Grenoble, France — [3]MESA+ Institute for Nanotechnology, University of Twente, Enschede, Netherlands

We use x-ray tomography to reconstruct 3D nanoscale density profiles of fs-laser-written integrated photonic structures. Our results show that this method can resolve even extremely low-contrast optical waveguides and enables imaging inside nanophotonic structures.

**Poster pitch** PP-1.7 12:24 ICM - Room 4a

*Poster pitch of CK-P.2*

**Optical switching between resonant wavelengths of a Gallium Phosphide (GaP) cavity** — •Daniela Satián-Guamán, Laura Mercadé, Maria Morant, Paula Mouriño, Víctor J. Gómez, Alejandro Martínez, and Roberto Llorente — Universitat Politècnica de València, Valencia, Spain

Gallium phosphide optomechanical cavities with dual resonances enable optical switching: pumping one resonance causes a non-linear wavelength shift in the other resonance in the opposite direction of the optical spectrum compared with the thermo-optical effect.

**Poster pitch** PP-1.8 12:28 ICM - Room 4a

*withdrawn*

**Poster pitch** PP-1.9 12:32 ICM - Room 4a

*Poster pitch of JSIII-P.6*

**Comparison of Laser-Induced Bulk Modifications in Glass by Femtosecond Pulses Using Single Pulses, MHz- and GHz-Bursts** — •Manon Lafargue[1,2], Théo Guilberteau[1,3], Pierre Balage[1], Bastien Gavory[2], John Lopez[1], and Inka Manek-Hönninger[1] — [1]Université de Bordeaux - CNRS - CEA, Talence, France — [2]Amplitude, Pessac, France — [3]ALPhANOV, Talence, France

We investigated bulk modifications induced by laser irradiation in single-pulse, MHz-, and GHz-burst regimes. Classification of these modifications enabled us to define processing windows for transparent glass welding for various pulse energies and scanning speeds.

**Poster pitch** PP-1.10 12:36 ICM - Room 4a

*withdrawn*

**Poster pitch** PP-1.11 12:40 ICM - Room 4a

*Poster pitch of EJ-P.2*

**Spontaneous Emission from Electronic Resonance States: Non-Hermitian Quantum Mechanical Treatment** — •Amir Sivan[1,2], Meir Orenstein[1,2], Milan Šindelka[2,3,4], and Nimrod Moiseyev[4,5] — [1]Andrew and Erna Viterbi department of Electrical & Computer Engineering, Technion-Israel Institute of Technology, Haifa, Israel — [2]Helen Diller Quantum Center, Technion-Israel Institute of Technology, Haifa, Israel — [3]Department of Chemistry, Guangdong Technion Israel Institute of Technology, Shantou, China — [4]Schulich Faculty of Chemistry, Technion – Israel Institute of Technology, Haifa, Israel — [5]Faculty of Physics, Technion – Israel Institute of Technology, Haifa, Israel

We extend the theory of light-matter interactions by deriving spontaneous emission from resonance quantum states. The generalized Fermi golden rule reveals a complex relationship between photon lifetime and intrinsic resonance decay.

**Poster pitch** PP-1.12 12:44 ICM - Room 4a

*Poster pitch of EH-P.4*

**Chiral-absorber planar metasurface made by rotation of simple achiral meta-atoms** — •Dmytro Gryb[1], Alexander Antonov[1], Andreas Tittl[1], and Leonardo de S. Menezes[1,2] — [1]Chair in Hybrid Nanosystems, Faculty of Physics, Ludwig Maximilians-University Munich, Munich, Germany — [2]Departamento de Física, Universidade Federal de Pernambuco, Recife, Brazil

This study examines a planar chiral metasurface made of amorphous silicon achiral nanorods deposited on a gold mirror, selectively reflecting one circular polarized light and absorbing the opposite polarization with minimal cross-conversion.

**Poster pitch** PP-1.13 12:48 ICM - Room 4a

*Poster pitch of EF-P.21*

**Dark-fringe interferometry for infrared sensing** — •Malo Briend and Lucile Rutkowski — Univ Rennes, CNRS, IPR (Institut de Physique de Rennes)-UMR 6251, Rennes, France

We present dark-fringe spectroscopy using an optical frequency comb and a mechanical Fourier transform spectrometer. We performed proof-of-concept experiments on a fused-silica etalon and preliminary tests on molecular detection.

**Poster pitch** PP-1.14 12:52 ICM - Room 4a

*Poster pitch of CD-P.32*

**Developing Zn-indiffused MgO-doped PPLN ridge waveguides for Type-II telecom photon pair production** — •Peter Iveson[1], Goronwy Tawy[1], Glenn M Churchill[1], Paolo L Mennea[1], Rex H S Bannerman[1], Lewis D Wright[2], Peter G R Smith[1], James C Gates[1], and Corin B E Gawith[1,2] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]Covesion Ltd., Southampton, United Kingdom

We present our latest work in Type II SPDC at telecom wavelengths in ductile-diced ridge waveguides in zinc-indiffused magnesium-doped lithium niobate. Emphasis will be placed on fabrication conditions for low-loss modes matched to standard fibres.

## CF-3: Pulse Measurement Techniques and Devices

Chair: Phillip D. Keathley, Massachusetts Institute of Technology, Cambridge, USA

Time: Monday, 14:00–15:30 Location: ICM - Room 1

**Invited** CF-3.1 14:00 ICM - Room 1

**Full characterization of few-fs pulses tunable in the vacuum ultraviolet** — José R. C. Andrade, Martin Kretschmar, Rostyslav Danylo, Stefanos Carlström, Tobias Witting, Alexandre Mermillod-Blondin, Serguei Patchkovskii, Misha Yu Ivanov, Marc J. J. Vrakking, Arnaud Rouzée, and •Tamas Nagy — Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany

We generate above-$\mu$J resonant dispersive-wave pulses in a capillary tuned across the vacuum ultraviolet. The sub-3-fs pulses are fully characterized by an electron-FROG apparatus, which is also used for exploring electron dynamics in small molecules.

**Oral** CF-3.2 14:30 ICM - Room 1

**Single-Pulse Phase Spectrum Measurement of Femtosecond Mid-infrared Pulses at 50 MHz** — •Zhihao Deng[1], Gabriel Demontigny[2], Denis Seletskiy[2], and Takuro Ideguchi[1,3] — [1]Department of Physics, The University of Tokyo, Tokyo, Japan — [2]femtoQ Laboratory, Department of Engineering Physics, Polytechnique Montre´al, Que´bec, Canada — [3]Institute for Photon Science and Technology, The University of Tokyo, Tokyo, Japan

The spectral phase is essential for characterizing ultrashort pulses. We present a method to measure the phase spectra of mid-infrared pulses on a single-pulse basis using upconversion time-stretch infrared spectroscopy and linear interferometry.

**Oral** CF-3.3 14:45 ICM - Room 1

**A Technique for the Characterization of the Time-Dependent Polarization State of Few-Cycle Laser Pulses: D-TURTLE** — Óscar Pérez-Benito and •Rosa Weigand — Department of Optics, Faculty of Physics, University Complutense de Madrid, Plaza de Ciencias 1, 28040, Madrid, Spain

D-TURTLE is a self-referenced inline technique combining d-scan and TURTLE for precise and unambiguous characterization of the polarization state of few-cycle pulses. It determines relative temporal phase, ellipticity and handedness, validated via simulations and experiments.

**Oral** CF-3.4 15:00 ICM - Room 1

**A-swing ptychographic retrieval of scalar and vector ultrashort pulses** — •Cristian Barbero[1], Iñigo Sola[1,2], Enrique García-García[1,2,3], Cruz Méndez[2,3], and Benjamín Alonso[1,2] — [1]Grupo de Investigación en Aplicaciones del Láser y Fotónica (ALF), Salamanca, Spain — [2]Unidad de Excelencia en Luz y Materia Estructuradas (LUMES), Salamanca, Spain — [3]Centro de Laseres Pulsados (CLPU), Salamanca, Spain

We present a fast and robust ptychographic algorithm to retrieve scalar and vector pulses from the different amplitude swing (a-swing) implementations, improving the a-swing capabilities and making the temporal and polarization characterization simple and versatile.

**Oral** CF-3.5 15:15 ICM - Room 1

**Spatio-temporal characterization of few-cycle laser pulses in the mid-infrared** — •Roland Sándor Nagymihály[1], Bálint Kiss[1], Miguel Miranda[2], Matias Charrut[2], Paulo T. Guerreiro[2], Levente Lehotai[1], Rajaram Shrestha[1], Eric Cormier[1,3], and Rosa Romero[2] — [1]ELI ERIC, ALPS Facility, Szeged, Hungary — [2]Sphere Ultrafast Photonics, Porot, Portugal — [3]Laboratoire Photonique Numérique et Nanosciences (LP2N), UMR 5298, CNRS-IOGS-Université Bordeaux, Bordeaux, France

Spatio-temporal characterization of four-cycle 3.2 $\mu$m laser pulses was performed by using spatially resolved Fourier-transform spectroscopy and tunneling ionization based temporal characterization, for the first time. Extension to the single-cycle regime is on the way.

## CK-3: Lithium Based Devices

Chair: Maximilien Billet, Ghent University, Zwijnaarde, Belgium

Time: Monday, 14:00–15:30 Location: ICM - Room 4a

**Oral** CK-3.1 14:00 ICM - Room 4a

**Frequency Conversion in Periodically Poled Thin-Film Lithium Tantalate Photonic Integrated Circuits** — •Nikolai Kuznetsov[1], Zihan Li[1], Chengli Wang[1], and Tobias J. Kippenberg[1,2] — [1]Institute of Physics, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [2]Institute of Electrical and Micro Engineering (IEM) Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland

We demonstrate, for the first time, periodically poled thin-film lithium tantalate waveguides capable of second-order nonlinear frequency conversion. We show that the poling process does not require MgO doping to reduce the coercive field.

**Oral** CK-3.2 14:15 ICM - Room 4a

**Spontaneous parametric down-conversion photon pair generation in a small footprint X-cut periodic poled lithium niobate micro-resonator** — •HYEON HWANG[1], Woojin Noh[1], Mahamad Reza Nurrahman[1], Guhwan Kim[2], Kiwon Moon[2], Jung Jin Ju[2], Hansuek Lee[1], and Min-Kyo Seo[1] — [1]Korea Advanced Institute of Science and Technology, daejeon, South Korea — [2]Electronics and Telecommunications Research Institute, daejeon, South Korea

We demonstrate compact SPDC photon pair generation in an X-cut PPLN racetrack resonator with a 0.614 nm FSR. Achieving 62.73 kHz/$\mu$W brightness, the device supports fast, reconfigurable quantum information processing applications.

**Oral** CK-3.3 14:30 ICM - Room 4a

**The piezoelectric influence on adiabatic frequency conversion in lithium niobate whispering gallery resonators** — •Alexander Mrokon[1], Dongsung Shin[1], Karsten Buse[1,2], and Ingo Breunig[1,2] — [1]Laboratory for Optical Systems, Department of Microsystems Engineering - IMTEK, University of Freiburg, D-79110 Freiburg, Germany — [2]Fraunhofer Institute for Physical Measurement Techniques IPM, D-79110 Freiburg, Germany

Acoustic eigenfrequencies in lithium niobate shape the electro-optic response in adiabatic frequency conversion. Linearity and performance for advanced photonic applications are maintained by engineering whispering gallery resonator geometry.

**Oral** CK-3.4 14:45 ICM - Room 4a

**Signal Boosting in Plasmonic Waveguides by Interdigital Transducer-Generated Surface Acoustic Waves** — •. Rohit[1], Kuntal Barman[1], Liang-Yun Lee[1], Cheng-Yi Cheng[1], and Jiang-Jang Huang[1,2] — [1]Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taipei City, Taiwan — [2]Department of Electrical Engineering, National Taiwan University, Taipei City, Taiwan

This study demonstrates signal amplification in plasmonic waveguides using surface acoustic waves (SAWs) generated by interdigital transducers. SAW-modulated plasmon-phonon interactions enhance plasmonic intensity, achieving 1.08 dB gain, enabling applications in biosensors and long-distance plasmonic devices.

**Oral** CK-3.5 15:00 ICM - Room 4a

**Enhanced Supercontinuum spectral broadening in thin film lithium niobate tapered waveguides** — •Pierre Demongodin[1], Yesim Koyaz[1], Christian Lafforgue[1], Homa Zarebidaki[2], Davide Grassani[2], Hamed Sattari[2], and Camille-Sophie Brès[1] — [1]E'cole Polytechnique Fe'de'rale de Lausanne, Photonic Systems Laboratory (PHOSL), STI-IEM, Station 11,, Lausanne, Switzerland — [2]CSEM Neuchatel, Rue Jaquet-Droz 1, Neuchatel, Switzerland

Using thin-film Lithium Niobate waveguides, we demonstrate that supercontinuum generation can be enhanced by varying the waveguide width along the propagation. This design enables continuous dispersion tuning and a broader spectrum compared to fixed-width designs.

**Oral** CK-3.6 15:15 ICM - Room 4a

**Grating-based polarization conversion and mode hybridization in LiNbO3 nanophotonic waveguides** — •Tiantong Li and Katia Gallo — KTH, Royal Institute of Technology, Stockholm, Sweden

We demonstrate polarization conversion at telecom wavelength between TE00 and TM00 modes in integrated Bragg gratings implemented in thin film lithium niobate, measuring 120pm Rabi splitting and 16pm linewidths with our grating-based devices.

## EA-3: Quantum Measurement and Tomography

Chair: Giulia Ferrini, Chalmers, Gothenburg, Sweden

Time: Monday, 14:00–15:30 Location: ICM - Room 4b

**Invited** EA-3.1 14:00 ICM - Room 4b

**Estimation of time and frequency parameters with frequency entangled photons** — •Nicolas Fabre[1], Eloi Descamps[2], Simone Felicetti[3], Arne Keller[2], and Pérola Milman[2] — [1]Telecom Paris, Institut Polytechnique de Paris, Palaiseau, France — [2] Université Paris Cité, CNRS, Laboratoire Matériaux et Phéomènes Quantiques, Paris, France — [3]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche (CNR-IFN), Via Cineto Romano 42, I-00156, Rome, Italy

We analyze how engineering spectral distributions of n-entangled photon states improves metrological precision for estimating time and frequency parameters, highlighting the performance of grid states.

**Oral** EA-3.2 14:30 ICM - Room 4b

**Mode-Selective Photon Subtraction via Time-to-Frequency Mapping for Multimode Entangled States** — •Bastien Oriot, Peter Namdar, David Fainsin, Leonardo Rincon Celis, Nicolas Treps, and Valentina Parigi — Laboratoire Kastler Brossel, Sorbonne Université, ENS-Université PSL, CNRS, Collège de France, Paris, France

We study experimental mode-selective photon subtraction on multimode squeezed states by mapping heralding frequency modes into time modes using a dispersive fibre. We analyse the non-Gaussian properties of different involved modes in the obtained state.

**Oral** EA-3.3 14:45 ICM - Room 4b

**Experimental quantum state tomography of multimode Gaussian states** — •Chan Roh, Geunhee Gwak, Young-Do Yoon, and Young-Sik Ra — Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon, South Korea

We report a quantum state tomography method that reliably reconstructs covariance matrices of multimode Gaussian states. Our method is free from non-physical results and exhibits higher reconstruction fidelity than the conventional method.

**Oral** EA-3.4 15:00 ICM - Room 4b

**Fourier state tomography of quantum light** — •Pierre Brosseau[1,2,3], Mohammed Alqedra[2], Anton Vetlugin[1], Val Zwiller[2], and Cesare Soci[1] — [1]Centre for Disruptive Photonics Technologies, SPMS, TPI, Nanyang technological University, Singapore, Singapore — [2]KTH Royal Institute of Technology, Department of Applied Physics, Stockholm, Sweden — [3]School of Physical and Mathematical Sciences, Interdisciplinary Graduate Programme, Nanyang technological University, Singapore, Singapore

We report the first Fourier tomography experimental demonstration for single-photon and photon-pair polarization states. Fourier tomography requires fewer components, simplifying alignment and scalability. We explore implications for practical state characterization and applications in quantum technologies.

**Oral** EA-3.5 15:15 ICM - Room 4b

**Die-level balanced homodyne receiver for squeezed light detection in the GHz regime** — •Emmily Zaiser[1], Alessandro Trenti[1], Dinka Milovancev[1], Christoph Gasser[2], Horst Zimmermann[1], and Hannes Hübel[1] — [1] AIT Austrian Institute of Technology, Vienna, Austria — [2]Technical University of Vienna, Vienna, Austria

We present a die-level balanced homodyne receiver, consisting of two fiber-coupled commercially available photodiodes wire-bonded to a low-noise high-speed custom transimpedance amplifier, suitable for quantum applications, in particular squeezed light detection

## ED-1: Precision Metrology for Fundamental Science 1

Chair: Oliver Heckl, University of Vienna, Vienna, Austria

Time: Monday, 14:00–15:30 Location: ICM - Room 13a

**Keynote** ED-1.1 14:00 ICM - Room 13a

**Quantum science, clocks, and fundamental physics** — •Jun Ye Jun Ye — JILA, Boulder, USA

Quantum technology has brought many thousands of atoms to coherence times of minutes. It is now knocking on the door of nuclear physics, heralded by the recent breakthrough of quantum-state-resolved laser spectroscopy of thorium-229 nuclear transition.

**Oral** ED-1.2 14:45 ICM - Room 13a

**Cavity-enhanced spectroscopy of $H_2$ in a deep cryogenic regime** — Kamil Stankiewicz, Marcin Makowski, Michał Słowiński, Kamil L. Sołtys, •Bogdan Bednarski, Hubert Jóźwiak, Nikodem Stolarczyk, Mateusz Narożnik, Dariusz Kierski, Szymon Wójtewicz, Agata Cygan, Grzegorz Kowzan, Piotr Masłowski, Mariusz Piwiński, Daniel Lisak, and Piotr Wcisło — Institute of Physics, Faculty of Physics, Astronomy and Informatics, Nicolaus Copernicus University in Torun, Torun, Poland

We present the first cavity-enhanced spectrometer operating at 4 K, enabling high-precision spectroscopy of $H_2$. Novel capabilities include complete cavity cooling, ortho-para isomer analysis, triple-point measurement, and detailed evaluation of $H_2$ thermodynamic properties in cryogenics.

**Oral** ED-1.3 15:00 ICM - Room 13a

**Comb-based spectroscopic gas temperature measurement in the mid-infrared range** — Yu-Rong Xu[1,2], Akiko Nishiyama[3], Grzegorz Kowzan[1], Szymon Wojtewicz[1], Katarzyna Bielska[1], Shui-Ming Hu[2], •Piotr Maslowski[1], and Daniel Lisak[1] — [1]Institute of Physics, Faculty of Physics, Astronomy and Informatics, Nicolaus Copernicus University in Torun, Torun, Poland — [2]Department of Chemical Physics, University of Science and Technology of China, Hefei, China — [3]National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan

We report a spectroscopic gas sample temperature measurement with an optical frequency comb in the mid-infrared by rotational line intensity ratio thermometry. Statistical uncertainty of temperature determination based on CO line ratios is 137 mK.

**Oral** ED-1.4 15:15 ICM - Room 13a

**Cavity-Enhanced Comb-Based Double-Resonance Spectroscopy of High Rotational Energy Levels in the 9070-9370 cm-1 Range of Methane** — Adrian Hjältén[1], Vinicius Silva de Oliveira[1], Isak Silander[1], Andrea Rosina[1], Michael Rey[2], Lucile Rutkowski[3], Grzegorz Soboń[4], Kevin K. Lehmann[5], and •Aleksandra Foltynowicz[1] — [1]Department of Physics, Umeå University, Umeå, Sweden — [2]Groupe de Spectrométrie Moléculaire et Atmosphérique, UMR CNRS 7331, Reims Cedex, France — [3]Université de Rennes, CNRS, IPR (Institut de Physique de Rennes)-UMR 6251, Rennes, France — [4]Faculty of Electronics, Photonics and Microsystems, Wrocław University of Science and Technology, Wrocław, Poland — [5]Departments of Chemistry & Physics, University of Virginia, Charlottesville, USA

We use double-resonance spectroscopy with a 3.3 $\mu$m continuous wave pump and a 1.68 $\mu$m-centered comb probe to measure hot-band transitions in methane reaching rotational levels with J>4, and we assign them using new accurate ab initio effective Hamiltonian predictions.

## CJ-2: Pulsed Fiber Sources 2

Chair: William Kerridge-Johns, University of Southampton, Southampton, United Kingdom

Time: Monday, 14:00–15:30 Location: ICM - Room 13b

**Oral** CJ-2.1 14:00 ICM - Room 13b

**Kilowatt Average Powers from a Nanosecond, Polarization Maintaining, Large Mode Area Yb Fiber Amplifier** — Erin S. Lamb[1], Jose Pincha[1], Ishu Goel[1], Robert S. Windeler[1], Simona Ovtar[2], Vasiliy Lukonin[1], Ian Sun[1], Shantanu Pandit[1], and •Jeffrey W. Nicholson[1] — [1]OFS Laboratories , Somerset, NJ, USA — [2]OFS Fitel, Priorparken, Denmark

We demonstrate 0.5 mJ,7.2 ns pulses at average powers of 1 kW from a polarization maintaining Yb-30/400 fiber amplifier. High higher-order mode loss supports diffraction limited output with a mode field diameter of 26 um.

**Oral** CJ-2.2 14:15 ICM - Room 13b

**Yb-fiber nonlinear ultrafast amplifier seeded at different wavelengths** — Sara Pizzurro[1], •Riccardo Gotti[1], Francesco Canella[2], Dario Giannotti[3], Gianluca Galzerano[2], Antonio Agnesi[1], and Federico Pirzio[1] — [1]Dipartimento di Ingegneria Industriale e dell'Informazione, Università di Pavia, Pavia, Italy — [2]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche, Milano, Italy — [3]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy

We present a Yb-doped gain-managed nonlinear fiber amplifier seeded at different wavelengths in the range 1040-1064 nm by a Mamyshev oscillator. After compression, we obtained 130-nJ, 30-fs, almost pedestal-free pulses with very good noise performance.

**Oral** CJ-2.3 14:30 ICM - Room 13b

**Ytterbium Hybrid Fiber/Bulk 343-nm Laser System for High Altitude Wind Lidar Measurements** — Jonathan Pouillaude[1], •Pierre Pichon[1], Xavier Délen[2], Patrick Georges[2], and Laurent Lombard[1] — [1]DOTA, ONERA, Université Paris Saclay, Palaiseau, France — [2]Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, Palaiseau, France

1030-nm pulses (40kHz, 25ns) with a frequency comb spectral shape (10 lines, 10GHz FSR) are amplified in Yb-doped LMA fibers and Yb:YAG for UV high altitude wind lidar applications.

**Oral** CJ-2.4 14:45 ICM - Room 13b

**Femtosecond Optical Vortices Generation from an All-Fiber Amplifier** — Hao He[1,2], Weijia Luo[1,2], Jiajie Chen[1,2], •Shan Wang[1,2], Di Lin[1,2], Songnian Fu[1,2], and Yuwen Qin[1,2] — [1]Institute of Advanced Photonics Technology, School of Information Engineering, Guangdong University of Technology, Guangzhou, China — [2]Key Laboratory of Photonic Technology for Integrated Sensing and Communication, Ministry of Education of China, Guangdong University of Technology, Guangzhou, China

We demonstrate the amplification of optical vortex pulses from an all-fiber amplifier, achieving 26 W average output power, 1.38 $\mu$J pulse energy, compressible to 200 fs with a peak power of 2.9 MW.

**Oral** CJ-2.5 15:00 ICM - Room 13b

**All-PM Fiber System Based on Soliton Self-frequency Shift for Ho:YLF Amplifier Seeding** — •Lea Schlotmann[1], Frithjof Haxsen[1], Jörg Neumann[1,2], and Dietmar Kracht[1,2,3] — [1]Laser Zentrum Hannover e.V., Hannover, Germany — [2]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering Innovation Across Disciplines), Hannover, Germany — [3]Leibniz University Hannover, Institute of Photonics, Hannover, Germany

We present an all-PM thulium-fiber system for femtosecond pulse generation, based on the soliton self-frequency shift. The system consists of a soliton oscillator and a single-stage amplifier and is designed for Ho:YLF amplifier seeding.

**Oral** CJ-2.6 15:15 ICM - Room 13b

**Repetition Rate and Wavelength Flexible Femtosecond Laser Pulse Generation Based on Nonlinear Optical Gain Modulation** — Zhi Cheng[1,2,3], •Jiaqi Zhou[1,2,3], and Yan Feng[3,4] — [1]Wangzhijiang Innovation Center for Laser, Aerospace Laser Technology and System Department, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [2]Key Laboratory of Space Laser Communication and Detection Technology, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [3]Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, Beijing, China — [4]Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences, Hangzhou, China

We demonstrate a new method to generate femtosecond Raman pulses with repetition-rate tuning from 1 MHz to 150 MHz continuously. The Raman pulse energy could be amplified to over 1 $\mu$J.

## CH-3: Fiber Grating Sensors

Chair: F. Costache, Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany

Time: Monday, 14:00–15:30 Location: ICM - Room 14a

**Oral** CH-3.1 14:00 ICM - Room 14a

**Using speckle suppression approach for improving interrogation of step-index, multimode optical fiber Bragg gratings** — •Ivan Chapalo[1], Andreas Ioannou[2], Vasilis Sarakatsianos[1], Kyriacos Kalli[2], and Stavros Pissadakis[1] — [1]Institute of Electronic Structure and Laser (IESL), Foundation for Research and Technology - Hellas (FORTH), Heraklion, Greece — [2]Photonics and Optical Sensor Research Laboratory, Cyprus University of Technology, Limassol, Cyprus

We experimentally investigate the use of extended length of step-index multimode fiber for stabilization the reflection spectrum of step-index fiber Bragg gratings. Up to 5x times reduction of spectral components instabilities is demonstrated.

**Oral** CH-3.2 14:15 ICM - Room 14a

**Fibre Vector Bend Sensor Based on Femtosecond Laser-written Integrated Optical Coupler with Bragg Gratings** — Anastasiia Koidan[1,2], Timothy Lee[1], Robert Thomson[2], Gilberto Brambilla[1], and •Martynas Beresna[1] — [1]University of Southampton, Southampton, United Kingdom — [2]Heriot-Watt University, Edinburgh, United Kingdom

We demonstrate a fully vectorial bend sensor based on a coupler with gratings in each arm integrated within coreless fibre by femtosecond laser writing, which benefits from high sensitivity, simple fabrication and can be cascaded.

**Oral** CH-3.3 14:30 ICM - Room 14a

**Temperature-insensitive Fibre Bragg Grating** — •Zipei Song, Mohan Wang, Frank P. Payne, Patrick S. Salter, Tongyu Liu, Steve J. Elston, Martin J. Booth, Stephen M. Morris, and Julian A. J. Fells — Department of Engineering Science, University of Oxford, Oxford, United Kingdom

Fibre Bragg Gratings (FBGs) are intrinsically temperature-sensitive. A temperature-insensitive FBG is fabricated, showing only +/-12.5 pm wavelength variation and +/-3% reflectivity variation over a temperature range of 17-45°C. It has only 1.29 dB loss.

**Oral** CH-3.4 14:45 ICM - Room 14a

**Tilted FBG Sensing in Microfluidic Chips Through Spectral Discretization** — Lucero Hernandez-Cedillo[1], Ander Zornoza[2], Joseba Zubia[1], and •Joel Villatoro[1,3] — [1]Department of Communications Engineering, University of the Basque Country UPV/EHU, 48013, Bilbao, Spain — [2]Department of Applied Mathematics, University of the Basque Country UPV/EHU, 48013, Bilbao, Spain — [3]IKERBASQUE, Basque Foundation for Science, 48011, Bilbao, Spain

Sensing with TFBGs in microfluidic chips though discretization of the spectral comb is proposed. Changes of the TFBG spectrum are converted in binary codes ("0" and "1") that can be correlated with refractive index changes.

**Oral** CH-3.5 15:00 ICM - Room 14a

**Multichannel Chromatic Dispersion Measurement Using Long-Period Fibre Gratings : tests of Wine Fermentation Monitoring.** — Thomas Allsop[1], Andreas Ioannou[2], Kyriacos Kalli[2], Evelyne Aguera[3], Alain Samson[3], Peggy Riggou[4], and •Bernard Dussardier[5] — [1]Aston Institute of Photonic Technologies, Aston University, Birmingham, United Kingdom — [2]Cyprus University of Technology, PhOSLab, Cyprus, Greece — [3] INRAE, UE999 Pech Rouge, Gruissan, France — [4]SPO, Université de Montpellier, INRAE, Institut Agro, Montpellier, France — [5]Université Côte d'Azur, CNRS, Institut de Physique de Nice (INPHYNI), Nice, France

The chromatic dispersion of models of fermented grape must was studied using a 9-channels long-pitch grating fibre sensor. It promises potentials of a conceptual on-line fermentation monitor tool for the liquid beverage industry.

**Oral** CH-3.6 15:15 ICM - Room 14a

**Next-generation photonic integrated interrogators for accurate vital signs monitoring** — •Aleksandra Bieniek-Kaczorek[1], Stanisław Stopiński[1,2,3], Krzysztof Anders[1,2,3], Krzysztof Wojtiuk[1], and Ryszard Piramidowicz[1,2,3] — [1]Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, Warsaw, Poland — [2]LightHouse Sp. z o.o, Lublin, Poland — [3]VIGO Photonics S.A., Ożarów Mazowiecki, Poland

The work presents a novel photonic integrated interrogator of FBGs based on an asymmetric Mach-Zehnder interferometer for vital signs monitoring. The architecture, combined with signal analysis, confirmed enhanced sensitivity and reduced measurement noise.

## EH-1: Metasurfaces Dispersion Engineering

Chair: Andrei Lavrinenko, Technical University of Denmark, Kongens Lyngby, Denmark

Time: Monday, 14:00–15:30 Location: ICM - Room 14b

**Tutorial** EH-1.1 14:00 ICM - Room 14b

**Nonlocal metasurfaces** — •Andrea Alù Alù — City University of New York, New York, USA

In this tutorial, I discuss the rational design of in metasurface nonlocalities to enable extreme control over optical wavefronts. I will showcase experimental demonstrations of nonlocal metasurfaces for applications in imaging, sensing, computing and more.

**Oral** EH-1.2 15:00 ICM - Room 14b

**Towards Large-Scale AI-driven Inverse Design in Metaphotonics: Experimental Generation of Million-Scale Datasets** — •Sergei Rodionov[1], Arturo Burguete-Lopez[1], Maxim Makarenko[2], Valeri Lopez-Nunez[1], Qizhou Wang[1], and Andrea Fratalocchi[1,3] — [1]King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia — [2]EXPEC ARC, Dhahran, Saudi Arabia — [3]Pixeltra Inc., CA, USA

We present a fast, scalable approach for generating million-scale metasurface spectral datasets through extensive device fabrication and polarization-resolved hyperspectral measurements, enabling more reliable AI-driven inverse design that accounts for fabrication errors and real spectral responses.

**Oral** EH-1.3 15:15 ICM - Room 14b

**Automatic Discovery of q-BIC Metasurfaces with Diffusion Models** — •Zesheng Chen[1], Zhiying Song[1], Weiwei Cai[2], and Tawfique Hasan[1] — [1]Department of Engineering, University of Cambridge, Cambridge, United Kingdom — [2]School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai, China

We introduce an automatic discovery framework utilizing a denoising diffusion probabilistic model (DDPM) for the inverse design of q-BIC metasurfaces. Our works enable efficient exploration of high-quality structures, thereby advancing metasurface engineering for high-dimensional photodetection.

## CD-3: Supercontinuum and Dispersive Wave Generation

Chair: Christelle Monat, Ecole Centrale Lyon, Institut des Nanotechnologies de Lyon, France

Time: Monday, 14:00–15:30 Location: ICM - Room Osterseen

**Oral** CD-3.1 14:00 ICM - Room Osterseen

**Nonlinear Metafiber: Unlocking Novel Pathway for Ultrafast Supercontinuum Generation in Small-Core Suspended Core Fibers** — •Shahrzad Hosseinabadi[1], Johannes Hofmann[1], Torsten Wieduwilt[1], Xue Qi[1], Michael H. Frosz[2], and Markus A. Schmidt[1,3,4] — [1]Leibniz Institute of Photonic Technology, Jena, Germany — [2]Max Planck Institute for the Science of Light, Erlangen, Germany — [3]Abbe Center of Photonics and Faculty of Physics, Friedrich Schiller University of Jena, Jena, Germany — [4]Otto Schott Institute of Materials Research (OSIM), Friedrich Schiller University of Jena, jena, Germany

Suspended core fibers enable efficient supercontinuum generation by concentrating modal fields. However, stable and efficient coupling is challenging and needs costly bulk optics. This study overcomes this by using tailored metalenses on fiber end faces.

**Oral** CD-3.2 14:15 ICM - Room Osterseen

**Dispersive wave emission from self-phase modulation with normal dispersion regime pumping in photonic crystal fibers** — •Elliott Crevon, Charbel Khallouf, John M. Dudley, and Thibaut Sylvestre — Institut FEMTO-ST, CNRS, Université Marie et Louis Pasteur, Besancon, France

We provide a detailed numerical and experimental investigation of dispersive wave (DW) emission from femtosecond pulses propagating in the normal dispersion regime of a polarization-maintaining photonic crystal fiber.

**Oral** CD-3.3 14:30 ICM - Room Osterseen

**Temporal reflection in a nonlinear photonic integrated circuit** — •Charbel Khallouf[1], Lynn Sader[2], Alexis Bougaud[2], Brent Little[3], Sai T. Chu[4], David Moss[5], Roberto Morandotti[6], Benjamin Wetzel[2], Govind P. Agrawal[7], John M. Dudley[1], and Thibaut Sylvestre[1] — [1]Institut FEMTO-ST, CNRS, Université Marie et Louis Pasteur, Besancon, France — [2]XLIM Research Institute, CNRS, Université de Limoges, Limoges, France — [3]QXP Technologies Inc., Xi'an, China — [4]Department of Physics, City University of Hong Kong, Hong Kong, China — [5]Optical Sciences Centre, Swinburne University of Technology, Hawthorn, Victoria, Australia — [6]INRS-EMT, 1650 Boulevard Lionel-Boulet, , Varennes, Canada — [7]The Institute of Optics, NY 14627, University of Rochester, Rochester, USA

We observe temporal reflection with large frequency shifts using dual pumping in a high-index doped silica waveguide. We experimentally demonstrate this approach effectiveness in significantly enhancing the supercontinuum bandwidth for advanced photonic applications.

**Oral** CD-3.4 14:45 ICM - Room Osterseen

**Extending the Supercontinuum Spectrum in Fully Etched Thick Aluminum Nitride Waveguides** — •Samantha Sbarra[1], Samuele Brunetta[2], Jean-François Carlin[2], Nicolas Grandjean[2], Raphaël Butté[2], and Camille-Sophie Brès[1] — [1]École Polytechnique Fédérale de Lausanne, Photonic Systems Laboratory (PHOSL), Lausanne, Switzerland — [2]École Polytechnique Fédérale de Lausanne, Laboratory of Advanced Semiconductors for Photonics and Electronics (LASPE), Lausanne, Switzerland

We show supercontinuum generation in crystalline Aluminum Nitride waveguides on sapphire spanning from the visible to the mid-infrared regions by flexibly engineering both the waveguide width and height and by tuning the pump wavelength.

**Oral** CD-3.5 15:00 ICM - Room Osterseen

**Supercontinua in dispersion engineered gallium nitride waveguides** — •Weichen Fan[1], Markus Ludwig[1,4], Ian Rousseau[2], Ivo Arabadzhiev[2], Bastian Ruhnke[1], Thibault Wildi[1], and Tobias Herr[1,3] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Hexisense SA, Lausanne, Switzerland — [3]Physics Department, Universität Hamburg UHH, Hamburg, Germany — [4]Presently: Université du Luxembourg, Luxembourg, Luxembourg

We demonstrate supercontinua that exceed two octaves and extend into the mid-infrared in emerging integrated gallium nitride waveguides. Dispersion engineering via mode hybridization results in a pronounced mid-infrared dispersive wave with a Raman-shifted soliton pump.

**Oral** CD-3.6 15:15 ICM - Room Osterseen

**Ultra-broadband UV/VIS spectroscopy enabled by resonant dispersive wave emission** — •Adrian Kirchner[1], Alexander Eber[1], Lukas Fürst[1], Emily Hruska[1], Michael H. Frosz[2], Francesco Tani[2,3], and Birgitta Bernhardt[1] — [1]Institute for Experimental Physics, Graz, Austria — [2]Max Plack Institut für die Physik des Lichts, Erlangen, Germany — [3]Univ. Lille, CNRS, UMR 8523-PhLAM-Physique des Lasers Atomes et Molécules, Lille, France

Resonant dispersive wave (RDW) emission in a hollow-core fiber upconverts a Yb:Fiber frequency comb to the UV/VIS with agile tunability. Ultra-broadband absorption spectroscopy with RDW is demonstrated for the first time using the trace-gas $NO_2$.

## CA-3: Solid-State Laser Materials

Chair: Xavier Mateos, Universitat Rovira i Virgili, Tarragona, Spain

Time: Monday, 14:00–15:30 Location: Hall A1 - Room A12

**Oral** CA-3.1 14:00 Hall A1 - Room A12

**Solid-state lasers with direct emission at 413 nm and 435 nm** — •Moritz Badtke, Hiroki Tanaka, Sascha Kalusniak, and Christian Kränkel — Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany

We report on direct solid-state lasers emitting at 413 nm and 435 nm for the first time. The Tb:YLF gain medium enabled 150 mW output power at 29% slope efficiency at 78 K.

**Oral** CA-3.2 14:15 Hall A1 - Room A12

**Red Ridge Pr:LiYF4 Waveguide Laser with >50% Optical Efficiency** — •Jonathan Demaimay[1], Pavel Loiko[1], Ji Eun Bae[1], Gurvan Brasse[1], Florent Starecki[1], Blandine Guichardaz[2], Patrice Camy[1], and Alain Braud[1] — [1]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), Caen, France — [2]Département d'Optique P. M. Duffieux, Institut FEMTO-ST, UMR 6174 CNRS Université de Franche-Comté, Besançon, France

Low-loss (0.05 dB/cm) ridge waveguides are fabricated in Pr,Gd:LiYF4 epitaxial layers by precision diamond-saw dicing. Red Pr-waveguide laser generates 454 mW at 639.4 nm with 58.7% slope efficiency and a threshold of 78 mW.

**Oral** CA-3.3 14:30 Hall A1 - Room A12

**Efficient YLF|Pr:YLF Composite Microlaser at 639 nm** — •Esrom Kifle[1,2], Rémi Soulard[2], Julien Rouvillain[1], Pavel Loiko[2], Alain Braud[2], Thierry Georges[1], and Patrice Camy[2] — [1]Oxxius SA, Lannion, France — [2]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France

We report on a monolithic cavity based 639 nm laser employing a composite YLF | Pr:YLF crystal. The laser performance under a 2$\omega$-OPSL (479 nm) and a diode laser (444 nm) pumping is presented.

**Oral** CA-3.4 14:45 Hall A1 - Room A12

**21-fs diode-pumped Kerr-lens mode-locked Yb:(Y,Sc)2O3 laser** — Hai-Yu Nie[1], Huang-Jun Zeng[1], Zhang-Lang Lin[1], Ge Zhang[1], Xiaodong Xu[2], Pavel Loiko[3], Chengbo Mou[4], Zhi-Chao Luo[5], Xavier Mateos[6], Valentin Petrov[7], and •Weidong Chen[1,7] — [1]State Key Laboratory of Functional Crystals and Devices, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, China — [2]Jiangsu Key Laboratory of Advanced Laser Materials and Devices, School of Physics and Electronic Engineering, Jiangsu Normal University, Xuzhou, China — [3]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen, Caen Cedex, France — [4]The Key Laboratory of Specialty Fiber Optics and Optical Access Networks, Joint International Research Laboratory of Specialty Fiber Optics and Advanced Communication, Shanghai University, Shanghai, China — [5]Guangdong Provincial Key Laboratory of Nanophotonic Functional Materials and Devices, School of Optoelectronic Science and Engineering, South China Normal University, Guangzhou, China — [6]Universitat Rovira i Virgili (URV), Física i Cristal·lografia de Materials (FiCMA), Tarragona, Spain — [7]Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany

We demonstrate a a diode-pumped KLM Yb:(Y,Sc)2O3 laser delivering soliton pulses as short as 21 fs at 1088.1 nm, with an average output power of 56 mW at a pulse repetition rate of 72 MHz.

**Oral** CA-3.5 15:00 Hall A1 - Room A12

**Mode-locked operation of Yb:LuGG channel waveguide laser using carbon nanotubes** — •Deok Woo Kim[1], Seong-Eun Lim[1], Xavier Mateos[2], Weidong Chen[3], Carolina Romero[4], Javier Rodríguez Vázquez de Aldana[4], and Fabian Rotermund[1] — [1]Department of Physics, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea — [2]Física i Cristal·lografia de Materials i Nanomaterials (FiCMA), Universitat Rovira i Virgili (URV), Tarragona, Spain — [3]Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fujian, China — [4]Grupo de Investigación en Aplicaciones del Láser y Fotónica, University of Salamanca, Salamanca, Spain

We demonstrate mode-locked operation of a femtosecond Yb:LuGG waveguide laser, fabricated via direct laser writing, using a single-walled carbon nanotube as a saturable absorber, achieving a repetition rate exceeding hundreds of MHz.

**Oral** CA-3.6 15:15 Hall A1 - Room A12

**Highly efficient $Tm^{3+}$:$LiYF_4$ cascade laser for telecom wavelengths** — Moritz Badtke[1], Stefan Püschel[1,2], Zoe Liestmann[1], Hiroki Tanaka[1], Christian Kränkel[1], and •Sascha Kalusniak[1] — [1]Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany — [2]Fraunhofer IOSB (Insitute for Optronics, System Technologies and Image Exploitation), Ettlingen, Germany

Highly efficient continuous-wave $Tm^{3+}$:$LiYF_4$ cascade laser operation at 1509 nm and 1932 nm is reported. Slope efficiencies of 44% and 35% and pump-power-limited output powers of 590 mW and 670 mW are obtained, respectively.

## CE-3: Optical Fibres - Materials and Devices

Chair: Laeticia Petit, Tampere University, Tampere, Finland

Time: Monday, 14:00–15:30 Location: Hall B1 - Room B11

**Invited** CE-3.1 14:00 Hall B1 - Room B11

**And the Little Prince said: If you please, draw me an optical fiber with nanoparticles!** — •Wilfried Blanc[1], Floriane Pellerin[1], Christelle Guillermier[2], Isabelle Martin[3], Hugues François-Saint-Cyr[4], Philippe Le Coustumer[5], Martiane Cabié[6], Thomas Neisius[6], Franck Pigeonneau[7], Matthieu Bellec[1], and John Ballato[8] — [1]Université Côte d'Azur, CNRS, INPHYNI, Nice, France — [2]Brigham and Women's Hospital and Harvard Medical School, Boston, USA — [3]CAMECA Instruments Inc, Madison, USA — [4]Thermo Fisher Scientific, Hillsboro,, USA — [5]Université de Bordeaux, CNRS, INSERM, BIC, Bordeaux, France — [6]Aix Marseille Univ., CNRS, Centrale Med, FSCM, Marseille, France — [7]Mines Paris, PSL University, Centre of Material Forming, Sophia-Antipolis, France — [8]Center for Optical Materials Science and Engineering Technologies, Clemson University, Anderson, USA

How do we prepare optical fibers containing nanoparticles when we do not have the magic pencil to draw them? This is what we will explore in this talk.

**Oral** CE-3.2 14:30 Hall B1 - Room B11

**Fluorescence properties of Ce-doped fiber and glass** — •Amit Yadav[1], Diana Galiakhmetova[1], Florian Lindner[2], Jörg Bierlich[2], Katrin Wondraczek[2], Owen McGann[3], and Edik U. Rafailov[1] — [1]Aston Institute of Photonic Technologies, Aston University, Birmingham, United Kingdom — [2]Leibniz Institute of Photonic Technologies, Jena, Germany — [3]Glass Technology Services Ltd, Sheffield, United Kingdom

Fluorescence properties of Ce-doped glass and fiber investigated. Under different pump powers for 405 nm pump broad fluorescence from fiber with peak in green region is observed. For Ce-doped glass two peak fluorescence is seen.

**Oral** CE-3.3 14:45 Hall B1 - Room B11

**Wavelength Division Multiplexing in the Mid-Infrared via Fluoride Optical Fibers** — •Francesco Anelli[1], Boris Perminov[2], Andrea Annunziato[1], Solenn Cozic[3], Jean Letorneur[3], Maria Chernysheva[2], and Francesco Prudenzano[1] — [1]Department of Electrical and Information Engineering, Politecnico di Bari, Bari, Italy — [2]Leibniz Institute of Photonics Technology, Jena, Germany — [3]Le Verre Fluoré, Bruz, France

A 2×2 coupler using single-mode indium fluoride optical fibers is designed and fabricated by fused biconical taper technique. The coupler is tested with a continuous-wave laser at the wavelength $\lambda$=2773 nm, showing 80:20 coupling ratio.

**Oral** CE-3.4 15:00 Hall B1 - Room B11

**Silica optical fiber with a ring-shaped active layer doped with thulium ions** — •Krzysztof Markowski[1], Piotr Miluski[1], Marcin Kochanowicz[1], Marek Łodziński[2], Magdalena Leśniak[2], Dominik Dorosz[2], Marta Kuwik[3], Wojciech A. Pisarski[3], Joanna Pisarska[3], and Jan Dorosz[1] — [1]Bialystok University of Technology, Bialystok, Poland — [2]AGH University of Science and Technology, Krakow, Poland — [3]University of Silesia, Katowice, Poland

A silica optical fiber with a ring-shaped Tm3+-doped layer was fabricated using the MCVD-CDT method. The influence of the refractive index profile and the dopant distribution profile on the luminescent and modal properties was analyzed.

**Oral** CE-3.5 15:15 Hall B1 - Room B11

**Photosensitivity of polypropylene no-core optical fibers using 248nm laser radiation** — Ivan Chapalo[1], Vasilis Sarakatsianos[1], Maria Konstantaki[1], Polyxeni Giouni[1], Eleni Grantzioti[1], Georgios Tsibidis[1], Theodore Manouras[1,2], Maria Vamvakaki[1,2], and •Stavros Pissadakis[1] — [1]Institute of Electronic Structure and Laser (IESL), Foundation for Research and Technology-Hellas (FORTH), Heraklion, Greece — [2]Department of Materials Science and Engineering, University of Crete, Heraklion, Greece

The photosensitivity of polypropylene no-core optical fibers using 248nm laser radiation is presented, using a new photosensitization method based on toluene in-diffusion. Refractive index changes of the order of 1.0x10-3 inscribed in the polypropylene matrix.

# EC-2: Topological Photonic Lattices and Crystals

Chair: Stefan Rotter, Vienna University of Technology, Vienna, Austria

Time: Monday, 14:00–15:30 Location: Hall B2 - Room B21

**Oral** EC-2.1 14:00 Hall B2 - Room B21

**Quantized Hall drift in a frequency-encoded photonic Chern insulator** — Alexandre Chénier[1], Bosco d'Aligny[2,3], Félix Pellerin[1], Paul-Édouard Blanchard[1], Tomoki Ozawa[4], Iacopo Carusotto[3], and •Philippe St-Jean[1,5] — [1]Université de Montréal, Montréal, Canada — [2]École Polytechnique, Palaiseau, France — [3]Universita di Trento, Trento, Italy — [4]Tohoku University, Sendai, Japan — [5]Institut Courtois, Montréal, Canada

We report an experimental observation of a photonic Chern insulator encoded in the synthetic frequency dimension of an optical fibre loop platform. We observe a quantized anomalous transport of light upon implementing an effective electric field

**Oral** EC-2.2 14:15 Hall B2 - Room B21

**Topological Classification of Driven-Dissipative Nonlinear Systems** — •Greta Villa[1], Javier del Pino[1], Vincent Dumont[2,3], Gianluca Rastelli[4], Mateusz Michałek[5], Alexander Eichler[2,3], and Oded Zilberberg[1] — [1]Department of Physics, University of Konstanz, Konstanz, Germany — [2]Laboratory for Solid State Physics, ETH Zürich, Zürich, Switzerland — [3]Quantum Center, ETH Zürich, Zürich, Switzerland — [4]Pitaevskii BEC Center, CNR-INO and Dipartimento di Fisica, Università di Trento, Trento, Italy — [5]University of Konstanz, Dept. of Mathematics and Statistics, Konstanz, Germany

We propose a topological index for driven-dissipative systems, building on the topological classification of structurally stable vector flows. We apply our approach to a dissipative bosonic Kerr-cavity, identifying the topological origin of its phase transitions.

**Invited** EC-2.3 14:30 Hall B2 - Room B21

**Extrinsic Topology in Floquet Photonic Lattices** — Rajesh Asapanna[1], Rabih El Sokhen[1], Albert F. Adiyatullin[1], Clément Hainaut[1], Pierre Delplace[2], Alvaro Gómez-León[3], and •Alberto Amo[1] — [1]Laboratoire PhLAM, CNRS - University of Lille, Lille, France — [2]ENS de Lyon, CNRS, Laboratoire de Physique , Lyon, France — [3]Institute of Fundamental Physics IFF-CSIC, Madrid, Spain

We report the observation of two-dimensional topological phases unique to lattices subject to discrete-step walks. We show that the number of edge states can be modified without the need of passing a gap closing transition.

**Oral** EC-2.4 15:00 Hall B2 - Room B21

**Strain-induced curvature in a photonic Chern insulator** — •Julius Beck[1], Alexander Fritzsche[1,2], Tom A. W. Wolterink[1], Lavi Upreti[2], Alexander Stegmaier[2], Matthias Heinrich[1], Ronny Thomale[2], and Alexander Szameit[1] — [1]Insitute of physics, University Rostock, Rostock, Germany — [2]Institut für Theoretische Physik und Astrophysik, Julius-Maximilians-Universität Würzburg, Würzburg, Germany

We explore the interplay between a negative spatial curvature and the topology of a Chern insulator, showing phenomena unobserved in flat space geometries. The measurements are performed in a strained lattice of helically driven waveguides.

**Oral** EC-2.5 15:15 Hall B2 - Room B21

**Broadband Localization of Light at the Termination of a Topological Photonic Waveguide** — •Daniel Muis[1], Yandong Li[2], René Barczyk[3], Sonakshi Arora[1], L. Kuipers[1], Gennady Shvets[2], and Ewold Verhagen[3] — [1]Kavli Institute of Nanoscience, Department of Quantum Nanoscience, Delft University of Technology, Delft, Netherlands — [2]School of Applied and Engineering Physics, Cornell University, Ithaca, New York, USA — [3]Center for Nanophotonics, AMOLF, Amsterdam, Netherlands

We observe the localization of light at the termination of a nanophotonic topological waveguide due to suppression of backreflection and attribute the origin of the effect to the near-conservation of the valley degree of freedom.

# CK-4: Resonant Structures and Cavities

Chair: Stefano Pelli, CNR - IFAC, Sesto Fiorentino, Italy

Time: Monday, 16:00–17:30 Location: ICM - Room 4a

**Oral** CK-4.1 16:00 ICM - Room 4a

**Phase Symmetry Breaking for All-Optical Computing with Microresonators** — Arghadeep Pal[1,2], •Alekhya Ghosh[1,2], Shuangyou Zhang[3], Lewis Hill[1], Toby Bi[1,2], and Pascal Del'Haye[1,2] — [1]Max Planck Institute for Science of Light, Erlangen, Erlangen, Germany — [2]Friedrich-Alexander-Universität, Erlangen, Germany — [3]Technical University of Denmark, Kgs. Lyngby, Denmark

We demonstrate the Kerr-induced symmetry breaking of the phases and intensities of the counter-propagating fields in a microresonator. Using this phase nonlinearity, we realize an optical switch and propose designs of photonic logic gates.

**Oral** CK-4.2 16:15 ICM - Room 4a

**Cavity Fluorescence Suppression from Ultra-high-Q Silica Microtoroid for Quantum Emitter Hybrid Integration** — •Haneul Lee[1], Jae Hoon Lee[2], Sungkun Hong[3,4], Hyun-Gue Hong[2], and Hansuek Lee[1,5] — [1]Department of Physics, Korea Advanced Institute of Science and Technology (KAIST), Daejon, South Korea — [2]Korea Research Institute of Standards and Science (KRISS), Daejon, South Korea — [3]Institute for Functional Matter and Quantum Technologies (FMQ), University of Stuttgart, Stuttgart, Germany — [4]Center for Integrated Quantum Science and Technology (IQST), University of Stuttgart, Stuttgart, Germany — [5]Graduate School of Quantum Science and Technology, KAIST, Daejon, South Korea

We investigated the source of fluorescence from microtoroids and demonstrated thermal annealing to suppress cavity fluorescence. Fluorescence from non-bridging oxygen hole centers was mitigated, highlighting silica microtoroids' potential for high-SNR quantum emitter hybrid integration.

**Oral** CK-4.3 16:30 ICM - Room 4a

**Photonic Molecule-Based Refractive Index Sensor Using Coupled Fabry-Perot Resonators** — S. Hadi Badri[1,2], •Davide Monopoli[1,2,3], Artem S. Vorobev[1,2], Giovanna Calò[3], and Liam O'Faolain[1,2] — [1]Centre for Advanced Photonics and Process Analysis, Munster Technological University, Cork, Ireland — [2]Tyndall National Institute, Cork, Ireland — [3]Polytechnic University of Bari, Department of Electrical and Information Engineering, Bari, Italy

We present a photonic molecule-based refractive index sensor using coupled Fabry-Perot resonators. This sensor offers a multi-parameter detection approach, utilizing resonance wavelength shifts, extinction ratio differences, and resonance splitting for enhanced refractive index analysis.

**Oral** CK-4.4 16:45 ICM - Room 4a

*moved from CK-P.6*

**Arrayed Waveguide Gratings on Integrated Thin-Film Lithium Tantalate** — •Shivaprasad U. Hulyal[1], Jianqi Hu[1], Chengli Wang[1], Jiachen Cai[1], Grigory Lihachev[1], and Tobias J. Kippenberg[1,2] — [1]Institute of Physics, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [2]Institute of Electrical and Microengineering, Swiss Federal Institute of Technology, Lausanne (EPFL), Lausanne, Switzerland

We report the first demonstration of arrayed waveguide grating (AWG) on an integrated X-cut thin-film lithium tantalate platform. The low birefringence of lithium tantalate greatly facilitates the design of AWG on this electro-optic material platform.

**Oral** CK-4.5 17:00 ICM - Room 4a

**Cavity optomechanics with polymer-based multi-membrane structures** — •Lukas Tenbrake[1], Sebastian Hofferberth[1], Stefan Linden[2], and Hannes Pfeifer[3] — [1]Institute of Applied Physics, University of Bonn, Bonn, Germany — [2]Institute of Physics, University of Bonn, Bonn, Germany — [3]Department of Microtechnology and Nanoscience, Chalmers University of Technology, Gothenburg, Sweden

We present a novel platform for 3D direct laser writing multi-membrane structures directly integrated into fiber Fabry-Perot cavities. Stacks of two or more coupled membranes with up to MHz normal-mode splittings are demonstrated.

**Oral** CK-4.6 17:15 ICM - Room 4a

**Propagation of Chiral Whispering Gallery Modes in Microrings Enabled by Tilted Angular Gratings** — Jinghan Chen[1], •Hayato Matsubayashi[1], Adrian Abazi[2,3,4], Frederik van Schoonhoven[2,3,4], Yuji Oki[1], Carsten Schuck[2,3,4], and Hiroaki Yoshioka[1] — [1]Graduate School and Faculty of Information Science and Electrical Engineering, Kyushu University, Fukuoka, Japan — [2]Department for Quantum Technology, University of Münster, Münster, Germany — [3]Center for Nanotechnology (CeNTech), Münster, Germany — [4]Center for Soft Nanoscience (SoN), Münster, Germany

This study introduces a method to achieve chiral whispering gallery mode propagation in microrings by integrating tilted angular gratings to break spatial symmetry, paving the way for advanced applications involving chiral orbital angular momentum.

# EA-4: Quantum Information Processing

Chair: Nicolas Fabre, Telecom Paris - Institut Polytechnique de Paris, Palaiseau, France

Time: Monday, 16:00–17:30 Location: ICM - Room 4b

**Invited** EA-4.1 16:00 ICM - Room 4b

**Classical simulation of bosonic-encoded quantum computations** — •Cameron Calcluth[1], Oliver Hahn[2], Juani Bermejo-Vega[3], Alessandro Ferraro[4], and Giulia Ferrini[1] — [1]Chalmers University of Technology, Gothenburg, Sweden — [2]The University of Tokyo, Tokyo, Japan — [3]Universidad de Granada, Granada, Spain — [4]Università degli Studi di Milano, Milano, Italy

We introduce a framework to classically simulate quantum circuits with a large number of highly-squeezed Gottesman-Kitaev-Preskill stabilizer states, thus offering useful benchmarks to guide the experimental design of fault-tolerant quantum computing architectures with bosonic codes.

**Oral** EA-4.2 16:30 ICM - Room 4b

**Photonic Quantum-to-Quantum Bernoulli facotry** — •Francesco Hoch[1], Giovanni Rodari[1], Taira Giordani[1], Alessia Suprano[1], Luca Castello[1], Elena Negro[1], Gonzalo Carvacho[1], Nicolò Spagnolo[1], Francesco Ceccarelli[2], Ciro Pentangelo[2], Simone Piacentini[2], Andrea Crespi[2,3], Roberto Osellame[2,3], Ernesto F. Galvão[4], and Fabio Sciarrino[1] — [1]Dipartimento di Fisica, Sapienza Università di Roma, Roma, Italy — [2]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche (IFN-CNR), Milano, Italy — [3]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy — [4] International Iberian Nanotechnology Laboratory (INL) , Braga, Portugal

We theoretically propose an optical implementation of the quantum-to-quantum Bernoulli factory protocol. We also experimentally test both with integrated photonic and Bulk optics showing a high operation fidelity and relatively good resilience to experimental noise.

**Oral** EA-4.3 16:45 ICM - Room 4b

**Characterization of local and nonlocal quantum correlations** — •Francesco Atzori[1,2], Salvatore Virzì[1], Enrico Rebufello[1], Alessio Avella[1], Fabrizio Piacentin[1], Iris Cusini[3], Henri Haka[3], Federica Villa[3], Marco Gramegna[1], Eliahu Cohen[4], Ivo Pietro Degiovanni[1,5], and Marco Genovese[1,5] — [1]INRIM, Torino, Italy — [2]Politecnico di Torino, Torino, Italy — [3]Politecnico di Milano, Milano, Italy — [4]Bar Ilan University, Ramat Gan, Israel — [5]INFN, Torino, Italy

We illustrate a novel, weak-measurement-based method for characterizing simultaneously local and nonlocal correlations in an entangled state without collapsing it, enabling the first experimental test of the nonlocality bound stemming from the Relativistic Independence principle.

**Oral** EA-4.4 17:00 ICM - Room 4b

**Restoring Information from Sparse Single Photon Detection Events for Experiments in Quantum Optics** — •Laura Orphal-Kobin[1], Gregor Pieplow[1], Alok Gokhale[1], Kilian Unterguggenberger[1], and Tim Schröder[1,2] — [1]Humboldt-Universität zu Berlin, Berlin, Germany — [2]Ferdinand-Braun-Institut (FBH), Berlin, Germany

In a weak signal regime, analysis of data with Monte Carlo simulations recovers information where standard methods fall short. This method unlocks new experimental regimes in quantum optics based on single photon detection events.

**Oral** EA-4.5 17:15 ICM - Room 4b

**Conservation of orbital angular momentum on a single-photon level** — Lea Kopf[1], Rafael Barros[1,2], Shashi Prabhakar[3], Enno Giese[4], and •Robert Fickler[1] — [1]Tampere University, Tampere, Finland — [2]Universidade de São Paulo, São Paolo, Brazil — [3]Physical Research Laboratory, Ahmedabad, India — [4]Technische Universität Darmstadt, Darmstadt, Germany

Correlated photon pairs are commonly generated in nonlinear processes owing to fundamental conservation laws. We show that momentum conservation enables orbital angular momentum correlations even if the pairs are generated by a single pump photon.

# ED-2: Precision Metrology for Fundamental Science 2

Chair: Piotr Maslowski, Nicolaus Copernicus University in Torun, Torun, Poland

Time: Monday, 16:00–17:30 Location: ICM - Room 13a

**Invited** ED-2.1 16:00 ICM - Room 13a

**Nuclear laser spectroscopy of the 8.4-eV-transition in Thorium-229 towards an optical nuclear clock** — •Ekkehard Peik — Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

The successful laser excitation of the 8.4 eV nuclear isomer state of Thorium-229 in Th-doped crystals has opened up the field of nuclear laser spectroscopy and the development of precise nuclear optical clocks.

**Oral** ED-2.2 16:30 ICM - Room 13a

**Ultrastable laser based on a room temperature ULE cavity with crystalline AlGaAs coatings** — •Chun Yu Ma[1], Jialiang Yu[1], Thomas Legero[1], Sofia Herbers[1], Daniele Nicolodi[1], Mona Kempkes[1], Fritz Riehle[1], Jun Ye[2], and Uwe Sterr[1] — [1]Physikalisch-Technische Bundsanstalt, Braunschweig, Germany — [2]JILA, National Institute of Standards and Technology and University of Colorado, Boulder, USA

In a cavity with low thermal noise crystalline AlGaAs coatings, we could minimize noise induced by laser power fluctuations by tuning the coating photobirefringent sensitivity with LED illumination to cancel the mirror photothermo-optic effect.

**Oral** ED-2.3 16:45 ICM - Room 13a

**Ultra-low noise transfer of spectral purity between two lasers of different wavelength using a heterodyne fiber interferometer** — Debanjan Show, Stéphanie Grabielle, Jean-Pierre Coulon, and •Fabien Kéfélian — ARTEMIS, Université Côte d'Azur & Observatoire Côte d'Azur & CNRS, Nice, France

We report the transfer of frequency noise of a 1542-nm fiber laser to a 1560-nm diode laser using a fiber delay line heterodyne interferometer achieving a transfer noise below 0.7 Hz/Hz over [1 Hz-30 kHz]

**Oral** ED-2.4 17:00 ICM - Room 13a

**Frequency stability transfer over a wide spectral band using fibered Bragg grating cavities** — •Yacine Chelouah[1], Mamadou Faye[1], Ronan Le-Masson[2], Laurent Lablonde[2], Frédéric Du-Burck[1], and Vincent Roncin[1] — [1]Laboratoire de Physique des Lasers CNRS-Université Sorbonne Paris Nord, Villetaneuse, France — [2]EXAIL SAS, Lannion, France

We present a compact device for frequency stability transfer over the spectral band from 1.5 $\mu$m to 1.0 $\mu$m, based on two interleaved Bragg grating Fabry-Perot cavities, each resonating at one of two wavelengths.

**Oral** ED-2.5 17:15 ICM - Room 13a

**Agile Hz-level Precision Spectroscopy using a Dual-Modulated Tunable Diode Laser** — •Toby Bi[1,2], Shuangyou Zhang[1,3], and Pascal Del'Haye[1,2] — [1]Max Planck Institute for the Science of Light, 91058 Erlangen, Germany — [2]Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, 91058 Erlangen, Germany — [3]Department of Electrical and Photonics Engineering, Technical University of Denmark, Lyngby, Denmark

A simple and fast spectroscopy technique using dual radio frequency modulated diode laser referenced to a fiber cavity is proposed. This technique provides broadband, Hz-level precision on-the-fly and can be used for the characterisation of integrated photonic circuits.

## CJ-3: 2-Micron Fiber Sources 1

Chair: Maria Chernysheva, Leibniz Institute of Photonic Technology, Jena, Germany

Time: Monday, 16:00–17:30 Location: ICM - Room 13b

**Invited** CJ-3.1 16:00 ICM - Room 13b

**Development of Tm-doped LMA fibres for high-power amplifiers/lasers operating in the 2 um spectral range** — •Pavel Honzatko[1], Jan Aubrecht[1], Ivo Barton[1], Martin Grabner[1], Michal Kamradek[1], Ivan Kasik[1], Ondrej Podrazky[1], Bara Svejkarova[1,2], Petr Varak[1], and Pavel Peterka[1] — [1]Institute of Photonics and Electronics of the Czech Academy of Sciences, Prague, Czech Republic — [2]Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Prague, Czech Republic

In-band pumping, combined with transversal and longitudinal core structuring, can potentially elevate heat load in large mode area thulium-doped fibres and enable operation in the 2 $\mu$m range with output powers far exceeding 1 kW.

**Oral** CJ-3.2 16:30 ICM - Room 13b

**Fiber-based CPA system at 2050 nm with multi-$\mu$J pulse energy at high repetition rate** — •Zbigniew Łaszczych[1], Aleksa Stefanović[1], Mathias Lenski[1], César Jáuregui[1,2], and Jens Limpert[1,2,3,4] — [1]Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-Universität, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany — [3]Helmholtz-Institute, Jena, Germany — [4]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany

We present highly efficient fiber-based chirped-pulse amplification at 2050 nm wavelength. 6 $\mu$J of pulse energy at 1 MHz repetition rate are generated pursuing an approach with great scaling potential.

**Oral** CJ-3.3 16:45 ICM - Room 13b

**Multipass cell compression of an ultrafast Tm-fiber laser delivering 1.3 mJ, 130 W, sub-two cycle pulses at 1.9 $\mu$m** — •Ziyao Wang[1], Warunya Röder[2], Tobias Heuermann[1,3,4,5], Chang Liu[1,3,4], Philipp Gierschke[1,2], Yi Zhang[1], Maximilian Karst[1,3,4], Mathias Lenski[1], Lucas Eisenbach[1,2], Jan Rothhardt[1,2,3,4], and Jens Limpert[1,2,3,4] — [1]Institute of Applied Physics, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany — [3]Helmholtz-Institute Jena, Jena, Germany — [4]GSI Helmholtzzentrum für Schwerionenforschung, Jena, Germany — [5]Active Fiber Systems GmbH, Jena, Germany

We report on the first multipass-cell pulse compression generating sub-two cycle pulses in the SWIR region (at 1.9 $\mu$m central wavelength). The system delivers 137 W average power at 101 kHz repetition rate.

**Oral** CJ-3.4 17:00 ICM - Room 13b

**All-fiberised picosecond 1.7 um thulium fibre laser** — •Matthew D. Gerard[1], Ibrahim H. Abughazaleh[1], Panuwat Srisamran[1], Duanyang Xu[1], David J. Richardson[1,2], and Lin Xu[1] — [1]Optoelectronics Research Centre, Southampton, United Kingdom — [2]Microsoft Azure, Southampton, United Kingdom

we demonstrate an all-fiberised 1749nm picosecond Tm-fibre laser system generating gain-switched pulses of 40ps with a controllable repetition rate between 34MHz and 2GHz, producing 3W of average power, 1.66kW of peak power, and 51dB gain.

**Oral** CJ-3.5 17:15 ICM - Room 13b

**High Power Single-Frequency 1762 nm Laser For Barium Ion Optical Qubits** — Saïd Hamdi[2], Kentin Poncelet[2], Coline Lavit[1], Thomas Dubé[1], Nicholas Traynor[2], Giorgio Santarelli[1], and •Germain Guiraud[2] — [1]TOPTICA Photonics SAS, Pessac, France — [2]LP2N, Talence, France

A record output power (14.5 W) all-fiber single frequency and low noise amplifier at 1762 nm is presented for Barium ion optical qubits.

## CH-4: Deep-Learning for Sensing and Microscopy

Chair: S. Sivankutty, CNRS, Paris, France

Time: Monday, 16:00–17:30 Location: ICM - Room 14a

**Invited** CH-4.1 16:00 ICM - Room 14a

**Virtual Staining of Label-Free Tissue** — •Aydogan Ozcan — UCLA, Los Angeles, USA

I will provide an overview of our recent work on using neural networks for label-free tissue staining in digital pathology. These networks provide rapid, cost-effective, accurate and environmentally friendly alternatives to standard chemical staining methods.

**Oral** CH-4.2 16:30 ICM - Room 14a

**Hybrid deep-neural network in digital holographic microscopy** — •Rémi Kieber and Maxime Jacquot — Université Marie et Louis Pasteur, CNRS, institut FEMTO-ST, Besançon, France

A hybrid physics-based deep neural network approach has been implemented in an experimental setup in both the digital and optical domains to develop a deep holographic microscope for image autofocusing in automated microscopy applications.

**Oral** CH-4.3 16:45 ICM - Room 14a

**All-fiber microendoscopic polarization sensing at single-photon level aided by deep-learning** — Martin Bielak, •Dominik Vašinka, and Miroslav Ježek — Department of Optics, Faculty of Science, Palacky University, Olomouc, Czech Republic

We address the problem of precise polarization measurement in challenging conditions. To resolve this problem, we introduce a single-shot all-fiber method based on intermodal interaction aided by deep-learning, providing accuracy down to a single-photon level.

**Oral** CH-4.4 17:00 ICM - Room 14a

*withdrawn*

**Oral** CH-4.5 17:15 ICM - Room 14a

**Additive-free dopamine detection via trained metasurface encoders** — •Qizhou Wang, Ning Li, Zhao He, Arturo Burguete-Lopez, Fei Xiang, and Andrea Fratalocchi — King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

This work introduces a novel framework for dopamine detection down to $10^{-11}$ mol/L. Different from state-of-the-art electrochemical sensing methods, the proposed approach employs a trainable metasurface for information-preserving spectral feature extraction.

# EH-2: Chiral Metamaterials and Nanostructures

Chair: Andrea Alù, City University of New York, New York, USA

Time: Monday, 16:00–17:30 Location: ICM - Room 14b

**Invited** EH-2.1 16:00 ICM - Room 14b

**$\alpha$-MoO3 for phase retardation and chirality in the mid-infrared range** — •Georgia Papadakis, Michael Enders (substitute speaker), Mitradeep Sarkar, Michela F. Picardi, Maxime Giteau, and Evgenia Klironomou — Institute of Photonic Sciences (ICFO), Barcelona, Spain

In this talk we will demonstrate that exfoliated flakes of a-MoO3 can serve as phase retarders, and twisted flakes can generate chiral light, at wavelengths above 10 micrometers.

**Oral** EH-2.2 16:30 ICM - Room 14b

**Plasmon-enhanced optical rotation and circular dichroism in near-zero index chiral metamaterial** — Ashis Paul[1], Matteo Venturi[1], Raju Adhikary[1], Leone Di Mauro Villari[1], Giovanna Salvitti[1], Carino Ferrante[2], Davide Tedeschi[1], Francesco Di Stasio[3], Andrea Toma[3], Hatice Altug[4], and •Andrea Marini[1] — [1]Department of Physical and Chemical Sciences, University of L'Aquila, L'Aquila , Italy — [2]CNR-SPIN, c/o Dip.to di Scienze Fisiche e Chimiche, L'Aquila , Italy — [3]Istituto Italiano di Tecnologia, Genova , Italy — [4]Institute of Bioengineering, Ecole Polytechnique Federale de Lausanne , Lausanne, Switzerland

We investigate plasmon-enhanced optical rotation and circular dichroism in a near-zero-index metamaterial composed of metallic nanospheres randomly dispersed in a chiral drug solution.

**Oral** EH-2.3 16:45 ICM - Room 14b

**Double helical antennas for direct coupling to quantum emitters or plasmonic waveguides** — Aleksei Tsarapkin[1], Luka Zurak[2], Krzysztof Maćkosz[3], Lorenz Löffler[2], Victor Deinhart[1], Ivo Utke[3], •Thorsten Feichtner[2], and Katja Höflich [1] — [1]Ferdinand-Braun-Institut (FBH), Berlin, Germany — [2]Institute of Physics, University of Würzburg, Würzburg, Germany — [3]Empa-Swiss Federal Laboratories for Materials Science and Technology, Thun, Switzerland

Here we present the computationally efficient design and d irect 3D electron-beam-based printing of double-helical plasmonic antennas. The antennas exhibit greatly enhanced and directional emission/reception of circularly polarized light to control polarization at the nanoscale.

**Oral** EH-2.4 17:00 ICM - Room 14b

**Bound states in a continuum empowering maximum chirality and strong coupling regime in plasmonic metasurfaces** — Hanan Ali[1], •Lucio C. Andreani[1], Giovanni Pellegrini[1], and Emilija Petronijevic[2] — [1]Department of Physics, University of Pavia, Pavia, Italy — [2]Department S.B.A.I., Sapienza University of Rome, Rome, Italy

A plasmonic metasurface with symmetry-broken nanoholes supports Bound States in a Continuum (BIC) with maximally chiral optical response. Interaction with an active medium gives rise to a strong coupling regime, yielding plasmonic chiral polariton BICs.

**Oral** EH-2.5 17:15 ICM - Room 14b

**Observation of the Orbit–Orbit Interaction of Light in Plasmonics** — •Raghvendra P. Chaudhary, Avraham Reiner, and Nir Shitrit — School of Electrical and Computer Engineering, Ben-Gurion University of the Negev, Be'er Sheva 8410501, Israel

We report the orbit–orbit interaction of light in a plasmonic ellipse cavity, whose unique geometry facilitates vortex–trajectory interplay. This interaction opens a new paradigm for light manipulation by leveraging the manifold vortex states.

# CD-4: Solitons

Chair: Simon-Pierre Gorza, Université Libre de Bruxelles, Brussels, Belgium

Time: Monday, 16:00–17:30 Location: ICM - Room Osterseen

**Oral** CD-4.1 16:00 ICM - Room Osterseen

**Addressing Thermal Instability in Accessing Dissipative Kerr Solitons in AlGaAs-on-insulator Microresonators** — •Yang Liu, Yueguang Zhou, Yanjing Zhao, Chaochao Ye, Xinda Lu, Yi Zheng, Leif Katsuo Oxenløwe, Kresten Yvind, and Minhao Pu — Department of Electrical and Photonic Engineering, Technical University of Denmark, Kongens Lyngby, Denmark

We demonstrate room-temperature dissipative Kerr soliton generation in a near-zero-dispersion AlGaAsOI microresonator, overcoming thermal instability via avoided-mode-crossing and providing a large soliton existence range.

**Oral** CD-4.2 16:15 ICM - Room Osterseen

**Self-healing of pulse drop-outs in harmonically mode-locked soliton fiber laser through satellite pulse generation** — •Haochen Lin[1,2], Xiaocong Wang[2,3], Benhai Wang[2], Xintong Zhang[2], Qi Huang[2], Wenbin He[2], and Meng Pang[1,2,3] — [1]Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences, Hangzhou , China — [2]Russell Centre for Advanced Lightwave Science, Shanghai Institute of Optics and Fine Mechanics and Hangzhou Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [3]State Key Laboratory of High Field Laser Physics and CAS Center for Excellence in Ultra-intense Laser Science, Shanghai Institute of Optics and Fine Mechanics CAS, Shanghai, China

Self-healing of pulse drop-outs in a harmonically mode-locked soliton fiber lasers are observed through satellite pulse generation. While all drop-outs were refilled by randomly-generated satellite pulses, pre-existing solitons remain stable despite inevitable collisions with them.

**Oral** CD-4.3 16:30 ICM - Room Osterseen

**Oscillatory central-frequency pulling in self-starting dynamics of NPR-based mode-locked soliton fiber laser** — •Qi Huang, Yu Jiang, Xintong Zhang, Benhai Wang, Xiaocong Wang, Wenbin He, and Meng Pang — Shanghai Institute of Optics and Fine Mechanics, Shanghai, China

We report observations of oscillatory central-frequency pulling during self-starting process of mode-locked soliton fiber laser, which is coupled with the relaxation oscillations of pulse peak-power and can be interpreted using NPR-related filtering effect.

**Oral** CD-4.4 16:45 ICM - Room Osterseen

**Sideband injection locking of a laser cavity-soliton** — •Andrew Cooper[1], Antonio Cutrona[1], Fedor Getman[1], Sai T. Chu[2], Brent E. Little[3], Roberto Morandotti[4], David J. Moss[5], Marco Peccianti[1], and Alessia Pasquazi[1] — [1]Emergent Photonics Research Center, Loughborough, United Kingdom — [2]Department of Physics, City University of Hong Kong, Hong Kong, China — [3]QXP Technologies Inc., Xi'an, China — [4]INRS-EMT, Varennes, Canada — [5]Optical Sciences Center, Swinburne University of Technology, Hawthorn, Australia

We report optical Kerr locking the CEO of a laser cavity-soliton microcomb for the first time. A study of the gain, thermal and nonlinear dynamics in this nested cavity layout will be discussed.

**Oral** CD-4.5 17:00 ICM - Room Osterseen

**Spontaneous Symmetry Breaking of Cavity Solitons in Coupled Resonators** — •Alekhya Ghosh[1,2], Arghadeep Pal[1,2], Lewis Hill[1], Haochen Yan[1,2], Gian-Luca Oppo[3], and Pascal Del'Haye[1,2] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany — [3]SUPA & CNQO, Department of Physics, University of Strathclyde, Glasgow, United Kingdom

We report spontaneous symmetry breaking (SSB) of counter propagating homogeneous fields and soliton states in two coupled resonators. This will help in developing integrated photonic devices for telecommunications, optical computing, and improving resonator-based gyroscope.

**Oral** CD-4.6 17:15 ICM - Room Osterseen

*withdrawn*

# EB-1: Quantum Imaging

Chair: Shaurya Aarav, INSP / Sorbonne University (CNRS), Paris, France

Time: Monday, 16:00–17:30 Location: Hall A1 - Room A12

**Oral** EB-1.1 16:00 Hall A1 - Room A12

**Quantum Ghost Imaging of remote targets with novel SPAD technology** — •Alessia Suprano[1], Massimiliano Proietti[1], Francesco Poggiali[2], Ugo Zanforlin[1], Chiara Michelini[1,3], Massimiliano Dispenza[1], Carsten Pitsch[4], Dominik Walter[4], Benjamin Guery[4,5], Henri Haka[6], Alberto Tosi[6], and Federica Villa[6] — [1]Leonardo Labs, Quantum Technologies Lab, Rome, Italy — [2]Leonardo Electronics Division, Campi Bisenzio, Italy — [3]University of Trento, Trento, Italy — [4]Fraunhofer IOSB, Ettlingen, Germany — [5]Université Paris-Saclay, Palaiseau, France — [6]Politecnico di Milano, Milano, Italy

We experimentally implemented an asynchronous quantum ghost imaging setup using an innovative SPAD array for remote sensing applications. This approach enables advanced imaging of reflective and diffusive objects, expanding the possibilities of long-distance imaging.

**Oral** EB-1.2 16:15 Hall A1 - Room A12

**High-resolution non-interferometric quantum phase imaging for biological samples** — Alberto Paniate, Marco Genovese, and •Ivano Ruo-Berchera — INRIM, Torino, Italy

Sub-shot-noise non-interferometric phase imaging at one-micron resolution and with 30% of quantum enhancement is shown, opening the way to reliable and fast quantum phase imaging of bio-sample at sub-cellular resolution.

**Oral** EB-1.3 16:30 Hall A1 - Room A12

**Off-axis holographic imaging with undetected light** — •Josué R. León-Torres[1,2,3], Filip Filip Krajinić[4,5], Mohit Kumar[1], Marta Gilaberte Basset[1,2], Frank Setzpfandt[1], Valerio F. Gili[2], Branislav Jelenković[5], and Markus Gräfe[6] — [1]1. Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany — [2]2. Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany — [3]3. Cluster of Excellence Balance of the Microverse, Jena, Germany — [4]4. University of Belgrade, School of Electrical Engineering, Belgrade, Serbia — [5]5. Institute of Physics Belgrade, University of Belgrade, Belgrade, Serbia — [6]6. Institute for Applied Physics, Technical University of Darmstadt, Darmstadt, Germany

In this study, we provide an experimental scheme of QIUL that merges Fourier off-axis holography with a hybrid-type induced-coherence nonlinear interferometer, that requires a single-shot to reconstruct the amplitude and phase information of an object.

**Oral** EB-1.4 16:45 Hall A1 - Room A12

**Applied hyperspectral mid-IR quantum imaging** — Marlon Placke[1], Chiara Lindner[2], Felix Mann[1], Inna Kviatkovsky[1], Helen Mary Chrzanowski[1], Frank Kühnemann[2,3], and •Sven Ramelow[1] — [1]Institut für Physik, Humboldt-Universität zu Berlin, Berlin, Germany — [2]Fraunhofer-Institut für Physikalische Messtechnik IPM, Freiburg, Germany — [3]Physikalisches Institut, Universität Freiburg, Freiburg, Germany

Sensing with undetected photons has become a distinct research field with numerous applications especially dedicated to mid-infrared wavelengths. We demonstrate its potential for label-free classification of bio-tissue and polymeric samples.

**Oral** EB-1.5 17:00 Hall A1 - Room A12

**Precision enhancement with bright Kerr amplitude-squeezed light for static-loss microscopy** — •Cyril Torre[1,2], Rachel N. Clark[1], Oliver Green[1,2], George S. Aktinson[1,2], Alex McMillan[1], John Rarity[1], Giacomo Ferranti[1], and Jonathan C.F. Matthews[1] — [1]Quantum Engineering Technology Labs, Bristol, United Kingdom — [2]Quantum Engineering Centre for Doctoral Training, Bristol, United Kingdom

For imaging, optical noise is a limiting factor. We propose using amplitude-squeezed light to enhance the precision of absorption raster-scan imaging. Experimentally, we demonstrate that precision improves as noise is reduced by the quantum source.

**Oral** EB-1.6 17:15 Hall A1 - Room A12

**Non-local wavefront shaping using entangled photons** — •Yanis Trouyet[1], Patrick Cameron[2], Pedro Ornelas[3], Isaac Nape[3], Andrew Forbes[3], and Hugo Defienne[1] — [1]Institut des NanoSciences de Paris, Paris, France — [2]Universita degli Studi di Napoli Federico II, Naples, Italy — [3]University of the Witwatersrand, Johannesburg, South Africa

Entangled photon pairs from spontaneous parametric down conversion enable correction of optical aberrations. By modulating the undistorted photon, we can recover strong spatial correlations even when its twin encounters scattering.

# CE-4: Laser Processing Techniques

Chair: Stavros Pissadakis, FORTH, Heraklion, Greece

Time: Monday, 16:00–17:30 Location: Hall B1 - Room B11

**Oral** CE-4.1 16:00 Hall B1 - Room B11

*withdrawn*

**Oral** CE-4.2 16:15 Hall B1 - Room B11

**Femtosecond Laser Direct-Write Integrated Optics Beam Combiner for the Detection of Exoplanets.** — •Elizabeth Arcadi[1], Glen Douglass[2], Jacinda Webb[1], Guillaume Tremblier[1], Stephanie Rossini-Bryson[3], Eckhart Spalding[3], Barnaby Norris[3], Peter Tuthill[3], Marc-Antoine Martinod[5], Mona E. Morsy[6], Julien Lozi[4], Sébastien Vievard[4], Kyohoon Ahn[4], Vincent Deo[4], Olivier Guyon[4], Micheal J. Withford[1], and Simon Gross[1,2] — [1]MQ Photonics, School of Mathematical and Physical Sciences, Macquarie University, Sydney, Austria — [2]School of Engineering, Macquarie University, Sydney, Austria — [3]Sydney Institute for Astronomy, School of Physics, University of Sydney, Sydney, Austria — [4]National Astronomical Observatory of Japan, Subaru Telescope, National Institutes of Natural Sciences, Hilo, USA — [5]Institute of Astronomy, KU Leuven, Leuven, Belgium — [6]Department of Physics and Astronomy, University of Texas, San Antonio, USA

Nulling interferometry enables high-contrast exoplanet imaging by suppressing starlight while transmitting planetary light. An integrated optics beam combiner, fabricated via femtosecond laser direct-write technique, achieves this on the GLINT instrument at Subaru telescope.

**Oral** CE-4.3 16:30 Hall B1 - Room B11

*withdrawn*

**Oral** CE-4.4 16:45 Hall B1 - Room B11

**PT-symmetric photonics in the absence of gain or loss** — •Johannes Bentzien[1], Julien Pinske[2], Lukas J. Maczewsky[1], Steffen Weimann[1], Matthias Heinrich[1], Stefan Scheel[1], and Alexander Szameit[1] — [1]Institute of Physics, University of Rostock, Rostock, Germany — [2]Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark

We observe nonorthogonal modes in femtosecond laser-written waveguide arrays and leverage the fluorescent properties of the waveguide cores to synthesize genuinely non-Hermitian and PT-symmetric dynamics without any injection or removal of intensity from the system.

**Oral** CE-4.5 17:00 Hall B1 - Room B11

**A Maskless Nanopatterning Method based on Laser Polarization Response** — •Beliz Doğukaya[1], Rana Asgari Sabet[1,2], and Onur Tokel[1,2] — [1]Department of Physics, Bilkent University, Ankara, Turkey — [2]UNAM - National Nanotechnology Research Center, Bilkent University, Ankara, Turkey

We report a novel freeform laser nano-patterning method for silicon. The approach leverages the recent 3D laser nano-fabrication capability with selective etching, enabling maskless, wide-area nano-patterning on the surface.

**Oral** CE-4.6 17:15 Hall B1 - Room B11

**Projecting multiphase holograms for maskless lithography** — •Ayan Rakshit, Antoni Wojcik, Oliver Burton, Tim Wilkinson, and Hannah Joyce — University of Cambridge, Cambridge, United Kingdom

We show how computer-generated holograms displayed on multiphase LCOS SLMs can be used for maskless lithography of custom patterns. By time-averaging reconstructions to reduce speckle, we can achieve scalable $\mu$m-scale resolutions with scope for improvements.

# EC-3: Topology in Non-Hermitian Systems

Chair: Natalia Litchinitser, Duke University, Durham, USA

Time: Monday, 16:00–17:30 Location: Hall B2 - Room B21

**Oral** EC-3.1 16:00 Hall B2 - Room B21

**Spatiotemporal non-Hermitian skin-effect in a fast-gain laser** — •Alexander Dikopoltsev[1], Barbara Schneider[1], Markus Bestler[2], Philipp Täschler[1], Mathieu Bertrand[1], Mattias Beck[1], David Burghoff[3], Oded Zilberberg[2], and Jérôme Faist[1] — [1]ETH Zürich, Zurich, Switzerland — [2]Konstanz University, Konstanz, Germany — [3]The University of Texas at Austin, Austin, USA

Topological photonics provides robust wave confinement, recently extending to non-Hermitian systems. We demonstrate a pulse bound to a spatiotemporal non-Hermitian topological interface, realized in lasers with fast gain recovery, enabling new pathways for light manipulation.

**Oral** EC-3.2 16:15 Hall B2 - Room B21

**Klein Tunneling and Enhanced Phase Synchronization in Laser Arrays with Linear Gapless Dispersion** — •Konstantin Manannikov, Sagie Gadasi, Nir Davidson, and Alexander N. Poddubny — Weizmann Institute of Science, Rehovot, Israel

We theoretically study how Dirac dispersion enhances synchronization in laser arrays with frequency disorder. Klein tunneling mediates strong overlap between linear modes, enhancing phase locking in the non-linear regime by an order of magnitude.

**Oral** EC-3.3 16:30 Hall B2 - Room B21

**Localized thermal emission from topological interfaces** — M. Said Ergoktas[1,2], Ali Kecebas[3], Konstantinos Despotelis[1,2], Sina Soleymani[3], Gokhan Bakan[1,2], Askin Kocabas[4], Alessandro Principi[5], •Stefan Rotter[6], Sahin K. Özdemir[3,7], and Coskun Kocabas[1,2,8] — [1]Department of Materials, University of Manchester, Manchester, United Kingdom — [2]National Graphene Institute, University of Manchester, Manchester, United Kingdom — [3]Department of Engineering Science and Mechanics, The Pennsylvania State University, University Park, USA — [4]Department of Physics, Koç University, Istanbul, Turkey — [5]Department of Physics, University of Manchester, Manchester, United Kingdom — [6]Institute for Theoretical Physics, Vienna University of Technology (TU Wien), Vienna, Austria — [7]Materials Research Institute, The Pennsylvania State University, University Park, USA — [8]Henry Royce Institute for Advanced Materials, University of Manchester, Manchester, United Kingdom

We show that concepts from topology can be used to engineer localized thermal radiation. Specifically, we demonstrate near-unity thermal emissivity from the interface between two topologically distinct surfaces that are engineered using multilayer optical cavities.

**Oral** EC-3.4 16:45 Hall B2 - Room B21

**Complex momentum bands feature non-Hermitian time topology** — •Andrea Steinfurth[1], Joshua Feis[1], Julia Görsch[1], Tom Sheppard[2], Hannah M. Price[2], Alexander Szameit[1], and Sebastian Weidemann[1] — [1]Institute of Physics, University of Rostock, Rostock, Germany — [2]School of Physics and Astronomy, University of Birmingham, Birmingham, United Kingdom

We demonstrate topological light localization at a time interface – a temporal version of the non-Hermitian skin effect. This is achieved by implementing momentum point gaps found in complex momentum bands of a non-Hermitian photonic lattice.

**Oral** EC-3.5 17:00 Hall B2 - Room B21

**In situ tunable platform for selective polariton condensation in a 1D topological lattice at ambient conditions** — •Ioannis Georgakilas[1,2], Rafał Mirek[1], Darius Urbonas[1], Michael Forster[3], Ullrich Scherf[3], Rainer F. Mahrt[1], and Thilo Stöferle[1] — [1]IBM Research Europe – Zurich, Rüschlikon, Switzerland — [2]Institute of Quantum Electronics, ETH Zurich, Zürich, Switzerland — [3]Macromolecular Chemistry Group and Wuppertal Center for Smart Materials & Systems (CM@S), Bergische Universität Wuppertal, Wuppertal, Germany

We demonstrate highly selective, room-temperature polariton condensation into various states of a one-dimensional topological lattice, by employing a tunable open cavity and an organic active layer.

**Oral** EC-3.6 17:15 Hall B2 - Room B21

**Exponentially Sensitive Lattices: Scaling and Pseudospectra** — •Ioannis Kiorpelidis[1] and Konstantinos Makris[1,2] — [1]Institute of Electronic Structure and Laser (IESL) – FORTH, Heraklion, Greece — [2]ITCP-Physics Department, University of Crete, Heraklion, Greece

We study the exponential sensitivity of photonic lattices with asymmetric couplings, based on pseudospectra theory. We determine the origin of such ultra-sensitivity and its dependence on the system size and perturbation strength.

# CA-P: CA Poster Session

Time: Monday, 13:00–14:00 Location: Hall B0

CA-P.1 13:00 Hall B0

**Carrier-envelope offset frequency stabilization in solid-state lasers: direct electro-optic vs pump-power modulation** — •Karolina Suliga, Jarosław Sotor, and Maciej Kowalczyk — Laser & Fiber Electronics Group, Faculty of Electronics, Photonics and Microsystems, Wrocław University of Science and Technology, Wrocław, Poland

We present carrier-envelope offset frequency stabilization (fceo) in Cr:ZnS laser based on direct phase modulation by an intracavity electro-optic modulator. This novel technique enables to overcome the limitations of a standard pump-power fceo-stabilization approach.

CA-P.2 13:00 Hall B0

**Development of Pulse-Shape-Controlled Hybrid ArF Excimer Laser** — Hironori Igarashi, •Atsushi Fuchimukai, Yasuhiro Kamba, Yasuaki Moriai, Rikuo Koike, and Taisuke Miura — Gigaphoton Inc., 400 Yokokurashinden, Oyamashi, Tochigi 323-8558, Japan

By changing the pulse shape of Er-doped fiber laser inside the DUV seed laser, the hybrid ArF laser can generate both nanosecond pulse and sub-nanosecond burst pulse around the 10-mJ level with high beam quality.

CA-P.3 13:00 Hall B0

**Toward 100Hz Joule class ultra-short pulses TiSa laser** — Alain Pellegrina, Adeline Kabacinski, Antoine Jeandet, Vincent Leroux, Loic Lavenu, •Olivier Chalus, Olivier Casagrande, Sandrine Ricaud, and Christophe Simon-Boisson — Thales LAS France, Elancourt, France

For societal application Terawatt lasers able to operate at high repetition is required. In this framework we present our recent development on 100Hz, tens of TW capabilities Ti:Sa system with details on thermal issues encountered.

CA-P.4 13:00 Hall B0

**9.3-W 2.3-$\mu$m fs MOPA employing Cr:ZnS/ZnSe polycrystal rods** — •Weibo Wu[1,2], Yuchen Wang[2], Xiyue Zhang[2,3], Ting Yu[2], Jintai Fan[2], Pinghua Tang[1], and Long Zhang[2] — [1]School of Physics and Optoelectronics, Xiangtan University, Xiangtan, China — [2]Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [3]University of Chinese Academy of Sciences, Beijing, China

We present a single-pass MOPA system generating fs pulses at ~2.3 $\mu$m with 9.3 W average power, <120 fs pulse durations, and >150 MHz repetition rates. Efficiency is optimized using the ion concentration gradient in thermally diffused gain media.

CA-P.5 13:00 Hall B0

**Optimising single-frequency intra-cavity-doubled diamond Raman lasers** — •Adam Sharp[1], Osama Terra[1], Richard Pahlavani[1], Ondrej Kitzler[1], David Spence[1], Jipeng Lin[2], Tiago Ortega[2], and Richard Mildren[1] — [1]Macquarie University , Sydney, Australia — [2]EOS Space Systems Pty Ltd, Sydney, Australia

We present experimental results and theoretical analysis for optimising nonlinear output coupling in an intra-cavity frequency-doubled diamond Raman laser that can be applied to other lasers.

CA-P.6 13:00 Hall B0

**A simple 1 mJ Ti:Sapphire booster amplifier for the KALDERA plasma acceleration drive laser at 1 kHz** — •Cora Braun, Juan B. Gonzalez-Diaz, Timo Eichner, Thomas Hülsenbusch, Guido Palmer, and Andreas R. Maier — Deutsches Elektronen Synchrotron (DESY), Hamburg, Germany

We report on a robust design of a Ti:Sa Booster amplifier, that provides >1mJ, 25fs FTL pulses, part of the KALDERA laser-plasma-accelerator. It enables sub-percent energy stability in the subsequent amplifier stages via gain saturation.

CA-P.7 13:00 Hall B0

**Cooling Laser Media in a Turbulent or Instable Flow: Index-Leveling for Forced-Flow Face-Cooling of High-Power Amplifiers** — •Denis Marion[1], Jérôme Lhermite[1], Christophe Féral[1], Mathias Lachat[1,2], Duncan Sarton[1], Antoine Rohm[1], and Philippe Balcou[1] — [1]University of Bordeaux, CNRS, CEA ; CELIA UMR 5107, Talence, France — [2]CEA CESTA, Le Barp, France

This study presents a novel direct face-cooling technique for laser amplifiers, utilizing thermo-optical null point to mitigate turbulence effects, enhancing cooling efficiency and output power, paving the way for advanced high-power laser systems.

CA-P.8 13:00 Hall B0

**Stable intracavity frequency up-conversion for mid-infrared spectroscopy** — •Elena Fedorova, Søren M. M. Friis, and Lasse Høgstedt — NLIR ApS, Farum, Denmark

We present a stable and compact up-conversion module for the 2.0 - 5.0 $\mu$m spectrometer with the variation of the output signal within ± 1% peak-to-peak at 79 hours and standard deviation of 0.11% at 100 ms averaging time.

CA-P.9 13:00 Hall B0

**Exploration of type-I intermittency leading to chaos in a passively Q-switched Tm:YLF laser emitting at 2.3 $\mu$m** — •Matthieu Glasset, Hippolyte Dupont, Patrick Georges, and Frederic Druon — Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, , Palaiseau (91192), France

Experimental results, characterized using Poincare maps, entropy calculation and phase space reconstruction, uncover an unusual type-I intermittency route to chaos in 2.3$\mu$m Tm:YLF lasers. Moreover, co-lasing at 1.9$\mu$m gives atypical views of population dynamics.

CA-P.10 13:00 Hall B0

**Sub-30-fs Kerr-lens mode-locked Yb:CaF2 laser** — Huang-Jun Zeng[1], Zhang-Lang Lin[1], Pavel Loiko[2], Ge Zhang[1], Abdelmjid Benayad[2], Simone Normani[2], Patrice Camy[2], Chengbo Mou[3], Zhi-Chao Luo[4], Xavier Mateos[5], Valentin Petrov[6], and •Weidong Chen[1,6] — [1]State Key Laboratory of Functional Crystals and Devices, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, China — [2]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen, Caen Cedex, France — [3]The Key Laboratory of Specialty Fiber Optics and Optical Access Networks, Joint International Research Laboratory of Specialty Fiber Optics and Advanced Communication, Shanghai University, Shanghai, China — [4]Guangdong Provincial Key Laboratory of Nanophotonic Functional Materials and Devices, School of Optoelectronic Science and Engineering, South China Normal University, Guangzhou, China — [5]Universitat Rovira i Virgili (URV), Física i Cristal·lografia de Materials (FiCMA), Tarragona, Spain — [6]Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany

We demonstrate a soft-aperture Kerr-lens mode-locked Yb:CaF2 laser delivering soliton pulses as short as 29 fs at 1060.3 nm, with an average output power of 124 mW at a pulse repetition rate of 72 MHz.

CA-P.11 13:00 Hall B0

**Study of the fast dynamics of optical aberrations on Nd:glass flash-pumped kilojoule-class laser chains toward the coherent beam combining** — •Pierre Lebegue[1,2], Cyril Rapeneau[2], Doina Badarau[2], Marie Froidevaux[2], Joanna De Sousa[2], Loïc Meignien[2], Ivan Doudet[3], Nolan Chan[3], Benoit Wattellier[3], Patrick Audebert[2], Dimitris Papadopoulos[2], and Frédéric Druon[1] — [1]Laboratoire Charles Fabry, Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Palaiseau, France — [2]LULI, CNRS, École Polytechnique, CEA, Sorbonne Université, Institut Polytechnique de Pari, Palaiseau, France — [3] Phasics S.A, Saint-Aubin, France

We present a setup and an analysis of the wavefront evolution during the flash pumping time of a high-energy laser chain to design and conclude on the possibility of combining such large-scale high-energy chains.

CA-P.12 13:00 Hall B0

*withdrawn*

CA-P.13 13:00 Hall B0

**1 kHz, 10 mJ Yb:CaGdAlO4 amplifier** — •Fengchen Zhang[1], Geyang Wang[2], Wenlong Tian[3], Yang Yu[4], Yishan Wang[5], ZhiYi Wei[6], and Jiangfeng Zhu[7] — [1]Xidian university, Xi'an, China — [2]Xidian university, Xi'an, China — [3]Xidian university, Xi'an, China — [4]Xidian university, Xi'an, China — [5]Xi'an Institute of Optics and Precision,Mechanics, Xi'an, China — [6]Institute of Physics, Beijing, China — [7]Xidian university, Xi'an, China

This paper reported a pulsed pump, two-stage, dual-pass Yb:CaGdAlO4 amplifier, which delivers 1 kHz,10.8 mJ pulse energy with a compressed pulse duration of 310 fs.

CA-P.14 13:00 Hall B0

**Tunable mid-infrared ultrafast soliton molecules from a Kerr-lens mode-locked few-cycle Cr:ZnS laser** — •Xiyue Zhang[1,2], Yuchen Wang[1], Weibo Wu[1,3], Tinghui An[1,4], Yiguang Jiang[1], Jintai Fan[1], Benxue Jiang[5], Pinghua Tang[3], Gianluca Galzerano[6], Paolo Laporta[6,7], and Long Zhang[1] — [1]Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [2]University of Chinese Academy of Sciences, Beijing, China — [3]School of Physics and Optoelectronics, Xiangtan University, Xiangtan, China — [4]ShanghaiTech University, Shanghai, China — [5]School of Physics Science and Engineering, Tongji University, Shanghai, China — [6]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche, Milano, Italy — [7]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy

We demonstrate the generation and precise manipulation of soliton molecules using a Kerr-lens mode-locked single-crystal Cr:ZnS laser, achieving pulse durations of 55-98 fs and temporal separations of 348-604 fs at 2.4 $\mu$m.

CA-P.15 13:00 Hall B0

**Improvement of beam ellipticity and amplification efficiency of two side cooled Yb:YAG thin rod using atomic-diffusion-bonding** — •Yasuhiro Kamba[1], Ryo Kageyama[1], Atsushi Fuchimukai[1], Taisuke Miura[1], Miyuki Uomoto[2,3], and Takehito Shimatsu[2,3] — [1]Gigaphoton Inc., Oyama, Japan — [2]Research Institute of Electrical Communication, Tohoku University, Sendai, Japan — [3]Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Sendai, Japan

Beam ellipticity of amplified beam of two side cooled ADB Yb:YAG thin rod amplifier was improved by optimizing the aspect ratio of gain media cross-section. We obtained almost complete circular beam at the 21.5-W output.

CA-P.16 13:00 Hall B0

**Sub-100 fs, 10 W Yb:CaAlYO$_4$ CPA Regenerative Amplifier a Front-end for Average Power Scaling of 0.1-1 MHz Yb-lasers** — Dimitar Velkov[1,2], Lyuben S. Petrov[1,2], Kaloyn Georgiev[1], Jan Bartoníček[3,4], Stephan Shishkov[1], Xiaodong Xu[5], and •Ivan Buchvarov[1,6] — [1]Physics Department, Sofia University , Sofia , Bulgaria — [2]IBPhotonics Ltd, Sofia, Bulgaria — [3]Extreme Light Infrastructure ERIC, Dolní Břežany, Czech Republic — [4]Department of Physics, Czech Technical University in Prague, Prague, Czech Republic — [5]Jiangsu Key Laboratory of Advanced Laser Materials and Devices, Xuzhou, China — [6]John Atanasoff Center for Bio and Nano Photonics, Sofia, Bulgaria

We show a straightforward method to boost the average power of sub-100 fs pulses up to 10 W using a Yb:CaYAlO$_4$ regenerative amplifier. The Yb-amplifier provides 1 MHz fs-pulses with a 21.5 nm bandwidth.

CA-P.17 13:00 Hall B0

**Highly Efficient Cryogenically Cooled Ho: YLF Oscillator** — •Miftar Ganija[1], Keiron Boyd[2], and Jesper Munch[1] — [1]The University of Adelaide, Adelaide, Australia — [2]Defence Science and Technology Group, Adelaide, Australia

We report on detail absorption spectra of Ho:YLF crystal and to the best of our knowledge the first cryogenically cooled Ho:YLF laser pumped by a unpolarised pump source with highest efficiency and diffraction limited beam quality.

CA-P.18 13:00 Hall B0

**Efficient Laser Operation of Cleaving Yb:CsGd(MoO4)2 Crystal** — Ghassen Zin Elabedine[1], Pavel Loiko[2], Anatoly Pavlyuk[3], Nikolay Naumov[3], Rosa Maria Solé[1], Alain Braud[2], Patrice Camy[2], Magdalena Aguiló[1], Francesc Díaz[1], and •Xavier Mateos[1] — [1]Física i Cristal·lografia de Materials (FiCMA), Universitat Rovira i Virgili (URV), Tarragona, Spain — [2]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France — [3]A.V. Nikolaev Institute of Inorganic Chemistry, Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia

Yb:CsGd(MoO4)2 crystal with a layered structure is grown and its polarized spectroscopy is studied. An Yb-laser employing mechanically cleaved crystal-plates generates 1.11 W at 1046 nm with 60.8% slope efficiency and a linear polarization.

CA-P.19 13:00 Hall B0

**Compact, high efficiency, continuous-wave, single frequency Watt-level 532nm and 561nm diode-pumped lasers based on a linear monolithic cavity** — Christophe BONNIN, Julien ROUVILLAIN, and •Thierry GEORGES — OXXIUS SAS, LANNION, France

Record 40%/30% optical efficiencies are demonstrated on 1.45W/1.11W CW 808nm diode end-pumped single-frequency 532nm/561nm linear monolithic lasers.

CA-P.20 13:00 Hall B0

*withdrawn*

CA-P.21 13:00 Hall B0

**Efficient Modeling of High-Energy Laser Amplifiers** — •Paul Quinoman, Julien Moreau, Hervé Coïc, and Jérôme Neauport — CEA CESTA, Le Barp F-33116, France

The modeling of time-dependent gain and heat spatial distribution of a high-energy laser amplifier is presented. For this purpose, a versatile and numerically efficient approach is developed and compared to experimental work of the literature.

CA-P.22 13:00 Hall B0

**Balancing Orthogonal Polarizations in Ytterbium-Doped Isotropic-Crystal Lasers: Effect of Crystal Disorder** — Herman Akagla[1], Pavel Loiko[2], Goulc'hen Loas[1], Abdelmjid Benayad[2], Patrice Camy[2], Weidong Chen[3], Marc Vallet[1], and •Marc Brunel[1] — [1]Institut FOTON, Rennes, France — [2]CIMAP, Caen, France — [3]Fujian Institute of Research on the Structure of Matter, Fuzhou, China

In isotropic crystals where dual-polarization oscillation is possible, the gain anisotropy induced by the pump polarization is strongly host-dependent, in relation with the crystal disorder. Pump-induced anisotropy is quantified in Yb:YAG, Yb:Lu:YAG, Yb:Na:CNGG, and Yb:CaF2.

CA-P.23 13:00 Hall B0

*withdrawn*

CA-P.24 13:00 Hall B0

**Fabrication of YAG/Yb:YAG microchip/Yb:YAG composite MOPA using room-temperature bonding** — •Sadafumi Ishizuka, Tomoya Yamada, and Ichiro Shoji — Chuo University, Tokyo, Japan

We fabricated a YAG/Yb:YAG microchip/Yb:YAG composite MOPA using the room-temperature bonding. The maximum power was 476 mW at the absorbed pump power of 9.42 W.

CA-P.25 13:00 Hall B0

**Numerical model of broadband pulse amplification in cryogenic Yb:YLF regenerative amplifiers** — •Alexey Yakovlev[1], Martin Kellert[1], Jelto Thesinga[1], Umit Demirbas[1], Muharrem Kilinc[1], Mikhail Pergament[1], and Franz X. Kärtner[1,2] — [1]Center for Free-Electron Laser Science CFEL, Deutsches Elektronen-Synchrotron DESY, Notkestr. 85, 22607 Hamburg, Germany — [2]Physics Department, University of Hamburg, Luruper Chaussee 149, 22761 Hamburg, Germany

We present a chromatic numerical model of gain dynamics based on rate equations in cryogenic $Yb^{3+}$ amplifiers, experimentally verified with broadband amplification in Yb:YLF. The model includes saturation effects, spectral evolution, and gain element temperature.

CA-P.26 13:00 Hall B0

**Thermal Dynamics in Titanium-Doped Sapphire Laser Crystal Pumped by a Pulsed Blue Laser Diode: A Discrete Element Analysis** — •Daniel Hug[1], Manuel Zeyen[1], Romain Carreto[2], Thomas Südmeyer[3], and Bojan Resan[1] — [1]University of Applied Sciences and Arts Northwestern Switzerland, Windisch, Switzerland — [2]TLD Photonics AG, Wettingen, Switzerland — [3]Université de Neuchâtel, Neuchâtel, Switzerland

We present a discrete element method that utilizes time-resolved analysis and temperature-dependent properties to model Ti:Sa crystals under pulsed blue laser diode pumping, showing stronger thermal lensing compared to CW pumping or constant-property models.

CA-P.27 13:00 Hall B0

**Airborne single longitudinal mode UV laser tailored for clear air turbulence detection** — •Johann Thurn, Raoul-Amadeus Lorbeer, Peter Mahnke, and Oliver Kliebisch — German Aerospace Center (DLR), Stuttgart, Germany

We developed a 3 kHz pulsed Nd:YAG amplifier for direct wind lidar in low aerosol environments. It operates in single longitudinal mode and delivers 1.7 mJ pulses at 355 nm with 6.9 ns pulse duration.

CA-P.28 13:00 Hall B0

**Spectrally-resolved Intensity Noise Measurement of Cr:ZnS Kerr-Lens Mode-locked Lasers** — •Jakub Jaworski and Maciej Kowalczyk — Wroclaw University of Science and Technology, Wroclaw, Poland

We present how to achieve ultra-low-noise performance in Cr:ZnS mode-locked lasers (relative intensity noise, RIN<0.007%) by minimizing power fluctuations of the pump source. We also report a spectrally-resolved RIN measurement for two Cr:ZnS lasers.

# CM-P: CM Poster Session

Time: Monday, 13:00–14:00 Location: Hall B0

CM-P.1 13:00 Hall B0

*moved to JSIII-P.6*

CM-P.2 13:00 Hall B0

**Segmented waveguides realized by single-shot femtosecond modifications in glass** — •Namig Alasgarzade[1], Alessandro Alberucci[1], Chandroth P. Jisha[1], and Stefan Nolte[1,2] — [1]Friedrich-Schiller-Universität Jena, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF,, Jena, Germany

We manufacture laser-written segmented waveguides in glass consisting in a chain of single-shot modifications. Control on the guiding properties by varying the period of the structure and the incident pulse energy is proved.

CM-P.3 13:00 Hall B0

**Space Debris Removal via Laser Ablation: Experimental Progress** — •Takayo Ogawa, Hiroshi Kasuga, Hideaki Yamane, Tomohiro Tsukihana, Yutaka Nagata, Katsuhiko Tsuno, Tatsuya Shinozaki, Noriko Kurose, Norihito Saito, and Satoshi Wada — RIKEN Center for Advanced Photonics, Saitama, Japan

We are researching space debris removal using laser ablation-generated thrust. Our work focuses on optimal lasers and developing a simulator to estimate thrust under various conditions. This presentation discusses thrust measurements using Q-switched ns lasers.

CM-P.4 13:00 Hall B0

**Investigation of high Bragg orders in ultrashort pulse written VBGs for applications in the blue spectral region** — •Malte P. Siems[1], Daniel Richter[1], Ria G. Krämer[1], Georg R. Schwartz[1], and Stefan Nolte[1,2] — [1]Friedrich-Schiller-University, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

We investigate the grating properties and absorption of high Bragg order resonances of ultrashort pulse written VBG in fused silica to evaluate their potential for applications in the blue spectral region.

CM-P.5 13:00 Hall B0

**Influence of Inscription Strategies on Group Delay Ripples in fs-written Chirped Fiber Bragg Gratings** — •Georg R. Schwartz[1], Malte P. Siems[1], Ria G. Krämer[1], Daniel Richter[1], and Stefan Nolte[1,2] — [1]Friedrich Schiller University Jena, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

Aside highly tailored dispersion properties group delay ripples are key characteristics of CFBGs for CPA systems. For fs phase mask written CFBGs we discuss inscription strategies for optimizing performance with respect to group delay ripples.

CM-P.6 13:00 Hall B0

**Influence of the polarization state on femtosecond laser-written longitudinal waveguides in silicon** — •Namig Alasgarzade[1], Markus Blothe[1], Maxime Chambonneau[1], Chandroth P. Jisha[1], Alessandro Alberucci[1], and Stefan Nolte[1,2] — [1]Friedrich-Schiller-Universität Jena, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

Longitudinal waveguides were inscribed in silicon using femtosecond laser pulses with linear and circular polarization. Characterization showed polarization-dependent morphology, refractive index changes, and nanostructure orientation, confirmed by Raman spectroscopy, SEM analysis, and waveguiding analysis.

CM-P.7 13:00 Hall B0

**Holmium-based solid-state ultrafast lasers for science and industry** — •Michael Müller[1,2], Célia Millon[1,2], Anna Suzuki[1], Boldizar Kassai[1], Yicheng Wang[1], and Clara J. Saraceno[1] — [1]RayVen Laser, Bochum, Germany — [2]Ruhr-Universität Bochum, PULS, Bochum, Germany

We present on the development of our compact ultrafast 2.1$\mu$m lasers and their application for materials processing of silicon, polymers, and glasses.

CM-P.8 13:00 Hall B0

**Phase Mask Integrated Aperture Shaping for Efficient Writing of Multiple Notch Filters in the Form of Fiber Bragg Gratings** — •Ria G. Krämer[1], Samuel L. Döpfner[1], Malte P. Siems[1], Georg R. Schwartz[1], Daniel Richter[1], and Stefan Nolte[1,2] — [1]Friedrich Schiller University Jena, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

For a reliable control of the spectral shape of fiber Bragg grating based integrated filters we present the integration of a shaping aperture into the phase mask for the femtosecond writing process.

CM-P.9 13:00 Hall B0

**Femtosecond Laser Ablation of Aluminium: Numerical Modelling and Experimental Validation** — •Enrique Castaño[1,2], Luis Omenaca[1,2], and Mikel Gomez-Aranzadi[1,2] — [1]CEIT-Basque Research and Technology Alliance (BRTA), San Sebastián, Spain — [2]Universidad de Navarra, Tecnun, San Sebastián, Spain

A two-temperature model for aluminium ablation with ultrafast lasers has been proposed and validated. Our model incorporates the dependencies of temperature on both electron and phonon lattices achieving good agreement between simulated and experimental results.

CM-P.10 13:00 Hall B0

**High-Power Laser-Induced Synthesis of Ni-Based Metal-Organic Framework for Electrocatalytic, and Glucose-Sensing Applications** — Saliha Mutlu[1,2], Bülend Ortaç[2], Ali Karatutlu[2], Taylan Gorkan[2], Engin Durgun[2], Dilek Söyler[3], Saniye Söylemez[3], •Sevil Savaşkan Yılmaz[1,2], and Nergis Arsu[4] — [1]Department of Chemistry, Karadeniz Technical University, 61080, Trabzon , Turkey — [2]National Nanotechnology Research Center (UNAM) and Institute of Materials Science Nanotechnology, Bilkent University, 06800, Ankara , Turkey — [3]Department of Biomedical Engineering Necmettin Erbakan University, 42090, Konya , Turkey — [4]Department of Chemistry, Yildiz Technical University, Davutpasa Campus, 34220, Istanbul , Turkey

We demonstrate the high-power laser-driven rapid synthesis of Ni-MOFs in 70 min and their applications in electrocatalysis, gas, and glucose sensing with an LOD of 13.96 $\mu$M and a high sensitivity of 120.606 $\mu$AmM−1cm−2.

CM-P.11 13:00 Hall B0

*withdrawn*

CM-P.12 13:00 Hall B0

**Fabrication of optical geometric phase elements in sapphire by ultrashort pulses** — •Edvinas Aleksandravičius, Gabrielius Kontenis, Indrė Meškėlaitė, and Darius Gailevičius — Vilnius university, Laser Research Center, Vilnius, Lithuania

Sapphire has many advantages over other materials, however an issue arises when attempting to fabricate phase elements. We show that ultrashort laser pulses down to 60 fs significantly reduce induced stress and likelihood of cracking.

CM-P.13 13:00 Hall B0

**Comparison of Broadband Loss in Fiber Bragg Gratings Manufactured with UV Phase Mask and Direct Writing Techniques** — •Alexander Roehrl, Silas Heissel, Fabian Buchfellner, and Johannes Roths — Photonics Lab, Munich University of Applied Sciences, Munich, Germany

This study compares broadband transmission losses in fiber Bragg gratings manufactured via UV phase mask and femtosecond laser line-by-line techniques across three fiber types, revealing fiber- and method-specific attenuation coefficients.

CM-P.14 13:00 Hall B0

**Laser-induced sintering of Titanium niobates (TNOs) from TiO2-Nb2O5 powders** — Gonzalo Gomez-Munoz[1], Paloma Fernandez[2], Javier Solis[1], and •Belen Sotillo[2] — [1]Instituto de Óptica "Daza de Valdés" - CSIC, Madrid, Spain — [2]Departamento de Física de Materiales - UCM, Madrid, Spain

An ultrafast laser powder bed fusion approach has been used to induce the sintering of continuous Titanium niobates layers with improved electrical performance starting from a mixture of TiO2-Nb2O5 powders.

CM-P.15 13:00 Hall B0

**Fast Laser Drilling on SiC-CMC Using Hybrid ArF Excimer Laser** — •Takashi Onose, Hironori Igarashi, Hiroaki Motosugi, Atsushi Fuchimukai, and Taisuke Miura — Gigaphoton Inc., 400 Yokokurashinden, Oyama-shi, Tochigi , Japan

Fast laser drilling on tilted SiC ceramics matrix composite (SiC-CMC) using the hybrid ArF excimer laser was demonstrated. The processing time of a single 30° diagonal hole on 2-mm thick SiC-CMC plate was 50.3 seconds.

CM-P.16 13:00 Hall B0

**Integrated Femtosecond Laser System for Precision Surface Patterning and High-Speed Cutting of Intraocular Lenses** — Gizem Alpakut[1], Burak Kara[1], Sungur Ozkan[1], Ibrahim Atespare[2], Elif Yaroglu[3], Orhun Uysal[3], Mehmet Burcin Unlu[4], Bora Akgun[1], Onur Ferhanoglu[5], and •Seydi Yavas[1,2,4] — [1]Department of Physics, Bogazici University, Istanbul, Turkey — [2]Lumos Laser Inc, Istanbul, Turkey — [3]VSY Biotechnology, Istanbul, Turkey — [4]Faculty of Engineering, Ozyegin University, Istanbul, Turkey — [5]Department of Electrical-Electronics Engineering, Istanbul Technical University, Istanbul, Turkey

We demonstrate a femtosecond laser-based approach for fabricating intraocular lenses with precise Fresnel zone patterns (1.1 $\mu$m depth modulation) and rapid cutting (<40 s/lens), enabling trifocal functionality and compatibility with industrial production.

CM-P.17 13:00 Hall B0

**Ablation of transparent materials with sub-100 fs pulses** — •Gregor Hehl[1], Mario Ochoa[2], Rashad Esloughi[1], Cheriyan Varghese[1], Moinuddin Kadiwala[1], and Oleg Pronin[1] — [1]Helmut Schmidt University, Hamburg, Germany — [2]Universidad de Cantabria, Santander, Spain

We systematically study and show benefits of ablation of different glasses, crystals and ceramics with <50 fs pulses vs >200 fs at 1030 nm central wavelength.

CM-P.18 13:00 Hall B0

**Through-Hole Drilling of Polyimide Films Using a Short-Pulse CO2 Laser and Vapor-Absorption-Based Water Assistance** — •Kazuyuki Uno — University of Yamanashi, Kofu, Japan

This study demonstrates a reduction in the heat-affected zone (HAZ) size during hole-drilling of polyimide (PI) films using a short-pulse CO2 laser combined with a novel vapor-absorption-based water assistance method.

CM-P.19 13:00 Hall B0

**NV color center generation in CVD diamond by fs-laser processing at different conditions** — Lucas Nolasco, Sebastiao Pratavieira, and •Cleber Mendonca — University od Sao Paulo, Sao Carlos, Brazil

A study of the fs-laser-induced generation of nitrogen-vacancy centers in CVD diamond was performed at distinct laser fluences and pulse durations to study conditions for its generation, which implications for developing novel quantum technologies

CM-P.20 13:00 Hall B0

**Integrating an equation of state and material separation to improve FEM-based solid mechanics simulations of ultrafast laser ablation** — •Julian Vollmann[1], David Redka[1,2], Ján Minár[2], Heinz Paul Huber[1,2], and Phillip Schmid[1] — [1]Department of Applied Sciences and Mechatronics, Munich University of Applied Sciences HM, Munich, Germany — [2]New Technologies-Research Centre, University of West Bohemia, Pilsen, Czech Republic

We introduce a finite element solid mechanics model for ultrafast laser ablation, incorporating an equation of state and spallation. This improves accuracy over isobaric solid mechanics simulations, matching hydrodynamic frameworks while providing a user-friendly alternative.

CM-P.21 13:00 Hall B0

**First-Principles Investigation of Thermal Transport Properties in Ti6Al4V for Ultrafast Laser Ablation** — •Korbinian Hobmaier[1], David Machenschalk[1], David Redka[1,2], Ján Minár[1,2], and Heinz Huber[1,2] — [1]Munich university of applied sciences, Munich, Germany — [2]New Technologies Research Center, University of West Bohemia, Plzeň, Czech Republic

This study uses DFT calculations to determine thermal transport properties of Titanium and Ti-6Al-4V for ultrafast laser ablation, highlighting phase-dependent variations in electronic heat capacity, electron-phonon coupling, and thermal conductivity for improved two-temperature model predictions.

CM-P.22 13:00 Hall B0

**Ultrafast filamentary excitation process in glass during Bessel beam irradiation** — •Ryota Hasegawa, Guoqi Ren, Sota Kiriake, Yanming Zhang, Naohiko Sugita, and Yusuke Ito — The university of Tokyo, Tokyo, Japan

Forming uniform filamentary excitation regions in glass is important for high-aspect-ratio drilling needed in the semiconductor industry. This study visualized the picosecond dynamics and showed the importance of suppression of multi-photon absorption.

CM-P.23 13:00 Hall B0

**Water Repellency of Laser-Textured Aluminum Surfaces Compared to its Polymer Imprints** — Oleksiy Myronyuk[1], •Aleksej M. Rodin[2], and Augustė Černeckytė[2] — [1]Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine — [2]Center for Physical Sciences and Technology, Vilnius, Lithuania

The water repellency of pico- and femtosecond laser textured aluminum dies was studied in comparison with their imprints on polymeric materials such as polydimethylsiloxane and polyethylene, revealing the influence of residual laser

processing defects.

# EA-P: EA Poster Session

Time: Monday, 13:00–14:00 Location: Hall B0

EA-P.1 13:00 Hall B0

**Impeded Bloch Oscillation and Nonlinear Landau-Zener Tunneling of Bose-Einstein Liquid Droplets in Optical Lattices** — Yu-Wen Wang[1,3], Szu-Cheng Cheng[2], and •Wen-Hsuan Kuan[1] — [1]Department of Applied Physics and Chemistry, University of Taipei, Taipei, Taiwan — [2]Department of Optoelectric Physics, Chinese Culture University, Taipei, Taiwan — [3]Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taipei, Taiwan

Surface breathing helps stabilize Bose-Einstein liquid droplets against deformation induced by the Lee-Huang-Yang damp, resulting in the self-bound phenomena by destroying the Bloch oscillation. Nonlinear Landau-Zener tunneling is also suppressed under the Lee-Huang-Yang interaction.

EA-P.2 13:00 Hall B0

**Towards Spectral Matching of Photons from Dissimliar Sources for Quantum Interference** — •Luis Matheis[1], Jan Krzyzanowski[2], Gregor Weihs[1], Michal Karpinski[2], and Robert Keil[1] — [1]University of Innsbruck, Innsbruck, Austria — [2]University of Warsaw, Warsaw, Poland

We present our progress towards spectral bandwidth matching of two quantum light sources, a GaAs/AlGaAs quantum dot and a spontaneous parametric down-conversion source. We present spectral and temporal performance of the quantum dot light source.

EA-P.3 13:00 Hall B0

**Towards the observation of collective radiance phenomena in a one-dimensional array of waveguide-coupled atoms with sub-$\lambda/2$ spacing** — •Lucas Pache , Hector Letellier, Martin Cordier, Max Schemmer , Philipp Schneeweiss, Jürgen Volz, and Arno Rauschenbeutel — Humboldt University of Berlin, Institute of Physics , Berlin, Germany

We realize a novel nanofiber-based dipole trapping scheme where the individual trap distance is about 35% of the atoms' resonance wavelength. This allows us to study collective radiance phenomena in an 1D-array of Cesium atoms.

EA-P.4 13:00 Hall B0

**Telecom single photon source based on nonlinear photon transport in hot atomic vapor** — •Inna Kviatkovsky[1], Lucas Pache[1], Leonid Yatsenko[2], Viola-Antonella Zeilberger[1], Martin Cordier[1], Philipp Schneeweiss[1], Jürgen Volz[1], and Arno Rauschenbeutel[1] — [1]Humboldt University of Berlin, Berlin, Germany — [2]nstitute of Physics, National Academy of Sciences of Ukraine, Kyiv, Ukraine

We present our progress in addressing the key challenges of nonlinear photon transport in Rubidium vapor, aiming to develop a technologically relevant filter that produces narrow-band single photons, compatible with atomic transitions.

EA-P.5 13:00 Hall B0

**Two-photon Interference under Modified Phonon-Induced Dephasing Isolated from Effects of Temporal Correlation** — •Jaewon Lee[1], Charlie Stalker[1], Loris Cholicchio[1], Fernando Cardoso[2,1], Jan Seelbinder[1], Sven Höfling[3], Christian Schneider[4], Celso Villas-Boas[2], and Ana Predojević[1] — [1] Department of Physics, Stockholm University, Stockholm, Sweden — [2] Departamento de Física, Universidade Federal de São Carlos, São Paulo, Brazil — [3] Technische Physik, Universität Würzburg, Würzburg, Germany — [4]Institut of Physics, University of Oldenburg, Oldenburg, Germany

This study examines temperature-dependent phonon-induced decoherence effects on Hong-Ou-Mandel visibility using a single quantum dot source, isolating decoherence impacts while maintaining temporal correlations, with experimental measurements and theoretical coherence time calculations presented.

EA-P.6 13:00 Hall B0

*withdrawn*

EA-P.7 13:00 Hall B0

**High-Efficiency Photon-Pair Sources Via Two-Photon Polymerized Strip-Loaded Lithium Niobate Waveguides** — •Muhamed Sewidan[1,3], Alexandra Rittmeier[2,3], Laura Bollmers[4,5], Silia Babel[4,5], Elisavet Chatzizyrli[2,3], Laura Padberg[4,5], Christof Eigner[5], Christine Silberhorn[4,5], Douglas Bremner[6], Andreas Wienke[2,3], Dietmar Kracht[1,2,3], Moritz Hinkelmann[2,3], and Michael Kues[1,2,3] — [1]Institute of photonics, Leibniz University Hannover, Hannover, Germany — [2]Laser Zentrum Hannover e.V., Hannover, Germany — [3]Cluster of Excellence PhoenixD, Leibniz University Hannover, Hannover, Germany — [4]Integrated Quantum Optics Group, Department of Physics, Paderborn University, Paderborn, Germany — [5]Institute for Photonic Quantum Systems, Paderborn University, Paderborn, Germany — [6]Alter Technology UK Ltd, Livingston, United Kingdom

Two-photon polymerization enables rapid, cost-effective fabrication of strip-loaded waveguides in periodically poled lithium niobate, achieving high photon pair generation rates and substrate reusability, offering a scalable alternative to traditional lithography-based methods for quantum photonic devices.

EA-P.8 13:00 Hall B0

**Indistinguishable heralded photon pairs from a whispering gallery resonator** — Sheng-Hsuan Huang[1,2], •Thomas Dirmeier[1,2], Golnoush Shafiee[1,2], Kaisa Laiho[3], Dmitry Strekalov[2], Andrea Aiello[2], Gerd Leuchs[1,2], and Christoph Marquardt[1,2] — [1]Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany — [2]Max Planck Institute for the Science of Light, Erlangen, Germany — [3]German Aerospace Center (DLR e.V.), Institute of Quantum Technologies, Ulm, Germany

We demonstrate Hong-Ou-Mandel interference between heralded photons generated in two degenerate counterpropagating modes in a whispering-gallery resonator at extremely low powers. At highest the visibility reaches a value above 74% agreeing well with the theory.

EA-P.9 13:00 Hall B0

**Quantum noise locking of squeezed light generated in periodically poled $LiNbO_3$ waveguides** — •Erik A.T. Svanberg, Hilma Karlsson, Katia Gallo, and Vaishali Adya — Department of Applied Physics, KTH Royal Institute of Technology, Stockholm, Sweden

Quantum noise locking is demonstrated with squeezed vacuum generated from waveguides as an alternative to convential locking schemes. This paves the way for a simple, controlled, high-bandwidth, low jitter, squeezed light source at telecom wavelengths.

EA-P.10 13:00 Hall B0

*withdrawn*

EA-P.11 13:00 Hall B0

**Characterization of a monolithic cavity for high-purity single-photon generation via pulsed SPDC** — •Xavier Barcons Planas[1,2], Helen M. Chrzanowski[1], and Janik Wolters[2,3] — [1]Humboldt-Universität zu Berlin, Berlin, Germany — [2]German Aerospace Center, Berlin, Germany — [3]Technische Universität Berlin, Berlin, Germany

The generation of spatially and spectrally pure single photons is critical for photonic quantum technologies. We realize single-photon emission with high-purity using pulsed spontaneous parametric down-conversion in a monolithic crystal cavity.

EA-P.12 13:00 Hall B0

**Potentialities of SiPMs in Quantum Optics: is it possible to use a single detector for coincidence measurements?** — •Giuseppe Di Blasio, Ilaria Bargigia, Antonio Pifferi, Giulio Nicola Felice Cerullo, and Alberto Dalla Mora — Politecnico di Milano, Milano, Italy

In this work we explore the unique properties of a silicon photomultiplier coupled with radiofrequency custom-designed front-end electronics to achieve simultaneous-photon counting within a single detector, which could open to potential breakthroughs in quantum optics.

EA-P.13 13:00 Hall B0

**Experimental Generation and Characterization of Multimode Squeezed Light in a Synchronously Pumped Optical Parametric Oscillator** — •Edoardo Suerra[1,2], Francesco Canella[3], Dario Giannotti[4,2], Samuele Altilia[1,2], Gianluca Galzerano[3,2], and Simone Cialdi[1,2] — [1]Università degli Studi di Milano, Dipartimento di Fisica, Milan, Italy — [2]Istituto Nazionale di Fisica Nucleare, Sezione di Milano, Milan, Italy — [3]Istituto di Fotonica e Nanotecnologie – Consiglio Nazionale delle Ricerche, Milan, Italy — [4]Politecnico di Milano, Dipartimento di Fisica, Milan, Italy

We present an experimental setup for generating and characterizing multimode squeezed light in a synchronously pumped optical parametric oscillator. The system allows precise control of spectral properties to investigate squeezing dependence on key experimental parameters.

EA-P.14 13:00 Hall B0

**Single-beam Bose-Einstein condensate source: a demonstration of optical-grating and magnetic chip hybridization for onboard quantum sensors** — •Romain Calviac[1], Antoine Rouxel[2], Antoine Monmayrant[2], Olivier Gauthier-Lafaye[2], Alexandre Gauguet[3], and Baptiste Allard[3] — [1]LP2N Institut d'Optique d'Aquitaine, Talence, France — [2]LAAS-CNRS, Université de Toulouse, Toulouse, France — [3]LCAR, Université Toulouse III—Paul Sabatier, Toulouse, France

Compact, robust sub-recoil atomic sources are essential for onboard quantum sensors. We present a novel grating-based magnetic chip capable of generating rubidium Bose-Einstein condensates using a single beam, a step forward for onboard quantum sensors.

EA-P.15 13:00 Hall B0

**Restoring Two-Photon Quantum Correlations Using Even-Parity Optimization** — •Kiran Bajar, Rounak Chatterjee, Vikas S. Bhat, and Sushil Mujumdar — Tata Institute of Fundamental Research, Mumbai, India

Using an SLM for wavefront correction, we experimentally restore spatially entangled two-photon correlations with high efficiency. By correcting only even-parity distortions in the far field, we rapidly enhance the correlations, improving experimental robustness.

EA-P.16 13:00 Hall B0

**Spin-orbit coupling in optical microcavities** — •Jonah Post and Martin van Exter — Leiden University, Leiden, Netherlands

We measure and characterize the eigenmodes of open-access plano-concave Fabry-Perot microcavities. Optical spin-orbit coupling, upon reflection from the curved mirror, is one of the mode shaping effects. Others are non-paraxiality, mirror astigmatism and spherical aberration.

EA-P.17 13:00 Hall B0

*withdrawn*

EA-P.18 13:00 Hall B0

*withdrawn*

EA-P.19 13:00 Hall B0

**Pulse compression to enhance photon-pairs brightness in hollow-core photonic crystal fiber based source** — •Yasmine Asselah[1], Antoine Pochet[2], Foued Amrani[2], Frédéric Delahaye[2], Benoît Debord[1,2], Frédéric Gérôme[1,2], and Fetah Benabid[1,2] — [1]Xlim Research Institute, Limoges, France — [2]GLOphotonics, Limoges, France

We report on the use of pulse compressor to improve performances of our photon-pairs source based on Xenon-filled hollow-core photonic crystal fiber. Compression from 280fs to 35fs enabled brightness enhancement by a factor of 7.7.

EA-P.20 13:00 Hall B0

*withdrawn*

# EC-P: EC Poster Session

Time: Monday, 13:00–14:00 Location: Hall B0

EC-P.1 13:00 Hall B0

**Generation of Self-Dual Lorentz-Invariant Toroidal Light Pulses** — •Luka Vignjevic[1], Yijie Shen[2], Nikitas Papasimakis[1], and Nikolay Zheludev[1,3] — [1]Optoelectronics Research Centre & Centre for Photonic Metamaterials, University of Southampton, Southampton, United Kingdom — [2]Centre for Disruptive Photonic Technologies & The Photonics Institute, Nanyang Technological University, Singapore, Singapore — [3]Texas A&M University, Institute for Advanced Study, College Station, USA

We present the experimental generation of self-dual pulses of toroidal topology, invariant under Lorentz boosts. They will be of interest in telecommunications, spectroscopy, and particle acceleration.

EC-P.2 13:00 Hall B0

*withdrawn*

EC-P.3 13:00 Hall B0

**Improving Imaging Resolution with Topologically Structured Light** — •Thomas A Grant[1], Eric Plum[1], Nikolay I Zheludev[1,2], and Kevin F MacDonald[1] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]. Hagler Institute for Advanced Study, Texas A&M University, Texas, USA

In imaging, the information content of a scattered field increases orders of magnitude with topologically structured (as opposed to unstructured) light. On this basis, we demonstrate a multi-fold improvement in binary object imaging resolution.

EC-P.4 13:00 Hall B0

**Focusing based on singular eigenstates in non-Hermitian systems** — •Konstantinos Makris[1] and Demetri Psaltis[2] — [1]Institute of Electronic Structure and Laser (IESL)-FORTH, Heraklion, Greece — [2]Optics Laboratory, Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland, Lausanne, Switzerland

We present a singular value decomposition method for achieving a tight focus with controllable power at the output of a multimode non-Hermitian fiber. Connections to other methods, like reverse propagation and transmission matrices are discussed.

EC-P.5 13:00 Hall B0

*withdrawn*

EC-P.6 13:00 Hall B0

*withdrawn*

EC-P.7 13:00 Hall B0

**Generation of Higher-order Optical Angular Momentum Beams using In-fibre Mode Converter and Spiral Phase Plate** — •Natasha Vukovic[1], Konstantin K. Bobkov[1], Peter Shardlow[2], Christophe A. Codemard[2], and Michalis N. Zervas[1] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]TRUMPF Lasers UK, Southampton, United Kingdom

We demonstrate the generation of higher-order vortex beams using an in-fibre mode converter and a spiral phase plate (SPP), controlling topological charge by breaking fibre LPm1 mode degeneracy and adjusting azimuthal order and SPP charge.

EC-P.8 13:00 Hall B0

*withdrawn*

EC-P.9 13:00 Hall B0

**Photonic spin-Hall effect in bulk twisted anisotropic media** — Chandroth P. Jisha[1], Lorenzo Marrucci[2], Stefan Nolte[1,3], and •Alessandro Alberucci[1] — [1]Friedrich Schiller University Jena, Institute of Applied Physics, Jena, Germany — [2]Dipartimento di Fisica "Ettore Pancini", Università di Napoli Federico II, Napoli, Italy — [3]Fraunhofer Institue for Applied Optics and Precision Engineering IOF, Jena, Germany

We demonstrate theoretically the polarization-dependent trajectories in the volume of twisted anisotropic materials. Such a photonic spin-Hall effect is explained by introducing a fictitious potential vector proportional to the gradient in the twist angle.

EC-P.10 13:00 Hall B0

**Propagation of Optical Vortex Constellations** — •Niladri Modak[1], Rafael Barros[1,2], Marco Ornigotti[1], and Robert Fickler[1] — [1]Tampere University, Tampere, Finland — [2]Universidade de Sao Paulo, Sao Paulo, Brazil

We experimentally study the free-space propagation of optical vortex constellations, a combination of unit charge vortices in a higher-order vortex beam, by capturing the elementary symmetric polynomials of the constellation coordinates.

EC-P.11 13:00 Hall B0

**Fabrication of Pancharatnam-Berry Waveguides Using Nanogratings** — •Stree Vithya Arumugam[1], Chandroth Pannian Jisha[1], Alessandro Alberucci[1], and Stefan Nolte[1,2] — [1]Friedrich Schiller University, Institute of Applied Physics, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

We fabricated a Pancharatnam-Berry (PBP) waveguide by stacking patterned half-waveplates inscribed by femtosecond laser writing and characterized its spin-dependent response.

EC-P.12 13:00 Hall B0

**Topological extended doublons formed by drive-induced non-local interactions** — •Julius Beck[1], Helena Drüeke[1], Marcus Meschede[1], Matthias Heinrich[1], Francesco S. Piccioli[1,2], Sebastian Weidemann[1], Joshua Feis[1], Dieter Bauer[1], and Alexander Szameit[1] — [1]Insitute of physics, University Rostock, Rostock, Germany — [2]INO-CNR BEC, Universita 'di Trento, Povo, Italy

We show how non-local particle interactions can be experimentally implemented by a combination of dimensional mapping and non-adiabatic driving. This enables the formation of topologically protected bound particle pairs, so called doublons.

# ED-P: ED Poster Session

Time: Monday, 13:00–14:00 Location: Hall B0

ED-P.1 13:00 Hall B0

*withdrawn*

ED-P.2 13:00 Hall B0

**Complete optical field reconstruction of optical frequency combs generated by gain-switching using the Gerchberg-Saxton algorithm** — •Alejandro Rosado[1,2], Ignacio Esquivias[3], Minghao Wei[1,2], Aleksandra Kaszubowska-Anandarajah[1,2], and Prince M. Anandarajah[1,2] — [1]Photonics Systems and Sensing Lab, School of Electronic Engineering, Dublin City University, Dublin, Ireland — [2]CONNECT Research Centre, Dunlop Oriel House, Trinity College Dublin, Dublin, Ireland — [3]CEMDATIC - E.T.S.I. Telecomunicación, Universidad Politécnica de Madrid, Madrid, Spain

This study presents the first numerical application of the Gerchberg-Saxton algorithm for phase retrieval in optical frequency combs generated by gain-switching, enabling precise optical field reconstruction and simplifying experimental phase characterization for several photonic applications.

ED-P.3 13:00 Hall B0

**Dual comb shape sensing spectroscopy** — •Hani Kbashi, Alberto Cuevas, and Sergey Sergeyev — Aston Institute of Photonic Technologies, Aston University , Birmingham,, United Kingdom

This work demonstrates the experimental application of dual-comb FBG shape sensing spectroscopy. Interferogram beating peaks were analyzed using spatiotemporal evolution, and FBG strain and rotation sensitivities of 3.5 Hz/$\mu\epsilon$ and 0.95 Hz/° were achieved.

ED-P.4 13:00 Hall B0

**An RIZ-Band Astrocomb with Versatile Offset Control** — •Kamalesh Dadi, Yuk Shan Cheng, William Newman, Jake M. Charsley, Richard A. McCracken, and Derryck T. Reid — Institute of Photonics and Quantum Sciences, School of Engineering and Physical Sciences, Heriot-Watt University , Edinburgh, United Kingdom

We present an offset-tunable RIZ-Band astrocomb for precise pixel-level characterization of astronomical spectrograph detectors. The control on the astrocomb mode offset is achieved using frequency tuning of a feedback-feedforward integrated cw laser marker.

ED-P.5 13:00 Hall B0

**Laser frequency comb for the NIRPS spectrograph** — •Christopher Bonzon[1], Ewelina Obrzud[1], Lionel Bischof[1], Séverine Denis[1], Lina Beltrán[1], Nicolas Torcheboeuf[1], Christoph Hofer[1], Jean Berney[1], Gaspare Lo Curto[2], Francesco Pepe[3], Tobias Schmidt[3], François Bouchy[3], and Steve Lecomte[1] — [1]CSEM, Neuchâtel, Switzerland — [2]ESO, Garching bei München, Germany — [3]UNIGE, Geneva, Switzerland

For the calibration of the NIRPS spectrograph, CSEM built a tailored turn-key laser frequency comb based on electro-optic modulation spanning a flat spectrum from 1200 to 1870 nm with a 15 GHz repetition rate.

ED-P.6 13:00 Hall B0

**Dual-Comb Functional Near-Infrared Spectroscopy for Perturbation Localization in Dispersive Media** — Roberto Barreiro[1], Frank Sanabria[1], Julio Posada[1], Pedro Martín-Mateos[2], J.L González-Mora[3], and •Cristina de Dios[2] — [1]Arquimea Research Center, Tenerife, Spain — [2]University Carlos III de Madrid, Leganés, Spain — [3]University of La Laguna, Tenerife, Spain

This work presents Dual Comb fNIRS for precise DTOF measurement in dispersive media, including backscattering. It demonstrates spatial perturbation localisation, offering a portable alternative to fMRI with potential in medical and neuroscience research.

ED-P.7 13:00 Hall B0

**Develpment of highly sensitive spectroscopy approach using a free-running dual-comb fiber laser** — •Yoshiaki Nakajima, Ryusei Uchiyama, Takehiko Mizuno, Naoki Takeshi, and Takumi Takahoshi — Toho University, Funabashi, Japan

For improving the sensitivity of the dual-comb fiber laser, frequency-domain digital signal processing was developed, enabling effective correction of frequency scale and position fluctuations and achieving accurate, high-sensitivity broadband absorption measurements of H13CN gas.

ED-P.8 13:00 Hall B0

**Absolutely stabilized, sub-kHz linewidth comb with automated locking and unified user interface** — •Jae-Ihn kim, Florian Figge, Maria Romodina, Daniel Heinrich, Michael Schmidt, Thomas Puppe, Christoph Stihler, Matthias Scholz, Sebastian Müller, and Ali Seer — Toptica Photonics AG, Gräfelfing, Germany

We present a reliable, automatically phase-locked optical frequency comb with simultaneously excellent short- and long-term stability, remotely controlled via a single user-interface. Applications include low-noise microwaves, precision spectroscopy, and quantum computing.

ED-P.9 13:00 Hall B0

**Simultaneous Measurement of Absolute Distance and Velocity Using a Single Electro-optic Frequency Comb based LiDAR** — Runmin Li[1], •Haochen Tian[2], Yang Liu[2], Dengfeng Dong[1], Lukasz Sterczewski[3], and Weihu Zhou[1] — [1]Institute of Microelectronics of the Chinese Academy of Sciences, Beijing, China — [2]National Institute of Metrology, Beijing, China — [3]Wroclaw University of Science and Technology, Wrocław, Poland

We demonstrated simultaneous ranging and velocimetry with high precision based on cascaded synthetic wavelength interferometry using a 25.3-GHz electro-optic frequency comb based LiDAR. The measurement results are validated by a HeNe interferometer.

ED-P.10 13:00 Hall B0

*withdrawn*

ED-P.11 13:00 Hall B0

**Spaceborn Precision Photonic Microwave Generator for Japanese Global Navigation Satellite System** — •Yuichi Takeuchi, Nozomu Takagi, Sou Aiba, Yushi Tanaka, Yusei Fujita, and Mitsuru Musha — Institute for laser science, The University of Electro-Communications, Tokyo, Japan

We have developed a spaceborne precision photonic microwave generation system with 10^-15 level which consists of a 1.5-um iodine stabilized laser and an all-fiber figure-8 mode-locked laser based optical frequency comb.

ED-P.12 13:00 Hall B0

**Phase noise characterization of an ultra-stable industrial clock laser system via cross-correlation analysis** — •Dewni Pathegama, Florian Schäfer, and Filippo Bregolin — TOPTICA Photonics AG, Gräfelfing, Germany

A characterization of a laser system at 729 nm, designed for quantum technologies is presented. Measured using a cross-correlation analysis of beat notes, the fractional frequency instability is below 4×10-16 at 1 s averaging time.

ED-P.13 13:00 Hall B0

*moved to EF-P.21*

ED-P.14 13:00 Hall B0

**Frequency Comb-based Spectroscopy of $O_2$ for Primary Thermometry** — Touko Uotila[1], Mikhail Roiz[1,2], Juho Karhu[1], Santeri Larnimaa[1], and •Markku Vainio[1,3] — [1]University of Helsinki, Helsinki, Finland — [2]Paderborn University, Paderborn, Germany — [3]Tampere University, Tampere, Finland

We present our first results from spectroscopic gas thermometry using both dual-comb and comb –assisted spectroscopy of molecular oxygen. We compare three different approaches: Doppler-broadening, rotational-state distribution, and line-strength ratio thermometry.

# PL-1: EQEC Plenary Talk and Award Ceremony

Time: Tuesday, 10:30–12:30 Location: ICM - Room 1

**Plenary** PL-1.1 10:30 ICM - Room 1

**Sub-Atomic Motions: From capturing electrons to probing human health** — •Ferenc Krausz — Max Planck Institute of Quantum Optics, Garching, Germany — Ludwig-Maximilians-Universität München, Munich, Germany — Center for Molecular Fingerprinting, Budapest, Hungary

Attosecond photography reveals subatomic motions, revolutionizing quantum and classical physics. Krausz's team, from 2001-2004, created attosecond pulses, promising faster electronics and better health monitoring, earning him prestigious awards, including the 2023 Nobel Prize.

# CF-4: Mid-Infrared Femtosecond Sources

Chair: Nicolas Forget, INPHYNI, Nice, France

Time: Tuesday, 14:00–15:30 Location: ICM - Room 1

**Invited** CF-4.1 14:00 ICM - Room 1

**Generation of Broadband Multi-mJ LWIR Pulses in Multicolor-Pumped ZGP NOPCPA** — •Rokas Jutas[1], Joris Roman[1], Ignas Astrauskas[1], Aref Imani[1], Paolo Carpeggiani[1], Pavel Polynkin[2], Edgar Kaksis[1], Tobias Floery[1], Jonas Kolenda[3], Tadas Bartulevičius[3], Kirilas Michailovas[3], Andrejus Michailovas[3,4], Andrius Baltuška[1,4], and Audrius Pugžlys[1,4] — [1]Photonics Institute, TU Wien, Vienna, Austria — [2]College of Optical Sciences, The University of Arizona, Tucson, USA — [3]Ekspla, Vilnius, Lithuania — [4]Center for Physical Sciences and Technology, Vilnius, Lithuania

Multicolor 2-$\mu$m pulses generated in non-collinearly-seeded, burst-pumped OPCPA non-collinearly pump LWIR OPCPA based on ZGP crystals. Broadband >9 $\mu$m pulses are amplified to sub-2 mJ energies, with the potential to be scaled beyond 10 mJ.

**Oral** CF-4.2 14:30 ICM - Room 1

**MHz-rate Cr:ZnS amplifier providing 2.7 W of pulses with sub-10-fs transform limit at 2.3 $\mu$m** — •Wei Liang[1,2], Džiugas Kimbaras[2,3], Alexander Fuerbach[4], Philipp Steinleitner[2], Claudio Cavecchi[3], Sebastian Gröbmeyer[1,5], Daiki Okazaki[2,6], Ferenc Krausz[1,2,3], and Alexander Weigel[1,2,3] — [1]Ludwig-Maximilians-Universität München, Garching near Munich, Germany — [2]Max-Planck-Institute of Quantum Optics, Garching near Munich, Germany — [3]Center for Molecular Fingerprinting, Budapest, Hungary — [4]School of Mathematical and Physical Sciences, Macquarie University, Macquarie Park, Australia — [5]Pulsed GmbH, Garching near Munich, Germany — [6]Institute for Chemical Research, Kyoto University, Kyoto, Japan

A single-pass Cr:ZnS amplifier with 3.4-W, 46-fs, $M^2$ = 1.1 output is presented. Spectral broadening in $TiO_2$ seeded by the amplifier output generates a sub-10-fs-supporting spectrum with an average power of 2.7 W.

**Oral** CF-4.3 14:45 ICM - Room 1

**High-power-seed Femtosecond Long-wave Infrared Difference Frequency Generators** — •Songyin Yu[1], Zhenyu Yang[1], Mengke Qin[1], and Zhaowei Zhang[1,2] — [1]School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan, China — [2]Wuhan National Laboratory for Optoelectronics, Wuhan, China

We present a high-power-seed difference-frequency-generator system using two signal pulse trains with the same power level from two optical parametric oscillators. Femtosecond pulses tunable over 5-20 $\mu$m and with 23% quantum conversion efficiency are obtained.

**Oral** CF-4.4 15:00 ICM - Room 1

**Application of External Electric Field on Laser Filaments for Ultrafast Mid-Infrared Sub-Cycle Pulse Stabilization** — •Neil Irvin Cabello[1], Shuto Nakamura[1], Yue Zhao[2], and Takao Fuji[1] — [1]Laser Science Laboratory, Toyota Technological Institute, Nagoya, Japan — [2]Graduate School of Engineering, College of Design and Manufacturing Technology, Muroran Institute of Technology, Muroran, Japan

We report on the stability improvement of laser filaments for mid-infrared (MIR) generation by the application of a strong electric field. Up to ~1.3% MIR stability, and consequently ~16.8% in the visible upconversion, were achieved.

**Oral** CF-4.5 15:15 ICM - Room 1

**Laser Pulse Shaping Capability at 2050 nm for Dielectric Laser Acceleration** — •Luca Genovese[1,2,3], Christoph Mahnke[1], Sarper H. Salman[1], Ingmar Hartl[1], Franz X. Kaertner[2,3], and Huseyin Cankaya[1] — [1]Deutsches Elektronen-Synchrotron DESY, Notkestraße 85, 22607, Hamburg, Germany — [2]Center for Free-Electron Laser Science, Deutsches Elektronen-Synchrotron DESY, Notkestraße 85, 22607, Hamburg, Germany — [3]University of Hamburg, Department of Physics, Luruper Chaussee 149, 22761, Hamburg, Germany

In this contribution, we demonstrate DAZZLER's pulse shaping capability at 2050nm. The dispersion management provided by DAZZLER potentially enhances dielectric laser acceleration performance.

# CI-3: Quantum Communications

Chair: Peter Horak, University of Southampton, Southampton, United Kingdom

Time: Tuesday, 14:00–15:30 Location: ICM - Room 4a

**Oral** CI-3.1 14:00 ICM - Room 4a

**Effect of polarization mode dispersion on spontaneous parametric down conversion photon pairs in coincidence counting** — •Tieme J. Walstra[1], Daan J. de Ruiter[1], Chigo Okonkwo[2], Tom D. Bradley[2], and Pepijn W.H. Pinkse[1] — [1]University of Twente, Enschede, Netherlands — [2]Eindhoven Technical University, Eindhoven, Netherlands

We used the Hong-Ou-Mandel effect to study the effect of polarization mode dispersion on SPDC photon pairs traveling in orthogonal polarization modes of a single-mode fiber, highlighting the unique properties of frequency anticorrelated photons.

**Oral** CI-3.2 14:15 ICM - Room 4a

**The Rome Quantum Key Distribution Network and the EuroQCI program** — Carlo Liorni, Giuseppe De Falco, Stefano Pepe, •Alessia Suprano, and Massimiliano Dispenza — Leonardo Innovation Labs, Quantum Technologies unit, Rome, Italy

This work presents the design and first results of the Rome Quantum Metropolitan Area Network, a Quantum Key distribution Network born as part of the Quantum Italy Deployment (QuID) project of EuroQCI.

**Oral** CI-3.3 14:30 ICM - Room 4a

**Quantum Communication with Photonic Integrated Circuits on a CubeSat** — •Jonas Pudelko[1,2], Ömer Bayraktar[1,2], Joost Vermeer[1,2], Luca Vill[1,2], Imran Khan[1,2], Winfried Boxleitner[3], Stefan Petscharnig[3], Christoph Pacher[3], Gerd Leuchs[1,2], and Christoph Marquardt[1,2] — [1]Max-Planck-Institut für die Physik des Lichts, Erlangen, Germany — [2]Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany — [3]AIT Austrian Institute of Technology GmbH, Vienna, Germany

Our CubeSat payload for the QUBE mission, launched in August, 2024, consists of a photonic integrated sender for weak coherent states and a quantum random number generator demonstrating miniaturized technology for satellite based quantum communication.

**Oral** CI-3.4 14:45 ICM - Room 4a

**Dynamically decoupled storage of single photons in a Pr3+:YSO quantum memory** — •Alberto E. Rodríguez-Moldes[1], Féclicien Appas[1], Jelena V. Rakonjac[1], Samuele Grandi[1], and Hugues de Riedmatten[1,2] — [1]ICFO - The Institute of Photonic Sciences, Barcelona, Spain — [2]ICREA - Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain

The storage time of quantum memories bounds the communication distance in a quantum repeater. We present the first dynamically decoupled storage of single photons in any atomic ensemble, and the longest storage in our platform.

**Oral** CI-3.5 15:00 ICM - Room 4a

**Heralded entanglement of on-demand spin-wave solid-state quantum memories for multiplexed quantum network links** — •Jonathan Hänni[1], Alberto E. Rodríguez-Moldes[1], Félicien Appas[1], Soeren Wengerowsky[1], Dario Lago-Rivera[1], Markus Teller[1], Samuele Grandi[1], and Hugues de Riedmatten[1,2] — [1]ICFO - Institut de Ciencies Fotoniques, The Barcelona Institute of Science and Technology, Castelldefels (Barcelona), Spain — [2]ICREA – Institucio Catalana de Recerca i Estudis Avançats, Barcelona, Spain

We demonstrate telecom-heralded entanglement between spatially separated on-demand spin-wave solid-state quantum memories over 15 temporal modes. We achieve conditional heralding rates over 500 counts/s with fully adjustable recall time.

**Oral** CI-3.6 15:15 ICM - Room 4a

**Variational Optical Processors** — •Charles Roques-Carmes, Aviv Karnieli, David AB Miller, and Shanhui Fan — Stanford University, Stanford CA, USA

We introduce "variational optical processors," self-configuring photonic net-

works that learn modal representations of partially coherent or quantum optical fields through optimization, applicable to diverse classical and quantum optical processing tasks.

## EA-5: Quantum Sources 1

Chair: Friederike Klauck, Institute of Physics, University of Rostock, Rostock

Time: Tuesday, 14:00–15:30 Location: ICM - Room 4b

**Oral** EA-5.1 14:00 ICM - Room 4b

**Ultra-fast Continuous-wave Homodyne Measurement of Schrödinger Cat States with 40-ps Wavepackets** — •Katsuki Nakashima[1], Tatsuki Sonoyama[1], Akito Kawasaki[1], Takumi Suzuki[1], Takahiro Kashiwazaki[2], Taichi Yamashima[2], Asuka Inoue[2], Takeshi Umeki[2], Masahiro Yabuno[3], Shigehito Miki[3], Hirotaka Terai[3], Kan Takase[4,5], Warit Asavanant[1,4,5], Mamoru Endo[1,5], and Akira Furusawa[1,4,5] — [1]Department of Applied Physics, School of Engineering, The University of Tokyo, 7-3-1 Hongo, Bunkyo, Tokyo, Japan — [2]NTT Device Technology Labs, NTT Corporation, 3-1 Morinosato, Atsugi, Kanagawa, Japan — [3]Advanced ICT Research Institute, National Institute of Information and Communications Technology, 588-2 Iwaoka, Nishi-ku, Kobe, Hyogo, Japan — [4]OptQC Corp., 1-16-15 Minami-Ikebukuro, Toshima, Tokyo, Japan — [5]Optical Quantum Computing Research Team, Riken Center for Quantum Computing, 2-1 Hirosawa, Wako, Saitama, Japan

This study demonstrates the continuous-wave homodyne measurement of Schrödinger cat states with an optical wavepacket width of 40 ps, overcoming previous limitations caused by photon detector timing jitter, using pulsed pump light for time-domain localization.

**Oral** EA-5.2 14:15 ICM - Room 4b

**Indistinguishability of remote quantum dot-cavity single-photon sources** — •Mathias Pont[1,2], Stephen C. Wein[2], Ilse Maillette de Buy Wenniger[1,3], Valentin Guichard[1], Nathan Coste[1,4], Abdelmounaim Harouri[1], Aristide Lemaître[1], Isabelle Sagnes[1], Loïc Lanco[1,5], Nadia Belabas[1], Niccolo Somaschi[2], Sarah E. Thomas[1,3], and Pascale Senellart[1] — [1]Université Paris-Saclay, Centre de Nanosciences et de Nanotechnologies, CNRS, Palaiseau, France — [2]Quandela SAS, Massy, France — [3]Department of Physics, Imperial College London, London, United Kingdom — [4]School of Mathematical and Physical Sciences, University of Technology Sydney, Ultimo, Australia — [5]Université Paris Cité, Centre de Nanosciences et de Nanotechnologies, CNRS, Palaiseau, France

We demonstrate interference fringe visibility between 44% and 69% for single photons emitted by four pairs formed from five distinct, remote, emitter-based bright single-photon sources — an important step toward scaling up optical quantum technologies.

**Oral** EA-5.3 14:30 ICM - Room 4b

**On demand single photon generation and coherent control of excitons from resonantly driven nanowire quantum dots.** — •Govind Krishna[1], Jun Gao[1], Edith Yeung[2,3], Lingxi Yu[2], Sayan Gangopadhyay[4], Kai-Sum Chan[2,5,6], Chiao-Tzu Huang[7], Thomas Descamps[1], Michael E. Reimer[4,8], Philip J. Poole[2], Dan Dalacu[2,3,5], Val Zwiller[1], and Ali Wanis Elshaari[1] — [1]KTH Royal Institute of Technology, Department of Applied Physics, Stockholm, Sweden — [2]National Research Council of Canada, Ottawa, Canada — [3]University of Ottawa, Ottawa, Canada — [4]Institute for Quantum Computing and Department of Physics and Astronomy, University of Waterloo, Waterloo, Canada — [5]Electrical and Computer Engineering, University of Toronto, Toronto, Canada — [6]Quantum Bridge Technologies Inc., Toronto, Canada — [7]Department of Electrophysics, National Yang Ming Chiao Tung University, Hsinchu, Taiwan — [8]Institute for Quantum Computing and Department of Electrical and Computer Engineering, University of Waterloo, Waterloo, Canada

On-demand single-photon generation and coherent control of excitons were demonstrated in InAsP/InP Nanowire quantum dots under resonant excitation. We Observed Rabi oscillations and low-timing jitter, highlighting their potential for integrated quantum photonic systems.

**Oral** EA-5.4 14:45 ICM - Room 4b

**Deterministic Quantum Emitters Generation in hexagonal Boron Nitride** — •Sofiya Karankova[1,2], Yeunjeong Lee[1,3], Chaun Jang[1], Yong-Won Song[1,2], and Hyowon Moon[1,2] — [1]Korea Institute of Science and Technology, Seoul, South Korea — [2]Korea National University of Science and Technology, Seoul, South Korea — [3]Korea University, Seoul, South Korea

We present a one-step method for fabricating deterministic quantum emitter arrays in hexagonal boron nitride, achieving a total 80% quantum emitter yield and consistent emission wavelength and offering versatile potential for quantum photonics applications.

**Oral** EA-5.5 15:00 ICM - Room 4b

*withdrawn*

**Oral** EA-5.6 15:15 ICM - Room 4b

**Highly Efficient Organic Single-Photon Source Operating at Cryogenic Temperatures** — •Siwei Luo[1,2], Tim Hebenstreit[1,2], Alexey Shkarin[1], Tobias Utikal[1], Jan Renger[1], Vahid Sandoghdar[1,2], and Stephan Götzinger[1,2,3] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Department of Physics, Friedrich-Alexander University Erlangen-Nürnberg, Erlangen, Germany — [3]Graduate School in Advanced Optical Technologies (SAOT), Friedrich-Alexander University Erlangen-Nürnberg, Erlangen, Germany

We have demonstrated a highly efficient single-photon source by embedding organic molecules inside a cryogenic metallo-dielectric antenna. The antenna provides more than 90% of collection efficiency for an arbitrary dipole orientation.

## CD-5: Optical Parametric Oscillators 1

Chair: Martin Fejer, E.L. Ginzton Laboratory at Stanford University, Stanford, USA

Time: Tuesday, 14:00–15:30 Location: ICM - Room 13a

**Oral** CD-5.1 14:00 ICM - Room 13a

**Widely Tunable Kerr Parametric Oscillation in AlGaAs-on-insulator Microresonators** — •Chaochao Ye, Yanjing Zhao, Yang Liu, Yi Zheng, Kresten Yvind, and Minhao Pu — Technical University of Denmark, Lyngby, Denmark

We demonstrate a widely separated, tunable Kerr optical parametric oscillation in a dispersion-engineered AlGaAsOI microresonator. Leveraging higher-order dispersion, a large signal-idler separation of 89 THz was recorded by pumping in the weak normal dispersion regime.

**Oral** CD-5.2 14:15 ICM - Room 13a

**Waveguide-based optical parametric chirped-pulse oscillator** — •Ming Gao[1], Maximilian Timmerkamp[1], and Carsten Fallnich[1,2] — [1]University of Münster, Institute of Applied Physics, Münster, Germany — [2]University of Münster, Cells in Motion Interfaculty Centre, Münster, Germany

Generation of pulses with flexibly adjustable spectral bandwidth between 0.69 and 6.74 nm by exclusively adjusting the chirp of the pump pulses of a synchronously pumped $Si_3N_4$ waveguide-based optical parametric oscillator is presented.

**Oral** CD-5.3 14:30 ICM - Room 13a

**Widely tunable all-Fiber Optical Parametric Oscillator seeded by ultrashort pulses at fixed central wavelength** — Cassia Corso, Bartosz Fabjanowicz, Agnieszka Jamrozik, Mateusz Pielach, Yuriy Stepanenko, and •Katarzyna Krupa — Institute of Physical Chemistry PAS, Warsaw, Poland

We demonstrate a widely-tunable fiber light source based on a four-wave mixing resonant cavity. The pump tunability was achieved by a novel all-fiber method of spectral broadening of chirped pulses enabled by bandpass filtration.

**Oral** CD-5.4 14:45 ICM - Room 13a

**Dual-wavelength optical parametric oscillator based on birefringent silicon nitride waveguide** — •Maximilian Timmerkamp[1], Ming Gao[1], and Carsten Fallnich[1,2] — [1]University of Münster, Institute of Applied Physics, Münster, Germany — [2]University of Münster, Cells in Motion Interfaculty Centre, Münster, Germany

Independently tunable picosecond idler waves with an adjustable center frequency spacing between zero and 65 THz were generated in a $Si_3N_4$ optical parametric oscillator by exploiting orthogonally polarized waveguide modes and tunable birefringence.

**Oral** CD-5.5 15:00 ICM - Room 13a

**Deep-infrared picosecond optical parametric oscillator based on $CdSiP_2$ delivering 190 mW of average power at 6.2 $\mu$m** — •Bhanu Chauhan[1], Kiran KP[2], K. T. Zawilski[3], P. G. Schunemann[3], M. Ebrahim-Zadeh[4,5], and S. Chaitanya Kumar[1] — [1]Tata Institute of Fundamental Research, 36/P Gopanpally, 500046, Hyderabad, India — [2]Tata Institute of Fundamental Research, 1 Homi Bhabha Road, Colaba, 400005, Mumbai, India — [3]BAE Systems Inc., MER15-1813, P.O. Box 868, Nashua, 03061-0868, New Hampshire, USA — [4]ICFO—Institut de Ciències Fotòniques, 08860 Castelldefels, Barcelona, Spain — [5]Institució Catalana de Recerca i Estudis Avançats (ICREA), Passeig Lluís Companys 23, 08010, Barcelona, Spain

We report an efficient picosecond optical parametric oscillator based on $CdSiP_2$ generating a record 190 mW of idler power at 6271 nm. The OPO is tunable from 6210-6735 nm with idler bandwidth >32 nm.

**Oral** CD-5.6 15:15 ICM - Room 13a

**Backward wave optical parametric oscillator pumped by a Bessel beam** — •Tim Julian Wörmann[1], Antoine Zheng[2], Andrius Zukauskas[1], and Valdas Pasiskevicius[1] — [1]Royal Institute of Technology, Stockholm, Sweden — [2]Université Paris-Saclay, Palaiseau, France

This work presents the first experimental investigation of backward wave optical parametric oscillators (BWOPO) pumped by spatially structured beams. A Bessel-Gaussian pump was employed, transferring transverse phase modulation primarily to forward parametric waves.

## CJ-4: Mid-Ir and Er Fiber Sources

Chair: Maria Chernysheva, Leibniz Institute of Photonic Technology, Jena, Germany

Time: Tuesday, 14:00–15:30 Location: ICM - Room 13b

**Oral** CJ-4.1 14:00 ICM - Room 13b

**Multi-millijoule Nanosecond Fiber Amplifier at 2.8 $\mu$m** — •Martin Bernier[1], Quentin Perry-Auger[1], Stanislav Leonov[1], Daiying Zhang[2], Yigit Ozan Aydin[1], Darren Kraemer[2], and Réal Vallée[1] — [1]Center for Optics, Photonics and Lasers (COPL), Université Laval, Québec, Canada — [2]Light Matter Interaction Inc., Toronto, Canada

We report a simplified fluoride fiber amplifier design that achieves multi-millijoule pulse energy at 2.8 $\mu$m while minimizing system complexity through its isolator-free architecture, low-loss fiber splicing and well-optimized pump combining techniques.

**Oral** CJ-4.2 14:15 ICM - Room 13b

**Amplification of a Single-Frequency Interband Cascade Laser around 3240 nm using a Dysprosium-doped Fluoride Fiber** — •Louis-Charles Michaud, Tommy Boilard, Réal Vallée, and Martin Bernier — Laval University, Québec, Canada

We report a dysprosium-doped fiber amplifier emitting around 3240 nm using a distributed feedback interband cascade laser as seed source. The amplifier yields up to 10 dB of optical gain without significant spectral broadening.

**Oral** CJ-4.3 14:30 ICM - Room 13b

**8.6 W Single-Frequency Fluoride Fiber MOPA at 3.5 $\mu$m** — •Lu Zhang[1,2], Shijie Fu[1,2], Quan Sheng[1,2], Junxiang Zhang[1,2], Wei Shi[1,2], and Jianquan Yao[1,2] — [1]Institute of Laser and Optoelectronics, School of Precision Instrument and Optoelectronics Engineering, Tianjin University, Tianjin, China — [2]Key Laboratory of Opto-electronic Information Technology, Ministry of Education, Tianjin University, Tianjin, China

We report the first demonstration of Er-doped fluoride fiber MOPA operating at 3.5 $\mu$m mid-infrared region, and based on it, achieve 8.6 W single-frequency laser output.

**Oral** CJ-4.4 14:45 ICM - Room 13b

**Q-switched Mode-locking in Er-doped ZBLAN Fibre Laser Employing Carbon Nanotube Saturable Absorber** — •Boris Perminov[1], Aram Mkrtchyan[2], Yuriy Gladush[2], Dmitry V. Krasnikov[2], Albert G. Nasibulin[2], and Maria Chernysheva[1] — [1]Leibniz Institute of Photonics Technology, Jena, Germany — [2]Skolkovo Institute of Science and Technology, Moscow, Russia

We demonstrate Q-switched mode-locking in an Er-doped ZBLAN fiber laser at 2.7 $\mu$m using an aerosol-synthesized carbon nanotube saturable absorber, producing 1.34 $\mu$s pulses at 45.1 kHz repetition rate and 60 mW average output power.

**Oral** CJ-4.5 15:00 ICM - Room 13b

**Spectral peaking in the mode-locked mid-infrared fibre laser** — •Zeqing Li[1,2], Jiapeng Huang[1], Weiyi Sun[1,2], Liming Chen[1], Wei Lin[1,3], Cong Jiang[1], Zhuozhao Luo[1], and Meng Pang[1,2,3] — [1]Russell Centre for Advanced Lightwave Science, Shanghai Institute of Optics and Fine Mechanics and Hangzhou Institute of Optics and Fine Mechanics, Hangzhou, China — [2]State Key Laboratory of High Field Laser Physics and CAS Centre for Excellence in Ultra-intense Laser Science, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [3]School of Physics and Optoelectronic Engineering, Hangzhou Institute for Advanced Study, Chinese Academy of Sciences, Hangzhou, China

We investigated the generation of spectral peaks induced by water vapor absorption in a 2.8 $\mu$m mode-locked fibre laser, revealing that these peaks originate from the phase-matching between molecule-induced quasi-continuous waves and solitons.

**Oral** CJ-4.6 15:15 ICM - Room 13b

**Suppression of Inter-Pulse Amplified Spontaneous Emission in High Peak Power Amplifier Based on an Er-Yb Doped Fiber** — •Svitlana Pavlova[1], Emre Yagci[1], Koray Eken[1], Emre Altay[1], and Ihor Pavlov[1,2,3] — [1]1. FiberLAST, A.S., Ankara, Türkiye — [2]2. Department of Physics, Middle East Technical University, Ankara, Türkiye — [3]3. Institute of Physics of the NAS of Ukraine, Ankara, Türkiye

Two seeds operating in the neighborhood wavelengths mitigated the gain saturation effect and ASE amplification. One source and bandpass filter serve as a pulse picker. Laser parameters: 32 kW peak power, 4.5 ns at 5-40kHz.

# CH-5: Ptychography and Holography

Chair: Lyubov Amitonova, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

Time: Tuesday, 14:00–15:30 Location: ICM - Room 14a

**Invited** CH-5.1 14:00 ICM - Room 14a

**High-resolution and high-speed EUV ptychography: quantitative imaging with enhanced material contrast** — Chang Liu[1,2,3], •Leona Licht[1,2,3], Wilhelm Eschen[1,2,3], Daniel S. Penagos Molina[1,2,3], Jens Limpert[1,2,3,4], and Jan Rothhardt[1,2,3,4] — [1]Helmholtz Institute Jena, Jena, Germany — [2]Institute of Applied Physics, FSU, Jena, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Jena, Germany — [4] Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

We demonstrate table-top EUV ptychography at 92 eV, achieving nanoscale resolution, a record imaging speed of 5 Mpix/h, and exceptional material contrast, enables chemical composition mapping for samples from microbiology and material science.

**Oral** CH-5.2 14:30 ICM - Room 14a

**High-speed computational imaging with path-corrected fly-scan ptychography** — •Augustas Karpavičius[1,2,3], Matthias Gouder[1,2], Jacob Seifert[1,2], Aaron Rivera Sanchez[1,2,3], and Stefan Witte[1,2,3] — [1]Advanced Research Center for Nanolithography, Amsterdam, Netherlands — [2]Laserlab Vrije Universiteit, Amsterdam, Netherlands — [3]Imaging Physics, Faculty of Applied Sciences, Technische Universiteit Delft, Delft, Netherlands

Path-corrected fly-scan ptychography, enabled by a modified forward model and automatic differentiation, reduces measurement time and achieves diffraction-limited resolution in computational imaging without requiring setup modifications or precise sample tracking systems.

**Oral** CH-5.3 14:45 ICM - Room 14a

**Ptychographic imaging ellipsometry with visible and extreme ultraviolet light** — •Matthias Gouder[1,2], Fengling Zhang[1,2], Mengqi Du[1], and Stefan Witte[1,2,3] — [1]Advanced Research Center for Nanolithography, Amsterdam, Netherlands — [2]Laserlab Vrije Universiteit, Amsterdam, Netherlands — [3]Imaging Physics, Faculty of Applied Sciences, Technische Universiteit Delft, Delft, Netherlands

We demonstrate how to utilize ptychographic measurements in reflection, to obtain maps of height and complex refractive indices, using visible and EUV light sources. This technique enables flexible, high-resolution imaging of multi-element microstructures.

**Oral** CH-5.4 15:00 ICM - Room 14a

**Incoherent Lateral Shearing Digital Holographic Microscopy** — •Jaromír Běhal and Miroslav Ježek — Palacký University, Olomouc, Czech Republic

We present an incoherent quantitative phase lateral shearing digital holographic microscopy, achieving artifact-free, high-accuracy phase reconstructions with shearing distances exceeding the coherence area. Validated across various setups, it offers a breakthrough solution for advanced microscopy.

**Oral** CH-5.5 15:15 ICM - Room 14a

**Infrared Digital Holography for structural analysis of historical structures** — Eugenio Pugliese[1], Massimiliano Locatelli[1], Giorgio Lacanna[2], and •Riccardo Meucci[1] — [1]CNR-INO, Firenze, Italy — [2]Università di Firenze, Dipartimento di Scienze della Terra, Firenze, Italy

In this study, we conducted a detailed modal analysis of the historical building Rocca di Radicofani (Tuscany, Italy) comparing two distinct techniques: Infrared Digital Holography (IRDH) and traditional seismic measurement methods.

# CK-5: Metamaterials

Chair: Michael Enders, ICFO, Barcelona, Spain

Time: Tuesday, 14:00–15:30 Location: ICM - Room 14b

**Oral** CK-5.1 14:00 ICM - Room 14b

**Higher-Order Nonlinear Chirality In AlGaAs Metasurfaces** — •Piyush Jangid[1], Hong-Gyu Park[2], Yuri Kivshar[1], and Sergey Kruk[3] — [1]Research School of Physics, Australian National University, Canberra ACT 2601, Australia — [2]Department of Physics and Astronomy, and Institute of Applied Physics, Seoul National University, Seoul 08826, South Korea — [3]Australian Research Council Centre of Excellence QUBIC, IBMD School of Mathematical and Physical Sciences, University of Technology Sydney, Ultimo NSW 2007, Australia

We show chiral high-harmonics generation in AlGaAs metasurfaces and probe higher-orders of nonlinear chirality. Further, we present a peculiar instance of nonlinear-only chirality where metasurface linear chirality is zero.

**Oral** CK-5.2 14:15 ICM - Room 14b

**Metasurface-based intelligent measurement of total angular momentum spectra for beams** — •Lang Li, Chunqing Gao, and Shiyao Fu — Beijing Institute of Technology, Beijing, China

A metasurface-based intelligent scheme is proposed for measuring the total angular momentum spectrum of a beam, which supports up to 34 TAM modes with diagnostic accuracy (mean-square error) $1.616\times10^{-5}$.

**Oral** CK-5.3 14:30 ICM - Room 14b

**High-Resolution OAM-Multiplexed Holography Based on Cascaded Metasurfaces** — •Xiao Jin and Thomas Zentgraf — University of Paderborn, Paderborn, Germany

A high-resolution OAM-multiplexed holography strategy using cascaded metasurfaces improves spatial resolution by beam redirection, achieving a gamma of 5.1 and reducing crosstalk for high-performance holographic systems.

**Oral** CK-5.4 14:45 ICM - Room 14b

**Multifunctional Diffractive Optical Element for Microcavity mode control** — Antoine Rouxel, •Cindy Peralle, Stéphane Calvez, Olivier Gauthier-Lafaye, and Antoine Monmayrant — LAAS-CNRS, Toulouse, France

We designed, fabricated, and successfully demonstrated diffractive optical elements (DOEs) that combine focusing, amplitude shaping and phase shaping using a standard single-step photolithography process to selectively address spatio-spectral modes in photonic cavities.

**Oral** CK-5.5 15:00 ICM - Room 14b

**High-harmonic generation driven by out-of-equilibrium electron dynamics in near-zero index heterogeneous nanostructures** — Matteo Silvestri[1], Ambaresh Sahoo[1], Luca Assogna[1], Paola Benassi[1,2], Carino Ferrante[2], Alessandro Ciattoni[2], and •Andrea Marini[1,2] — [1]University of L'Aquila, L'Aquila, Italy — [2]CNR-SPIN, L'Aquila, Italy

We theoretically model third-harmonic generation in near-zero heterogeneous nanostructures arising from collision-driven nonlinear electron dynamics. We explore the potential of harmonic generation process on a sodium-aluminum bilayer for the development of integrated XUV sources.

**Oral** CK-5.6 15:15 ICM - Room 14b

**Analysis of phase modulation performance in metasurface diffusers with designed complex amplitude transmittance** — •Yuanhao Jiang, Tomohiro Maeda, Tomoya Suzuki, and Hideyuki Sotobayashi — Aoyama Gakuin University, Kanagawa, Japan

We investigate the transmitted phase consistency of metasurface diffusers designed based on Gaussian-profiled models. Simulation results show how thickness parameters affect phase consistency and provide design insights for achieving precise and controllable optical diffusion.

# CC-1: Novel Techniques and Developments

Chair: Jiawen Liu, EPFL, Lausanne, Switzerland

Time: Tuesday, 14:00–15:30 Location: ICM - Room Osterseen

**Invited** CC-1.1 14:00 ICM - Room Osterseen

**Terahertz control of free electrons in a transmission electron microscope** — •Joel Kuttruff, David Nabben, Ann-Céline Zimmermann, Andrey Ryabov, and Peter Baum — Universität Konstanz, Konstanz, Germany

We demonstrate multidimensional control of free electrons in an ultrafast transmission electron microscope using the electromagnetic fields of terahertz single-cycle pulses.

**Oral** CC-1.2 14:30 ICM - Room Osterseen

**Confinement of Tamm modes in the THz spectral range** — •Ismael Abdourahamane[1], Alexis Wietzke[1], Simon Messelot[1], José Palomo[1], Solen Coeymans[1], Clementine Symonds[2], Sukhdeep Dhillon[1], Boris Khulmey[3], and Juliette Mangeney[1] — [1]Laboratoire de Physique de l'Ecole Normale Supérieure (ENS), Université Paris Sciences et Lettres (PSL), CNRS, Sorbonne Université, Université Paris-Cité, Paris, France — [2]Universite de Lyon, Universite Claude Bernard Lyon 1, CNRS, Institut Lumière Matière, Villeurbanne, France — [3]The University of Sydney, School of Physics, Institute of Photonics and Optical Science, Sydney, Australia

We demonstrate confinement of THz Tamm modes by depositing a finite-sized metallic disk on a planar Bragg reflector. Confined Tamm modes are evidenced experimentally and theoretically, with a lateral confinement limited to the disk area.

**Oral** CC-1.3 14:45 ICM - Room Osterseen

**Direct Near-field Spacetime Imaging of Phase and Group Velocities of Terahertz Surface Plasmon Polaritons in Graphene** — •Simon Anglhuber[1], Martin Zizlsperger[1], Eva A. A. Pogna[2], Yaroslav A. Gerasimenko[1], Anastasios D. Koulouklidis[1], Imke Gronwald[1], Svenja Nerreter[1], Leonardo Viti[3], Miriam S. Vitiello[3], Rupert Huber[1], and Markus A. Huber[1] — [1]Department of Physics and Regensburg Center for Ultrafast Nanoscopy (RUN), University of Regensburg, Regensburg, Germany — [2]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche (CNR-IFN), Milano, Italy — [3]NEST, CNR – Istituto Nanoscienze and Scuola Normale Superiore, Pisa, Italy

Using field-resolved subcycle terahertz near-field microscopy, we directly map the spatiotemporal dynamics of polaritons in graphene, determining their group and phase velocities as well as damping. Optical excitation provides femtosecond control over non-equilibrium polariton propagation.

**Oral** CC-1.4 15:00 ICM - Room Osterseen

**Observation of Nanoscopic Thermal Expansion in Solids by Echo-Resolved Terahertz Spectroscopy** — •Nicolas S. Beermann, Andreas Gebauer, Savio Fabretti, Wentao Zhang, Tomoki Hiraoka, Hassan A. Hafez, and Dmitry Turchinovich — Faculty of Physics, Bielefeld University, Bielefeld, Germany

Echo-resolved terahertz spectroscopy (ERTS) enables precise determination of temperature-dependent complex refractive index and nanoscopic thermal expansion in solids. We demonstrate minuscule, sub-micron thickness changes in MgO and $Al_2O_3$ across 10–300 K using this method.

**Oral** CC-1.5 15:15 ICM - Room Osterseen

**Volumetric Additive Manufacturing of Hollow-Core Photonic Crystal Fiber Structures for THz Frequencies** — •Markus Lippl[1,2], Nicolas Couture[3,4], Daniel Häupl[1,2], David Purschke[3,4], Yujie Zhang[4], Jean-Michel Menard[3,5], Daniel Webber[4], and Nicolas Y. Joly[2,1,6] — [1]Max Planck Institute for the science of light, Erlangen, Germany — [2]University of Erlangen-Nürnberg, Erlangen, Germany — [3]University of Ottawa, Ottawa, Canada — [4]National Research Council of Canada, Ottawa, Canada — [5]Max Planck Centre for Extreme and Quantum Photonics, Ottawa, Canada — [6]Interdisciplinary Center for Nanostructured Films, Erlangen, Germany

We present hollow-core photonic crystal fibers for THz radiation manufactured by tomographic volumetric additive manufacturing, a new and highly promising 3D-printing technology highly suitable for fabrication of photonic devices in the THz range.

# CM-LiM: Advanced Laser Processing: Fundamentals and Applications

Chair: Marwan Abdou Ahmed, University of Stuttgart, Stuttgart, Germany

Time: Tuesday, 14:00–15:30 Location: Hall A1 - Room A12

**Oral** CM-LiM.1 14:00 Hall A1 - Room A12

**Laser-Induced Forward Transfer for 3D cell bioprinting : Controlled Immobilization in Extracellular Matrices** — •Stavroula (Evina) Elezoglou[1], Antonis Hatziapostolou[1], Kyriakos Giannakopoulos[1], and Ioanna Zergioti[1,2] — [1]National Technical University of Athens, School of Applied Mathematical and Physical Sciences, Iroon Polytehneiou, Athens, Greece — [2]PhosPrint P.C., Lefkippos Technology Park, Athens, Greece

Laser-Induced Forward Transfer (LIFT) achieves high-precision 3D cell immobilization within extracellular matrices using a sub-ns Nd:YAG laser. Rheological analyses and dynamic imaging optimize biofabrication, showcasing potential applications in regenerative medicine and tissue engineering.

**Oral** CM-LiM.2 14:15 Hall A1 - Room A12

**Unlocking Extreme Parallelization: 1 kW Ultrafast Laser Processing with Compensation of Spatio-Temporal Effects for Large Angle Beam Splitting** — •Dario Mekle[1,2], Daniel Grossmann[3], Benjamin Dannecker[3], Helge Höck[3], Dominik Bauer[3], Daniel Flamm[1], and Stefan Nolte[2,4] — [1]TRUMPF Laser- und Systemtechnik SE, Johann-Maus-Straße 2, 71254 Ditzingen, Germany — [2]Institute of Applied Physics, Abbe Center of Photonics, Friedrich Schiller University Jena, Albert-Einstein-Str. 15, 07745 Jena, Germany — [3]TRUMPF Laser SE, Aichhalder Straße 39, 78713 Schramberg, Germany — [4] Fraunhofer Institute for Applied Optics and Precision Engineering, Albert-Einstein-Str. 7, 07745 Jena, Germany

Industrial ultrashort pulse laser advancements culminate in the 1-kW-average-power TruMicro 9000 laser, delivering up to 10 mJ pulses. Diffractive beam splitting increases throughput significantly, but spatio-temporal distortions require careful compensation for industrial-scale ultrafast processing.

**Oral** CM-LiM.3 14:30 Hall A1 - Room A12

**Effect of laser-induced periodic structures on the resistance of aluminium current collectors in supercapacitors** — Oleksandr Kuznetsov[1,2], Vanessa Barvinska[2], Fedir Ivashchyshyn[1,3], A. Lotnyk[4], I. Hrytsai [1], and •Iaroslav Gnilitskyi[1,2] — [1]Lviv Polytechnic National University, Lviv, Ukraine — [2]"NoviNano Lab" LLC, Lviv, Ukraine — [3]Czestochowa University of Technology, Czestochowa, Ukraine — [4]Leibniz Institute of Surface Engineering, Leipzig, Germany

In our reserch, we demonstrated that the formation of laser-induced periodic surface structures (LIPSS) in air and nitrogen atmospheres on the surface of aluminium current collectors allows a significant reduction in cell resistance

**Oral** CM-LiM.4 14:45 Hall A1 - Room A12

**Connecting pump–probe microscopy with final-state measurements in ultrafast laser ablation of disordered alloys** — •David Redka[1,2], Maximilian Spellauge[1,3], Ján Minár[1,2], and Heinz Paul Huber[1,2] — [1]Department of Applied Sciences and Mechatronics, Munich University of Applied Sciences HM, Munich, Germany — [2]New Technologies-Research Centre, University of West Bohemia, Pilsen, Czech Republic — [3]Technical Chemistry I and Center for Nanointegration Duisburg-Essen (CENIDE), University of Duisburg-Essen, Essen, Germany

This study addresses the quantitative link between transient optical signals and final-state measurements by examining the ablation dynamics of austenitic stainless steel AISI 304 and the high-entropy alloy CrMnFeCoN.

**Oral** CM-LiM.5 15:00 Hall A1 - Room A12

**One-shot imaging of laser-induced surface acoustic waves on silicon and metal films using pump-probe microscopy** — •Matthias Domke, Felix Wäger, David Schönebeck, and Fadi Dohnal — Research Center for Microtechnology, Vorarlberg University of Applied Sciences , Dornbirn, Austria

This study presents a new approach to detecting laser-induced surface acoustic waves (SAWs) on silicon and thin metal films using a conventional setup.

**Oral** CM-LiM.6 15:15 Hall A1 - Room A12

**Fundamental origin of low laser ablation in liquid productivity and how to increase it** — •Maximilian Spellauge[1,2], David Redka[1,3], Bilal Gökce[4], and Stephan Barcikowski[2] — [1]University of Applied Sciences, Department of Applied Sciences and Mechatronics, Munich, Germany — [2]University of Duisburg-Essen, Technical Chemistry I and Center for Nanointegration Duisburg-Essen (CENIDE), Essen, Germany — [3]New Technologies Research Center, University of West Bohemia, Plzen, Czech Republic — [4]University of Wuppertal, School of Mechanical,Engineering and Safety Engineering, Chair of Materials Science and Additive Manufacturing,, Wuppertal, Germany

This study combines results from pump-probe microscopy and absorption-corrected ablation efficiency measurements to investigate how the change in laser ablation dynamics due to the presence of the liquid layer affects ablation efficiency

## CE-5: Photonic Integrated Circuits

Chair: Christos Riziotis, National Hellenic Research Foundation (NHRF), Athens, Greece

Time: Tuesday, 14:00–15:30 Location: Hall B1 - Room B11

**Oral** CE-5.1 14:00 Hall B1 - Room B11

**Widely tunable second harmonic generation in low-loss thin-film LiNbO3 membrane** — •Aiman Zinaoui, Jean-David Fayssaud, Arthur De Sousa Lopes Moreira, Miguel Angel Suarez, Ludovic Gauthier-Manuel, Samuel Queste, Laurent Robert, Mathieu Chauvet, and Nadège Courjal — Université Marie et Louis Pasteur, CNRS, institut FEMTO-ST, Besançon, France

We present a nonlinear thin-film lithium niobate platform using birefringent phase matching for 900nm spectral tunability across NIR to MIR bands. It offers low coupling losses (0.8 dB/facet) and precise thickness control for nonlinear optics applications.

**Oral** CE-5.2 14:15 Hall B1 - Room B11

**Electrically Modulated Waveguide Grating on Thin-Film Lithium Niobate** — •Zhibo Li[1], Xiao Sun[1], Jue Wang[1], Archie McIver[2], Lianping Hou[1], John Marsh[1], Anthony Kelly[1], and Marc Sorel[1] — [1]Critical Technologies Accelerator (CTA), James Watt School of Engineering, University of Glasgow, Glasgow, United Kingdom — [2]James Watt Nanofabrication Centre (JWNC), James Watt School of Engineering, University of Glasgow, Glasgow, United Kingdom

A novel waveguide grating on low-loss thin-film lithium niobate (0.61 dB/cm) has been demonstrated with narrow wavelength selection, large stopband and high extinction ratio features, showing great potentials in wavelength filtering, sensing and optical modulation.

**Oral** CE-5.3 14:30 Hall B1 - Room B11

**Hetero-integration of diamond nanostructures on AlGaN-based photonic circuits** — •Domenica Bermeo Alvaro[1,2], Sinan Gündogdu[1,2], Lea Marlen Rektorschek[2], Marco E. Stucki[1,2], Maarten H. van der Hoeven[2], Julian Bopp[2,1], Tim Kolbe[1], Sylvia Hagedorn[1], Markus Weyers[1], Tommaso Pregnolato[2,1], and Tim Schröder[2,1] — [1]Ferdinand-Braun-Institut (FBH), Berlin, Germany — [2]Department of Physics, Humboldt-Universität zu Berlin, Berlin, Germany

We propose the hetero-integration of diamond nanostructures into AlGaN-based photonic circuits to create scalable, efficient spin-photon interfaces for quantum networks. Our approach involves optimizing low-loss coupling designs and transfer printing techniques to achieve precise integration.

**Oral** CE-5.4 14:45 Hall B1 - Room B11

**Aluminum nitride waveguides with 0.12 dB/cm propagation loss around the telecommunication C-band** — •Radhakant Singh[1,2], Rijil Thomas[1], Mohit Raghuwanshi[3], Balasubramanian Sundarapandian[3], Lutz Kirste[3], Stephan Suckow[1], and Max C. Lemme[1,2] — [1]AMO GmbH,Otto-Blumenthal-Str. 25, 52074, Aachen, Germany — [2]Chair of Electronic Devices, RWTH Aachen University, Otto-Blumenthal-Str. 25, 52074, Aachen, Germany — [3]Fraunhofer Institute for Applied Solid State Physics, 79108 Freiburg im Breisgau, Freiburg, Germany

We report record-low-loss photonic waveguides made from sputtered aluminum nitride (AlN). We achieved propagation losses of ~0.136 dB/cm at 1554 nm and ~0.12 dB/cm at 1590 nm, surpassing the epitaxially grown AlN on sapphire substrate.

**Oral** CE-5.5 15:00 Hall B1 - Room B11

**An SU-8 waveguide system coupled to site-controlled (In)GaAs quantum dots.** — •Salvador A. Medina-Rangel[1,2], Nicola Maraviglia[1,2], John O'Hara[1], Luca Colavecchi[1], Liam O'Faolain[1,2], and Emanuele Pelucchi[1] — [1]Tyndall National Institute, Cork, Ireland — [2]Munster Technological University, Cork, Ireland

Efficient light coupling from QDs semiconductor into quantum photonic integrated circuits remains challenging. Here we propose SU-8 waveguides coupled to site-controlled pyramidal QDs as powerful versatile solution for integrating heterogeneous optical materials at cryogenic temperatures

**Oral** CE-5.6 15:15 Hall B1 - Room B11

**Low Index Cladding For Polymer Microring Resonator Waveguides** — •Santhosh Pandian[1], Marina Fetisova[2], Petri Karvinen[2], Heikki Rekola[2], Paul Müllner[3], Moritz Eggeling[3], Rainer Hainberger[3], Evgenii Lepukhov[1], and Tapio Niemi[1] — [1]Tampere University, Tampere, Finland — [2]University of Eastern Finland, Joensuu, Finland — [3]AIT Austrian Institute of Technology, Vienna, Austria

We present polymeric microring resonators made with nanoimprint lithography, emphasizing low index cladding and high refractive index contrast to reduce the diameter of the ring. These miniature resonators are applied as detectors in photoacoustic imaging.

## JSIII-1: Quantum Sensing and Navigation Technologies

Chair: Kevin Gallacher, University of Glasgow, Glasgow, United Kingdom

Time: Tuesday, 14:00–15:30 Location: Hall B2 - Room B21

**Invited** JSIII-1.1 14:00 Hall B2 - Room B21

**Quantum sensing, imaging and timing for practical applications** — •Michael Holynski — Quantum Sensing Group, School of Physics and Astronomy, University of Birmingham, Birmingham, United Kingdom — UK Quantum Technology Research Hub in Sensing, Imaging and Timing, Birmingham, United Kingdom

Major strides have been achieved in bringing quantum sensing, imaging and timing capabilities from the laboratory to field applications. This talk will summarise our recent developments and ongoing research into addressing barriers to wider adoption.

**Oral** JSIII-1.2 14:30 Hall B2 - Room B21

**Compact, Low-Noise, Low-SWaP Diode Lasers and Photonic Modules for Quantum Technology Applications** — •Nora Goossen-Schmidt, Bassem Arar, Ahmad Bawamia, Marcel Bursy, Jörg Fricke, Martin Gärtner, Stephanie Gerken, Jonas Hamperl, Sriram Hariharan, Janpeter Hirsch, Andrea Knigge, Simon Kubitza, Andre Maaßdorf, Norbert Müller, Christoph Pyrlik, Max Schiemangk, Sandy Szermer, Christoph Tyborski, Hans Wenzel, Dian Zou, and Andreas Wicht — Ferdinand-Braun-Institut (FBH), Gustav-Kirchhoff-Str. 4, 12489 Berlin, Germany

We present compact and robust low-noise, low-SWaP ECDL-MOPA laser modules for quantum technology applications. DBR laser chips further reduce size and complexity and allow to combine two lasers into a miniature Light Control Unit.

**Oral** JSIII-1.3 14:45 Hall B2 - Room B21

**A Quantum-classical cold atom system for inertial navigation** — •Maxwell Rowley[1], Alex Webber-Date[1], Paul F. Osborn[1], Robert Shah[2], Teodor Krastev[2], Rachel Cannon[3], Paul Griffin[3], Erling Riis[3], Joeseph Cotter[2], Oliver Burrow[1], and Edward Boughton[1] — [1]CPI TMD Technologies, Hayes, United Kingdom — [2]Imperial College London, London, United Kingdom — [3]University of Strathclyde, Glasgow, United Kingdom

An inertial navigation system demonstrator based on a grating magneto-optical trap (gMOT) is presented. We outline the development of laser systems for the specific application as well as results from the atom interferometer system.

**Oral** JSIII-1.4 15:00 Hall B2 - Room B21

**A Rubidium Frequency-standard Based on a MEMS Vapour Cell** — •Steven Johnson, Allan McWilliam, Eilidh MacLennan, Erling Riis, James McGilligan, and Paul Griffin — University of Strathclyde, Glasgow, United Kingdom

A portable atomic frequency-references based on a MEMS rubidium vapour cells is being developed at the University of Strathclyde. It utilises robust lasers and micro-fabricated vapour cells to produce a reliable timing hold-over reference.

**Oral** JSIII-1.5 15:15 Hall B2 - Room B21

**Quantum Sensing for Rail Positioning** — •Andrew David White, Alex Ainsworth, Daleep Bahra, Robert Shah, Henry Sewell, Aisha Kaushik, and Joseph P Cotter — Imperial College London, London, United Kingdom

We have developed a transportable enhanced inertial navigation sensor using cold atom interferometry that has recently been deployed on an underground railway system.

## CF-5: Ultrafast Laser Technology 1

Chair: Catherine Leblanc, IOGS, Palaiseau, France

Time: Tuesday, 16:00–17:30 Location: ICM - Room 1

**Invited** CF-5.1 16:00 ICM - Room 1

**Key Milestones in Femtosecond Lasers: From Scientific Breakthroughs to Industrial Impact** — •Ursula Keller — ETH Zurich, Zurich, Switzerland

This invited talk, based on the 2025 Julius Springer Prize, reviews key ultrafast solid-state laser innovations, from SESAM-enabled passive modelocking to dual-comb lasers, enabling Nobel Prize-winning breakthroughs, frequency metrology, attosecond science, and transformative industrial applications.

**Oral** CF-5.2 16:30 ICM - Room 1

**A compact fiber device providing a petahertz of coherent bandwidth** — •Sarah Haller, Sarah Rebecca Hutter, Philipp Sterk, and Alfred Leitenstorfer — Department of Physics and Center for Applied Photonics, University of Konstanz, 78457 Konstanz, Germany

Generation and control of coherent supercontinua spanning a bandwidth of 1 PHz, covering the deep ultraviolet to the mid-infrared, achieved through a compact fiber device resulting in single-cycle pulses with an exceptionally clean temporal envelope.

**Oral** CF-5.3 16:45 ICM - Room 1

**A Compact Zigzag Compressor for Spectrally-Divided CPA** — •Edgar Kaksis[1], Zhengru Guo[2], Vinzenz Stummer[1], Audrius Pugzlys[1,3], Heping Zeng[4], and Andrius Baltuska[1,3] — [1]Photonics Institute, TU Wien, Vienna, Austria — [2]School of Optical Electrical and Computer Engineering, University of Shanghai for Science and Technology, Shanghai, China — [3]Center for Physical Sciences & Technology, Vilnius, Lithuania — [4]State Key Laboratory of Precision Spectroscopy, East China Normal University, Shanghai, China

We propose a scalable folding geometry for CPA dispersion management that allows a 10-fold increase of the stretched pulse duration and a 3-fold increase of damage-limited extractable pulse energy compared to a standard grating-pair compressor with the same aperture.

**Oral** CF-5.4 17:00 ICM - Room 1

**Towards an Efficient Gas-Based Sono-Photonic Michelson Modulator** — •Yannick Schrödel[1,2,3], Emilian Ghabashi Nejad[1,4], Sören Soennecken[5], Jan Helge Dörsam[5], Tino Lang[1], Anne Harth[6], Mario Kupnik[5], and Christoph M. Heyl[1,2,3] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Helmholtz-Institute Jena, Jena, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [4]Universität Hamburg, Hamburg, Germany — [5]Measurement and Sensor Technology Group, Technische Universität Darmstadt, Darmstadt, Germany — [6]Hochschule Aalen, Aalen, Germany

We present the first implementation of a gas-based acousto-optic modulator as a solid-state free beam splitter and combiner inside a Michelson interferometer, offering exciting opportunities for efficient solid-less optical switching at GW peak powers.

**Oral** CF-5.5 17:15 ICM - Room 1

**Repetition rate stabilized high power mode-locked thin-disk oscillator** — •Yasmin Kopp, Gregor Hehl, Kevin Schwarz, and Oleg Pronin — Helmut Schmidt University, Hamburg, Germany

The repetition rate stabilization of a mode-locked thin-disk oscillator is demonstrated for the first time. This step is necessary to lock the thin-disk oscillator to the stabilized <1 Hz CW laser for XUV frequency comb spectroscopy.

## CI-4: Free Space Communications

Chair: Juan Diego Ania-Castañón, IO-CSIC, Madrid, Spain

Time: Tuesday, 16:00–17:30 Location: ICM - Room 4a

**Oral** CI-4.1 16:00 ICM - Room 4a

**Key Design Issues in Uplink Deep Space Optical Communications** — •Giulio Cossu and Ernesto Ciaramella — Scuola Superiore Sant'Anna, TeCIP Institute, Pisa, Italy

We investigate uplink deep space optical communication, optimizing performance in a wide range of distances. We highlight the advantages of using GEO satellites as relay for reduced atmospheric impairments and enhanced bitrate.

**Oral** CI-4.2 16:15 ICM - Room 4a

**PCM assisted Compact Optical Beamformer: A step towards Next-Gen Wireless Communication** — •Nabarun Saha, Giuseppe Brunetti, and Caterina Ciminelli — Politecnico di Bari, Bari, Italy

This work proposes a 5-bit optical beamformer using PCM Sb2Se3 integrated on SOI, achieving a compact, energy-efficient, squint-free design with steerability over 40 GHz bandwidth and ±60° angles.

**Oral** CI-4.3 16:30 ICM - Room 4a

**Demonstration of 3D-printed Optical Antennas for pervasive Optical Wireless Communication with non-Optical, commercial materials** — •Mauro Aresti[1,2], Marco Meucci[1,2], Satoshi Iketani[3], Cristiana Lofrumento[4], Caterina Credi[1,2], and Jacopo Catani[1,2] — [1]National Institute of Optics - CNR (CNR-INO), sesto fiorentino, Italy — [2]European Laboratory for Nonlinear Spectroscopy (LENS), sesto fiorentino, Italy — [3]DWS srl, Thiene, Italy — [4]Dipartimento di Chimica Ugo Schiff, Università degli Studi di Firenze, sesto fiorentino, Italy

Efficient fluorescent Optical Antennas for OWC/VLC applications were realized using transparent, additively manufactured slabs from commercial resins, achieving high optical gain, bandwidth, and data rates, enabling novel IoT implementations towards 6G architectures.

**Oral** CI-4.4 16:45 ICM - Room 4a

**Fibre-Based Dynamic Speckle Generation for Emulation of Atmospheric Turbulence** — •Debparna Majumder, Kyle R.H. Bottrill, and Periklis Petropoulos — Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

A fibre-based atmospheric turbulence emulator has been designed for dynamic speckle generation. Its compact, simple structure, combined with its scalable

scrambling enables the affordable emulation of turbulence even under high-slew rate conditions found in LEO

**Oral** CI-4.5 17:00 ICM - Room 4a

**Frequency Agile Dual-Chirp Microwave Waveform Generation with MZM** — •Mukund Jha[1,3], Atul Khanna[2,3], Lakshay Kumar[1,3], Rajveer Dhawan[1,3], and Amol Choudhary[1,3] — [1]Ultra-Fast Optical Communications and High-performance Integrated Photonics (UFO-CHIP) group, NEW DELHI, India — [2]Optics & Photonics Centre Indian Institute of Technology (IIT) Delhi, NEW DELHI, India — [3]Department of Electrical Engineering Indian Institute of Technology (IIT) Delhi, NEW DELHI, India

Dual linearly chirped microwave waveform are generated using a single Mach Zehnder modulator (MZM) coupled with a tunable laser. Dual-chirped waveforms tunable from 5GHz to 20GHz were achieved using a simple configuration.

**Oral** CI-4.6 17:15 ICM - Room 4a

**Ultra-fast Wavelength Switching DS-DBR Laser with Enhanced Coherence Enabled by Optical Injection Locking** — •Zichuan Zhou[1], Selina Farwell[2], Michael Wale[1], and Zhixin Liu[1] — [1]University College London, London, United Kingdom — [2]Lumentum UK, Towcester, United Kingdom

We study the switching time and linewidth performance of an optically injection locked fast tunable laser for coherent data center interconnection. We show ns-scale switching time and significantly improved linewidth under optical injection locking.

## EA-6: Atomic Systems

Chair: Yifan Li, Centre for Quantum Technologies, Singapore, Singapore

Time: Tuesday, 16:00–17:30 Location: ICM - Room 4b

**Invited** EA-6.1 16:00 ICM - Room 4b

**From dark-state polaritons to many-body spin physics with Rydberg atoms** — •Michael Fleischhauer — University of Kaiserslautern-Landau, Kaiserslautern, Germany

Coherent drive of atoms allows control of photon propagation and interaction and to engineer spin systems with unusal interactions. I will review concept and applications of dark-state polaritons and many-body dynamics of Rydberg spin systems.

**Oral** EA-6.2 16:30 ICM - Room 4b

**Local manipulation and quantum non-demolition measurement of circular Rydberg atoms** — Yohann Machu[1], •Andrés Durán Hernández[1], Gautier Creutzer[1], Aurore Young[1], Jean-Michel Raimond[1], Clément Sayrin[1,2], and Michel Brune[1] — [1]Laboratoire Kastler Brossel, Collège de France, CNRS, ENS-Université PSL, Sorbonne Université, Paris, France — [2]Institut Universitaire de France, Paris, France

I will present experimental results demonstrating quantum non-demolition measurements and local manipulation of laser-trapped circular Rydberg atoms through resonant interactions with an ancilla atom in a laser-accessible Rydberg state.

**Oral** EA-6.3 16:45 ICM - Room 4b

**Development of a photonic interface for neutral-atom based quantum processors using a nanofiber cavity** — •Kenichi N. Komagata[1], Shanjou Yang[1,2], Gento Aman[2], Remi Oddon[1], Kai Mukaihara[1,2], Seitaro Horikawa[1,2], Shinya Kato[1], Ratnesh K. Gupta[2], Takao Aoki[1,2], Hideki Konishi[1], and Akihisa Goban[1] — [1]Nanofiber Quantum Technologies, Inc, Tokyo, Japan — [2]Department of Applied Physics, Waseda University, Tokyo, Japan

Scalable quantum computing with neutral atoms could be achieved by a modular approach employing photonic links. We present our progress on a cavity-QED approach based on nanofiber cavities to interface the atomic and photonic qubits.

**Oral** EA-6.4 17:00 ICM - Room 4b

**Generation of Atom-Photon Entanglement with an Optically Trapped Single Atom** — •Zifang Xu[1], Chang Hoong Chow[1], Boon Long Ng[1], Vindhiya Prakash[1], and Christian Kurtsiefer[1,2] — [1]Center for Quantum Technologies, Singapore, Singapore — [2]National University of Singapore, Singapore, Singapore

We present results on atom-photon entanglement using an optically trapped rubidium atom and high numerical-aperture lenses. We detect an average of 600 atom-photon entanglements per minute and measure an entangled-state fidelity of 79(2)%.

**Oral** EA-6.5 17:15 ICM - Room 4b

**A cavity-integrated high-speed low-loss optical switch in rubidium vapour** — •Georgia Booton[1], Cameron McGarry[1,2], Tabijah Wasawo[1], Alex Davis[1], Kristina Rusimova[1], Josh Nunn[3], and Peter Mosley[1] — [1]University of Bath , Bath, United Kingdom — [2]University of Sydney, Sydney, Australia — [3]ORCA computing Ltd, London, United Kingdom

Photonic quantum technologies require fast, low-loss switching to re-route photons whilst preserving their quantum state. We show light-matter interactions can deliver all-optical high-bandwidth switching with minimal loss in warm rubidium vapour.

## CD-6: Mid-Infrared Nonlinear Optics

Chair: Michał Karpiński, University of Warsaw, Warsaw, Poland

Time: Tuesday, 16:00–17:30 Location: ICM - Room 13a

**Oral** CD-6.1 16:00 ICM - Room 13a

**SWIR upconversion quad-detector using an array of PPLN waveguides and SNSPDs** — •Rex H. S. Bannerman[1], Noelia Palomar Davidson[1], Paolo L. Mennea[1], Glenn M. Churchill[1], Corin B. E. Gawith[1,2], and Peter G. R. Smith[1] — [1]Optoelectronics Centre, Southampton, United Kingdom — [2]Covesion Ltd., Southampton, United Kingdom

We demonstrate a quad-detector system for 1560 nm light detection using an array of zinc-indiffused PPLN waveguides for sum-frequency generation with a 1950 nm pump, upconverting the signal to 860 nm for detection by SNSPDs.

**Oral** CD-6.2 16:15 ICM - Room 13a

**Multi-GHz mid-IR source based on continuous-wave parametric amplification in a femtosecond OPO** — •Anirban Ghosh[1,2], Niladri Das[1], S. Chaitanya Kumar[3], Kavita Devi[4], and G. K. Samanta[1] — [1]PRL Ahmedabad, Ahmedabad, India — [2]Indian Institute of Technology-Gandhinagar , Ahmedabad, India — [3]Tata Institute of Fundamental Research, Hyderabad, India — [4]Department of Physics, Indian Institute of Technology Dharwad, Karnataka, India

We report on a novel method to generate a 2.4 GHz, high repetition rate mid-IR pulses using CW laser-pumped parametric amplification seeded by a high harmonic synchronously-pumped optical parametric oscillator.

**Oral** CD-6.3 16:30 ICM - Room 13a

**High-precision Mid-infrared wavelength measurement via waveguide-based MIR-to-NIR upconversion** — •Jachin Kunz[1], Sebastian Wolf[1], Frank Kühnemann[1], Florian Karlewski[2], Peter Federsel[2], Lewis Wright[3], and Corin Gawith[3] — [1]Fraunhofer Institute for Physical Measurement Techniques IPM, Freiburg, Germany — [2]HighFinesse Laser and Electronic Systems GmbH, Tübingen, Germany — [3]Covesion Ltd., Southampton, United Kingdom

A waveguide-based MIR-to-NIR upconversion module has been developed as a wavelength range extender for Fizeau-interferometer-based NIR wavemeters. This allows the measurement of MIR wavelengths with rates up to 1 kHz and <+/- 10 MHz accuracy.

**Oral** CD-6.4 16:45 ICM - Room 13a

**Mid-Infrared Frequency Conversion with Silicon Photonics** — •Samuel W. A. Gears[1,2], Dominic A. Sulway[2], Edward C. R. Deacon[2], Quinn Palmer[1,2], Sebastian G. Currie[1,2], Alex S. Clark[2], and Joshua W. Silverstone[2] — [1]Quantum Engineering Centre for Doctoral Training, H.H. Wills Physics Laboratory and Department of Electrical and Electronic Engineering, University of Bristol, BS8 1FD, Bristol, United Kingdom — [2]Quantum Engineering and Technology Laboratories, School of Physics and Department of Electrical and Electronic Engineering, University of Bristol, BS8 1TL, Bristol, United Kingdom

We demonstrate integrated all-optical frequency conversion in the mid-infrared using silicon photonics. We use intermodal phase matching to attain -51.7 dB

peak conversion efficiency with 13.4 dB of spurious conversion suppression.

**Oral** CD-6.5 17:00 ICM - Room 13a

**Mid-IR conversion efficiency improvements for energy scaled optimized ZGP OPO pump pulses** — •Dominik Lorenz[1,2], Julian Schneider[1,2], Marius Rupp[2], Clement Romano[2], Dieter Panitzek[1,2], Jan Lautenschläger[1,2], Marc Eichhorn[1,2], and Christelle Kieleck[2] — [1]Karlsruhe Institute of Technology, Karlsruhe, Germany — [2]Fraunhofer IOSB , Ettlingen, Germany

Mid-IR conversion efficiency improvements for energy-scaled optimized ZGP OPO pump pulses are investigated and evaluated regarding possible near future all-fiber alternatives.

**Oral** CD-6.6 17:15 ICM - Room 13a

*withdrawn*

## EB-2: Quantum Simulation and Computing

Chair: Nicolas Maring, QUANDELA, Massy, France

Time: Tuesday, 16:00–17:30 Location: ICM - Room 13b

**Tutorial** EB-2.1 16:00 ICM - Room 13b

**Quantum simulation with long-range-interacting magnetic atoms** — •Francesca Ferlaino — University of Innsbruck, Innsbruck, Austria — IQOQI, Innsbruck, Austria

Dipolar quantum gases with tunable long-range interactions offer a unique platform for many-body physics and quantum simulation. This talk explores recent advances in quantum phases, dynamics, and supersolidity, highlighting their impact on experimental realizations and emerging quantum technologies.

**Oral** EB-2.2 17:00 ICM - Room 13b

**Determinstic Grover's algorithm: Finding the needle in the haystack every time ... well most times** — Fatemeh Mohit[1,2], •Markus Rambach[1,2], Till J. Weinhold[1,2], Marcelo P. Almeida[1,2], Joshua Guanzon[1,2], and Andrew G. White[1,2] — [1]Australian Research Council Centre of Excellence for Engineered Quantum Systems, Brisbane, Australia — [2]School of Mathematics and Physics, University of Queensland, Brisbane, Australia

We present an experimental realisation of a truly deterministic version of Grover's algorithm on an integrated quantum photonic processor that takes at most one extra iteration compared to its original probabilistic version.

**Oral** EB-2.3 17:15 ICM - Room 13b

**Parameter shift rule for variational photonic quantum circuit** — •Francesco Hoch[1], Giovanni Rodari[1], Taira Giordani[1], Paul Perret[2], Nicolò Spagnolo[1], Gonzalo Carvacho[1], Ciro Pentangelo[3], Simone Piacentini[4], Andrea Crespi[4,5], Francesco Ceccarelli[3,4], Roberto Osellame[3,4], and Fabio Sciarrino[1] — [1]Dipartimento di Fisica - Sapienza Universit'a di Roma, Roma, Italy — [2]DER de Physique - Universit'e Paris-Saclay, ENS Paris-Saclay, France — [3]Ephos, Milano, Italy — [4]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche (IFN-CNR), Milano, Italy — [5]Dipartimento di Fisica, Politecnico di Milano, Mialno, Italy

We theoretically propose and experimentally test a new method to compute the gradient and the integral for integrated photonic parametric circuits, which opens up new approaches to optical variational quantum algorithms.

## CH-6: Optical Frequency Combs Spectroscopy

Chair: Francesco Tani, PhLAM - CNRS, Lille, France

Time: Tuesday, 16:00–17:30 Location: ICM - Room 14a

**Oral** CH-6.1 16:00 ICM - Room 14a

**Single quantum walk comb spectroscopy** — •Davide Pinto, Ina Heckelmann, Mathieu Bertrand, Uwe Schmitt, Mattias Beck, Giacomo Scalari, and Jérôme Faist — ETH Zurich, Zurich, Switzerland

We present a novel spectroscopic approach based on a single quantum walk QCL comb for acetone detection in the fingerprint region. Fast and broadband detection was achieved by shaping the comb spectrum via RF injection.

**Oral** CH-6.2 16:15 ICM - Room 14a

**3-Watt, 3-optical-cycle mid-IR Cr:ZnS Laser System for High Performance Dual Comb Spectroscopy** — •Sergey Vasilyev[1], Igor Moskalev[1], Yury Barnakov[1], Mike Mirov[1], Andrey Muraviev[2], Dmitrii Konnov[2], Roderik Krebbers[3], Simona Cristescu[3], and Konstantin Vodopyanov[2] — [1]IPG Photonics Corporation, Boston, USA — [2]University of Central Florida, Orlando, USA — [3]Radboud University, Nijmegen, Netherlands

We report an ultra-low noise frequency comb based on Cr:ZnS laser. We evaluate source's performance for dual-comb spectroscopy in the long-wave IR (6-12 $\mu$m) achieving the highest figure of merit on the timescale of seconds.

**Oral** CH-6.3 16:30 ICM - Room 14a

**Bicolor fiber-cavity-enhanced dual-comb spectro-microscopy** — •Bingxin Xu[1,3], Stephan Fraundienst[2], Sambit Mitra[2], Rute Fernandes[2], Michael Förg[2], Thomas Hümmer[2], Theodor W. Hänsch[3,4], and Nathalie Picqué[1,3] — [1]Max-Born Institute for Nonlinear Optics and Short-Pulse Spectroscopy, Berlin, Germany — [2]Qlibri GmbH, Munich, Germany — [3]Max-Planck Institute of Quantum Optics, Garching, Germany — [4]Ludwig-Maximilian University of Munich, Munich, Germany

In this work, we present a novel approach to cavity-enhanced condensed-phase dual-comb spectroscopy, combining high sensitivity and broad bandwidth, that enables spectrally and spatially resolved measurements and combines without the need for dispersion management and feedback stabilisation.

**Oral** CH-6.4 16:45 ICM - Room 14a

**Dual-Comb Spectroscopy for Rare-Earth Element Detection** — •Christina Hofer[1,2], Andrew Jarymowycz[3], Hope Dannar[3], John J. McCauley[3], Errol Bowman[1,2], Dylan P. Tooley[3,4], Avery Wong[1,2], Arthur K. Mills[1,2], Mark C. Phillips[3], R. Jason Jones[3], and David J. Jones[1,2] — [1]Quantum Matter Institute, University of British Columbia, Vancouver, Canada — [2]Department of Physics and Astronomy, University of British Columbia, Vancouver, Canada — [3]Wyant College of Optical Sciences, University of Arizona, Tucson, USA — [4]Department of Physics, University of Arizona, Tucson, USA

We apply dual-comb spectroscopy of laser-produced plasmas to the detection of rare-earth elements which are crucial for more sustainable energy sources. Probing various species in their pure element and mineral form reveals sample-dependent matrix effects.

**Oral** CH-6.5 17:00 ICM - Room 14a

**Free-Running Deep-UV Dual-Comb Spectroscopy** — Tobias Hofer, •Gregor Hehl, Johann Meyer, and Oleg Pronin — Helmut Schmidt University, Hamburg, Germany

A thin-disk oscillator achieves up to 15W at 515nm and 1.5W at 257nm per beam after frequency-quadrupling. Free-running Dual-Comb Spectroscopy is performed with iodine (green) and an etalon (deep UV) at GHz-resolution and THz-spans.

**Oral** CH-6.6 17:15 ICM - Room 14a

**Time and OAM-resolved Pump-probe Measurement with Ultrawide Temporal Dynamic Range using Dual-comb Asynchronous Optical Sampling Technique** — •Akifumi Asahara[1,2] and Kaoru Minoshima[1] — [1]The University of Electro-Communications, Tokyo, Japan — [2]JST, PRESTO, Tokyo, Japan

We demonstrate time and OAM-resolved pump-probe measurement based on dual-comb configuration with spatial optical mode, where ultrawide dynamic range is achieved utilizing the asynchronous optical sampling technique.

# CK-6: Advanced Photonics Devices

Chair: Stefano Pelli, CNR - IFAC, Sesto Fiorentino, Italy

Time: Tuesday, 16:00–17:30 Location: ICM - Room 14b

**Oral** CK-6.1 16:00 ICM - Room 14b

**Time translation symmetry breaking and random number generation in a metamaterial time crystal** — •Venugopal Raskatla[1], Kevin F. MacDonald[1], and Nikolay I. Zheludev[1,2] — [1]Optoelectronics Research Centre, University of Southampton, Highfield, Southampton, United Kingdom — [2]Hagler Institute for Advanced Study, Texas A&M University, College Station, Texas, USA

The inherent unpredictability of oscillation phase in the continuous time crystal state on a nano-opto-mechanical platform, experimentally validated by statistical analysis, offers a novel, on-demand source for true random number generation.

**Oral** CK-6.2 16:15 ICM - Room 14b

**Time-Domain Physical Unclonable Functions using Ring Resonators** — Lars van der Hoeven, Daan Stellinga, Daan J. de Ruiter, Matthias C. Velsink, and •Pepijn W.H. Pinkse — MESA+ Institute, University of Twente, Enschede, Netherlands

We demonstrate time-domain physical unclonable functions (tPUFs) using silicon nitride ring resonator networks with fabrication-induced randomness. These tPUFs exhibit unique spectro-temporal responses, enabling secure authentication via compact, scalable designs compatible with telecom and satellite infrastructure.

**Oral** CK-6.3 16:30 ICM - Room 14b

**Highly performing Chiral Mirror by Multilayer of Anisotropic Media** — •Andrea Alessandrini[1], Leone Di Mauro Villari[1], Matteo Venturi[1], Luca Assogna[1], Matteo Silvestri[1], Carino Ferrante[2], Paola Benassi[1,2], Davide Tedeschi[1], and Andrea Marini[1,2] — [1]Department of Physical and Chemical Sciences, University of L'Aquila, Via Vetoio, 67100 L'Aquila, Italy — [2]CNR-SPIN, c/o Department of Physical and Chemical Sciences, Via Vetoio, Coppito (L'Aquila) 67100, Italy

We investigate miniaturized and integrable stacks of uniaxial anisotropic layered media to engineer chiral mirrors for manipulating circularly polarized light thanks to the optical torque exerted by the medium polarization on an electromagnetic field.

**Oral** CK-6.4 16:45 ICM - Room 14b

**Compact All-optical Differentiator of Multi-orders Enabled by a Single-layer Metasurface** — •Niu Liu, Zhelin Lin, Zhenyu Xing, Yuhui Hu, Yuxuan Liao, Xinliang Zhang, and Cheng Zhang — Huazhong University of Science and Technology, Wuhan, China

Single-layer metasurface-based all-optical differentiators are realized using the complex-valued point spread function engineering strategy. The devices enable function-multiplexed arbitrary-order differential operations in direct-imaging mode, offering high spatial resolution and adaptability across diverse application scenarios.

**Oral** CK-6.5 17:00 ICM - Room 14b

**Purcell Effect of Plasmonic Perovskite Scintillators** — Michal Makowski[1], Wenzheng Ye[2,3], •Dominik Kowal[1], Francesco Maddalena[2,3], Christophe Dujardin[4,5], Liang Jie Wong[2,3], and Muhammad Danang Birowosuto[1] — [1]Lukasiewicz Research Network - PORT, Wroclaw, Poland — [2]CINTRA, NTU, Singapore, Singapore — [3]School of Electrical and Electronic Engineering, NTU, Singapore, Singapore — [4]Universite Claude Bernard Lyon, Lyon, France — [5]Institut Universitaire de France, Paris, France

This study demonstrates up to fourfold Purcell enhancements in intensity and decay rates using $BA_2PbBr_4$ thin films and $CsPbBr_3$ nanocrystal perovskite scintillators, integrating nanophotonic techniques for scalable, ultrafast imaging applications bridging nano- and large-scale implementations.

**Oral** CK-6.6 17:15 ICM - Room 14b

*withdrawn*

# EF-1: Mode-Locking Dynamics

Chair: Sergei Turitsyn, Aston Institute of Photonic Technologies, Aston University, UK

Time: Tuesday, 16:00–17:30 Location: ICM - Room Osterseen

**Oral** EF-1.1 16:00 ICM - Room Osterseen

**Coherent pulse interactions in mode-locked semiconductor lasers** — Thomas G. Seidel[1,2], Adrian Bartolo[3,4], Arnaud Garnache[3], Massimo Giudici[4], Mathias Marconi[4], Svetlana V. Gurevich[1,2], and •Julien Javaloyes[2] — [1]University of Münster, Münster, Germany — [2]Universitat de les Illes Balears, Palma de Mallorca, Spain — [3]University of Montpellier, Montpellier, France — [4]Université Côte d'Azur, Nice, France

We explore coherent pulse interactions in mode-locked semiconductor lasers. Using both theory and experiment, we demonstrate that the pulses' phases behave as coupled oscillators in a Kuramoto model, profoundly impacting the notion of their coherence.

**Oral** EF-1.2 16:15 ICM - Room Osterseen

**New Route to Chaos in Mode-Locked Laser: The Modulated Subharmonic Scenario** — Huiyu Kang[1], Anran Zhou[1], Ying Zhang[1], Xiuqi Wu[1], Bo Yuan[1], Junsong Peng[1], Christophe Finot[2], •Sonia Boscolo[3], and Heping Zeng[1] — [1]State Key Laboratory of Precision Spectroscopy, and Hainan Institute, East China Normal University, Shanghai, China — [2]Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303 CNRS – Universite´ de Bourgogne Europe, Dijon, France — [3]Aston Institute of Photonic Technologies, Aston University, Birmingham, United Kingdom

We reveal a new route from solitons to chaos in an ultrafast fibre laser: the modulated subharmonic route. We confirm its universality in two different laser configurations (figure-of-eight and ring) and via numerical modelling.

**Oral** EF-1.3 16:30 ICM - Room Osterseen

**The Q-Switching Instability of Passively Modelocked Solid-State Lasers** — Franco Prati[1], Auro M Perego[2], Javier Redondo[3], and •German J de Valcarcel[4] — [1]Università dell'Insubria, Como, Italy — [2]Aston University, Birmingham, United Kingdom — [3]Universitat Politècnica de València, Valencia, Spain — [4]Universitat de València, Valencia, Spain

We provide analytical expression for the Q-switching instability of solid-state mode-locked pulses in the general case of a slow saturable absorber taking into account finite cavity bandwidth.

**Oral** EF-1.4 16:45 ICM - Room Osterseen

**Temporal Solitons in Active Cavities under Extreme Power Extraction** — •Haftamu Gebreslassie Berhe[1], Nicolas Englebert[1,2], François Leo[1], and Simon-Pierre Gorza[1] — [1]Université libre de Bruxelles, Brussels, Belgium — [2]California Institute of Technology, Pasadena, USA

We experimentally demonstrate stable cavity solitons with 90% power extraction per roundtrip using a saturated amplifier to partially compensate the cavity loss. The internal gain enables coherent continuous-wave driving power as low as 50 $\mu$W.

**Oral** EF-1.5 17:00 ICM - Room Osterseen

**Dynamics of harmonic mode-locking via delayed optical feedback** — •Qi Yan[1], Fanchao Meng[1], Changjian Lv[1], Zhixu Jia[1], Weiping Qin[1], Guanshi Qin[1], and John Dudley[2] — [1]College of Electronic Science and Engineering, Jilin University,, Changchun, China — [2]Institut FEMTO-ST, Université de Franche-Comté , Besançon, France

We demonstrate novel harmonic mode-locking generation in a dissipative soliton fiber laser via delayed optical feedback. Real-time measurement was used to reveal the formation dynamics of harmonic mode-locking in such systems for the first time.

**Oral** EF-1.6 17:15 ICM - Room Osterseen

**Classification of Intra-Cavity Multi-Soliton Interactions and Prospects for Ultrafast Spectroscopy** — •Julia A. Lang and Georg Herink — University of Bayreuth, Bayreuth, Germany

Interactions of solitons occur in every mode-locked laser - yet they critically depend on the specific system. Here, we present a fundamental classification of key effects and demonstrate their potential for novel high-speed ultrafast measurements.

# ED-3: Kerr Combs and High Repetition Rate Sources

Chair: Gianluca Galzerano, Insititute of Photonics and Nanotechnology, Milano, Italy

Time: Tuesday, 16:00–17:30 Location: Hall A1 - Room A12

**Oral** ED-3.1 16:00 Hall A1 - Room A12

**Octave-spanning Kerr frequency comb in a $Si_3N_4$ microresonator at electronically detectable repetition rate** — •Alisa Davydova, Miles H. Anderson, Zheru Qiu, and Tobias J. Kippenberg — Institute of Physics, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland

We demonstrate an octave-spanning soliton microcomb at 15 GHz repetition rate in a $Si_3N_4$ microresonator by using pulse pumping. Together with higher-order dispersive waves, the spectrum has the record number of comb lines ~ 8800.

**Oral** ED-3.2 16:15 Hall A1 - Room A12

**Sub-Hz Intrinsic Linewidth Power Efficient Microcombs** — Krishna Twayana[1], Fuchuan Lei[2], and •Victor Torres-Company[1] — [1]Chalmers University of Technology, Gothenburg, Sweden — [2]Northeast Normal University, Changchun, China

We demonstrate self-injection locking under feedback in a highly efficient photonic molecule microcomb, overcoming fundamental noise limitations and achieving a 100 GHz microcomb with a sub-Hz intrinsic linewidth within the C-band.

**Oral** ED-3.3 16:30 Hall A1 - Room A12

**Ultrafast 1-GHz dual-comb OPO from a single cavity for rapid DCS** — •Carolin P. Bauer[1], Benjamin Willenberg[1], Justinas Pupeikis[1], and Ursula Keller[2] — [1]Institute for Quantum Electronics, ETH Zurich, Zurich, Switzerland — [2]Dept. of Information Technology and Electrical Engineering, ETH Zurich, Zurich, Switzerland

We present a femtosecond dual-comb optical parametric oscillator at 1-GHz repetition rate fundamentally synchronously pumped by a low-noise 1-GHz Yb:$CaF_2$ solid-state dual-comb laser. In a proof-of-concept DCS measurement at 1525 nm, we obtained an SNR of 25 dB within 20 ms.

**Oral** ED-3.4 16:45 Hall A1 - Room A12

**Ultrastable Synchronization of Mode-Locked Laser and Microcomb** — •Changmin Ahn[1], Daewon Suk[2], Hansuek Lee[2], and Jungwon Kim[1] — [1]School of Mechanical and Aerospace Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea — [2]Department of Physics, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea

We synchronized mode-locked lasers and microwave-rate microcombs with 2×10-18 stability using an EOS-TD. Based on this, an Rb RF clock-referenced microcomb was generated. The proposed method can link ultrastable optical and RF references to microcombs.

**Oral** ED-3.5 17:00 Hall A1 - Room A12

*withdrawn*

**Oral** ED-3.6 17:15 Hall A1 - Room A12

**Locking of the Cavity-Soliton Repetition Rate via a Piezo-Stretched Amplifier** — •Fedor Getman[1], Antonio Cutrona[1], Nitish Paul[1], Aadithya Suresh[1], Debayan Das[1], Sai Chu[2], Brent Little[3], Roberto Morandotti[4], David Moss[5], Marco Peccianti[1], and Alessia Pasquazi[1] — [1]Emergent Photonics Research Centre (EPicX), Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [2]Department of Physics, City University of Hong Kong, Hong Kong, China — [3]QXP Technologies Inc., Xi'an, China — [4]INRS-EMT, Varennes, Canada — [5]Optical Sciences Centre, Swinburne University of Technology, and ARC-COMBS, Hawthorn, Australia

By employing a piezo-stretched Er-doped amplifier, we lock the laser cavity-soliton repetition rate to a GPS-disciplined oscillator. We achieve a stable, self-emergent microcomb, with long-term stability performances comparable with our metrological reference.

# CE-6: Silicon-Based Photonic Integrated Circuits

Chair: Nadege Courjal, FEMTO-ST, Besançon, France

Time: Tuesday, 16:00–17:30 Location: Hall B1 - Room B11

**Invited** CE-6.1 16:00 Hall B1 - Room B11

**Novel Materials and Processes for Silicon Photonics** — •Dries Van Thourhout — Photonics Research Group, Ghent University / IMEC, Ghent, Belgium

This talk discusses how, through the integration of novel materials, such as graphene and TMDCs, or using new processes, such as nano-ridge engineering for III-Vs and sol-gel deposition of ferro-electrics, we enhance the functionality of silicon and SiN waveguide platforms.

**Oral** CE-6.2 16:30 Hall B1 - Room B11

**Fabrication Tolerant Heterogeneously Integrated Lithium Niobate Modulator on Bi-Layer Silicon Nitride using Micro Transfer Printing** — •Vahid Talebi[1], Marcello Girardi[2], Yan Gao[2], Fabien N. A. Labbé [1], Victor Torres Company[2], Yunhong Ding[1], Minhao Pu[1], and Kresten Yvind[1] — [1]Technical University of Denmark, Copenhgen, Denmark — [2]Chalmers University of Technology, Goteborg, Sweden

We propose a fabrication-tolerant LN modulator on bi-layer SiN featuring low loss and a bandwidth exceeding 100 GHz. We demonstrate the device fabrication process, including the critical micro-transfer printing of centimeter-long LN coupons on SiN.

**Oral** CE-6.3 16:45 Hall B1 - Room B11

**Rapid Prototyping of Silicon Nitride Integrated Photonics Platforms for Visible to Mid-IR Circuits** — •Batoul Hashemi[1], Cameron M. Naraine[1], Niloofar Majidian Taleghani[1], Jocelyn N. Westwood Bachman[2], Cameron Horvath[2], Bruno L. Segat Frare[1], Hamidu M. Mbonde[1], Pooya Torab Ahmadi[1], Stefanie Markevich[1], Kevin Setzer[2], Alexandria McKinlay[2], Khadijeh Miarabbas Kiani[1], Renjie Wang[1], Ponnambalam Ravi Selvaganapathy[1], Peter Mascher[1], Andrew P. Knights[1], Jens H. Schmid[3], Pavel Cheben[3], Mirwais Aktary[2], and Jonathan D. B. Bradley[1] — [1]McMaster University, Hamilton, Canada — [2]Applied Nanotools Inc. , Edmonton, Canada — [3]National Research Council Canada, Ottawa, Canada

We present an electron-beam lithography-based rapid prototyping process for moderate (0.4-$\mu$m) and low-confinement (0.15-$\mu$m) silicon nitride platforms, with a quick turnover of about five runs per year. Key photonic components are fabricated and characterized.

**Oral** CE-6.4 17:00 Hall B1 - Room B11

**Ultra-high Q silicon nitride microresonators enabled Raman lasing** — •Yi Zheng, Haoyang Tan, Kresten Yvind, and Minhao Pu — Technical University of Denmark, Copenhagen, Denmark

We demonstrated a Q factor as high as 40 million in 300 nm Si3N4 platform. Benefiting from the realized ultra-high Q factor, we achieved low threshold power for on-chip CW Raman laser generation.

**Oral** CE-6.5 17:15 Hall B1 - Room B11

**Silicon-nitride-based integrated photonics platform for VIS spectral range** — •Mateusz Słowikowski[1], Marcin Juchniewicz[1], Michał Golas[1], Marcin Myśliwiec[1], Bartłomiej Stonio[1,2], Bartosz Michalak[1], Marcin Lelit[1,2], Dagmara Drecka[1,2], Michał Jarosik[1,2], Krystian Pavłov[1], and Maciej Filipiak[1] — [1]Warsaw University of Technology, Centre for Advanced Materials and Technologies CEZAMAT, Warsaw, Poland — [2]Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, Warsaw, Poland

The SiN platform developed in CEZAMAT WUT consists of passive components performing in the visible part of the spectrum. The presented results focus on standardisation and preparation of the process design kit.

# JSIII-2: Photonic Integration & Quantum Communication Devices

Chair: James P. McGilligan, University of Strathclyde, Glasgow, United Kingdom

Time: Tuesday, 16:00–17:30 Location: Hall B2 - Room B21

**Invited** JSIII-2.1 16:00 Hall B2 - Room B21

**Integrated atomic devices for field-deployable timing and sensing applications** — •Markus Krutzik — Ferdinand-Braun-Institut (FBH), Berlin, Germany — Humboldt-Universität zu Berlin, Berlin, Germany

This talk will focus on our results in discrete hybrid integration of photonic, electro-optical components and atomic systems for operation in miniaturized and field-deployable devices for timing and sensing applications.

**Oral** JSIII-2.2 16:30 Hall B2 - Room B21

**Low-footprint fiber-coupled InGaAs/InP single-photon avalanche diode butterfly module** — •Pascal Rustige[1], Elisa Collin[1], Thilo Petsch[1], Patrick Runge[1], and Martin Schell[1,2] — [1]Fraunhofer Heinnrich Hertz Institute, Berlin, Germany — [2]Technical University Berlin, Berlin, Germany

We present a low-footprint fiber-coupled InGaAs/InP SPAD butterfly module. At a PDE of 25% the DCR is 1.5 kcps, the APP is under 0.5% after 10 $\mu$s and the timing jitter is 162 ps.

**Oral** JSIII-2.3 16:45 Hall B2 - Room B21

**Micro-integrated Light Control Units for Low-SWaP Quantum Optical Sensing Applications** — •Jonas Hamperl, Marcel Bursy, Martin Gärtner, Nora Goossen-Schmidt, Simon Kubitza, Sonja Nozinic, Max Schiemangk, Christoph Tyborski, and Andreas Wicht — Ferdinand-Braun-Institut (FBH), Berlin, Germany

We present the status of our efforts to develop and build hybrid micro-integrated light control units for compact and ruggedized quantum optical sensors. These modules feature miniaturized acousto-and electrooptic modulators for laser beam preparation.

**Oral** JSIII-2.4 17:00 Hall B2 - Room B21

**Vacuum CO2 sealing of monolithic silica components for quantum applications** — •Christophe Pierre[1], Andrea Bertoldi[2], Johan Boullet[2], and Marc Castaing[1] — [1]ALPhANOV, TALENCE, France — [2]Institut d'Optique, TALENCE, France

We hereby report on the development and exploitation of an in vacuum sealing platform based on CO2 light source for generation of compact and fiber functionalized hot rubidium vapor cells for quantum applications.

**Oral** JSIII-2.5 17:15 Hall B2 - Room B21

**Real-Time State Discriminator for Searching Laser Cavity-Solitons in a Microresonator Filtered Fiber Laser** — •Aadithya Suresh[1], Antonio Cutrona[1], Sai Chu[2], Brent Little[3], Roberto Morandotti[4], David Moss[5], Juan Sebastian Totero Gongora[1], Marco Peccianti[1], and Alessia Pasquazi[1] — [1]Emergent Photonics Research Centre (EPicX), Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [2]Department of Physics, City University of Hong Kong, Hong Kong, China — [3]QXP Technologies Inc., Xi'an, China — [4]INRS-EMT, Varennes, Canada — [5]Optical Sciences Centre, Swinburne University of Technology, and ARC-COMBS, Hawthorn, Australia

We show a real-time state discriminator to distinguish different states in a laser cavity-soliton implementation. This technique paves the way for automated soliton detection in nonlinear optical systems with minimum computational cost.

# CD-P: CD Poster Session

Time: Tuesday, 13:00–14:00 Location: Hall B0

CD-P.1 13:00 Hall B0

**Raman-enhanced Beam Self-cleaning with Femtosecond Pulse Pumping at 1.56 $\mu$m** — Sikai Chen[1], Jinhui Yuan[2], Hong-Guang Duan[1], and •Chao Mei[1] — [1]Department of Physics, School of Physical Science and Technology, Ningbo, China — [2]State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, Beijing, China

In this work, we present experimental evidences for Raman-enhanced beam self-cleaning at the anomalous dispersion regime of multimode fibers. When Raman effect takes part in the beam self-cleaning, mode area is decreased by 9% compared to the pure Kerr process.

CD-P.2 13:00 Hall B0

**Theoretical model of laser-driven proton acceleration via hybrid scheme based on KPSI J-KAREN-P 1-PW laser** — •Keng-Ju Lee[1], Yao-Li Liu[1], Shivam Gupta[1], Shogo Isayama[2], Shih-Hung Chen[3], and Yasuhiro Kuramitsu[4,5] — [1]Institute of Space and Plasma Sciences, National Cheng Kung University, Taiwan — [2]Department of Advanced Environmental Science and Engineering, Kyushu University, Japan — [3]Department of Physics, National Central University, Taiwan — [4]Graduate School of Engineering, Osaka University, Japan — [5]Institute of Laser Engineering, Osaka University, Japan

We propose a theoretical model for the hybrid scheme of laser-driven proton acceleration and compare it with particle-in-cell simulations. It shows that proton energy achieves 0.5 GeV by J-KAREN-P laser with an only 2.3% error.

CD-P.3 13:00 Hall B0

**Tunable Low-noise Photonic Microwave Synthesizer Based on a Polarization Multiplexing Fiber Brillouin Cavity** — Yuyan Chen[1] and •Yihan Li[2] — [1]School of Electronic and Information Engineering, Beihang University, Beijing, China — [2]School of Integrated Circuit Science and Engineering, Beihang University, Beijing, China

A microwave photonic system for frequency synthesis is proposed and experimentally demonstrated, where polarization multiplexing is employed for tight in-resonance pumping of a fiber Brillouin cavity enabling spectral purification of the generated microwaves.

CD-P.4 13:00 Hall B0

*withdrawn*

CD-P.5 13:00 Hall B0

**Odd-and Even-order Brillouin Comb Generation for RF communication** — •Sharashti Saxena, Harsh Vaid, Rajveer Dhawan, and Amol Choudhary — Indian Institute of Technology Delhi, Delhi, India

A tunable optical frequency comb using cascaded Brillouin scattering is presented. 21.7-GHz-spaced odd- and even-order comb lines were used as a carrier in a radio-over-fiber link and evaluated for QPSK, 8PSK and 16QAM modulation schemes.

CD-P.6 13:00 Hall B0

**Electrical waveform shaping for Flat band Tunable Brillouin Filters** — •Md Kamran Afroz, Deeksha Jachpure, and Amol Choudhary — Indian Institute of Technology Delhi, New Delhi, India

Amplitude optimization of various electrical waveforms for pump shaping for Stimulated Brillouin Scattering based flat response bandpass filter is presented.The gain flatness achieved is within 2dB for tunable and reconfigurable bandwidth up to 500MHz

CD-P.7 13:00 Hall B0

**Generalized Heterodyne Interferometry in Kerr Materials** — •Arnaud Rogemont, Rajath Sawant, Aurélien Coillet, and Benoit Cluzel — Laboratoire Interdisciplinaire Carnot de Bourgogne, Dijon, France

We use heterodyne interferometry to study Kerr-induced nonlinearities in optical waveguides. Self-heterodyne schemes enable accurate characterization of nonlinear phase shifts and power-dependent amplitude variations, unveiling counterintuitive dynamics influenced by pulse shape and medium dispersion.

CD-P.8 13:00 Hall B0

**Background-free stimulated Raman microscopy with a broadband frequency-modulation scheme** — Luca Genchi[1,2], Sergey P. Laptenok[1], and •Carlo Liberale[1] — [1]Biological and Environmental Science and Engineering Division, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia — [2]Centrale Marseille, Institut Fresnel UMR 7249, Aix-Marseille Université, CNRS, Marseille, France

We present a novel broadband frequency-modulation stimulated Raman scattering architecture using femtosecond and picosecond lasers, and two narrowband filters, including a fast acousto-optic tunable filter, enabling simplified and flexible wavenumber selection for background-free Raman micro-spectroscopy.

CD-P.9 13:00 Hall B0

**A Novel Simple Technique to measure the Nonlinear Coefficient of Optical Fibres using a Coherent Receiver** — Laurent Bramerie[1], Mathilde Gay[1], Simon Lévêque[1,2], Anaëlle Maho[2], Michel Joindot[1], and •Thierry Chartier[1] — [1]Institut Foton, Université de Rennes, Lannion, France — [2]Thales Alenia Space, Toulouse, France

The Kerr nonlinear coefficient of optical fibres is deduced from the measurement,

thanks to a coherent receiver, of the phase shift between the career frequency and the side bands of a modulated laser.

CD-P.10 13:00 Hall B0

**Mid-Infrared Wavelength Generation via Intermodal Four-Wave Mixing in Thin-Film $LiNbO_3$ Waveguides** — •Anna Pennoni, Valerio Vitali, Ilaria Cristiani, and Cosimo Lacava — Electrical, Computer and Biomedical Engineering Department, University of Pavia, Pavia, Italy

We propose a poling-free method for mid-infrared wavelength generation in thin-film lithium niobate on insulator waveguides. By leveraging intermodal four-wave mixing, we numerically demonstrate parametric gain spanning from 2.85 $\mu$m to 3.02 $\mu$m.

CD-P.11 13:00 Hall B0

**Optical near-to-eye display based on nonlinear mixing** — •Peter GR Smith, Goronwy Tawy, Corin BE Gawith, Rex H Bannerman, Glenn Churchill, and James C Gates — University of Southampton, Southampton, United Kingdom

We demonstrate a new approach to augmented reality glasses based on nonlinear wavemixing in a fully transparent near-to-eye display. Offering complete transparency, daylight brightness and full depth-of-field this solves many issues of current approaches.

CD-P.12 13:00 Hall B0

**Nonlinear optical properties of $CdSiP_2$ crystal at 1 $\mu$m** — Kiran KP[1], Dibakar Pal[1], •Bhanu Chauhan[2], K.T. Zawilski[3], P.G. Schunemann[3], M. Ebrahim-Zadeh[4,5], and S. Chaitanya Kumar[2] — [1]Tata Institute of Fundamental Research, 1 Homi Bhabha Road, Colaba, 400005, Mumbai, India — [2]Tata Institute of Fundamental Research Hyderabad, 36/P Gopanpally, 500046, Hyderabad, India — [3]BAE Systems, Incorporated, MER15-1813, P.O. Box 868, Nashua, 03061-0868, New Hampshire , USA — [4]ICFO-Institut de Ciencies Fotoniques, Mediterranean Technology Park, 08860 Castelldefels, Barcelona, Spain — [5]Institucio Catalana de Recerca i Estudis Avancats (ICREA), Passeig Lluis Companys 23, 08010, Barcelona, Spain

We report on the polarization-dependent third-order nonlinear optical properties of $CdSiP_2$ crystal at 1.034 $\mu$m using the Z-scan technique resulting in two-photon absorption coefficient $\beta_2 \sim 0.51$ cm/GW and nonlinear refractive index $n_2 \sim 2.74 \times 10^{-5}$ cm$^2$/GW.

CD-P.13 13:00 Hall B0

**Light Dynamics in Twin Microresonators with Tunable Coupling** — •Arghadeep Pal[1,2], Alekhya Ghosh[1,2], Shuangyou Zhang[3], Lewis Hill[1], Haochen Yan[1,2], Hao Zhang[4], Toby Bi[1,2], Abdullah Alabbadi[1,2], and Pascal Del'Haye[1,2] — [1]Max Planck Institute for Science of Light, Erlangen, Erlangen, Germany — [2]Friedrich-Alexander-Universität, Erlangen, Germany — [3]Technical University of Denmark, Kys. Lyngby, Denmark — [4]Nanjing University of Aeronautics and AstronauticsNanjing University of Aeronautics and Astronautics, Nanjing, China

We demonstrate the linear and nonlinear light dynamics in coupled microresonators. The real-time coupling between the resonators enables us to investigate the evolution of the nonlinearities of the hybridized counterpropagating modes.

CD-P.14 13:00 Hall B0

**Exploring dual-phonon lasing in a two-mode optomechanical system** — •Raúl Ortiz[1], Carlos Mas Arabí[2], Carles Milián[2], and Alejandro Martínez[1] — [1]Nanophotonics Technology Center (NTC), Universitat Politècnica de València (UPV)), Valencia, Spain — [2]Institut Universitari de Matemàtica Pura i Aplicada, Universitat Politècnica de València,, Valencia, Spain

We study dual-phonon lasing in a cavity with two mechanical modes coupled to the same optical mode. Using numerical simulations and bifurcation analysis, we predict dual-frequency combs under single-tone optical pumping, enabling exploration of diverse optomechanical applications.

CD-P.15 13:00 Hall B0

**Design of Artificial Nonlinear Materials for Plasmonic Electro-Optic Modulators** — •Killian Keller, Marco Dober, Joel Winiger, Arnaud Schneuwly, Michael Doderer, Michael Baumann, and Juerg Leuthold — ETH Zürich, Institute of Electromagnetic Fields, Zürich, Switzerland

Simulations of materials utilizing intersubband transitions for plasmonic electro-optic applications are presented. Tuning the resonance of the transition leads to record-low $V_\pi L\alpha$, as loss is almost constant due to the dominance of plasmonic loss.

CD-P.16 13:00 Hall B0

**Innovative Uses of Stochastic Photonic Sources** — Jean-Christophe Delagnes[1], Jérôme Lhermite[1], Nicolas Valero[1], Guillaume Walter[1], Marie Zambelli[1], Guillaume Duchateau[1,2], and •Denis Marion[1] — [1]University of Bordeaux, CNRS, CEA ; CELIA UMR 5107, Talence, France — [2]CEA CESTA, Le Barp, France

We present innovative stochastic photonic sources based on amplified spontaneous emission (ASE), describing their nonlinear filtering, their impact on nonlinear processes, and their use for characterizing photonic crystal fibers.

CD-P.17 13:00 Hall B0

**Evaluation of the pressure sensing capabilities for pure radial acoustic mode exited by optomechanic interaction in SMF-28 optical fiber** — •Carlos Andrés Álvarez Ocampo[1], Aleksander Paterno[2,3], Martina Delgado Pinar[1,2], Antonio Díez[1,2], José Luis Cruz[1,2], and Miguel Vicente Andrés[1,2] — [1]Laboratory of Fiber Optics, ICMUV, Burjassot, Spain — [2]Departament de Física Aplicada I Electromagnetisme, Universitat de València, Burjassot, Spain — [3]Santa Catarina State University, Joinville, Brazil

Method to detect hydrostatic pressure changes by analyzing shifts in the frequency and spectral width of acoustic resonances in standard fiber excited via Forward Stimulated Brillouin Scattering, providing an approximation for sensitivity and resolution.

CD-P.18 13:00 Hall B0

**High-Flux XUV Beamlines for state-of-the-art imaging and spectroscopy methods** — Maxim Tschernajew, Vinzenz Hilbert, •Christian Gaida, Oliver Herrfurth, Sven Breitkopf, Tino Eidam, and Jens Limpert — Active Fiber Systems GmbH, Jena, Germany

Covering a photon energy range from 20 eV to 150 eV, the system utilizes dual-color driving modes and switchable gas nozzles. It achieves an unprecedented photon flux of over 1010 photons/s per harmonic between 80 eV and 140 eV.

CD-P.19 13:00 Hall B0

**High-Speed Up-Conversion-Based Mid-Infrared Line-Scanner at Room Temperature** — •Tobias Schiby, Søren M.M. Friis, Elena Fedorova, and Lasse Høgstedt — NLIR ApS, Farum, Denmark

We present a sum-frequency generation-based line-scanner for mid-infrared sensing applications, exploiting the high-speed capabilities of silicon based detectors, by implementing a 688 fps read-out rate and 624 by 816 pixels CMOS detector.

CD-P.20 13:00 Hall B0

*withdrawn*

CD-P.21 13:00 Hall B0

*moved to CD-13.4*

CD-P.22 13:00 Hall B0

**Spatially Resolved Pressure Measurement of Antiresonant Hollow-Core Fibres Using Nonlinear Optics** — •Mitchell Gerrard, Mohammad Mousavi, Radan Slavík, and Peter Horak — Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

We propose and investigate nonlinear optics techniques based on four-wave mixing and cross-phase modulation for spatially resolved monitoring of gas pressure in the core of hollow-core optical fibres in-line and in real time.

CD-P.23 13:00 Hall B0

**Two-color Femtosecond Source at 930 nm and 1100 nm for Two-photon Fluorescence Microscopy** — •Hao Zhang[1,2], Aimin Wang[3], Yizhou Liu[2,4], and Lishuang Feng[1] — [1]Beihang University, Beijing, China — [2]Beijing Fatonics Technology Co., Ltd, Beijing, China — [3]Peking University, Beijing, China — [4] Shandong University, Qingdao, China

The self-phase modulation (SPM) process was managed by pre-chirping the input pulse. A two-color femtosecond laser was demonstrated. The average powers of the 930.6-nm pulses and 1098.1-nm pulses were 210 mW and 263 mW.

CD-P.24 13:00 Hall B0

**Flexible Platicon Generation via Random Backscattering in Ultra-high-Q Microresonators** — •Haoyang Tan, Yi Zheng, Kresten Yvind, and Minhao Pu — DTU Electro, Department of Electrical and Photonics Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark

Flexible platicon generation is achieved through multiple mode splittings induced by random backscattering in ultra-high-Q microresonators, offering a wider pump wavelength range compared to conventional intermodal coupling approach, extending the practical microcomb applications.

CD-P.25 13:00 Hall B0

**Advancing Remote Sensing Technology through Long-Wave Infrared Photonic Chaos** — •Sara Zaminga[1], Thomas Poletti[1], and Frederic Grillot[1,2] — [1]Telecom Paris, Palaiseau, France — [2]. Center for High Technology Materials, University of New-Mexico, Albuquerque, USA

By utilizing a mature quantum technology in the long-wave infrared region, we successfully generate photonic chaos serving remote sensing applications. Our system achieves sub-meter range precision for target distance detection, offering innovative solutions for medium- and long-range sensing.

CD-P.26 13:00 Hall B0

**Ultra-Low Noise, 80 W Laser System at 532 nm: Enabling Titanium-Sapphire Pumping and Advanced Semiconductor Inspection with Superior Noise Performance** — •Marcel Holtz[1], Simon Reinisch[1], Harald Rossmeier[1], Pierre Laygue[2], Konstantinos Simeonidis[1], and Matthias Scholz[1] — [1]TOPTICA Photonics AG, Graefelfing/Munich, Germany — [2]TOPTICA Photonics SAS, Pessac/Bordeaux, France

We demonstrate an ultra-low noise, high-power laser system delivering > 80 W at 532 nm with RIN RMS noise below 0.02%, featuring advanced noise suppression, enabling advanced applications in Ti:Sa pumping and inspection metrology.

CD-P.27 13:00 Hall B0

*withdrawn*

CD-P.28 13:00 Hall B0

**Rb two-photon transition in a rubidium chipcell for SBS microcomb stabilization** — •Kyung Bin Park[1], Hyun-Gue Hong[2], Jongcheol Park[3], Jae Hoon Lee[1,2], and Hansuek Lee[1,4] — [1]Department of Quantum Science and Technology, Korea Advanced Institute of Science and Technology, Daejeon, South Korea — [2]Korea Research Institute of Standards and Science , Daejeon, South Korea — [3]Nanostructure Application Team, National NanoFab Center, Daejeon, South Korea — [4]Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon, South Korea

We developed an Rb chip cell to utilize its two-photon transitions for stabilizing a turnkey Brilloun soliton microcomb. Doppler-free spectroscopy with a 1.52 MHz linewidth has been achieved, enabling the utilization of atomic accuracy for this miniaturized time precision platform.

CD-P.29 13:00 Hall B0

**A ready-to-use compact light engine for quantum microscopy** — •Vasile Laurentiu Dosan[1,2,3], Alek Lagarrigue[1], Josué Ricardo León Torres[2,4], Adrià Sansa Perna[1], Dobryna Zalvidea[5], Markus Gräfe[4,6], Valerio Flavio Gili[4], and Oliver de Vries[1] — [1]Quantum Optics Jena GmbH, Am Zementwerk 8, 07745 Jena, Germany — [2]Abbe Center of Photonics, Friedrich Schiller University Jena, Albert-Einstein-Str. 6, 07745 Jena, Germany — [3]Max Planck School of Photonics, Friedrich Schiller University Jena, Albert-Einstein-Str. 15, 07745 Jena, Germany — [4]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Albert-Einstein-Str. 7, 07745 Jena, Germany — [5]PreciPoint GmbH, Parkring 6, 85748 Garching, Germany — [6]Institute for Applied Physics, Technical University of Darmstadt, Otto-Bernd-Str. 3, 64287 Darmstadt, Germany

We introduce a quantum light engine for scanning microscopy with undetected photons, enabling lipid imaging from 3.3 to 3.4 $\mu$m. This add-on features a chirped lithium niobate crystal and reflective optics for enhanced performance.

CD-P.30 13:00 Hall B0

**Temporal Dynamics of Fiber Optical Poling** — Umberto Minoni[1], Jose Manuel Chavez Boggio[1,2], Kassahun Mamuye Tesfaye[1], and •Daniele Modotto[1] — [1]Dipartimento di Ingegneria dell'Informazione, Università di Brescia, Brescia, Italy — [2]Caral Filmproduktion, Berlin, Germany

During optical poling of a fiber we systematically monitored the second harmonic evolution. We discovered unexpected fluctuations and that by blocking the 532 nm seed the fundamental 1064 nm alone cancels the written quadratic nonlinearity.

CD-P.31 13:00 Hall B0

**Quiet Point Dynamics in Photonic Molecule Microcombs** — Krishna Twayana, Marcello Girardi, and •Victor Torres-Company — Chalmers University of Technology, Gothenburg, Sweden

We report the engineering of coupled-mode-induced dispersive-waves to access a quiet point for low-noise microwave generation in photonic molecule microcombs via thermo-optic tuning of an auxiliary resonance.

CD-P.32 13:00 Hall B0

**Developing Zn-indiffused MgO-doped PPLN ridge waveguides for Type-II telecom photon pair production** — •Peter Iveson[1], Goronwy Tawy[1], Glenn M Churchill[1], Paolo L Mennea[1], Rex H S Bannerman[1], Lewis D Wright[2], Peter G R Smith[1], James C Gates[1], and Corin B E Gawith[1,2] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]Covesion Ltd., Southampton, United Kingdom

We present our latest work in Type II SPDC at telecom wavelengths in ductile-diced ridge waveguides in zinc-indiffused magnesium-doped lithium niobate. Emphasis will be placed on fabrication conditions for low-loss modes matched to standard fibres.

CD-P.33 13:00 Hall B0

**Enhancing scalability and efficiency of self-phase modulation-enabled spectral selection** — •Shih-Hsuan Chia and Yu-Wei Chen — Institute of Biophotonics, National Yang Ming Chiao Tung University, Taipei, Taiwan

This study advances self-phase modulation-enabled spectral selection by optimizing spatiotemporal dynamics and addressing efficiency loss, achieving ~17% conversion efficiency at 1480 nm using a 40 fs Yb:fiber laser, demonstrating improved scalability for microscopy and spectroscopy applications.

# CE-P: CE Poster Session

Time: Tuesday, 13:00–14:00 Location: Hall B0

CE-P.1 13:00 Hall B0

**The Dual Function of Light-Activated TiO/Zn/Zeolite Nanomotors in Optical Sensing and Dye Degradation** — •shadab dabagh[1], Rukmani Singh[1], Claudia Borri[1], Huseyin Avci[2,3,4], Mahdi Bahadoran[5], and Francesco Chiavaioli[1] — [1]National Research Council of Italy (CNR), Institute of Applied Physics "Nello Carrara", 50019 Sesto Fiorentino, Italy, FLORENCE , Italy — [2]Cellular Therapy and Stem Cell Production Application and Research Centre, ESTEM, Eskisehir Osmangazi University, Eskisehir, 26040 Turkey, Eskisehir, Türkiye — [3]Department of Metallurgical and Materials Engineering, Eskisehir Osmangazi University, Eskisehir, 26040 Turkey, Eskisehir, Türkiye — [4]Translational Medicine Research and Clinical Center (TATUM), Eskişehir Osmangazi University, Eskişehir, 26040 Turkey, Eskisehir, Türkiye — [5]Department of Physics, Shiraz University of Technology, 31371555, Shiraz, Fars, Iran, shiraz, Iran

An advanced TiO/Zn/zeolite nanomotor achieves 97% dye degradation under UV light and functions as an optical sensor, enabling fast, cost-effective, real-time monitoring of dye concentrations for large-scale applications in textile and dye industries.

CE-P.2 13:00 Hall B0

**Physical Machining of Chambers, Vias, and Monolithic Mirrors in Silicon for Quantum Technologies** — Paul C. Gow, Glenn M. Churchill, Joel M. N. Keen, Corin B. E. Gawith, and •James C. Gates — Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

We present a scalable ultra-precision micro-machining approach to 2.5D fabrication of quantum components. Apertures, wells, and vias were achieved in up to 6mm thick silicon, as well as internal, optical-grade mirrors for light coupling.

CE-P.3 13:00 Hall B0

**Impact of replacing Na+ with Ag+ on the optical and spectroscopic properties of Er3+-doped tellurite glasses** — •Iuliia Kraskowski[1], Khaldoon Nasser[1], Chloe Hannesse[2], and Laeticia Petit[1] — [1]Tampere University, Tampere, Finland — [2]Formasup Ain Rhône Loire, Lyon, France

This work investigates Er3+-doped tellurite glasses, focusing on the effects of substituting Na+ with Ag+ and varying TeO2 content, to identify optimal compositions for waveguide amplifiers and integrated optical devices.

CE-P.4 13:00 Hall B0

**Optical Nonlinearity Mapping and Upconversion Excitation of Defect Photoluminescence in Epitaxial-Grown Boron Nitride Layers** — •Mariusz Klimczak[1], Bazlul Karim[2], Filip Bojdecki[3], Marcin Pastorczak[2], Jan Kossacki[1], Gabriela Szwed[1], Aleksandra Dąbrowska[1], Tomasz Kazimierczuk[1], Johannes Binder[1], and Andrzej Wysmołek[1] — [1]University of Warsaw, Faculty of Physics , Warsaw, Poland — [2]Institute of Physical Chemistry, Polish Academy of Sciences, Warsaw, Poland — [3]Institute of Geophysics, Polish Academy of Sciences, Warsaw, Poland

Boron nitride van der Waals crystals with various structural polytypes exhibit strong second-order nonlinear optical responses, enabling upconverted color center photoluminescence. We demonstrate how epitaxial BN growth opens new excitation pathways for future ultraviolet emitters.

CE-P.5 13:00 Hall B0

**Does Photodarkening in BGSe and BGGSe Influence Nonlinear Conversion** — •Julius Lukošiūnas[1,2], Robertas Kananavičius[1], Regimantas Januškevičius[1], Justinas Čeponkus[3], Rokas Danilevičius[1], and Andrejus Michailovas[1,2] — [1]Ekspla, Vilnius, Lithuania — [2]Center for Physical Sciences and Technology, Vilnius, Lithuania — [3]Vilnius University, Vilnius, Lithuania

BGSe and BGGSe crystals have emerged as promising alternatives to AGS crystals in nonlinear optics. In this work we study photodarkening effect in BGSe and

BGGSe crystals and influence to nolinear conversion in mid-infrared region

CE-P.6 13:00 Hall B0

*withdrawn*

CE-P.7 13:00 Hall B0

**Annealing in Zn vapours for manufacturing large-aperture Cr:ZnS laser gain media** — •Nazar Kovalenko, Thomas Thiel, and Oleg Pronin — Helmut-Schmidt University, Hamburg, Germany

Thermal diffusion doping of large Cr:ZnS crystals is challenging. The method for healing scattering centers in Cr:ZnS by annealing in Zn vapours is presented which allows to increase the crystal aperture for high-energy applications.

CE-P.8 13:00 Hall B0

**Fabrication of 3D direct-taper for the optimization of SiN waveguides edge couplers** — •Gioele Piccoli, Yuejiao Yang, Georg Pucker, and Mher Ghulinyan — Fondazione Bruno Kessler, Trento, Italy

We present a novel fabrication technique to realize 3D taper of SiN integrated waveguides, increasing both the height and width of their facet. This improves the efficiency of edge couplers between PICs and optical fibers.

CE-P.9 13:00 Hall B0

**Doping profile engineering for Cr2+:ZnS polycrystals enabling 52% slope efficiency at 5-W output power** — •Xiyue Zhang[1,2], Yuchen Wang[1], Ting Yu[1], Jintai Fan[1], Benxue Jiang[3], and Long Zhang[1] — [1] Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [2]University of Chinese Academy of Sciences, Beijing, China — [3]School of Physics Science and Engineering, Tongji University, Shanghai, China

We demonstrate a method of intra-cavity gain optimization exploiting the inherent ion concentration gradient of the thermally diffused gain media, e.g. in this particular case, Cr2+:ZnS polycrystals. Using the inherent concentration gradient, the intracavity laser efficiency is optimized to 52%.

CE-P.10 13:00 Hall B0

**Analytical and Experimental Demonstration of Fano Resonance in One-Dimensional Photonic Crystal Cavity and Waveguide System** — •Pratip Ghosh and Akshay K. Naik — Indian Institute of Science, Bengaluru, India

We demonstrate the Fano spectrum analytically and experimentally in a one-dimensional photonic crystal cavity fabricated on a waveguide and report that the Fano parameter can be manipulated by modulating the cavity resonance.

CE-P.11 13:00 Hall B0

**Spectroscopic investigation and Raman spectra of (Dy,Tb):YAG crystals: a possible gain material for visible laser** — •Angela Pirri[1], Alberto Santonocito[2,3], Jiang Li[4], Paolo Matteini[1], Martin Nikl[5], and Guido Toci[3] — [1]Istituto di Fisica Applicata "N. Carrara", Consiglio Nazionale delle Ricerche, CNR-IFAC , Sesto Fiorentino (Fi), Italy — [2]Dipartimento di Chimica, Università di Pisa, Pisa, Italy — [3]Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche, CNR-INO, Sesto Fiorentino (Fi), Italy — [4]Transparent Ceramics Research Center, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, China — [5]Institute of Physics Academy of Sciences of the Czech Republic, Prague, Czech Republic

We report on spectroscopic investigation and micro-Raman spectra of Dy(xat%),Tb(yat%):YAG crystals (with x= 1,2,5 and y=0.5,1) grown by the micro-pulling down method. A comparison with ceramic samples such as (xat%Dy,yat%Tb):LuAG is given.

CE-P.12 13:00 Hall B0

**Very sensitive, high dynamic range fluorescence analysis of praseodymium- and dysprosium-doped fibres with different core composition** — •Matthias Jäger[1], Arni Pratiwi[1], Martin Leich[1], Sonja Unger[1], Anka Schwuchow[1], Martin Lorenz[1], Robert Müller[1], Adrian Lorenz[1], Jakub Markiewicz[2], Tomasz Ragin[2], Piotr Miluski[2], Marcin Kochanowicz[2], Gloria Lesly Jimenez[3], Dominik Dorosz[3], and Jan Dellith[1] — [1]Leibniz Institute of Photonic Technology (IPHT), Jena, Germany — [2]Bialystok University of Technology, Bialystok, Poland — [3]AGH University of Krakow, Krakow, Poland

The absorption and fluorescence properties of various Pr- and Dy-doped fibres with very different core compositions (ZBLAN, silica, germanate, molten-core fibres) will be analysed and the potential for visible fibre lasers judged.

CE-P.13 13:00 Hall B0

**Development of NIR-rechargeable phosphor embedded in active glasses** — •Evellyn Santos Magalhães[1], Minnea Tuomisto[2], Philippe Smet[3], Mika Lastusaari[2], and Laeticia Petit[1] — [1]Photonics Laboratory, Tampere University, Tampere, Finland — [2]Department of Chemistry, University of Turku, Turku, Finland — [3]LumiLab, Department of Solid State Sciences, Ghent University, Gent, Belgium

The doping of $TeO_2$-based glasses with $Tm^{3+}$ and $Yb^{3+}$ ions, combined with PeL phosphors, enables tailored spectroscopic and lasing properties. We investigate their impact on $70TeO_2$-20ZnO-10BaO glasses for applications in visible and NIR regions.

CE-P.14 13:00 Hall B0

**High-performance Optical Filters for Advanced Bio-imaging Systems: Manufacturing Challenges and Innovative Solutions** — •Lucas Arsac[1,2], Fabien Lemarchand[1], Detlef Arhilger[3], Harro Hagedorn[3], and Julien Lumeau[1] — [1]Institut Fresnel, Marseille, France — [2]Bühler SAS, Villepinte, France — [3]Bühler Leybold Optics GmbH, Alzenau, Germany

Bio-imaging systems often rely on thin-film optical filters, but manufacturing challenges limit performance. We present a novel algorithm to optimize monitoring wavelengths used during deposition, improving thickness control and filter performance. Practical examples demonstrate enhanced spectral properties.

CE-P.15 13:00 Hall B0

**Bayesian Optimization for Data Selection in Bragg Grating Design Space for Machine Learning Training** — •M. R. Mahani, Igor A. Nechepurenko, Yasmin Rahimof, and Andreas Wicht — Ferdinand-Braun-Institut (FBH), Berlin, Germany

Bayesian optimization with various acquisition functions was used to construct efficient training datasets for machine-learning (ML) models, achieving comparable prediction accuracy with 60% fewer data than traditional methods. This enhances ML-based modeling in resource intensive fields.

CE-P.16 13:00 Hall B0

**Nanoscale X-Ray Tomography of fs-Laser-Written Integrated Photonics** — •Karoline Becker[1], Dmitry Karpov[2], Matthias Heinrich[1], Alexander Szameit[1], Pepijn W. H. Pinkse[3], and Tom A. W. Wolterink[1] — [1]Institute of Physics, University of Rostock, Rostock, Germany — [2]European Synchrotron Radiation Facility, Grenoble, France — [3]MESA+ Institute for Nanotechnology, University of Twente, Enschede, Netherlands

We use x-ray tomography to reconstruct 3D nanoscale density profiles of fs-laser-written integrated photonic structures. Our results show that this method can resolve even extremely low-contrast optical waveguides and enables imaging inside nanophotonic structures.

CE-P.17 13:00 Hall B0

**Fabrication of PPLNOI waveguides via in-situ poling monitoring and optimized dry etching conditions for efficient frequency conversion** — •Tetiana Slusar, Hong-Seok Kim, Guhwan Kim, Jinwoo Kim, Jiho Park, Jin Tae Kim, Jaegyu Park, Min-su Kim, Jung Jin Ju, and Kiwon Moon — ETRI, Daejeon, South Korea

By performing in-situ electric field periodic poling and dry etching at optimized conditions, we fabricated high-quality PPLNOI waveguide-based devices, achieving 1550-to-775 nm SHG with a normalized conversion efficiency of about 3000 % $W^{-1}cm^{-2}$.

CE-P.18 13:00 Hall B0

**Nanofabrication of 3D Photonic Band Gap Crystals from Silicon to Control the Emission of Light** — •Melissa J. Goodwin[1,2], Timon J. Vreman[1], Cornelis A.M. Harteveld[1], Geert-Jan Kamphuis[1], Andreas S. Schulz[1], Ad Lagendijk[1], and Willem L. Vos[1] — [1]Complex Photonic Systems (COPS), MESA+ Institute, University of Twente, Enschede, Netherlands — [2]MESA+ Nanolab, University of Twente, Enschede, Netherlands

We present our methodology to fabricate 3D photonic band gap crystals from silicon with the inverse woodpile structure. Spontaneous emission of embedded quantum dots reveals a remarkably enhanced emission at frequencies above the band gap.

CE-P.19 13:00 Hall B0

**Lithium Niobate Tantalate: Investigations of Nonlinear Optical Behavior and Ultrafast Transient Phenomena** — •Niklas Dömer[1], Anton Pfannstiel[1], Jan Klenen[1], Julian Koelmann[1], Steffen Ganschow[2], and Mirco Imlau[1] — [1]Universität Osnabrück, Osnabrück, Germany — [2]Leibniz-Institut für Kristallzüchtung, Berlin, Germany

A time-resolved study (sub-100fs up to 100s) of the nonlinear optical response of lithiumniobate-tantalate solid solutions is presented. Our results indicate the need to revise the established defect structure models for lithium niobate and tantalate.

CE-P.20 13:00 Hall B0

**Physical Mechanisms behind the Amplified Spontaneous Emission Signatures in $CsPbBr_3$ Nanocrystal Films** — •Luis Cerdán[1], Stefania Milanese[2], Maria Luisa De Giorgi[2], Marco Anni[2], and Maryna I. Bodnarchuk[3,4] — [1]Instituto de Química Física Blas Cabrera (IQF-CSIC), Madrid, Spain — [2]Dipartimento di Matematica e Fisica "Ennio De Giorgi", Universitá del Salento, Lecce, Italy — [3]Institute of Inorganic Chemistry, ETH Zürich, Zürich, Switzerland — [4]Laboratory for Thin Films and Photovoltaics, Empa - Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland

We show that ground and excited state reabsorption, together with the coex-

istence of short- and long-lived single excitons, are the main responsible for the distinctive Amplified Spontaneous Emission behavior in $CsPbBr_3$ perovskite nanocrystal thin films.

CE-P.21 13:00 Hall B0

**The Second Harmonic Generation in the ABC-type Metamaterials** — •Martin Mičulka[1], Jinsong Liu[1], Sebastian Beer[1], Raihan Rafi[1], Denys Sevriukov[2], Sergiy Yulin[2], Vladimir Roddatis[3], and Adriana Szeghalmi[2] — [1]Institute of Applied Physics, Friedrich Schiller University Jena, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany — [3]German Research Centre for Geosciences, Jena, Germany

Altering the structure of materials at the atomic scale gives rise to enhanced nonlinear optical properties. We optimize CMOS-compatible amorphous ABC-type nanolaminates to enhance bulk second-order electric susceptibility to record $\chi_{zzz} = 2.0 \pm 0.2$ pm/V for this metamaterial.

CE-P.22 13:00 Hall B0

**Optical waveguides fabrication on flexible PMMA substrate using aerosol-jet printing for automotive and aeronautical applications** — •Pauline Girault[1], Olatz Adarraga[2], Ibai Santamaria Teran[2], Celina Vaquero Moralejo[2], Laurent Oyhenart[1], Lionel Canioni[3], and Laurent Bechou[1] — [1]Laboratoire de l'Intégration du Matériau au Système (IMS), Bordeaux, France — [2]Fundacion TECNALIA Research & innovation (TECNALIA), Donostia, Spain — [3]Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB), Bordeaux, France

This work on aerosol jet printing of ink on PMMA flexible substrate demonstrates the fabrication of waveguides at 633 nm and permits the understanding of printing parameters influence showing potential for scalable printed photonic devices.

CE-P.23 13:00 Hall B0

**Compact multimode interference coupler based on hybrid silicon rich nitride-thin film lithium niobate platform** — •Toijam Sunder Meetei, Yong Tak Lee, and Nan Ei Yu — Advanced Photonics Research Institute, Gwangju Institute of Science and Technology, Gwangju 61005, South Korea

We demonstrate a compact 1×2 MMI coupler on a hybrid silicon-rich nitride-thin film lithium niobate (SRN-LN) platform. The design parameters of the MMI coupler were meticulously optimized to ensure uniform power splitting and minimize losses.

CE-P.24 13:00 Hall B0

**Suspended Waveguides for Mid-infrared in Silicon Nitride** — •Michał Jarosik[1,2], Marcin Juchniewicz[1], Michał Golas[1], Mateusz Słowikowski[1], Maciej Filipiak[1], Bartłomiej Stonio[1,2], and Dagmara Drecka[1,2] — [1]Warsaw University of Technology, Centre for Advanced Materials and Technologies CEZAMAT, Poleczki 19, 02-822 Warsaw, Poland — [2]Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, Koszykowa 75, 00-662 Warsaw, Poland

The paper presents the development of waveguide fabrication on a silicon nitride platform designed for mid-infrared applications, enabling the removal of silicon dioxide from the vicinity of the waveguides.

CE-P.25 13:00 Hall B0

**Development of repeatedly washable ultrabroadband and soft photo-imaging sensor sheets** — •Junyu Jin[1], Asumi Sano[1], Qi Zhang[1], Naoko Hagiwara[1], Yukio Kawano[1,2,3], and Kou Li[1] — [1]Chuo University, Tokyo, Japan — [2]NII, Tokyo, Japan — [3]KISTEC, Kanagawa, Japan

This work focuses on the development of repeatedly washable, ultrabroadband, and soft photo-imaging sensor sheets. The device contributes to enabling a reuse cycle after implementation in contaminating environments, which will be experimentally verified.

CE-P.26 13:00 Hall B0

**Design and fabrication of a metalens for beam shaping in an end-fire optical phased array** — Talem Rebeda Roy, Toijam Sunder Meetei, and •Nan Ei Yu — Advanced Photonics Research Institute, Gwangju Institute of Science and Technology, Gwangju 61005, South Korea

We design and fabricated a metalens for beam shaping in a silica optical phased array (OPA) device. The analytical ray tracing of the metalens and experimental results are in agreement, producing a sharp spherical beam.

CE-P.27 13:00 Hall B0

**The influence of Nb2O5 in the linear and nonlinear properties of fluorophosphates glasses** — •Artur Barbedo[1], José Luis Clabel Huamán[1], Leandro Olivetti Estevam da Silva[2], Danilo Manzani[2], and Cleber R. Mendonça[1] — [1]Physics Institute of São Carlos (IFSC), University of São Paulo (USP), São Carlos, Brazil — [2]Chemistry Institute of São Carlos (IQSC), University of São Paulo, São Carlos, Brazil

This study investigates nonlinear optics of fluorophosphate glasses doped with Nb2O5, with the NERS method, emphasizing structural influences via Raman analyses, achieving an n2 of 1.6x10-19 m2/W at high Nb2O5 concentrations.

CE-P.28 13:00 Hall B0

**Sm3+ -doped SrTi(PO4)2 phosphor-in-glass for inorganic colour conversion in LEDs** — •Jeena Rose Jose[1,2], Gin Jose[1], and P R Biju[2] — [1]School of Chemical and Process Engineering, University of Leeds, Leeds, United Kingdom — [2]School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam , India

Transparent orange-red emitting PiGs were fabricated using SrTi(PO4)2:Sm3+ phosphor and tellurite glass. The PiGs exhibit intense orange-red emission under 401nm excitation. Characterization confirmed successful integration with minimal glass-phosphor interaction, promising performance for lighting and display applications.

CE-P.29 13:00 Hall B0

**Optically Programmed Phase-Change Materials for Scalable Neuromorphic Photonics** — •Dominik Ditz [1], Shabnam Taheriniya[1], Rongyang Xu[1], Frank Brückerhoff-Plückelmann[1,2], and Wolfram Pernice[1,2] — [1]Kirchhoff-Institute for Physics, Heidelberg, Germany — [2]Physics Institute, University of Münster, Münster, Germany

We demonstrate a femtosecond laser setup for reversible switching of phase-change materials on silicon nitride waveguides. Our results demonstrate high extinction ratios, supporting scalable photonic circuits for neuromorphic computing and AI edge applications.

CE-P.30 13:00 Hall B0

**Coefficient of thermal expansion of ultra-stable materials measured with 10^-10/K uncertainty** — •Noah Roman Syring, Tobias Ohlendorf, Uwe Sterr, and Thomas Legero — Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

We measure the coefficient of thermal expansion of low-expansion materials based on Fabry-Pérot resonators and present an improved uncertainty budget, considering the contribution of the mirror coatings and the mirror deformation with temperature change.

CE-P.31 13:00 Hall B0

**Temperature-dependent spectroscopy of praseodymium-doped oxides** — •Ole Hahn, Noémie Sandré, Sascha Kalusniak, Moritz Badtke, and Christian Kränkel — Leibniz-Institut für Kristallzüchtung, Berlin, Germany

We present polarized, temperature-dependent, high-resolution absorption, emission, and fluorescent lifetime measurements of $Pr^{3+}$ doped YAP and LuAP to improve the understanding of low temperature visible laser operation of praseodymium-doped oxides.

CE-P.32 13:00 Hall B0

**Characterization of Astrophotonic Components with the CHara ARray Integrated Optics Testbench (CHARIOT)** — •Aline N. Dinkelaker[1], Kévin Barjot[2], Alyssa V. Mayer[3], Lucas Labadie[2], Nicholas J. Scott[4], Narsireddy Anugu[4], Gail Schaefer[4], Aurélien Benoît[5], Jacopo Siliprandi[5], Robert R. Thomson[5], and Kalaga Madhav[1] — [1]Leibniz-Institut für Astrophysik Potsdam, Potsdam, Germany — [2]I. Physikalisches Institut, Universität zu Köln, Köln, Germany — [3]Deutsches Zentrum für Luft- und Raumfahrt (DLR), Institut für Optische Sensorsysteme, Berlin, Germany — [4]The CHARA Array of Georgia State University, Mount Wilson Observatory, Mount Wilson, USA — [5]Institute of Photonics and Quantum Sciences, Heriot-Watt University, Edinburgh, United Kingdom

We present a characterization testbench for astrophotonics at the CHARA telescope array developed to support component qualification, including first characterization results of a laser-written fiber-connectorized integrated-optics beam combiner for near-infrared interferometry.

CE-P.33 13:00 Hall B0

**Multifunctional phosphors with ultra-broadband near-infrared emission (700 – 1700 nm)** — •Karolina Sadowska, Jakub Markiewicz, Tomasz Ragiń, Marcin Kochanowicz, Piotr Miluski, and Jacek Mariusz Żmojda — Faculty of Electrical Engineering, Bialystok University of Technology, Wiejska 45D, Białystok, Poland

Compositional materials with rare earth ions and transition metals may be broadband, near-infrared phosphors-converted LED with high efficiency that can achieve high-intensity luminescence spectra in the near-infrared range.

CE-P.34 13:00 Hall B0

*withdrawn*

# CK-P: CK Poster Session

Time: Tuesday, 13:00–14:00 Location: Hall B0

CK-P.1 13:00 Hall B0

**Interfacing quantum dots with silicon-nitride circuits at telecom wavelengths using photonic wire bonding at cryogenic-temperatures** — •Daniel Wendland[1,2], Ulrich Pfister[3], Florian Hornung[3], Lena Engel[3], Hendrik Hüging[1], Elias Herzog[3], Ponraj Vijayan[3], Raphael Joos[3], Erik Jung[2], Michael Jetter[3], Simone L. Portalupi[3], Wolfram H.P. Pernice[1,2], and Peter Michler[3] — [1]Institute of Physics and Venter for Nanotechnology, Münster, Germany — [2]Kirchhoff-Institute for Physics, Heidelberg, Germany — [3]Institut für Halbleiteroptik und Funktionelle Grenzflächen, Center for Integrated Quantum Science and Technology and SCoPE, Stuttgart, Germany

For realizing quantum technologies on small footprints hybrid approaches are beneficial. We combined In(Ga)As quantum dots with the silicon nitride waveguides using direct-laser-written structures, and showed the usability of this system in a cryogenic environment.

CK-P.2 13:00 Hall B0

**Optical switching between resonant wavelengths of a Gallium Phosphide (GaP) cavity** — •Daniela Satián-Guamán, Laura Mercadé, Maria Morant, Paula Mouriño, Víctor J. Gómez, Alejandro Martínez, and Roberto Llorente — Universitat Politècnica de València, Valencia, Spain

Gallium phosphide optomechanical cavities with dual resonances enable optical switching: pumping one resonance causes a non-linear wavelength shift in the other resonance in the opposite direction of the optical spectrum compared with the thermo-optical effect.

CK-P.3 13:00 Hall B0

*withdrawn*

CK-P.4 13:00 Hall B0

**Characterization of Light Scattering in Microresonator via Symmetry Breaking of Counterpropagating Light** — •Arghadeep Pal[1,2], Alekhya Ghosh[1,2], Haochen Yan[1,2], Toby Bi[1,2], Ibrahim El Mazbouh[1,2], Shuangyou Zhang[3,1], Lewis Hill[1], and Pascal Del'Haye[1,2] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany — [3]Department of Electrical and Photonics Engineering, Technical University of Denmark, Lyngby, Denmark

We report a novel method to characterize scatterers in microresonators using spontaneous symmetry breaking (SSB) of counter propagating lights. This will help in rapid characterization of microresonators and developing microresonator-based sensors.

CK-P.5 13:00 Hall B0

**Designing Photonic Crystal Equalizers for Broadband Soliton Microcombs** — •Jan L. Schreiber[1,2], Thibault Wildi[1], and Tobias Herr[1,2] — [1]Deutsches Elektron-Synchrotron DESY, Hamburg, Germany — [2]Physics Department, Universität Hamburg, Hamburg, Germany

We present a photonic crystal filter based on corrugated silicon nitride waveguides for the equalization of microresonator frequency combs, suitable for optical communications and potentially relevant for ultra-short pulse generation.

CK-P.6 13:00 Hall B0

*moved to CK-4.4*

CK-P.7 13:00 Hall B0

**Probabilistic photonic computing with chaotic light** — •Frank Brückerhoff-Plückelmann[1], Hendrik Borras[2], Holger Fröning[2], and Wolfram Pernce[1] — [1]Kirchhoff-Institute for Physics, Heidelberg, Germany — [2]Institute of Computer Engineering, Heidelberg, Germany

Biological neural networks excel at predicting from noisy data. Using chaotic light and incoherent photonic processing, we enable ultrafast probabilistic computation (70.4 GS/s) for Bayesian neural networks, performing image classification and uncertainty prediction.

CK-P.8 13:00 Hall B0

**Electrically Controlled Exceptional Points in Intersubband Polaritonic Metasurfaces** — •Beomjoon Kim[1], Hyeongju Chung[1], Gerhard Boehm[2], Mikhail A. Belkin[2], and Jongwon Lee[1] — [1]Department of Electrical Engineering, Ulsan National Institute of Science and Technology (UNIST), Ulsan 44919, South Korea — [2]Walter Schottky Institute, Technical University of Munich, Am Coulombwall 4, Garching 85748, Germany

We demonstrate electrically tunable Exceptional Points (EPs) in a polaritonic metasurface with two plasmonic resonators strongly coupled to intersubband transitions, achieving EPs at 9.5 $\mu$m via voltage bias in FDTD simulations.

CK-P.9 13:00 Hall B0

**Analog inverse discrete Fourier transform for optical pattern generation using thin-film lithium niobate waveguides with phase-change material** — •Ivonne Bente[1], J. Rasmus Bankwitz[2], Daniel Wendland[1,2], and Wolfram Pernice[1,2] — [1]Institute of Physics, University of Münster, 48155 Münster, Germany — [2]Kirchhoff-Institute for Physics, Heidelberg University, 69120 Heidelberg, Germany

We show the integration of phase-change material with thin-film lithium niobate waveguides and electro-optic phase shifter. These are used to perform analog inverse discrete Fourier transform for optical pattern generation on an integrated platform.

CK-P.10 13:00 Hall B0

**Mid-infrared optical loss analysis in thin-film lithium niobate based on thickness gradient method** — •HYEON HWANG, Kiyoung Ko, Min-Kyo Seo, and Hansuek Lee — Korea advanced institute science and technology, Daejeon, South Korea

The mid-infrared region is vital for spectroscopy, sensing, and communication, yet efficient light manipulation remains challenging. This work systematically analyzes thickness-dependent optical losses in TFLN micro-resonators, revealing bulk defects and surface absorption as dominant mechanisms.

CK-P.11 13:00 Hall B0

*withdrawn*

CK-P.12 13:00 Hall B0

*withdrawn*

CK-P.13 13:00 Hall B0

**Silicon Non-Blocking Four-Mode Exchanger Assisted by Mode-Selective Phase Shifter for 2-$\mu$m Waveband** — •Taichi Muratsubaki, Takanori Sato, and Kunimasa Saitoh — Hokkaido University, Sapporo, Japan

Silicon non-blocking four-mode exchanger assisted by mode-selective phase shifter for 2-$\mu$m waveband is proposed. We numerically demonstrate that the proposed mode exchanger provides the loss < 0.36 dB and mode crosstalk < –24 dB.

CK-P.14 13:00 Hall B0

**Efficient characterization of phase relations in linear optical devices** — •Andrea Crespi[1,2], Niki Di Giano[1,2], Riccardo Albiero[2], Francesco Ceccarelli[2], and Roberto Osellame[2] — [1]Politecnico di Milano - Dipartimento di Fisica, Milano, Italy — [2]Consiglio Nazionale delle Ricerche - Istituto di Fotonica e Nanotecnologie (CNR-IFN), Milano, Italy

We propose a method to reconstruct the phase terms of the unitary matrix implemented by a multimode linear interferometer. The phases of the outputs beams are evaluated simultaneously harnessing an array of Young interferometers.

CK-P.15 13:00 Hall B0

*withdrawn*

CK-P.16 13:00 Hall B0

**Dielectric Metasurface Enabled Multispectral Polarisation Imaging** — •Sarah E. Dean[1,2], Neuton Li[1], Josephine Munro[1], Robert Sharp[3], Dragomir N. Neshev[1], Falk Eilenberger[2], and Andrey A. Sukhorukov[1] — [1]ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS), Department of Electronic Materials Engineering, Research School of Physics, Australian National University, Canberra, Australia — [2]Fraunhofer-Institute for Applied Optics and Precision Engineering IOF, Jena, Germany — [3]Research School of Astronomy & Astrophysics, Australian National University, Canberra, Australia

We present a novel metasurface designed for polarisation imaging simultaneously at two distinct wavelengths within an ultra-compact system, suitable specifically for small satellite remote sensing of the Earth's surface.

CK-P.17 13:00 Hall B0

**High Responsivity UV Photodetector Based on ZnO Nanowire Arrays** — •Dana Cristea, Paula Obreja, Roxana Tomescu, and Adrian Dinescu — National Institute for Research and Development in Microtechnologies – IMT Bucharest, Voluntari, Romania

We present the fabrication and characterization of UV photodetectors based oblique ZnO nanowires selectively grown on Au interdigitated electrodes by hydrothermal method. The process was optimized to obtain high responsivities, over 1000 A/W.

CK-P.18 13:00 Hall B0

*withdrawn*

CK-P.19 13:00 Hall B0

**Pulse-Self-Steepening via Optical Push Broom** — Boyi Zhang[1], Maurice Pffeifer[1], Evgeny Lonshakov[2], Felix Vega[2], Manfred Eich[1,3], Alexander Petrov[1,3], and •Mahmoud Gaafar[2] — [1]Institute of Optical and Electronic Materials, Hamburg University of Technology, Hamburg, Germany — [2]Directed Energy Research Centre, Technology Innovation Institute, Abu Dhabi, United Arab Emirates — [3]Institute of Functional Materials for Sustainability, Helmholtz-Zentrum Hereon, Geesthacht, Germany

We demonstrate an on-chip time lens and pulse self-steepening effect using the optical push broom mechanism, where a Kerr-induced refractive index front compresses signal pulses, steepens their leading edge, and concentrates energy.

CK-P.20 13:00 Hall B0

**Deep-Learning Assisted Laser Chip Coupling for Hybrid Integrated Photonics** — Mohamed Alaaeldeen[1], Ziad Yasser[1,2], Khaled Lashin[1], Hisham Othman[2,3], and •Haitham Omran[1,3] — [1]Laboratory of Micro Optics, Faculty of Information Engineering and Technology, German University in Cairo (GUC), Cairo, Egypt — [2]Faculty of Media Engineering and Technology, German University in Cairo (GUC), Cairo, Egypt — [3]AI Quanta Engineering, Cairo, Egypt

We present deep-learning assisted quantum-dot laser chip coupling system for hybrid-integrated photonics. We adopt YOLO convolution neural network (CNN) object tracking technology for automated multi-strip laser chip alignment with a GRIN micro-lens showing 99% mAP50.

CK-P.21 13:00 Hall B0

**Integrated Optical Circulator in a Silicon Ring Resonator with Two Time-Modulated Regions** — •Arezoo Zarif and Kambiz Jamshidi — Chair of RF and Photonics, Technische Universität Dresden, Dresden, Germany

A magnetic-free integrated optical circulator based on a partially time-modulated silicon ring resonator coupled to a Bragg grating is proposed. By sweeping the modulation frequency and amplitude, a maximum isolation of 15 dB is obtained.

CK-P.22 13:00 Hall B0

**2D Beam Scanning Using Silicon Nitride-Based Optical Phased Array** — •Saeed Arsanjani[1,2], Muhammad S. Khan[1], Jochen Bardong[1], Albert Frank[1], Lars Zimmermann[2], and Tommaso Cassese[1] — [1]Silicon Austria Labs, Villach, Austria — [2]Technical University of Berlin, Berlin, Germany

This study showcases the first operational optical phased array (OPA) at 1500 – 1630 nm. The OPA is fully integrated on a silicon nitride platform and demonstrates a field of view of 24.28° × 9.46°.

CK-P.23 13:00 Hall B0

**Implementation of a Spurious Solution Free 8-band k.p Model for the Identification of Absorption Spectra of InAs Quantum Dots grown on GaAs** — •Ben Jakobs[1], Dominic Gallagher[2], and Peter M Smowton[1] — [1]Cardiff University, Cardiff, United Kingdom — [2]Photon Design, Oxford, United Kingdom

An 8-band k.p model is utilized to simulate InAs quantum dots absorption spectra, with application in the design of silicon-photonics compatible lasers. Experimental results at different operating temperatures are replicated.

CK-P.24 13:00 Hall B0

**(3+1)D Printing of Low-loss Core-Clad Waveguide by two-photon polymerization** — •Raphaël Hazem[1], Mathis Carpentier[1], Marc Dussauze[2], Yannick Petit[1], and Lionel Canioni[1] — [1]Institute of Chemistry of the Condensed Mater of Bordeaux, Pessac, France — [2]Institute of Molecular Science, Talence, France

To our knowledge, we demonstrate the first fabrication of single-mode core-clad waveguides by (3+1)D two-photon polymerization in hybrid resin with propagation losses down to -0.16 dB.cm-1.

CK-P.25 13:00 Hall B0

**3D Printing for Enhanced On-chip Stimulated Brillouin Scattering** — •Deepanshu Yadav[1], Angeliki Afentaki[2,3], Moritz Hinkelmann[2,3], and Thomas Schneider[1] — [1]THz-Photonics Group, Technische Universitat Braunschweig, Schleinitzstrasse 22, 38106, Braunschweig, Germany, Braunschweig, Germany — [2]Laser Zentrum Hannover e.V., Photonics Integration Department, Hollerithallee 8, 30419 Hannover, Germany, Hannover, Germany — [3]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering – Innovation Across Disciplines), Hannover, Germany, Hannover, Germany

We suggest 3D two-photon polymerization for high-gain on-chip stimulated Brillouin scattering (SBS). The simple prototyping and possibility to fabricate complex structures may enable new microwave photonic filters, ultra-narrow linewidth lasers and extremely pure THz sources.

CK-P.26 13:00 Hall B0

**Optical components for on-chip Interferometric Fiber Optic Gyroscope using thin film Lithium Niobate Platform** — •Anupama T Vasudevan, Sana Fathima, and Shankar Kumar Selvaraja — Indian Institute of Science, Karnataka, India

We propose and demonstrate integrating the optical passive components like waveguides, splitters, and circulators with the active phase modulator component, all on a single photonics integrated to realise an on-chip interferometric fiber optical gyroscope.

CK-P.27 13:00 Hall B0

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CK-P.28 13:00 Hall B0

**Ultra broadband and super low-loss plug-and-play fiber to PIC connector** — •Erik Jung[1], Helge Gehring[2], Frank Brückerhoff-Plückelmann[1], Clara Vazquez-Martel[3], Eva Blasco[3], and Wolfram Pernice[1,2] — [1]KIP, Heidelberg University, Heidelberg, Germany — [2]University of Münster, Münster, Germany — [3]IMSEAM, Heidelberg University, Heidelberg, Germany

This paper presents a scalable, plug-and-play photonic packaging solution featuring self-aligning MTP cables and 3D-printed couplers directly on the chip surface, achieving an average system loss of 0.9 ± 0.11 dB for high-bandwidth applications like matrix-vector multiplication.

CK-P.29 13:00 Hall B0

*withdrawn*

CK-P.30 13:00 Hall B0

**Excitation and Control of Polaritons Using Period Arrays** — •Leila Prelat[1], Eduardo J. C. Dias[1], and F. Javier García de Abajo[1,2] — [1]ICFO-Institut de Ciencies Fotoniques, Barcelona, Spain — [2] ICREA-Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain

We theoretically study the coupling between free electrons and polaritons mediated by a single small scatterers, as well as polariton Smith-Purcell emission assisted by scatterer arrays, obtaining the conditions to maximize electron–polariton coupling.

CK-P.31 13:00 Hall B0

*withdrawn*

CK-P.32 13:00 Hall B0

**Chirality dependent spatially discriminated excitations using Vogel spirals** — •Chung-Kai Tseng and Chao-Yi Tai — National Central University, Taoyuan, Taiwan

Chirality dependent spatially discriminated field enhancement is achieved by introducing anisotropic elliptical nanorods in Vogel spiral structures. The distribution of hotspots can be manipulated in the near-field and readout all-optically in-situ.

CK-P.33 13:00 Hall B0

**Scandium-Doped Aluminum Nitride (AlScN) Thin-Film as a Piezoelectric Optical Waveguide for Photonic Crystal Slabs** — •Fabio Aldo Kraft[1,2], Maike Gremmel[3], Simon Fichtner[2,3,4], and Martina Gerken[1,2] — [1]Chair for Integrated Systems and Photonics, Faculty of Engineering, Kiel University, Kiel, Germany — [2]Kiel Nano, Surface and Interface Science KiNSIS, Kiel University, Kiel, Germany — [3]Materials and Devices for Microsystem Technology, Faculty of Engineering, Kiel University, Kiel, Germany — [4]Fraunhofer Institut for Silicon Technology, Itzehoe, Germany

Photonic crystal slabs (PCS) are commonly processed oh high refractive dielectric materials. Here, we show that piezoelectric scandium-doped aluminum nitride (AlScN) can be used as a waveguide for PCS via a two-layer nanostructuring process.

CK-P.34 13:00 Hall B0

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CK-P.35 13:00 Hall B0

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CK-P.36 13:00 Hall B0

*withdrawn*

CK-P.37 13:00 Hall B0

**Broadband Vortex Waves Generation by All-dielectric Vogel Metasurface** — Volodymyr I. Fesenko[1,2], •Erick R. Baca-Montero[1], and Oleksiy V. Shulika[1] — [1]University of Guanajuato, Salamanca, Mexico — [2]Institute of Radio Astronomy of National Academy of Sciences of Ukraine, Kharkiv, Ukraine

All-dielectric transmissive metasurface formed by Vogel golden spiral is studied in this report. We demonstrate that such aperiodic metasurface provides generation of high-quality vortex waves over the broad spectral range from 470 nm to 580 nm.

CK-P.38 13:00 Hall B0

**Elimination of Dispersion Ripples in a Waveguide Cavity Using Two Slightly Dispersion-Shifted Bragg Gratings** — Hagen Renner[1], Hendrik Preuss[1], Nikita Kondratyev[2], Thibault Wildi[3], Felix Vega[2], Tobias Herr[3], Manfred Eich[1,4], Alexander Petrov[1,4], and •Mahmoud Gaafar[2] — [1]Institute of Optical and Electronic Materials, Hamburg University of Technology, Hamburg, Germany — [2]Directed Energy Research Centre, Technology Innovation Institute, Abu Dhabi, United Arab Emirates — [3]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [4]Institute of Functional Materials for Sustainability, Helmholtz-Zentrum Hereon, Geesthacht, Germany

Chip-integrated chirped Bragg gratings are crucial for on-chip dispersion compensation. We demonstrate that using two Bragg mirrors with slightly shifted dispersion spectra effectively suppresses group-delay dispersion ripples, validated through FEM simulations.

CK-P.39 13:00 Hall B0

**Nanoimprinted Meta-mirror Surfaces for Reflection Phase Control for High Resolution Displays** — •Yoonjeong Lee[1,2], Youngyoon Lim[1,3], Soongeun Kwon[1], Nuri Oh[2], Seung-Yeol Lee[4], Hyungjun Lim[1], and Hak-Jong Choi[1] — [1]Korea Institute of Machinery and Materials (KIMM), Daejeon, South Korea — [2]Hanyang University, Seoul, South Korea — [3]Chungnam National University, Daejeon, South Korea — [4]Kyungpook National University, Daegu, South Korea

Using nanoimprint lithography, metasurfaces with engineered nanostructures enable directional light emission and improved color performance in microdisplays. This approach reduces optical cross-talk, ensuring brightness and resolution, with applications in AR/VR/XR, automotive HUDs, and medical imaging systems.

CK-P.40 13:00 Hall B0

**Threshold Parameters Optimisation in Bichromatically Driven Microresonators for On-Chip Degenerate Optical Parametric Oscillators** — •Nadezhda Tatarinova[1,2], Anatoly Masalov[1,3], Artem Shitikov[1], Igor Bilenko[1,4], Valery Lobanov[1], and Dmitry Chermoshentsev[1,2] — [1]Russian Quantum Center, Moscow, Russia — [2]Moscow Institute of Physics and Technology, Dolgoprudny, Russia — [3]Lebedev Physical Institute, Russian Academy of Sciences, Moscow, Russia — [4]Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia

We theoretically analyse process of degenerate optical parametric oscillations in bichromatically pumped normal-dispersion microresonator to determine optimal threshold parameters. Threshold pump power can be decreased by introducing frequency shift in specific microresonator eigenmodes.

CK-P.41 13:00 Hall B0

**Latent-Symmetric Photonic Systems and their Eigenmodes** — •Jonas Himmel[1], Max Ehrhardt[1], Matthias Heinrich[1], Malte Röntgen[2], Alexander Szameit[1], and Tom A. W. Wolterink[1] — [1]Institute for Physics, University Rostock, Rostock, Germany — [2]Eastern Institute for Advanced Study, Eastern Institute of Technology, Ningbo, China

We investigate how the recently discovered concept of latent symmetry affects the dynamics of photonic systems and their eigenmodes. This adds a powerful tool to design systems with desired functionality on any nanophotonic platform.

CK-P.42 13:00 Hall B0

*withdrawn*

# EF-P: EF Poster Session

Time: Tuesday, 13:00–14:00 Location: Hall B0

EF-P.1 13:00 Hall B0

**Frequency-Tunable DUV Bi-Chromatic Pulse Pairs Directly Generated from NIR Ultrashort Pulses** — •Hamid A. Rashtabadi[1,2,3,4], Marek Wieland[1,2,3], Mark J. Prandolini[2,3], Silva Mezinska[1,2], and Markus Drescher[1,2,3] — [1]The Hamburg Centre for Ultrafast Imaging, Hamburg, Germany — [2]Institute for Experimental Physics, Hamburg, Germany — [3]Center for Free-Electron Laser Science CFEL, Hamburg, Germany — [4]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

Frequency-tunable deep ultraviolet bi-chromatic pulse pairs were experimentally generated via soliton-plasma interactions in a gas-filled hollow waveguide. Central wavelengths were precisely tunable through dispersion and pressure adjustments, spanning 225–390 nm.

EF-P.2 13:00 Hall B0

**Hysteresis in Laser Cavity-Solitons** — •Aadithya Suresh[1], Antonio Cutrona[1], Debayan Das[1], Sai Chu[2], Brent Little[3], Roberto Morandotti[4], David Moss[5], Juan Sebastian Totero Gongora[1], Marco Peccianti[1], and Alessia Pasquazi[1] — [1]Emergent Photonics Research Centre (EPicX), Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [2]Department of Physics, City University of Hong Kong, Hong Kong, China — [3]QXP Technologies Inc., Xi'an, China — [4]INRS-EMT, Varennes, Canada — [5]Optical Sciences Centre, Swinburne University of Technology, and ARC-COMBS, Hawthorn, Australia

We show repeatable hysteresis behaviour in the energy of laser cavity-solitons when the gain of the system is varied following opposite trajectories induced by the slow nonlinearities of the microcomb laser.

EF-P.3 13:00 Hall B0

**Energy-velocity scaling of wavelet-like optical solitons** — •Oliver Melchert[1,2], Ihar Babushkin[1,2], Uwe Morgner[1,2], and Ayhan Demircan[1,2] — [1]Leibnitz Universität Hannover, Institute of Quantum Optics, Hannover, Germany — [2]Cluster of Excellence PhoenixD, Hannover, Germany

We characterize a novel type of wavelet-shaped soliton. These solutions are characterized by broad spectra, carrier-envelop phase stability, robustness against perturbations, independence on the fine details of dispersion and unusual energy scaling.

EF-P.4 13:00 Hall B0

**Localized Patterns and Solitons in Cylindrical Microresonators with Anomalous GVD** — •Carlos Mas Arabí[1], Pedro Fernández de Córdoba[1], José Alberto Conejero[1], Yaroslav Kartashov[2], and Carles Milián[1] — [1] Institut Universitari de Matemàtica Pura i Aplicada, Universitat Politècnica de València, València, Spain — [2]Institute of Spectroscopy, Russian Academy of Sciences, Troitsk, Moscow, Russia

We analize the formation of localized patterns in cylindrical microresonators with anomalous group velocity dispersion. We unveil a rich landscape of new dissipative structures, which have no equivalent in one-dimensional resonators.

EF-P.5 13:00 Hall B0

**Quasiperiodic non-Hermitian lattices: Nonlinearity and Anderson jumps** — •Dimitrios H. Kaltsas[1,2], Ananya Ghatak[2], Manas Kulkarni[3], and Konstantinos Makris[1,2] — [1]Institute of Theoretical and Computational Physics, Heraklion, Greece — [2]Institute of Electronic Structure and Laser, Heraklion, Greece — [3]International Centre for Theoretical Sciences, Bangalore, India

We investigate the effect of saturable gain nonlinearity on the wave propagation in a non-Hermitian quasiperiodic Aubry-Andre photonic lattice. The interplay of nonlinearity and the Anderson jumps near the localization-delocalization phase transition is examined.

EF-P.6 13:00 Hall B0

*withdrawn*

EF-P.7 13:00 Hall B0

**Diverse dynamics of polarization domain walls in passive Kerr resonators** — •Pengxiang Wang[1], Changqing Li[1], Ziang Xiao[1], Carlos Mas-Arabí[2], and Gang Xu[1] — [1]Huazhong University of Science and Technology, Wuhan, China — [2]Universitat Politècnica de València, València, Spain

By analyzing spatiotemporal dynamics and eigenvalues, we report on novel regimes of polarization-domain-wall structures, including breathing, quadristable and tail-locking configurations.

EF-P.8 13:00 Hall B0

*withdrawn*

EF-P.9 13:00 Hall B0

**Spontaneous pattern formation in a noise-initiated laser system mediated by the dissipative Faraday instability** — •Changqing Li[1], Ran Xia[1,2], Pengxiang Wang[1], Ziang Xiao[1], and Gang Xu[1] — [1]School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan, China — [2]Department of Electronic Engineering, School of Electronic Science and Engineering, Xiamen University, Xiamen, China

We show that a single - peak comb filter in DFI - guided lasers enables noise - to - pattern evolution sans CW drive and demonstrate pulsation pattern generation within specific parameters.

EF-P.10 13:00 Hall B0

*withdrawn*

EF-P.11 13:00 Hall B0

*withdrawn*

EF-P.12 13:00 Hall B0

**Characterization of Temporal Optical Parametric Oscillation in Silicon Nitride Microresonator Driven by Modulated Pumping** — •Menglong He, Mohd Saif Shaikh, Abdou Shetewy, and Kambiz Jamshidi — TU Dresden, Dresden, Germany

We experimentally demonstrate the temporal behavior of signal generation in optical parametric oscillation in the SiN microresonator using a single pump with modulation rates of 10, 50, and 100 MHz to obtain high-speed time multiplexing.

EF-P.13 13:00 Hall B0

*withdrawn*

EF-P.14 13:00 Hall B0

**Probing Nonlinear Turbulent Dynamics with a Fully-controllable Platform for Paraxial Fluids of Light** — •Nuno A. Silva[1,2] and Tiago Ferreira[1,2] — [1]INESC TEC - Institute for Systems and Computer Engineering, Technology and Science, Porto, Portugal — [2]Department of Physics and Astronomy, Faculty of Sciences, University of Porto, Porto, Portugal

Using an optical feedback loop enabled by digital holography and wavefront shaping, we investigate nonlinear dynamics in paraxial fluids of light in a photorefractive crystal. Featuring extended propagation dynamics, it allows observation of quantum-like turbulence.

EF-P.15 13:00 Hall B0

**Observation of bound states of parametrically-driven Kerr cavity solitons** — •Clément Dupont[1,2], Nicolas Englebert[3], Simon-Pierre Gorza[2], Serge Massar[1], and Leo François[2] — [1]LIQ (ULB), Bruxelles, Belgium — [2]OPERA (ULB), Bruxelles, Belgium — [3]Caltech, California, USA

We report the first observation of close-range bound states of parametrically-driven cavity solitons (PDCSs) in a hybrid optical parametric oscillator. Experimental results highlight soliton interactions and bound-state formation dynamics.

EF-P.16 13:00 Hall B0

**Application of the nonlinear Fourier transform for analysis of the coherent structures generation** — •Igor Chekhovskoy[1], Olga Shtyrina[1], Mikhail Fedoruk[1,2], Egor Sedov[3], and Sergey Turitsyn[3] — [1]Novosibirsk State University, Novosibirsk, Russia — [2]Federal Research Center for Information and Computational Technologies, Novosibirsk, Russia — [3]Aston Institute of Photonic Technologies, Aston University, Birmingham, United Kingdom

We investigate the formation of dissipative solitons in lasers described by the Haus-Ginzburg-Landau equation, demonstrating how the nonlinear Fourier transform characterizes coherent structures from noise via a minimal number of discrete eigenvalues in the nonlinear spectrum.

EF-P.17 13:00 Hall B0

**Statistically Informed Latent Feature Selection for Physical Reservoirs** — •Juliane Heim[1], Sobhi Saeed[1], Glitta Cheeran[1], Mehmet Müftüoğlu[1], and Mario Chemnitz[1,2] — [1]Leibniz-Institute of Photonic Technology, Jena, Germany — [2]Friedrich Schiller University Jena, Jena, Germany

This paper introduces a statistical bin selection approach for reservoir computing, selecting high-variance channels to reduce complexity and maintain accuracy, validated on fiber-optical and acoustic reservoirs with robust results on MNIST and Audio-MNIST.

EF-P.18 13:00 Hall B0

**Impact of Waveguide Radius on the Spectral Bandwidth of Frequency-Tunable Ultrashort Ultraviolet Pulses** — •Hamid A. Rashtabadi[1,2,3,4], Mark J. Prandolini[2,3], Marek Wieland[1,2,3], Silva Mezinska[1,2], and Markus Drescher[1,2,3] — [1]The Hamburg Centre for Ultrafast Imaging, Hamburg, Germany — [2]Institute for Experimental Physics, University Hamburg, Hamburg, Germany — [3]Center for Free-Electron Laser Science CFEL, Hamburg, Germany — [4]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

This study explores the impact of waveguide radius on coherence length and spectral bandwidth of frequency-tunable ultrashort ultraviolet pulses, demonstrating how waveguide dispersion can be tailored for optimized RDW emission and control over their spectral bandwidth.

EF-P.19 13:00 Hall B0

**Modal Analysis of Supercontinuum Generation within Multi-mode Ta2O5 Nonlinear Waveguides** — •Guan-Hong Li[1], Shao-Rong Gan[1], Yuan-Yao Lin[1], Min-Hsiung Shih[2,3], Yi-Jen Chiu[1], and Chao-Kuei Lee[1,3,4,5] — [1]Department of Photonics, National Sun Yat-sen University, Kaohsiung, Taiwan — [2]Department of Photonics, National Yang Ming Chiao Tung University, Hsinchu, Taiwan — [3]Research Center for Applied Sciences, Taipei, Taiwan — [4]Department of Physics and Research Center of Crystal Growth, National Sun Yat-sen University, Kaohsiung, Taiwan — [5]Taiwan Instrument Research Institute of NAR Labs, Hsinchu, Taiwan

In this work, by using spatial mode analyzing spectrometer, optimizing supersontinuum generation via the combinations of contributions from various modes was characterized, enabling the potential of functional spectral profile of SCG.

EF-P.20 13:00 Hall B0

*withdrawn*

EF-P.21 13:00 Hall B0

*moved from ED-P.13*

**Dark-fringe interferometry for infrared sensing** — •Malo Briend and Lucile Rutkowski — Univ Rennes, CNRS, IPR (Institut de Physique de Rennes)-UMR 6251, Rennes, France

We present dark-fringe spectroscopy using an optical frequency comb and a mechanical Fourier transform spectrometer. We performed proof-of-concept experiments on a fused-silica etalon and preliminary tests on molecular detection.

## JSIII-P: JSIII Poster Session

Time: Tuesday, 13:00–14:00 Location: Hall B0

JSIII-P.1 13:00 Hall B0

**Modelling and fabrication of gallium nitride lasers for atomic clocks** — •Shuqiao Cai[1], Finlay Walton[1], Daehyun Kim[1], Simon Munro[1], Sean Mulholland[2], Ian Hill[2], Stephen P. Najda[3], Piotr Perlin[3,4], Tadek Suski[3,4], Lucja Marona[3,4], Mike Leszczynski[3,4], Szymon Stanczyk[3,4], Patrick Gill[2], Anthony E. Kelly[1], and Scott Watson[1] — [1]James Watt School of Engineering, University of Glasgow, Glasgow, United Kingdom — [2]National Physical Laboratory, Teddington, United Kingdom — [3]TopGaN Ltd, Warsaw, Poland — [4]Institute of High Pressure Physics PAS, Warsaw, Poland

This work explores the design and fabrication of gallium nitride distributed feedback lasers which can be used as compact, narrow line width sources for the cooling transitions in optical atomic clocks.

JSIII-P.2 13:00 Hall B0

**Examining the Design Trade-offs of Ge-on-Si Single Photon Avalanche Diodes with Etched Photonic Crystals** — Charlie Smith[1], Charlie McCarthy[1], Gerald Buller[2], Douglas Paul[1], and •Ross Millar[1] — [1]University of Glasgow, Glasgow, United Kingdom — [2]Heriot-Watt University, Edinburgh, United Kingdom

Ge-on-Si single photon avalanche diodes (SPADs) with etched photonic crystals can potentially enhance detection efficiencies. This simulation study examines design trade-offs and challenges, revealing potential noise-equivalent-power improvements as a function of material and passivation properties.

JSIII-P.3 13:00 Hall B0

**Nonlinear Transformations in Telecom Devices for Optical Computing** — •Egor Manuylovich, Dmitrii Stoliarov, David Saad, and Sergei K. Turitsyn — Aston University, Birmingham, United Kingdom

Using telecom devices' high bandwidth and nonlinearity, we propose a photonic computing approach. Wave-division multiplexing, combined with trainable encoding masks, yields superior time-series forecasting and demonstrates the potential of repurposing telecom infrastructure for optical computing.

JSIII-P.4 13:00 Hall B0

**Modelling of Energy-Dependent Nonlinearities in Microresonator Filtered Lasers** — •Antonio Cutrona[1], Andrew Cooper[1], Juan Sebastian Totero Gongora[1], Gian-Luca Oppo[2], Marco Peccianti[1], and Alessia Pasquazi[1] — [1]Emergent Photonics Research Centre (EPicX), Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [2]SUPA and Department of Physics, University of Strathclyde, Glasgow, United Kingdom

We investigate the effect of slow nonlinear processes on Laser Cavity-Solitons (LCS). By leveraging a recirculating formalism, we find a promising approach towards the stabilisation of LCS states in generic platforms with different nonlinear properties.

JSIII-P.5 13:00 Hall B0

**Miniaturised optical isolators for realising micro-integrated photonic modules in quantum technology applications** — •Marcel Bursy[1], Ahmad Bawamia[1], Thomas Flisgen[1,2], Nora Goossen-Schmidt[1], Charleen Luplow[1], Max Schiemangk[1], Christoph Tyborski[1,3], and Andreas Wicht[1] — [1]Ferdinand-Braun-Institut (FBH), Berlin, Germany — [2]Fachgebiet Theoretische Elektrotechnik, Brandenburgische Technische Universität Cottbus-Senftenberg, Cottbus, Germany — [3]CryLaS Crystal Laser Systems GmbH, Berlin, Germany

To realise our next-generation laser modules and our new light control units, we have developed a technology platform for ultra-compact optical isolators covering the entire desired wavelength range between 400 and 950 nm.

JSIII-P.6 13:00 Hall B0

*moved from CM-P.1*

**Comparison of Laser-Induced Bulk Modifications in Glass by Femtosecond Pulses Using Single Pulses, MHz- and GHz-Bursts** — •Manon Lafargue[1,2], Théo Guilberteau[1,3], Pierre Balage[1], Bastien Gavory[2], John Lopez[1], and Inka Manek-Hönninger[1] — [1]Université de Bordeaux - CNRS - CEA, Talence, France — [2]Amplitude, Pessac, France — [3]ALPhANOV, Talence, France

We investigated bulk modifications induced by laser irradiation in single-pulse, MHz-, and GHz-burst regimes. Classification of these modifications enabled us to define processing windows for transparent glass welding for various pulse energies and scanning speeds.

## CF-6: Multi-Pass Cells 1

Chair: Ming-Chang Chen, National Tsing Hua University, Hsinchu, Taiwan

Time: Wednesday, 8:30–10:00 Location: ICM - Room 1

**Oral** CF-6.1 8:30 ICM - Room 1

**Post-Compression of a Q-switched laser in a Multi-Pass Cell** — •Arthur Schönberg[1], Peer Biesterfeld[2], Marc Seitz[1], Nayla Jimenez[1,3,4], Tino Lang[1], Marcus Seidel[1,3,4], Prannay Balla[1], Lutz Winkelmann[1], Sven Fröhlich[2], Philip Mosel[2], Ingmar Hartl[1], Francesca Calegari[1,5], Uwe Morgner[2], Milutin Kovacev[2], Christoph M. Heyl[1,3,4], and Andrea Trabattoni[1,2] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Leibniz Universität Hannover, Institut für Quantenoptik, Hannover, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany — [4]Helmholtz-Institut Jena, Jena, Germany — [5]Department of Physics, Universität Hamburg, Hamburg, Germany

We demonstrate post-compression of a 1 mJ, 0.5 ns Q-switched laser down to 24 ps in a multi-pass cell using a 10 cm long fused silica block as the nonlinear medium.

**Oral** CF-6.2 8:45 ICM - Room 1

**Quasi-phase matched four-wave mixing in gas-filled multipass cell: an experimental study** — •Antoine Comby[1], Florent Guichard[1], Michele Natile[1], Xavier Délen[2], and Marc Hanna[2] — [1]Amplitude Laser, 11 Avenue de Canteranne, Cité de la Photonique, 33600 Pessac, France — [2], France 2. Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, 91127 Palaiseau, France

We show experimental evidence of a quasi-phase matched four wave mixing process inside a gas-filled multipass cell, including the development of the signal spectrum as a function of number of passes with an exponential growth.

**Oral** CF-6.3 9:00 ICM - Room 1

**Multipass-cell–based nonlinear post-compression to 250W, 2.5mJ, <8fs at 1030nm** — Christian Grebing, Stefano Wunderlich, Maxim Tschernajew, Evgeny Shestaev, Florian Just, Vinzenz Hilbert, Christian Kern, Marco Kienel, Hafiz Masood, Tobias Heuermann, •Christian Gaida, Oliver Herrfurth, Sven Breitkopf, Tino Eidam, and Jens Limpert — Active Fiber Systems GmbH, Jena, Germany

Compression in the two-stage MPC reduces the pulse duration to 8fs with 2.5mJ pulse energy, yielding the highest compressed average power for few-cycle MPC systems—250W at a 100kHz repetition rate—nearly doubling previous benchmarks.

**Oral** CF-6.4 9:15 ICM - Room 1

**Temporal pulse shaping technique for self-phase modulation tailoring** — •Gautier Parize[1,2], Michele Natile[1], Florent Guichard[1], Antoine Comby[1], Marc Hanna[2], and Patrick Georges[2] — [1]Amplitude, Pessac, France — [2]Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, Palaiseau, France

We report a general temporal shaping method based on nonlinear chirp. We demonstrate a spectral shift from 1031.2 nm to 1017.6 nm by sending a 150 $\mu$J generated sawtooth pulse in a multipass cell.

**Oral** CF-6.5 9:30 ICM - Room 1

**100 $\mu$J-level Pulse Compression Down to 23 fs in a Single-Stage Gas-filled Herriott Multipass Cell** — •Michał Pietrzak, Arkadiusz Hudzikowski, Aleksander Głuszek, and Jarosław Sotor — Wrocław University of Science and Technology, Wrocław, Poland

This study demonstrates efficient ultrashort Yb-doped fiber laser pulse compression using spectral broadening in a compact gas-filled multipass cell. By optimizing gas pressure and GDD, we achieved 13.3 compression factor, reducing a 307fs pulse to 23fs.

**Oral** CF-6.6 9:45 ICM - Room 1

**Re-evaluating the V-Parameter: Insights into spatio-spectral homogeneity in nonlinear post-compression** — •Maximilian Karst[1,2,3], Lucas Eisenbach[1,4], Tobias Heuermann[1], Wilhelm Eschen[1,2,3], Philipp Gierschke[1,4], Maximilian Benner[1], Robert Klas[1,2,3,4], Arno Klenke[1,2,3], and Jens Limpert[1,2,3,4] — [1]Institute of Applied Physics, Jena, Germany — [2]Helmholtz-Institute , Jena, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [4]. Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

The V-parameter as a widely used metric for spatio-spectral homogeneity in nonlinear post-compression is investigated. Simulations reveal multiple shortcomings initiating the search for a better suited figure of merit.

## EH-3: Near- and Far-Field Light Shaping with Metasurfaces

Chair: Crina Cojocaru, University of Catalunia, Barcelona, Spain

Time: Wednesday, 8:30–10:00 Location: ICM - Room 4a

**Invited** EH-3.1 8:30 ICM - Room 4a

**Near-Field Electron Ptychography of Metasurfaces** — •Tamir Shpiro[1], Ron Ruimy[1], Michael Yannai[1], Tom Lenkiewicz[1], Amit Kam[2], and Ido Kaminer[1] — [1]Solid State Institute, Technion-Israel Institute of Technology, Haifa , Israel — [2]Department of Physics, Technion-Israel Institute of Technology, Haifa , Israel

We propose and experimentally demonstrate a novel near-field tomography concept, based on laser-driven, energy-filtered scanning electron diffraction. This tomography method is particularly promising for metasurfaces, where conventional approaches fail to achieve full-vectorial deep-subwavelength polarization-mapping.

**Oral** EH-3.2 9:00 ICM - Room 4a

**Ultrafast Wavefront Shaping in Reconfigurable All-dielectric Metasurfaces** — Mert Akturk[1], Giulia Crotti[1], Andrea Schirato[1,2], Katsuya Tanaka[3], Isabelle Staude[3], Thomas Pertsch[3], Giulio Cerullo[1], Giuseppe Della Valle[1], and •Margherita Maiuri[1,4] — [1]Politecnico di Milano, Milano, Italy — [2]Rice University, Huston, USA — [3]Friedrich Schiller University, Jena, Germany — [4]Princeton Universty, Princeton, USA

We developed an ultrafast k-space spectrometer to demonstrate all-optical beam steering within a silicon nanowire metasurface. By employing an astigmatic pump, we resolved a transient deflection respect to normal incidence, extinguished within 1ps.

**Oral** EH-3.3 9:15 ICM - Room 4a

**Dissipation-engineered plasmonic ratchet** — •Anna Sidorenko[1], Jan Mathis Giesen[2], Sebastian Eggert[2], and Stefan Linden[1] — [1]Physikalisches Institut, Universität Bonn, Bonn, Germany — [2]Physics Department and Research Center OPTIMAS, University of Kaiserslautern-Landau, Kaiserslautern, Germany

The ratchet effect transforms periodic drive into directed motion without the need for a bias force. We propose a new design of a plasmonic waveguide ratchet based solely on periodic loss variation.

**Oral** EH-3.4 9:30 ICM - Room 4a

**Polarization-to-Spatial Degree-of-Freedom Converter with Cascaded Metasurfaces** — •Shiu Hei Lam[1], Jinyong Ma[2], Thomas Pertsch[1,3,4], and Andrey A. Sukhorukov[2] — [1]Abbe Center of Photonics, Institute of Applied Physics, Friedrich Schiller University Jena, Jena, Germany — [2]ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS), Department of Electronic Materials Engineering, Research School of Physics, Canberra, Australia — [3]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany — [4]Max Plank School of Photonics, Jena, Germany

We present a breakthrough in polarization-to-spatial degree-of-freedom conversion using cascaded metasurfaces with efficiency approaching unity. The design principle is compatible with arbitrary polarization basis and spatial states.

**Oral** EH-3.5 9:45 ICM - Room 4a

**Remote Focus Control: 3D Nanoprinted Holograms on Multicore Single-Mode Fibers** — •Mohammadhossein Khosravi[1,2], Torsten Wieduwilt[1], Matthias Zeisberger[1], Adrian Lorenz[1], and Markus A. Schmidt[1,2,3] — [1]Leibniz-Institut for Photonic Technology, Jena, Germany — [2]Abbe Center of Photonics and Faculty of Physics, FSU Jena, Jena, Germany — [3]Otto Schott Institute of Material Research, FSU Jena, Jena, Germany

This study demonstrates tunable focus control via 3D nanoprinted holograms on multicore fibers. The approach achieves precise, crosstalk-free focus manipulation, advancing applications in microscopy, laser micromachining, telecommunications, and biophotonics with compact and high-performance optical systems.

## EA-7: Quantum Light-Matter Coupling

Chair: Matteo Clerici, University of Insubria, Como, Italy

Time: Wednesday, 8:30–10:00 Location: ICM - Room 4b

**Oral** EA-7.1 8:30 ICM - Room 4b

**Photon pair survival rates through non-Hermitian SSH lattices** — •Friederike Klauck, Joshua Feis, Matthias Heinrich, Tom A.W. Wolterink, and Alexander Szameit — Institute of Physics, University of Rostock, Rostock, Germany

We study how quantum states can systematically avoid losses in non-Hermitian systems, using the robustness of topological protection. We compare the survival rates of different two-photon states after propagation through a PT-symmetric Su-Schrieffer-Heeger lattice.

**Oral** EA-7.2 8:45 ICM - Room 4b

**Quantum memory in Brillouin-active waveguides** — •Changlong Zhu[1] and Birgit Stiller[1,2] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]University of Erlangen-Nuremberg, Erlangen, Germany

In this work, we propose to realize a memory for light states in Brillouin-active waveguides. It is achieved by transferring quantum states between optical photons and acoustic phonons via Brillouin anti-Stokes scattering.

**Oral** EA-7.3 9:00 ICM - Room 4b

**Vacuum levitation and motion control with a single 3D-printed fiber lens** — •Seyed Khalil Alavi[1,2], Manuel Monterrosas Romero[1,2], Pavel Ruchka[3], Sara Jakovljević[3], Harald Giessen[3], and Sungkun Hong[1,2] — [1]Institute for Functional Matter and Quantum Technologies, University of Stuttgart, Stuttgart, Germany — [2]Center for Integrated Quantum Science and Technology (IQST), University of Stuttgart, Stuttgart, Germany — [3]4. Physikalisches Institut, Research Center SCoPE and Center for Integrated Quantum Science and Technology, Universität Stuttgart, Stuttgart, Germany

We present a compact fiber-based optical levitation platform utilizing a 3D-printed lens for nanoparticle trapping and motion detection in vacuum, achieving high detection efficiency, feedback cooling, and portability for quantum and hybrid system applications.

**Oral** EA-7.4 9:15 ICM - Room 4b

**Deterministic Generation of Light-Matter Entangled States for Realization of Quantum Repeaters** — •Priyanshu Tiwari[1], Aleksa Krstic[1], Frank Setzpfandt[1,2], Robert Löw[3], and Sina Saravi[1] — [1]Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller University Jena, Albert-Einstein-Str. 15, 07745, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering, Albert-Einstein-Str. 7, 07745, Jena, Germany — [3]Physikalisches Institut, Universität Stuttgart, Pfaffenwaldring 57, 70569, Stuttgart, Germany

We propose and theoretically demonstrate a scheme using a nonlinear cavity hybridized with a multi-level atomic system to generate an on-demand single-photon state entangled with the metastable states of an atomic quantum memory.

**Oral** EA-7.5 9:30 ICM - Room 4b

**Overcoming angular dispersion in optical microcavities and filters by ultrastrong light matter coupling** — •Andreas Mischok[1,2], Bernhard Siegmund[3], Florian Le Roux[1], Sabina Hillebrandt[1,2], Koen Vandewal[3], and Malte Gather[1,2] — [1]Humboldt Centre for Nano- and Biophotonics, Institute for Light and Matter, Department of Chemistry, University of Cologne, Greinstr. 4-6, Cologne, Germany — [2]School of Physics and Astronomy, University of St. Andrews, Saint Andrews, United Kingdom — [3]UHasselt, Institute for Materials Research (IMO-IMOMEC), Diepenbeek, Belgium

Thin film interference is integral to modern photonic devices and inevitably leads to an undesired change of spectral characteristics with angle. We overcome this fundamental limit by utilizing and tuning the exciton-polariton modes in microcavities.

**Oral** EA-7.6 9:45 ICM - Room 4b

**Upper bound for the quantum coupling between free electrons and photons** — •Zhexin Zhao — Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

An analytical upper bound is established for the quantum coupling coefficient that describes the free-electron—light interaction, which provides guidance to the choice of system parameters to reach the strong coupling regime.

## CD-7: Quantum Nonlinear Optics 1

Chair: Michał Karpiński, University of Warsaw, Warsaw, Poland

Time: Wednesday, 8:30–10:00 Location: ICM - Room 13a

**Keynote** CD-7.1 8:30 ICM - Room 13a

**Quantum, Nonlinear, and Nano Optics meet** — •Maria Chekhova — Max-Planck Institute for the Science of Light, Erlangen, Germany — Universität Erlangen-Nürnberg, Erlangen, Germany

Spontaneous parametric down-conversion is a convenient tool to generate quantum states of light. Today it is implemented on 'flat' platforms, i.e., ultrathin layers and metasurfaces, benefiting from high nonlinearity, relaxed phase matching, and resonant enhancement.

**Oral** CD-7.2 9:15 ICM - Room 13a

**Simultaneous Frequency Conversion and Spectral-Temporal Shaping of Single-Photon Pulses** — •Michał Mikołajczyk[1], Ali Golestani[1,2], Rex H. S. Bannerman[3], James C. Gates[3], Peter G. R. Smith[3], and Michał Karpiński[1] — [1]Faculty of Physics, University of Warsaw, Warszawa, Poland — [2]Department of Electrical & Computer Engineering, University of Toronto, Toronto, Canada — [3]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

We experimentally demonstrate nonlinear optical shaping of single-photon-level puses: frequency conversion from ner infrared to a standard O-band telecommunication channel and simultaneous increase of spectral bandwidth from 5 GHz to 100 GHz, with near-unity efficiency.

**Oral** CD-7.3 9:30 ICM - Room 13a

**Methane detection using single-photon upconversion in a PPLN waveguide** — •Ruaridh Smith[1], Imogen Morland[1], Lewis Wright[2], Krish Pandiyan[2], Andrew Weld[3], Xiao Ai[3], Arthur Cardoso[4], John Rarity[4], Corin Gawith[2,5], and Loyd McKnight[1,6] — [1]Fraunhofer Centre for Applied Photonics, Fraunhofer UK Research Ltd., Glasgow, United Kingdom — [2]Covesion Ltd, Southampton, United Kingdom — [3]QLM Ltd, Bristol, United Kingdom — [4]University of Bristol, Bristol, United Kingdom — [5]University of Southampton, Southampton, United Kingdom — [6]University of Strathclyde, Glasgow, United Kingdom

We present a novel single-photon lidar gas detection system using upconversion in a PPLN waveguide. We characterise the overall photon detection efficiency to be greater than InGaAs SPADs and demonstrate methane imaging at 25m.

**Oral** CD-7.4 9:45 ICM - Room 13a

**Fully programmable Spatial Photonic Ising Machine by Focal Plane Division** — •Daniele Veraldi[1], Davide Pierangeli[2], Silvia Gentilini[2], Marcello Calvanese Strinati[3], Jason Sakellariou[4], James S. Cummins[5], Airat Kamaletdinov[5], Marvin Syed[5], Richard Z. Wang[5], Natalia G. Berloff[5], Dimitrios Karanikolopoulos[6,7], Pavlos G. Savvidis[6,7,8], and Claudio Conti[1,3] — [1]Department of Physics, Sapienza University, Rome, Italy — [2]Institute for Complex Systems, National Research Council, Rome, Italy — [3]Enrico Fermi Research Center (CREF), Rome, Italy — [4]QUBITECH, Athens, Greece — [5]Department of Applied Mathematics and Theoretical Physics,University of Cambridge, Cambridge, United Kingdom — [6]Key Laboratory for Quantum Materials of Zhejiang Province, Physics Department,Westlake University, Zhejang, China — [7]Institute of Natural Sciences, Hangzhou, China — [8]Institute of Electronic Structure and Laser, FORTH, Heraklion, Greece

We present a fully programmable Spatial Photonic Ising Machine (SPIM) utilizing focal plane division. This method enables optical computation of arbitrary Ising Hamiltonians, achieving high success rates in solving up to 32-spin Ising models.

## CJ-5: Mode-Locked Fiber Lasers 1

Chair: Jakub Boguslawski, Wrocław University of Science and Technology, Wroclaw, Poland

Time: Wednesday, 8:30–10:00 Location: ICM - Room 13b

**Tutorial** CJ-5.1 8:30 ICM - Room 13b

**Compact Ultrafast Fiber Lasers** — •Grzegorz Sobon — Wroclaw University of Science and Technology, Wroclaw, Poland

This tutorial explores the generation of ultrashort optical pulses using commercially available fiber technology. We discuss recent advancements enabling few-cycle pulses, their applications, and the role of AI in optimizing ultrafast laser performance.

**Oral** CJ-5.2 9:30 ICM - Room 13b

**Narrow-bandwidth dissipative solitons in the anomalous dispersion regime with large spectral tunability** — •Maolin Dai, Bowen Liu, Yuanjun Zhu, Yifan Ma, Sze Yun Set, and Shinji Yamashita — The University of Tokyo, Tokyo, Japan

We demonstrate an all-PM mode-locked fiber laser with giant tunability in both center wavelength and pulse duration. The narrowest bandwidth reaches 1.49 GHz, with characteristics of dissipative soliton under strong filtering.

**Oral** CJ-5.3 9:45 ICM - Room 13b

**Few-mode Energy-managed Soliton Fiber Laser** — •Mostafa I. Mohamed[1,2], Mincheng Tang[1,3], Aurélien Coillet[1], Vincent Couderc[4], and Philippe Grelu[1] — [1]Université Bourgogne Europe, ICB, Dijon, France — [2]Alexandria University, Alexandria, Egypt — [3]Femto Easy, Pessac, France — [4]Université de Limoges, XLIM, Limoges, France

We demonstrate an all-anomalous dispersion fiber laser leveraging few-mode gain to achieve a record-breaking 39 nJ pulse energy,15.6 kW peak power and 2.5 ps duration, showcasing stable performance and validating the flexible energy-management approach

## EF-2: Emerging Topics in NI Photonics

Chair: Svetlana Gurevich, University of Münster, Münster, Germany

Time: Wednesday, 8:30–10:00 Location: ICM - Room 14a

**Invited** EF-2.1 8:30 ICM - Room 14a

**The high-dimensional future of light** — •Logan Wright — Yale University, New Haven, USA

With examples from my own and others' work, I will speculate on the future of photonics, with special focus on nonlinear optics. A key conclusion is the inevitability of ever-higher dimensionality and use of computing.

**Oral** EF-2.2 9:00 ICM - Room 14a

**Automating physical intuition in nonlinear fibre optics using dominant balance search** — •Andrei V. Ermolaev[1], Christophe Finot[2], Goëri Genty[3], and John M. Dudley[1] — [1]Université Marie et Louis Pasteur, Institut FEMTO-ST, CNRS UMR 6174, Besançon, France — [2]Université de Bourgogne Europe, Laboratoire Interdisciplinaire Carnot de Bourgogne, CNRS UMR 6303, Dijon, France — [3]Photonics Laboratory, Tampere University, Tampere, Finland

We apply an unsupervised learning algorithm to identify dominant physical interactions in optical fibre propagation and demonstrate the possibility to automatically discover dominant balance models governing soliton fission, dispersive wave generation and Raman soliton ejection.

**Oral** EF-2.3 9:15 ICM - Room 14a

**Experimental observation of thermalisation in a nonlinear non-Hermitian optical lattice** — •Julia Görsch[1], Joshua Feis[1], Andrea Steinfurth[1], Sebastian Weidemann[1], Georgios G. Pyrialakos[2], Matthias Heinrich[1], Mercedeh Khajavikhan[2], Alexander Szameit[1], and Demetrios N. Christodoulides[2] — [1]Institute of Physics, University of Rostock, Rostock, Germany — [2]Ming Hsieh Department of Electrical and Computer Engineering, University of Southern California, Los Angeles, USA

We experimentally demonstrate modal thermalisation dynamics in non-Hermitian optical lattices using coupled fibre loops, paving the way towards advanced self-organised beam shaping techniques leveraging optical thermodynamics in the presence of gain and loss.

**Oral** EF-2.4 9:30 ICM - Room 14a

**Machine Learning Control of Modulation Instability in Optical Fiber** — Yassin Boussafa[1], Lynn Sader[1], Van Thuy Hoang[1], Alexis Bougaud[1], Raktim Haldar[2,3], Marc Fabert[1], Alessandro Tonello[1], John M. Dudley[4], Michael Kues[2], and •Benjamin Wetzel[1] — [1]XLIM Research Institute, CNRS UMR 7252, Université de Limoges, Limoges, France — [2]Institute of Photonics, Leibniz University Hannover, Hannover, Germany — [3]School of Electrical and Computational Sciences (SECs), Indian Institute of Technology Bhubaneswar (IITBBS), Odisha, India — [4]Institut FEMTO-ST, CNRS, Université Marie et Louis Pasteur, Besançon, France

We review recent experimental works employing machine learning strategies, paired with optical seeding, for the control of noise-driven modulation instability dynamics during nonlinear fiber propagation.

**Oral** EF-2.5 9:45 ICM - Room 14a

**Transition dynamics of photonic metamaterial continuous time crystals** — •Venugopal Raskatla[1], Jinxiang Li[2], Giorgio Adamo[2], Kevin F. MacDonald[1], and Nikolay I. Zheludev[1,2,3] — [1]Optoelectronics Research Centre, University of Southampton, Highfield, Southampton, United Kingdom — [2]Centre for Disruptive Photonic Technologies, TPI, SPMS, Nanyang Technological University, Singapore, Singapore — [3]Hagler Institute for Advanced Study, Texas A&M University, College Station, Texas, USA

The transition dynamics of metamaterial time crystals driven by nonreciprocal

optical forces reveal their stability and rigidity, establishing them as a platform for timetronics – an emerging information technology leveraging unique functionalities of time crystal states.

## EB-3: Optical Quantum Computing

Chair: Norbert Linke, University of Maryland, Maryland, USA

Time: Wednesday, 8:30–10:00 Location: ICM - Room 14b

**Invited** EB-3.1 8:30 ICM - Room 14b

**A cloud-accessible photonic quantum computing platform** — •Nicolas Maring — QUANDELA, Massy, France

We will present a photonic quantum computing platform which demonstrates high-fidelity gates and versatile applications, from variational quantum algorithms to machine learning, enabled by an efficient quantum-dot source and reconfigurable photonic chip.

**Invited** EB-3.2 9:00 ICM - Room 14b

**Full-Stack Optical Quantum Computer with 101 Qumode Inputs** — •Atsushi Sakaguchi[1], Shota Yokoyama[1], Warit Asavanant[2], Kan Takase[1,2,3], Yi-Ru Chen[1], Hironari Nagayoshi[2], Jun-ichi Yoshikawa[1], Takahiro Kashiwazaki[4], Asuka Inoue[4], Takeshi Umeki[4], Toshikazu Hashimoto[4], Takuji Hiraoka[5], Akira Furusawa[1,2,3], and Hidehiro Yonezawa[1] — [1]RIKEN Center for Quantum Computing, 2-1 Hirosawa, Wako, Saitama, Japan — [2]Department of Applied Physics, School of Engineering, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, Japan — [3]OptQC Corp., 1-16-15 Minami-Ikebukuro, Toshima-ku, Tokyo, Japan — [4]NTT Device Technology Labs, NTT Corporation, 3-1 Morinosato Wakamiya, Atsugi, Kanagawa, Japan — [5]Fixstars Amplify Corporation, 3-1-1 Shibaura, Minato-ku, Tokyo, Japan

We have developed a full-stack optical quantum computer with flexible quantum processor and user-friendly software. Our quantum computer is capable of universal Gaussian operations on 101 qumode inputs at the clock frequency of 100MHz.

**Oral** EB-3.3 9:30 ICM - Room 14b

**Programmable quantum photonic circuit in free space** — •Maria Gorizia Ammendola[1,2], Nazanin Dehghan[3,4], Lukas Scarfe[3], Alessio D'Errico[3,4], Lorenzo Marrucci[1,5], Francesco Di Colandrea[1,3], Ebrahim Karimi[3,4,6], and Filippo Cardano[1] — [1]Università degli Studi di Napoli Federico II, Napoli, Italy — [2]Scuola Superiore Meridionale, Napoli, Italy — [3]Nexus for Quantum Technologies, University of Ottawa, Ottawa, Canada — [4]National Research Council of Canada, Ottawa, Canada — [5]CNR-ISASI, Napoli, Italy — [6]Institute for Quantum Studies, Chapman University, Orange, California, USA

Here we present a compact programmable quantum photonic circuit in free space that implements all-optical mode-coupling unitary operations in one and two spatial dimensions, operating in large-scale regimes on transverse modes of structured light.

**Oral** EB-3.4 9:45 ICM - Room 14b

**Experimental verifiable multi-client blind quantum computing on a Qline architecture** — •Beatrice Polacchi[1], Dominik Leichtle[2], Gonzalo Carvacho[1], Giorgio Milani[1], Nicolò Spagnolo[1], Marc Kaplan[3], Elham Kashefi[2,4], and Fabio Sciarrino[1] — [1]Dipartimento di Fisica - Sapienza Universita di Roma, Rome, Italy — [2]School of Informatics - University of Edinburgh, Edinburgh, United Kingdom — [3]VeriQloud, Montrouge, France — [4]Laboratoire d'Informatique de Paris 6, CNRS - Sorbonne Universite, Paris, France

We perform the first demonstration of a verifiable scalable multi-client blind quantum computing protocol using a linear quantum network. Our results enable secure distributed computations with untrusted quantum sources and servers, toward large-scale private applications.

## CH-7: Integrated Photonics

Chair: F. Costache, Fraunhofer Institute for Photonic Microsystems IPMS, Dresden, Germany

Time: Wednesday, 8:30–10:00 Location: ICM - Room Osterseen

**Oral** CH-7.1 8:30 ICM - Room Osterseen

**Wide-range luminescent thermometer based on periodic layer ALD-encapsulated Ga2O3:Cr optical microcavities** — •Manuel Alonso-Orts[1,2], Ruben J. T. Neelissen[1], Daniel Carrasco[1,3], Marco Schowalter[1,2], Andreas Rosenauer[1,2], Emilio Nogales[3], Bianchi Méndez[3], and Martin Eickhoff[1,2] — [1]Institute of Solid State Physics, University of Bremen, Bremen, Germany — [2]MAPEX Center for Materials and Processes, University of Bremen, Bremen, Germany — [3]Dpto. Física Materiales, Facultad CC Físicas, Univ. Complutense, Madrid, Spain

This work presents our recently patented robust and accurate luminescent microthermometer based on chromium (Cr) doped gallium oxide (Ga2O3) micro-/nanowires coated by Atomic Layer Deposition (ALD).

**Oral** CH-7.2 8:45 ICM - Room Osterseen

**Electrode optimization for on chip resonant electro-optic frequency combs** — •Andrea Volpini[1], Samuel Häusler[2], Giovanni Finco[3], Gaoyuan Li[3], Charles Caër[1], Jannis Serge Holzer[1], Hamed Sattari[1], Homa Zarebidaki[1], Ivan Pietro Gonzales[1], Peter Niklaus[2], Steve Lecomte[1], Rachel Grange[3], Christoph Wildfeuer[2], and Davide Grassani[1] — [1]CSEM, Swiss Center for Electronics and Microtechnology, Neuchâtel, Switzerland — [2]FHNW University of Applied Sciences and Arts Northwestern Switzerland, Windisch, Switzerland — [3]ETH Zurich, Department of Physics, Institute for Quantum Electronics, Optical Nanomaterial Group, Zurich, Switzerland

We experimentally validate a semi-analytical model for optimizing electrode length and RF injection location for on-chip electro-optic frequency combs generation. Using RF frequency multiple of ring's FSR is beneficial when electrodes' RF loss is low.

**Oral** CH-7.3 9:00 ICM - Room Osterseen

**High-speed Tunable Interferometric Spectral Shaper for VCSEL Manufacturing Inspection** — Antoine Rouxel, Karim Ben Saddik, Stéphane Calvez, •Antoine Monmayrant, and Guilhem Almuneau — LAAS-CNRS, Toulouse, France

We demonstrate a fast, high-contrast, tunable interferometric method for inspecting VCSEL oxidation, employing sinusoidal illumination matched to reflectance differences. This approach enhances contrast, mitigates speckle, and enables automated aperture measurements, improving manufacturing precision and yield.

**Oral** CH-7.4 9:15 ICM - Room Osterseen

**On-chip Refractive Index Sensors in 200 mm Wafer Silicon Technology** — Sebastian Reiter[1], Akant Sengül[1], Christian Mai[2], Carlos Alvarado Chavarin[2], Christian Wenger[2], and •Inga Anita Fischer[1] — [1]BTU Cottbus-Senftenberg , Cottbus, Germany — [2]IHP - Leibniz Institut für innovative Mikroelektronik, Frankfurt (Oder), Germany

We present electrooptical characterization results for Ge photodetectors with TiN nanohole arrays as miniaturized sensors for the detection of refractive index changes. Fabrication was carried out in cost-effective CMOS compatible 200 mm wafer Si technology.

**Oral** CH-7.5 9:30 ICM - Room Osterseen

*moved from CH-P.6*

**Passive On-Chip Tri-Axial Fiber-Optic Accelerometer with Nano-g Level Noise Floor** — Minzhi Hong[1], Kuangqi Li[1], Jiakang Xu[1], Shiyu Yan[2], Yuhan Xiao[1], Ping Lu[1], and •Chaotan Sima[1] — [1]Next Generation Internet Access National Engineering Research Center, School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan 430074, China — [2]China Offshore Oil Engineering Co., Ltd., Tianjin Port Free Trade Zone, Tianjin 300461, China

We propose and demonstrate a passive on-chip tri-axial fiber-optic accelerometer with a sensitivity of 43.6 dB and a noise floor of 22.82 ng/Hz1/2, showing promise for low-frequency micro seismic monitoring.

**Oral** CH-7.6 9:45 ICM - Room Osterseen

**Optical frequency reconstruction with microcavity assemblies** — •Anton Saetchnikov and Andreas Ostendorf — Ruhr University Bochum, Bochum, Germany

We propose a novel method for optical frequency reconstruction of high precision with a compact and affordable instrument. It is based on assemblies of weakly deformed cavities providing unique patterns for the broad spectral range.

## CA-4: Disk Laser Concepts

Chair: Clara Saraceno, Ruhr University Bochum, Bochum, Germany

Time: Wednesday, 8:30–10:00 Location: Hall A1 - Room A12

**Oral** CA-4.1 8:30 Hall A1 - Room A12

**Kilowatt-level Femtosecond Thin-disk Laser without CPA** — •Xing Liu[1], Sizhi Xu[1], Xingyu He[1], Yubo Gao[1], Haotian Lu[1], Qitao Lue[2], and Shuangchen Ruan[1] — [1]Shenzhen Technology University, Shenzhen, China — [2]Han's Laser Technology Industry Group Co., Ltd, Shenzhen, China

We report on a CPA-free kilowatt-level femtosecond system consisting of a regenerative amplifier and twomulti-pass amplifiers using Yb:YAG thin disks. A maximum pulse energy of 1.3 mJ at 750 kHz repetition rate was achieved.

**Oral** CA-4.2 8:45 Hall A1 - Room A12

**Nonlinear pulse compression of a thin-disk amplifier to 620 fs at 303 W, 660 kHz by a bulk multi-pass cell** — •Yubo Gao[1], Sizhi Xu[1], Xingyu He[1], Xing Liu[1], Qitao Lue[2], and Shuangchen Ruan[1] — [1]Key Laboratory of Advanced Optical Precision Manufacturing Technology of Guangdong Higher Education Institutes, Sino-German College of Intelligent Manufacturing, Shenzhen Technology University, Shenzhen, China — [2]Han's Laser Technology Industry Group Co. Ltd., Shenzhen, China

We demonstrate nonlinear pulse compression combined with ultrafast thin-disk lasers, achieving 303 W average power and 459 $\mu J$ pulse energy at 660 kHz. The pulse duration is compressed from 6.43 ps to 620 fs by a bulk multi-pass cell.

**Oral** CA-4.3 9:00 Hall A1 - Room A12

**Liquid Face Cooled Spinning Disks for Kilowatt Yb-YAG Laser Amplifier** — •Jérôme Lhermite[1], Christophe Féral[1], Denis Marion[1], Mathias Lachat[1,2], Antoine Rohm[1], Stéphane Petit[1], Dominique Descamps[1], Duncan Sarton[1], Marie-Christine Nadeau[1], Jérémy Brandam[1], Alexandre Mêlé[1], Eric Mével[1], Laurent Lamaignère[2], and Philippe Balcou[1] — [1]Université de Bordeaux, CNRS, CEA, CELIA (Centre Lasers Intenses et Applications), UMR 5107, Talence, France — [2]CEA CESTA, Le Barp, France

The HORIZON project at CELIA, Bordeaux University, develops a new way of high-power Yb:YAG laser amplifier using an innovative spinning disk and water-cooled architecture, achieving 2kW average power with stable pointing and good beam quality.

**Oral** CA-4.4 9:15 Hall A1 - Room A12

**Wedged thin-disk amplifier with 50% extraction efficiency in a single pass** — •Pirmin Schweizer, Raoul-Amadeus Lorbeer, Benjamin Ewers, Jochen Speiser, and Thomas Dekorsy — Deutsches Zentrum für Luft- und Raumfahrt, Stuttgart, Germany

Using an angle dependent coating to realize multiple reflections within a wedged thin-disk results in a compact thin-disk multi-pass amplifier setup. Reaching 50% extraction efficiency, the amplification efficiency was doubled compared to our previous attempts.

**Oral** CA-4.5 9:30 Hall A1 - Room A12

**Novel method for controlling the brightness of laser beams emitted by a thin-disk laser** — •Ayoub Boubekraoui[1], Stephanie Mrzyglod[2], Stefan Esser[1], Christian Schmittner[1], Oliver Sawodny[2], Thomas Graf[1], and Marwan Abdou Ahmed[1] — [1]Institut für Strahlwerkzeuge, Stuttgart, Germany — [2]Institute for System Dynamics, Stuttgart, Germany

We successfully demonstrated, using actively regulated spherical deformable mirrors, a switchable thin-disk laser oscillator capable of operating in both fundamental mode and multimode and delivering output powers exceeding 140 W.

**Oral** CA-4.6 9:45 Hall A1 - Room A12

**41 W Deep Ultraviolet Ultrafast laser based on A Thin-disk Amplifier** — •Sizhi Xu[1], Xing Liu[1], Zuoyuan Ou[1], Yubo Gao[1], Xingyu He[1], Zongzhi Lin[2], Xiong Li[2], Wei Chen[2], Qitao Lue[3], and Shuangchen Ruan[1] — [1]Shenzhen Technology University, Shenzhen, China — [2]Castech Inc., Fuzhou, China — [3]Han's Laser Technology Industry Group Co., Ltd., Shenzhen, China

We demonstrate the development of a high-power ultrafast deep ultraviolet laser based on thin-disk amplifiers.The 180 W green laser was converted into 41 W of ultrafast deep ultraviolet laser with a CLBO crystal.

## CE-7: Doped Optical Materials

Chair: Wilfried Blanc, CNRS, Paris, France

Time: Wednesday, 8:30–10:00 Location: Hall B1 - Room B11

**Oral** CE-7.1 8:30 Hall B1 - Room B11

**Photonic Crystal Surface Emitting Lasers over the Entire Visible Spectrum based on Colloidal Nanocrystals** — •Ivo Tanghe[1], Tom Vandekerckhove[1], Margarita Samoli[1], Amelia Waters[2], Dulanjan Harankahage[2], Mikhail Zamkov[2], Zeger Hens[1], Christian Seassal[3], Hai-Son Nguyen[3], Dries Van Thourhout[1], and Pieter Geiregat[1] — [1]Ghent University, Gent, Belgium — [2]Bowling Green State University, Bowling Green, USA — [3]Ecole Centrale de Lyon, Lyon, France

Silicon nitride, a low-loss platform for integrated photonics, does not emit light efficiently. This work demonstrates red and green lasing on silicon nitride using solution-processible semiconductors, paving a cost-effective and straightforward path for on-chip lasers.

**Oral** CE-7.2 8:45 Hall B1 - Room B11

**Non-destructive 2D Profiling of Refractive Index and Dopant Distributions in Yb-doped Glass Preforms** — •Rosemary C. Clark, Nilotpal Choudhury, Jayanta K. Sahu, and Michalis N. Zervas — Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

Refractive index profiles and non-destructive 2D dopant measurements have been taken from 2 Yb-doped preforms using an in-house profiler. Dopant measurements revealed an asymmetrical Yb distribution missing from the refractive index profile.

**Oral** CE-7.3 9:00 Hall B1 - Room B11

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**Oral** CE-7.4 9:15 Hall B1 - Room B11

**CaTbAlO4: a new attractive Faraday crystal for miniature optical isolators** — •Volker Wesemann, Christoph Liebald, and Sebastian Schwung — EOT GmbH, Idar-Oberstein, Germany

CaTbAlO4 (CALTO) crystals were grown and characterized concerning Verdet constant dispersion, absorption, polarization extinction ratio. High Verdet constants (170% of TGG), low absorption and high PER (40dB) shows the potential usability for miniature optical isolators.

**Oral** CE-7.5 9:30 Hall B1 - Room B11

**Stimulated-Emission, Phonon Sidebands and Energy-Transfer Upconversion in Ho3+:MF2 Crystals for Lasers at 2-3 $\mu$m** — Ngoc Quynh Hoa Nguyen, •Pavel Loiko, Abdelmjid Benayad, Patrice Camy, and Alain Braud — Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France

We report on the growth, stimulated-emission properties, long-wave multi-

phonon sidebands, non-radiative relaxation and energy-transfer upconversion, for Ho3+-doped low-phonon-energy fluorite-type crystals MF2 (M = Ca, Sr, Ba), for developing ultrafast lasers at 2 to 3 $\mu$m.

**Oral** CE-7.6 9:45 Hall B1 - Room B11

**$\mu$-Raman/Luminescence Spectroscopy of Ultrafast Laser Inscribed Waveguides in Er3+:LiYF4 for Refractive Index Engineering** — Ji Eun Bae[1], •Pavel Loiko[1], Carolina Romero[2], Javier R. Vázquez de Aldana[2], Xavier Mateos[3], Abdelmjid Benayad[1], Alain Braud[1], and Patrice Camy[1] — [1]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France — [2]Grupo de Investigación en Aplicaciones del Láser y Fotónica, University of Salamanca, Salamanca, Spain — [3]Física i Cristal·lografia de Materials (FiCMA), Universitat Rovira i Virgili (URV), Tarragona, Spain

The refractive index profiles associated with ultrafast laser inscription of depressed-cladding waveguides in Er3+:LiYF4 are reconstructed based on $\mu$-Raman/luminescence spectroscopy. The maximum refractive index variation reaches -3.5×10-3 enabling the design of mid-infrared laser waveguides.

## EG-1: Quantum Nanophotonics and Nonlinear Interactions

Chair: Mathieu Mivelle, Sorbonne Université - CNRS, Paris, France

Time: Wednesday, 8:30–10:00 Location: Hall B2 - Room B21

**Oral** EG-1.1 8:30 Hall B2 - Room B21

**Near-Infrared Polarization-Entangled Photons From Orthogonal GaAs Nanowires** — •Elise Bailly[1], Grégoire Saerens[1], Wenhe Jia[1,2], Helena Weigand[1], Thomas Dursap[3], Andreas Maeder[1], Philippe Regreny[3], Robert Chapman[1], Alexandre Danescu[3], Nicolas Chauvin[3], José Penuelas[3], and Rachel Grange[1] — [1]ETH Zurich, Department of Physics, Institute for Quantum Electronics, Optical Nanomaterial Group, Auguste-Piccard-Hof 1, 8093 Zurich, Switzerland — [2]State Key Laboratory for Precision Measurement Technology and Instruments, Department of Precision Instrument, Tsinghua University, Beijing 100084, China — [3]Univ. Lyon, CNRS, ECL, INSA Lyon, UCBL, CPE Lyon, INL, UMR 5270, 69130 Ecully, France

We present a new platform to generate polarization entangled photons at the nanoscale. This platform is composed of two orthogonal GaAs nanowires that both emit photon pairs through type 0 spontaneous parametric down conversion.

**Oral** EG-1.2 8:45 Hall B2 - Room B21

**Substrate-driven modulation of photon pair generation in quantum optical metasurfaces** — •Alberto Paniate[1], Ivano Ruo Berchera[1], Marco Genovese[1], and Francesco Monticone[2] — [1]Quantum metrology and nano technologies division, INRiM, Turin, Italy — [2]School of Electrical and Computer Engineering, Cornell University, Ithaca, USA

Research on spontaneous parametric down-conversion with metasurfaces advances photon pair generation. This study represents a comprehensive simulation of photon pair emission on periodic metasurfaces, highlighting the substrate's critical role in emission efficiency and directionality.

**Oral** EG-1.3 9:00 Hall B2 - Room B21

**Monte-Carlo-Markov-Chain Detector Tomography of Nanobridge SNSPDs with 56% quantum efficiency** — •Frederik B. Baalbergen[1], Iman E. Zadeh[2], Martin P. van Exter[1], and Michiel J.A. de Dood[1] — [1]Huygens-Kamerlingh Onnes Laboratory, Leiden University, Leiden, Netherlands — [2]Department of Imaging Physics (ImPhys), Delft University of Technology, Delft, Netherlands

We determine the quantum efficiency of a Superconducting Nanobridge Single Photon Detector using novel Monte-Carlo-Markov-Chain detector tomography to explore the detection mechanism. The efficiency is limited to 0.56 by the detector geometry.

**Oral** EG-1.4 9:15 Hall B2 - Room B21

**Many-Body Quantum Optics of Superfluorescent Perovskite Quantum Dots** — •Chen Mechel, Alexey Gorlach, Shai Levy, Shaul Katznelson, Yehonadav Bekenstein, and Ido Kaminer — Technion, Haifa, Israel

Superfluorescence is a collective emission phenomenon with promising prospects and still-standing open questions about its underlying mechanism. We explain theoretically how "disorder-resistant superfluorescence" emerges beyond conventional conditions and despite strong disorder, matching new experimental results.

**Oral** EG-1.5 9:30 Hall B2 - Room B21

**Single-Photon Emission from Silicon-Vacancy Color Centers in Polycrystalline Diamond Membranes** — •Assegid Mengistu Flatae[1], Florian Sledz[1], Haritha Kambalathmana[1], Stefano Lagomarsino[2,3], Silvio Sciortino[2,4], Christoph Wild[5], Eckhard Wörner[5], and Mario Agio[1,3] — [1]Laboratory of Nano-Optics, University of Siegen, Siegen, Germany — [2]Nazionale di Fisica Nucleare (INFN), Sezione di Firenze, Florence, Italy — [3]National Institute of Optics (INO), National Research Council (CNR), Florence, Italy — [4]Department of Physics and Astronomy, University of Florence, Florence, Italy — [5]Diamond Materials GmbH, Freiburg, Germany

Single quantum emitters in thin polycrystalline diamond films are limited by graphitic grain boundaries and small grain sizes. Here, we present a thin polycrystalline diamond membrane single-photon source based on the silicon-vacancy color center.

**Oral** EG-1.6 9:45 Hall B2 - Room B21

**Photon Pairs Generated via Spontaneous Four-Wave Mixing in SiN subwavelength layers** — •Changjin Son[1,2], Samuel Peanna[3], Owen Mattiessen[3], Artem Kryvobok[3], Alexander Senichev[3], Alexandra Boltasseva[3], Vladmir M. Shalev[3], and Maria Chekhova[1,2] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Friedrich-Alexander Universität Erlangen-Nürnberg, Erlangen, Germany — [3]School of Electrical & Computer Engineering, Birck Nanotechnology Center, Purdue University, Indiana, USA

We generate pairs of entangled photons from subwavelength-thick SiN layers with various nitrogen concentrations. Based on two-photon interference between pairs generated in the layers and the substrate, we estimate the third-order susceptibility for the layers.

## JSII-CF: Free-Electron Lasers 2

Chair: Luca Giannessi, ELETTRA, Basovizza, Italy

Time: Wednesday, 10:30–12:00 Location: ICM - Room 1

**Tutorial** JSII-CF.1 10:30 ICM - Room 1

**Ultrafast Laser Technology for High Repetition Rate X-ray Free Electron Lasers** — •Ingmar Hartl — Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

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**Oral** JSII-CF.2 11:30 ICM - Room 1

**Double-blind holography with ultrashort free-electron laser pulses** — Agata Azzolin[1,2,3], Oliviero Cannelli[2], Kai Fu Wong[1,2,3], Erik. P. Månsson[2], Marc Seitz[1,2], Josina Hahne[1,2,3], Ammar bin Wahid[1,2], Alexander Magunia[4], Christina Papadopoulou[5], Elisa Appi[6], Ulrike Frühling[5], Jayasurya Yallapraganda[7], Peer Biesterfeld[8], Philip Mosel[8], Sven Fröhlich[8], Markus Braune[5], Sebastian Schulz[5], Stefan Düsterer[5], Milutin Kovacev[8], Uwe Morgner[8], Robert Moshammer[4], Tino Lang[5], Christoph M. Heyl[5,9,10], Oren Raz[11], Dan Oron[11], Nirit Dudovich[11], Christian Ott[4], Thomas Pfeifer[4], Evgeny Schneidmiller[5], Vincent Wanie[2], •Andrea Trabattoni[2,8], and Francesca Calegari[1,2,3] — [1]Physics Department, University of Hamburg, Hamburg, Germany — [2]Centre for Free-Electron Laser Science, Hamburg, Germany — [3]The Hamburg Centre for Ultrafast Imaging, Hamburg, Germany — [4]Max-Planck-Institut für Kernphysik, Max-Planck-Gesellschaft, Heidelberg, Germany — [5]Deutsches-Elektronen Synchrotron, DESY, Hamburg, Germany — [6]Lund University, Lund, Sweden — [7]Indian Institute of Technology Kanpur, Kanpur, India — [8]Institute of Quantum Optics, Leibniz Universität Hannover, Hannover, Germany — [9]Helmholtz Institute Jena,

This work introduces a fully-optical, single-shot method for temporal characterization and few-fs-precision delay tagging of ultrashort free-electron laser (FEL) pulses, using double-blind holography that combines FEL and high-harmonic generation pulses.

**Oral** JSII-CF.3 11:45 ICM - Room 1

**Attosecond temporal structure of non-regularly spaced harmonic combs using an attosecond timing tool for seeded free-electron lasers** — Praveen Kumar Praveen Kumar Maroju[1,2], Miguel Benito de Lama[3], Michele Di Fraia[4], Oksana Oksana[5], Matteo Bonanomi[5,6,7], Barbara Merzuk[1], David Busto[1,2], Ioannis Makos[1], Marvin Schmoll[1], Ronak Shah[1], Primoz Rebernik Ribic[5], Luca Giannessi[5,8], Enrico Allaria[5], Giuseppe Penco[5], Marco Zangrando[4,5], Alberto Simoncig[5], Michele Manfredda[5], Giovanni De Ninno[5,9], Carlo Spezzani[5], Alexander Demidovich[5], Miltcho Danailov[5], Marcello Coreno[5,10], Richard J. Squibb[11], Raimund Feifel[11], Samuel Bengtsson[2], Emma Rose Simpson[2], Tamas Csizmadia[12], Mathieu Dumergue[12], Sergei Kuhn [12], Kiyoshi Ueda[13], Gabriele Zeni[14], Fabio Frassetto[14], Luca Poletto[14], Kevin C. Prince[5,15], Johan Mauritsson[2], Johannes Feist[16,17], Alicia Palacios[3,17,18], Carlo Callegari[5], and •Giuseppe Sansone[1,19] — [1]Institute of Physics, University of Freiburg, Freiburg, Germany — [2]Department of Physics, Lund University, Lund, Sweden — [3]Departamento de Qu'ımica, Modulo 13, Universidad Autonoma de Madrid, Madrid, Spain — [4]CNR-IOM – Istituto Officina dei Materiali, National Research Council of Italy, Trieste, Italy — [5]Elettra-Sincrotrone Trieste, 34149 Basovizza, Trieste, Italy — [6]Dipartimento di Fisica Politecnico Milano, Milano, Italy — [7]Istituto di Fotonica e Nanotecnologie, Milano, Italy — [8]INFN Laboratori Nazionali di Frascati, Frascati, Italy — [9]Laboratory of Quantum Optics, University of Nova Gorica, Nova Gorica, Slovenia — [10]ISM-CNR, Istituto Struttura della Materia, LD2 Unit, Basovizza , Trieste, Italy — [11]Department of Physics, University of Gothenburg, Gothenburg, Sweden — [12]ELI ALPS, ELI-HU Non-Profit Ltd, Szeged, Hungary — [13]Department of Chemistry, Tohoku University, Sendai, Japan — [14]Istituto di Fotonica e Nanotecnologie, Padova, Italy — [15]Charles University, Faculty of Mathematics and Physics, Department of Surface and Plasma Science, Prague, Czech Republic — [16]Departamento de Fısica Teorica de la Materia Condensada, Madrid, Spain — [17]Condensed Matter Physics Center , Madrid, Spain — [18]Institute for Advanced Research in Chemical Sciences, Madrid, Spain — [19]Freiburg Institute for Advanced Studies (FRIAS), Freiburg, Germany

We present the temporal characterisation of an attosecond pulse train consisting of non-consecutive harmonics generated at FERMI. The approach is based on a generalisation of the RABBIT scheme exploiting multi-photon near-infrared transitions.

## EH-4: Ultrafast Dynamics and Functionalities at the Nanoscale

Chair: Michele Celebrano, Politecnico Milano, Milano, Italy

Time: Wednesday, 10:30–12:00 Location: ICM - Room 4a

**Oral** EH-4.1 10:30 ICM - Room 4a

**Ultrafast Tuning of Radiative Optical Losses in quasi-Bound States in the Continuum** — •Thomas Possmayer[1], Andreas Aigner[1], Thomas Weber[1], Leonardo de S. Menezes[1,2], Stefan A. Maier[3,4], and Andreas Tittl[1] — [1]Chair in Hybrid Nanosystems, Faculty of Physics, Ludwig-Maximilians-University Munich, 80539 Munich, Germany — [2]Departamento de Física, Universidade Federal de Pernambuco, 50670-901 Recife-PE, Brazil — [3]School of Physics and Astronomy, Monash University, Clayton, Victoria 3800, Australia — [4]Department of Physics, Imperial College London, London SW7 2AZ, United Kingdom

Resonant metasurfaces based on bound states in the continuum can consist of geometrically asymmetric elements if their dipole moments match. By pumping element-specific optical Mie modes, we tune the resonance's quality factor on ultrafast timescales.

**Oral** EH-4.2 10:45 ICM - Room 4a

**Tracking the ultrafast nonlinear optical response of Silicon Nitride for nonequilibrium nanophotonics** — •Andrea Schirato[1,2], Mert Akturk[1], Yuan Xu[3], Andres Valladares[1], Giulia Crotti[1], Nanfang Yu[3], Giulio Cerullo[1,4], Giuseppe Della Valle[1,4], and Margherita Maiuri[1] — [1]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy — [2]Department of Physics and Astronomy, Rice University, Houston, USA — [3]Department of Applied Physics and Applied Mathematics, Columbia University, New York City, USA — [4]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche, Milano, Italy

By combining advanced numerical and experimental tools, we characterise the ultrafast optical nonlinearities of Silicon Nitride, both as thin film and resonant metasurface, photoinduced by UV femtosecond light pulses, towards new low-loss nonequilibrium nanophotonic platforms.

**Oral** EH-4.3 11:00 ICM - Room 4a

**Ultrafast Terahertz Pulse Generation Enabled by Resonant All-Dielectric Metasurfaces** — •Luke Peters[1,2], Davide Rocco[3], Luana Olivieri[1,2], Unai Arregui Leon[4], Vittorio Cecconi[1], Luca Carletti[3], Carlo Gigli[5], Guiseppe Della Valle[4], Antonio Cutrona[1,2], Juan Sebastian Totero Gongora[1,2], Guiseppe Leo[5], Alessia Pasquazi[1,2], Constantino De Aneglis[3], and Marco Peccianti[1,2] — [1]Emergent Photonics Research Centre (EPicX), Department of Physics, Loughborough University, Loughborough, United Kingdom — [2]Emergent Photonics Lab (Epic), Department of Physics and Astronomy, University of Sussex, Brighton, United Kingdom — [3]University of Brescia, Department of Information Engineering, Brescia, Italy — [4]Politecnico di Milano, Department of Physics, Milan, Italy — [5]Matériaux et Phénomènes Quantiques, Université Paris Cité and CNRS, Paris, France

We present Resonant all-dielectric AlGaAs metasurfaces with semiconductor nano-resonators, achieving a 40× enhancement in ultrafast THz pulse emission. Optimised elliptical nanocylinders allowed for dynamic control of amplitude, phase, and wavefront for beam steering and imaging.

**Oral** EH-4.4 11:15 ICM - Room 4a

**Ultrabroadband excitation of hot carriers in plasmonic nanorods revealed by two-dimensional electronic spectroscopy** — Mattia Russo[1], •Andrea Schirato[1,2], Luca Moretti[1,3], Alessandro Molinelli[4], Elisa Lacroce[4], Laura Polito[5], Filippo Rossi[4], Giulio Cerullo[1], Giuseppe Della Valle[1], and Margherita Maiuri[1] — [1]Department of Physics, Politecnico di Milano, Milan, Italy — [2]Department of Physics and Astronomy, Rice University, Houston, USA — [3]CNR-NANOTEC, Istituto di Nanotecnologia, Lecce, Italy — [4]Department of Chemistry, materials and chemical engineering, Politecnico di Milano, Milan, Italy — [5]Consiglio Nazionale delle Ricerche, CNR-SCITEC, Milan, Italy

Two-dimensional spectroscopy is used to track ultrafast hot-carrier dynamics in plasmonic nanorods. Our ultrabroadband excitation enables to cover both the transverse and longitudinal mode, distinguishing their character due to inhomogeneous broadening and sub-ps spectro-temporal features

**Oral** EH-4.5 11:30 ICM - Room 4a

*moved from EH-P.2*

**Dual-functional metaoptics for advanced arbitrary light shaping** — Gianluca Ruffato[1,2,3], Andrea Vogliardi[1,3], Daniele Bonaldo[2,3], Simone Dal Zilio[4], and •Filippo Romanato[1,3,4] — [1]Department of Physics and Astronomy, University of Padova, Padova, Italy — [2]Department of Information Engineering, University of Padova, Padova, Italy — [3]Quantum Technologies Research Center, University of Padova, Padova, Italy — [4]CNR-IOM Istituto Officina dei Materiali , Trieste, Italy

While structured light advanced life sciences and ICT, metasurfaces enabled complex light manipulation with high integration. We present dual-functional silicon metaoptics for arbitrary 3D light control, offering promising applications in particle manipulation, microscopy, quantum computing.

**Oral** EH-4.6 11:45 ICM - Room 4a

**Size and cluster effects on the electron relaxation dynamics in plasmonic gold nanoparticles** — Lucrezia Catanzaro[1], Tlek Tapani[2], •Nils Henriksson[2], Nicolas Boulanger[2], Esdras J. Canto-Aguilar[2], Erik Zäll[2], Vittorio Scardaci[1], Giuseppe Compagnini[1], and Nicolò Maccaferri[2] — [1]Department of Chemical Sciences, University of Catania, Catania, Italy — [2]Department of Physics, Umeå University, Umeå, Sweden

We study ultrafast charge dynamics in plasmonic gold nanoparticles with different sizes. Pump-probe experiments, supported by numerical simulations based on the two-temperature model, reveal cluster-enhanced electron relaxation time with increasing particle size.

## EA-8: Quantum Technology

Chair: Sarah McCarthy, SUPA Department of Physics - University of Starthclyde, Glasgow, United Kingdom

Time: Wednesday, 10:30–12:00 Location: ICM - Room 4b

**Oral** EA-8.1 10:30 ICM - Room 4b

*withdrawn*

**Oral** EA-8.2 10:45 ICM - Room 4b

**Metasurface System for Quantum Phase Imaging** — •Jinliang Ren[1], Jinyong Ma[1], Katsuya Tanaka[3], Lukas Wesemann[2], Ann Roberts[2], Frank Setzpfant[3], and Andrey Sukhorukov[1] — [1]Australian National University, Canberra, Australia — [2]University of Melbourne, Melbourne, Australia — [3]Abbe Center of Photonics, Jena, Germany

We propose a novel quantum phase imaging system that integrates metasurfaces for generation and detection. Leveraging a metasurface-based quantum light source and phase gradient extraction, this approach offers potential for ultra-compact, switchable quantum imaging devices.

**Oral** EA-8.3 11:00 ICM - Room 4b

**Programmable Lithium Niobate-on-Insulator Bell State Generator** — •Andreas Maeder, Giovanni Finco, Alessandra Sabatti, Robert J. Chapman, and Rachel Grange — ETH Zurich, Department of Physics, Institute for Quantum Electronics, Optical Nanomaterial Group, Zurich, Switzerland

We present a lithium niobate-on-insulator circuit for generating entangled two-qubit states. It enables programmable generation of different Bell states with over 90% fidelity, highlighting the potential of the platform for photonic quantum computing.

**Oral** EA-8.4 11:15 ICM - Room 4b

**Enhancing bandwidth compression using an aberration-corrected sinusoidal time lens** — •Sanjay Kapoor, Filip Sośnicki, and Michał Karpiński — Faculty of Physics, Univeristy of Warsaw, Warsaw, Poland

We demonstrate a 1.5x improvement in spectral bandwidth compression of Gaussian pulses using an electro-optic sinusoidal time lens by correcting time aperture aberrations, which enables applications in both classical and quantum optics.

**Oral** EA-8.5 11:30 ICM - Room 4b

**Photon Entanglement in Synthetic Dimensions of a Single Waveguide** — •Amir Sivan[1,2], Stav Lotan[1,2], Amit Kam[2,3], Lior Gal[1], Guy Bartal[1,2], and Meir Orenstein[1,2] — [1]Andrew and Erna Viterbi department of Electrical & Computer Engineering, Technion-Israel Institute of Technology, Haifa, Israel — [2]Helen Diller Quantum Center, Technion-Israel Institute of Technology, Haifa, Israel — [3]Physics Department, Technion-Israel Institute of Technology, Haifa, Israel

We exploit the intricate mode structure and intermodal interactions of a single waveguide, modifying its lateral dimensions to generate photonic states such as NOON and W on a small-footprint and easily fabricable platform.

**Oral** EA-8.6 11:45 ICM - Room 4b

**AlGaAs Bragg Reflection Waveguides as Single and Entangled Photon Pair Source** — •Akriti Raj[1], Tobias Bauer[1], David Lindler[1], Quankui Yang[2], Thorsten Passow[2], and Christoph Becher[1] — [1]University of Saarland, Department of Physics, Campus E2.6, Saarbrücken, Germany — [2]Fraunhofer Institute for Applied Solid State Physics IAF, Tullastr. 72, Freiburg, Germany

Single and entangled photon pair sources are pivotal for quantum technologies. We present such a room-temperature source using AlGaAs Bragg reflection waveguides at 1546 nm i.e. coupled in a standard single-mode fiber for further applications.

## CD-8: Quantum Nonlinear Optics 2

Chair: Nathalie Vermeulen, Free University of Brussels, Brussels, Belgium

Time: Wednesday, 10:30–12:00 Location: ICM - Room 13a

**Oral** CD-8.1 10:30 ICM - Room 13a

**Quasi-Phase Matching of Third-Order Nonlinear Processes by Direct Laser Writing** — Vincent Fortin[1,2], Mathis Carpentier[2], Lionel Canioni[2], Thierry Cardinal[2], Philippe Balcou[1], Jérôme Lhermite[1], Yannick Petit[2], and •Jean-Christophe Delagnes[1] — [1]CELIA Centre Laser Intense et Applications, Talence, France — [2]ICMCB Institut de la Chimie de la Matière Condensée de Bordeaux, Pessac, France

We report on the results on periodically laser-written guiding structures on glassy materials applied to quasi-phase matching of third-order non-linear processes, and the theoretical basis that allows us to determine the structure period $\Lambda$.

**Oral** CD-8.2 10:45 ICM - Room 13a

**Counterpropagating non-degenerate frequency up-conversion in X-cut Periodically Poled LiNbO3 nanophotonic wires** — Halvor R. Fergestad, •Daiheng Fu, Vaishali B. Adya, and Katia Gallo — KTH Royal Institute of Technology, Stockholm, Sweden

We demonstrate sum-frequency-generation in a waveguide with counterpropagating pumps in the telecom band featuring bandwidths of 3nm and 45nm in the backward and forward direction. We obtain 1.9$\mu$W at 771.5nm from 5.23mW pumps around 1543nm.

**Oral** CD-8.3 11:00 ICM - Room 13a

**Suppressing parasitic nonlinear processes in frequency-degenerate photon pairs emission in layer-poled TFLN waveguides** — •Olivia Hefti[1,2], Enrico Melani[3], Marco Clementi[3], Jean-Etienne Tremblay[1], Andrea Volpini[1], Yesim Koyaz[2], Homa Zarebidaki[1], Ivan Prieto[1], Olivier Dubochet[1], Charles Caër[1], Daniele Bajoni[4], Hamed Sattari[1], Camille Sophie Brès[2], Matteo Galli[3], and Davide Grassani[1] — [1]Centre suisse d'électronique et de microtechnique, Neuchâtel, Switzerland — [2]École Polytechnique Fédérale de Lausanne, Photonic Systems Laboratory (PHOSL), Lausanne, Switzerland — [3]Dipartimento di Fisica, Università di Pavia, Pavia, Italy — [4]Dipartimento di Ingegneria Industriale e dell'Informazione, Università di Pavia, Pavia, Italy

We use cascaded sum frequency generation and spontaneous parametric down conversion in layer-poled thin film lithium niobate waveguides to suppress noise photons from unwanted single-pump nonlinear processes and produce degenerate-frequency photon pairs.

**Oral** CD-8.4 11:15 ICM - Room 13a

**Creation of photon states with negative Wigner function with tunable N-level EIT processes** — Sutapa Ghosh[1,2,3,6], Alexey Gorlach[1,2], Chen Mechel[1,2], •Maria V. Chekhova[1,4,5], Ido Kaminer[1,2,3], and Gadi Eisenstein[1,2,3] — [1]ECE department, Technion-Israel Institute of Technology, HAIFA, Israel — [2]Russel Berrie Nanotechnology Institute and Solid State Institute, Technion-Israel Institute of Technology, HAIFA, Israel — [3]Diller Quantum Center Technion-Israel Institute of Technology, HAIFA, Israel — [4]Max Planck Institute for the Science of Light, Erlangen, Germany — [5]Friedrich–Alexander Universität Erlangen–Nürnberg, Erlangen, Germany — [6]University of Maryland, Maryland , USA

We demonstrate a giant, tunable cross-Kerr optical nonlinearity by exciting N-level electromagnetically-induced-transparency driven by a frequency comb. It enables 3.5 dB quadrature squeezing and deterministic generation of non-Gaussian state with negative Wigner distribution without post-selection.

**Oral** CD-8.5 11:30 ICM - Room 13a

**Intermodal-vectorial four-wave mixing in few-mode fibers for generation of photon pairs with spatial-polarization-frequency hybrid entanglement** — •Andrzej Gawlik, Marta Bernaś, Kinga Żołnacz, and Karol Tarnowski — Department of Optics and Photonics, Faculty of Fundamental Problems of Technology, Wrocław University of Science and Technology, Wrocław, Poland

Scheme for the generation of hybrid-entangled photon pairs using intermodal-vectorial four-wave mixing in few-mode fibers is proposed. Two photon state is realized via the spectral overlap of two and three four-wave mixing processes.

**Oral** CD-8.6 11:45 ICM - Room 13a

**Synthetic off-axis Quantum Holography with Undetected Light** — •Sebastian Töpfer[1], Sergio Tovar[1], Josué R. Leòn Torres[2,3,4], Daniel Derr[1], Enno Giese[1], Jorge Fuenzalida[1,5], and Markus Gräfe[1,2] — [1]Institute for Applied Physics, Technical University of Darmstadt, Darmstadt, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany — [3]Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany — [4]Cluster of Excellence Balance of the Microverse, Friedrich Schiller University Jena, Jena, Germany — [5]ICFO-Institut de Ciencies Fotoniques, The Barcelona Institute of Science and Technology, Castelldefels (Barcelona), Spain

This work presents a novel technique for single acquisition quantum holography with undetected light, by applying synthetic off-axis holography. This leads to a significant reduced total acquisition time and enabling the usage in dynamic processes.

## CJ-6: Mode-Locked Fiber Lasers 2

Chair: Jakub Boguslawski, Wrocław University of Science and Technology, Poland, Poland

Time: Wednesday, 10:30–12:00 Location: ICM - Room 13b

**Oral** CJ-6.1 10:30 ICM - Room 13b

**Pulse Scalability in All-Fiber Energy-Managed Soliton Laser** — •Xingliang Li[1,2], Mostafa I. Mohamed[1], Aurélien Coillet[1], and Philippe Grelu[1] — [1]Université Bourgogne Europe, Dijon, France — [2]Hebei Normal University, Shijiazhuang, China

We build an all-fiber energy-managed soliton laser with standard anomalous fiber components at 1.5-micron wavelength. Adjusting the intracavity filter bandwidth scales the pulse energy (0.28-1.45 nJ) and duration (0.3-9 ps) using 100-200 mW pumping power.

**Oral** CJ-6.2 10:45 ICM - Room 13b

**Self-starting Thulium-doped all-fibre Mamyshev Oscillator** — •Dennis Christian Kirsch[1], Mikhail E. Likhachev[2], Svetlana S. Aleshkina[2], Mikhail V. Yashkov[3], and Maria Chernysheva[1] — [1]Leibniz Institute of Photonics Technology, Jena, Germany — [2]Prokhorov General Physics Institute of the Russian Academy of Sciences, Dianov Fiber Optics Research Center, Moscow, Russia — [3]Institute of Chemistry of High Purity Substances of the Russian Academy of Sciences, Nizhny Novgorod, Russia

Using specially designed active and nonlinear fibres and super-imposed fibre gratings, we introduce such a monolithic self-starting laser in the 2-$\mu$m band for the first time. The emitted rectangular-shaped pulses can be tuned via filter-mismatch.

**Oral** CJ-6.3 11:00 ICM - Room 13b

**Spatial beam cleaning in Ytterbium spatiotemporal mode-locked fiber laser** — Guohao Fu[1], Wasyhun A. Gemechu[2], Jose Alfredo Alvarez-Chavez[3], Fabio Mangini[2], •Karolina Stefanska[2], and Stefan Wabnitz[2] — [1] Department of Precision Instrument, Tsinghua University, Beijing 100084, China — [2]Department of Information Engineering, Electronics and Telecommunications, Sapienza University of Rome, Rome 00184, Italy — [3] Optical Sciences Group—University of Twente, Drienerlolaan 5, , 7522NB Enschede, Netherlands

We present a novel spatiotemporal mode-locked Yb-doped fiber laser producing high-energy, ultrashort pulses with near-Gaussian beam profiles. Combining nonlinear polarization rotation and Kerr beam self-cleaning, the cavity operates without isolators or dispersion compensators.

**Oral** CJ-6.4 11:15 ICM - Room 13b

**Integrated Fabry-Perot output coupler for Mamyshev fiber oscillator** — •Riccardo Gotti[1], Sara Pizzurro[1], Antonio Agnesi[1], Antonin Moreau[2], Julien Lumeau[2], and Federico Pirzio[1] — [1]Dipartimento di Ingegneria Industriale e dell'Informazione, Università di Pavia, Pavia, Italy — [2]Aix Marseille Univ, CNRS, Centrale Med, Institut Fresnel, Marseille, France

We designed a Fabry-Perot filter for efficient output extraction from a hybrid Yb-doped Mamyshev oscillator. Its combination with a commercial band-pass filter improves pulse compression by 17% down to 40 fs and reduces satellite pulses.

**Oral** CJ-6.5 11:30 ICM - Room 13b

**Real-time Observations on Vector Soliton Pair Formation in a Self-mode-locked Tm-doped Fibre Laser** — •Dennis Christian Kirsch[1], Anastasia Bednyakova[2], and Maria Chernysheva[1] — [1]Leibniz Institute of Photonics Technology, Jena, Germany — [2]Novosibirsk State University, Novosibirsk, Russia

We observe and simulate the interaction between two trapped orthogonally polarised vector solitons and synchronised and unsynchronised dispersive waves for the first time by dispersive Fourier transform in a self-mode-locked oscillator at 2 $\mu$m wavelength.

**Oral** CJ-6.6 11:45 ICM - Room 13b

**Microjoule ultrafast Yb-fiber laser in tunable repetition-rate** — •Xiangming Xiao[1,2,3], Wenmi Shi[1,2], Chenyang Gao[1,2], Yang Gui[1,2,3], and Gengji Zhou[1,2] — [1]State Key Laboratory of High Field Laser Physics and CAS Center for Excellence in Ultra-intense Laser Science, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [2]University of Chinese Academy of Sciences, Beijing, China — [3]Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences, Hangzhou, China

We experimentally demonstrated a repetition-rate tunable ultrafast fiber laser delivering microjoule level pulse energy. Pulse duration of less than 180 fs were obtained despite of repetition rate tuning from 200 kHz to 2 MHz.

## EF-3: Control and Engineering of Localized States

Chair: Ihar Babushkin, Leibniz University Hannover, Hannover, Germany

Time: Wednesday, 10:30–12:00 Location: ICM - Room 14a

**Oral** EF-3.1 10:30 ICM - Room 14a

**Observation of optical solitons governed by fractional dispersion** — Van Thuy Hoang[1,2], Justin Widjaja[1], Y. Long Qiang[1,2], Maxwell Liu[1], Tristram J. Alexander[1], Antoine F. J. Runge[1,2], and •C. Martijn de Sterke[1,2] — [1]Institute of Photonics and Optical Science (IPOS), School of Physics, The University of Sydney, Sydney, Australia — [2]ARC Centre of Excellence for Optical Microcombs for Breakthrough Science (COMBS), Sydney, Australia

We investigate a novel type of soliton governed by dispersion with a discontinuous derivative at the central frequency, which is equivalent to a fractional Laplacian. These solitons exhibit non-exponential temporal decay and pulse length-independent energy.

**Oral** EF-3.2 10:45 ICM - Room 14a

**Möbius Laser Cavity Soliton Microcomb** — •Debayan Das[1], Antonio Cutrona[1], Gian-Luca Oppo[2], Andrew Cooper[1], Luana Olivieri[1], Alexander Balanov[1], Sai Chu[3], Brent Little[4], Roberto Morandotti[5], David Moss[6], Juan Sebastian Totero Gongora[1], Marco Peccianti[1], and Alessia Pasquazi[1] — [1]Emergent Photonics Research Centre (EPicX), Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [2]SUPA and Department of Physics, University of Strathclyde, Glasgow, United Kingdom — [3]Department of Physics, City University of Hong Kong, Hong Kong, China — [4]QXP Technologies Inc., Xi'an, China — [5]INRS-EMT, Varennes, Canada — [6]Optical Sciences Centre for Microphotonics, Swinburne University of Technology and ARC-COMBS, Hawthorn, Australia

We propose a simple laser cavity geometry to effectively realise Möbius cavity and generate interleaved soliton microcombs. Our findings are confirmed by preliminary results showing distinct threshold for interleaved solitons.

**Oral** EF-3.3 11:00 ICM - Room 14a

**Normal dispersion Kerr cavity solitons: beyond the mean field limit** — Thomas G. Seidel[1,2], Julien Javaloyes[2], and •Svetlana V. Gurevich[1] — [1]University of Münster, Münster, Germany — [2]Universitat de les Illes Balears, Palma de Mallorca, Spain

We investigate novel temporal localized structures (TLS) in Kerr resonators with normal dispersion, surpassing the mean field limit. These TLS, modeled via delay algebraic equations, exhibit unique properties, enhancing optical frequency comb generation.

**Oral** EF-3.4 11:15 ICM - Room 14a

**Impact of Loss and Gain on the Nonlinear Spectrum of Dense Optical Soliton Gases** — •Loic Fache, François Copie, Pierre Suret, and Stéphane Randoux — Univ. Lille, CNRS, UMR 8523 - PhLAM, F-59 000 Lille, France

We report optical fiber experiments demonstrating how dissipation modifies the distribution of solitons' characteristics in an optical soliton gas during its propagation by measuring the amplitude and phase of the optical field at various distances.

**Oral** EF-3.5 11:30 ICM - Room 14a

**Controlling Frequency Comb Line Spacing Via Symmetry Broken Faticons** — •Lewis Hill[1], Erwan Lucas[2], Alekhya Ghosh[1,3], Juan Diego Mazo Vásquez[1,3], Julius T. Gohsrich[1,3], Arghadeep Pal[1,3], Haochen Yan[1,3], Pascal Del'Haye[1,3], Gian-Luca Oppo[4], Stéphane Coen[5,6], Flore K. Kunst[1,3], and Julien Fatome[2] — [1]Max Planck Institute for the Science of Light, Staudtstr. 2, 91058, Erlangen, Germany — [2]Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303 CNRS-UBE, Dijon, France — [3]Department of Physics, Friedrich-Alexander Universität Erlangen-Nürnberg, 91058, Erlangen, Germany — [4]SUPA and Department of Physics, University of Strathclyde, G4 0NG, Glasgow, United Kingdom — [5]Department of Physics, University of Auckland, Auckland, New Zealand — [6]The Dodd-Walls Centre for Photonic and Quantum Technologies, Dunedin, New Zealand

Faticons, novel temporal structures in Kerr ring resonators, exhibit unique dynamics driven by spontaneous symmetry breaking (SSB). Higher-order SSB enables precise tuning of faticon propagation speed and frequency comb line spacing, advancing optical system control.

**Oral** EF-3.6 11:45 ICM - Room 14a

**Hybridised solitons in normal Kerr cavities with non-Hermitian potentials** — •Salim B. Ivars[1,4], Carlos Milián[2], Muriel Botey[1], Ramon Herrero[1], and Kestutis Staliunas[1,3] — [1]Departament de Física, Universitat Politècnica de Catalunya (UPC), Terrassa, Spain — [2]Institut Universitari de Matemàtica Pura i Aplicada, Universitat Politècnica de València, València, Spain — [3]Vilnius University, Faculty of Physics, Laser Research Center, Vilnius, Lithuania — [4]ICFO—Institut de Ciències Fotòniques, Castelldefels, Spain

We introduce a new formation mechanism for solitons in modulated Kerr cavities with normal dispersion. These potentials hybridise the two canonical formation mechanisms inducing a dual behaviour to states, introducing mechanism for manipulation of solitons.

# EB-4: Quantum Entanglement and Interference

Chair: Fabio Sciarrino, Sapienza Universita di Roma, Rome, Italy

Time: Wednesday, 10:30–12:00 Location: ICM - Room 14b

**Oral** EB-4.1 10:30 ICM - Room 14b

**Enabling hybrid two-photon interference with a time lens** — •Jan Krzyżanowski[1], Jerzy Szuniewicz[1], Sanjay Kapoor[1], Filip Sośnicki[1,2], and Michał Karpiński[1] — [1]Faculty of Physics, University of Warsaw, Warszawa, Poland — [2]Integrated Quantum Optics, Institute for Photonic Quantum Systems (PhoQS), Paderborn University, Paderborn, Germany

We experimentally demonstrate non-classical two-photon interference for bandwidth-mismatched photons. We matched the single photon spectra using a time lens based bandwidth converter. This experiment makes a step towards quantum information exchange between spectrally mismatched sources.

**Oral** EB-4.2 10:45 ICM - Room 14b

**Cavity Cooling using Electron Pulses** — •Daniel Maison, Liron Stettiner, Shiran Even-Haim, Alexey Gorlach, Ron Ruimy, and Ido Kaminer — Solid State Institute, Technion – Israel Institute of Technology, Haifa, Israel

The which-path gedankenexperiment is a cornerstone of quantum mechanics, inspiring applications in multiple platforms. We show that which-path electron interferometers can be used to cool photonic cavities, providing a universal scheme for general "qubit-oscillator" systems.

**Oral** EB-4.3 11:00 ICM - Room 14b

**Exploring entangled photonic state properties for polarization-based characterization of light scattering in a turbid medium** — •Vira Besaga[1], Ivan Lopushenko[2], Oleksii Sieryi[2], Alexander Bykov[2], Frank Setzpfandt[1,3], and Igor Meglinski[4] — [1]Institute of Applied Physics & Abbe Center of Photoncis, Friedrich Schiller University Jena, Jena, Germany — [2]Opto-Electronics and Measurement Techniques Unit, University of Oulu, Oulu, Finland — [3]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany — [4]College of Engineering and Physical Sciences, Aston University, Birmingham, United Kingdom

We study the evolution of the polarization-entangled photon pairs when one of the partner photons interacts with a turbid medium and explore which parameters of two-photon states are applicable for quantitative sensing of scattering samples.

**Oral** EB-4.4 11:15 ICM - Room 14b

**Hong-Ou-Mandel interference of two photons of vastly different color** — Felix Mann[1], Helen M. Chrzanowski[1], Felipe Gewers[1], •Marlon Placke[1], and Sven Ramelow[1,2] — [1]Institut für Physik, Humboldt-Universität zu Berlin, Berlin, Germany — [2]IRIS Adlershof, Berlin, Germany

Hong-Ou-Mandel interference is a quantum phenomenon that underlies quantum information processing with single photons. Using a quantum frequency converter as an active beam splitter we demonstrate Hong-Ou-Mandel interference of two photons of vastly different colors.

**Oral** EB-4.5 11:30 ICM - Room 14b

**Quantum teleportation of genuine single-rail vacuum–one-photon qubits** — •Beatrice Polacchi, Francesco Hoch, Giovanni Rodari, Stefano Savo, Gonzalo Carvacho, Nicolò Spagnolo, Taira Giordani, and Fabio Sciarrino — Sapienza Università di Roma, Rome, Italy

Quantum teleportation in the photon-number encoding is challenging with linear optics. Using a resonantly excited semiconductor quantum dot-based single-photon source, we demonstrate the teleportation of single-rail vacuum-one-photon qubits, disclosing new potentialities for quantum information processing.

**Oral** EB-4.6 11:45 ICM - Room 14b

*moved from EB-P.1*

**Towards quantum-enhanced fiber-optic inertial sensing** — Marialuisa Capezzuto[1], Davide D'Ambrosio[1], Saverio Avino[1], Hugo Degert[2], Romain Dalidet[2], Laurent Labonte[2], and •Gianluca Gagliardi[1] — [1]Consiglio Nazionale delle Ricerche, Istituto Nazionale di Ottica (INO), Pozzuoli (NA), Italy — [2]Institut de Physique de Nice, Université Côte d'Azur-CNRS , Nice, France

In the framework of EDF project ADEQUADE, we developed a quantum-enhanced fiber-optic inertial sensor based on a fiber-optic Fabry-Pèrot cavity sensor interrogated by single photons generated by a classical source and nonlinear-generated entangled-photon pairs.

# CH-8: Surface-Enhanced Raman (in Memoriam Marco Grande)

Chair: Crina Cojocaru, Universitat Politecnica de Catalunya, Terrassa (Barcelona), Spain

Time: Wednesday, 10:30–12:00 Location: ICM - Room Osterseen

**Oral** CH-8.1 10:30 ICM - Room Osterseen

**Single-protein dynamics revealed by meta-surface-enhanced Raman spectroscopy** — •MohammadReza Aghdaee[1], Sharif Zaidouni[1], Yeganeh Bahiraie[1], Gulsen Gork[2], Yongyi Gao[3], Anupa Kumari[1], and Oluwafemi S. Ojambati[1] — [1]Faculty of Science and Technology, MESA+ Institute for Nanotechnology, University of Twente, Enschede, Netherlands — [2]Faculty Of Sciences, Department Of Physics, Department Of General Physics, Marmara University, Istanbul, Türkiye — [3]Cavendish Laboratory, University of Cambridge, Cambridge, United Kingdom

We develop a label-free technique to probe the secondary structure of a single protein, using meta-surface-enhance Raman spectroscopy. Our approach shows temporal fluctuations in the Raman spectrum, indicating dynamic changes in the secondary structure.

**Oral** CH-8.2 10:45 ICM - Room Osterseen

**Towards fully loss-corrected SRS imaging** — •Nick S. Lemberger[1], Kristin Wallmeier[1], and Carsten Fallnich[1,2] — [1]Institute of Applied Physics, University of Münster, Münster, Germany — [2]Cells in Motion Interfaculty Centre, University of Münster, Münster, Germany

Detector-based real-time transmission loss correction of Stokes and pump beam in stimulated Raman scattering microscopy is presented, enabling improved image quality of thick and heterogeneous tissue samples by removal of transmission-loss-induced chemically unspecific shadows.

**Oral** CH-8.3 11:00 ICM - Room Osterseen

**Detection of cotinine (spiked in human urine) using plasmonic quasi crystal as SERS-active substrate** — •Sibashish Chakraborty[1], Rishabh Vij[2], Venu Gopal Achanta[2,3], and Satish Kumar Dubey[1] — [1]SeNSE, Indian Institute of Technology (IIT) Delhi , New Delhi, India — [2]Tata Institute of Fundamental Research (TIFR), Mumbai, India — [3]National Physical laboratory (NPL), New Delhi, India

Detection of micromolar concentrations of cotinine in human urine using SERS is performed. Cotinine is key biomarker for tobacco exposure, its detection is valuable for epidemiological research on different groups of nicotine and tobacco consumers.

**Oral** CH-8.4 11:15 ICM - Room Osterseen

**Whispering-gallery mode enhanced SERS sensing** — •Davide D'Ambrosio[1], Naveed Ahmed Chishti[1], Benedetta Catalano[2], Giulia Rusciano[2], Antonio Sasso[2], and Gianluca Gagliardi[1] — [1]Consiglio Nazionale delle Ricerche, Istituto Nazionale di Ottica (INO), Napoli, Italy — [2]Department of Physics "E. Pancini", University of Naples Federico II, Napoli, Italy

A novel photonic scheme based on a whispering-gallery mode resonator and silver nanoparticles is reported. The proposed setup combines photonic and plasmonic enhancement factors to push forward SERS limits of detection for nanoplastics in water

**Oral** CH-8.5 11:30 ICM - Room Osterseen

**Ultrafast Raman detection of small molecules by plasmonic nanopore** — •Francesco Tantussi[1], Kirill Kabarov[1], Ilaria Baldi[1], Maria Formoso[1], Foroogh Sarbish[1], Giulia Bruno[1], Michele Dipalo[1], Francesco Gentile[2], Federica Villa[3], and Francesco De angelis[1] — [1]Istituto Italiano di Tecnologia ( IIT ), Genova, Italy — [2]Universita Magna Grecia, Catanzaro, Italy — [3]Politecnico di Milano, Milano, Italy

To go beyond standard protein identification methods, we combine SERS with the speed and sensitivity of SPAD cameras. We'll present ultrafast Raman of amino acid sequences as they pass through a plasmonic nanopore.

**Oral** CH-8.6 11:45 ICM - Room Osterseen

**Optimization of laser induced periodic surface structures for surface enhanced Raman spectroscopy of extracellular vesicles** — •Simon A. Barter, Neil G.R. Broderick, and Francesco Merola — Dodd Walls Centre for Quantum and Photonics Technologies, Department of Physics, The University of Auckland, Auckland, New Zealand

Laser-induced periodic surface structures with a SERS-active gold thin-film coating are proposed as effective substrates for surface-enhanced Raman spectroscopy. Nano-structuring of steel wafers by femtosecond laser pulses is achieved and optimised for detecting extracellular vesicles.

# CA-5: High-Power Solid State Lasers

Chair: Catherine Leblanc, Institut d'Optique Graduate School, Paris, France

Time: Wednesday, 10:30–12:00 Location: Hall A1 - Room A12

**Invited** CA-5.1 10:30 Hall A1 - Room A12

**Recent progress in photonic-crystal surface-emitting lasers** — •Susumu Noda — Kyoto University, Kyoto, Japan

I will describe recent progress in photonic-crystal surface-emitting lasers (PCSELs) including their latest high-brightness and high-functionality operations. New trends such as short-pulse, short-wavelength, and optical communication wavelength operations also discussed.

**Oral** CA-5.2 11:00 Hall A1 - Room A12

**Flat-top beam shaping for high-power high-energy ps Yb:YAG lasers** — •Stéphane Petit, Vincent Fortin, Maylis Lavastre, Marie-Christine Nadeau, Philippe Balcou, Dominique Descamps, Christophe Féral, Mathias Lachat, Jérôme Lhermite, Denis Marion, Eric Mével, and Antoine Rohm — Université de Bordeaux, CNRS, CEA,CELIA (Centre Lasers Intenses et Applications), UMR 5107, Talence, France

We report the experimental validation of phase mirrors under 20 W, 20 mJ nanosecond stretched pulses, demonstrating a highly efficient method of shaping Gaussian beams into flat-top beams before seeding Yb:YAG J-level kW amplifiers.

**Oral** CA-5.3 11:15 Hall A1 - Room A12

**Seed spectral shaping for 90 fs multi-mJ 1-kHz laser pulses in Yb:CaAlYO4 amplifier** — •Dimitar Velkov[1], Lyuben Petrov[1,3], Iriney Vasilev[1], Kaloyan Georgiev[1], Marta Mladenova[1], Xiaodong Xu[4], Anton Trifonov[3], Tihomir Tenev[5], and Buchvarov Buchvarov[1,2] — [1]Physics Department, Sofia University, Sofia, Bulgaria — [2]John Atanasoff Center for Bio and Nano Photonics,, Sofia, Bulgaria — [3]IBPhotonics Ltd., Sofia, Bulgaria — [4]Jiangsu Key Laboratory of Advanced Laser Materials and Devices, Jiangsu Normal University, Xuzhou, China — [5]Institute of Solid State Physics, Bulgarian Academy of Sciences, Sofia, Bulgaria

The spectral bandwidth of the Yb:CaYAlO4 amplifier is widened from 15 to 25 nm, and the pulse duration is shortened to 90 fs, keeping mJ-level of the pulse energy by implementing a birefringent filter.

**Oral** CA-5.4 11:30 Hall A1 - Room A12

**PCMA-FCPA Yb-fiber amplifier delivering 76 MHz repetition rate and 72 W average power femtosecond pulses** — •Jokūbas Pimpė[1,2], Jonas Banys[1], Simona Armalytė[1], Jonas Jakutis Neto[1,3], Vygandas Jarutis[1], Audrius Dubietis[1], and Julius Vengelis[1] — [1]Vilnius University Laser Research Center, Saulėtekio Ave. 10, LT-10223, Vilnius, Lithuania — [2]Light Conversion Ltd., 2b Keramiku str., LT-10233, Vilnius, Lithuania — [3]Institute for Advanced Studies (IEAv), Department of Aerospace Science and Technology, Trevo Cel Av Jose A. A. do Amarante, 1,12228001, Sao Jose dos Campos, Brazil

We report a highly stable, robust, high-power (>70W) 76 MHz hybrid PCMA-FCPA Yb-fiber amplifier, and it's application for nonlinear optics, that delivers nearly transform-limited femtosecond pulses with excellent Gaussian spatial intensity distribution.

**Oral** CA-5.5 11:45 Hall A1 - Room A12

**Development for Nanosecond OPCPA Laser Pumped by Optically Synchronized Nd:YAG Laser** — •Yasuhiro Miyasaka — Kansai Institute for Photon Science (KPSI), National Institutes for Quantum Science and Technology (QST), Kizugawa City, Japan

Ti:sapphire chirped-pulses, pumped by optically synchronized Nd:YAG green laser in a 330 ps pulse, were amplified with two-stage OPCPA from 0.1 nJ to 8.6 mJ in a 200 ps pulse and compressed to 45 fs.

# CE-8: Materials and Device Fabrication Methods

Chair: Georgios Tsibidis, FORTH, Heraklion, Greece

Time: Wednesday, 10:30–12:00 Location: Hall B1 - Room B11

**Oral** CE-8.1 10:30 Hall B1 - Room B11

**Towards a VUV cw laser light source** — •Simon J. Herr[1], Hiroki Tanaka[2], Anna-Rosa Waidhas[1], Gaetano Bonetti[2], Milena Hugenschmidt[1], Matthias Bickermann[2], and Frank Kühnemann[1,3] — [1]Fraunhofer Institute for Physical Measurement Techniques IPM, Freiburg, Germany — [2]Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany — [3]University of Freiburg, Institute of Physics, Freiburg, Germany

We report on recent progress in the crystal growth of ultra-pure VUV-transparent BaMgF4 crystals as well as on recent progress in the periodic poling of BaMgF4 crystals for VUV generation via nonlinear frequency conversion.

**Oral** CE-8.2 10:45 Hall B1 - Room B11

**Fabrication of Perovskite Semiconductor Devices for Solar-pumped Lasers** — •Yosuke Kume[1], Taiki Sakaguchi[1], Takaaki Ishikawa[1], Shijun Shi[2], Masato Soutome[2], Takashi Kondo[2], and Ichiro Shoji[1] — [1]Chuo University, 1-13-27, Kasuga, Bunkyo-ku, Tokyo, Japan — [2]RCAST, The University of Tokyo, 4-6-1, Komaba, Meguro-ku, Toyko, Japan

We aim to develop solar-pumped laser devices using a MAPbI3 as the laser medium. In this work, we improved the durability and reduced optical loss by bonding two perovskite thin films together.

**Oral** CE-8.3 11:00 Hall B1 - Room B11

**Laser Waveguides by a Hybrid Ceramic Process** — •Francesco Picelli[1], Jan Hostaša[1], Laura Esposito[1], Andreana Piancastelli[1], Guido Toci[2], and Barbara Patrizi[2] — [1]Institute of Science, Technology, and Susainability for Ceramics ISSMC-CNR, Fenza (RA), Italy — [2]National Institute of Optics INO-CNR, Sesto Fiorentino (FI), Italy

We used a hybrid ceramic process to produce a transparent ceramic waveguide of Yb:YAG, with lateral Cr:YAG cladding. The waveguide has internal transmittance of 70% and output 30.6W with slope efficiency of 43.4%.

**Oral** CE-8.4 11:15 Hall B1 - Room B11

**Wafer-scale diamond grinding of 3D optical accessible vacuum cells for Quantum Technologies** — •Joel M. N. Keen, Paul C. Gow, Glenn M. Churchill, Corin B. E. Gawith, and James C. Gates — Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

We present the wafer-based approach for fabricating micro atom-trap cells via diamond tool ultra-precision micro-machining. Strategies such as axial oscillation have yielded a 20x reduction in surface roughness, enabling 3D optical access.

**Oral** CE-8.5 11:30 Hall B1 - Room B11

**Fabrication of Polymer Waveguide Networks By Hot Imprint Replication for Multi-Functional Sensing** — •Yash Bhatia[1,2], Lei Zheng[1,2], Axel Günther[1,2,3], and Bernhard Roth[1,2] — [1]Hanover Centre for Optical Technologies, Leibniz University Hannover, Hannover, Germany — [2]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering-Innovation Across Disciplines), Hannover, Germany — [3]Institute for High-Frequency Technologies, Technical University of Braunschweig, Braunschweig, Germany

Planar polymer waveguide network arrays were fabricated using a home-built hot imprinting setup for scalable, cost-effective optical sensing of pressure, temperature, or gases, enabling its usage in advanced multi-sensing applications.

**Oral** CE-8.6 11:45 Hall B1 - Room B11

**Wafer-scalable fabrication of highly efficient plasmonic substrates via simple self-assembly approach** — •Vasanthan Devaraj[1], Jongmin Lee[2], Minjun Kim[3], and Thomas Zentgraf[1] — [1]Paderborn University , Paderborn, Germany — [2]Hallym University, Chuncheon, South Korea — [3]Chungnam National University, Daejeon, South Korea

We present a 4-inch wafer-sized, highly efficient plasmonic SERS substrate with <10% relative standard deviation in SERS signal, fabricated via a simple, lithography-free self-assembly approach, crucial for advancing diverse academic and commercial applications.

# EG-2: Manipulating Infrared Light at the Nanoscale

Chair: Mathieu Mivelle, Sorbonne Université - CNRS, Paris, France

Time: Wednesday, 10:30–12:00 Location: Hall B2 - Room B21

**Keynote** EG-2.1 10:30 Hall B2 - Room B21

**Detector-less near-field nanoscopy in the far-infrared** — •Miriam Serena Vitiello — CNR-Istituto Nanoscienze and Scuola Normale Superiore, Pisa, Italy

Quantum cascade laser-based, compact, detectorless near-field imaging techniques at THz frequencies will be discussed. Spatial mapping of the real-space propagation of THz-frequency polaritons in nano-material and metamaterial systems will be presented

**Oral** EG-2.2 11:15 Hall B2 - Room B21

**Electrical Modification of Single THz Meta-Atom Ultrastrong Light Matter Interaction** — •Elsa Jöchl[1], Anna-Lydia Vieli[1], Lucy Hale[1], Felix Helmrich[1], Deniz Turan[2], Mona Jarrahi[1], Mattias Beck[1], Jérôme Faist[1], and Giacomo Scalari[1] — [1]ETH, Zürich, Switzerland — [2]UCLA, Los Angeles, USA

We present spectroscopic measurements of THz ultrastrong light matter interaction between a single resonator and Landau transitions in a 2DEG. We tune the electron density in situ, decreasing the coupling from 46% to 18%.

**Oral** EG-2.3 11:30 Hall B2 - Room B21

**Nanometer-scale phononic resonators for long-wave-infrared radiation** — Michael Klein[1], Alisa Perutski[1], Jean-Paul Hugonin[2], and •Itai Epstein[1] — [1]Tel Aviv University, Tel Aviv, Israel — [2]Université Paris-Saclay, Palaiseau, France

We present an experimental observation of acoustic phonon polaritons acting as nanometric resonators, which enables to confine far-infrared light to nanometric-size mode volumes that are over a million times smaller than the free-space mode volume.

**Oral** EG-2.4 11:45 Hall B2 - Room B21

**Nonlinear THz Response in Ultrathin Au Films** — •Rokas Jutas[1], Andrius Baltuška[1,2], Audrius Pugžlys[1,2], Claudia Gollner[3], Yannic U. Staechelin[4], Holger Lange[4,5], Jonas Grumm[6], and Andreas Knorr[6] — [1]Photonics Institute, TU Wien, Vienna, Austria — [2]Center for Physical Sciences and Technology, Vilnius, Lithuania — [3]SLAC National Accelerator Laboratory, Menlo Park, USA — [4]Institute of Physical Chemistry, University of Hamburg, Hamburg, Germany — [5]Institute of Physics and Astronomy, University of Potsdam, Potsdam, Germany — [6]Institute of Theoretical Physics, TU Berlin, Berlin, Germany

We investigate theoretically and experimentally nonlinear response of ultra-thin gold films perturbed by strong THz E-fields. The non-linearity results from the dynamic change of electron temperature leading to non-equilibrium electron distribution and changed electron-phonon scattering.

# PP-2: Early-Stage Researcher (ESR) Poster Pitches - Session 2

Chair: Nathalie Destouches, University Jean Monnet Saint-Etienne, and the European Optical Society (EOS)

Time: Wednesday, 12:00–12:56 Location: ICM - Room 4a

**Poster pitch** PP-2.1 12:00 ICM - Room 4a

*Poster pitch of CG-P.1*

**Strong field electron emission driven by a bright squeezed vacuum** — •Andrei Rasputnyi[1,2], Jonas Heimerl[1], Jonathan Pölloth[1], Stefan Meier[1], Francesco Tani[2,3], Maria Chekhova[1,2], and Peter Hommelhoff[1,4] — [1]Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU),, Erlangen, Germany — [2]Max Planck Institute for the Science of Light, Erlangen, Germany — [3]UMR 8523—PhLAM—Physique des Lasers Atomes et Molécules, Université de Lille, CNRS, Lille, France — [4]Physics Department, LMU Munich, Munich, Germany

We experimentally study electron emission from a metal tip in the strong-field regime driven by a bright squeezed vacuum. We observe a significant extension of the electron energy spectrum compared to the classical drive case.

**Poster pitch** PP-2.2 12:04 ICM - Room 4a

*Poster pitch of EF-P.15*

**Observation of bound states of parametrically-driven Kerr cavity solitons** — •Clément Dupont[1,2], Nicolas Englebert[3], Simon-Pierre Gorza[2], Serge Massar[1], and Leo François[2] — [1]LIQ (ULB), Bruxelles, Belgium — [2]OPERA (ULB), Bruxelles, Belgium — [3]Caltech, California, USA

We report the first observation of close-range bound states of parametrically-driven cavity solitons (PDCSs) in a hybrid optical parametric oscillator. Experimental results highlight soliton interactions and bound-state formation dynamics.

**Poster pitch** PP-2.3 12:08 ICM - Room 4a

*Poster pitch of CA-P.1*

**Carrier-envelope offset frequency stabilization in solid-state lasers: direct electro-optic vs pump-power modulation** — •Karolina Suliga, Jarosław Sotor, and Maciej Kowalczyk — Laser & Fiber Electronics Group, Faculty of Electronics, Photonics and Microsystems, Wrocław University of Science and Technology, Wrocław, Poland

We present carrier-envelope offset frequency stabilization (fceo) in Cr:ZnS laser based on direct phase modulation by an intracavity electro-optic modulator. This novel technique enables to overcome the limitations of a standard pump-power fceo-stabilization approach.

**Poster pitch** PP-2.4 12:12 ICM - Room 4a

*Poster pitch of JSI-P.2*

**Optoelectronic nanowire neuron** — •Thomas K. Jensen[1], Joachim E. Sestoft[2], Vidar Flodgren[1], Abhijit Das[1], Rasmus D. Schlosser[2], David Alcer[3], Thomas Kanne[2], Magnus Borgström[3], Jesper Nygård[2], and Anders Mikkelsen[1] — [1]Division of Synchrotron Radiation Research, Department of Physics, and NanoLund, Lund University, Lund, Sweden — [2]Center for Quantum Devices & Nano-science Center, Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark — [3]Division of Solid State Physics, Department of Physics,and NanoLund, Lund University, Lund, Sweden

Three nanowires are interconnected to form an optoelectronic neuron device. We use external illumination and show that the device could operate in an insect-inspired neuromorphic broadcasting network.

**Poster pitch** PP-2.5 12:16 ICM - Room 4a

*Poster pitch of CA-P.9*

**Exploration of type-I intermittency leading to chaos in a passively Q-switched Tm:YLF laser emitting at 2.3 $\mu$m** — •Matthieu Glasset, Hippolyte Dupont, Patrick Georges, and Frederic Druon — Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, , Palaiseau (91192), France

Experimental results, characterized using Poincare maps, entropy calculation and phase space reconstruction, uncover an unusual type-I intermittency route to chaos in 2.3$\mu$m Tm:YLF lasers. Moreover, co-lasing at 1.9$\mu$m gives atypical views of population dynamics.

**Poster pitch** PP-2.6 12:20 ICM - Room 4a

*Poster pitch of CF-P.28*

**Implementation Of A Single-Shot Dispersion Scan At 2 $\mu$m For Optimizing A High-Power Few-Cycle OPCPA Source** — •Caroline Juliano, Ivan Sytcevich, Roya Garayeva, Daniel Díaz Rivas, Miguel Canhota, Chen Guo, Anne-Lise Viotti, Anne L'Huillier, and Cord Arnold — Department of Physics, Lund University, Box 118, 22100, Lund, Sweden

In this work, we present the development of a high-power, high repetition rate (200 kHz) few-cycle OPCPA system centered at 2 $\mu$m together with a single-shot dispersion scan technique for real-time monitoring and performance optimization.

**Poster pitch** PP-2.7 12:24 ICM - Room 4a

*withdrawn*

**Poster pitch** PP-2.8 12:28 ICM - Room 4a

*Poster pitch of CM-P.8*

**Phase Mask Integrated Aperture Shaping for Efficient Writing of Multiple Notch Filters in the Form of Fiber Bragg Gratings** — •Ria G. Krämer[1], Samuel L. Döpfner[1], Malte P. Siems[1], Georg R. Schwartz[1], Daniel Richter[1], and Stefan Nolte[1,2] — [1]Friedrich Schiller University Jena, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

For a reliable control of the spectral shape of fiber Bragg grating based integrated filters we present the integration of a shaping aperture into the phase mask for the femtosecond writing process.

**Poster pitch** PP-2.9 12:32 ICM - Room 4a

*Poster pitch of CB-P.2*

**Enhancement of frequency comb bandwidth in gain-switched integrated semiconductor lasers via mutual coupling.** — •Diarmuid O' Sullivan[1,2], John McCarthy[1,2], Frank Peters[1,2], and Bryan Kelleher[1,2] — [1]Tyndall National Institute, Cork, Ireland — [2]Physics Department, University College Cork, Cork, Ireland

We present evidence of the preferred regime for OFC bandwidth of an integrated coupled gain switched device. Biasing both lasers equally produces combs up to three times wider at 10dBm than preferentially biasing one laser.

**Poster pitch** PP-2.10 12:36 ICM - Room 4a

*withdrawn*

**Poster pitch** PP-2.11 12:40 ICM - Room 4a

*Poster pitch of CB-P.3*

**Dual-wavelength operation of a VCSEL for cryogenic communication** — •Patrik Rajala, Behzad Namvar, Jukka Viheriälä, Teemu Hakkarainen, Heikki Virtanen, Topi Uusitalo, and Mircea Guina — Tampere University, Optoelectronics Research Centre, Tampere, Finland

The development of quantum computers requires advanced optical communication solutions at cryogenic environments. We present a dual-wavelength, 830 nm and 867 nm, intra-cavity contact VCSEL working at 8 K. Design constraints and optimization guidelines are discussed.

**Poster pitch** PP-2.12 12:44 ICM - Room 4a

*Poster pitch of CL-P.15*

**Tunable MOEMS Microring Resonator Based on In-Plane Bending Through Rotary Comb Drives** — •Nicolas Hanine[1], Alessio Buzzin[1], Lorenzo Giannini[1], Ahmadreza Alaeddini[1], Nicola Pio Belfiore[2], and Rita Asquini[1] — [1]Sapienza University of Rome, Rome, Italy — [2]University of Roma Tre, Rome, Italy

Mechanically tunable MOEMS ring resonator with voltage-actuated comb-drives offers high sensitivity (5.83 nm/V) and efficient wavelength tuning. Compact and SOI-compatible, it is designed for optical communication networks and photonic circuit applications.

**Poster pitch** PP-2.13 12:48 ICM - Room 4a

*Poster pitch of JSI-P.3*

**The Limits of Supercontinuum Generation for Photonic Neuromorphic Computing** — •Andrei V. Ermolaev[1], Mathilde Hary[2], Lev Leybov[2], Piotr Ryczkowski[2], Anas Skalli[1], Daniel Brunner[1], Goëry Genty[2], and John M. Dudley[1] — [1]Université Marie et Louis Pasteur, Institut FEMTO-ST, CNRS UMR 6174, Besançon, France — [2]Photonics Laboratory, Tampere University, Tampere, Finland

We report a realistic simulation pipeline of an extreme learning machine based on nonlinear fibre supercontinuum generation. Results show over 92% accuracy for MNIST digit classification for suitable choice of input parameters.

**Poster pitch** PP-2.14 12:52 ICM - Room 4a

*Poster pitch of JSIII-P.4*

**Modelling of Energy-Dependent Nonlinearities in Microresonator Filtered Lasers** — •Antonio Cutrona[1], Andrew Cooper[1], Juan Sebastian Totero Gongora[1], Gian-Luca Oppo[2], Marco Peccianti[1], and Alessia Pasquazi[1] — [1]Emergent Photonics Research Centre (EPicX), Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [2]SUPA and Department of Physics, University of Strathclyde, Glasgow, United Kingdom

We investigate the effect of slow nonlinear processes on Laser Cavity-Solitons (LCS). By leveraging a recirculating formalism, we find a promising approach towards the stabilisation of LCS states in generic platforms with different nonlinear properties.

## PL-2: CLEO®/Europe Plenary Talk

Chair: Aleksandra Foltynowicz,Umeå University, Umeå, Sweden

Time: Wednesday, 14:00–15:30 Location: ICM - Room 1

**Plenary** PL-2.1 14:00 ICM - Room 1

**Attosecond light pulses for studying electron dynamics** — •Anne L'Huiller — Lund University, Lund, Sweden

This presentation will highlight some of the key steps of the field of attosecond science.

## EB-5: Quantum Information with Nv Centers

Chair: Vira Besaga, Friedrich Schiller University Jena, Jena, Germany

Time: Wednesday, 16:00–17:30 Location: ICM - Room 1

**Invited** EB-5.1 16:00 ICM - Room 1

**A diamond NV-center testbed for Quantum Internet applications** — •Mariagrazia Iuliano[1], Marie-Christine Slater[1], Arian J. Stolk[1], Matthew J. Weaver[1], Tanmoy Chakraborty[1], Elsie Loukiantchenko[1], Gustavo C. do Amaral[1], Nir Alfasi[1], Mariya O. Sholkina[1], Wolfgang Tittel[2,3], Nicolas Demetriou[1], Benjamin van Ommen[1], Julius Fischer[1], Tim H. Taminiau[1], Carlo Delle Donne[1], Bart van der Vecht[1], Stephanie Wehner[1], and Ronald Hanson[1] — [1]QuTech & Kavli Institute of Nanoscience, Delft University of Technology, Delft, Netherlands — [2]Departement of Applied Physics, University of Geneva, Geneva, Switzerland — [3]Constructor University Bremen GmbH, Bremen, Germany

We report on recent experimental progress in the Quantum Internet scenario using an NV-center testbed. The focus is primarily on the necessary interfaces and the enabled quantum network applications.

**Oral** EB-5.2 16:30 ICM - Room 1

**Optically Stable NV Centers Integrated into Highly Tunable Diamond Photonic Crystal Cavities** — •Alok Gokhale[1], Julian M. Bopp[1,2], Laura Orphal-Kobin[1], Kilian Unterguggenberger[1], Marco E. Stucki[1,2], Tommaso Pregnolato[1,2], and Tim Schröder[1,2] — [1]Department of Physics, Humboldt Universität zu Berlin, Newtonstr. 15, D-12489, Berlin, Germany — [2]Ferdinand-Braun-Institut (FBH), Gustav-Kirchhoff-Str. 4, D-12489, Berlin, Germany

We report our progress on the investigations of the optical properties of nitrogen-vacancy centers in 'Sawfish' photonic crystal cavities. We show tuning of the cavity resonance over a large range, thus overcoming potential fabrication imperfections.

**Oral** EB-5.3 16:45 ICM - Room 1

**A novel approach for scalable production of low noise two-stage frequency converters for NV center qubits in telecom-based quantum networks** — •Ludwig Hollstein[1], Hans Huber[1], Bernd Jungbluth[1], Florian Elsen[2], and Constantin Häfner[1,2] — [1]Fraunhofer Institute for Laser Technology ILT, Aachen, Germany — [2]Chair for Laser Technology LLT, RWTH Aachen University, Aachen, Germany

An innovative approach for low-noise, high efficiency quantum frequency conversion (QFC) of photons from 637nm to the telecom band for remote entanglement of NV center qubits, to be implemented in a highly integrated, scalable manner.

**Oral** EB-5.4 17:00 ICM - Room 1

**Portable Quantum Sensor for Simultaneous Temperature and Magnetic Field Measurement using Nitrogen-Vacancy Ensembles in Diamond** — Marta Arceiz[1,2], Julio Posada[2], José Carlos Guerra[2], Alfonso Fernández-García[1,2], Fernando Hidalgo[1], Erik Torrontegue[1], Pablo Acedo[1], and •Cristina de Dios[1] — [1]University Carlos III de Madrid, Leganés, Spain — [2]Arquimea Research Center, Tenerife, Spain

We present a new portable Quantum Sensor for Simultaneous Temperature and Magnetic Field Measurement using Nitrogen-Vacancy Ensembles in Diamond achieving sensitivities of $\eta_B = 0.1345\mu\mathrm{T}/\sqrt{\mathrm{Hz}}$ and $\eta_T = 51.32\mathrm{mK}/\sqrt{\mathrm{Hz}}$, comparable to current single sensing implementations

**Oral** EB-5.5 17:15 ICM - Room 1

**Cavity-enhanced absorption magnetometry in the visible to near-infrared range with nitrogen-vacancy ensembles** — •Florian Schall[1], Felix A. Hahl[1], Lukas Lindner[1], Janina J. Schindler[1], Yves Rottstaedt[1], Xavier Vidal[1,2], Tingpeng Luo[1], Alexander M. Zaitsev[3], Takeshi Ohshima[4,5], Jan Jeske[1], and Rüdiger Quay[1] — [1]Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany — [2]TECNALIA Basque Research and Technology Alliance (BRTA), Derio, Spain — [3]College of Staten Island (CUNY), New York, USA — [4]National Institutes for Quantum Science and Technology (QST), Takasaki, Japan — [5]Department of Maerial Science, Tohoku University, Sendai, Japan

We show a novel optical NV absorption starting in the emission wavelengths and reaching up to 1000 nm. Leveraging this, we demonstrate cavity-enhanced absorption magnetometry achieving improved contrast up to 42 % and good sensitivity.

## EA-9: Quantum Sources 2

Chair: Gian-Luca Oppo, University of Strathclyde, Glasgow, UK

Time: Wednesday, 16:00–17:30 Location: ICM - Room 4b

**Oral** EA-9.1 16:00 ICM - Room 4b

**Narrowband Correlated Photon Quadruplets from a Cold Atomic Ensemble** — •Yifan Li[1], Boon Long Ng[1], Chang Hoong Chow[1], Vindhiya Prakash[1], and Christian Kurtsiefer[1,2] — [1]Centre for Quantum Technologies, Singapore, Singapore — [2]Department of Physics, National University of Singapore, Singapore, Singapore

We present a narrowband correlated photon-pair source, based on spontaneous four-wave mixing in a cold atomic ensemble. Through Hanbury-Brown and Twiss measurements, we investigate triple and quadruple coincidences, directly observing correlated photon quadruplets.

**Oral** EA-9.2 16:15 ICM - Room 4b

*withdrawn*

**Oral** EA-9.3 16:30 ICM - Room 4b

*withdrawn*

**Oral** EA-9.4 16:45 ICM - Room 4b

**Single-mode Squeezed Vacuum State Generation in a Photonic Crystal Ring Microresonator** — •Alexander Ulanov[1], Thibault Wildi[1], and Tobias Herr[1,2] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Physics Department, University of Hamburg UHH, Hamburg, Germany

We demonstrate single-mode quadrature squeezing in a photonic crystal ring microresonator. The engineered resonance structure suppresses unwanted nonlinear processes and yields 8.5 dB of on-chip squeezing in a scalable platform relevant to quantum information processing applications.

**Oral** EA-9.5 17:00 ICM - Room 4b

**A stable source of polarization-entangled photon-pairs in a folded Mach-Zehnder interferometer** — •Sarah McCarthy[1,2], Ali Anwar[2], Ruaridh Smith[2], Imogen Morland[2], Gerald Bonner[2], Daniel Oi[1], and Loyd McKnight[1,2] — [1]SUPA Department of Physics, University of Strathclyde, Glasgow, United Kingdom — [2]Fraunhofer Centre for Applied Photonics, Glasgow, United Kingdom

We present a compact source of polarization-entangled photon-pairs using a folded Mach-Zehnder configuration. The source has demonstrated ultrahigh brightness values when compared to similar linear designs and good stability under tip-tilt misalignment.

**Oral** EA-9.6 17:15 ICM - Room 4b

**Generation of Polarization Entangled Photon Pairs in the Mid-infrared and Visible regions** — •Haruya Hirota[1] and Koichiro Tanaka[1,2] — [1]Kyoto University, Kyoto, Japan — [2]RIKEN, Wako, Japan

We successfully generated polarization-entangled mid-infrared and visible pho-

ton pairs via Type-II phase-matched SPDC in periodically poled stoichiometric lithium tantalate. Two distinct polarization-entangled states were verified through quantum tomography measurement.

## CF-7: Multi-Pass Cells 2

Chair: Gaia Barbiero, TRUMPF Scientific Lasers, Unterfoehring, Germany

Time: Wednesday, 16:00–17:30 Location: ICM - Room 13a

**Oral** CF-7.1 16:00 ICM - Room 13a

**Nonlinear Compression of a 2.08-$\mu$m Regenerative Amplifier with Bulk Multipass Cell** — •Boldizsar Kassai[1], Anna Suzuki[1], Alan Omar[1], Yicheng Wang[1], Martin Hoffmann[1], and Clara J. Saraceno[1,2] — [1]Photonics and Ultrafast Laser Science, Ruhr-Universität Bochum, Bochum, Germany — [2]Research Center Chemical Science and Sustainability, University Alliance Ruhr, Bochum, Germany

We present the nonlinear pulse compression of a high-power 2 $\mu$m laser amplifier using a Herriott-type bulk multi-pass cell, achieving sub-100-fs pulse duration with a 72 $\mu$J pulse energy, reaching a peak power of 525 MW.

**Oral** CF-7.2 16:15 ICM - Room 13a

**Post-compression with enhanced temporal pulse quality via chirped ellipse rotation** — •Esmerando Escoto[1], Andrea Z. Ticas[1], Supriya Rajhans[1], and Christoph M. Heyl[1,2,3] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Helmholtz Institute Jena, Jena, Germany — [3]GSI Helmholtzzentrum fuer Schwerionenforschung GmbH, Darmstadt, Germany

We numerically demonstrate an enhanced temporal cleaning approach combining nonlinear polarization ellipse rotation (NER) with enhanced frequency chirping (EFC) in a multi-pass cell post-compressor providing superior temporal contrast at large compression factors.

**Oral** CF-7.3 16:30 ICM - Room 13a

**Multi-Mirror Multi-Pass Cells for Compression of Energetic Narrowband Laser Pulses into the Femtosecond Regime** — •Gaspard Beaufort[1,2], Nayla Jimenez[1,3,4], Gunnar Arisholm[5], Victor Hariton[1], Ayhan Tajalli[1], Ingmar Hartl[1], Anne-Lise Viotti[2], and Marcus Seidel[1,3,4] — [1]Deutsches Elektronen-Synchrotron DESY, Notkestrasse 85, 22607 Hamburg, Germany — [2]Department of Physics, Lund Univeristy, P.O. Box 118, SE-22100 Lund, Sweden — [3]Helmholtz-Institute Jena, Frobelstieg 3,07743 Jena, Germany — [4]GSI Helmholtzzentrum fur Schwerionenforschnung GmbH, Planckstrasse 1, 64291 Darmstadt, Germany — [5]Norwegian Defence Research Establishment FFI, P. O. Box 25, NO-2027 Kjeller, Norway

We propose using multi-mirror multi-pass cells to compress energetic narrowband lasers into the femtosecond regime. As proof of principle, spectral broadening in air is achieved with an 11-mirror cell providing 297 passes.

**Oral** CF-7.4 16:45 ICM - Room 13a

**Single stage 20fs pulse generation from a 550fs high power Yb-YAG amplifier** — Michele Natile[1], Ahmed Maghraoui[1], •Florent Guichard[1], Antoine Comby[1], Marc Hanna[2], and Patrick Georges[2] — [1]Amplitude, Pessac, France — [2]Laboratoire Charles Fabry, Palaiseau, France

We report on a single stage, large compression factor >25, dispersion-controlled multipass cell scheme able to generate 20fs pulses.

**Oral** CF-7.5 17:00 ICM - Room 13a

**Double-pass Multipass Cell Compressor for Peak Power Enhancement of $\mu$J Pulse Energies** — •Alan Omar[1], Martin Hoffmann[1], and Clara J. Saraceno[1,2] — [1]Photonics and Ultrafast Laser Science, Ruhr-Universität Bochum, Bochum, Germany — [2]Research Center Chemical Science and Sustainability, Bochum, Germany

We present a robust double-pass multipass cell compressor, achieving high peak power enhancement by x9.5, compressing 8.8-$\mu$J pulses from 600 fs down to 40 fs, and high optical transmission of 89%.

**Oral** CF-7.6 17:15 ICM - Room 13a

**Yb-based cascaded multi-pass cell post-compression setup for kHz laser-plasma acceleration** — •Victor Koltalo, Louis Daniault, Jaismeen Kaur, and Rodrigo Lopez-Martens — Laboratoire d'Optique Appliquée, Palaiseau, France

We present a double stage post-compression setup based on multi-pass cells, boosting the peak power of an Ytterbium laser to 0.5 TW after one stage, with 23.5 fs pulse duration after compression

## CC-2: Intense THz Sources

Chair: Jérôme Faist, ETH Zürich, Zürich, Switzerland

Time: Wednesday, 16:00–17:30 Location: ICM - Room 13b

**Oral** CC-2.1 16:00 ICM - Room 13b

**Time-resolved THz Stark spectroscopy of molecules in solution** — •Bong Joo Kang[1,5], Egmont J. Rohwer[1], David Rohrbach[1], Michele Cascella[2], Robert J. Stanley[3], Shi-Xia Liu[4], and Thomas Feurer[1] — [1]Institute of Applied Physics, University of Bern, Bern, Switzerland — [2]Department of Chemistry and Hylleraas Centre for Quantum Molecular Sciences, University of Oslo, Oslo, Norway — [3]Department of Chemistry, Temple University, Philadelphia, USA — [4]Department of Chemistry and Biochemistry, University of Bern, Bern, Switzerland — [5]Division of Advanced Materials, Korea Research Institute of Chemical Technology, Daejeon, South Korea

We demonstrate THz Stark spectroscopy of solvated molecules using intense single-cycle THz pulses, thereby overcoming limitations of traditional Stark spectroscopy: No sample freezing, peak fields beyond the dielectric breakdown in conventional experiments, and arbitrary polarization.

**Oral** CC-2.2 16:15 ICM - Room 13b

**High average power large-area photoconductive emitter at 400 kHz repetition rate** — •Mohsen Khalili[1], Yicheng Wang[1], Stephan Winnerl[2], and Clara J. Saraceno[1] — [1]Photonics and Ultrafast Laser Science, Ruhr Universität Bochum, 44801 Bochum, Germany — [2]Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, 01314 Dresden, Germany

We demonstrate 6.7 mW terahertz emission from a GaAs-based large-area photoconductive emitter driven by a 400 kHz Yb-laser amplifier, achieving 107 dB dynamic range and 3 THz bandwidth, highlighting advancements in scalable, high-power THz generation.

**Oral** CC-2.3 16:30 ICM - Room 13b

**Cavity-Enhanced THz Generation via Optical Rectification of Ytterbium Ultrafast Lasers** — •Francesco Canella[1], Edoardo Suerra[2,3], Dario Giannotti[4,3], Mohsen Khalili[5], Yicheng Wang[5], Kore Hasse[6], Sergiy Suntsov[6], Detlef Kip[6], Clara Saraceno[5], Simone Cialdi[2,3], and Gianluca Galzerano[1,3] — [1]Istituto di Fotonica e Nanotecnologie - Consiglio Nazionale delle Ricerche, Milan, Italy — [2]Dipartimento di Fisica, Università degli Studi di Milano, Milan, Italy — [3]Istituto Nazionale di Fisica Nucleare, Sezione di Milano, Milan, Italy — [4]Dipartimento di Fisica, Politecnico di Milano, Milan, Italy — [5]Photonics an Ultrafast Laser Science (PULS), Ruhr-Universität Bochum, Bochum, Germany — [6]Experimental Physics and Material Sciences, Helmut-Schmidt-Universität, Hamburg, Germany

We demonstrated mW-level THz pulse generation via 1.9-kW-average-power optical rectification in a 50-$\mu$m lithium niobate plate inside a passive cavity. Cavity-enhanced optical rectification paves the way for novel hundred-MHz repetition rate THz sources and applications.

**Oral** CC-2.4 16:45 ICM - Room 13b

**Broadband, High-power and High Repetition Rate Terahertz Time-Domain Spectrometer Based on Organic Crystal MNA** — •Samira Mansourzadeh[1], Tim Vogel[1], Alan Omer[1], Megan F. Biggs[2], Enoch S.-H Ho[2], Claudius Hoberg[3], David J. Michaelis[2], Martina Havenith[3], Jeremy A. Johnson[2], and Clara J. Saraceno[2] — [1]Photonics and Ultrafast Laser Science (PULS), Ruhr-University Bochum, Bochum, Germany — [2]Department of Chemistry and Biochemistry, Brigham Young University, Provo, USA — [3]Faculty of Chemistry and Biochemistry, Ruhr-University Bochum, Bochum, Germany

We present a THz-TDS providing a high average power of 11 mW at high rep-

etition rate of 100 kHz, which significantly reduces the measurement time for linear spectroscopy at a high bandwidth of 9 THz.

**Oral** CC-2.5 17:00 ICM - Room 13b

**Effect of cumulative gas hydrodynamics on two-colour air-plasma terahertz sources at high repetition rates up to 100 kHz** — •Robin Löscher[1], Malte C. Schroeder[1], Tim Vogel[1], Alan Omar[1], Adam Hasso[2], Claudius Hoberg[2], Martina Havenith[2], and Clara J. Saraceno[1,3] — [1]Photonics and Ultrafast Laser Science, Ruhr-Universität Bochum, Bochum, Germany — [2]Department of Physical Chemistry II, Ruhr-Universität Bochum, Bochum, Germany — [3]Research Center Chemical Science and Sustainability, University Alliance Ruhr, Bochum, Germany

We study repetition-rate scaling of air-plasma THz sources up to 100kHz, demonstrating a correlation between gas-density depletion and yield. At 100kHz, 2.8mW of average power is achieved with minimal efficiency reduction of ~20%.

**Oral** CC-2.6 17:15 ICM - Room 13b

**Controlling the polarization state of plasma-induced THz waves** — •Ihar Babushkin[1,2,3], Virgilijus Vaićaitis[4], Ayhan Demircan[1,2], Stefan Skupin[5], Luc Bergé[6], and Uwe Morgner[1,2] — [1]Leibniz University Hannover, Hannover, Germany — [2]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering – Innovation Across Disciplines), Hannover, Germany — [3]Max Born Institute, Berlin, Germany — [4]Vilnius University, Vilnius, Lithuania — [5]Institut Lumière Matière, Villeurbanne, France — [6]Université de Bordeaux–CNRS–CEA, Talence, France

We propose controlling the polarization state of plasma-induced terahertz pulses by adapting multi-color pump drivers. We demonstrate a linear "ellipticity chirp" of the THz polarization, with strong sensitivity on the attosecond ionization dynamics.

## CH-9: Innovative Approaches in Microscopy and Imaging

Chair: Federico Vernuccio, Aix Marseille University - CNRS - Institut Fresnel, Marseille, France

Time: Wednesday, 16:00–17:30 Location: ICM - Room 14a

**Invited** CH-9.1 16:00 ICM - Room 14a

**Polarization-Sensitive Single-Object Microscopy Reveals the Structure of a Synthetic Light-Harvesting Complex** — •Maxim S. Pshenichnikov, Alexey V. Kuevda, Mónica K. Espinoza Cangahuala, Richard Hildner, and Thomas L.C. Jansen — Zernike Institute for Advanced Materials, University of Groningen, Groningen, Netherlands

By combining advanced polarization-resolved wide-field photoluminescence microscopy on single objects with theoretical analysis, we resolve the long-standing debate surrounding two competing molecular packing models for the structure of a synthetic light-harvesting complex.

**Oral** CH-9.2 16:30 ICM - Room 14a

**Microscopic magnetic field imaging with hot atoms** — Jordan Brass, Sebastian J. B. Bisdee, Mohammed T. Rasheed, Carrie Weidner, and •Cyril Torre — Quantum Engineering Technology Labs, University of Bristol, Bristol, United Kingdom

The spatial resolution from atom-based magnetometers is currently limited by the size of the sensor. Here, we propose to combine single-pixel imaging techniques with an optically pumped magnetometer to experimentally demonstrate microscopic magnetic field imaging.

**Oral** CH-9.3 16:45 ICM - Room 14a

*withdrawn*

**Oral** CH-9.4 17:00 ICM - Room 14a

**Imaging the reflection phase of nanophotonic structures** — •Niels F.L. Alferink[1], Melissa J. Goodwin[1], Victor Barolle[2], Paul Balondrade[2], Alexandre Aubry[2], Ad Lagendijk[1], and Willem L. Vos[1,2] — [1]Complex Photonic Systems, University of Twente, Enschede, Netherlands — [2]Institute Langevin, ESPCI Paris, PSL University, Paris, France

Since typical reflectivity studies collect intensities, we initiate 2D position-resolved interferometry to obtain phase. On gold pads and thin 3D opal photonic crystals we obtain reproducible phase steps, revealing steps even between different crystal orientations.

**Oral** CH-9.5 17:15 ICM - Room 14a

**High-NA 2D image edge detection using Tamm plasmon polaritons in few-layer stratified media** — •Bernardo S. Dias and Jorik van de Groep — Van der Waals-Zeeman Institute, Institute of Physics, University of Amsterdam, Amsterdam, Netherlands

We demonstrate how a very simple 7-layer thin-film stack provides dual-channel, high efficiency, polarization-independent 2D image edge detection with a numerical aperture approaching 0.9 by leveraging the intrinsic properties of Tamm Plasmon Polariton resonances.

## CK-7: Silicon Nitrides Systems and Devices

Chair: Christian Grillet, CNRS researcher, INL-Ecole Centrale de Lyon, France

Time: Wednesday, 16:00–17:30 Location: ICM - Room 14b

**Oral** CK-7.1 16:00 ICM - Room 14b

*withdrawn*

**Oral** CK-7.2 16:15 ICM - Room 14b

*withdrawn*

**Oral** CK-7.3 16:30 ICM - Room 14b

**Perfectly Vertical Coupling with High-Efficiency Bi-Layer Grating Coupler for Thin Film SiN Technology** — •Anna Pennoni[1], Francesca di Croce[1], Valerio Vitali[1,2], Thalia Domínguez Bucio[2], Hao Liu[2], Ilaria Cristiani[1], Frederic Gardes[2], Periklis Petropoulos[2], and Cosimo Lacava[1] — [1]Electrical, Computer and Biomedical Engineering Department, University of Pavia, Pavia, Italy — [2]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

We experimentally demonstrate a bi-layer grating coupler composed of a silicon-rich silicon nitride apodized grating on a thin-film silicon nitride waveguide, achieving perfectly vertical coupling with a record measured coupling efficiency of -1.8 dB.

**Oral** CK-7.4 16:45 ICM - Room 14b

**Low-Loss Strip-Loaded SiN Waveguides on Engineered AlN for Quantum Photonic Applications** — •Francesco Conidi, Ajeethkumar Rengarajan, Francesco Mattioli, Francesco Martini, and Alessandro Gaggero — CNR-IFN, Rome, Italy

We demonstrate a Si3N4 strip-loaded aluminum nitride (AlN) waveguide with low propagation losses. Engineering the AlN Pockels tensor we improve the electro-optic response, allowing the integration on-chip of Mach-Zehnder interferometers and non-classical light-sources.

**Oral** CK-7.5 17:00 ICM - Room 14b

**Negative Kerr contribution on hybrid SiN-CNTs waveguides** — •Adrian Bartolo[1], Zijun Xiao[2], Mikhail Dyatlov[1,2], Elena Duran-Valdeiglesias[2], Justine Brundu[1], Samuel Serna[2,4], Alejandro Giacomotti[1], Arianna Filoramo[3], Laurent Vivien[2], and Nicolas Nicolas[1] — [1]LP2N, Institut d'Optique Graduate School, Université de Bordeaux, 33400 Talence, France — [2]C2N, Université Paris-Saclay, 91120 Palaiseau, France — [3]IRAMIS Institut, Centre CEA Paris-Saclay, 91191 Gif-sur-Yvette, France — [4] Bridgewater State University, Bridgewater, USA

We report the first demonstration of hybrid SiN-CNT waveguides with a negative nonlinear refractive index, highlighting CNTs' chirality-dependent properties and their potential to simplify dispersion control for advanced broadband photonic applications

**Oral** CK-7.6 17:15 ICM - Room 14b

**Integrated Wavemeter with 8 Mach-Zehnder Interferometers for the Near-IR Range with Picometer Accuracy** — •Tunahan Gök[1,2], Jashanpreet Kaur[2], Piotr Cegielski[3], Avinash Kumar[1,2], Stephan Suckow[2], Alexander Eras[4], Christian Nölleke[4], and Max C. Lemme[1,2] — [1]Chair of Electronic Devices, RWTH Aachen University, Otto-Blumenthal-Str. 25, 52074, Aachen, Germany — [2]AMO GmbH, Advanced Microelectronic Center Aachen, Otto-Blumenthal-Str. 25, 52074, Aachen, Germany — [3]Now with: Infineon Technologies AG, Am Campeon 1-15, 85579, Neubiberg, Germany — [4]TOPTICA Photonics AG, Lochhamer Schlag 19, 82166, Gräfelfing, Germany

We demonstrate an integrated broadband wavemeter achieving a mean wavelength determination accuracy of 0.16 pm in the wavelength range from 940 nm to 970 nm and 0.78 pm from 1010 nm to 1100 nm.

## ED-4: Dual Comb Spectroscopy and Sources

Chair: Markku Vainio, University of Helsinki, Helsinki, Finland

Time: Wednesday, 16:00–17:30 Location: ICM - Room Osterseen

**Oral** ED-4.1 16:00 ICM - Room Osterseen

**Dual-comb modelocked Er:Yb:glass oscillator at 500 MHz** — •Justinas Pupeikis[1,2], Benjamin Willenberg[1,2], Moritz Seidel[1], Marco Gaulke[1], Matthias Golling[1], and Ursula Keller[1] — [1]ETH Zurich, Zurich, Switzerland — [2]K2 Photonics AG, Zurich, Switzerland

We achieved dual-comb modelocked Er:Yb:glass oscillator at 500 MHz repetition rate and applied it for coherent dual-comb spectroscopy measurement.

**Oral** ED-4.2 16:15 ICM - Room Osterseen

**Dual-optical frequency comb generation for gas spectroscopy using a single gain-switched externally-injected semiconductor laser** — Laura Monroy[1], Alejandro Rosado[2,3], Clara Quevedo-Galán[4], •Pablo López-Querol[4], Antonio Pérez-Serrano[4], José Manuel G. Tijero[4], and Ignacio Esquivias[4] — [1]Electronics Technology Department, Universidad Carlos III de Madrid, Leganes, Spain — [2]Photonics Systems and Sensing Lab, School of Electronic Engineering, Dublin City University, Dublin, Ireland — [3]CONNECT Research Centre, Dunlop Oriel House, Trinity College Dublin, Dublin, Ireland — [4]CEMDATIC - E.T.S.I. Telecomunicación, Universidad Politécnica de Madrid, Madrid, Spain

This study presents a novel architecture for dual-comb spectroscopy by using a single gain-switched, externally-injected laser diode to generate two optical frequency combs, reducing system complexity, costs and instabilities between independent laser sources.

**Invited** ED-4.3 16:30 ICM - Room Osterseen

**Real-time squeezed dual-comb spectroscopy** — •Mathieu Walsh[1], Molly Kate Kreider[2,3], Daniel I. Herman[2,4], Matthew Heyrich[2,3], Scott A. Diddams[2,3], and Jérôme Genest[1] — [1]Centre d'Optique, Photonique et Laser, Université Laval, Quebec, Canada — [2]Department of Electrical, Computer and Energy Engineering, University of Colorado Boulder, Boulder, USA — [3]Department of Physics, University of Colorado Boulder, Boulder, USA — [4]present address: Sandia National Laboratories, Albuquerque, USA

Quantum noise reduction is demonstrated for long averaging time (>100 s) in a real-time squeezed dual-comb spectroscopy measurement. The quantum advantage is preserved up to the systematic error floor reached at 100 s of averaging time.

**Oral** ED-4.4 17:00 ICM - Room Osterseen

**THz spectroscopy using a free-running dual-comb fiber laser** — •Yoshiaki Nakajima[1], Takumi Takahoshi[1], Ryusei Uchiyama[1], Naoki Takeshi[1], Toshiyuki Miyazaki[1], Kousuke Kubota[1], and Takeshi Yasui[2] — [1]Toho University, Funabashi, Japan — [2]Institute of Post-LED Photonics, Tokushima, Japan

We developed a compact and practical terahertz spectroscopy system using asynchronous optical sampling with a mechanically shared dual-comb fiber laser. This streamlined system successfully and efficiently measured the transmission spectrum of a Si-plate.

**Oral** ED-4.5 17:15 ICM - Room Osterseen

**Polarization-Multiplexed Erbium Single-Cavity Dual Comb and Detection of Carbon Monoxide** — Collin Aldia Pulickal Edwin[1,2], Jiayang Chen[1,3], Jonas K C Ballentin[1], Lukas W Perner[4], and •Oliver H Heckl[1] — [1]Optical Metrology Group, Faculty of Physics, University of Vienna, Boltzmanngasse 5, 1090, Vienna, Austria — [2]University of Vienna, Vienna Doctoral School in Physics, Boltzmanngasse 5, 1090, Vienna, Austria — [3]State Key Laboratory of Precision Measurement Technology and Instruments, Department of Precision Instrument, Tsinghua University, 100084, Beijing, China — [4]Laboratoire Temps-Fréquence, Institut de Physique, Université de Neuchâtel, Avenue de Bellevaux 51, 2000, Neuchâtel, Switzerland

We propose a compact, robust, and reliable single-cavity dual-comb system using polarization-multiplexing. It offers long-term stability, dynamic repetition rate tuning, and off-the-shelf components, making it ideal for field-deployable spectroscopy applications.

## CA-6: Visible, UV and Deep-UV Solid-State Lasers

Chair: Pavel Loiko, University of Caen Lower Normandy, Caen, France

Time: Wednesday, 16:00–17:30 Location: Hall A1 - Room A12

**Oral** CA-6.1 16:00 Hall A1 - Room A12

**60W continuous-wave diamond Raman laser in the visible** — •Adam Sharp, Hadiya Jasbeer, Richard Pahlavani, Ondrej Kitzler, David Spence, and Richard Mildren — Macquarie University, Sydney, Australia

We present an intra-cavity frequency-doubled diamond Raman laser that generates up to 60 W at 607 nm, with a conversion efficiency of 28%, and operates without isolators in the pump beam path.

**Oral** CA-6.2 16:15 Hall A1 - Room A12

**Ultra-low-noise diamond Raman lasers with enhanced linewidth narrowing** — •Zhenxu Bai[1,2], Hui Chen[1,2], Wenqiang Fan[1,2], Zhongan Zhao[1,2], Yulei Wang[1,2], and Zhiwei Lu[1,2] — [1]Center for Advanced Laser Technology, Hebei University of Technology, Tianjin, China — [2]Collaborative Innovation Center for Diamond Laser Technology and Applications, Tianjin, China

We developed an ultra-low-noise diamond Raman laser with over twofold linewidth compression and three orders of magnitude noise reduction, highlighting its exceptional potential for high-performance, ultra-stable, narrow-linewidth laser applications.

**Oral** CA-6.3 16:30 Hall A1 - Room A12

**Towards Stable, Low-Phase-Noise, and Multi-Watt Single Frequency Diamond Lasers in the Visible** — Osama Terra[1], Adam Sharp[1], Jipeng Lin[2], Tiago Ortega[2], and •Richard P. Mildren[1] — [1]Macquarie University, Sydney, Australia — [2]EOS Space Systems Pty. Ltd., Symonston, Australia

Here, we report our recent achievement toward seamless single-frequency operation at high-power of diamond Raman lasers at the yellow (589 nm) with its phase noise-cleaning mechanism that surpasses that of the traditional Brillouin lasers.

**Oral** CA-6.4 16:45 Hall A1 - Room A12

**Frequency conversion to the DUV in all-type-1 phase matched LBO crystals** — •Christian Schmittner[1], Christoph Röcker[1], Florian Bienert[1], André Loescher[1], Alexandre Dobroc[2], Denis Balitski[2], Dominique Lupinski[2], Thomas Graf[1], and Marwan Abdou Ahmed[1] — [1]Institut für Strahlwerkzeuge, Univ. Stuttgart, Stuttgart, Germany — [2]Cristal Laser, Messein, France

We present an approach to convert IR laser radiation to high-power DUV radiation using all-type-I phase-matched LBO crystals, purely undepleted pump fields, and with group-delay compensation between the pump pulses of the FoHG process.

**Oral** CA-6.5 17:00 Hall A1 - Room A12

**Power scaling approach for visible lasers based on multi-axial mode external resonant second harmonic generation** — •Manuel Alessandro Medina, Sahar Alidousti, Callum McEwan, and William Andrew Clarkson — University of Southampton, Southampton, United Kingdom

We demonstrate a multi-axial mode approach for external resonant SHG to achieve scalable green laser emission, overcoming SBS limitations in fibre amplifiers. Preliminary experiments yielded 15 W of green output, with optimization promising >100 W.

**Oral** CA-6.6 17:15 Hall A1 - Room A12

**Generation of High-Energy Laser Pulses at 266 nm with Sub-Nanosecond Pulse Duration and 20 Hz Repetition Rate** — •Kenichi Hirosawa[1], Nobuo Ohata[1], Hideho Odaka[2,3], Arvydas Kausas[2,3], Vincent Yahia[3,2], and Takunori Taira[2,3] — [1]Mitsubishi Electric Corporation, Kamakura, Japan — [2]RIKEN SPring-8 Center, Sayo-gun, Japan — [3]Institute for Molecular Science, Okazaki, Japan

We developed a high-energy UV laser system using LBO crystals, achieving 266 nm DUV pulses with a maximum pulse energy of 111 mJ and peak power of 190 MW at a 20 Hz repetition rate.

## CE-9: Photodetectors and Emitters

Chair: Maria Kandyla, NHRF, Greece

Time: Wednesday, 16:00–17:30 Location: Hall B1 - Room B11

**Oral** CE-9.1 16:00 Hall B1 - Room B11

**Monolayer-Thick GaN/AlN Quantum Well Anodes and Far-UVC Field Emission Device at 226 nm** — •Dmitri Boiko[1], Pierre Demolon[2], Jean-François Carlin[2], Emma Eriksson[3], Arno Hoogerwerf[1], Kevin Bach Gravesen[4], Asger Brimnes Gardner[4,5], Marc-Alexander Dubois[1], Peter Tønning[4], Emil Zanchetta Ulsig[4,5], Mercedes Marin[4], Johan Tingsborg[3], Nicolas Volet[4,5], and Nicolas Grandjean[2] — [1]CSEM SA, Neuchâtel, Switzerland — [2]EPFL, Lausanne, Switzerland — [3]PureFize Technologies AB, Uppsala, Sweden — [4]UVL A/S, Åbyhøj, Denmark — [5]Aarhus University, Aarhus N, Denmark

We report on unique features of shallow GaN/AlN quantum wells enabled demonstration of field emission device for human-safe disinfection with a record external quantum efficiency of 18% and superior reliability as compared to far-UVC LEDs.

**Oral** CE-9.2 16:15 Hall B1 - Room B11

**Electrochemical Etching for Seamless Micro-Transfer Printing of InGaN LEDs** — •Mikołaj Chlipała[1], Konstantinos Akritidis[2,3], Iryna Levchenko[1], Krzysztof Gibasiewicz[1], Tara Brstilo[1], Maximilien Billet[2], Pol Van Dorpe[3], Natalia Fiuczek[1], Marta Sawicka[1], Bart Kuyken[2], and Henryk Turski[1,4] — [1]Institute of High Pressure Physics Polish Academy of Sciences, Warsaw, Poland — [2]Photonics Research Group, INTEC Department, Ghent University - imec, Ghent, Belgium — [3]IMEC, Leuven, Belgium — [4]School of Electrical and Computer Engineering, Cornell University, Ithaca, USA

This study demonstrates the fabrication of ultra-thin GaN-based LEDs on a bulk substrate using molecular beam epitaxy, electrochemical etching to undercut LEDs, and micro-transfer printing achieving high-quality device integration onto foreign substrates without performance degradation.

**Oral** CE-9.3 16:30 Hall B1 - Room B11

**Black Quartz for Infrared Photodetection** — •Raffaele De Palo[1], Annalisa Volpe[1,2], Pietro Patimisco[1,3], Andrea Zifarelli[1], Angelo Sampaolo[1,3], Antonio Ancona[1,2], and Vincenzo Spagnolo[1,3] — [1]Dipartimento Interateneo di Fisica, Polytechnic of Bari & University of Bari, Bari, Italy — [2]Institute for Photonics and Nanotechnologies, National Research Council of Italy, Bari, Italy — [3]PolySense Innovations srl, Bari, Italy

This work proposes a method for modify quartz optical absorption by localized superficial texturing performed using a femtosecond laser. This approach was proved successful in the infrared range where quartz is employed as photoactive medium.

**Oral** CE-9.4 16:45 Hall B1 - Room B11

**Nanostructured Organic Photodetectors for Differential Measurements** — •Jan Schardt and Martina Gerken — Kiel University, Factulty of Engineering, Chair for Integrated Systems and Photonics, Kiel, Germany

Organic photodetectors (OPDs) with laterally nanostructured gratings enable wavelength-selective sensing. By integrating OPDs with varying grating periods beneath the same active layers, background noise is eliminated, enhancing sensitivity for targeted spectral regions in sensing applications.

**Oral** CE-9.5 17:00 Hall B1 - Room B11

**Self-driven and High-Performance Photodetector Based on Topological Insulator BiSb/Si Heterojunction for Visible Light Communication** — •Hongguang Sun[1,2], Zhao Ye[1], Ying Qiu[2], Jin Tao[2], and Qiuyun Fu[1] — [1]Engineering Research Center for Functional Ceramics of Ministry of Education, School of Integrated Circuits, Huazhong University of Science and Technology, wuhan, China — [2]State Key Laboratory of Optical Communication Technologies and Networks, China Information Communication Technologies Group Corporation (CICT), wuhan, China

A self-driven and high-performance photodetector based on BiSb/silicon heterostructure is firstly demonstrated, especially achieving excellent detectivity of 1.81×1014 Jones, which is due to the high electron mobility and low dark current of BiSb.

**Oral** CE-9.6 17:15 Hall B1 - Room B11

**Towards the realization of smart windows for joint solar energy harvesting and visible light communication** — Marco Meucci[1,2], Mauro Aresti[1,2], Ali Umair[1,2], Francesco Bruni[3], Francesco Meinardi[3,4], Sergio Brovelli[3,4], and •Jacopo Catani[1,2] — [1]Istituto Nazionale di Ottica del CNR (CNR-INO), Sesto Fiorentino, Italy — [2]European Laboratory for Nonlinear Spectroscopy (LENS), sesto fiorentino, Italy — [3]Università di Milano Bicocca, Milano, Italy — [4]Glass to Power spa, Rovereto, Italy

We report on a quantum-dot based, large-area fluorescent concentrator for joint solar energy harvesting and visible light communication (VLC), assessing its VLC performances in a realistic scenario, towards hybrid devices for future smart buildings.

## CH-P: CH Poster Session

Time: Wednesday, 13:00–14:00 Location: Hall B0

CH-P.1 13:00 Hall B0

*moved to CH-13.1*

CH-P.2 13:00 Hall B0

**Ultra-Wideband Portable MEMS FTIR Spectrometer towards the MIR Spectral Fingerprint Region** — •Mazen Erfan[1,2], Mohamed G. Mahmoud[3], Kirollos E. Matta[1,4], Mohamed A. Mousa[1], Ahmed S. Kishka[3], Islam Samir[2,3], Mohamed H. Al Haron[3], Mina Gad[3], Bassem Mortada[3], Tarik Bourouina[1,4], and Yasser M. Sabry[2,3] — [1]Si-Ware Systems SAS, Paris, France — [2]Faculty of Engineering, Ain-Shams University, Cairo, Egypt — [3]Si-Ware Systems, Cairo, Egypt — [4]ESYCOM Lab, UMR 9007 CNRS, Univ Gustave Eiffel, Marne-la-Vallée, France

This work presents a compact ultra-wideband MEMS FTIR spectrometer cover-

ing 5700 cm-1 to 1160 cm-1 (1.75 - 8.6 $\mu$m) with a spectral resolution of 50 cm-1 enabling analysis in the fingerprint region.

CH-P.3 13:00 Hall B0

*withdrawn*

CH-P.4 13:00 Hall B0

**Aperture-less stimulated Raman photothermal microscopy in epi-configuration** — •Kristin Wallmeier[1], Nick S. Lemberger[1], and Carsten Fallnich[1,2] — [1]Institute of Applied Physics, University of Münster, Münster, Germany — [2]Cells in Motion Interfaculty Centre, University of Münster, Münster, Germany

Aperture-less photothermal microscopy in epi-configuration is presented with stimulated Raman scattering (SRS), enabling a 7-times improved contrast compared to normal epi-SRS with keeping chemical selectivity and thereby improving inspection of non-transmissive samples.

CH-P.5 13:00 Hall B0

*moved to CH-7.5*

CH-P.6 13:00 Hall B0

*withdrawn*

CH-P.7 13:00 Hall B0

**Affordable High-Frequency Interrogation of Optical Fiber Speckle Sensors with Event-Based Cameras** — Tomás Lopes[1,2], Joana Teixeira[1,2], •Catarina S. Monteiro[1,2], Tiago D. Ferreira[1,2], and Nuno A. Silva[1,2] — [1]INESC TEC - Institute for Systems and Computer Engineering, Technology and Science, Porto, Portugal — [2]Department of Physics and Astronomy, Faculty of Sciences, University of Porto, Porto, Portugal

Speckle-based fiber sensors are known for their sensitivity but are typically constrained by camera frame rates and dynamic range. In this presentation, we demonstrate the potential of event-based cameras for high-speed interrogation of speckle-based sensors.

CH-P.8 13:00 Hall B0

**Scalable High-Fidelity Photon Detection Using a 20-Channel Spatially-Multiplexed SNSPD Array** — •Oliver P. Page, Iurii Konyshev, Kilian Welz, Wolfram Pernice, and Simone Ferrari — Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany

Our 20-channel spatially-multiplexed SNSPD array enables accurate photon-number resolution with high efficiency and low jitter, addressing photonic quantum computing and metrology challenges. This scalable design supports advanced quantum technologies and progresses towards a 100-channel photon-number-resolving detector.

CH-P.9 13:00 Hall B0

**Mesoscopic Theory of Wavefront Shaping to Focus Waves Deep inside Disordered Opaque Media** — Bart A. van Tiggelen[1], Ad Lagendijk[2], and •Willem L. Vos[1,2,3] — [1]Université Grenoble Alpes, Centre National de la Recherche Scientifique (CNRS), Laboratoire de Physique et de Modélisation des Milieux Condensées (LPMMC), 38000 Grenoble, France — [2]Complex Photonic Systems (COPS), MESA+ Institute, University of Twente, 7500 AE Enschede, Netherlands — [3]Institut Langevin, ESPCI Paris, PSL University, CNRS, 75005 Paris, France

We describe a mesoscopic theory of wavefront shaping to focus waves to a predefined focal point deep inside disordered 3D opaque media by shaping N different external field sources, and invoking time-reversal physics.

CH-P.10 13:00 Hall B0

**Optical detection of single sub-15 nm objects using elastic scattering strong coupling** — •MohammadReza Aghdaee and Oluwafemi S. Ojambati — Faculty of Science and Technology, MESA+ Institute for Nanotechnology, University of Twente, Enschede, Netherlands

We demonstrate a strong coupling of elastic scattering between a nano-object and a plasmonic nanocavity. This approach allows us to detect individual objects with diameters down to 1.8 nm inside the nanocavity.

CH-P.11 13:00 Hall B0

**Multidimensional fluorescence spectroscopy for chemical chromatography** — Hans-Peter Loock[1], Monique Bueno[1], Travis Ferguson[1], •Sarah Klose[1], and Adam Bernicky[2] — [1]University of Victoria, Victoria, Canada — [2]National Research Council, Ottawa, Canada

We present a 5000-fold faster version of the fluorescence Excitation Emission Matrix spectroscopic technique and its application to common chemical separation techniques such as Capillary Electrophoresis (CE) and high-performance liquid chromatography (HPLC).

CH-P.12 13:00 Hall B0

**Generation and Detection of Optoacoustic Waves in Liquids by the Photothermal Lens Technique** — Eduardo V. Bergmann[1], •Gustavo V. B. Lukasievicz[2,3], Bernhard Lendl[3], Anderson R. Sampaio[1], Vitor S. Zanuto[1], Mauro L. Baesso[1], Luis C. Malacarne[1], and Nelson G. C. Astrath[1,3] — [1]Departamento de Física, Universidade Estadual de Maringá, Maringá, Brazil — [2]Departamento de Física, Universidade Tecnológica Federal do Paraná, Medianeira, Brazil — [3]Institute of Chemical Technologies and Analytics, Tu Wien, Vienna, Austria

Pulsed laser excitation is used to generate thermo-acoustic waves in liquids that are detected using the photothermal lens technique. This method can be used to determine a complete set of physical properties of liquid samples.

CH-P.13 13:00 Hall B0

**Simultaneous Multichannel A-Scans in Photonic Time Stretch OCT** — Weiqing Liao[1,2], •Shouju Liu[1], and Chao Wang[1] — [1]University of Kent, Canterbury, United Kingdom — [2]Hebei University, Baoding, China

We propose a high-throughput photonic time-stretch OCT system using frequency-division multiplexing for simultaneous multichannel A-scans. Experiments demonstrate ultrafast imaging of spinning objects, validating its capability for high-speed, multi-layer imaging applications.

CH-P.14 13:00 Hall B0

**Extreme Amplification in Ultrasensitive Interferometric Phase Metrology** — Andreu Molina García, Adolfo Esteban Martín, José Ángel Picazo Bueno, Fernando Silva, •Javier García Monreal, and Germán J. de Valcárcel — Optics Department, Universitat de València, València, Spain

We report extreme amplification of phase variations in the range of several hundreds, which can have important implications in measuring tiny displacements.

CH-P.15 13:00 Hall B0

**Laser Machining of Micro-channels in Hollow-core Optical Fibers for Improved Gas Exchange** — Timothy Lee, •Andres M. Biondi V., Thomas W. Kelly, Ian A. Davidson, Radan Slavik, Natalie V. Wheeler, and Martynas Beresna — Optoelectronics Reserach Centre, Univeristy of Southampton , Southampton , United Kingdom

Femtosecond laser ablation is adapted for developing distributed gas sensors on hollow-core fibre (HCFs) platform. This study presents a novel multi-step ablation technique for precise, and scalable micro-channel fabrication, improving gas exchange flow in HCF.

CH-P.16 13:00 Hall B0

**Integrated UV-C source-sensor platform based on efficient ultrafast fourth harmonic generator and two-dimensional sensor** — •Tim Klee[1], Benjamin T. Dewes[2], Nathan D. Cottam[2], Joseph J. Broughton[1], Mustaqeem Shiffa[2], Tin S. Cheng[2], Sergei V. Novikov[2], Oleg Makarovsky[2], Amalia Patané[2], and John W. G. Tisch[1] — [1]Imperial College London , London, United Kingdom — [2]University of Nottingham, Nottingham, United Kingdom

An efficient fourth harmonic generator is demonstrated for ultrafast NIR lasers achieving 20% conversion efficiency at 256 nm. Using this UV-C source, we investigate the photoresponse of a 55 nm thick GaSe sensor.

CH-P.17 13:00 Hall B0

**Random temporal signals (RATS) method for measuring high-reflectance coatings via a cavity ring-down configuration** — •Jiří Junek and Karel Žídek — Institute of Plasma Physics of the CAS,TOPTEC, Prague 8, Czech Republic

We present the novel time-resolved method RATS implemented for cavity ring-down spectroscopy for high-reflectance coatings characterization. We outline the benefits of the RATS approach, which yields time-effective characterization with unmatched simplicity and precision.

CH-P.18 13:00 Hall B0

**AI-Enabled Optical Inspection of Microoptics Integration with Photonic MEMS Chips for Wideband FTIR Spectroscopy** — Ali Khater[1], Ahmed Abdelkhalek[1], Mohamed Metwally[1], Omar El Nahhas[1], Mohamed Ismail[1], Hoda El Gibally[1], Ahmed Mostafa[1], •Mazen Erfan[2,3], Mohamed H. Al Haron[1], Bassem Mortada[1], Momen Anwar[1], and Yasser M. Sabry[1,3] — [1]Si-Ware Systems, Cairo, Egypt — [2]Si-Ware Systems SAS, Paris, France — [3]Faculty of Engineering, Ain-Shams University, Cairo, Egypt

An AI-enabled optical inspection method is presented for microoptics integration in MEMS-based FTIR spectrometers. Optical imaging and deep learning are combined, achieving 100% precision and 96% recall in alignment assessment and defect detection.

CH-P.19 13:00 Hall B0

**Quantitative Schlieren Xray tomography for the 3D determination of chemical and sturctural composition of batteries** — •Herve Hugonnet[1,2], KyeoReh Lee[1,2], Jo Sugeun[3], Jun Lim[3], and Park YongKeun[1,2] — [1]Department of Physics, Korea Advanced Institute of Science and Technology, daejeon, South Korea — [2]KAIST Institute for Health Science and Technology, daejeon, South Korea — [3]Pohang Accelerator Laboratory, Pohang, South Korea

A new setup akin to schlieren imaging is developped to measure the spectral phase and intensity of Xrays. Using tomography, 3D images providing chemical composition and high-resolution structural information are obtained.

CH-P.20 13:00 Hall B0

*withdrawn*

CH-P.21 13:00 Hall B0

**Extending the limits of multi-core fiber-based confocal microscopy for sub-nanometer optical sensing** — •Kian M.M. Goeloe[1] and Lyubov V. Amitonova[1,2] — [1]Advanced Research Center for Nanolithography, Amsterdam, Netherlands — [2]Vrije Universiteit Amsterdam, Amsterdam, Netherlands

Extending the capabilities of multi-core fiber-based confocal microscopy, by combining it with advanced computational techniques, aspiring to push beyond the diffraction limit and increase the information yield using multimode fibers.

CH-P.22 13:00 Hall B0

**Cross-talk Simulation for an FBG-Based Underwater Acoustic Sensor Array Using VPI Photonics** — •Omer Faruk Dinc[1], Faruk Uyar[1,2], Tolga Kartaloglu[1], Ekmel Ozbay[1,2,3], and Ibrahim Ozdur[4] — [1]Nanotechnology Research Center, Bilkent University, Ankara, Turkey — [2]Department of Electrical and Electronics Engineering, Ankara, Turkey — [3]Department of Physics, Bilkent University, Ankara, Turkey — [4]Department of Electrical and Electronics Engineering, TOBB University of Economics and Technology, Ankara, Turkey

This study investigates cross-talk in ultra-weak fiber Bragg grating (UWFBG) arrays using VPI Photonics simulations. Results show cross-talk increases with sensor count and reflectivity, achieving system consistency of 98% (1% reflectivity), 97% (2%), and 93% (3%).

CH-P.23 13:00 Hall B0

**Compressive Ghost Imaging with Customized Speckles** — •Elif Sünnetci, Hakan Alıcı, Abdullah Serhan Başdemirci, and Hasan Yılmaz — UNAM – Institute of Materials Science and Nanotechnology, Bilkent University, Ankara, Türkiye

We demonstrate compressive ghost imaging using customized speckle patterns, achieving reduced illuminations for sparse object reconstruction and enhanced resolution. These patterns outperform standard Rayleigh speckles, enabling high-resolution imaging in complex scattering environments.

CH-P.24 13:00 Hall B0

**Microring Resonator based Force Sensor, with Real-time Temperature-induced Resonance Shift Cancellation** — •Sahar Safarloo, Wouter Westerveld, Peter G. Steeneken, Amir A. Zadpoor, and Mohammad J. Mirzaali — Delft University of Technology, Delft, Netherlands

We present a silicon photonic microring resonator-based force sensor with real-time temperature-induced resonance shift cancellation. The device achieves 115 pm/$\mu$N sensitivity, enabling precise vertical force measurements, paving the way for biomedical and industrial applications.

CH-P.25 13:00 Hall B0

**Miniature Mid-IR Spectrometer Based on a Ge-Si Photonic Integrated Circuit and a Linear Detector Array for Trace Gas Detection** — •Filip Łabaj[1,2], Jerzy Kalwas[1], Stanisław Stopiński[1,2], Krzysztof Anders[1,2], Rafał Ciechański[1], Krzysztof Machałowski[1], and Ryszard Piramidowicz[1,2] — [1]VIGO Photonics S.A., Ożarów Mazowiecki, Poland — [2]Institute of Microelectronics and Optoelectronics, Warsaw University of Technology, Warsaw, Poland

We discuss development of a spectrometer operating in the 3-12 $\mu$m spectral region. The system is based on a photonic integrated circuit (PIC), realized using the Ge-on-Si MIRPIC platform, coupled with a linear detector array.

CH-P.26 13:00 Hall B0

*withdrawn*

CH-P.27 13:00 Hall B0

**Efficient production of photon bunching from laser light for rangefinding** — •Darren Ming Zhi Koh[1], Xi Jie Yeo[1], Christian Kurtsiefer[1,2], and Peng Kian Tan[1] — [1]Center for Quantum Technologies, Singapore, Singapore — [2]Department of Physics, National University of Singapore, Singapore, Singapore

We present a technique to generate photon bunching from coherent light with a conversion efficiency of -7dB compared to -100dB using existing methods. We also perform rangefinding with this light at a distance of 168m.

CH-P.28 13:00 Hall B0

*withdrawn*

CH-P.29 13:00 Hall B0

**3D-printed assembly including micro-optics for efficient direct light coupling** — •Muhammad Shaukat Khan, Ivan Shishkin, Ali Roshanghias, and Andreas Tortschanoff — Silicon Austria Labs GmbH, Villach, Austria

We report on 3D printed structure with integrated micro-optical element fabricated with two-photon polymerization for SiC based quantum sensing device. The fabricated optical element is characterized and enables efficient light coupling and reliable optical assembly.

CH-P.30 13:00 Hall B0

**Chirped-Pulse Φ-OTDR and Seismic Noise Interferometry: Enhancing Distributed Optical Sensing for Seismic Applications** — •Jorge Canudo[1,2], Javier Preciado-Garbayo[2], Pascual Sevillano[1], Jesus Subias[1], Miguel Gonzalez-Herraez[3], Hugo F. Martins[4], Beatriz Gaite-Castrillo[5], Jose Benito Bravo-Monge[5], Irene de Maria[6], and Miguel Rodriguez-Plaza[6] — [1]Universidad de Zaragoza, Zaragoza, Spain — [2]Aragon Photonics Labs, Zaragoza, Spain — [3]Universidad de Alcala de Henares, Madrid, Spain — [4]Instituto de Optica, CSIC, Madrid, Spain — [5]Instituto Geografico Nacional, Madrid, Spain — [6]Administrador de Infraestructuras Ferroviarias (ADIF), Madrid, Spain

Chirped-Pulse Optical Time Domain Reflectometry results in a cost-effective solution for seismic noise interferometry, providing high-resolution measurements of the dispersion relationships of the terrain with applications in infrastructure health monitoring and geological studies.

CH-P.31 13:00 Hall B0

**On The Impact of Distortions in Coded Hyperspectral Systems** — •Léo Paillet[1,2], Antoine Rouxel[1], Hervé Carfantan[2], Simon Lacroix[1], and Antoine Monmayrant[1] — [1]LAAS-CNRS, Toulouse, France — [2]Institut de Recherche en Astrophysique et Planétologie, Toulouse, France

Using a ray-traced renderer, we demonstrate that distortions have a marginal impact on coded hyperspectral imagers when the image formation model is incorporated into the processing algorithms. This relaxes constraints on optical system design.

CH-P.32 13:00 Hall B0

**Design and fabrication of HOE without aberration introduced by wavelength mismatch** — •Yuan Xu, Zhenlv Lv, Changyu Wang, and Juan Liu — Beijing Engineering Research Center for Mixed Reality and Advanced Display, MoE Key Lab of Photoelectronic Imaging Technology and System, School of Optics and Photonics, Beijing Institute of Technology, Beijing 100081, China, Beijing, China

We propose the HOE for laser Doppler velocimeter with different recording and working wavelength. The diffraction efficiency has been improved to over 99%, and the 15mm astigmatism introduced by wavelength mismatch has been almost eliminated.

CH-P.33 13:00 Hall B0

**Two-photon Bessel beam light-sheet microscopy with time-domain ptychography** — Imraan Badrodien, Pieter Neethling, and •Gurthwin Bosman — Stellenbosch Photonics Institute, Physics Department, Stellenbosch University, Stellenbosch, South Africa

We developed a two-photon light-sheet fluorescence microscopy technique combining ptychographic pulse compression and Bessel beam shaping for rapid widefield imaging. This approach enhances 2p responses, improves image contrast, increases FOV, and minimizes photodamage.

CH-P.34 13:00 Hall B0

**Multicolor Wavefront Shaping** — •L. (Bert) Mulder, Maël Hubert, Tamara A. M. Tromp, Ad Lagendijk, and Willem L. Vos — University of Twente, Enschede, Netherlands

It is a challenge in optical wavefront shaping to control multiple incident wavelengths. Here we meet this challenge by modulating two very different wavelengths with one spatial modulator, to achieve separate enhanced spots.

CH-P.35 13:00 Hall B0

**Single-shot measurement of electron density distribution under ultrashort laser pulse irradiation** — •Seitaro Kumo, Tomohiro Fukui, Qinru Zheng, Nobuhiro Kaku, Yuta Teshima, Kenta Tokumi, Junya Hattori, Yanming Zhang, and Yusuke Ito — The University of Tokyo, Tokyo, Japan

To measure electron density under laser irradiation, we constructed a system that can simultaneously measure the refractive index and attenuation coefficient at two wavelengths and achieved precise electron density measurement on the picosecond scale.

CH-P.36 13:00 Hall B0

**Graphene-assisted Heat Dissipation and Dynamic Nanoscale Thermal Expansion in Mirrors Observed by An Advanced Chromatic Confocal Microscopy** — Ming-Che Chan[1,2,3], Yu-Chi Pan[2], Tzin-Hsin Liao[2], Shih-Hsiang Hsiao[2], and •Wei-Shiuan Tseng[1] — [1]Institute of Imaging and Biomedical Photonics, College of Photonics, National Yang-Ming Chiao-Tung University, Tainan, Taiwan — [2]Institute of Photonic Systems, College of Photonics, National Yang-Ming Chiao-Tung University, Tainan, Taiwan — [3]Institute of Biophotonics, College of Biomedical Science and Engineering, National Yang-Ming Chiao-Tung University, Taipei, Taiwan

In this work, dynamic nano-thermal expansion images/animations of reflective mirrors from high-intensity incident laser beams were observed in situ. The excellent heat dissipation property of graphene coating to reduce surface distortion was also captured.

CH-P.37 13:00 Hall B0

**Incoherent Diffraction Imaging with Pseudo-Thermal Light Sources** — •Peer Biesterfeld[1], Pablo San Miguel Claveria[2], Sebastiao Antunes[2], Matilde Fernandes[2], Matilde Garcia[2], Matilde Nunes[2], Lucas Ansia Fernandez[2], Gareth O. Williams[2], Sven Fröhlich[1], David Theidel[3], Philip Mosel[1], Ihsan Fsaifes[4], Andrea Trabattoni[1,5], Marco Piccardo[6,7], Jean-Christophe Chanteloup[4], Milutin Kovacev[1], Hamed Merdji[3], and Marta Fajardo[2] — [1]Institut für Quantenoptik, Leibniz Universität Hannover, Hannover, Germany — [2]GoLP / IPFN, Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal — [3]Laboratoire d'Optique Appliquée, ENSTA Paris, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris, Palaiseau, France — [4]LULI, CNRS, Ecole Polytechnique, CEA, Sorbonne Université, Institut Polytechnique de Paris, Palaiseau, France — [5]Center for Free-Electron Laser Science CFEL, Deutsches Elektronen Synchrotron DESY, Hamburg, Germany — [6]Department of Physics, Instituto Superior Técnico, Universidade de Lisboa, Lisbon, Portugal — [7]Instituto de Engenharia de Sistemas e Computadores – Microsistemas e Nanotecnologias (INESC MN), Lisbon, Portugal

Recent development of the incoherent diffraction imaging (IDI) method enables imaging in the X-ray regime based on fluorescence. To investigate the method of IDI, a pseudo-thermal light source in the visible was developed.

CH-P.38 13:00 Hall B0

**Digital Aberration Correction for Thick Tissue Imaging Using Aberration Matrix and Tilt-Tilt Correlation in Optical Memory Effect** — •ChulMin Oh[1,2], Herve Hugonnet[1,2], Moosung Lee[1,2], and YongKeun Park[1,2,3] — [1]Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon, South Korea — [2]KAIST Institute for Health Science and Technology, Korea Advanced Institute of Science and Technology, Daejeon, South Korea — [3]Tomocube Inc., Daejeon, South Korea

We present a computational adaptive optics method for thick tissues, leveraging tilt-tilt correlation to correct phase aberrations. It improves imaging clarity, resists sample movement in challenging biomedical conditions.

CH-P.39 13:00 Hall B0

**Development of a Portable Optical Frequency Comb and Application to Open-Path Atmospheric Measurement** — •Ryo Mitsumoto, Kazumichi Yoshii, and Shin-ichi Yamamoto — Faculty of Advanced Science and Technology, Ryukoku University, Ohtsu City, Japan

We developed a portable optical frequency comb system for open-path atmospheric measurement. The system, housed in a 19-inch hard case, operated stably for extended periods in environments outside the laboratory.

CH-P.40 13:00 Hall B0

**Electro-optic frequency comb spectroscopy using tailored reconfigurable modulation** — •Jordi Navarro-Alventosa and Vicente Durán — GROC-UJI, Institute of New Imaging Technologies, University Jaume I, Castellón de la Plana, Spain

Using reconfigurable electro-optic modulation, we perform computational frequency comb spectroscopy with a straightforward optical architecture, showing that specific spectral fingerprints can be reconstructed by tailoring the addressing signal.

CH-P.41 13:00 Hall B0

**A Compact and Cost-Effective RP2040-Based Signal Processing System for High-Precision Wavelength Modulation Spectroscopy of Gases** — •Dmytro Luchyn and Karol Krzempek — Laser Spectroscopy Group, Wroclaw University of Science and Technology, Wrocław, Poland

We present a compact, cost-effective signal acquisition system for Wavelength Modulation Spectroscopy (WMS) of gases, leveraging an RP2040 microcontroller. Tested in open-path methane detection, it achieves high sensitivity with exceptional performance, portability, and affordability.

CH-P.42 13:00 Hall B0

**Wavefront Shaping with varying degrees of freedom** — •Maël Hubert, Bert Mulder, Timon Vreman, Tamara Tromp, Ad Lagendijk, and Willem Vos — Complex Photonic Systems (COPS), MESA+ Institute, University of Twente, Enschede, Netherlands

Optical wavefront shaping employs the linearity of scattering to focus light through scattering media using spatial modulation. By selectively switching off weakly-contributing segments, we significantly improve optimization speeds with minimal intensity loss, and enhanced efficiency.

CH-P.43 13:00 Hall B0

**Amplified Surface-enhanced Infrared Absorption Signal using Analytical Compensation of Information Loss** — •Seongjin Lee and Jongwon Lee — Ulsan National Institute of Science and Technology, Ulsan, South Korea

A synthetic complex frequency wave excitation method was applied to various structures, thoroughly examining its limitations and fundamental principles. This research explores potential advancements, aiming to enhance performance and adaptability in metasurface-based sensing technologies.

CH-P.44 13:00 Hall B0

*withdrawn*

CH-P.45 13:00 Hall B0

**Simultaneous Measurement of Optical Amplitude and Phase Spectra Using Beam-Scanning Angular Surface Plasmon Resonance Sensor with Heterodyne Interferometry** — Katsuma Murata[1], Takezo Nose[1], Yu Tokizane[1], Eiji Hase[1], Takeo Minamikawa[1,2], and •Takeshi Yasui[1] — [1]Tokushima University, Tokushima, Japan — [2]Osaka University, Toyonaka, Japan

We report a beam-scanning angular SPR sensor integrated with heterodyne interferometry, enabling simultaneous measurement of reflectance and phase spectra. This method achieves enhanced refractive index sensing precision and functionality for advanced industrial and biosensing applications.

CH-P.46 13:00 Hall B0

**Reflective angular estimation with carbon nanotube broadband infrared scanners for non-destructive tomographic reconstruction** — •Mitsuki Kosaka[1], Daiki Shikichi[1], Noa Izumi[1], Miki Kubota[1], Minami Yamamoto[1], Yukio Kawano[1,2,3], and Kou Li[1] — [1]Faculty of Science and Engineering, Chuo University, Tokyo, Japan — [2]National Institute of Informatics, Tokyo, Japan — [3]Kanagawa Institute of Industrial Science and Technology, Kanagawa, Japan

This work demonstrates reflective angular estimation with carbon nanotube broadband infrared scanners for non-destructive tomographic reconstruction. This technique is complementary to transmissive material identification technique (e.g., CT) and contributes to non-destructive inspections.

## CI-P: CI Poster Session

Time: Wednesday, 13:00–14:00 Location: Hall B0

CI-P.1 13:00 Hall B0

**Dielectric metasurface diffraction neural network-based mode, wavelength, polarization division demultiplexer** — •Zehui Lu[1], Shaoxiang Duan[1,3,4], Hao Zhang[1,2,3], Wei Lin[1,2], Haifeng Liu[1,2], and Bo Liu[1,2,3,4] — [1]Institute of Modern Optics, College of Electronic Information and Optical Engineering, Nankai University, Tianjin, China — [2]Tianjin Key Laboratory of Optoelectronic Sensor and Sensing Network Technology, Nankai University, Tianjin, China — [3]Tianjin Key Laboratory of Micro-scale Optical Information Science and Technology, Nankai University, Tianjin, China — [4]Southern Marine Science and Engineering Guangdong Laboratory, Tianjin, China

We propose a framework of three-dimensional metasurface-based diffractive neural network demultiplexer. A proof-of-concept three-layer diffractive neural networks is demonstrated, which can identify 24 channels, including 4 modes, 3 wavelengths and 2 polarization states simultaneously.

CI-P.2 13:00 Hall B0

*moved to CL-P.15*

CI-P.3 13:00 Hall B0

**Data Driven Simulation of Semiconductor Optical Amplifiers by Means of bi-LSTM and Transformer Machine Learning Models** — •Georgios Moustakas[1], Stavros Deligiannidis[1], Nikolaos Argyris[2], Stefanos Dris[2], Paraskevas Bakopoulos[2], Charis Mesaritakis[1], and Adonis Bogris[1] — [1]Department of Informatics and Computer Engineering, University of West Attica, Egaleo, Athens, Greece — [2]NVIDIA, Athens, Greece

A data-driven machine-learning modeling technique for semiconductor optical amplifiers is proposed. We show accurate approximation of the experimentally measured temporal dynamics accelerating simulations by a factor of 45 compared to a traveling wave model.

CI-P.4 13:00 Hall B0

**A novel air-gap ring-core fiber for low inter-core crosstalk and enhanced fiber-fuse resistance** — •Aditi Mehta[1], Takaaki Minamikawa[2], Yusaku Ueno[2], Takeshi Takagi[3], Kazunori Mukasa[2], Michael Galili[1], Leif K. Oxenløwe[1], Karsten Rottwitt[1], and Toshio Morioka[1] — [1]Denmark Technical university, Lyngby, Denmark — [2]Furukawa Electric Co., Ltd, Telecommunications & Energy Laboratories, Kameyama, Mie, Japan — [3]Furukawa Electric Co., Ltd, Telecommunications & Energy Laboratories,, Ichihara, Chiba, Japan

We present an air-gap fiber having two ring-cores with reduced inter-core crosstalk and improved fiber fuse resistance, supporting 52 orbital angular momentum modes with crosstalk below -100 dB/100 km, ideal for high-capacity space-division multiplexing.

CI-P.5 13:00 Hall B0

**Simultaneous Transmission of Baseband and RF over Fiber** — •Shruti Shruti[1,2], Rajveer Dhawan[1,3], Baljinder Singh Heera[1,3], Amol Choudhary[1,2,3], and Abhishek Dixit[2,3] — [1]Ultrafast Optical Communications and High-performance Integrated Photonics (UFO-CHIP) group, Indian Institute of Technology (IIT), Delhi, New delhi, India — [2]Bharti School of Telecommunication Technology and Management, Indian Institute of Technology (IIT), Delhi, New delhi, India — [3]Department of Electrical Engineering, Indian Institute of Technology (IIT), Delhi, New delhi, India

We present a hybrid modulation scheme for simultaneous transmission of baseband and RF over a single wavelength detected using a single photodetector. Simulations and experiments demonstrate its effectiveness in enhancing resource utilization of RoF links.

CI-P.6 13:00 Hall B0

**Orthogonal sampling with a single photodiode** — •Souvaraj De[1,2], Janosch Meier[1], Younus Mandalawi[1], Ranjan Das[1], Nora Meyne[2], Kai Baaske[2], Thomas Kleine-Ostmann[2], and Thomas Schneider[1] — [1]Technische Universität Braunschweig, Braunschweig, Germany — [2]Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany

We analyze orthogonal sampling with a single photodiode and show that it always provides a bandwidth improvement. Especially for high-jitter and roll-off, the quality of the detected signal is improved.

CI-P.7 13:00 Hall B0

**MZM-based FMCW Radar Receiver for Multi-Target Detection** — Lakshay Kumar[1,3], •Atul Khanna[1,2], Mukund Jha[1,3], Rajveer Dhawan[1,3], and Amol Choudhary[1,3] — [1]Ultra-Fast Optical Communications and High-performance Integrated Photonics (UFO-CHIP) group, Indian Institute of Technology Delhi, New Delhi, India — [2]Optics & Photonics Centre, Indian Institute of Technology Delhi, New Delhi, India — [3]Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi, India

We present a simple filter-less photonic radar receiver based on a Mach Zehnder Modulator which uses the transmitted waveform as the reference. Sub-cm errors in the range detection of single and dual targets are reported.

CI-P.8 13:00 Hall B0

**Exploiting Propagation and Polarization Effects of Multimode Fibers for In-network Physical Layer Key Distribution** — •Dennis Pohle[1], Dominic Fröming[1], Eduard Jorswieck[2], Norbert Hanik[3], and Jürgen W. Czarske[1] — [1]Technische Universität Dresden, Dresden, Germany — [2]Technische Universität Braunschweig, Braunschweig, Germany — [3]Technische Universität München, München, Germany

Spatial multimode transmission fibers scale core- and datacenter networks in capacity and security. We present a fiber-based optical reservoir receiver for reference-less signal recovery for crosstalk characterization leading to long-haul high-capacity and secure transmission.

CI-P.9 13:00 Hall B0

**A Large-Scale Reconfigurable Multiplexed Quantum Photonic Network** — •Natalia Herrera Valencia, Annameng Ma, Suraj Goel, Saroch Leedumrongwatthanakun, Francesco Graffitti, Alessandro Fedrizzi, Will McCutcheon, and Mehul Malik — Institute of Photonics and Quantum Sciences, Heriot-Watt University, Edinburgh, United Kingdom

We demonstrate the next stage in the evolution of multiplexed quantum networks: a prototype global reconfigurable eight-user network where entanglement is routed and teleported in a flexible and multiplexed manner between two local multi-user networks.

CI-P.10 13:00 Hall B0

**1-Tb/s/3.9-km FSO Communications with WDM-PAM4 Technology and MEMS-Based Four-Lens Setup** — •Chun-Cheng Liang, Yen-Jen Chen, Jia-Hui Chou, Wei-Ting Huang, Feng-Ti Chen, and Hai-Han Lu — National Taipei University of Technology, Taipei, Taiwan

A 1-Tb/s/3.9-km FSO communication with WDM-PAM4 technology and MEMS-based four-lens setup is successfully implemented. This demonstrated 1-Tb/s/3.9-m FSO communication develops the state implemented by high aggregate transmission rate, long-distance free-space transmission, and high reliability.

CI-P.11 13:00 Hall B0

**Time-Domain Jacobi-Pulse-Sequence Transceiver** — •Paulomi Mandal, Janosch Meier, Gouri Krishnan, and Thomas Schneider — Institut für Hochfrequenztechnik Technische Universität Braunschweig, Germany, Germany

A transceiver for time-domain-multiplexing with orthogonal Jacobi-pulse-sequences is demonstrated by simulation, proof-of-concept experiments and a 26x2 GBd multiplexing of 26 orthogonal sequences into the same time-window.

CI-P.12 13:00 Hall B0

**Transition Based Feedback Equalizer for Error Mitigation in High-Speed Short-Reach Optical Communication System** — •Benedictus Yohanes Bagus Widhianto, Hao Chun Tsui, and Jyehong Chen — National Yang Ming Chiao Tung University, Hsinchu, Taiwan

An equalizer combining adaptive FFE and transition-based DFE is proposed to improve VCSEL-based optical communication systems. Experimental results demonstrate one-order BER improvement compared with FFE, enabling a reliable 50Gb data-rate transmission over 500m OM4 fiber.

## EG-P: EG Poster Session

Time: Wednesday, 13:00–14:00 Location: Hall B0

EG-P.1 13:00 Hall B0

**Chiral exciton polaritons in a $WS_2$ monolayer** — Matthias J. Wurdack[1,2,3,4,5], •Sarka Vavreckova[2,3,4], Ivan Iorsh[6], Tobias Bucher[1,3,4], Eliezer Estrecho[2], Sebastian Klimmer[1], Zlata Fedorova[1,3,4], Huachun Deng[7], Qinghai Song[7], Giancarlo Soavi[1,4], Falk Eilenberger[3,4,8], Thomas Pertsch[3,4], Isabelle Staude[1,3,4], Yuri Kivshar[9], and Elena A. Ostrovskaya[2] — [1]Institute of Solid State Physics, Friedrich Schiller University Jena, Jena, Germany — [2]Department of Quantum Science and Technology, Canberra, Australia — [3]Institute of Applied Physics, Friedrich Schiller University Jena, Jena, Germany — [4]Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany — [5]Department of Chemical Engineering, Stanford University, Stanford, USA — [6]Department of Physics, Queen's University, Kingston, Canada — [7]Harbin Institute of Technology, Shenzhen, China — [8]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany — [9]Nonlinear Physics Center, Australian National University, Canberra, Australia

We demonstrate strong coupling between circularly polarized photons and valley excitons in $WS_2$ monolayer using chiral BICs, achieving highly chiral exciton polaritons with enhanced photoluminescence intensity and circular polarization compared to uncoupled excitons.

EG-P.2 13:00 Hall B0

*withdrawn*

EG-P.3 13:00 Hall B0

**Coherent control in size selected semiconductor quantum dot thin films** — •Victor Kärcher[1], Tobias Reiker[1], Pedro F. G. M. da Costa[2], Andrea S. S. de Camargo[3,4], and Helmut Zacharias[1] — [1]Center for Soft Nanoscience, Münster, Germany — [2]São Carlos Institute of Physics, University of São Paulo, São Carlos, Brazil — [3]Federal Institute for Materials Research and Testing (BAM), Berlin, Germany — [4] Friedrich-Schiller University Jena (FSU), Jena, Germany

We introduce a novel approach for coherent control of resonant third harmonic

generation in CdTe quantum dot thin films, leveraging varying thicknesses to manipulate internal field interference and enhance or suppress specific quantum pathways.

EG-P.4 13:00 Hall B0

*withdrawn*

EG-P.5 13:00 Hall B0

**Strongly Inhibited Spontaneous Emission of PbS Quantum Dots Covalently Bound to 3D Silicon Photonic Band Gap Crystals** — Andreas S. Schulz, Marek Kozoň, G. Julius Vancso, Jurriaan Huskens, and •Willem L. Vos — MESA+ Institute, University of Twente, Enschede, Netherlands

We report spontaneous emission from PbS quantum dots covalently bound to polymer brush layers grafted from Si inside 3D photonic band gap crystals. We observe broad (26% bandwidth) and up to 30x band-gap inhibition.

EG-P.6 13:00 Hall B0

*withdrawn*

EG-P.7 13:00 Hall B0

**Single molecule spectroscopy of emitters in hexagonal Boron Nitride** — •Osama Farooqui and Klas Lindfors — Institute for Light and Matter, Department of Chemistry, University of Cologne, Cologne, Germany

Efficient light interaction with atoms or molecules is crucial for high-speed communication devices. This project studies light emission and absorption in two-/one-dimensional heterostructures and single molecules, enhancing stability via encapsulation molecules under hBN flakes.

EG-P.8 13:00 Hall B0

*moved to EG-4.4*

EG-P.9 13:00 Hall B0

**Few Photons Probe Third-Order Nonlinear Properties of Nanomaterials in a Plasmonic Nanocavity** — •Anupa Kumari[1], Mohammadreza Aghdaee[1], Mathis Van de Voorde[1,2], and Oluwafemi Ojambati[1] — [1]Faculty of Science and Technology, MESA+ Institute, University of Twente,Enschede, 7522NB, the Netherlands, Enschede, Netherlands — [2]Institute of Microstructure Technology, Karlsruhe Institute of Technology, Karlsruhe, Germany, Karlsruhe, Germany

We demonstrate that a few photons probe the nonlinear properties of different nanomaterials inside a plasmonic nanocavity. A simple analytical model fits the experimental results, which show a strong dependence on the nanocavity resonance.

EG-P.10 13:00 Hall B0

**Nitrogen-Vacancy Center hybridization with external emitters leading to improved sensing capabilities** — •Marc Espinosa Edo[1,2] and Xavier Vidal[1] — [1]TECNALIA, Basque Research and Technology Alliance (BRTA), Derio, 48160, Spain — [2]Department of Physical Chemistry, University of the Basque Country UPV/EHU, Leioa, 48940, Spain

We present simulations of a novel mechanism that shows an improvement on NV center's ODMR contrast and sensitivity leading to better magnetic field sensing. We present experimental configurations for maximizing this effect in bulk diamond.

EG-P.11 13:00 Hall B0

**Plasmonics enabled linearly polarised emission from WSe2 at room temperature.** — •Bidisha Roy[1,2], Mäx Blauth[2], Siddharth Dhomkar[3], Michael Kaniber[2], Vinod M. Menon[4], and Jonathan J. Finley[2] — [1]Center for Quantum Enabled Science and Technologies, Woxsen University, Hyderabad, India — [2]Walter Schottky Institute of Technical University Munich, Munich, Germany — [3]Indian Institute of Technology Madras, Chennai, India — [4]City College of New York of City University of New York, New York, USA

We report an experimental demonstration of intrinsically unpolarised excitonic emission from atomically thin monolayer of WSe2 gaining a significant degree of ~20-40% linear polarisation after suitably designed integration with an array of elliptical nanoplasmonic units.

EG-P.12 13:00 Hall B0

**Suppressing photobleaching of j-aggregates via strong light-matter coupling** — •Rohit Umashankar Yadav and Parinda Vasa — Indian Institute of Technology Bombay, Mumbai, India

Here, we demonstrate an experimental study of photobleaching suppression of cyanine dye J-aggregates strongly coupled to surface plasmons on silver film. We use the Kretschmann configuration to probe coupled molecules exclusively, eliminating uncoupled molecule background interference.

EG-P.13 13:00 Hall B0

**Trapping and interfacing laser-cooled strontium atoms using an optical nanofiber** — Luca Göcke, •Hector Letellier, Philipp Schneeweiss, Jürgen Volz, and Arno Rauschenbeutel — Department of Physics, Humboldt-Universität zu Berlin, Berlin, Germany

We present a compact design for trapping strontium atoms along an optical nanofiber. For this purpose we use laser ablation to load atoms into a MOT before transferring them into the optical nanofiber trap.

## EH-P: EH Poster Session

Time: Wednesday, 13:00–14:00 Location: Hall B0

EH-P.1 13:00 Hall B0

**Spatial Coherence of Thermal Emission associated with Coherent Perfect Absorption** — •Douglas Oña, Angel Ortega-Gomez, Osmery Hernández, and Iñigo Liberal — Public University of Navarre, Pamplona, Spain

In this paper we explore how Coherent Perfect Absorption (CPA) enables the separation of thermal noise and transmitted signals, unlocking novel applications in thermal management, radiative heat transfer, and noise control within confined optical networks.

EH-P.2 13:00 Hall B0

*moved to EH-4.5*

EH-P.3 13:00 Hall B0

*withdrawn*

EH-P.4 13:00 Hall B0

**Chiral-absorber planar metasurface made by rotation of simple achiral meta-atoms** — •Dmytro Gryb[1], Alexander Antonov[1], Andreas Tittl[1], and Leonardo de S. Menezes[1,2] — [1]Chair in Hybrid Nanosystems, Faculty of Physics, Ludwig Maximilians-University Munich, Munich, Germany — [2]Departamento de Física, Universidade Federal de Pernambuco, Recife, Brazil

This study examines a planar chiral metasurface made of amorphous silicon achiral nanorods deposited on a gold mirror, selectively reflecting one circular polarized light and absorbing the opposite polarization with minimal cross-conversion.

EH-P.5 13:00 Hall B0

**Achromatic and wide field of view singlet metalens for optical beam steering** — •Jian Cao, Sarra Salhi, Jonathan Peltier, Jean-René Coudevylle, Cédric Villebasse, Laurent Vivien, Carlos Ramos, and Daniele Melati — Centre de Nanosciences et de Nanotechnologies, Palaiseau, France

In this work, we present an achromatic and wide field of view metalens by combining a quadratic phase profile and dispersion compensation, demonstrating a relative focal shift as low as 1.1% combined with a field of view of ±43°

EH-P.6 13:00 Hall B0

**Sensitivity and pseudospctra of non-Hermiitan quasi-periodic lattices** — •Ananya Ghatak[1], Dimitrti Kaltsas[2], Manas Kulkarni[3], and Konstantinos Makris[1,2] — [1]Institute of Electronic Structure and Laser (IESL) – FORTH,, Herakilon, Greece — [2]ITCP-Physics Department, University of Crete, , Heraklion, Greece — [3]International Centre for Theoretical Sciences, Tata Institute of Fundamental Research, Bangalore, India

We investigate the sensitivity of a PT-symmetric quasiperiodic Aubry-Andre model in terms of the associated pseudospectra. Multiple pairs of exceptional points near the localization-delocalization phase transition are formed and Anderson jumps occur.

EH-P.7 13:00 Hall B0

**Plasmon-enhanced circular dichroism for enantiomeric discrimination of chiral drug solutions** — •Matteo Venturi[1], Raju Adhikary[1], Ambaresh Sahoo[1], Carino Ferrante[2], Isabella Daidone[1], Francesco Di Stasio[3], Andrea Toma[3], Francesco Tani[4], Hatice Altug[5], Antonio Mecozzi[1], Massimiliano Aschi[1], and Andrea Marini[1,2] — [1]University of L'Aquila, L'Aquila, Italy — [2]CNR SPIN, L'Aquila, Italy — [3]IIT, Genova, Italy — [4]Max Planck Institute , Erlangen, Germany — [5]EPFL, Lausanne, Switzerland

We analyze surface plasmon polaritons at noble metal interfaces for enhancing chiroptical sensing of dilute chiral drug solutions. Circular dichroism is amplified by plasmonic resonances to attain sensitivity to nano-scale drug volumes, demonstrating great potential for chiroptical sensing.

EH-P.8 13:00 Hall B0

**Polarization-Controlled Plasmonic Logic Gates and EN/DECODER** — Ting-Yin Chen[1], •Komal Gupta[1], Anand Hegde[1], Yun-Chorng Chang[2], and Chen-Bin Huang[1] — [1]Institute of Photonics Technologies, National Tsing Hua University, Hsinchu City, Taiwan (R.O.C.) — [2]Research Center for Applied Science, Academia Sinica, Nangang, Taipei City, Taiwan (R.O.C.)

Plasmonic NAND, NOR, and XNOR gates implemented through polarization-controls in a nanoscopic two-wire transmission lines are experimentally demonstrated, enabling 67% footprint and 50% power reductions. 4-to-2 encoder and 2-to-4 decoder are also presented.

EH-P.9 13:00 Hall B0

**Enhanced Second Harmonic Generation of NLO polymer/Plasmonic Au Nanoprism Hybrid Structure** — •Atsushi Sugita, kazuki Kuroyanagi, Kei Hosomi, and Masayoshi Kamiya — Shizuoka University, Hamamatsu, Japan

Enhanced SHG of NLO polymer/Au nanoprism hybrid structure is reported. Three orders of magnitude enhancement of SHG conversion was achieved by two-photon resonance excitation of LSP-enhanced field in an optical medium rich in NLO susceptibility.

EH-P.10 13:00 Hall B0

**Continuously Variable Topological Charge of a Vector Vortex Beam Generated by an Integrated Metasurface** — •Hao Peng, Yuntian Ye, and Xu Fang — School of Electronics and Computer Science, University of Southampton, Southampton, United Kingdom

We propose and numerically verify a new method for generating a vector vortex beam, in which the twist of the wavefront varies continuously along the beam axis, offering potential benefits for distance detection.

EH-P.11 13:00 Hall B0

**Design and Evaluation of a Bull's Eye Structure for Improving the Response Speed and Voltage of Carbon Nanotube Sensor in GHz Range** — •Masakazu Konishi[1], Hiroki Okawa[2], Shun Hashiyada[3], Yuto Matsuzaki[1], Qi Zhang[1], Hajime Nishiyama[4], Kou Li[1], Yoshito Tanaka[3], and Yukio Kawano[1,2,5] — [1]Chuo University, Tokyo, Japan — [2]Kanagawa Institute of Industrial Science and Technology, Kanagawa, Japan — [3]Hokkaido University, Hokkaido, Japan — [4]Institute of Science Tokyo, Tokyo, Japan — [5]National Institute of Informatics, Tokyo, Japan

We developed a GHz Bull's Eye structure that enhanced the response speed of a carbon nanotube sensor by 13 to 17 times and increased the sensor's response voltage by 2.6 times by concentrating GHz wave.

EH-P.12 13:00 Hall B0

**Effects of strain and plasmon induced doping on Raman modes of MoS2 transferred on a broadband plasmonic light harvester** — •Dreamsy Manchanda, Umakant Patra, and Parinda Vasa — Indian Institute of Technology Bombay, Powai-400076, Mumbai, India

We investigated effects of strain and surface plasmon induced doping on Raman modes of MoS2, transferred on broadband plasmonic light harvester. Interfacial strain and intense plasmonic light localization significantly modulate characteristic MoS2 Raman modes.

EH-P.13 13:00 Hall B0

**Minimum scattering superabsorbers with Dirac-Delta-like radiation** — •Jeng Yi Lee[1], Irving Rondón[2], Andrey E. Miroshnichenko[3], and Pai-Yen Chen[4] — [1]Department of Opto-Electronic Engineering, National Dong Hwa University,, Hualien 974301, Taiwan — [2]School of Computational Sciences, Korea Institute for Advanced Study, , Seoul 0245, South Korea — [3]School of Engineering and Information Technology, University of New South Wales, Australian Capital Territory 2600, Australia, Australia — [4]Department of Electrical and Computer Engineering, University of Illinois at Chicago, Illinois 60661, USA

By introducing an optimization, we depict a generic energy distribution of light scattering. Based on the energy distribution diagram, we design a subwavelength scatter with not only lower scattering and enhanced absorption, but also Dirac-delta-like radiation pattern.

EH-P.14 13:00 Hall B0

**Soft-Nanoimprinted Metasurfaces with Crossing Lattice Resonances in the Visible Range** — •Rachel Grange[1], Helena Weigand[1], Virginia Falcone[1], Luca Carletti[2], Domenico De Ceglia[2], Davide Rocco[2], Hooman Barati Sedeh[3], Wenhao Li[3], Natalia M. Litchinitser[3], Michael Scalora[4], and Maria Antonietta Vincenti[2] — [1]ETH Zurich, Zurich, Switzerland — [2]University of Brescia, Brescia, Italy — [3]Duke University, Durham, USA — [4]Charles M. Bowden Research Center, Redstone Arsenal, USA

We measure double lattice resonances and their crossing at 700 nm with nanoimprinted solution-processed barium titanate metasurfaces by varying their periodicity from 460 to 490 nm. This bottom-up process allows for negligible sidewall angles.

EH-P.15 13:00 Hall B0

**Electric Field Confinement Optimization in Polycrystalline Barium Titanate Metasurfaces for Electro-Optic Modulation** — •Eleni Prountzou, Helena Weigand, Virginia Falcone, Elise Bailly, Ülle-Linda Talts, and Rachel Grange — Institute for Quantum Electronics, Department of Physics, ETH, Zurich, Switzerland

We use metasurfaces from sol-gel derived $BaTiO_3$ for free-space electro-optic modulation. The device efficiency is optimized by back-etching the $SiO_2$ environment of the metasurfaces, confining the electric field in the nanostructures 30 times more efficiently.

EH-P.16 13:00 Hall B0

**Phase-Change Extraordinary Optical Transmission Metasurface for Reconfigurable Spatial Filtering** — •Stuart Kendall[1], Joe Shields[1], Carlota Ruiz de Galarreta[1,2], Jacopo Bertolotti[1], Andrea Alù[3], and C. David Wright[1] — [1]University of Exeter, Exeter, United Kingdom — [2]Institute of Materials Science of Barcelona, Bellaterra, Spain — [3]City University of New York, New York, USA

Phase-change metasurfaces utilising extraordinary optical transmission are designed for dual-function reconfigurable optical low and high-pass filtering, so providing dynamically switchable edge-detection and blurring imaging modes.

EH-P.17 13:00 Hall B0

**Metallic Bull's eye resonators as a platform for directed single-photon emission from TMDC monolayers** — •Sven Stephan[1], Ivan Solovev[2], Viktor Mitryakhin[2], Falk Eilenberger[3], Christian Schneider[2], and Martin Silies[1] — [1]Institute for Laser and Optics, University of Applied Sciences Emden/Leer, Emden, Germany — [2]Institute of Physics, University of Oldenburg, Oldenburg, Germany — [3]Institute of Applied Physics, Friedrich Schiller University of Jena, Jena, Germany

We show the versatility of metallic Bull's eye cavities as a platform for single-photon emission from transition metal dichalcogenide monolayers. The optical properties of the cavities are explored by far-field spectroscopy and FDTD simulations.

# EB-6: Integrated Photonics for Quantum Information

Chair: Markus Gräfe, TU Darmstadt, Darmstadt, Germany

Time: Thursday, 8:30–10:00 Location: ICM - Room 1

**Tutorial** EB-6.1 8:30 ICM - Room 1

**Integrated Photonics for Quantum Information Processing** — •Fabio Sciarrino — Sapienza Università di Roma, Rome, Italy

Integrated photonics enables quantum information processing using miniaturized optical components. This tutorial covers fundamental principles, device technologies, recent advancements, and future chal- lenges in this rapidly growing field.

**Oral** EB-6.2 9:30 ICM - Room 1

**Path-Transverse Electric Mode Hyperentanglement on an Integrated Photonic Chip** — •Imogen Forbes[1], Patrick Yard[1], Martin Bielak[2], Matthew Jones[1], Molly Thomas[1], Stefano Paesani[3], Massimo Borghi[4], and Anthony Laing[1] — [1]University of Bristol, Bristol, United Kingdom — [2]Palacky University, Olomouc, Czech Republic — [3]Niels Bohr Institute, Copenhagen, Denmark — [4]University of Pavia, Pavia, Italy

We present a novel photonics integrated circuit which generates and verifies hyperentanglement, with simultaneous entanglement in the path and transverse electric modes. Results are shown, highlighting the multi-modal design and ver-

ifying state generation using tomography.

**Oral** EB-6.3 9:45 ICM - Room 1

**Time-Resolved Measurement of Hong-Ou-Mandel Interference from integrated SPDC sources** — •Karen Lozano-Mendez[1], Meritxell Cabrejo-Ponce[1,2], Baghdasar Baghdasaryan[1,2], and Fabian Steinlechner[1,2] — [1]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany — [2]Abbe Center of Photonics, Institute of Applied Physics, Friedrich-Schiller-University Jena, Jena, Germany

In this work, we post-selected temporally indistinguishable photons from independent, unsynchronized SPDC sources using low jitter SNSPDs. Thereby, we were able to perform time-resolved Hong–Ou–Mandel experiments.

## CK-8: Advanced Fabrication Techniques 1

Chair: Stefano Pelli, CNR - IFAC, Florence, Italy

Time: Thursday, 8:30–10:00 Location: ICM - Room 4a

**Oral** CK-8.1 8:30 ICM - Room 4a

**Nanophotonic fabrication for coupling to single organic molecules** — •Michael J Neville, Granthick Barua, Jieqing Mo, Rowan A Hoggarth, and Alex S Clark — Quantum Engineering Technology Labs, University of Bristol, Bristol, United Kingdom

Dibenzoterrylene (DBT) molecules display narrow linewidth photon emission at cryogenic temperature where photon collection is often inefficient. To enhance collection we demonstrate the design and characterisation of nanophotonic structures to couple to DBT molecules.

**Oral** CK-8.2 8:45 ICM - Room 4a

**Polycrystalline Lithium Niobate Nonlinear Metasurfaces** — •Ülle-Linda Talts, Helena Weigand, Irene Occhiodori, Eleni Prountzou, Virginia Falcone, and Rachel Grange — 1. ETH Zurich, Department of Physics, Institute for Quantum Electronics, Optical Nanomaterial Group, Zürich, Switzerland

Solution-derived lithium niobate combined with nanoimprint lithography unlocks a new designs space for nonlinear metasurfaces. We demonstrate how the high aspect ratio polycrystalline structures enable resonant and wavefront-shaping by this nonlinear nanocrystalline material platform.

**Oral** CK-8.3 9:00 ICM - Room 4a

**Enabling micro transfer printable SNSPDs for fully integrated quantum photonic platforms** — •Linus Kraemer[1], Roland Jaha[1], Connor Graham-Scott[2], Isaac Luntadila Lufungula[3], Lin Jin[4], Simone Ferrari[1], and Wolfram Pernice[1] — [1]University of Heidelberg, Heidelberg, Germany — [2]University of Muenster, Muenster, Germany — [3]Ghent University, Ghent, Belgium — [4]Delft University of Technology, Delft, Netherlands

Micro-transfer printing allows to combine pre-characterized devices from various substrates onto one common substrate, enabling high-yield processes. Heading towards fully integrated photonics for quantum applications, transferable SNSPDs present a key module for precise optical readout.

**Oral** CK-8.4 9:15 ICM - Room 4a

**12-Gbps All-Optical Switching via Nonlinear Kerr Effect in Silicon Carbide Micro-Ring Resonator** — •Chih-Hsien Cheng[1], Atsushi Matsumoto[1], Naokatsu Yamamoto[1], Gong-Ru Lin[2], and Kouichi Akahane[1] — [1]National Institute of Information and Communications Technology, Tokyo, Japan — [2]National Taiwan University, Taipei, Taiwan

We successfully demonstrated the all-optical data conversion and inversion at 12 Gbps with an SNR of 8 dB and a BER below 1e-9 in SiC micro-ring resonator for future electronic and photonic integrated circuit applications.

**Oral** CK-8.5 9:30 ICM - Room 4a

**Free-form Laser Nano-Patterning of Silicon with Subsurface-Seeding** — Mehmet Bütün[1], •Rana Asgari Sabet[1,2], and Onur Tokel[1,2] — [1]Department of Physics, Bilkent University, Ankara, Turkey — [2]UNAM - National Nanotechnology Research Center, Bilkent University, Ankara, Turkey

We demonstrate a novel direct laser nano-fabrication method that enables the free-form nano-patterning of silicon. The wide-area nano-fabrication method overcomes critical limitations of conventional approaches with significant potential to extend to other materials.

**Oral** CK-8.6 9:45 ICM - Room 4a

*withdrawn*

## CM-3: Laser-Matter Interaction Dynamics

Chair: Gert-Willen Römer, University of Twente, Enschede, The Netherlands

Time: Thursday, 8:30–10:00 Location: ICM - Room 4b

**Invited** CM-3.1 8:30 ICM - Room 4b

**Time-Resolved Complex Optical Field Imaging of Deep-UV Nanosecond Pulsed Laser Processing of BK7 Glass using Linear Absorption Process** — •Shotaro Kawano, Keiichiro Toda, Haruyuki Sakurai, Kuniaki Konishi, and Takuro Ideguchi — Institute for Photon Science and Technology, The University of Tokyo, Tokyo, Japan

We have observed the dynamics of deep ultraviolet nanosecond laser processing of BK7 glass, which exhibits relatively reproducible processing results where pump-probe observations are applicable, by time-resolved complex optical field imaging.

**Oral** CM-3.2 9:00 ICM - Room 4b

**Precise ablation in bulk dielectrics through synergistic femtosecond laser irradiation and ion implantation** — Irene Solana[1], Yoann Levy[2], Nadezhda M. Bulgakova[2], Maria Dolores Ynsa[3], Fatima Cabello[1], Fernando Chacón-Sancéz[1], Jan Siegel[1], and •Mario Garcia-Lechuga[1] — [1]Instituto de Optica Daza de Valdes (IO), CSIC, Madrid, Spain — [2]HiLASE Centre, FZU- Institute of Physics of the Czech Academy of Sciences, Dolní Břežany, Czech Republic — [3]Centro de Microanálisis de Materiales (CMAM), Universidad Autónoma de Madrid, Madrid, Spain

We demonstrate the formation of flat, hundreds-of-nanometer-deep craters in glass under ultrashort laser pulses. Laser interaction at a deeply Au-ion-implanted interface induces thick-layer spallation, visualized using femtosecond time-resolved microscopy.

**Oral** CM-3.3 9:15 ICM - Room 4b

**Single shot imaging of femtosecond laser-induced lattice distortions inside crystalline semiconductors by Ultrafast x-ray Dynamical Diffraction** — •Angel Rodriguez Fernandez[1], Jan-Etienne Pudell[1], Roman Shayduk[1], Pablo Villanueva-Perez[2], Thies J. Albert[3,4], Jerzy Antonowicz[5], Dominik Kaczmarek[3,4], Houri Mosafer[7], Oleksii Liubchenko[7], Javier Solis[8], Lukas Horak[9], Peter Zalden[1], Joerg Halmann[1], Wonhyuk Jo[1], James Wrigley[1], Alexey Zozulya[1], Anders Madsen[1], Zdenek Matej[6], Ryszard Sobierajski[7], Klaus Sokolowski-Tinten[3,4], and Jan Siegel[8] — [1]European XFEL GmbH, Schenefeld, Germany — [2]Lund University, Lund, Sweden — [3]Universität Duisburg-Essen, Duisburg, Germany — [4]Center for Nanointegration Duisburg-Essen, Duisburg, Germany — [5]Warsaw University of Technology, Warsaw, Poland — [6]MAX IV Laboratory, Lund, Sweden — [7]Polish Academy of Sciences, Warsaw, Poland — [8]Consejo Superior de Investigaciones Científicas, Madrid, Spain — [9]Charles University, Prague, Czech Republic

We have developed a novel technique for imaging ultrafast deformations along the depth in crystalline Semiconductors. The fs laser pump (800nm) - fs X-ray probe (9 keV) experiment was performed at the European XFEL.

**Oral** CM-3.4 9:30 ICM - Room 4b

**Time-resolved investigations of ultrafast laser-induced crystallization in tellurium oxide glass** — •Pasquale Barbato[1], Larissa Boie[2], Vladimir Ovuka[2], Dario Ferreira Sanchez[2], Malgorzata Grazyna Makowska[2], Markus Schölmerich[2], Daniel Grolimund[2], Rasmus Ischebeck[1], and Christoph Boestdt[2,3] — [1]Center for Accelerator Science and Engineering, Paul Scherrer Institut, Villigen , Switzerland — [2]Photon Science Division, Paul Scherrer Institut, Villigen , Switzerland — [3]Institute of Chemical Sciences and Engineering, École Polytechnique Fédérale de Lausanne , Lausanne, Switzerland

We present time-resolved measurements of femtosecond laser-induced crystallization in tellurium oxide glasses. By combining X-ray techniques with optical ultrafast microscopy, we provide insights into the fundamental mechanisms driving amorphous-to-crystalline phase transitions.

**Oral** CM-3.5 9:45 ICM - Room 4b

**Semiclassical Simulation of Laser-Electron Coupled Dynamics in Metals under Ultrashort Pulse Laser Irradiation** — •Mizuki Tani[1,2,3], Tomohito Otobe[1,2], Yasushi Shinohara[2], and Kenichi L. Ishikawa[2,3,4,5] — [1]Kansai Institute for Photon Science, National Institutes for Quantum and Radiological Science and Technology, Kizugawa, Japan — [2]Photon Science Center, Graduate School of Engineering, The University of Tokyo, Tokyo, Japan — [3]Department of Nuclear Engineering and Management, Graduate School of Engineering, The University of Tokyo, Tokyo, Japan — [4]Research Institute for Photon Science and Laser Technology, The University of Tokyo, Tokyo, Japan — [5]Institute for Attosecond Laser Facility, The University of Tokyo, Tokyo, Japan

We propose Maxwell-Vlasov-Uehling-Uhlenbeck simulation, which incorporates electron-electron scattering and light propagation, improving simulation accuracy and providing practical insights into laser-matter interactions in the initial stages of laser processing, including energy transport in laser-irradiated metal films.

## CD-9: Second Harmonic Generation

Chair: Vasanthan Devara, Paderborn University, Paderborn, Germany,

Time: Thursday, 8:30–10:00 Location: ICM - Room 13a

**Oral** CD-9.1 8:30 ICM - Room 13a

**Milliwatt-level on-chip green light source via second-harmonic generation in silicon nitride microresonators** — •Gang Wang[1], Ozan Yakar[1], Xinru Ji[2], Marco Clementi[1], Ji Zhou[1], Christian Lafforgue[1], Jiaye Wu[1], Jianqi Hu[2], Tobias J. Kippenberg[2], and Camille-Sophie Brès[1] — [1]École Polytechnique Fédérale de Lausanne, Photonic Systems Laboratory (PHOSL), Lausanne, Switzerland — [2]École Polytechnique Fédérale de Lausanne, Laboratory of Photonics and Quantum Measurements (LPQM), Lausanne, Switzerland

We achieved continuous-wave second-harmonic generation of green light from a 1-$\mu$m pump in silicon nitride microresonators through all-optical poling, achieving 1.5 mW output power, surpassing previous demonstrations by over an order of magnitude.

**Oral** CD-9.2 8:45 ICM - Room 13a

**Optical Skyrmion Driven Second Harmonic Generation** — •Sushanta Kumar Pal[1,2], Allam Srinivasa Rao[1,2], Hiroko Yokota[3], and Takashige Omatsu[1,2] — [1]Graduate School of Engineering, Chiba University, Chiba 263-8522, Japan — [2]Molecular Chirality Research Center, Chiba University, Chiba 263-8522, Japan — [3]Institute of Science Tokyo, Kanagawa 152-8552, Japan

We study the optical skyrmion-driven second harmonic generation. The second harmonic possesses an elliptical spot, with the minor and major axes 1/6 and 1/3 of the fundamental spot diameter, thus manifesting its superresolution capability.

**Oral** CD-9.3 9:00 ICM - Room 13a

**Broadband multiphoton microscopy for nonlinear spectroscopy of harmonic nanoparticles** — •Tianhao Guo, Volodymyr Multian, Kevin Bredillet, Ameni Dhouib, Laura Vittadello, Yannick Mugnier, and Ronan Le Dantec — Univ. Savoie Mont Blanc, Annecy, France

This work outlines the critical experimental steps and precise calibration methods for developing a broadband multiphoton microscope designed for nonlinear spectroscopy of single nano-objects.

**Oral** CD-9.4 9:15 ICM - Room 13a

**Wave-mixing frequency generation with electron beams** — •Leila Prelat[1], Eduardo J. C. Dias[1], and F. Javier García de Abajo[1,2] — [1]ICFO-Institut de Ciencies Fotoniques, Barcelona, Spain — [2]ICREA-Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain

We theoretically describe the response of nonlinear cavities simultaneously illuminated by an electron beam and light. We show that this technique can be used to probe low-frequency vibrational resonances in dielectric materials and molecular layers.

**Oral** CD-9.5 9:30 ICM - Room 13a

**Full vectorial description of second harmonic generation in silicon nitride waveguides integrated with $MoS_2$ monolayers** — •Nathalia B. Tomazio[1], Mohd Rehan[2], Alisson R. Cadore[3], Daniel F. Londono-Giraldo[2], Daniel A. Matos[1], Gustavo S. Wiederhecker[4], and Christiano J. S. De Matos[2] — [1]Instituto de Fisica, Universidade de Sao Paulo (IFUSP), Sao Paulo, Brazil — [2]Mackenzie Engineering School, Mackenzie Presbyterian University, Sao Paulo, Brazil — [3]Brazilian Nanotechnology National Laboratory (LNNano/CNPEM), Campinas, Brazil — [4]Gleb Wataghin Physics Institute, Universidade Estadual de Campinas (UNICAMP), Campinas, Brazil

We investigate second harmonic generation in on-chip silicon nitride waveguides integrated with $MoS_2$ monolayers. Our analysis accounts for the full vectorial nature of the modal fields and the tensorial nature of the $MoS_2$'s second-order susceptibility.

**Oral** CD-9.6 9:45 ICM - Room 13a

**Femtosecond photorefractive optical transient detection in the blue** — •. Sukeert[1], Chaitanya Kumar Suddapalli[2], Peter G. Schunemann[3], Majid Ebrahim-Zadeh[1,4], and Adolfo Esteban-Martín[5] — [1]ICFO-The Institute of Photonic Sciences, Castelldefels, Spain — [2]Tata Institute of Fundamental Research Hyderabad, Hyderabad, India — [3]BAE Systems Inc., Nashua, USA — [4]Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain — [5]Universitat de València, Valencia, Spain

We report on femtosecond photorefractive optical transient detection in $BaTiO_3$ pumped in the blue, providing a remarkable ability for phase measurement of a dynamic signal while suppressing stationary background, achieving a suppression contrast of 60%.

# CJ-7: Visible to Mid-Ir Waveguide Sources

Chair: Bülend Ortaç, Bilkent University, Ankara, Turkey

Time: Thursday, 8:30–10:00 Location: ICM - Room 13b

**Oral** CJ-7.1 8:30 ICM - Room 13b

**GLS Waveguide Array: A Novel Saturable Absorber for Mid-Infrared Mode-Locked Fiber Lasers** — Trong Thuy Ha[1], Gayathri Bharathan[1,2], Luyi Xu[1], and •Alex Fuerbach[1] — [1]MQ Photonics Research Centre, School of Mathematics and Physics, Macquarie University, Sydney, Australia — [2]Indian Institute of Technology Delhi (IITD), Optics and Photonics Centre, New Delhi , India

A novel 2D GLS waveguide array, fabricated using ultrafast laser inscription, enabled passive mode-locking in a mid-IR fiber laser. Stable 2.8 $\mu$m laser emission demonstrates the potential of this approach for compact mid-IR laser development.

**Oral** CJ-7.2 8:45 ICM - Room 13b

**Harmonics generation in large-mode-area Cr:ZnS waveguide amplifier** — •Alexander Rudenkov[1], Vladimir L. Kalashnikov[1], Maksim Demesh[1], Nikolai Tolstik[1], Evgeni Sorokin[2,3], and Irina T. Sorokina[1,3] — [1]Norwegian University of Science and Technology, Trondheim, Norway — [2]Photonics Institute, Vienna University of Technology, Vienna, Austria — [3]ATLA Lasers AS, Trondheim, Norway

We demonstrate harmonics generation in a 34-mm long large-mode-area waveguide Cr:ZnS ultrafast amplifier with true waveguide propagation of all signals, high output beam quality $M^2$<1.3, 2.05W of average output power, and 4.3dB/cm gain.

**Oral** CJ-7.3 9:00 ICM - Room 13b

**A New Platform for Compact Solid-State Yellow Lasers: Waveguides in Dy,Tb:LiLuF$_4$** — •Davide Baiocco[1], Ignacio Lopez-Quintas[2,3], Javier Rodriguez Vazquez de Aldana[2,3], Alessandro di Maggio[4], Fabio Pozzi[4], Mauro Tonelli[1], and Alessandro Tredicucci[1] — [1]Dipartimento di Fisica, Università di Pisa, Pisa, Italy — [2]Grupo de Investigación en Aplicaciones del Láser y Fotónica, Universidad de Salamanca, Salamanca, Spain — [3]Unidad de Excelencia en Luz y Materia Estructurada (LUMES), Universidad de Salamanca, Salamanca, Spain — [4]Lumibird Photonics Italia Srl, Torino, Italy

We report the first Dy-based yellow femtosecond-laser-written waveguide laser on Dy,Tb:LiLuF$_4$. We demonstrated lasing at 574nm, 578nm and 568nm, with output powers of 86mW, 100mW, and 12mW respectively, and a maximum slope efficiency of 19%.

**Oral** CJ-7.4 9:15 ICM - Room 13b

**From single to multiple solitons in a GaN mode-locked polariton laser** — •Thierry Guillet[1], Valentin Develay[1], Olha Bahrova[2], Hassen Souissi[3], Christelle Brimont[1], Laetitia Doyennette[1], Edmond Cambril[3], Sophie Bouchoule[3], Blandine Alloing[4], Jesus Zuniga-Perez[4,5], Thorsten Ackemann[6], Dmitry Solnyshkov[2], and Guillaume Malpuech[2] — [1]Laboratoire Charles Coulomb, Université de Montpellier, CNRS, Montpellier, France — [2]Institut Pascal, Université Clermont Auvergne, CNRS, Clermont-Ferrand, France — [3]Centre de Nanosciences et de Nanotechnologies, CNRS, Université Paris-Saclay, Palaiseau, France — [4]CRHEA, Université Cote d'Azur, CNRS, Valbonne, France — [5]MajuLab, CNRS, Singapore, Singapore — [6]SUPA, Department of Physics, University of Strathclyde, Glasgow, United Kingdom

We demonstrate a mode-locked polariton laser in a 40 $\mu m$-long GaN ridge cavity, based on cavity solitons. Changing the pump position along the cavity allows to control the formation of single or multiple solitons.

**Oral** CJ-7.5 9:30 ICM - Room 13b

**All-Fiber Power-Scaling of a small-core Thulium-doped Fiber laser at 1931 nm** — •Jan Lautenschläger[1,2], Clément Romano[1], Dominik Lorenz[1,2], Julian Schneider[1,2], Dieter Panitzek[1,2], Marc Eichhorn[1,2], and Christelle Kieleck[1] — [1]Fraunhofer IOSB (Institute of Optronics, System Technologies and Image Exploitation), Ettlingen, Germany — [2]Institute of Control Systems (IRS), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany

Power scaling of an all-fiber single oscillator $Tm^{3+}$-doped step-index 10/125 $\mu$m fiber laser at 1931 nm with stable operation is demonstrated up to an output power of 70 W with greater 59% slope efficiency.

**Oral** CJ-7.6 9:45 ICM - Room 13b

**Non-linear fiber amplifier for shaping the optical pulses emitted by a gain-switch laser diode** — •Jean-Bernard Lecourt, Razane Ouarradi, and Yves Hernandez — Multitel Innovation Centre, Mons, Belgium

We propose a method to amplify and shape the pulses emitted by gain-switched diodes. It relies on NALM amplifier which is able to select either the main spike or the trailing edge of the pulses.

# CH-10: Gas, Particle and Surface Sensing

Chair: Cristian Focsa, University of Lille, Lille, France

Time: Thursday, 8:30–10:00 Location: ICM - Room 14a

**Oral** CH-10.1 8:30 ICM - Room 14a

**Single-shot coherent Brillouin scattering for gas particle velocimetry** — Stefan Karatodorov[1], Maria Mitrou[1], and •Alexandros Gerakis[1,2] — [1]Luxembourg Institute of Science and Technology, Esch-sur-Alzette, Luxembourg — [2]Department of Aerospace Engineering, Texas AM University, College Station, USA

We present, for the first time to the best of our knowledge, single-shot coherent Brillouin scattering, a non-resonant four-wave mixing technique, and demonstrate its capability for single-shot (~200ns) velocimetry in gas flow conditions.

**Oral** CH-10.2 8:45 ICM - Room 14a

**Silicon Photonic MEMS Chip for Photothermal Spectroscopy Gas Sensing** — Ahmed Mahrous[1,2,3], •Mazen Erfan[2,3], Johannes P. Waclawek[4], Ahmed Mostafa[1], Nicolas Pavy[1], Frédéric Marty[1], Elyes Nefzaoui[1], Yasser M. Sabry[2,3], Bernhard Lendl[4], and Tarik Bourouina[1] — [1]ESYCOM Lab, Univ Gustave Eiffel, CNRS, F-77454, Marne-la-Vallée, France — [2]Si-Ware Systems SAS, 16 rue Portalis, 75008, Paris, France — [3]Faculty of Engineering, Ain-Shams University, 1 Elsarayat St., 11535 Abbaseya, Cairo, Egypt — [4]Institute of Chemical Technologies and Analytics, TU Wien,1060, Vienna , Austria

We explore the potential of silicon micro-Fabry-Pérot Interferometers (FPI) for their operation in Photothermal Spectroscopy (PTS), targeting the first demonstration of PTS gas sensing based on a silicon-based interferometer.

**Oral** CH-10.3 9:00 ICM - Room 14a

**Sensitive Photoacoustic Gas Sensor for NOx Detection Using Hybrid Resonant Modes** — •Zhiyu Feng[1], Tailin Li[1], Wenzhe Wang[1], Shiyu Yan[2], and Chaotan Sima[1] — [1]National Engineering Research Center for Next Generation Internet Access System, School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan, China — [2]China Offshore Oil Engineering Co.,Ltd., TianjinPort Free Trade Zone, Tianjin, China

Resonance cell-based photoacoustic spectroscopy (PAS) is a promising detection method for gas component detection. We innovatively proposed a photoacoustic gas sensor with hybrid resonance modes and implement it for the simultaneous detection of nitrogen oxides.

**Oral** CH-10.4 9:15 ICM - Room 14a

**High-speed CO2 spectroscopy in the short-wave infrared using a dual-comb MIXSEL** — Marco Gaulke[1], Maximilian C. Schuchter[1,3], •Nicolas Huwyler[1], Matthias Golling[1], Benjamin Willenberg[1], Christopher R. Phillips[1], and Ursula Keller[1,2] — [1]ETH Zurich, Department of Physics, Zurich, Switzerland — [2]ETH Zurich, Department of Information Technology and Electrical Engineering, Zurich, Switzerland — [3]Tampere University, Faculty of Engineering and Natural Siences, Tampere, Finland

This work presents the high-speed spectroscopic capabilities of the dual-comb InGaSb MIXSEL for CO2 measurements at ambient pressures in the short-wave infrared (SWIR). The system operates at 2030 nm overlapping with significant CO2 absorption lines.

**Oral** CH-10.5 9:30 ICM - Room 14a

**Fast Detection of Multispecies Liquid Evaporation by Mid-IR Broadband Supercontinuum Source and Upconversion Spectrometer** — •Yueyu Lin[1], Paola Formica[1,2], Roderik Krebbers[1], Amir Khodabakhsh[1], and Simona M. Cristescu[1] — [1]Life Science Trace Detection Laboratory, IMM, Radboud University, Nijmegen, Netherlands — [2]Department of Physics, University of Bari, Via G. Amendola 173, Bari, Italy

Combining a mid-IR supercontinuum source and an upconversion grating-based spectrometer, we demonstrate time-resolved multispecies spectroscopy (spectral range: 2-4 $\mu$m, resolution: 4.5 cm-1) on the plumes of evaporating liquids in an open multipass absorption cell.

**Oral** CH-10.6 9:45 ICM - Room 14a

*withdrawn*

## CB-1: Frequency Comb Semiconductor Lasers

Chair: Borislav Hinkov, Silicon Austria Labs, Graz, Austria

Time: Thursday, 8:30–10:00 Location: ICM - Room 14b

**Invited** CB-1.1 8:30 ICM - Room 14b

**Semiconductor Quantum walk combs from the near-infrared to the terahertz** — •Jérôme Faist, Ina Heckelmann, Alexander Dikopoltsev, Bahareh Marzban, Lucius Miller, Miguel Montesinos-Ballister, Alessio Cargioli, Diego Piciocci, Valerio Digiorgio, Mattias Beck, and Giacomo Scalari — IQE, ETH Zurich, Zurich, Switzerland

The fast gain saturation of semiconductor heterostructures allows the stabilization of a broad quantum walk combs. Applications of this concept is shown at optical frequencies from the terahertz to the near-IR at 1.55um

**Oral** CB-1.2 9:00 ICM - Room 14b

**Integrated platform for high power Quantum Walk frequency combs** — •Johannes Fuchsberger[1], Theodore Letsou[2], Nikola Opacak[1], Dmitry Kazakov[2], Benedikt Schwarz[1], and Federico Capasso[2] — [1] Institute of Solid State Electronics, TU Wien, Vienna, Austria — [2] Harvard John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, USA

We present, a integrated, dry-etched platform for quantum walk combs with a power of up to 80.9mW, emitted from a single facet with a single lobed far field.

**Oral** CB-1.3 9:15 ICM - Room 14b

**Staggered Phase Flux for Frequency Comb Shaping in Fast Gain Lasers** — •Diego Piciocchi, Alexander Dikopoltsev, Ina Heckelmann, Mathieu Bertrand, Mattias Beck, Giacomo Scalari, and Jérôme Faist — Institute for Quantum Electronics, ETH Zurich, Zurich, Switzerland

By harnessing the controllability of an active synthetic photonic lattice in the frequency domain, we present an efficient method for electrically controlled spectral shaping of frequency combs from lasers with fast gain recovery times.

**Oral** CB-1.4 9:30 ICM - Room 14b

**High efficiency Quantum Walk Comb via double waveguide integration** — •Alessio Cargioli, Miguel Montesinos Ballester, Mattias Beck, and Jerome Faist — Institute for Quantumelectronics, ETH, Zurich, Switzerland

Quantum Walk Combs are a novel way of generating tunable frequency combs, however, they are limited in output power. We exploit a double waveguide scheme to improve the outcoupling by two orders of magnitude.

**Oral** CB-1.5 9:45 ICM - Room 14b

**Actively Mode-Locked Monolithic Semiconductor Laser with a Tunable Repetition Frequency** — •Urban Senica[1,3], Michael Schreiber[2], Paolo Micheletti[1], Mattias Beck[1], Christian Jirauschek[2], Jérôme Faist[1], and Giacomo Scalari[1] — [1]Quantum Optoelectronics Group, Institute for Quantum Electronics, ETH Zurich, Zurich, Switzerland — [2]TUM School of Computation, Information and Technology, Technical University of Munich (TUM), Munich, Germany — [3]John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, USA

An intracavity pulse pulling effect, induced by a spatiotemporal gain/loss modulation along the entire monolithic semiconductor laser waveguide, can generate coherent pulse trains and frequency combs with a continuously tunable repetition frequency between 4-16 GHz.

## CL-1: Biomedical Sensing Applications

Chair: Martin Booth, University of Oxford, Oxford, United Kingdom

Time: Thursday, 8:30–10:00 Location: ICM - Room Osterseen

**Oral** CL-1.1 8:30 ICM - Room Osterseen

**An integrated microscope for high throughput imaging of circulating tumour cells on a chip** — Andrea Ciceri[1], Giacomo Corrielli[2], Martina Russo[3], Francesca Bragheri[2], Roberto Osellame[2], Giulia Bertolini[4], Cinzia De Marco[4], Serena Di Cosimo[4], Nadia Brancati[3], and •Petra Paiè[1] — [1]Politecnico di Milano, Milano, Italy — [2]Istituto di Fotonica e Nanotecnologie, IFN-CNR, Milano, Italy — [3]Istituto di Calcolo e Reti ad Alte Prestazioni, ICAR-CNR, Napoli, Italy — [4]Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Milano, Italy

We present an innovative optofluidic microscope on a chip for high-throughput imaging. Ease of use, robustness and throughput characterizes this integrated system, capable to image a single cell in few microseconds.

**Oral** CL-1.2 8:45 ICM - Room Osterseen

**Twisted Hollow-Core Fiber for Enhanced Optical Rotation Measurements of Chiral Solutions** — •Sonia Maniappan[1], Christof Helfrich[1,2], Michael H Frosz[1], and Francesco Tani[1,3] — [1]Max-Planck-Institut für die Physik des Lichts, Erlangen, Germany — [2]University of Erlangen-Nürnberg, Erlangen, Germany — [3]University of Lille, CNRS, UMR 8523—PhLAM—Physique des Lasers Atomes et Molécules, Lille, France

A twisted single-ring hollow-core fiber is demonstrated for optical rotation measurements of chiral drug-Ladarixin, utilizing nanoliter-scale sample volumes while achieving high polarization extinction ratios, minimal birefringence, broadband operation, and robustness for analytical applications.

**Oral** CL-1.3 9:00 ICM - Room Osterseen

**PCR-free Single Nucleotide Polymorphism Analysis using Heterogeneous Probe-particle Optical Condensation** — •Shuichi Toyouchi[1,2], Ryoma Hasegawa[1,2,3], Kota Hayashi[1,2,3], Yumiko Takagi[1,2], Mamoru Tamura[1,4], Shiho Tokonami[1,3], and Takuya Iida[1,2] — [1]Research Institute for Light-induced Acceleration System (RILACS), Osaka Metropolitan University, Sakai, Japan — [2]Department of Physics, Graduate School of Science, Osaka Metropolitan University, Sakai, Japan — [3]Department of Materials Science, Graduate School of Engineering, Osaka Metropolitan University, Sakai, Japan — [4]Department of Material Engineering Science, Graduate School of Engineering Science, Osaka University, Toyonaka, Japan

This study presents a light-driven method for detecting single nucleotide polymorphisms in DNA using heterogeneous probe-particles. The technique enables rapid, PCR-free DNA detection with exceptional sensitivity, distinguishing single-base mutations with just five-minute laser irradiation.

**Oral** CL-1.4 9:15 ICM - Room Osterseen

**Simultaneous Measurement of Enzyme Activity and Concentration via a Multiplexed Photonic Sensor** — •Jordan Butt[1], Daniel Steiner[2,3], Michael Bryan[2,3], Katie Mann[4], and Benjamin Miller[2,3,4] — [1]Department of Chemistry, University of Rochester, Rochester, USA — [2]Department of Dermatology, University of Rochester, Rochester, USA — [3]Department of Biochemistry and Biophysics, University of Rochester, Rochester, USA — [4]The Institute of Optics, University of Rochester, Rochester, USA

Enzyme assays are a cornerstone of basic biology and clinical diagnostics. Through the use of a multiplexed photonic ring resonator, we demonstrate the first simultaneous quantification of both enzyme activity and concentration.

**Oral** CL-1.5 9:30 ICM - Room Osterseen

**A sensor for measuring vital parameters during ex situ liver perfusion** — •Jonas Binz, Florian Huwyler, Jasmina Saxer, Nika Petelinsek, and Mark Tibbitt — ETH Zurich, Zurich, Switzerland

Development of an optical sensor to measure predicting biomarkers during ex situ liver machine perfusion in real-time for systematic assessment of graft viability.

**Oral** CL-1.6 9:45 ICM - Room Osterseen

**High-throughput Analysis of Biomarker Proteins with Microflow Optical Condensation** — •Takuya Iida [1,2], Yumiko Takagi[2,1], Mami Katsumata[2,1,3], Kota Hayashi[2,1], Mamoru Tamura[2,4], Ikuhiko Nakase[1,2], Shiho Tokonami[3,2], and Ayumu Taguchi[5] — [1]Graduate School of Science, Osaka Metropolitan University, Osaka, Japan — [2]Research Institute for Light-induced Acceleration System (RILACS), Osaka Metropolitan University, Osaka, Japan — [3]Graduate School of Engineering, Osaka Metropolitan University, Osaka, Japan — [4] Graduate School of Engineering Science, Osaka University, Osaka, Japan — [5]Graduate School of Medical Science, Nagoya City University, Nagoya, Japan

We demonstrated selective quantitative measurement of biomarker proteins with high sensitivity by assembling of antibody-modified beads under optical and microfluidic pressure. Our obtained results are useful for ultra-early diagnosis of various diseases such as cancer.

## CA-7: New Concepts for Solid-State Lasers

Chair: Richard Mildren, Macquarie University, Sydney, Australia

Time: Thursday, 8:30–10:00 Location: Hall A1 - Room A12

**Oral** CA-7.1 8:30 Hall A1 - Room A12

**100 W coherently combined picosecond optical vortices** — •Hossein Fathi[1], Rafael Barros[2], and Regina Gumenyuk[1] — [1]Laboratory of Photonics, Physics Unit, Faculty of Engineering and Natural Sciences, Tampere University, Korkeakoulunkatu 3, 33720, Tampere, Finland — [2]Instituto de Física, Universidade de São Paulo, 05315-970, São Paulo, Brazil

We experimentally demonstrate 100 W optical vortices with topological charges l = 1, 5, and 8 using coherent beam combining, achieving combining efficiencies of 95%, 93.9%, and 91.2%, showcasing effective power scaling of optical vortices.

**Oral** CA-7.2 8:45 Hall A1 - Room A12

**LED-pumped alexandrite multipass amplifier** — Elio Thellier, Hussein Taleb, Catherine Le Blanc, Pierre Pichon, Frédéric Druon, •Patrick Georges, and François Balembois — Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, Palaiseau, France

We demonstrate a multipass alexandrite amplifier indirectly LED-pumped by a Ce:YAG luminescent concentrator illuminated by 3400 blue LEDs. The single pass gain is 1.38 and the total gain reaches 34 after 16 passes.

**Oral** CA-7.3 9:00 Hall A1 - Room A12

**High gain indirectly LED-pumped Nd:glass lasers** — Maxime Nourry-Martin[1], Nicolas Fermon[1], •Catherine Le Blanc[1], Loïc Meignien[2], Patrick Audebert[2], Frédéric Druon[1], Patrick Georges[1], and François Balembois[1] — [1]Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, Palaiseau, France — [2]LULI, CNRS, École Polytechnique, CEA, Sorbonne Université, Institut Polytechnique de Paris, Palaiseau, France

We demonstrate the first LED Nd:glass lasers indirectly LED pumped via a Ce:YAG luminescent concentrator. A small signal gain up to 1.9 is recorded. 5 mJ pulses are obtained in a cavity-dumped configuration.

**Oral** CA-7.4 9:15 Hall A1 - Room A12

**Off-Resonance Intracavity Upconversion Pumping for High-Power 2.3-$\mu$m Tm:YLF Laser** — •Matthieu Glasset[1], Hippolyte Dupont[1], Lauren Guillemot[2], Pavel Loiko[2], Patrice Camy[2], Patrick Georges[1], and Frederic Druon[1] — [1]Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry , Palaiseau (91192), France — [2]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen, Caen (14050), France

We propose an intracavity, off-resonance laser architecture for upconversion pumping at 1064 nm of a 2.3 $\mu$m Tm:YLF. Our study shows significant output power , gain and efficiency, making the couple Tm:YLF Nd:YVO4 competitive with direct diode pumping.

**Oral** CA-7.5 9:30 Hall A1 - Room A12

**Electro-optic metasurface for tunable external cavity lasers** — •Zahra Basiri[1], Andrea Lanfranchi[2], Alessandro Tomasino[1], Francesco Bertot[1], and Ileana-Cristina Benea-Chelmus[1] — [1]Hybrid photonic laboratory, EPFL, 1015-CH, Lausanne, Switzerland — [2]Department of Chemistry and Industrial Chemistry, University of Genoa, 16146 , Genova, Italy

We introduce linear, electro-optic control of a free-space laser diode by using a compact hybrid metasurface as an RF-tunable cavity mirror. Our method provides 86.1% modulation efficiency at CMOS-compatible 3V radio frequency voltage.

**Oral** CA-7.6 9:45 Hall A1 - Room A12

**Optimizing the linewidth of Alexandrite lasers emitting in the IR or the UV for atmospheric lidars** — •Lamine Seck[1], Alexander Munk[1], Michael Strotkamp[1], and Josef Höffner[2] — [1]Fraunhofer Institute for Laser Technology - ILT, Aachen, Germany — [2]Leibniz Institute of Atmospheric Physics - IAP, Kühlungsborn, Germany

For atmospheric Doppler lidars, diode-pumped Alexandrite lasers are superior due to extremely narrow linewidths achievable with injection seeding and cavity-control. With matched spectral filters, the time-resolved spectrum is measured and optimized close to the Fourier limit.

## CE-10: Mid-Infrared Materials and Devices

Chair: Martina Gerken, Kiel University, Kiel, Germany

Time: Thursday, 8:30–10:00 Location: Hall B1 - Room B11

**Oral** CE-10.1 8:30 Hall B1 - Room B11

**On-Chip Microresonators with Quality Factor Over 40 Million in the Mid-Infrared Region** — •Daewon Suk[1], Kiyoung Ko[1], Duk-Yong Choi[2], and Hansuek Lee[1] — [1]Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon, South Korea — [2]Laser Physics Centre, Research School of Physics, Australian National University, Canberra, Australia

We demonstrated on-chip microresonators with Q-factors exceeding 40 million in the mid-infrared region, surpassing previous records by over 40 times. The converted optical loss from Q-factors is 0.40 dB/m, approaching the loss performance of fibers.

**Oral** CE-10.2 8:45 Hall B1 - Room B11

**Hybrid Mid-Infrared Supermirrors with Ion-Beam-Sputtered Coatings** — •Lukas W. Perner[1], Valentin J. Wittwer[1,2], Gar-Wing Truong[3], Garrett D. Cole[3], and Thomas Südmeyer[1] — [1]Laboratoire Temps-Fréquence, Institut de Physique, Université de Neuchâtel, Neuchâtel, Switzerland — [2]UTOM AG, Oensingen, Switzerland — [3]Thorlabs Crystalline Solutions, Santa Barbara, CA, USA

We report details on the design, manufacturing, and characterization of low-loss ion-beam-sputtered mulitlayers used for amorphous-crystalline hybrid supermirrors for mid-infrared applications, including details on highly reflective coatings and characterization of a hybrid mirror design.

**Oral** CE-10.3 9:00 Hall B1 - Room B11

**Group Delay Dispersion Measurements of Novel Mid-Infrared Mirrors** — •Ulrich Galander[1,2], Maximilian Prinz[1,2], Lukas W. Perner[3], and Oliver H. Heckl[1] — [1]University of Vienna, Faculty of Physics, Optical Metrology Group, Vienna, Austria — [2]University of Vienna, Vienna Doctoral School in Physics, Vienna, Austria — [3]Université de Neuchâtel, Institut de Physique (LTF), Neuchâtel, Switzerland

We present the methods and results of broadband group delay dispersion measurements for novel monocrystalline and amorphous-crystalline hybrid supermirrors, as well as an all-amorphous mirror in the wavelength range from 2–4.8 $\mu$m.

**Oral** CE-10.4 9:15 Hall B1 - Room B11

**Advanced PDK elements for a mid-infrared Ge-on-Si Platform (MIRPIC)** — •Andrzej Polatynski[1,2], Jacek Olszewski[3], Marcin Lelit[1], Aleksandra Paśnikowska[1], Aleksandra Bieniek-Kaczorek[1], Paweł Bortnowski[1], Łukasz Kozłowski[1], Krzysztof Anders[1,3,4], Stanisław Stopiński[1,3,4], Piotr Wiśniewski[5], Mateusz Słowikowski[5], Marcin Juchniewicz[5], Dorota Pierścińska[6], Kamil Pierściński[6], André Richter[2], and Ryszard Piramidowicz[1,3,4] — [1]Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, Warsaw, Poland — [2]VPIphotonics GmbH, Berlin, Germany — [3]VIGO Photonics S.A, Warsaw, Poland — [4]LightHouse Sp. z o.o., Lublin, Poland — [5]Centre for Advanced Materials and Technologies CEZA, Warsaw, Poland — [6]Lukasiewicz Research Network – Institute of Microelectronics and Photonics, Warsaw, Poland

In this work, we present and discuss recent advances in developing a simulation process design kit library for the Germanium-on-Silicon MIRPIC platform. We demonstrate its capacities based on a mid-infrared gas sensing system.

**Oral** CE-10.5 9:30 Hall B1 - Room B11

**Micro-tapered Long Period Grating for Mid-Infrared Wavelengths** — Francesco Anelli[1], Antonella Maria Loconsole[1], Solenn Cozic[2], and •Francesco Prudenzano[1] — [1]Politecnico di Bari, Bari, Italy — [2]Le Verre Fluoré, Bruz, France

A micro-tapered long-period grating was successfully inscribed on a single-mode ZBLAN optical fiber using a filament fusion splicer. The measured transmission spectrum validates the operating mechanism, demonstrating the effectiveness of the design and fabrication approach.

**Oral** CE-10.6 9:45 Hall B1 - Room B11

**Mid-infrared adaptive fiber micro-lenses for inline beam shaping** — •Tinghui An[1,2], Yuchen Wang[1], Wenkai Zhao[1,3], Xiyue Zhang[1,3], Weibo Wu[1,4], Lu Deng[1], Xinqiang Yuan[5], Yiguang Jiang[1], and Long Zhang[1] — [1]Shanghai Institute of Optics and Fine Mechanics, Shanghai, China — [2]ShanghaiTech University, Shanghai , China — [3]University of Chinese Academy of Sciences, Beijing, China — [4]Xiangtan University, Xiangtan, China — [5]Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences, Hangzhou, China

We demonstrate fluorozirconate mid-IR fiber micro-lenses enabling beam collimation and focusing. With <0.14 dB loss, reduced divergence, tunable focal lengths (0.98–1.61 mm) and low losses (<0.14 dB), they advance mid-IR photonic integration for applications.

# CG-1: Strong Field and Ultrafast Phenomena in Condensed Matter

Chair: Mathieu Gisselbrecht, Lund University, Lund, Sweden

Time: Thursday, 8:30–10:00 Location: Hall B2 - Room B21

**Invited** CG-1.1 8:30 Hall B2 - Room B21

**Coherent nanophotonic particle acceleration on a chip** — •Peter Hommelhoff[1,2], Leon Brückner[1], Stefanie Kraus[1], Tomas Chlouba[1], Roy Shiloh[1], Julian Litzel[1], Manuel Konrad[1], Nils Bode[1], Viacheslav Korolev[1], Tatsunori Shibuya[1,3], Julian Freier[1], and Zhexin Zhao[1] — [1]Friedrich-Alexander University (FAU), Erlangen, Germany — [2]Ludwig-Maximilian University (LMU), Munich, Germany — [3]National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan

We show acceleration and confinement of electron beams based on nanophotonic nearfields, realizing the particle accelerator on a chip.

**Oral** CG-1.2 9:00 Hall B2 - Room B21

**Element-Specific Phonon Dynamics in Molybdenum Dioxide Revealed by Transient Absorption Spectroscopy** — •Florence Burri, Marko Hollm, Erik W. de Vos, Lukas Gallmann, Ursula Keller, and Sergej Neb — Eidgenössische Technische Hochschule Zürich, CH-8093 Zürich, Switzerland

Our thorough study using attosecond transient absorption spectroscopy offers detailed insights into phonon-driven dynamics in molybdenum dioxide. Simple density functional theory uncovers phononic fingerprints in photoabsorption and encodes element- and energy-specific contributions.

**Oral** CG-1.3 9:15 Hall B2 - Room B21

**Discovery of a Hybrid Exciton State by Attosecond Spectroscopy** — •Simone Bonetti[1], Nicola Di Palo[1], Giacomo Inzani[1], Gian Luca Dolso[1], Matteo Talarico[1], Martin Zukerstein[2], Giacomo Fiorentini[1], Rocío Borrego-Varillas[2], Mauro Nisoli[1,2], Marco D'Alessandro[3], Nicolas Tancogne-Dejean[4], Umberto De Giovannini[4,5], Davide Sangalli[6], and Matteo Lucchini[1,2] — [1]Department of Physics, Politecnico Di Milano, Milano, Italy — [2]Institute for Photonics and Nanotechnologies, IFN-CNR, Milano, Italy — [3]Istituto di Struttura della Materia-CNR (ISM-CNR), Roma, Italy — [4]Max Planck Institute for the Structure and Dynamics of Matter and Center for Free-Electron Laser Science, Hamburg, Germany — [5]Università degli Studi di Palermo, Dipartimento di Fisica e Chimica - Emilio Segrè, Palermo, Italy — [6]Istituto di Struttura della Materia-CNR (ISM-CNR), Monterotondo Scalo, Italy

We investigate the ultrafast optical properties of lithium fluoride using attosecond transient reflection spectroscopy. We discover a new hybrid excitonic resonance, offering insights into field-driven dynamics governing the coherent response of wide band-gap insulators.

**Oral** CG-1.4 9:30 Hall B2 - Room B21

**Subcycle Band-Structure Videography of Graphene** — •Vincent Eggers[1], Giacomo Inzani[1], Manuel Meierhofer[1], Jakob Helml[1], Lasse Münster[1], Robert Wallauer[2], Sarah Zajusch[2], Suguru Ito[2], Leon Machtl[1], Hao Yin[3], Christian Kumpf[3], François C. Bocquet[3], Changhua Bao[1], Jens Güdde[2], F. Stefan Tautz[3], Rupert Huber[1], and Ulrich Höfer[1,2] — [1]Department of Physics and Regensburg Center for Ultrafast Nanoscopy, University of Regensburg, Regensburg, Germany — [2]Department of Physics, Philipps-Universität Marburg, Marburg, Germany — [3]Peter Grünberg Institut (PGI-3), Forschungszentrum Jülich, Jülich, Germany

Momentum microscopy with subcycle temporal resolution enables band-structure videography throughout the entire Brillouin zone, capturing the impact of intense mid-infrared lightfields on quantum materials. Subcycle analysis of lightwave-driven currents in graphene reveals femtosecond scattering dynamics.

**Oral** CG-1.5 9:45 Hall B2 - Room B21

*withdrawn*

## EB-7: Machine Learning and Metasurfaces for Quantum Optics

Chair: Robert Fickler, Tampere University, Tampere, Finland

Time: Thursday, 10:30–12:00 Location: ICM - Room 1

**Invited** EB-7.1 10:30 ICM - Room 1
*withdrawn*

**Oral** EB-7.2 11:00 ICM - Room 1
**Harnessing Photon Indistinguishability in Quantum Extreme Learning Machines** — •Malo Joly[1], Adrian Maksowki[1,2], Lukas Porstendorfer[3], Steffen Wilksen[3], Edoardo Charbon[4], Christopher Gies[3], Hugo Defienne[5], and Sylvain Gigan[1] — [1]Laboratoire Kastler Brossel, Paris, France — [2]Institute of Experimental Physics, Warsaw, Poland — [3]Institute for Theoretical Physics and Bremen Center for Computational Material Science,, Bremen, Germany — [4]Advanced Quantum Architecture Laboratory , Lausanne, Switzerland — [5] Institut des NanoSciences de Paris, Paris, France
Quantum extreme learning machines using photons and a multimode fiber show enhanced machine learning accuracy by leveraging quantum indistinguishability. We present an experiment for two photons and promising simulation results as we include more photons.

**Oral** EB-7.3 11:15 ICM - Room 1
*withdrawn*

**Oral** EB-7.4 11:30 ICM - Room 1
*withdrawn*

**Oral** EB-7.5 11:45 ICM - Room 1
**Stabilization of phase and polarization in multiplexed entangled states through multi-channel optical fibre arrays** — •Adrián S. Blanca[1], Giacomo Paganini[1], Evelyn A. Ortega[1], Robin Camphausen[1], Álvaro Cuevas[1,3], and Valerio Pruneri[1,2] — [1]ICFO - The Institute of Photonic Sciences, Castelldefels, Spain — [2]ICREA - Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain — [3]Quside Technologies SL, Castelldefels, Spain
We present a scalable spatial light modulation-based system for efficiently coupling entangled photons into a multi-core fibre, as well as stabilizing their phase and polarization along fibre propagation, showing potential applications in different fields.

## CK-9: Advanced Fabrication Techniques 2

Chair: Carlo Liberale, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia

Time: Thursday, 10:30–12:00 Location: ICM - Room 4a

**Oral** CK-9.1 10:30 ICM - Room 4a
**Retinomorphic Computing with Photonic Network Lasers** — •Wai Kit Ng[1], Jakub Dranczewski[1,2], Anna Fischer[1,2], T. V. Raziman[1,3], Dhruv Saxena[1], Tobias Farchy[1], Kilian Stenning[1,4], Jonathan Peters[1,5], Heinz Schmid[2], Will R. Branford[1,4], Mauricio Barahona[3], Kirsten Moselund[6,7], Riccardo Sapienza[1], and Jack C. Gartside[1] — [1]The Blackett Laboratory, Department of Physics, Imperial College London, London, United Kingdom — [2]IBM Research Europe – Zurich, Zurich, Switzerland — [3]Department of Mathematics, Imperial College London, London, United Kingdom — [4]London Centre for Nanotechnology, Imperial College London, London, United Kingdom — [5]Spintec, Univ. Grenoble Alpes, CEA, CNRS, Grenoble INP, Grenoble, France — [6]Laboratory of Nano and Quantum Technologies, Paul Scherrer Institut, Villigen, Switzerland — [7]INPhO, Faculty of Engineering, EPFL, Lausanne , Switzerland
We achieved an efficient retinomorphic machine vision platform using a photonic network with nonlinear mode interactions. Image features can be effectively extracted from the network's spatially and spectrally distributed lasing emission.

**Oral** CK-9.2 10:45 ICM - Room 4a
*withdrawn*

**Oral** CK-9.3 11:00 ICM - Room 4a
**Fiber-Interfaced Nanoprinted Hollow-Core Waveguide: A Novel Platform for Nanoparticle Tracking** — •Diana Pereira[1,2], Torsten Wieduwilt[1], Walter Hauswald[1], Matthias Zeisberger[1], Marta S. Ferreira[2], and Markus A. Schmidt[1,3,4] — [1]Leibniz Institute of Photonic Technology, Jena, Germany — [2]i3N & Physics Department, University of Aveiro, Aveiro, Portugal — [3]Abbe Center of Photonics and Faculty of Physics, Friedrich-Schiller University Jena, Jena, Germany — [4]Otto Schott Institute of Materials Research (OSIM), Friedrich-Schiller University Jena, Jena, Germany
This work proposes a novel strategy for integrating a square hollow-core waveguide with standard optical fibers using 3D nanoprinting technology, showcasing its practical utility through a nanoscience-based characterization technique (Nanoparticle Tracking Analysis).

**Oral** CK-9.4 11:15 ICM - Room 4a
**Integration of Suspended, High Q-factor Photonic Crystal Cavities onto Optical Fibre Tips by Transfer Printing** — •Elise A.B. Burns[1], Sean P. Bommer[1], Jack A. Smith[1], Benoit Guilhabert[1], Christopher Panuski[2], Dirk Englund[2], and Michael J. Strain[1] — [1]Institute of Photonics, Dep. of Physics, University of Strathclyde, Glasgow, United Kingdom — [2]Research Laboratory of Electronics, MIT , Cambridge, Massachusetts, USA
Photonic crystal cavities were printed onto suspended mechanical blocks and subsequently transferred onto an optical fibre tip. A reflection peak was observed with a Q-factor of 1.3x105 enabling potential sensing applications in challenging environments.

**Oral** CK-9.5 11:30 ICM - Room 4a
**Etching-free rare-earth-doped Al2O3 and Y2O3 micro-devices made by Pulsed Laser Deposition and Lift-off** — •Antoine Bernard[1], Antonio Pereira[1], Régis Orobtchouk[2], Hai-Son Nguyen[2], Damien Rinnert[2], Christian Seassal[2], Yannick Guyot[1], and Alban Gassenq[1] — [1]Institut Lumière Matière, Villeurbanne, France — [2]Institut des Nanotechnologies de Lyon, Ecully, Villeurbanne, France
Rare-earth-doped oxides micro-devices are essential for integrated photonics. Etching-based structuring is challenging. We present an etchless technique to build rare-earth-doped waveguides, photonic crystals and rings using pulsed laser deposition and lift-off.

**Oral** CK-9.6 11:45 ICM - Room 4a
**3D Microprinting of Lanthanide-based polymers on optical fibers: A platform for multiplexed sensing** — Shaghayegh Baghapour[1], Valese Aslani[2], Wenqi Zhang[1], Stephen Warren-Smith[3], Sally Plush[4], Alois Herkommer[2], Andrea Toulouse[2], and •Shahraam Afshar V[1] — [1]UniSA STEM, University of South Australia, Adelaide, Australia — [2]University of Stuttgart, Institute of Applied Optics (ITO), Stuttgart, Germany — [3]Future Industries Institute, University of South Australia, Adelaide, Australia — [4]Clinical and Health Sciences, University of South Australia, Adelaide, Australia
We develop a simultaneous multiplexed sensing platform by 3D microprinting active polymers doped with lanthanide-based fluorophores onto the tips of optical fibers. This platform enables spectral, temporal, and spatial separation of signals from multiple stimuli.

# CM-4: Laser Processing of Semiconductors

Chair: Inka Manek-Hönninger, University of Bordeaux, Bordeaux, France

Time: Thursday, 10:30–12:00 Location: ICM - Room 4b

**Oral** CM-4.1 10:30 ICM - Room 4b

**Enhanced Conditions inside Silicon by Interactions with Tightly Focused Counterpropagating Ultrafast Laser Pulses** — •Niladri Ganguly, Pol Sopeña, and David Grojo — Aix-Marseille University, CNRS, LP3 UMR 7341, F-13009, Marseille, France

Using spatial light modulation and the time-reversal concept, we obtain with a single objective lens counterpropagating focused pulses for cooperative interactions inside silicon. We study the achievable new levels of excitation for 3D writing modalities.

**Oral** CM-4.2 10:45 ICM - Room 4b

**Ultrafast laser-induced silicon surface modification: from linear to highly nonlinear excitation regimes** — •Mario Garcia-Lechuga[1], Pol Sopeña[2], Noemi Casquero[1], Javier Solis[1], Olivier Utéza[2], David Grojo[2], and Jan Siegel[1] — [1]Instituto de Optica Daza de Valdes (IO), CSIC, Madrid, Spain — [2]Aix Marseille Université, CNRS, LP3, UMR7341, Marseille, France

We explore the impact of ultrashort laser wavelengths (258–4000 nm) on crystalline silicon amorphization and ablation. Fluence thresholds and amorphization depth are characterized, further understood through the role of absorption mechanisms and time-resolved reflectivity measurements.

**Oral** CM-4.3 11:00 ICM - Room 4b

**Ultrafast Laser Filamentation in Semiconductors** — •Maxime Chambonneau[1], Markus Blothe[1], Vladimir Yu. Fedorov[2], Stelios Tzortzakis[3,4], and Stefan Nolte[1,5] — [1]Friedrich Schiller University Jena, Institute of Applied Physics, Abbe Center of Photonics, Jena, Germany — [2]Laboratoire Hubert Curien, Université Jean Monnet, Saint-Étienne, France — [3]Institute of Electronic Structure and Laser, Foundation for Research and Technology-Hellas, Heraklion, Greece — [4]Department of Materials Science and Engineering, University of Crete, Heraklion, Greece — [5]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Center of Excellence in Photonics, Jena, Germany

We demonstrate the universality of ultrafast laser filamentation in semiconductors. Our approach relies on nonlinear propagation imaging for various laser conditions. Spectral shaping is proposed to increase internal energy deposition in semiconductors.

**Oral** CM-4.4 11:15 ICM - Room 4b

**Laser Nano-fabrication inside Silicon with Anisotropic Seeding** — Rana Asgari Sabet[1,2], Mehmet Bütün[1], and •Onur Tokel[1,2] — [1]Department of Physics, Bilkent University, Ankara, Turkey — [2]National Nanotechnology Research Center, Bilkent University, Ankara, Turkey

We report controlled nano-structuring capability inside the bulk of silicon with features down to 100 nm. The maskless approach enables beyond diffraction limit features and diverse architectures, with modulated laser beams and anisotropic seeding.

**Oral** CM-4.5 11:30 ICM - Room 4b

**Double-pulse ultrafast laser bulk modification of silicon** — •Markus Blothe[1], Jesvin Joseph[1], Maxime Chambonneau[1], and Stefan Nolte[1,2] — [1]Friedrich Schiller University Jena, Institute of Applied Physics, Abbe Center of Photonics, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Center of Excellence in Photonics, Jena, Germany

Silicon bulk modification with temporally adaptable double-pulse laser irradiation is investigated. An upper limit often restricts the energy range for modification, evidencing filamentation. Interference is identified as crucial for picosecond pulse-durations with near-THz repetition rates.

**Oral** CM-4.6 11:45 ICM - Room 4b

**Nanosecond IR Laser-Assisted Selective 3D Etching of Silicon for Photovoltaics** — •Darya Akhtaryarazar[1], Viktor Kadan[1,3], Khalil Dadashi[1], Kardelen Demirbas[1], Alpan Bek[1], Mona Zolfaghari Borra[2], Bulent Arikan[2], Arian Goodarzi[2], Rasit Turan[1,2], and Ihor Pavlov[1,3] — [1]Middle East Technical University, Ankara, Turkey — [2]ODTU-GUNAM Center for Solar Energy Research and Applications, Ankara, Turkey — [3]Institute of Physics of the NAS of Ukraine, Kyiv, Ukraine

We developed a highly efficient selective etchant for nanosecond laser-processed silicon with 1600× selectivity. We demonstrated that etched silicon retains long carrier lifetime for PV applications. Several advanced structures were fabricated for solar cell integration.

# CD-10: Brillouin and Raman Effects

Chair: Nathalie Vermeulen, Vrije Universiteit Brussel, Brussels, Belgium

Time: Thursday, 10:30–12:00 Location: ICM - Room 13a

**Invited** CD-10.1 10:30 ICM - Room 13a

**Optoacoustic Building Blocks for Photonic Neural Networks** — •Jesús Humberto Marines Cabello[1,2], Grigorii Slinkov[1,2], Olivia Saffer[1,2], Niklas Braband[1,2], Andreas Geilen[1,2], Steven Becker[1,2], and Birgit Stiller[1,2,3] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany — [3]Institute of Photonics, Leibniz University Hannover, Hannover, Germany

We present optoacoustics as a novel platform for photonic neuromorphic computing. We experimentally demonstrate a nonlinear activation function, a photonic-phononic memory with extended storage time capable of processing phase-encoded information, and an optoacoustic recurrent operator.

**Oral** CD-10.2 11:00 ICM - Room 13a

**Laser-drawn silicon core fibres for Raman amplification and wavelength conversion** — •Meng Huang[1], Amar N. Ghosh[1], Tuoyang Chen[1], Lin Xu[1], Clarissa M. Harvey[2], Michael Fokine[2], and Anna C. Peacock[1] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]Department of Applied Physics, Royal Institute of Technology, Roslagstullsbacken, Sweden

Strong nonlinear Raman emission is observed using high-quality nonlinear silicon core fibres. Raman amplification in the telecom band is achieved with a gain of 9 dB and efficient wavelength conversion is demonstrated in the mid-infrared.

**Oral** CD-10.3 11:15 ICM - Room 13a

**Generation of cascaded Raman vortex lasers using diamond** — Hui Chen[1,2], Zhihan Zhu[3], Takashige Omatsu[4], Richard P. Mildren[5], and •Zhenxu Bai[1,2] — [1]Center for Advanced Laser Technology, Hebei University of Technology, Tianjin, China — [2]Collaborative Innovation Center for Diamond Laser Technology and Applications, Tianjin, China — [3]Heilongjiang Key Laboratory of Quantum Control, Harbin University of Science and Technology, Harbin, China — [4]Molecular Chirality Research Center, Chiba University, Chiba, Japan — [5]MQ Photonics Research Centre, Department of Physics and Astronomy, Sydney, Australia

For the first time, the direct generation of a diamond Raman vortex laser was demonstrated using an off-axis cavity mirror method, achieving HG and LG modes with outputs of 42 W at 1.2 $\mu$m and 22 W at 1.5 $\mu$m.

**Oral** CD-10.4 11:30 ICM - Room 13a

**Generation of Intense Femtosecond Pulses Beyond 3000 nm Using OPCPA Combined with Transient Rotational SRS in Hydrogen** — •Augustė Černeckytė, Augustinas Petrulėnas, Paulius Mackonis, and Aleksej M. Rodin — Center for Physical Sciences and Technology, Vilnius, Lithuania

Stokes pulse generation via transient rotational SRS in hydrogen was studied using sub-ps signal and idler SWIR OPCPA pulses. This approach of combining OPCPA with transient rotational SRS provides spectral extension from ~2 $\mu$m to ~3.1 $\mu$m.

**Oral** CD-10.5 11:45 ICM - Room 13a

**Experimental study of the structural dependence of stimulated Raman-like scattering in solid-core photonic crystal fibres** — •Ruchen Lv[1,2], Yuejiao Zi[1], Benhai Wang[1], Haochen Lin[1], Guoqing Ji[3], Jiapeng Huang[1], Xin Jiang[1], Wenbin He[1], and Meng Pang[1,2,3] — [1]Russell Centre for Advanced Lightwave Science, Shanghai Institute of Optics and Fine Mechanics and Hangzhou Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [2]Department of Optics and Optical Engineering, University of Science and Technology of China, Hefei, China — [3]State Key Laboratory of High Field Laser Physics, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China

We investigated the stimulated Raman-like scattering process in a series of photonic crystal fibres with varied air-filling ratios, unveiling the impacts of air-channels upon PCF-core resonance through avoided mode-crossing with vibration modes in the cladding.

## CJ-8: Novel Fiber Lasers and Amplifiers 1

Chair: Federica Poli, Università di Parma, Parma, Italy

Time: Thursday, 10:30–12:00 Location: ICM - Room 13b

**Invited** CJ-8.1 10:30 ICM - Room 13b

**Fluorescent and amplifying/laser behaviors of bismuth and neodymium ions doped silica glasses and fibers** — Lili Hu , Xin Li, Chunlei Yu, Shikai Wang, Mengting Guo, and •Fan Wang — Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Science, Shanghai, China

The latest progress on the fluorescent and amplification properties of bismuth doped silica fiber, as well as the laser behaviors at around 900 nm of neodymium doped silica fiber in SIOM will be presented.

**Oral** CJ-8.2 11:00 ICM - Room 13b

**Watt-level ultrafast praseodymium-doped fluoride fiber amplifier at 1.3 $\mu$m** — •Takao Fuji, Junya Takano, and Tatsuki Yamada — Toyota Technological Institute, Nagoya, Japan

Watt-level chirped pulse amplification based on three-stage praseodymium-doped fluoride fiber amplifier has been demonstrated. The amplified pulse has been compressed down to 360 fs without serious phase distortion.

**Oral** CJ-8.3 11:15 ICM - Room 13b

**Continuously tunable Bi-doped germanosilicate fiber laser from 1400nm to 1479nm** — Ziwei Zhai and •Jayanta K. Sahu — University of Southampton, Southampton, United Kingdom

We report an all-fiber Bi-doped ring laser continuously tunable from 1400-1479nm using 23m of Bi-doped germanosilicate fiber and a tunable optical-filter. At 1445nm, we achieve 163.4mW output power, 19.1% slope efficiency, and 58dB in-band OSNR.

**Oral** CJ-8.4 11:30 ICM - Room 13b

**29 dB Gain Single-Pass Bismuth-Doped Fiber Amplifier Operating in the Short Wavelength Range of the O-Band** — •Serge Dedeyan, Simon Boivinet, Monika Bouet, Vincent Andrieux, Sarah Garzandat, Andy Cassez, Hicham El Hamzaoui, and Laurent Bigot — Univ. Lille, CNRS, UMR 8523 - PhLAM - Physique des Lasers Atomes et Molécules, F-59000 Lille, France

29dB gain is demonstrated in the short wavelength range of the O-band with a bismuth-doped phosphosilicate fiber bidirectionally pumped in single-pass configuration. This high gain is attributed to moderate unsaturated losses.

**Oral** CJ-8.5 11:45 ICM - Room 13b

**Watt-level O-band Bismuth-Doped Fiber Amplifier** — •Aleksandr Donodin[1], Dmitrii Stoliarov[1], Vitaly Mikhailov[2], Egor Manuylovich[1], Jiawei Luo[2], David J. DiGiovanni[2], and Sergei K. Turitsyn[1] — [1]Aston University, Birmingham, United Kingdom — [2]OFS Laboratories, Somerset, USA

We report for the first time a watt-level O-band bismuth-doped fiber amplifier, which operates over 1260 to 1350 nm, and has maximum 17.6 dB gain and minimal 8.3 dB NF for 13 dBm signal power.

## CH-11: Vibrational Spectroscopy and Sensing

Chair: J.J. Huang, National Taiwan University, Taipei, Taiwan

Time: Thursday, 10:30–12:00 Location: ICM - Room 14a

**Oral** CH-11.1 10:30 ICM - Room 14a

**Methods for temperature profile reconstruction from incomplete measurements in incoherent Raman OFDR** — •Thibault North[1] and Matteo Ravasi[2] — [1]LUNA Innovations GmbH, Cologne, Germany — [2]King Abdullah University of Science and Technology (KAUST), Thuwal, Kingdom of Saudi Arabia

Incoherent Raman OFDR systems can produce full temperature profiles despite acquiring only a non-uniform frequency subset. With little apriori knowledge of the temperature profile changes, a direct reconstruction is possible using adequate regularization operators.

**Oral** CH-11.2 10:45 ICM - Room 14a

**Correlation Between Double-Pulse Signal Characteristics and Brillouin Backscatter Spectrum in Optical Fibers** — •Vishwakarma Vishal Santosh, Sumeet Kumar Sinha, and Deepak Jain — Indian Institute of Technology Delhi, New Delhi, India

An analytical expression for the spectrum of the Brillouin backscattered pulse for double-input-pulse is derived, revealing an oscillatory spectrum leading to better resolution than single-input pulse in a distributed optical fiber sensing system.

**Oral** CH-11.3 11:00 ICM - Room 14a

**Room-Temperature Fourier Transform Spectroscopy from the UV to the THz with a Thin-Membrane Pyroelectric Detector** — •Jakub Mnich, Grzegorz Gomółka, Jarosław Sotor, and Łukasz Sterczewski — Laser and Fiber Electronics Group, Faculty of Electronics, Photonics and Microsystems, Wrocław University of Science and Technology, Wrocław, Poland

We present a room-temperature Fourier transform spectrometer covering the 0.39 – 50 $\mu$m spectral range with a static optical configuration employing a pyroelectric detector. Multiple samples including atmospheric species are measured with GHz resolution.

**Oral** CH-11.4 11:15 ICM - Room 14a

**Flat-top supercontinuum laser for C-H bond spectroscopy in NIR-III region** — •Huajun Tang[1], Jixiang Chen[1], Xiaoxiao Wen[1], Yitian Tong[1], and Kenneth K.Y. Wong[1,2] — [1]The University of Hong Kong, Department of Electrical and Electronic Engineering, Hong Kong, China — [2]Advanced Biomedical Instrumentation Centre, Hong Kong Science Park, Hong Kong, China

We built up a flat-top supercontinuum laser based on a dual-pumped optical parametric amplifier and applied it for fast C-H bond spectroscopy in NIR-III region.

**Oral** CH-11.5 11:30 ICM - Room 14a

**Time-Coupled Mode Theory Optimized Gold Core-Shell Particles for Surface-Enhanced Infrared Absorption** — •Zihao Liu[1], Jing Ni[1], Zhouzhuo Tang[1], and Xia Yu[1,2] — [1]School of Instrumentation and Optoelectronic Engineering, Beihang University , Beijing , China — [2]Hangzhou International Innovation Institute, Beihang University , Hangzhou, China

This work designs SiO2@Au as a surface-enhanced infrared absorption structure, with uniform size, low cost, and evenly distributed enhancement hotspots. It offers two design degrees of freedom, enabling optimal enhancement via time-coupled mode theory.

**Oral** CH-11.6 11:45 ICM - Room 14a

**Exploring the Potential of Fluoride Optical Fibers for Sensing in the Mid-Infrared** — •Francesco Anelli[1], Antonella Maria Loconsole[1], Sebastien Venck[2], and Francesco Prudenzano[1] — [1]Politecnico di Bari, Bari, Italy — [2]Le Verre Fluoré, Bruz, France

ZBLAN fibers are utilized to design, fabricate, and characterize an S-tapered sensor operating in the mid-infrared. Fabrication was achieved by off-axis stretching and heating. Spectral measurements demonstrated the interference between the core and cladding modes.

# CB-3: Semiconductor Lasers in the Telecommunication Band

Chair: Atsushi Matsumoto, NICT, Tokyo, Japan

Time: Thursday, 10:30–12:00 Location: ICM - Room 14b

**Oral** CB-3.1 10:30 ICM - Room 14b

**1.55 $\mu$m Quantum Dot Lasers with Increased Modal Gain Based on Improved Gain Material with High Size Homogeneity** — •Vikram Khatri[1], Vitalii Sichkovskyi[1], Larisa Popilevsky[2], Yaron Kauffmann[3], Gadi Eisenstein[2,4], and Johann Peter Reithmaier[1] — [1]Technische Physik, Institute of Nanostructure Technologies and Analytics (INA), University of Kassel, Kassel, Germany — [2]Russel Berrie Nanotechnology Institute, Technion, Haifa, Israel — [3]Materials Science and Engineering Department, Technion, Haifa, Israel — [4]Electrical and Computer Engineering Department, Technion , Haifa, Israel

The size homogeneity of InAs/InP quantum dots were optimized by growth parameters and the introduction of a GaAs nucleation layer. The spectral gain improvement has a systematic impact in modal gain of C-band telecom lasers.

**Oral** CB-3.2 10:45 ICM - Room 14b

**1550 nm High Power Broad Area Laser with InGaAlAs-MQWs as active Material and Al-free Facets** — •Niklas Kanold, Martin Moehrle, and Martin Schell — Fraunhofer Institute of Telecommunications, Heinrich-Hertz-Institut, Berlin, Germany

For the first time we present a broad area laser diode with InGaAlAs-QWs as active material and Al-free facets. The device achieves a maximum optical output power of 4.1 W in CW operation.

**Oral** CB-3.3 11:00 ICM - Room 14b

**Monolithic 1550 nm Narrow Linewidth Laser by Optical Injection Locking** — •Xiao Sun, Zhibo Li, Yiming Sun, Jue Wang, John Marsh, Stephen Sweeney, Anthony Kelly, and Lianping Hou — University of Glasgow, Glasgow, China

We demonstrate a monolithic optical injection locking (MOIL) laser achieved the narrowest linewidth of 4.2 kHz on a monolithic InP single-chip platform with a side-mode suppression ratio (SMSR) > 50 dB.

**Oral** CB-3.4 11:15 ICM - Room 14b

**Over 1.3 THz Tunable All-Optical Wavelength Conversion with a Feedback-Controlled Multi-Wavelength Laser** — •Pablo Marin-Palomo and Martin Virte — Brussels Photonics Team (B-PHOT), Vrije Universiteit Brussel (VUB), Brussel, Belgium

We demonstrate all-optical wavelength conversion over 1.3 THz of a 5-GBd signal via optical injection in an integrated multi-wavelength laser. Our approach enables controlling the frequency shift featuring large conversion efficiency and avoiding additional pumps.

**Oral** CB-3.5 11:30 ICM - Room 14b

**Selective filtering and amplification of THz-range optical signals with an on-chip multi-wavelength DBR laser** — Garzan Arda Akın, Martin Virte, and •Pablo Marin-Palomo — Brussels Photonics Team (B-PHOT), Vrije Universiteit Brussel (VUB), Brussel, Belgium

Using an integrated multi-wavelength laser with an optical-feedback control, we demonstrate selective narrowband filtering with >10 dB suppression, >20 dB gain, 0.8 GHz 10-dB-BW, of optical signals with a 1.3 THz-separated carrier for THz processing.

**Oral** CB-3.6 11:45 ICM - Room 14b

**Four-Wavelength Mode-Locked DFB Laser Using Chirped Sampled Bragg Grating** — •Mohanad Al-Rubaiee[1,2,3], Bocheng Yuan[1], Yizhe Fan[1], Simeng Zhu[1], Yiming Sun[1], Xiao Sun[1], John H. Marsh[1], Stephen J. Sweeney[1], and Lianping Hou[1] — [1]University of Glasgow, Glasgow, United Kingdom — [2]EPSRC Centre for Doctoral Training in Applied Photonics, Edinburgh , United Kingdom — [3]Al-Karkh University of Science, Baghdad, Iraq

We demonstrate the first multi-wavelength mode-locked DFB laser using chirped sampled Bragg gratings, achieving stable four-wavelength lasing at 1.55 $\mu$m with high spectral purity, phase coherence, and near-transform-limited pulses, promising for DWDM and advanced photonics.

# CL-2: Biomedical Imaging and Microscopy

Chair: Alessandro Zunino, Istituto Italiano di Tecnologia, Genoa, Italy

Time: Thursday, 10:30–12:00 Location: ICM - Room Osterseen

**Oral** CL-2.1 10:30 ICM - Room Osterseen

**Calcium Imaging Using a Miniature Structured Illumination Microscope** — •Forest Speed[1], Sean Hansen[1], Omkar Supekar[2,3], Fabio Simoes de Souza[4,5], Victor Bright[3], Juliet Gopinath[2,6], Cristin Welle[7,8], Diego Restrepo[4], and Emily Gibson[1] — [1]Department of Bioengineering, University of Colorado Anschutz, Aurora, USA — [2]Department of Electrical, Energy and Computer Engineering, University of Colorado Boulder, Boulder, USA — [3]Department of Mechanical Engineering, University of Colorado Boulder, Boulder, USA — [4]Department of Cell and Developmental Biology, University of Colorado Anschutz, Aurora, USA — [5]Center for Mathematics, Computation and Cognition, Federal University of ABC, Sao Bernardo do Campo, Brazil — [6]Department of Physics, University of Colorado Boulder, Boulder, USA — [7]Department of Physiology and Biophysics, University of Colorado Anschutz, Aurora, USA — [8]Department of Neurosurgery, University of Colorado Anschutz, Aurora, USA

We utilize the pseudo-HiLo (pHiLo) image reconstruction technique to enable reduced out-of-focus background contamination in calcium recordings taken in vivo using a miniature (6.7 g) structured illumination microscope.

**Oral** CL-2.2 10:45 ICM - Room Osterseen

**Compact liquid crystal adaptive optics for biomedical imaging applications** — Alec Xu, Camron Nourshargh, Zhiyu Xu, Nathan Spiller, Jingyu Wang, Qi Hu, Patrick Salter, Steve Elston, Stephen Morris, and •Martin Booth — University of Oxford, Oxford, United Kingdom

Existing adaptive optics have limitations of bulkiness, complexity in control and expensive hardware. Our developments in direct laser written liquid crystal devices has overcome these drawbacks and provided flexible potential for compact adaptive optics systems.

**Oral** CL-2.3 11:00 ICM - Room Osterseen

**Refractive index-matching to improve polarization-resolved second harmonic imaging of the Human cornea in depth** — Poncia Nyembo Kasongo[1], Pierre Mahou[1], Jean-Marc Sintès[1], Gaël Latour[1,2], and •Marie-Claire Schanne-Klein[1] — [1]Laboratory for Optics and Biosciences, École Polytechnique, CNRS, Inserm, Institut Polytechnique de Paris, Palaiseau, France — [2]Université Paris-Saclay, Gif sur Yvette, France

We developed a protocol for measuring the refractive index of whole human corneas and recording polarization-resolved SHG images in a refractive index-matched configuration, which allowed better determination of the orientation of collagen lamellae in depth.

**Oral** CL-2.4 11:15 ICM - Room Osterseen

**Event-Based Imaging Cytometry Combined with Recurrent/Feedforward Adaptive Spiking Neural Networks** — •Georgios Moustakas[1], Ioannis Tsilikas[2], Adonis Bogris[2], and Charis Mesaritakis[3] — [1]Dept. Informatics and Computer Engineering - university of West Attica, Egaleo - Athens, Greece — [2]Dept. of Physics- National Technical University of Athens, Zografou - Athens, Greece — [3]Dept. Biomedical Engineering - University of West Attica, Egaleo-Athens, Greece

In this work, we utilize experimental data from an event-based imaging flow cytometry and process them using lightweight adaptive feedforward and recurrent spiking neural networks offering an accuracy of 98.4% and reduced number of parameters.

**Oral** CL-2.5 11:30 ICM - Room Osterseen

**Polarization-resolved hyperspectral imaging of Scarab beetles** — Peyman Soltani[1], Milan ten Hacken[1], Arie van der Meijden[2], Frans Snik[3], and •Michiel de Dood[1] — [1]Huygens-Kamerlingh Onnes Laboratory, Leiden University, Leiden, Netherlands — [2]BIOPOLIS Program in Genomics, Biodiversity and Land Planning, CIBIO, Vairão, Portugal — [3]Leiden Observatory, Leiden University, Leiden, Netherlands

We report the first polarization-resolved-hyperspectral images of *Protaetia speciosa jousselini*. The left-handed reflection is self-similar with a chiral photonic strength $\psi_C \approx 0.14$ independent of color. We deduce the thickness of the chiral Bragg reflector across the beetle.

**Oral** CL-2.6 11:45 ICM - Room Osterseen

*withdrawn*

## CA-8: High Energy Solid-State Lasers and Amplifiers

Chair: Takunori Taira, RIKEN SPring-8 Center, Sayo, Japan

Time: Thursday, 10:30–12:00 Location: Hall A1 - Room A12

**Invited** CA-8.1 10:30 Hall A1 - Room A12

**Demonstration of a Nanosecond Diode Pumped Solid State Laser Operating at 10 J, 100 Hz and Future Applications** — •Mariastefania De Vido[1], Gary Quinn[1,2], Danielle Clarke[1,2], Luke McHugh[1], Paul Mason[1], Jacob Spear[1], Jodie Smith[1], Martin Divoky[3], Jan Pilar[3], Ondrej Denak[3], Thomas Butcher[1], Chris Edwards[1], Tomas Mocek[3], and John Collier[1] — [1]STFC Central Laser Facility, Didcot, United Kingdom — [2]Heriot-Watt University, Edinburgh, United Kingdom — [3]HiLASE Centre, Dolny Brezany, Czech Republic

We report on stable amplification of nanosecond pulses to 10 J at 100 Hz in DiPOLE-100Hz, a diode-pumped solid-state laser, with 25.4% optical-to-optical efficiency and 1% rms energy stability and discuss applications of this technology.

**Oral** CA-8.2 11:00 Hall A1 - Room A12

*withdrawn*

**Oral** CA-8.3 11:15 Hall A1 - Room A12

**A 100Hz Ti:Sapphire amplifier delivering >700mJ pulses for high energy laser plasma acceleration** — •Timo Eichner, Man Jiang, Juan B. Gonzalez-Diaz, Thomas Hülsenbusch, Abdullah Yousefi, Jelto Thesinga, Mikhail Pergament, Lutz Winkelmann, Wim P. Leemans, Andreas R. Maier, and Guido Palmer — Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

We present an ultrafast Ti:sapphire amplifier delivering 750mJ pulses for high-energy laser-plasma acceleration (LPA) at an unprecedented 100Hz repetition rate. This marks a key step toward reliable, high-repetition-rate LPA-operation at DESY's KALDERA facility.

**Oral** CA-8.4 11:30 Hall A1 - Room A12

**Picosecond contrast improvement for PW class lasers based on modified stretcher design** — •Olivier Chalus[1], Dimitrios Papadopoulos[2], Francois Mathieu[2], Patrick Audebert[2], Nathalie Lebas[2], Mathilde Charbonneau[1], Stanislas Pasternak[1], Christophe Derycke[1], Samy Ferhat[1], Alain Pellegrina[1], Sandrine Ricaud[1], Bruno LeGarrec[3], Erhard Gaul[4], Gabriel Cojocaru[5], Antonia Toma[5], Saidbek Norbaev[5], and Ioan Dancus[5] — [1]Thales LAS France, Elancourt, France — [2]Laboratoire pour l'Utilisation des Lasers Intenses, Saclay, France — [3]LASYEX, Prague, Czech Republic — [4]MARVEL Fusion, Munich, Germany — [5]ELI-NP, Magurele, Romania

Contrast is a major requirements on multi PetaWatt laser system, we present recent progress realized at ELI-NP on the picosecond time scale pedestal with a Martinez stretcher to improve contrast of several order of magnitude.

**Oral** CA-8.5 11:45 Hall A1 - Room A12

**Dielectric grating technology for high power ultrashort laser source** — •Samy Ferhat[1], Doriane Jussey[2], Guillaume Croizier[1], Justin Rouxel[2], Raphael Guillemet[2], Sandrine Ricaud[1], Olivier Chalus[1], Man-Si Laure Lee[2], and Brigitte Loiseaux[2] — [1]Thales LAS France, Elancourt, France — [2]Thales Research and Technology, Palaiseau, France

We present design and performances of a high-efficiency dielectric gratings. The broadband wavelength acceptance and low absorption of this dielectric grating make it suitable for high-repetition-rates and high-power femtosecond lasers allowing in plane compressor design.

## CE-11: Optical Materials & Structures

Chair: Fransesco Prudenzano, Politecnico di Bari, Bari, Italy

Time: Thursday, 10:30–12:00 Location: Hall B1 - Room B11

**Oral** CE-11.1 10:30 Hall B1 - Room B11

**Pixelated holographic printing of light-reconfigurable diffractive optical elements on azobenzene materials** — •Alex Berdin and Arri Priimagi — Tampere University, Tampere, Finland

We show that surface patterning of azobenzene-based materials using a digital holographic microscope with an integrated laser interference system provides a way to rapidly fabricate diffractive optical elements with embedded metrology.

**Oral** CE-11.2 10:45 Hall B1 - Room B11

**Azopolymer surface reliefs gratings: fabrication & diffraction properties** — •Francesco Reda[1], Marcella Salvatore[1,2], I Komang Januariyasa [1], Fabio Borbone[3], and Stefano Luigi Oscurato[1,2] — [1]University of Naples "Federico II", Physics Department "E. Pancini", Napoli, Italy — [2]Centro Servizi Metrologici e Tecnologici Avanzati (CeSMA), University of Naples "Federico II", Napoli, Italy — [3]University of Naples "Federico II", Department of Chemical Sciences, Napoli, Italy

This work explores the fabrication and characterization of azopolymer surface relief gratings, introducing an accurate model to relate surface profile and diffraction behavior, and enabling real-time holographic reconstruction of grating shapes during fabrication.

**Oral** CE-11.3 11:00 Hall B1 - Room B11

*withdrawn*

**Oral** CE-11.4 11:15 Hall B1 - Room B11

**Epitaxial Growth and Spectroscopy of Sm3+:LiYF4 Crystalline Layers for Orange Waveguide Lasers** — •Jonathan Demaimay, Pavel Loiko, Gurvan Brasse, Abdelmjid Benayad, Patrice Camy, and Alain Braud — Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), Caen, France

We present the Liquid Phase Epitaxy growth and polarized spectroscopy of Sm3+:LiYF4 waveguiding layers. Sm3+ ions exhibit a stimulated-emission cross-section of 1.43×10-21 cm2 at 604.8 nm and a 4.11 ms luminescence lifetime.

**Oral** CE-11.5 11:30 Hall B1 - Room B11

**Individual authentication method for semiconductor industry using optical characteristics of inkjet-printed WGM-microdisks** — •Naoya Tate[1], Wang Weiheng[1], Seigo Kitazaki[1], Jinghan Chen[1], Hiroaki Yoshioka[1], Naoki Yoshida[2], Kaoru Sumiya[3], Morihisa Hoga[3], Ken Takano[4], Shinya Takyu[4], and Tsutomu Matsumoto[3] — [1]Kyushu University, Fukuoka, Japan — [2]Yokohama National University, Kanagawa, Japan — [3]The National Institute of Advanced Industrial Science and Technology, Tokyo, Japan — [4]LINTEC Corporation, Tokyo, Japan

We successfully verified an authentication based on fabrication of microdisk resonators and an optical-sensing of their individualities as technologies for applying physical IDs within a framework that ensures the safety/security of semiconductor supply chains.

**Oral** CE-11.6 11:45 Hall B1 - Room B11

**SLM-based optical computing platform for designing polychromatic flat optics** — Filipe Camarneiro, Manuel J. L. F. Rodrigues, Aamod Shanker, Ana Dias, and •Diogo E. Aguiam — INL - International Iberian Nanotechnology Laboratory, Braga, Portugal

We present a novel SLM-based optical computing platform to accelerate the design optimization for polychromatic surface relief diffractive optics by mimicking real lens material dispersion and topography, and performing the free space propagation step optically.

# CG-2: Quantum Effects and Interferometry

Chair: Vaishali Adya, KTH Royal Institute of Technology, Stockholm, Sweden

Time: Thursday, 10:30–12:00 Location: Hall B2 - Room B21

**Oral** CG-2.1 10:30 Hall B2 - Room B21

*withdrawn*

**Oral** CG-2.2 10:45 Hall B2 - Room B21

**Quantum Tomography of Nonperturbative Harmonic Light from Solids** — •Ido Nisim[1,2], Zhaopin Chen[1,2], Ido Kaminer[2,3], and Michael Krüger[1,2] — [1]Department of Physics, Technion – Israel Institute of Technology, Haifa, Israel — [2]Solid State Institute and Helen Diller Quantum Center, Technion – Israel Institute of Technology, Haifa, Israel — [3]Electrical and Computer Engineering, Technion – Israel Institute of Technology, Haifa, Israel

We present the first measurement of the full quantum state of non-perturbative third harmonic generation from graphite using a novel homodyne detection scheme. Our results show non-classical characteristics including anti-squeezing and signatures of squeezing.

**Oral** CG-2.3 11:00 Hall B2 - Room B21

**Entangled bright states of light via with matter-light-correlations in harmonic generation** — •Ihar Babushkin[1,2,3], Sili Yi[3], Olga Smirnova[3,4,5], and Missha Ivanov[3,5,6] — [1]Leibniz University Hannover, Hannover, Germany — [2]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering – Innovation Across Disciplines), Hannover, Germany — [3]Max Born Institute, Berlin, Germany — [4]Technical University Berlin, Berlin, Germany — [5]Technion, Haifa, Israel — [6]Humboldt University, Berlin, Germany

Attosecond since is now extending into the realm of quantum optics. Here we show that bright nonclassical states of light can be obtained via entanglement with matter during harmonic generation in strong optical fields.

**Oral** CG-2.4 11:15 Hall B2 - Room B21

**Attosecond Magnetic Pulses from Ring-Current Gating Schemes** — •Alba de las Heras[1,2,3], Franco P. Bonafé[1], Carlos Hernández-García[2,3], Angel Rubio[1,4], and Ofer Neufeld[1,5] — [1]Max Planck Institute for the Structure and Dynamics of Matter and Center for Free-Electron Laser Science, Hamburg, Germany — [2]Grupo de Investigación en Aplicaciones del Láser y Fotónica, Departamento de Física Aplicada, Universidad de Salamanca, Salamanca, Spain — [3]Unidad de Excelencia en Luz y Materia Estructuradas (LUMES), Universidad de Salamanca, Salamanca, Spain — [4]Center for Computational Quantum Physics, The Flatiron Institute, New York, USA — [5]Schulich Faculty of Chemistry, Technion - Israel Institute of Technology, Haifa, Israel

We propose current gating as a method to synthesize the waveform of the generated magnetic field in the attosecond timescale. Our ab initio calculations predict a tunable tesla-scale magnetic pulse of 787 as, paving the way for probing attomagnetism.

**Oral** CG-2.5 11:30 Hall B2 - Room B21

**Fast Spectroscopic Imaging using Extreme Ultraviolet Interferometry** — •G. S. Matthijs Jansen[1], Hannah C. Strauch[1], Fengling Zhang[2], Thorsten Hohage[3], Stefan Witte[2], and Stefan Mathias[1] — [1]1st Institute of Physics, University of Göttingen, Göttingen, Germany — [2]Advanced Research Center for Nanolithography, Amsterdam, Netherlands — [3]Institute for Numerical and Applied Mathematics, University of Göttingen, Göttingen, Germany

Joining ultrafast nanoscale imaging with extreme ultraviolet spectroscopy is highly desirable to study light-matter interaction with elemental resolution. Here, we show that interferometry of high-harmonics is uniquely suited to achieve this goal in the lab.

**Oral** CG-2.6 11:45 Hall B2 - Room B21

**Unveiling Photoinjection Dynamics** — •Vladislav S. Yakovlev[1,2] and Manoram Agarwal[1,2] — [1]Max-Planck-Institut für Quantenoptik, Garching, Germany — [2]Ludwig-Maximilians-Universität München, Munich, Germany

We present a method to retrieve strong-field photoinjection rates in solids from photoinjection probabilities calculated ab initio for a set of few-cycle laser pulses. This method unveils photoinjection dynamics crucial for lightwave (petahertz) electronics.

# EB-8: Quantum Photonics in Time-Frequency Domain

Chair: Florent Baboux, Sorbonne University, Paris, France

Time: Thursday, 14:00–15:30 Location: ICM - Room 1

**Oral** EB-8.1 14:00 ICM - Room 1

**Self-guided quantum tomography in high-dimensional systems** — Laura Serino[1], •Markus Rambach[2,3], Benjamin Brecht[1], Jacquiline Romero[2,3], and Christine Silberhorn[1] — [1]Paderborn University, Integrated Quantum Optics, Institute for Photonic Quantum Systems (PhoQS), Paderborn, Germany — [2]Australian Research Council Centre of Excellence for Engineered Quantum Systems, Brisbane, Australia — [3]School of Mathematics and Physics, University of Queensland, Brisbane, Australia

We experimentally demonstrate an efficient, robust, and precise quantum tomography method, self-guided tomography, in two high-dimensional quantum systems: spatial and time-frequency modes. We show that our method outperforms standard tomography, especially in high noise environments.

**Oral** EB-8.2 14:15 ICM - Room 1

**Ultrafast post-selection free time-bin entanglement on a thin film lithium niobate photonic chip** — Marcello Bacchi[1], •Andrea Bernardi[2,3], Marco Clementi[1], Sara Congia[1], Francesco Garrisi[3], Andrea Martellosio[3], Marco Passoni[3], Alexander Wrobel[3], Federico A. Sabattoli[3], Matteo Galli[1], and Daniele Bajoni[2] — [1]Dipartimento di Fisica, Università di Pavia, Pavia, Italy — [2]Dipartimento di Ingegneria Industriale e dell'Informazione, Università di Pavia, Pavia, Italy — [3]Advanced Fiber Resources Milan s.r.l., San Donato Milanese, Italy

We experimentally demonstrate the violation of Bell inequality by more than 20 standard deviations on a thin-film lithium niobate photonic chip without any temporal post-selection.

**Oral** EB-8.3 14:30 ICM - Room 1

**Quantum-enhanced time-domain sampling of THz fields** — Dionysis Adamou[1], Lennart Hirsch[1], Taylor Shields[1], Seungjin Yoon[1], Adetunmise C. Dada[2], Jonathan M. R. Weaver[1], Daniele Faccio[2], Marco Peccianti[3], Lucia Caspani[4,5], and •Matteo Clerici[1,5] — [1]James Watt School of Engineering, University of Glasgow, Glasgow, United Kingdom — [2]School of Physics and Astronomy, University of Glasgow, Glasgow, United Kingdom — [3]Emergent Photonics Research Centre, Department of Physics, Loughborough University, Loughborough, United Kingdom — [4]Institute of Photonics, Department of Physics, University of Strathclyde, Glasgow, United Kingdom — [5]Como Lake Institute of Photonics, Dipartimento di Scienza e Alta Tecnologia, Insubria University, Como, Italy

We investigated the use of quantum resources to enhance Terahertz time-domain spectroscopy and report the experimental demonstration of a significant sensitivity improvement achieved by employing ultrashort pulsed twin beams as probes for THz electro-optical sampling.

**Oral** EB-8.4 14:45 ICM - Room 1

**An Integrated Photonic Circuit on Thin-Film Lithium Niobate for Time-Bin Quantum Information Processing** — •Giovanni Finco, Giovanni Vio, Filippo Miserocchi, Andreas Maeder, Jost Kellner, Alessandra Sabatti, Robert J. Chapman, and Rachel Grange — ETH Zurich, Department of Physics, Institute for Quantum Electronics, Optical Nanomaterial Group, 8093 Zurich, Switzerland

We present an integrated optical circuit on thin-film lithium niobate generating and reconstructing entangled qubits in the time-bin basis, highlighting the suitability of the platform for the next generation optical quantum communication technologies.

**Oral** EB-8.5 15:00 ICM - Room 1

**Adaptive Frequency-bin Encoding for Scalable Entanglement-based Quantum Key Distribution** — •Anahita Khodadad Kashi[1,2] and Michael Kues[1,2] — [1]Institute of Photonics, Leibniz University, Hannover, Germany — [2]Cluster of Excellence, PhoenixD, Hannover, Germany

Dynamic and resource-efficient solutions are crucial to realizing large-scale photonic quantum networks. We demonstrate the first-time frequency-bin-encoded entanglement-based quantum key distribution between two users, and a flexible entanglement distribution over long optical fiber links.

**Oral** EB-8.6 15:15 ICM - Room 1

**Entanglement Distribution and Quantum Teleportation of Time-bin Entangled Qubits Towards a Quantum Internet** — •Jinwoo Kim[1], Jiho Park[1], Hong-Seok Kim[1], Tetiana Slusar[1], Guhwan Kim[1,2], Jaegyu Park[1], Jin Tae Kim[1], Kiwon Moon[1], Min-su Kim[1], and Jung Jin Ju[1] — [1]Electronics and Telecommunications Research Institute (ETRI), Daejeon, South Korea — [2]Sungkyunkwan University, Suwon, South Korea

We demonstrate entanglement generation, distribution, and quantum teleportation with time-bin qubits. We discuss how photon number resolving capabilities can be implemented to improve such protocols.

## JSI-1: Photonic Integrated Systems for AI

Chair: Javier Porte Parera, University of Strathclyde, United Kingdom

Time: Thursday, 14:00–15:30 Location: ICM - Room 4a

**Invited** JSI-1.1 14:00 ICM - Room 4a

**Photonic Fabric™ for Optical Interconnect Networks in AI** — Subal Sahni, Ankur Aggarwal, Nadav Bergstein, Trung Diep, Jing Ding, Andrew Gimlett, Ravi Mahatme, Parmanand Mishra, Romanas Narevich, Sujit Ramachandra, Matteo Staffaroni, •Angelina Totovic, Saurabh Vats, Phil Winterbottom, Waleed Younis, Shifeng Yu, and David Lazovsky — Celestial AI, Santa Clara, USA

We present Photonic Fabric™, a photonic interconnectivity and disaggregation platform, which provides optical connection between chiplets unconstrained by the beachfront, relieving the bandwidth bottleneck and unlocking memory pool for heavy AI workloads.

**Oral** JSI-1.2 14:30 ICM - Room 4a

**BYOD: A system-level simulator framework for end-to-end evaluation and architecture design of photonic AI accelerators** — •Fabian Böhm[1], Sébastien d'Herbais de Thun[1], Morten Kapusta[1], Matěj Hejda[1], Bassem Tossoun[2], Ray Beausoleil[2], and Thomas Van Vaerenbergh[1] — [1]Hewlett Packard Labs, Diegem, Belgium — [2]Hewlett Packard Labs, Milpitas, USA

We demonstrate a system-level simulator framework for designing and evaluating photonic AI accelerator architectures. This tool enables the rapid development of hybrid opto-electronic accelerator devices capable of end-to-end acceleration of AI workloads.

**Oral** JSI-1.3 14:45 ICM - Room 4a

**Photonic convolution accelerator employing barium titanate electro-optic phase shifters** — •Anna Fischer[1], Folkert Horst[1], Matthew J. Filipovich[1,2], and Bert J. Offrein[1] — [1]IBM Research Europe - Zürich, Rüschlikon, Switzerland — [2]Clarendon Laboratory, University of Oxford, Oxford, United Kingdom

We demonstrate an integrated-optic photonic convolution accelerator based on a cascade of tunable couplers and delay lines, employing BaTiO3 electro-optic phase shifters. Examples of operations on complex data and kernels will be presented.

**Oral** JSI-1.4 15:00 ICM - Room 4a

**Multi-chiplet implementation of a TOPS-ready Hyperdimensional AWGR-based Photonic Tensor Core** — •Christos Pappas[1], Antonios Prapas[1], Miltiadis Moralis-Pegios[1], Apostolos Tsakyridis[1], Thodoris Moschos[1], Stefanos Kovaios[1], Odysseas Asimopoulos[2], Manos Kirtas[1], Nikolaos Passalis[1], Konstantinos Vyrsokinos[2], Anastasios Tefas[1], and Nikos Pleros[1] — [1]Centre for Interdisciplinary Research and Innovation, Informatics Dept. Aristotle University of Thessaloniki, Thessaloniki, Greece — [2]Centre for Interdisciplinary Research and Innovation, Physics Dept. Aristotle University of Thessaloniki, Thessaloniki, Greece

We demonstrate experimentally an 8×8 AWGR-based photonic accelerator that leverages a SiGe EAM array chiplet as its computational core. The experimental implementation of a MNIST classifier at 20 Gbaud revealed a Cohen's kappa-score of 0.7421.

**Oral** JSI-1.5 15:15 ICM - Room 4a

**The Potential of Efficient Photonic Multiply-Accumulator Processors** — •Niklas Bahr[1,2], Daniel Steinmeyer[1], Jelle Dijkstra[2], and Wolfram Pernice[2] — [1]Volkswagen AG, Group Innovation, Wolfsburg, Germany — [2]Kirchhoff-Institute for Physics, University of Heidelberg, Heidelberg, Germany

In this work, we review existing photonic and conventional compute units, introduce a systematic analysis of the overall energy consumption of photonic compute modules, and compare their performance regarding energy efficiency and throughput.

## CB-7: Photonic Integration of Semiconductor Lasers

Chair: Katrin Paschke, Ferdinand-Braun-Institut (FBH), Berlin, Germany

Time: Thursday, 14:00–15:30 Location: ICM - Room 4b

**Oral** CB-7.1 14:00 ICM - Room 4b

**Heterogeneously Integrated Evanescently Coupled Laser Systems on SiN Emitting in the Near-Infrared Band** — •Konstantinos Akritidis[1,2,3], Maximilien Billet[1,2], Max Kiewiet[1,2], Jan-Philipp Koester[4], Jörg Fricke[4], Pietro Della Casa[4], Hans Wenzel[4], Markus Weyers[4], Joost Brouckaert[3], Pol Van Dorpe[3], and Bart Kuyken[1,2] — [1]Photonics Research Group, Ghent University - imec, Ghent, Belgium — [2]Center for Nano- and Biophotonics, Ghent University, Ghent, Belgium — [3]IMEC, Leuven, Belgium — [4]Ferdinand-Braun-Institut (FBH), Berlin, Germany

The large refractive index mismatch between SiN and III/V hinders the development of evanescently coupled laser systems. Using a CMOS-compatible a-Si:H intermediate layer, we demonstrate heterogeneously integrated Fabry-Pérot lasers emitting below 1 $\mu$m on SiN.

**Oral** CB-7.2 14:15 ICM - Room 4b

**Low Threshold 1.55-um-Band Si-Photonics-Based Heterogeneous Integrated Quantum Dot Tunable Laser** — •Atsushi Matsumoto, Shinya Nakajima, Chih-Hsien Cheng, Sho Okada, Toshimasa Umezawa, Naokatsu Yamamoto, and Kouichi Akahane — National Institute of Information and Communications Technology, Koganei, Japan

In this paper, we fabricated a heterogeneous integrated Quantum Dot tunable laser in the 1.55-um-band, and demonstrated the threshold current could be made decreased to 52.2 mA and fine tunability of lasing wavelength.

**Oral** CB-7.3 14:30 ICM - Room 4b

**Design and Fabrication of Transfer-Printable Evanescently Coupled GaAs-based Amplifier** — •Jan-Philipp Koester[1], Jörg Fricke[1], Hans Wenzel[1], Pietro Della Casa[1], Konstantinos Akritidis[2,3], Maximilien Billet[2], Max Kiewiet[2], Joost Brouckaert[3], Pol Van Dorpe[3], Bart Kuyken[2], Andrea Knigge[1], and Markus Weyers[1] — [1]Ferdinand-Braun-Institut (FBH), Berlin, Germany — [2]Photonics Research Group, INTEC Department, Ghent University - imec, Ghent, Belgium — [3]IMEC, Leuven, Belgium

We report on the design and fabrication of transfer-printable GaAs-based amplifier coupons providing gain around 890 nm, suitable for evanescent coupling to SiN PICs, and present details on the vertical structure and the taper optimization.

**Oral** CB-7.4 14:45 ICM - Room 4b

**High-Power Micro-Transfer Printed 796 nm Fabry-Perot Laser** — •Max Kiewiet, Stijn Cuyvers, Maximilien Billet, Kasper Van Gasse, and Bart Kuyken — Photonics Research Group, INTEC Department, Ghent University , Ghent, Belgium

High-power lasers are required for nonlinear applications at 800 nm. Using the micro-transfer printing technique, we heterogeneously integrate gallium arsenide lasers on a silicon substrate with high laser power exceeding 70 mW at 150 mA.

**Oral** CB-7.5 15:00 ICM - Room 4b

**Monolithically integrated dual-comb generator based on a generic platform photonic integrated circuit** — •Pablo López-Querol, Clara Quevedo-Galán, José Manuel G. Tijero, Ignacio Esquivias, and Antonio Pérez-Serrano — CEMDATIC-E.T.S.I Telecomunicación, Universidad Politécnica de Madrid (UPM), Madrid, Spain

We present a monolithically integrated dual-comb interferometer based on standardised building blocks of a generic InP platform. Two optically injected semiconductor ring lasers are gain-switched to generate the combs, achieving a compression factor of 5,000.

**Oral** CB-7.6 15:15 ICM - Room 4b

**Monolithically integrated low repetition rate mode-locked lasers** — •Jessica César-Cuello[1], Alberto Zarzuelo[1], Robinson C. Guzmán[2], and Guillermo Carpintero[1] — [1]University Carlos III of Madrid, Leganés, Spain — [2]University Rey Juan Carlos, Madrid, Spain

We experimentally characterize two monolithically integrated mode-locked lasers operating in hybrid regime. Designed with ring and linear configurations, the lasers achieve repetition rates of 2.78 GHz and 1.4 GHz, respectively, demonstrating their distinct performance characteristics.

## CF-8: Post-Compression in Gases

Chair: Yoann Pertot, Fastlite, Antibes, France

Time: Thursday, 14:00–15:30 Location: ICM - Room 13a

**Oral** CF-8.1 14:00 ICM - Room 13a

**Hollow-Core Fibres for Stable Trains of Wavelength-Tuneable Ultraviolet Pulses at 10 MHz Repetition Rate** — •Martin Butryn[1], Mouhamad Abo Koura[1], Markus Lippl[1,2], Michael H. Frosz[1], Nicolas Y. Joly[2,1,3], and Francesco Tani[1,4] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]University of Erlangen-Nürnberg, Erlangen, Germany — [3]Interdisciplinary Center for Nanostructured Films, Erlangen, Germany — [4]University of Lille, CNRS, UMR 8523—PhLAM—Physique des Lasers Atomes et Molécules, Lille, France

We report a system based on two gas-filled hollow-core fibers, which deliver ultrashort pulses tunable across the ultraviolet with >100 mW and a 10 MHz repetition rate and demonstrate stable operation by minimizing gas ionization.

**Oral** CF-8.2 14:15 ICM - Room 13a

**Extreme Compression of Multidimensional Solitary States in Molecular Gas-Filled Hollow-Core Fibers Driven by Picosecond Yb Lasers** — Maghsoud Arshadipirlar[1], Dependra Khatri[2], Stephen Londo[1], Behnam Azizi[1], Gaetan Jargot[1], Mayank Kumar[1], Chunmei Zhang[3], Chelsea Kincaid[2,4], Christopher Lantigua[2], Tran-Chau Truong[2], Heide Ibrahim[1,3], Paul B. Corkum[3], Michael Chini[2,5], François Légaré[1], and •Reza Safaei[1,3] — [1]Advanced Laser Light Source (ALLS), INRS-EMT, 1650 Boulevard Lionel-Boulet, J3X 1P7, Varennes, Canada — [2]Department of Physics, University of Central Florida, Orlando, Florida 32816, USA — [3]University of Ottawa and National Research Council of Canada, 25 Templeton St, Ottawa, ON, K1N 6N5, Canada — [4]Linac Coherent Light Source, SLAC National Accelerator Laboratory, 2575 Sand Hill Road, MS103, Menlo Park, CA 94025, USA — [5]Department of Physics, The Ohio State University, 191 W Woodruff Ave,, Columbus, Ohio 43210, USA

Using 7 mJ, 1 ps laser pulses, we generated 22 fs pulses with 47% energy conversion efficiency, demonstrating MDSS as a robust platform for high-energy, ultrashort pulses with tunable wavelengths, ideal for applications like HHG.

**Oral** CF-8.3 14:30 ICM - Room 13a

**Single-Cycle 2.6 fs Pulses via Two-Stage Plasma Self-Compression** — •Yu-En Chien, Chun-Wei Hsieh, Ming-Shian Tsai, and Ming-Chang Chen — Institute of Photonics and Technologies, National Tsing Hua University, Hsinchu City, Taiwan

We demonstrate a multi-stage plasma-based self-compression scheme, reducing 4.6 fs (1.5 cycles at 1 micron) pulses to 2.6 fs (1 cycle at 0.7 microns), providing a scalable approach for post-compressing pulses to sub-femtosecond regimes.

**Oral** CF-8.4 14:45 ICM - Room 13a

**Tunable Wavelength by Adjusting SPM and SRS in Pulse Non-linear Post-Compression Scheme** — •Aref Imani, Edgar Kaksis, Alessandra Bellissimo, Audrius Pugžlys, Andrius Baltuška, and Paolo Antonio Carpeggiani — Technische Universität Wien, Vienna, Austria

We demonstrate independent control of central wavelength tunability and spectral broadening in pulse compression by balancing self-phase modulation (SPM) and stimulated Raman scattering (SRS) with atomic and molecular gas mixtures in HCF and MPC.

**Oral** CF-8.5 15:00 ICM - Room 13a

**Sub-50 fs self-compression of 5-$\mu$m pulses in a hollow-core fiber** — •Martin Bock[1], Usman Sapaev[2], Ji Eun Bae[3], Anton Husakou[1], Joachim Herrmann[1], Tamas Nagy[1], Dennis Ueberschaer[1], and Uwe Griebner[1] — [1]Max Born Institute, Berlin, Germany — [2]Tashkent State Technical University, Tashkent, Usbekistan — [3]CIMAP, UMR 6252 CNRS, Université de Caen Normandie, Caen, France

We experimentally and numerically investigate self-compression of millijoule 5-$\mu$m pulses in an Ar-filled hollow-core fiber at 1-kHz repetition rate. The solitonic compression regime resulted in sub-three cycle pulses with 0.88 mJ energy.

**Oral** CF-8.6 15:15 ICM - Room 13a

**Sub-cycle pulse compression origins from Yb:KGW amplifier** — •Zekun Pi, Hee-Yong Kim, and Eleftherios Goulielmakis — University of Rostock, institute for Physics, Rostock, Germany

We utilized a dual hollow-core fiber module to broaden Yb:KGW laser pulses to over 3.5 optical octaves. Using a light-field synthesizer, we compressed the 380-1000 nm bandwidth to sub-cycle pulses for the first time.

## CJ-9: Specialty Fiber and Devices 1

Chair: Jayanta Sahu, University of Southampton, Southampton, United Kingdom

Time: Thursday, 14:00–15:30 Location: ICM - Room 13b

**Oral** CJ-9.1 14:00 ICM - Room 13b

**Innovative Pure-Erbium-Doped VLMA Fibers Delivering High Peak Power at 1.5 $\mu$m for Eye-Safe Solutions** — •Yann Leventoux[1], Baptiste Leconte[1], Romain Dauliat[1], Sebastien Vidal[2], Marc Castaing[2], Sébastien Février[1], Katrin Wondraczek[3], Jérêmy Dain[4], Eric Delevaque[4], Raphael Jamier[1], and Philippe Roy[1] — [1]Université de Limoges, XLIM, UMR CNRS 7252, 123 Av. A. Thomas, Limoges, France — [2]ALPhANOV, Centre technologique Optique & Lasers, Rue F. Mitterrand, Talence, France — [3]Leibniz Institute of Photonic Technology, Albert-Einstein-Strasse 9, Jena, Germany — [4]BKtel, 5 rue Louis de Broglie, Lannion, France

We present an innovative erbium-doped VLMA fiber (55 $\mu$m core) delivering record performance at 1.5 $\mu$m. Achieving high peak power with excellent beam quality, we provide advanced solutions for high-energy, eye-safe applications.

**Oral** CJ-9.2 14:15 ICM - Room 13b

**Hybrid Silica-Fluoride GTWave Fibres** — •Maria Chernysheva — Leibniz Institute of Photonic Technology, Jena, Germany

GTWave fibre design offers an effective structure for coupling multimode pump light from silica fibre into fluoride-based mid-IR laser cavities. Current work demonstrates over 30% coupling efficiency over a short 35-cm coupling length.

**Oral** CJ-9.3 14:30 ICM - Room 13b

**Yb-doped Large Mode Area fibers produced by powder sintering for high peak power narrow-linewidth laser source** — •Amelie Chervet[1], Baptiste Leconte[2], Guillaume Caussain[2], Raphael Jamier[1], Julien Didierjean[2], Katrin Wondraczek[3], and Philippe Roy[1] — [1]Université de Limoges, XLIM, Limoges, France — [2]BLOOM Lasers, Pessac, France — [3]Leibniz Institute of Photonic Technology, Jena, Germany

First demonstration of a LMA fiber produced by power sintering with 40$\mu$m core, simple step-index circular design, and delivering high average power, high peak power with excellent beam quality

**Oral** CJ-9.4 14:45 ICM - Room 13b

**Polarisation properties of few-mode highly birefringent fibres** — •Konstantin Bobkov and Michalis Zervas — Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

We investigated a few-mode HiBi step-index fibre polarisation properties, showing its guided modes exhibit a vectorial, not linear, electric field, resulting in degradation of the measured PER and oscillations in the modal birefringence.

**Oral** CJ-9.5 15:00 ICM - Room 13b

**Bose-Einstein beam condensation in optical multimode fibers** — Jiaxuan Zhang[1], Jintao Fan[1], Chao Mei[2], •Günter Steinmeyer[3,4], and Minglie Hu[3,4] — [1]Ultrafast Laboratory, Tianjin University, Tianjin, China — [2]Dept. of Physics, Ningbo University, Zhejiang, China — [3]Dept. of Physics, Humboldt University, Berlin, Germany — [4]Max Born Institute, Berlin, Germany

Beam self-cleaning at unprecedented quality is analyzed by optical thermodynamics, indicative of a phase transition with abrupt change of the chemical potential, which leads to formation of a Townes soliton condensate.

**Oral** CJ-9.6 15:15 ICM - Room 13b

**Tm-doped fibers manufactured using direct nanoparticle deposition** — Pauli Kiiveri, Ville Aallos, Juha Harra, •Ossi Kimmelma, Mikko Kuusisto, Päivi Kyllönen, Camilla Parviainen, Hannu Husu, Jijo Paul, and Steffen Novotny — nLIGHT, Inc., Finland, Lohja, Finland

We present a Tm-doped (10/125 um) fiber made using direct nanoparticle deposition, which enables accurate dopant concentration control. The pedestal was made in the same process as the core. The fiber has 70 % slope efficiency.

## CH-12: Structured/Random Light

Chair: Willem L. Vos, University of Twente, Enschede, The Netherlands

Time: Thursday, 14:00–15:30 Location: ICM - Room 14a

**Oral** CH-12.1 14:00 ICM - Room 14a

**Complex speckle illumination for quantitative phase imaging** — •Aleksandra Ivanina[1,2], Maxim Marshall[1,3], Ksenia Abrashitova[1], Tristan van Leeuwen[4], and Lyubov V. Amitonova[1,2] — [1]Advanced Research Center for Nanolithography (ARCNL), Science Park, Amsterdam, Netherlands — [2]Vrije Universiteit (VU), Amsterdam, Netherlands — [3]Universiteit van Amsterdam (UvA), Amsterdam, Netherlands — [4]Centrum Wiskunde & Informatica (CWI), Science Park, Amsterdam, Netherlands

Phase imaging is vital for optical microscopy. We propose and experimentally demonstrate a new non-interferometric, high-resolution, and label-free quantitative phase imaging approach using complex speckle illumination from a multimode fiber and center-of-mass position detection.

**Oral** CH-12.2 14:15 ICM - Room 14a

**Real-time condition monitoring of an uncrewed aerial vehicle using a scattering-based specklemeter interrogator** — •Przemyslaw Falak[1], Toby King-Cline[2], Timothy Lee[1], Bruno Moog[1], Pawel Maniewski[1,3], Robert Entwistle[2], Martynas Beresna[1], and Christopher Holmes[1] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]Soton UAV, University of Southampton, Southampton, United Kingdom — [3]Department of Applied Physics, KTH Royal Institute of Technology, Stockholm, Sweden

Scattering-based FBG interrogator was deployed for in-situ monitoring of fixed wing uncrewed autonomous vehicle. The FBG externally attached to the wing registered strain values up to 400 microstrains at a read-out rate of 10 Hz.

**Oral** CH-12.3 14:30 ICM - Room 14a

**Compressive photoluminescence tomography via 3D structured light: limits of the method** — Šárka Lísková, Jiří Hlubuček, and •Karel Žídek — Institute of Plasma Physics of the Czech Academy of Sciences, Prague 8, Czech Republic

Using 3D structured excitation and single-pixel detection, we achieve high-resolution PL tomography with only 1% compression ratio. Our method retrievs PL from subsurface defects with 25 micron axial resolution, offering efficient defect analysis in optical materials.

**Oral** CH-12.4 14:45 ICM - Room 14a

**Femtosecond Laser Fabricated Integrated Light Pattern Generator** — Paolo Maran[1], Giovanni Castiglioni[2], Petra Paiè[1,2], Alessia Candeo[1], Abhiram Rajan[1,2], Francesco Ceccarelli[2], Roberto Osellame[2], Andrea Bassi[1], and •Francesca Bragheri[2] — [1]Department of Physics, Politecnico di Milano, Milano, Italy — [2]Institute for Photonics and Nanotechnologies, IFN-CNR, Milano, Italy

Femtosecond laser micromachining is used to fabricate an integrated device for advanced microscopy. The chip encompasses waveguides and thermal shifter to generate and move a 3D pattern with 1D interference patterns oriented at different angles.

**Oral** CH-12.5 15:00 ICM - Room 14a

**Fast and Efficient Speckle Customization with Binary Amplitude Modulation** — •Hakan Alıcı, Elif Sünnetci, Abdullah Serhan Başdemirci, and Hasan Yılmaz — UNAM - Institute of Materials Science and Nanotechnology, Ankara, Türkiye

Speckles are essential for diverse applications, including imaging and cryptography. We present a fast, efficient speckle customization method using binary amplitude modulation with a DMD and diffuser, achieving high-speed performance and improved diffraction efficiency.

**Oral** CH-12.6 15:15 ICM - Room 14a

**Reconfigurable helico-conical beams based on coordinate transformation** — •Dongye Xu[1,2], Zehui Lu[1,2], Meng Guo[1,2], Haifeng Liu[1,3], Wei Lin[1,3], Hao Zhang[1,2], and Bo Liu[1,2,4] — [1]Institute of Modern Optics, College of Electronic Information and Optical Engineering, Nankai University, Tianjin, China — [2]Tianjin Key Laboratory of Optoelectronic Sensor and Sensing Network Technology, Nankai University, Tianjin, China — [3]Tianjin Key Laboratory of Microscale Optical Information Science and Technology, Nankai University, Tianjin, China — [4]Southern Marine Science and Engineering Guangdong Laboratory, Zhuhai, China

We demonstrate reconfigurable helico-conical beams (HCBs) based on coordinate transformation. By introducing scale factors at the initial plane, the desired HCB patterns can be precisely controlled in elliptical coordinate system as undergoing optical Fourier transform.

## CK-10: Micro-Optical Combs

Chair: Minhao Pu, Technical University of Denmark (DTU), Lyngby, Denmark

Time: Thursday, 14:00–15:30 Location: ICM - Room 14b

**Oral** CK-10.1 14:00 ICM - Room 14b

**High-power, thermally-accessible dissipative Kerr soliton generation** — •Yanjing Zhao[1], Andreas Jacobsen[1], Yang Liu[1], Chaochao Ye[1], Yi Zheng[1], Camiel Op de Beeck[2], José Carreira[2], Michael Geiselmann[2], and Minhao Pu[1] — [1]DTU Electro, Department of Electrical and Photonics Engineering, Technical University of Denmark, Kongens Lyngby, Denmark — [2]LIGENTEC SA, EPFL Innovation Park, Ecublens, Switzerland

By combining optimized design with novel pumping strategy, we thermally access single soliton states (100% success rate in 80 consecutive trials) with high output power (up to 50 mW), advancing microcomb systems for real-world applications.

**Oral** CK-10.2 14:15 ICM - Room 14b

**Coherent dual-comb and low-noise photonic microwave generation with mechanically actuated soliton microcombs** — •Tatsuki Murakami[1], Koshiro Wada[2], Soma Kogure[2], Ryomei Takabayashi[2], Liu Yang[1,2,3], Riku Shibata[1], Hajime Kumazaki[1,2], Shinichi Watanabe[1], Atsushi Ishizawa[4], Takasumi Tanabe[2], and Shun Fujii[1] — [1]Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan — [2]Department of Electronics and Electrical Engineering, Faculty of Science and Technology, Keio University, Yokohama, Japan — [3]Electronic Materials Research Laboratory, Key Laboratory of the Ministry of Education & International Center for Dielectric Research, School of Electronic Science and Engineering, Faculty of Electronic and Information Engineering, Xi'an Jiaotong University, Xi'an, China — [4]College of Industrial Technology, Nihon University,, Chiba , Japan

We realized a coherent dual-comb sharing a single excitation source by using mechanically actuated soliton microcombs. This setup successfully balances the flexibility of the difference in repetition rates and mutual coherence.

**Oral** CK-10.3 14:30 ICM - Room 14b

**Power robustness of soliton crystal microcombs turnkey generation** — •Xinyu Yang[1], Xiaotian Zhu[2], Qihang Ai[1], Caitlin Murray[3], Chawaphon Prayoonyong[3], Xingyuan Xu[4], Mengxi Tan[1], Brent E. Little[5], Sai T. Chu[2], Bill Corcoran[3], and Donglin Su[1] — [1]University of Beihang, Beijing, China — [2]City University of Hong Kong, Hong Kong, China — [3]Monash University, Melbourne, Australia — [4]Beijing University of Posts and Telecommunications, Beijing, China — [5]QXP Technologies Inc., Xi'an, China

The paper demonstrated power robustness of "palm-like" soliton crystal microcombs via deterministic turnkey generation, showing the stability of comb states across a 600-mW pump power range and facilitating the miniaturization of microcombs applications.

**Oral** CK-10.4 14:45 ICM - Room 14b

**Ultrabroadband Integrated Electro-Optic Frequency Comb in Lithium Tantalate** — •Junyin Zhang[1], Chengli Wang[1], Connor Denney[2], Johann Riemensberger[1], Grigory Lihachev[1], Jianqi Hu[1], Wil Kao[1], Terence Blésin[1], Nikolai Kuznetsov[1], Zihan Li[1], Mikhail Churaev[1], Xin Ou[3], Gabriel Santamaria-Botello[2], and Tobias J, Kippenberg[1] — [1]Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [2]Colorado School of Mines, Golden, USA — [3]Shanghai Institute of Microsystems and Information Technology, China Academy of Science, Shanghai, China

We present an integrated electro-optic frequency comb generator on thin-film lithium tantalate (LiTaO3), achieving a 450 nm span with 29.6 GHz spacing, and extremely detuning-agnostic operation, via monolithic co-integrated microwave and photonic resonators.

**Oral** CK-10.5 15:00 ICM - Room 14b

*withdrawn*

**Oral** CK-10.6 15:15 ICM - Room 14b

*withdrawn*

## ED-5: Frequency Comb Sources

Chair: Marco Marangoni, Politecnico di Milano, Milan, Italy

Time: Thursday, 14:00–15:30 Location: ICM - Room Osterseen

**Oral** ED-5.1 14:00 ICM - Room Osterseen

**Watt-Class Sub-100-fs Kerr-Lens Mode-Locked Dual-Comb Laser at 2.13 $\mu$m** — •Mykyta Redkin, Yicheng Wang, Sergei Tomilov, and Clara Saraceno — Ruhr University Bochum, Bochum, Germany

We report a soft-aperture Kerr-lens mode-locked free-running dual-comb laser operating at a 2.13 $\mu$m wavelength, presenting the first demonstration of a watt-class dual-comb system within the 2-$\mu$m wavelength range.

**Oral** ED-5.2 14:15 ICM - Room Osterseen

**Broadband Astrocomb with Feed-Forward Integration of a cw Laser Frequency Marker** — Yuk Shan Cheng, •Kamalesh Dadi, William Newman, Jake Charsley, Richard McCracken, and Derryck Reid — Institute of Photonics and Quantum Sciences, School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, United Kingdom

We present a Ti:sapphire-based astrocomb in RIZ band integrated with a single-frequency laser through feed-forward. The precise integration of the cw laser serve as a fiducial marker while enabling broadband LFC filtering through Pound-Drever-Hall technique.

**Oral** ED-5.3 14:30 ICM - Room Osterseen

*withdrawn*

**Oral** ED-5.4 14:45 ICM - Room Osterseen

**How to Generate XUV Frequency Combs Without Enhancement Resonators?** — •Muhammad Thariq[1,2], Johannes Weitenberg[1,3], Francesco Canella[4,5], Gianluca Galzerano[5], Theodor W. Hänsch[1,2], Thomas Udem[1,2], and Akira Ozawa[1] — [1]Max-Planck-Institut für Quantenoptik, Garching, Germany — [2]Ludwig-Maximilians-Universität München, Munich, Germany — [3]Fraunhofer-Institut für Lasertechnik ILT, Aachen, Germany — [4]Politecnico di Milano, Milan, Italy — [5]Istituto di Fotonica e Nanotecnologie - Consiglio Nazionale delle Richerce, Milan, Italy

We have performed high harmonic generation of a frequency comb without enhancement resonators. This is achieved by reducing the repetition rate to 40 kHz, significantly simplifying the laser system and enable easier accessibility for XUV spectroscopy.

**Oral** ED-5.5 15:00 ICM - Room Osterseen

**High Stability Harmonically Modelocked GHz Er Fiber Frequency Comb** — Kevin F Lee, •Jacob Lampen, Jie Jiang, and Martin E Fermann — IMRA America, Inc., Ann Arbor, USA

We generate a 1 GHz repetition rate erbium fiber frequency comb by coupling a small subcavity to a fiber oscillator. The frequency comb stabilization and performance is comparable to a conventional fiber comb.

**Oral** ED-5.6 15:15 ICM - Room Osterseen

**Noise performance of the carrier-envelope offset in passively stabilized frequency combs** — •Haochen Tian[1,2], Yu Cai[1], Tao Yang[1,2], Qiang Wang[1,2,5], Xinqi Wang[1], Baike Lin[1,2], Fei Meng[1,2], Ye Li[1,2], Zhanjun Fang[1,2,5], Günter Steinmeyer[3,4], and Yige Lin[1,2,5] — [1]Division of Time and Frequency Metrology, National Institute of Metrology, Beijing, China — [2]Key Laboratory of Time Frequency and Gravity Primary Standard, State Administration for Market Regulation, Beijing, China — [3]Max-Born-Institut, Berlin, Germany — [4]Physics Department, Humboldt University, Berlin, Germany — [5]Hefei National Laboratory, Hefei, China

To access the noise performance and origin of carrier-envelope offset frequency of passively stabilized frequency combs, a frequency-shifted f-2f interferometer is built to characterize its frequency stability, frequency shift, frequency uncertainty, linewidth, and phase noise.

## CA-9: Pulsed Solid-State Lasers Above 2 $\mu$m Wavelength

Chair: Federico Pirzio, University of Pavia, Pavia, Italy

Time: Thursday, 14:00–15:30 Location: Hall A1 - Room A12

**Invited** CA-9.1 14:00 Hall A1 - Room A12

**Femtosecond Upconversion Pumped 2.3-$\mu$m Thulium Laser** — •Ji Eun Bae[1], Marco Gaulke[2], Pavel Loiko[1], Jonas Heidrich[2], Matthias Golling[2], Said Idlahcen[3], Lauren Guillemot[1], Thomas Godin[3], Frédéric Druon[4], Patrice Camy[1], Ursula Keller[2], and Ammar Hideur[3] — [1]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France — [2]ETH Zürich, Zürich, Switzerland — [3]CORIA UMR 6614, CNRS-INSA-Université de Rouen Normandie, Saint Etienne du Rouvray, France — [4]Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, Palaiseau, France

Thulium laser with upconversion pumping at 1.45 $\mu$m is mode-locked by a GaSb-based SESAM delivering 282-fs soliton pulses at 2306 nm (the 3H4→3H5 transition) corresponding to an output power of 478 mW at 104.7 MHz.

**Oral** CA-9.2 14:30 Hall A1 - Room A12

**Experiments and numerical simulations of Ho:CALGO regenerative amplifier at 2.08 $\mu$m** — •Anna Suzuki, Boldizsar Kassai, Sergei Tomilov, Yicheng Wang, and Clara Saraceno — Photonics and Ultrafast Laser Science, Ruhr-University Bochum, Bochum, Germany

We present experiments and numerical studies of a femtosecond Ho:CALGO regenerative amplifier at 2.08-$\mu$m wavelength. 11.2-W average output power was achieved at 100 kHz, and further energy scaling was explored with numerical simulations.

**Oral** CA-9.3 14:45 Hall A1 - Room A12

**Ultra-short Pulse Ho:YAG Slab Amplifier for Laser Processing of Infrared Optical Materials** — •Lucas Groult, Jake Sanwell, Tara van Abeelen, Adrian Dzipalski, Richard M. Carter, Duncan P. Hand, and M. J. Daniel Esser — Heriot-Watt University, Edinburgh, United Kingdom

A Ho:YAG slab amplifier is developed, pumped by a Tm:YLF slab laser, seeded with a 5 ps, 23 MHz fibre laser at 2.1 $\mu$m, and scaled to $\mu$J-energies for processing of silicon and other materials.

**Oral** CA-9.4 15:00 Hall A1 - Room A12

**Sub-picosecond Tm:YAP Regenerative Amplifier Operating out of the Window of Water Vapour Absorption** — •Joris Roman[1], Edgar Kaksis[1], Julius Lukosiunas[2,3], Kirilas Michailovas[2], Michailas Grishinas[2], Rokas Danilevicius[2], Andrejus Michailovas[2,3], Andrius Baltuska[1,3], and Audrius Pugzlys[1,3] — [1]Photonics Institute, TU Wien, Vienna, Austria — [2]Ekspla uab, Vilnius, Lithuania — [3]Center for Physical Sciences & Technology, Vilnius, Lithuania

We report on design and performance of a robust 10-kHz Tm:YAP DPSSL system generating scalable in energy and duration sub-mJ, sub-picosecond pulses at 1980 nm, which is out of the window of water vapour absorption.

**Oral** CA-9.5 15:15 Hall A1 - Room A12

**Resonantly Pumped Tm-doped and Y/Lu/Gd/La Buffered $CaF_2$ Lasers Tunable in Wide Wavelength Range of 1820-2062 nm** — •Dominika Popelová[1], Karel Veselský[1], Jan Šulc[1], Helena Jelínková[1], Abdelmjid Benayad[2], Patrice Camy[2], Alain Braud[2], and Pavel Loiko[2] — [1]Czech Technical University in Prague, FNSPE, Prague, Czech Republic — [2]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France

Resonantly-pumped thulium-doped $CaF_2$ lasers with Y/Lu/Gd/La buffers and their tunability using a birefringent filter were characterised. Tm,Y:$CaF_2$ laser generated 97 mW with slope efficiency of 40% and reached the widest tuning range of 242 nm.

## CE-12: 3D Fabricated Optical Devices and Structures

Chair: Pawel Maniewski, KTH Royal Institute of Technology, Stockholm, Sweden

Time: Thursday, 14:00–15:30 Location: Hall B1 - Room B11

**Oral** CE-12.1 14:00 Hall B1 - Room B11

**A Hybrid Fiber–Solid-State Laser with 3D-Printed Intracavity Lenses** — •Simon Angstenberger, Pavel Ruchka, Mario Hentschel, Tobias Steinle, and Harald Giessen — 4th Physics Institute and Stuttgart Research Center of Photonic Engineering, University of Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart, Germany, Stuttgart, Germany

Microscale 3D-printing enables the first laser with intracavity 3D-printed optics on a fiber. We find good durability of the investigated optics even at Watt power levels, offering integration of bulk active media in fiber platforms.

**Oral** CE-12.2 14:15 Hall B1 - Room B11

**On-fiber 3D printed broadband radial and azimuthal vector beam generator** — Diana Gonzalez-Hernandez, Andrea Bertoncini, Innem V.A.K. Reddy, and •Carlo Liberale — Biological and Environmental Science and Engineering Division, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia

We present an on-fiber 3D-printed photonic microstructure with stacked hybrid segments, generating broadband radial and azimuthal polarization beams from polarization-maintaining fibers, enabling compact, monolithic solutions for delivering vector beams in photonic applications.

**Oral** CE-12.3 14:30 Hall B1 - Room B11

**Femtosecond laser-assisted free-form 3D printing on fiber tip for microfluidic sensing applications** — •Ribal Beyrouti[1,2], Pauline Girault[2], Laurent Oyhenart[2], Laurent Béchou[2], and Lionel Canioni[1] — [1]Institut de chimie de la matière condensée de Bordeaux (ICMCB), UMR CNRS 5026, Univ. Bordeaux, Bordeaux INP, Pessac, France — [2]Laboratoire de l'Intégration du Matériau au Système (IMS) - UMR CNRS 5218, Université de Bordeaux, Bordeaux INP, Talence, France

This study develops a fiber-based system for water analysis via microabsorption spectroscopy. A 200 $\mu$m reflective hemisphere, fabricated using laser-assisted 3D printing and gold coating, enables efficient light collection for simplified microfluidic applications.

**Oral** CE-12.4 14:45 Hall B1 - Room B11

*withdrawn*

**Oral** CE-12.5 15:00 Hall B1 - Room B11

**High-NA Quasi-Parabolic Microlenses Fabricated by Two-Photon Polymerization for Linear and Nonlinear Microscopy** — •Behjat Sadat Kariman[1], Alessandra Nardini[2,5], Mario Marini[3], Claudio Conci[4], Manuela T. Raimondi[4], Roberto Osellame[5], Giuseppe Chirico[3], Giulio Cerullo[1], and Rebeca Martínez Vázquez[5] — [1]Department of Physics, Politecnico di Milano,, Milan, Italy — [2]Department of Experimental Medicine, University of Salento c/o College Isufi, , Lecce, Italy — [3]Department of Physics, Università degli Studi di Milano-Bicocca, Milan, Italy — [4]Department of Chemistry, Materials and Chemical Engineering "Giulio Natta", Politecnico di Milano, Milan, Italy — [5]Institute of Photonic and Nanotechnologies (IFN), CNR, Milan, Italy

Integration of micro-optics technologies with various optical microscopy techniques has paved the path to enhance images quality through 2D and 3D specimens. We propose high-NA parabolic aspheric microlenses to be coupled within an imaging system.

**Oral** CE-12.6 15:15 Hall B1 - Room B11

**3D Soft Imprint Lithography for Characterization of Polycrystalline $\chi^{(2)}$ Materials** — •Ülle-Linda Talts[1], Andrea Morandi[1], Helena Weigand[1], Bruno Melo[2], Romain Quidant[2], and Rachel Grange[1] — [1]ETH Zurich, Department of Physics, Institute for Quantum Electronics, Optical Nanomaterial Group , Zürich, Switzerland — [2]ETH Zurich, Department of Mechanical and Process Engineering, Nanophotonic Systems Laboratory, Zürich, Switzerland

Solution-dispersed non-centrosymmetric nanoparticles are an interesting material platform for investigating the interplay between multiple scattering and nonlinear optics. We demonstrate how three-dimensional imprint lithography helps to quantitatively characterize the nonlinear optical properties of nanoparticle assemblies.

## CG-3: Harmonic Generation and Particle Acceleration

Chair: Christoph Heyl, DESY (Deutsches Elektronen-Synchrotron), Hamburg, Germany

Time: Thursday, 14:00–15:30 Location: Hall B2 - Room B21

**Oral** CG-3.1 14:00 Hall B2 - Room B21

**From in-situ sub-cycle pulse characterization to quantitative in silico high-harmonic generation predictions.** — •Rafael de Queiroz Garcia[1,2], Fabian Scheiba[1,2,3], Maximilian Kubullek[1,2], Roland Erwin Mainz[2,3], Naglis Kriunas[2], Miguel Angel Silva Toledo[1,2], Giulio Maria Rossi[2], and Franz Xaver Kärtner[1,2,3] — [1]Department of Physics, University of Hamburg, Hamburg, Germany — [2]Center for Free-Electron Laser Science (CFEL), Hamburg, Germany — [3]The Hamburg Centre for Ultrafast Imaging (CUI), Hamburg, Germany

A cost-effective high-harmonic generation simulation framework was developed combining in-situ optical pulse characterization and 1D field propagation. It re-

produces quantitatively our efficiency enhancement experiments of isolated attosecond pulse production in the water-window using tailored waveforms.

**Oral** CG-3.2 14:15 Hall B2 - Room B21

**Exploring the Effects of Pulse Duration on High-Order Harmonic Generation with Tunable Multi-Pass Cell Post-Compression** — •Saga Westerberg[1], Melvin Redon[1], Ann-Kathrin Raab[1], Gaspard Beaufort[1], Marta Arias Velasco[2], Chen Guo[1], Ivan Sytcevich[1], Robin Weissenbilder[1], Cord Arnold[1], Anne L'Huillier[1], and Anne-Lise Viotti[1] — [1]Department of Physics, Lund University, P.O. Box 118, 22100,, Lund, Sweden — [2]CNR, Istituto di Fotonica e Nanotecnologie, Piazza Leonardo da Vinci 32, 20133, Milano, Italy

We investigate the influence of the driving laser pulse duration on the yield of high-order harmonic generation through numerical simulations and experiments, by employing a bulk multi-pass cell post-compression setup delivering tunable pulses durations.

**Oral** CG-3.3 14:30 Hall B2 - Room B21

**Relativistic high-harmonic generation from liquid leaf targets at kHz rate** — •Antoine Cavagna[1], Milo Eder[2], Jaismeen Kaur[1], André Kalouguine[1], Stefan Haessler[1], Enam Chowdhury[2], and Rodrigo Lopez-Martens[1] — [1]Laboratoire d'Optique Appliquée, Palaiseau, France — [2]Ohio State University, Columbus, USA

Relativistic high-harmonic generation (RHHG) at 1 kHz from liquid-leaf plasma mirrors is demonstrated, producing stable, high-flux attosecond pulse trains via precise waveform control, offering a scalable path toward next-generation high-power attosecond lasers.

**Oral** CG-3.4 14:45 Hall B2 - Room B21

**Ion-based Hard X-Ray High-Harmonic Generation with a Transverse Disruptive Pulse for Quasi-Phase-Matching** — Hsu-hsin Chu[1,2], Yao-Li Liu[3], •Shih-Chi Kao[1], and Chih-Hao Pai[1,2] — [1]Department of Physics, National Central University, Taoyuan, Taiwan — [2]Center for High Energy and High Field Physics, National Central University, Taoyuan, Taiwan — [3]Institute of Space and Plasma Sciences, National Cheng Kung University, Tainan, Taiwan

A quasi-phase-matching scheme for 1-keV hard x-ray harmonic generation is proposed. Practical experimental conditions are analyzed. A proof-of-principle experiment is demonstrated in the EUV range. 35% enhancement is obtained with one QPM zone.

**Oral** CG-3.5 15:00 Hall B2 - Room B21

**A High Repetition-Rate High Harmonic Generation Setup for Time-resolved Molecular Spectroscopy** — •Lorenzo Pratolli[1,2], Katinka Horn[3,4], Erik Månsson[5], Fabio Frassetto[6], Luca Poletto[6], Laura Silletti[2,5], Ammar bin Wahid[2,5], Ana Oliveria e Silva[2,5], Teodora F. Grigorova[7], Christian Brahms[7], John C. Travers[7], Christoph M. Heyl[5,8], Terry Mullins[5], Vincent Wanie[5], and Francesca Calegari[5] — [1]Physics Department, Universität Hamburg, Hamburg, Germany — [2]Helmholz-Lund International Graduate School, Hamburg, Germany — [3]Department of Chemistry and Applied Biosciences, ETH Zürich, Zürich, Switzerland — [4]Center for Molecular and Water Science, Deutsches Elektronen-Synchrotron, Hamburg, Germany — [5]Center for Free-Electron Laser Science, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [6]Institute for Photonics and Nanotechnologies CNR-IFN, Padova, Italy — [7]School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, United Kingdom — [8]Helmholtz-Institut Jena, Jena, Germany

We present the ongoing development of a 200 kHz UV-pump XUV-probe spectroscopy setup featuring a tuneable time-compensating monochromator to investigate ultrafast photochemical phenomena of biomolecules in water clusters.

**Oral** CG-3.6 15:15 Hall B2 - Room B21

**Stabilization of an Ultrathin Liquid Sheet Target System for Ion Acceleration at 1 kHz Repetition Rate** — Tibor Gilinger[1], Előd Buzás[1], Máté Karnok[1], •Attila P. Kovács[1,2], Ádám Kovács[3], Botond Bencsik[1], and Károly Osvay[1,2,3] — [1]National Laser-Initiated Transmutation Laboratory, University of Szeged, Szeged, Hungary — [2]Department of Optics and Quantum Electronics, University of Szeged, Szeged, Hungary — [3]National Laboratory for Cooperative Technologies, University of Szeged, Szeged, Hungary

The developed active stabilization system keeps the pointing stability of the surface of a liquid sheet target below 10mrad over several hours of interaction with laser pulses at 1 kHz repetition rate.

## EB-9: Quantum Sensing

Chair: Sven Ramelow, Humboldt University of Berlin (HU Berlin), Berlin, Germany

Time: Thursday, 16:00–17:30 Location: ICM - Room 1

**Oral** EB-9.1 16:00 ICM - Room 1

*withdrawn*

**Oral** EB-9.2 16:15 ICM - Room 1

**Quantum rotation sensing with 512-fold improvement in resolution using spatially structured 4-photon N00N states** — •Ofir Yesharim, Guy Tshuva, and Ady Arie — Tel Aviv University, Tel Aviv, Israel

Quantum-structured light enables improved sensitivity and resolution with respect to classical light. We use a structured 4-photon N00N state, by spontaneous parametric down-conversion and two spiral phase plates (l=128), to achieve 512× rotational resolution enhancement.

**Oral** EB-9.3 16:30 ICM - Room 1

**High-Quality Fluorescent Nanodiamonds for Bio-Quantum Sensing** — •Masazumi Fujiwara and Keisuke Oshimi — Okayama University, Okayama, Japan

Fluorescent nanodiamonds with enriched \(^{12}\)C isotopes and reduced nitrogen impurities exhibit enhanced spin properties and brightness, achieving improved ODMR contrast, longer relaxation times, and high-sensitivity thermal echo measurements for advanced quantum sensing in biology.

**Oral** EB-9.4 16:45 ICM - Room 1

**Rydberg Atoms as Tunable All-Optical and Phase-Sensitive Sensors of Microwave Fields** — •Sebastian Borówka[1,2], Bartosz Kasza[1,2], Mateusz Mazelanik[1], Wojciech Wasilewski[1,2], and Michał Parniak[1,2] — [1]Centre for Quantum Optical Technologies, Centre of New Technologies, University of Warsaw, Warsaw, Poland — [2]Faculty of Physics, University of Warsaw, Warsaw, Poland

We present an experimental realization of all-optical and phase-sensitive detection of microwave fields in rubidium atomic vapors. We achieve sensitivity paralleling state-of-the-art superheterodyne methods, even though no microwave local oscillator is employed.

**Oral** EB-9.5 17:00 ICM - Room 1

*withdrawn*

**Oral** EB-9.6 17:15 ICM - Room 1

**Quantum-enhanced second harmonic generation beyond the photon pairs regime** — Thomas Dickinson[1,2], Ivi Afxenti[3], Giedre Astrauskaite[4], Lennart Hirsch[3], Samuel Nerenberg[4], Ottavia Jedrkiewicz[2,5], Daniele Faccio[4], Caroline Müllenbroich[4], Alessandra Gatti[5], Matteo Clerici[2,3], and •Lucia Caspani[1,2] — [1]Institute of Photonics, Department of Physics, University of Strathclyde, Glasgow, United Kingdom — [2]Como Lake Institute of Photonics, Dipartimento di Scienza e Alta Tecnologia, University of Insubria, Como, Italy — [3]James Watt School of Engineering, University of Glasgow, Glasgow, United Kingdom — [4]School of Physics and Astronomy, University of Glasgow, Glasgow, United Kingdom — [5]Istituto di Fotonica e Nanotecnologie del CNR, Milano, Italy

We demonstrated quantum-enhanced efficiency of second harmonic generation driven by parametric down-conversion (PDC) compared to a classical laser field, with PDC intensities of up to ~ 10 photons per mode, well beyond the standard 1-photon-per-mode limit.

# JSI-2: Neuromorphic Photonics 1

Chair: Daniel Brunner, FEMTO-ST, Besançon, France

Time: Thursday, 16:00–17:30 Location: ICM - Room 4a

**Invited** JSI-2.1 16:00 ICM - Room 4a

**Best of Both Worlds' Neuromorphic Computing in 3D Photonic-Electronic Integrated Neural Networks** — •S. J. Ben Yoo — University of California, Davis, USA

We propose a brain-derived Neuromorphic Computing architecture for flexible learning intelligent systems capable of handling complex tasks in unpredictable environments. We will discuss 3D Nanophotonic-Nanoelectronic integrated circuits that can realize energy-efficient, high-throughput, and scalable realization of brain-derived Neuromorphic Computing.

**Oral** JSI-2.2 16:30 ICM - Room 4a

**III-V Semiconductor Nanopillar Arrays for an Insect Vision Inspired Neuromorphic On-Chip Platform** — •João Azevedo, Bejoys Jacob, Jana B. Nieder, and Bruno Romeira — INL – International Iberian Nanotechnology Laboratory, Braga, Portugal

The insect brain architecture is mimicked through an energy-efficient on-chip platform based on III-V semiconductor nanopillar arrays. These will work as emitting and detecting neurosynaptic nodes for spiking nanocircuits, relevant for future data processing solutions.

**Oral** JSI-2.3 16:45 ICM - Room 4a

**Fast Edge Detection in Time-series using Photonic-Electronic Spiking Resonant Tunnelling Diode Neurons** — •Dafydd Owen-Newns[1], Giovanni Donati[1], Andrew Adair[1], Dylan Black[1], Edward Wasige[2], José Figueiredo[3], Bruno Romeira[4], Joshua Robertson[1], and Antonio Hurtado[1] — [1]Institute of Photonics, University of Strathclyde, Glasgow, United Kingdom — [2]High Frequency Electronics Group, University of Glasgow, Glasgow, United Kingdom — [3]LIP and Departamento de Física da Faculdade de Ciências da Universidade de Lisboa, Lisboa, Portugal — [4]International Iberian Nanotechnology Lab, Lisboa, Portugal

Photodetecting Resonant Tunnelling Diodes are used as fast spiking neurons for detecting rising edges in time-series data by using simultaneous optical and electronic modulation

**Oral** JSI-2.4 17:00 ICM - Room 4a

**Unlocking New Frontiers in Scalable Photonic Artificial Neurons: A Study on Gain-Doped Layer-on-Waveguide-Synapse** — •Robert Otupiri and Ripalta Stabile — Technische Universiteit Eindhoven, EHCI, Eindhoven, Netherlands

We introduce a Gain-Doped-layer-on-Waveguide for neuromorphic photonics, enabling efficient spiking neurons with threshold operation, asynchronous spikes, temporal integration, and transient memory. This all-optical approach enhances performance while reducing energy and hardware requirements for scalable cognitive computing.

**Oral** JSI-2.5 17:15 ICM - Room 4a

**Photonic spiking reservoir computing based on a single passive silicon microring and time-wavelength multiplexing** — •Giovanni Donati[1], Stefano Biasi[2], Alessio Lugnan[2], Lorenzo Pavesi[2], and Antonio Hurtado[1] — [1]University of Strathclyde, Glasgow, United Kingdom — [2]University of Trento, Trento, Italy

We introduce a novel photonic spiking reservoir computer based on a passive silicon microring. The system achieves 92% classification accuracy on the Iris dataset, with an average of only three optical spikes per flower datapoint.

# CB-2: UV and Visible Semiconductor Lasers

Chair: Karl Häusler, Ferdinand-Braun-Institut (FBH), Berlin, Germany

Time: Thursday, 16:00–17:30 Location: ICM - Room 4b

**Invited** CB-2.1 16:00 ICM - Room 4b

**Advances in deep ultraviolet semiconductor laser: from material challenges to device performance** — •Maki Kushimoto[1], Ziyi Zhang[1,2], Akira Yoshikawa[1,2], Koji Aoto[1], Yoshio Honda[1], Chiaki Sasaoka[1], and Hiroshi Amano[1] — [1]Nagoya University, Nagoya, Japan — [2]Asahi Kasei, Chiyoda, Japan

We achieved room-temperature continuous-wave lasing of AlGaN-based deep ultraviolet laser diodes by optimizing epitaxial growth and device structure, addressing shear stress-induced dislocations through tilted mesa geometry, and enhancing optical confinement.

**Oral** CB-2.2 16:30 ICM - Room 4b

**Demonstration of a BIC polariton laser in a GaN waveguide** — •Valentin Develay[1], Hassen Souissi[2], Ismaël Septembre[3], Laetitia Doyennette[1], Christelle Brimont[1], Edmond Cambril[2], Sophie Bouchoule[1], Blandine Alloing[4], Jesus Zuniga-Perez[4,5], Olha Bahrova[6], Dmitry Solnyshkov[6], Guillaume Malpuech[6], and Thierry Guillet[1] — [1]Laboratoire Charles Coulomb, Université de Montpellier, CNRS, , Montpellier, France — [2]Centre de Nanosciences et de Nanotechnologies, CNRS, Université Paris-Saclay, , Palaiseau, France — [3]Naturwissenschaftlich-Technische Fakultät, Universität Siegen, , Siegen, Germany — [4]Université Cote d'Azur, CNRS, CRHEA,, Valbonne, France — [5]MajuLab, International Research Laboratory IRL 3654, CNRS, Université Côte d'Azur, Sorbonne Université, National University of Singapore, Nanyang Technological University,, Singapore, Singapore — [6]Université Clermont Auvergne, Clermont Auvergne INP, CNRS, Institut Pascal,, Clermont-Ferrand, France

We demonstrate a bound state in the continuum (BIC) polariton laser in a GaN-based photonic crystal waveguide. BIC-based polaritons and polariton condensation were observed at 70K, enabling prospects for low-threshold room-temperature polariton lasing.

**Oral** CB-2.3 16:45 ICM - Room 4b

**Chip-integrated ultra-narrow linewidth laser at 640 nm** — •Lisa V. Winkler[1,2], Albert van Rees[1], Philip P. J. Schrinner[3], Marcel Hoekman[3], Ronald Dekker[3], Adriano R. Do Nascimento Jr.[4], Peter J. M. van der Slot[1], Christian Nölleke[2], and Klaus-J. Boller[1] — [1]University of Twente, Enschede, Netherlands — [2]TOPTICA Photonics AG, Gräfelfing, Germany — [3]LioniX International B.V., Enschede, Netherlands — [4]PHIX B.V., Enschede, Netherlands

We demonstrate a photonic integrated laser with an ultra-narrow linewidth of only 750 Hz, which is a record-low for the visible. This is achieved by joining the two widespread concepts of ECDLs and self-injection locking.

**Oral** CB-2.4 17:00 ICM - Room 4b

**Monolithic Dual-Wavelength DBR Diode Laser at 633 nm Suitable for Raman Spectroscopy in Fluorescent Environments** — •Aghigh Jalehdoost, Kay Sowoidnich, André Müller, David Feise, Katrin Paschke, Bernd Sumpf, and Martin Maiwald — Ferdinand-Braun-Institut (FBH), Berlin, Germany

A monolithic dual-wavelength 633 nm Y-branch DBR diode laser with an optical output power of 30 mW and stable narrowband emission over the entire operation range suitable for shifted excitation Raman difference spectroscopy is presented.

**Oral** CB-2.5 17:15 ICM - Room 4b

**Highly collimated Gaussian-beam emission of VCSEL in the visible red spectral range for sensing and fiber applications** — •Michael Jetter, Lena Engel, Farnaz Khamses, Arina Farsian, Michael Zimmer, and Peter Michler — Institut für Halbleiteroptik und Funktionelle Grenzflächen, Stuttgart, Germany

Enhanced emission characteristics of red emitting VCSELs with suppressed multi-mode emission over the entire operating range and low divergence angle for sensing and fiber application without external optics are shown.

# CF-9: Frequency Combs

Chair: Takao Fuji, Toyota Technological Institute, Nagoya, Japan

Time: Thursday, 16:00–17:30 Location: ICM - Room 13a

**Oral** CF-9.1 16:00 ICM - Room 13a

**Towards a Compact Single-Diode-Pumped Ti:sapphire Astrocomb** — •Ewan Allan[1], Abdullah Alabbadi[2], Hanna Ostapenko[1], Pablo Castro-Marin[1], Richard A. McCracken[1], Pascal Del'Haye[2], and Derryck T. Reid[1] — [1]Heriot-Watt University, Edinburgh, United Kingdom — [2]Max Planck Institute for the Science of Light, Erlangen, Germany

We present a route to a simple and compact optical astrocomb based on a femtosecond, 1 GHz, single diode pumped, 3-element Ti:sapphire laser design and a $Si_3N_4$ waveguide to generate an octave spanning supercontinuum.

**Oral** CF-9.2 16:15 ICM - Room 13a

**Mode-locked monolithic Ti:sapphire laser with 17 GHz repetition rate** — •Torben Fiehler and Ulrich Wittrock — FH Münster, Steinfurt, Germany

We developed a self-starting Kerr-lens mode-locked monolithic Ti:sapphire laser with nearly bandwidth-limited 200-fs pulses, 17 GHz repetition rate, and close to 1 W average output power.

**Oral** CF-9.3 16:30 ICM - Room 13a

**Low noise repetition rate multiplication of a modelocked Er Fiber Laser with a V-cavity** — •Jacob Lampen, Kevin Lee, Jie Jiang, and Martin Fermann — IMRA America, Ann Arbor, USA

We demonstrate a low noise repetition rate multiplication of a modelocked Er fiber laser with a V-shaped cavity, enabling supermode-free operation at the 33rd harmonic resulting in a repetition rate of approximately 1 GHz.

**Oral** CF-9.4 16:45 ICM - Room 13a

**Offset dynamics in ultra-broadband frequency combs with overlapping harmonics** — •Weichen Fan[1], Furkan Ayhan[2], Thibault Wildi[1], Mikhail Volkov[3], Ali Seer[3], Markus Ludwig[1,6], Thibault Voumard[1,7], Andreas Brodschelm[3], Victor Brasch[5], Guillermo L. Villanueva[2], and Tobias Herr[1,4] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland — [3]TOPTICA Photonics, Munich, Germany — [4]Physics Department, Universität Hamburg UHH, Hamburg, Germany — [5]Q.ANT GmbH, Stuttgart, Germany — [6]Presently: Université du Luxembourg, Luxembourg, Luxembourg — [7]Presently: Centre Suisse d'Électronique et de Microtechnique CSEM, Neuchâtel, Switzerland

We numerically and experimentally reveal the offset dynamics in frequency combs with overlapping harmonics. Multi-offset interleaved frequency combs are generated, whereas when the pump source is offset-free, a single consistent comb is generated.

**Oral** CF-9.5 17:00 ICM - Room 13a

**Temporal compression of an electro-optic fiber laser with flexible repetition rate in the multi-GHz range** — •Duncan Sarton, Jérôme Lhermite, Jean-Christophe Delagnes, Philippe Balcou, Charles Lacampagne, and Denis Marion — CELIA, Talence, France

We present a technology to recompress to the Fourier limit the output of electro-optically modulated fiber lasers, while keeping the ability of agile switching between repetition rates, from 6 to 18 GHz.

**Oral** CF-9.6 17:15 ICM - Room 13a

**Cw-seeded Parametric Combs with sub-100 mrad Carrier-envelope Phase Noise** — •Jintao Fan[1], Jue Wang[1], Haosen Shi[2], Günter Steinmeyer[3], and Minglie Hu[1] — [1]Tianjin University, Tianjin, China — [2]East China Normal University, Shanghai, China — [3]Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany

We present a novel approach for measuring carrier-envelope phase (CEP) fluctuations in a cw-seeded femtosecond OPA at oscillator repetition rates. This approach employs dispersive temporal interferometry for experimentally confirming unexpectedly low CEP noise levels.

# CJ-10: 2-Micron Fiber Sources 2

Chair: Jayanta Sahu, University of Southampton, Southampton, United Kingdom

Time: Thursday, 16:00–17:30 Location: ICM - Room 13b

**Oral** CJ-10.1 16:00 ICM - Room 13b

**Efficiency scaling of high power and high energy Tm-doped fiber lasers** — •Mathias Lenski[1], Qian Xu[1], Philipp Gierschke[1,2], Ziyao Wang[1], Tobias Heuermann[1,3,4], Christopher Aleshire[1], Christian Gaida[5], César Jáuregui[1,2], and Jens Limpert[1,2,3,4] — [1]Institute of Applied Physics, Friedrich-Schiller-Universität, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany — [3]Helmholtz-Institute, Jena, Germany — [4]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [5]Active Fiber Systems GmbH, Jena, Germany

We demonstrate our experimental investigations on high-power, high-energy Tm-doped fiber lasers, pumped in-band at 1692 nm. According to our simulations, this pump wavelength enables high output power and scalability of Tm-doped fibers above 10 kW.

**Oral** CJ-10.2 16:15 ICM - Room 13b

**Ultrafast 2.1-$\mu$m Mode-Locked Tm:Ho:ZBLAN Fiber Laser** — •Hiroki Kawase[1], Nur Atikah Binti Azali[2], and Takao Fuji[2] — [1]RIKEN Center for Advanced Photonics, Wako, Japan — [2]Laser Science Laboratory, Toyota Technological Institute, Nagoya, Japan

We demonstrated 2.1-$\mu$m Tm:Ho:ZBLAN mode-locked fiber laser. The laser generated 75 fs pulses after compression, representing the shortest pulse duration achieved in either Ho-doped or Tm-Ho-doped mode-locked fiber oscillators.

**Oral** CJ-10.3 16:30 ICM - Room 13b

**High-power actively-pulse-shaped 2 mJ nanosecond-pulsed $Tm^{3+}$-doped photonic crystal fiber amplifier emitting at 2048 nm** — •Julian Schneider[1,2], Dominik Lorenz[1,2], Clément Romano[1], Dieter Panitzek[1], Jan Lautenschläger[1,2], Marc Eichhorn[1,2], and Christelle Kieleck[1] — [1]Fraunhofer IOSB, Ettlingen, Germany — [2]Institute of Control Systems (IRS), Karlsruhe Institute of Technolgoy (KIT), Karlsruhe, Germany

An actively-pulse-shaped $Tm^{3+}$-doped photonic crystal fiber amplifier is reported that generates 49 ns-long rectangular pulses with pulse energies of 2.07 mJ, peak powers of 52 kW, and an average output power of 207 W at a wavelength of 2048 nm.

**Oral** CJ-10.4 16:45 ICM - Room 13b

**Instantaneous output power of 0.2 kW achieved in a quasi-continuous-wave-pumped thulium-doped fiber laser** — •changshun Hou, Ziwei Zhai, Nilotpal choudhury, Tom Harris, Jayanta Sahu, and Johan Nilsson — Optoelectronic Research Centre (ORC), university of southampton, southampton, United Kingdom

A cladding-pumped thulium-doped fiber laser generated 198 W in 0.2-ms pulses at 50 Hz repetition rate, with slope efficiency of 67% up to 200 W and 52% at full 352 W of absorbed pump power.

**Oral** CJ-10.5 17:00 ICM - Room 13b

**Monolithic 272W high efficiency Tm-doped nested-ring fibre laser** — •Richard Švejkar[1], Martin P. Buckthorpe[1], Bára Švejkarová[2,3], Peter C. Shardlow[1], and W. Andrew Clarkson[1] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]Institute of Photonics and Electronics of the Czech Academy of Sciences, Prague, Czech Republic — [3]Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Prague, Czech Republic

Tm-doped small-core size (8.2/130 $\mu$m) and pedestal free fibre with novel design based on nested-ring structure was used to build 1940 nm laser generating output power of 272 W in CW with slope efficiency of 71 %.

**Oral** CJ-10.6 17:15 ICM - Room 13b

**35 W Core-Pumped Holmium Fiber Laser** — •Jan Pokorný[1,2], Bára Švejkarová[1,2], Jan Aubrecht[1], Michal Kamrádek[1], Ivo Bartoň[1], Ivan Kašík[1], Pavel Honzátko[1], and Pavel Peterka[1] — [1]Institute of Photonics and Electronics of the Czech Academy of Sciences, Praha, Czech Republic — [2]Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Praha, Czech Republic

We present a 35 W resonantly core pumped holmium doped fiber laser at 2.1 um. The efficiency of the presented laser exceeds 80 % and represents, to our knowledge, the highest presented power from such design.

## CH-13: Light Detection and Ranging

Chair: Cristian Focsa, University of Lille, Lille, France

Time: Thursday, 16:00–17:30 Location: ICM - Room 14a

**Oral** CH-13.1 16:00 ICM - Room 14a

*moved from CH-P.1*

**Nanomotion visualization through cathodoluminescence** — •Toji Thomas[1], Eric Plum[1], Kevin F. MacDonald[1], and Nikolay I. Zheludev[1,2] — [1]Optoelectronics Research Centre, University of Southampton, Highfield, Southampton, United Kingdom — [2]Hagler Institute for Advanced Study, Texas A&M University, College Station, Texas, USA

The motion of nano/microscale objects can be detected and mapped via cathodoluminescence, with nanometric displacement sensitivity and spatial resolution, and MHz bandwidth.

**Oral** CH-13.2 16:15 ICM - Room 14a

**Surface Scanning of Structured Metal Artefacts with Two-Photon Dual-Comb LiDAR** — •Alexander J. M. Nelmes, Hollie Wright, and Derryck T. Reid — Heriot-Watt University, Edinburgh, United Kingdom

Two-photon dual-comb LiDAR exploits time-stamping with a microcontroller for real-time dual-comb ranging with minimal data burden. Here, we employ amplified detection and automated collection to demonstrate surface scanning of a brass artefact with our technique.

**Oral** CH-13.3 16:30 ICM - Room 14a

**Characterization of 466 nm DFB laser diode for underwater FMCW LiDAR applications** — •Wataru Kokuyama[1], Hidemi Tsuchida[1], and Yoshiaki Nakajima[2] — [1]National Institute of Advanced Industrical Science and Technology (AIST), Tsukuba, Japan — [2]Toho University, Funabashi, Japan

We have characterized a 466 nm single-frequency distributed feedback (DFB) laser with a self-delayed heterodyne measurement. Its modulation depth at 1 kHz was 12 GHz peak-to-peak and its linewidth was 1.9 MHz.

**Oral** CH-13.4 16:45 ICM - Room 14a

**Long-Distance Ranging and hyperspectral LiDAR using Free-Running Dual-Comb Lasers** — •Lukas Lang[1], Sandro L. Camenzind[1], Benjamin Willenberg[1], Justinas Pupeikis[1], Hayk Soghomonyan[1], Alexander Nussbaum-Lapping[1], Robert Presl[2], Pabitro Ray[2], Josef Taher[3], Teemu Hakala[3], Antero Kukko[3], Juha Hyyppä[3], Andreas Wieser[2], Ursula Keller[1], and Christopher R. Phillips[1] — [1]Department of Physics, Institute for Quantum Electronics, ETH Zurich, Zurich, Switzerland — [2]Department of Civil, Environmental and Geomatic Engineering, Institute of Geodesy and Photogrammetry, ETH Zurich, Zurich, Switzerland — [3]Department of Remote Sensing and Photogrammetry, Finnish Geospatial Research Institute, Espoo, Finland

We apply free-running GHz single-cavity dual-comb lasers to long-distance ranging and hyperspectral LiDAR. For ranging, we achieve sub-um precision at 40 m. For hyperspectral LiDAR, we record point clouds and broadband spectra of non-cooperative targets.

**Oral** CH-13.5 17:00 ICM - Room 14a

**Three dimensional mapping of $H_2$ plumes with Raman LIDAR** — •Andrew Lockwood[1] and Charlie Ironside[2] — [1]Xcalbur Aviation, Perth, Australia — [2]Department of Physics and Astronomy, Perth, Australia

We report on 3D mapping of hydrogen gas plume concentration profiles using a Raman LIDAR system capable of detecting hydrogen with a limit of detection (LOD) of approximately 0.01 molar fraction at 2.2 m.

**Oral** CH-13.6 17:15 ICM - Room 14a

**Industrial non-destructive inspection by mid-infrared optical coherence tomography** — •Coraline Lapre[1], Christian Rosenberg Petersen[1,2], Ole Bang[1,2,3], and Niels Møller Israelsen[1,2] — [1]DTU Electro, Technical University of Denmark, Kongens Lyngby, Denmark — [2]NORBLIS ApS, Virum, Denmark — [3]NKT Photonics A/S, Birkerød, Denmark

We present our latest work using mid-infrared optical coherence tomography operating at 4 $\mu$m for non-destructive inspection and subsurface imaging of printed ceramics, and protective coatings on wind turbine blades.

## CK-11: Light Generation and Active Devices 1

Chair: Thorsten Feichtner, University of Würzburg, Würzburg, Germany

Time: Thursday, 16:00–17:30 Location: ICM - Room 14b

**Oral** CK-11.1 16:00 ICM - Room 14b

**Coupling Between Lossy Resonators: a New Approach Towards Large-area Single-mode Lasing** — •Korneel Molkens[1], Wai Kit Ng[2], T.V. Raziman[2], Ivo Tanghe[1], Pieter Geiregat[1], Ricardo Sapienza[2], and Dries Van Thourhout[1] — [1]Ghent university, Gent, Belgium — [2]Imperial college, London, United Kingdom

Large-area single-mode lasing is achieved via a new cavity design, based on coupling between leaky modes. These high loss modes interact strongly and create a low loss super mode. Our fabricated devices showed single-mode lasing.

**Oral** CK-11.2 16:15 ICM - Room 14b

**All-optical generation of quasi-Bound States in the Continuum resonances in a homogeneous dielectric thin film** — •Leonardo de S. Menezes[1,2], Rodrigo Berté[1], Thomas Possmayer[1], Andreas Tittl[1], and Stefan A. Maier[3,4] — [1]Chair in Hybrid Nanosystems, Fakultät für Physik, Ludwig-Maximilians Universität München, 80539 Munich, Germany — [2]Departamento de Física, Universidade Federal de Pernambuco, 50670-901 Recife-PE, Brazil — [3]School of Physics and Astronomy, Monash University, Clayton, Victoria 3800, Australia — [4]The Blackett Laboratory, Department of Physics, Imperial College of London, London SW7 2AZ, United Kingdom

The spatial and temporal overlap of two ultrashort (~180fs) laser pulses on a non-patterned 45nm-thick amorphous silicon film is used to generate spectrally and temporally fully controlled ultrafast-lived (~1ps) quasi-Bound State in the Continuum resonances.

**Oral** CK-11.3 16:30 ICM - Room 14b

**Non-Euclidean photonics: pseudosphere and black hole microlasers** — •Hugo Girin[1], Stefan Bittner[2], Clément Lafargue[3], Xavier Checoury[1], Dominique Decanini[1], Barbara Dietz[4], Chenni Xu[5], Patrick Sebbah[5], and Mélanie Lebental[1] — [1]Centre de Nanosciences and Nanotechnologies, Palaiseau, France — [2]Chair in Photonics, LMOPS EA-4423 Laboratory, CentraleSupélec and Université de Lorraine, Metz, France — [3]Laboratoire Lumière, Matière et Interfaces (LuMIn), CNRS, ENS Paris-Saclay, Gif-sur-Yvette, France — [4]Basic Science Program, Korea University of Science and Technology (UST), Daejon, South Korea — [5]Department of Physics, The Jack and Pearl Resnick Institute for Advanced Technology, Bar-Ilan University, Ramat-Gan, Israel

This paper explores non-Euclidean photonics on hyperbolic surface microlasers, focusing on triangles and black holes. It opens exciting avenues for studying quantum chaos and general relativity through human-scale experiments.

**Oral** CK-11.4 16:45 ICM - Room 14b

**Tunable Semiconductor Laser based on Self-injection Locking to an Integrated Fabry-Pérot Microresonator** — •Alexander Ulanov[1], Thibault Wildi[1], Utkarsh Bhatnagar[1,2], Jens Fahje[1,2], and Tobias Herr[1,2] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Physics Department, University of Hamburg UHH, Hamburg, Germany

We demonstrate a tunable semiconductor laser by self-injection locking to a chip-integrated Fabry-Pérot microresonator, achieving a peak-to-peak frequency modulation amplitude of 80 MHz and a linewidth below 400 Hz, limited by fundamental thermorefractive noise.

**Oral** CK-11.5 17:00 ICM - Room 14b

**Experimental characterisation of nanoscale buried heterostructure quantum wells** — •Valdemar Bille-Lauridsen[1,2], Meng Xiong[1,2], Yi Yu[1,2], Pawel Holewa[1,2], Elizaveta Semenova[1,2], Kresten Yvind[1,2], and Jesper Mørk[1,2] — [1]DTU Electro, Kongens Lyngby, Denmark — [2]NanoPhoton – Center for Nanophotonics, Kongens Lyngby, Denmark

Ultra-small buried heterostructure quantum wells with in-plane sizes down to 20×20 nm, are experimentally characterised. We investigate size-dependent emission properties and the role of surface effects from active material interfaces and cavity fabrication.

**Oral** CK-11.6 17:15 ICM - Room 14b

**Water-Stable CsPbBr3 Quantum Dot Polariton Emitters** — •Chiao-Chih Lin, Hsu-Cheng Hsu, Chung-Wei Kung, and Yu-Hsun Chou — National Cheng Kung University, Tainan, Taiwan

We observed polariton emissions of water-stable CsPbBr3@UiO-66 quantum dots in hybrid microcavity, demonstrating strong light-matter coupling and stability under aqueous conditions.

## ED-6: Frequency Comb Applications

Chair: Lucile Rutkowski, Institut de Physique de Rennes (IPR) - CNRS, Rennes, France

Time: Thursday, 16:00–17:30 Location: ICM - Room Osterseen

**Oral** ED-6.1 16:00 ICM - Room Osterseen

**Cavity-Enhanced Optical-Optical Double-Resonance Polarization Spectroscopy Using a Frequency Comb Probe** — •Andrea Rosina[1], Isak Silander[1], Vinicius Silva de Oliveira[1], Adrian Hjältén[1], Kevin K. Lehmann[2], and Aleksandra Foltynowicz[1] — [1]Department of Physics, Umeå University, Umeå, Sweden — [2]Departments of Chemistry and Physics, University of Virginia, Charlottesville, USA

We demonstrate a method that enables branch assignment of molecular hot band transitions via their distinct line-shapes and improves the signal-to-noise ratio by an order of magnitude compared to previous comb-based double-resonance methods.

**Oral** ED-6.2 16:15 ICM - Room Osterseen

**Spectral Shaping of an Astrocomb with Single-Comb-Mode Specificity** — •William Newman, Jake M. Charsley, Yuk Shan Cheng, Richard A. McCracken, and Derryck T. Reid — Heriot-Watt University, Edinburgh, United Kingdom

We demonstrate independent intensity control of each comb-tooth in a 20 GHz astrocomb. Arbitrary spectral shaping and flattening is achieved from 550–950 nm and visualised on a spatially-comb-mode-resolving cross dispersion spectrograph.

**Oral** ED-6.3 16:30 ICM - Room Osterseen

**Swept heterodyne correlation for long-baseline stellar interferometry** — •Félix Gudin and Nicolas Forget — Université côte d'azur, CNRS, Institut de Physique de Nice, 17 rue Julien Lauprêtre, Nice, France

To overcome sensitivity and bandwidth bottlenecks of heterodyne stellar interferometry in the near infrared we use highly-chirped pulses as local oscillator to achieve phase-sensitive broadband detection (1.5 THz) with GHz-resolution at astronomical fluxes.

**Oral** ED-6.4 16:45 ICM - Room Osterseen

**Picophotonic Localization Metrology at MHz Frame Rates: Beyond Brownian Motion** — •Cheng-Hung Chi[1], Eric Plum[1], Kevin MacDonald[1], and Nikolay Zheludev[1,2] — [1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [2]Hagler Institute for Advanced Study, Texas A&M University, College Station, USA

Movements of a suspended microwire exhibiting flexural phononic thermal motion in vacuum can be tracked optically at length and timescales which Einstein once envisaged as immeasurably small, revealing the transition from stochastic to ballistic motion.

**Oral** ED-6.5 17:00 ICM - Room Osterseen

**Optical Microwaves Based on a Difference Frequency Comb** — •Sebastian Mueller[1,2] and Thomas Puppe[1] — [1]TOPTICA Photonics AG, Graefelfing, Germany — [2]Institute of Microwaves and Photonics, Friedrich-Alexander University, Erlangen, Germany

We demonstrate ultra-stable microwave generation based on optical frequency division using an offset-free comb. Combined with GPS stabilization of the optical reference, and hence the microwave, this enables high-end test and measurement applications.

**Oral** ED-6.6 17:15 ICM - Room Osterseen

**Rotational-Doppler Fourier-transform Absorption Spectroscopy** — •Santeri Larnimaa[1] and Markku Vainio[1,2] — [1]University of Helsinki, Helsinki, Finland — [2]Tampere University, Tampere, Finland

We present a new approach to Fourier-transform absorption spectroscopy based on the rotational Doppler effect and optical vortex frequency comb light with helical wavefronts. The technique offers fast, mode-resolved measurements with a compact experimental setup.

## CA-10: Novel Technology for Long Wavelength Solid-State Lasers

Chair: Eric Cormier, Université de Bordeaux, Bordeaux, France

Time: Thursday, 16:00–17:30 Location: Hall A1 - Room A12

**Oral** CA-10.1 16:00 Hall A1 - Room A12

**Mid-infrared Erbium Waveguide Laser Passively Q-switched by Fe:ZnSe** — •Ji Eun Bae[1], Pavel Loiko[1], Carolina Romero[2], Javier R. Vázquez de Aldana[2], Stanislav Balabanov[3], Weidong Chen[4], Dunlu Sun[5], Peixiong Zhang[6], Xavier Mateos[7], Ammar Hideur[8], and Patrice Camy[1] — [1]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France — [2]University of Salamanca, Salamanca, Spain — [3]G. G. Devyatykh Institute of Chemistry of High-Purity Substances of RAS, Nizhny Novgorod, Russia — [4]Fujian Institute of Research on the Structure of Matter, Fuzhou, China — [5]Anhui Institute of Optics and Fine Mechanics, Hefei, China — [6]Jinan University, Guangzhou, China — [7]Universitat Rovira i Virgili (URV), Tarragona, Spain — [8]CORIA UMR 6614, CNRS-INSA-Université de Rouen Normandie, Saint Etienne du Rouvray, France

A mid-infrared ultrafast-laser-inscribed Erbium waveguide laser is passively Q-switched by a Fe2+:ZnSe saturable absorber. It generates 253 mW at 2797 nm (pulse duration/energy: 18 ns/3.4 $\mu$J) with a linear polarization and single-transverse-mode output.

**Oral** CA-10.2 16:15 Hall A1 - Room A12

**Low-Noise, Single-Frequency, All-Fiber, 50 W-Class Laser Source at 1844 nm For Quantum Applications** — •Kentin Poncelet[1,2], Coline Lavit[1], Laure Chichet[2], Thomas Dubé[1], Roopa Prakash[1], Germain Guiraud[2], Nick Traynor[2], Adèle Hilico[1], and Giorgio Santarelli[1] — [1]LP2N, IOGS, CNRS, Université de Bordeaux, Talence, France — [2]TOPTICA Photonics SAS, Pessac, France

We present a polarized, a robust all-fiber laser system operating at 1844 nm Thulium doped laser system, delivering up to 47 W with single frequency and low intensity noise for quantum technologies applications.

**Oral** CA-10.3 16:30 Hall A1 - Room A12

**Resonantly Pumped Tm,Ho:BaF2 and Tm,Ho:SrF2 Laser Systems Emitting in Atmospheric Window around 2.04 $\mu$m** — •Michal Němec[1], Dominika Popelová[1], Jan Šulc[1], Pavel Loiko[2], Helena Jelínková[1], Karel Veselský[1], Abdelmjid Benayad[2], Patrice Camy[2], and Alain Braud[2] — [1]Czech Technical University of Prague, Prague, Czech Republic — [2]Centre de Recherche sur les Ions, les Matériaux et la Photonique , Caen, France

Spectroscopic and laser characterizations of new Tm,Ho:BaF2 and Tm,Ho:SrF2 crystals were investigated. By a direct resonant diode pumping, lasers based on Ho3+ ion generated radiation in the atmospheric windows in the 2 $\mu$m region.

**Oral** CA-10.4 16:45 Hall A1 - Room A12

**Short-pulse, high-energy Q-Switched Ho3+:LLF Laser for precise time-of-flight and high-peak-power applications** — •Johannes Deutsch[1,2], Katharina Goth[1,2], Madeleine Eitner[1], Marius Rupp[1,2], Marc Eichhorn[1,2], and Christelle Kieleck[1] — [1]Fraunhofer IOSB (Institute of Optronics, System Technologies and Image Exploitation), Ettlingen, Germany — [2]Institute of Control Systems (IRS), Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany

A Ho:LLF laser for generation of short, highly stable pulses in the 2 $\mu$m range is presented. Laser performance and pulse characteristics, including pulse-to-pulse characteristics is analysed.

**Oral** CA-10.5 17:00 Hall A1 - Room A12

**Single-Frequency Broadly Tunable Cr:ZnSe Laser** — •Antonio Caruso[1,2], Niccolò S. Barberio[1], Dario Giannotti[1], Francesco Canella[2], Roberto Aiello[3], Pasquale Maddaloni[3], Paolo Laporta[1], and Gianluca Galzerano[2] — [1]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy — [2]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche, Milano, Italy — [3]Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche, Pozzuoli, Italy

We demonstrate a single-frequency Cr:ZnSe laser tunable from 2.32 to 2.77 $\mu$m with applications in high-resolution spectroscopy of HD isotopologues, achieving 350 mW of output power at 2.689 $\mu$m with 13.2% slope efficiency.

**Oral** CA-10.6 17:15 Hall A1 - Room A12

**A large-area liquid-crystal spatial light modulator for amplitude modulation of high-power infrared laser beams** — •Natan Monvoisin[1], Oihana Mesplede[2], Guilhem Rouzaud[2], Sébastien Montant[2], Laurent Lamaignère[2], Cyrille Claudet[1], Gilles Chériaux[1], Nicolas Forget[1], and Aurélie Jullien[1] — [1]Université côte d'azur, CNRS, Institut de Physique de Nice (INPHYNI), Nice, France — [2]CEA-CESTA, Le Barp, France

An innovative thermo-optically-addressed SLM with liquid crystal enables large-area spatial amplitude modulation of high-power near-infrared lasers, offering a high extinction ratio, 50 gray levels, and a nanosecond laser damage threshold exceeding 1 J/cm$^2$.

## CE-13: Tuneable and Driven Optical Materials

Chair: James C. Gates, University of Southampton, Southampton, United Kingdom

Time: Thursday, 16:00–17:30 Location: Hall B1 - Room B11

**Oral** CE-13.1 16:00 Hall B1 - Room B11

**Ionic-driven optical tuning: unlocking dynamic refractive index control with PEDOT:PSS** — Paolo Franceschini[1], Andrea Tognazzi[2], Virginia Maria Demartis[1], •Luca Carletti[1], Evgenii Menshikov[1], Ivano Alessandri[1], Alfonso Carmelo Cino[2], Fabrizio Torricelli[1], Costantino De Angelis[1], and Maria Antonietta Vincenti[1] — [1]Department of Information Engineering - University of Brescia, Brescia, Italy — [2]Università degli Studi di Palermo, Palermo, Italy

We demonstrate voltage-controlled refractive index tuning in PEDOT:PSS in OECT configuration. By modulating ionic charge distribution, we achieve spatially programmable gradient index profiles, enabling compact, broadband optical devices without nanoscale patterning for diverse photonic applications.

**Oral** CE-13.2 16:15 Hall B1 - Room B11

**Tunable Optical Filters using Barium Strontium Titanate as Electro- Optical Material** — •Mojdeh Vakili[1], Yating Ruan[2], Lambert Alff[2], and Sascha Preu[1] — [1]TU Darmstadt, Terahertz Devices and Systems, Darmstadt, Germany — [2]TU Darmstadt, Material Science, Darmstadt, Germany

BST is a well-known material especially in varactors. Here, we introduce a novel application to develop an electrically tunable optical filter in a Fabry- Pérot cavity, employing BST resulting in a narrow-band notch filter.

**Oral** CE-13.3 16:30 Hall B1 - Room B11

**Optical Phase Transition in Tin Diselenide for Photonic Non-Volatile Memory Applications** — •Rakshitha Kallega[1], Ramesh Karupannan[2], and Shankar Kumar Selvaraja[1] — [1]Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore, India — [2]Department of Physics, Indian Institute of Science , Bangalore, India

We present tin diselenide as a high optical contrast, low-loss, and non-volatile phase change material for photonic memory application. We present material characterization and demonstrate non-volatile phase transition and optical properties using a microring resonator.

**Oral** CE-13.4 16:45 Hall B1 - Room B11

**Programmable light-driven fabrication of azopolymer microstructures** — •Marcella Salvatore[1], I Komang Januariyasa[1], Francesco Reda[1], Fabio Borbone[2], and Stefano Luigi Oscurato[1] — [1]Department of Physics "Ettore Pancini", University of Naples Federico II, Naples, Italy — [2]Department of Chemical Sciences, University of Naples Federico II, Naples, Italy

Surface engineering leverages azobenzene-containing polymers for cost-effective, light-driven fabrication of programmable, anisotropic microstructures. By controlling light polarization, wavelength, and intensity, this maskless approach enables tunable, 3D surface textures for advanced functional applications.

**Oral** CE-13.5 17:00 Hall B1 - Room B11

**Laser cooling of Yb-doped KY3F10 to 170 K** — Stefan Püschel[1,2], Zoe Liestmann[1], Christian Kränkel[1], and •Hiroki Tanaka[1] — [1]Leibniz-Institut für Kristallzüchtung (IKZ), Berlin, Germany — [2]Fraunhofer IOSB, Ettlingen, Germany

We demonstrate high-power laser cooling of Yb:KY3F10 crystals, achieving 170 K via anti-Stokes fluorescence. Despite suboptimal pumping, results highlight the potential of Yb:KY3F10 to outperform Yb:YLF at cryogenic temperatures with optimized setups and wavelengths.

**Oral** CE-13.6 17:15 Hall B1 - Room B11

*withdrawn*

## CG-4: Laser Technology

Chair: Bruno Schmidt, few-cycle Inc., Montreal, Canada

Time: Thursday, 16:00–17:30 Location: Hall B2 - Room B21

**Oral** CG-4.1 16:00 Hall B2 - Room B21

**The KALDERA Ti:Sapphire drive-laser for laser plasma acceleration at high repetition rates** — •Guido Palmer[1], Juan, B. González-Díaz[1], Timo Eichner[1], Cora Braun[1], Man Jiang[1], Thomas Hülsenbusch[1], Christian Werle[1], Lutz Winkelmann[1], Caterina Vidoli[1], Abdullah Yousefi[1], Matthias Schnepp[2], Manuel Kirchen[1], Wim Leemanns[1], and Andreas, R. Maier[1] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Institute for Experimental Physics, University of Hamburg, Hamburg, Germany

We introduce the KALDERA Ti:Sapphire drive-laser for plasma acceleration which recently reached 750 mJ of pulse energy at 100 Hz. We report on first compression results and the next energy and repetition-rate scaling activities.

**Oral** CG-4.2 16:15 Hall B2 - Room B21

**Temporal Contrast Study in the Petawatt J-KAREN-P Laser: Three Different Contrast Enhancement Technologies** — •Hiromitsu Kiriyama[1], Akito Sagisaka[1], Akira Kon[1], Yasuhiro Miyasaka[1], Mamiko Nishiuchi[1], Hajime Sasao[2], Alexander Pirozhkov[1], Yuji Fukuda[1], Koichi Ogura[1], Kotaro Kondo[1], Nobuhiko Nakanii[1], Yuji Mashiba[1], Nicholas Dover[1], Liu Chang[1], Masaki Kando[1], Stefan Bock[1], Tim Ziegler[3,4], Thomas Püschel[3,4], Hans-Peter Schlenvoigt[3], Karl Zeil[3], Ulrich Schramm[3,4], II Woo Choi[5,6], and Chan Nam[5,7] — [1]Kansai Institute for Photon Science (KPSI), National Institutes for Quantum Science and Technology (QST), Kyoto, Japan — [2]aka Institute for Fusion Science and Technology, National Institutes for Quantum Science and Technology (QST), Ibaraki, Japan — [3]Helmholtz-Zentrum Dresden-Rossendorf (HZDR), Dresden, Germany — [4]Helmholtz-ZentruInstitute of Nuclear and Particle Physics, Technical Universitat, Dresden, Germany — [5]Center for relativistic Laser Science (CoReLS), Institute for Basic Science (IBS), Gwangju, South Korea — [6]Advanced Photonics Research Institute (APRI), Gwangju, South Korea — [7]Department of Physics and Photon Science, Gwangju, South Korea

The technique of temporal contrast enhancement capability is presented to suppress any pre- and post-pulses generated in the first and second CPA stages for a pre-pulse-free petawatt laser system.

**Oral** CG-4.3 16:30 Hall B2 - Room B21

**Development of Infrared Oscillator-type Free-Electron Laser for High Harmonic Generation Experiments** — •Heishun Zen[1], Hideaki Ohgaki[1], and Ryoichi Hajima[2] — [1]Institute of Advanced Energy, Kyoto University, Uji, Japan — [2]Kansai Institute for Photon Science, National Institutes for Quantum Science and Technology, Kizugawa, Japan

A research project on high-harmonic-generation-based attosecond X-ray source driven by oscillator-type infrared free-electron laser (FEL) is ongoing. Recent progress of the FEL development for proof of concept experiments will be presented in this talk.

**Oral** CG-4.4 16:45 Hall B2 - Room B21

**Fiber-Based High-Energy 1550 nm Laser for Generating High-Order Harmonics** — •Anastasiia Mikhneva[1,2], Djamila Boukhaoui[1], Said Idlahcen[2], Jonathan Houard[1], Ivan Blum[1], Thomas Godin[2], Leo Guiramand[2], Foued Amrani[3], Frédéric Gérôme[3,4], Fetah Benabid[3,4], David Gauthier[5,6], Hamed Merdji[7], Willem Boutu[5,6], Angela Vella[1], and Ammar Hideur[2] — [1]GPM UMR 6634, CNRS - University of Rouen Normandie - INSA Rouen Normandie, Rouen, France — [2]CORIA UMR 6634, CNRS - University of Rouen Normandie - INSA Rouen Normandie, Rouen, France — [3]Glophotonics, 123 avenue Albert Thomas, 87060 , Limoges, France — [4]GPPMM Group, XLIM Research Institute, CNRS UMR 7252, University of Limoges, Limoges, France — [5]Universite Paris-Saclay, CEA, LIDYL, 91191 , Gif sur Yvette, France — [6]CY Cergy Paris Universite, CEA, LIDYL, 91191, Gif sur Yvette, France — [7]Laboratoire d'Optique Appliquee, CNRS, Ecole Polytechnique, ENSTA, Institut Polytechnique de Paris, Palaiseau, France

High-energy fiber-based laser near 1550 nm generates high-order harmonics in MgO, reaching the 29th order with microjoule-level pulses. This compact, efficient platform advances extreme ultraviolet generation for strong-field science and industrial applications.

**Oral** CG-4.5 17:00 Hall B2 - Room B21

**Recent developments on the high repetition rate petawatt laser of ELI ALPS** — •Roland Sándor Nagymihály[1], Levente Lehotai[1], Viktor Pajer[1], János Bohus[1], Nóra Csernus-Lukács[1], Balázs Tari[1], Mikhail Kalashnikov[1], Franck Falcoz[2], David Armier[2], Philippe Demengeot[2], and Ádám Börzsönyi[1] — [1]ELI ERIC, ALPS Facility, Szeged, Hungary — [2]Amplitude, Evry, France

First results on the performance of the HFPW laser of the ELI ERIC ALPS Facility after the implementation of a new OPCPA seeder and next generation power amplifier laser heads are presented at 2.5 Hz.

**Oral** CG-4.6 17:15 Hall B2 - Room B21

**Progress in Optical Synchronization for 2x10 PW Laser System at ELI-NP** — •Daniel Ursescu[1,2], Andrei Naziru[1,2], Alice Dumitru[1,2,3], Stefan Popa[1,2], Dan Gh. Matei[1], Cristian Alexe[1,2,3], Ioan Dancus[1], Ana-Maria Lupu[1,2], Dmitrii Nistor[1,3], Antonia Toma[1], Lidia Vasescu[1], and Claudiu A. Stan[4] — [1]Extreme Light Infrastructure - Nuclear Physics, Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering (IFIN-HH), Magurele, Romania — [2]Doctoral School of Physics, University of Bucharest, Magurele, Romania — [3]Engineering and Applications of Lasers and Accelerators Doctoral School, National University of Sciences and Technology Politehnica Bucuresti, Bucuresti, Romania — [4]Department of Physics, Rutgers University Newark, Newark, USA

Optical synchronization of the two outputs of the operational dual arm 10 PW laser system is reported. The drift in the relative delay between the two pulses reached 11 fs in closed feedback loop.

## PD-1: Postdeadline session I: Integrated photonics

Chair: Alessandro Tonello, Université de Limoges, Limoges, France

Time: Thursday, 17:45–19:15 Location: ICM - Room 13a

**Post-deadline** PD-1.1 17:45 ICM - Room 13a

**Octave-Spanning Soliton Microcomb with Over 50% Conversion Efficiency Enabled by Strong Mode Coupling** — •Andreas Jacobsen[1], Yang Liu[1], Thibault Wildi[2], Yanjing Zhao[1], Chaochao Ye[1], Yi Zheng[1], Camiel Op de Beeck[3], José Carreira[3], Michael Geiselmann[3], Kresten Yvind[1], Tobias Herr[2], and Minhao Pu[1] — [1]DTU Electro, Department of Electrical and Photonics Engineering, Technical University of Denmark, 2800 Kgs. Lyngby, Denmark — [2]Deutsches Elektronen-Synchrotron DESY, Notkestr. 85, 22607 Hamburg, , Germany — [3]LIGENTEC SA, EPFL Innovation Park, 1024 Ecublens, Switzerland

We demonstrate octave-spanning dissipative Kerr solitons leveraging novel, strong intermodal coupling in microresonators, achieving a record-high 52% pump-to-comb conversion efficiency overcoming efficiency-bandwidth tradeoffs for practical applications such as self-referencing and broadband spectroscopy.

**Post-deadline** PD-1.2 17:55 ICM - Room 13a

**Formation of Energy-Efficient Multi-Octave Frequency Combs in Nanophotonic Parametric Oscillators** — •Robert Gray, Justin Widjaja, Ryoto Sekine, Thomas Zacharias, and Alireza Marandi — California Institute of Technology, Pasadena, CA, USA

We investigate the formation of a 2.6-octave coherent supercontinuum in a low-energy, far-above-threshold nanophotonic parametric oscillator. Our measurements and corresponding simulations illuminate the coherence mechanism, with design implications for broadband, highly nonlinear resonators.

**Post-deadline** PD-1.3 18:05 ICM - Room 13a

**3D in-situ profiling in a laser micromachining station using dual-comb LiDAR** — •Hayk Soghomonyan[1], Justinas Pupeikis[1,2], Benjamin Willenberg[1,2], Armin Stumpp[3], Lukas Lang[1,2], Christopher R. Phillips[1], Bojan Resan[3], and Ursula Keller[1] — [1]Department of Physics, ETH Zurich, Zurich, Switzerland — [2]K2 Photonics, Zurich, Switzerland — [3]University of Applied Sciences and Arts Northwestern Switzerland, Zurich, Switzerland

We present a proof-of-concept 3D in-situ profiling system for laser micromachining station via coaxial dual-comb LiDAR integration. It achieves 0.8 $\mu$m axial precision at a stand-off and can significantly reduce process development time, potentially enabling active machining control.

**Post-deadline** PD-1.4 18:15 ICM - Room 13a

**Amplification in a Hybrid Erbium Silicon Photonic Waveguide** — •Batoul Hashemi[1], Bruno L. Segat Frare[1], Niloofar Majidian Taleghani[1], Manuel Arturo Méndez-Rosales[1], Ponnambalam Ravi Selvaganapathy[2], Andrew P. Knights[1], and Jonathan D. B. Bradley[1] — [1]Department of Engineering Physics, McMaster University, , Hamilton, Canada — [2]Department of Mechanical Engineering and School of Biomedical Engineering, Hamilton, Canada

In this work, we demonstrate internal net gain over the C-band on a foundry SOI platform, using a hybrid monolithic erbium-doped glass-on-silicon waveguide structure with a compact spiral design.

**Post-deadline** PD-1.5 18:25 ICM - Room 13a

**High-Energy Mode-Locked Pulses from a Photonic Integrated Mamyshev Oscillator** — •Zheru Qiu[1,2], Zhongshu Liu[1,2], Xuan Yang[1,2], Jianqi Hu[1,2], Yichi Zhang[1,2], Jiale Sun[1,2], Xinru Ji[1,2], Grigorii Likhachev[1,2], Xurong Li[1,2], Zihan Li[1,2], Ulrich Kentsch[3], and Tobias Kippenberg[1,2] — [1]Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [2]Institute of Electrical and Micro Engineering, EPFL, Lausanne, Switzerland — [3]Helmholtz-Zentrum Dresden-Rossendorf (HZDR), Dresden, Germany

We present the first photonic integrated circuit-based Mamyshev oscillator mode-locked laser on an erbium-doped silicon nitride photonic chip, delivering stable 161 pJ pulses at a repetition rate of 184.9 MHz.

**Post-deadline** PD-1.6 18:35 ICM - Room 13a

**Cavity-less Brillouin strong coupling in a solid-state continuous system** — •Laura Blázquez Martínez[1,2], Changlong Zhu[1,2], and Birgit Stiller[1,2,3] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Department of Physics, Friedrich-Alexander Universität Erlangen-Nürnberg, Erlangen, Germany — [3]Institute of Photonics, Leibniz Universität Hannover, Hannover, Germany

We report the first experimental demonstration of optoacoustic strong coupling in a cavity-less configuration. A continuum of acoustic phonons is strongly coupled to photons via anti-Stokes Brillouin-Mandelstam scattering in an optical fiber at 4 K.

**Post-deadline** PD-1.7 18:45 ICM - Room 13a

**Individually Controllable Continuous Variable Cluster State on Quantum Photonic Integrated Circuits** — •Chang You[1], Xinyu Jia[1], Chonghao Zhai[1], Xuezhi Zhu[2], Yun Zheng[1], Tianxiang Dai[1], Zhaorong Fu[1], Xiaolong Su[2], Qihuang Gong[1], and Jianwei Wang[1] — [1]State Key Laboratory for Mesoscopic Physics, School of Physics, Peking University, Beijing, China — [2]State Key Laboratory of Quantum Optics and Quantum Optics Devices, Institute of Opto-Electronics, Shanxi University, Taiyuan, China

We demonstrate continuous variable quantum photonic integrated circuits for squeezed state and cluster state preparation. Through monolithic integration of microresonator squeezing sources with entangling gate, a four-qumode cluster state violating van Loock-Furusawa criterion is generated.

**Post-deadline** PD-1.8 18:55 ICM - Room 13a

**Multi-NV quantum sensing with photonic integrated circuits** — Hao-Cheng Weng[2], John G Rarity[2], Krishna C Balram[2], and •Joe A Smith[1,2] — [1]University of Sheffield, Sheffield, United Kingdom — [2]University of Bristol, Bristol, United Kingdom

We demonstrate the coupling of a set of site-defined NV sensors to foundry-optimised silicon nitride photonics in an all-integrated device. The NV sensors simultaneously record the presence of an external magnetic field.

**Post-deadline** PD-1.9 19:05 ICM - Room 13a

**Nano-Electro-Mechanically-Tuneable Photonic Bowtie Cavities for Enhanced Light-Matter Interactions** — •Sergei Lepeshov[1], Daniel Farbowitz[1,2], Thor August Schimmell Weis[1,2], Nikolaj Balslev Hougs[1], Mikkel Heuck[1,2], Babak Vosoughi Lahijani[1,2], and Søren Stobbe[1,2] — [1]DTU Electro, Department of Electrical and Photonic Engineering, Technical University of Denmark, Lyngby, Denmark — [2]NanoPhoton — Center for Nanophotonics, Technical University of Denmark, Lyngby, Denmark

We demonstrate subwavelength photonic nanocavities with strong field confinement whose optical resonances can be desirably tuned by nano-electro-mechanical actuators within 11 nm wavelength range for efficient coupling with quantum emitters.

## PD-2: Postdeadline session II: Ultrafast Nonlinear Optics

Chair: Caterina Vozzi, Istituto di fotonica e nanotecnologie, Milano, Italy

Time: Thursday, 17:45–19:15 Location: ICM - Room 13b

**Post-deadline** PD-2.1 17:45 ICM - Room 13b

**Free-Space Optical Communications using Terahertz Lasers at Gbit/s Data Rates** — •Jayaprasath Elumalai[1], Mohammed Salih[1], Martyn Fice[2], Adam Brown[1], Lianhe Li[1], Edmund Linfield[1], Alexander Valavanis[1], Alwyn Seeds[2], A. Giles Davies[1], and Joshua Freeman[1] — [1]School of Electronic and Electrical Engineering, University of Leeds, Leeds, United Kingdom — [2]Department of Electronic and Electrical Engineering, University College London, London, United Kingdom

We demonstrate terahertz free-space optical communications using a quantum cascade laser transmitter and a Schottky barrier diode receiver, achieving data transmission rates of 1 Gbit/s over a distance of 0.5 m.

**Post-deadline** PD-2.2 17:55 ICM - Room 13b

**Autonomous User-Defined Supercontinuum Optimization via Programmable Liquid-Core Optical Fiber** — •Mario Chemnitz[1,2], Johannes Hofmann[1], Ramona Scheibinger[1], Bennet Fischer[1], and Markus Schmidt[1,3] — [1]Leibniz-Institute of Photonic Technology, Jena, Germany — [2]Institute of Applied Optics and Biophysics, Friedrich-Schiller-University, Jena, Germany — [3]Otto Schott Institute of Materials Research, Jena, Germany

We demonstrate programmable liquid-core fibers for tailoring supercontinuum generation using temperature-controlled dispersion profiles. Experiments show 150× enhancement in targeted spectral bands and 7× improvement in spectral flatness through autonomous algorithmic optimization of local fiber properties.

**Post-deadline** PD-2.3 18:05 ICM - Room 13b

**Extreme Soliton Dynamics for Terawatt-Scale Optical Attosecond Pulses and 30 GW-Scale Sub-3 fs Far-ultraviolet Pulses** — •Nikoleta Kotsina, Michael Heynck, Joleik Nordmann, Martin Gebhardt, Teodora Grigorova, Christian Brahms, and John C. Travers — Heriot-Watt University, Edinburgh, United Kingdom

We present the extreme soliton (XSOL) beamline, which generates terawatt-scale sub-femtosecond self-compressed visible-infrared pulses as well as sub-3 fs far-ultraviolet pulses with energy exceeding 170 $\mu J$ at 240 nm and wavelength tunability down to 140 nm.

**Post-deadline** PD-2.4 18:15 ICM - Room 13b

**Extension of high-harmonic cutoff in solids to 50 eV using MgO** — •Hortense Allegre, Joseph J Broughton, Tim Klee, Yan Li, Katarzyna M Kowalczyk, Nikolas Thatte, Daniel Lim, Jon P Marangos, Mary M Matthews, and John W G Tisch — Imperial College London, London, United Kingdom

We report the highest ever recorded photon energy for HHG in solids, reaching 50 eV in MgO, using a 780 nm, 30 fs driving pulse. This is achieved through optimization of the spectrometer, detection efficiency, and geometry.

**Post-deadline** PD-2.5 18:25 ICM - Room 13b

**Bridging Coherent Octave-Spanning Supercontinuum Generation and Integrated Laser Sources** — •Yanjing Zhao[1], Yujun Chen[1,2], Kaibin Lin[3], Yi Zheng[1], Chanju Kim[1], Jinhui Yuan[2], Kresten Yvind[1], Qian Li[3], and Minhao Pu[1] — [1]DTU Electro, Technical University of Denmark, Kongens Lyngby, Denmark — [2]State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, Beijing, China — [3]School of Electronic and Computer Engineering, Peking University, Shenzhen, China

Based on parametric gain assisted cascaded four wave mixing, we demonstrate coherent octave-spanning frequency combs in aluminum-gallium-arsenide-on-insulator nanowaveguides using picosecond pulses with watt-level peak powers, compatible with readily available on-chip laser sources.

**Post-deadline** PD-2.6 18:35 ICM - Room 13b

**Kramers-Kronig detection in the quantum regime** — •Thomas Pousset, Maxime Federico, Romain Alléaume, and Nicolas Fabre — Telecom Paris, Palaiseau, France

Kramers-Kronig detection, developed in classical optics, is a direct detection that digitally reconstructs the field's phase using intensity measurements. We investigate its quantization and show that both quadratures can be reconstructed similarly to coherent detections.

**Post-deadline** PD-2.7 18:45 ICM - Room 13b

**Controlling Multiple Quantum Dots using Structured Light** — •Suraj Goel, Sheena Shaji, Julian Wiercinski, Antoine Borel, Natalia H. Valencia, Moritz Cygorek, Erik Gauger, Brian Gerardot, and Mehul Malik — Institute for Photonics and Quantum Sciences, Heriot-Watt University, Edinburgh, United Kingdom

We demonstrate the control of multiple, distinct quantum dots on the same sample via spatial light modulation, allowing us to observe cooperative emission from upto five dots and two-photon interference enabled by multi-plane opti-

cal circuits.

**Post-deadline** PD-2.8 18:55 ICM - Room 13b

**A few-femtosecond UV light source for the realtime tracking of coherent electron and nuclear dynamics in molecules.** — •Ammar Bin Wahid[1], Kate Robertson[1], Aurelien Sanchez[1], Sergey Ryabchuk[1], Josina Hahne[1], Pasquale Barbato[2], David Amorim[1], Erik Månsson[1], Terry Mullins[1], Vincent Wanie[1], Roberto Osellame[2], Rebeca Martínez Vázquez[2], and Francesca Calegari[1] — [1]Center for Free-Electron Laser Science CFEL, DESY, Hamburg, Germany — [2]Institute for Photonics and Nanotechnologies CNR-IFN,, Milano, Italy

We present here a compact microfluidic chip for broadband UV generation, enabling unprecedented temporal resolution to monitor ultrafast excited-state dynamics in acetone, revealing vibrational and electronic coherences.

**Post-deadline** PD-2.9 19:05 ICM - Room 13b

**Optical "writing" of stable single-atom features in plasmonic nanogaps** — •Paul Kerner[1], Rakesh Arul[1], Damien Thompson[2], Jeremy J Baumberg[1], and Bart de Nijs[1] — [1]Nanophotonics Centre, Department of Physics, Cavendish Laboratory, University of Cambridge, Cambridge, United Kingdom — [2]Department of Physics, Bernal Institute, University of Limerick, Limerick, Ireland

We demonstrate all-optical creation and low-power readout of stable single-atom features in plasmonic nanogaps. These deterministically "written" picocavities exhibit week-long ambient stability in darkness, enabling applications in single-atom devices and catalysis.

# CB-P: CB Poster Session

Time: Thursday, 13:00–14:00 Location: Hall B0

CB-P.1 13:00 Hall B0

**Low-Power Optical Injection into Suppressed Longitudinal Modes for Wideband Optical Frequency Comb Generation in Gain-Switched Discrete Mode Lasers** — •Daniel Plaza-Vas[1,2,3], María Duque Gijón[4], Cristina Masoller[4], Jordi Tiana-Alsina[5], Ángel Valle[3], Nathalie Vermeulen[1], and Ana Quirce[1,3] — [1]Brussels Photonics (B-PHOT), Department of Applied Physics and Photonics, Vrije Universiteit Brussel (VUB), Brussels, Belgium — [2]Departamento de Física Moderna, Universidad de Cantabria (UC), Santander, Spain — [3]Instituto de Física de Cantabria (IFCA), Universidad de Cantabria (UC-CSIC), Santander, Spain — [4]Department de Fisica, Universitat Politecnica de Catalunya, Terrassa, Spain — [5]Department de Física Aplicada, Facultat de Física, Universitat de Barcelona, Barcelona, Spain

We demonstrate tunable single- and dual-frequency comb generation in gain-switched discrete-mode lasers via low-power optical injection into suppressed longitudinal modes, achieving high-quality combs over a 4 THz range with modulation-frequency-dependent behavior.

CB-P.2 13:00 Hall B0

**Enhancement of frequency comb bandwidth in gain-switched integrated semiconductor lasers via mutual coupling.** — •Diarmuid O' Sullivan[1,2], John McCarthy[1,2], Frank Peters[1,2], and Bryan Kelleher[1,2] — [1]Tyndall National Institute, Cork, Ireland — [2]Physics Department, University College Cork, Cork, Ireland

We present evidence of the preferred regime for OFC bandwidth of an integrated coupled gain switched device. Biasing both lasers equally produces combs up to three times wider at 10dBm than preferentially biasing one laser.

CB-P.3 13:00 Hall B0

**Dual-wavelength operation of a VCSEL for cryogenic communication** — •Patrik Rajala, Behzad Namvar, Jukka Viheriälä, Teemu Hakkarainen, Heikki Virtanen, Topi Uusitalo, and Mircea Guina — Tampere University, Optoelectronics Research Centre, Tampere, Finland

The development of quantum computers requires advanced optical communication solutions at cryogenic environments. We present a dual-wavelength, 830 nm and 867 nm, intra-cavity contact VCSEL working at 8 K. Design constraints and optimization guidelines are discussed.

CB-P.4 13:00 Hall B0

**Birefringence-induced polarization dynamics in multimode spin-VCSEL** — •Uliana Diiankova[1], Tobias Pusch[2], Rainer Michalzik[2], Mariusz Drong[3], Markus Lindemann[1], Nils C. Gerhardt[1], and Martin R. Hofmann[1] — [1]Ruhr-University Bochum, Bochum, Germany — [2]Ulm University, Ulm, Germany — [3]University of California, Berkeley, Berkeley, USA

We observed polarization oscillations in a spin-VCSEL emitting in several transverse modes. This could represent a novel approach to overcoming the bandwidth limitation, an important step for advancing short-reach communication networks.

CB-P.5 13:00 Hall B0

*withdrawn*

CB-P.6 13:00 Hall B0

**Quasi-PT Symmetry: A Pathway to Better Laser Performance** — •Babak Olyaeefar[1], Ece Karabey[1], Enes Şeker[1], Ramy El-Ganainy[2], and Abdullah Demir[1] — [1]UNAM - Institute of Materials Science and Nanotechnology, Bilkent University, Ankara, Turkey — [2]Department of Electrical and Computer Engineering, Saint Louis University, Saint Louis, USA

Semiconductor diode lasers face challenges in achieving high power without compromising beam quality. We theoretically and experimentally prove that the quasi-PT-symmetry provides the optimal design for pushing the single-mode power emission to industrial values.

CB-P.7 13:00 Hall B0

**Experimental and theoretical investigation of thermal crosstalk in RSOA array** — •David Coenen[1], Huseyin Sar[1], Negin Golshani[1], Damien Leech[1], Hsiao-Lun Wang[1], Stuart Smyth[2], Sulakshna Kumari[1], Filippo Ferraro[1], Yoojin Ban[1], Herman Oprins[1], and Joris Van Campenhout[1] — [1]imec, Leuven, Belgium — [2]Sivers Photonics, Glasgow, United Kingdom

The impact of thermal crosstalk on optical performance of an RSOA array integrated on Si photonics wafer is experimentally characterized and simulated. The results show significant (73%) increase in self-heating temperature.

CB-P.8 13:00 Hall B0

**Electro-Absorber/Modulator Recovery Time for High Energy Pulse Burst Monolithic Mode-Locked Tapered Laser** — •Dmitri Boiko[1], Severin Oeschger[1], Patrick Flückiger[1], Sylvain Boust[2], Maxime Meghnagi[2], Tom Vimont[2], Guillaume Daccord[2], François Duport[2], Eva Izquierdo[2], Jean-Pierre Legoec[2], Thomas Cossuet[2], Michel Garcia[2], Olivier Parillaud[2], and Michel Krakowski[2] — [1]CSEM SA, Neuchâtel, Switzerland — [2]III-V Lab, Palaiseau, France

We report on novel approach to measure of one of key parameters in the design and operation of hundred pJ pulse energy tapered mode-locked lasers with intracity pulse burst picker for 2ph-FLIM

CB-P.9 13:00 Hall B0

**Thermal Dynamics and Dimensional Heat Dissipation Analysis in Mid-IR Quantum Cascade Lasers** — Ivan Vrubel[1], Evgeniia Cherotchenko[1], Vladislav Dudelev[1], Dmitry Mikhailov[1], Dmitry Chistyakov[1], Andrey Babichev[1], Andrey Lyutetskiy[1], Sergey Slipchenko[1], Nikita Pikhtin[1], Andrey Gladyshev[2], Denis Papylev[3], Innokenty Novikov[2,3], Vladimir Kuchinskii[1], Leonid Karachinskii[2,3], Anton Egorov[2], and •Grigorii Sokolovskii[1] — [1]Ioffe Institute, St. Petersburg, Russia — [2]LLC "Connector Optics", St. Petersburg, Russia — [3]ITMO University, St. Petersburg, Russia

Mid-infrared quantum cascade lasers (QCLs) experience active region overheating, impacting performance. Using time-resolved emission spectra, we analyze heat dynamics across dimensional regimes and derive the thermal diffusivity constant, informing QCL design and post-growth optimization.

CB-P.10 13:00 Hall B0

**High-temperature operation of tuneable 780 nm DBR lasers for spectroscopic applications** — •Heike Christopher, Jörg Fricke, Pietro Della Casa, Andre Maaßdorf, Hans Wenzel, and Andrea Knigge — Ferdinand-Braun-Institut (FBH), Berlin, Germany

780 nm DBR lasers with micro heaters for operation in Rb-based spectroscopic applications at ambient temperatures of 75°C will be reported. Devices with different epitaxial designs providing output powers exceeding 50 mW will be compared.

CB-P.11 13:00 Hall B0

**Narrow-linewidth, Fully Integrated Chip-based Laser System in the Red Spectral Range** — •Jovana Nojic[1], Alexander Eras[1], Lisa Winkler[1], Dimitri Mayzlin[1], Mateus Corato-Zanarella[2], Matthias Lommel[3], and Christian Nölleke[1] — [1]TOPTICA Photonics AG, Gräfelfing, Germany — [2]TOPTICA Photonics Inc., Pittsford, USA — [3]TOPTICA EAGLEYARD Photonics, Berlin, Germany

Compact chip-integrated laser systems require stable co-integration of electronics and isolators. We present a fully integrated PIC laser system in the red spectral range, including a compact and low-noise controller, optical isolation and fiber coupling.

CB-P.12 13:00 Hall B0

**Transverse mode control and synchronization in coupled broad-area VCSELs** — •Jules Mercadier[1,2], Stefan Bittner[1,2], and Marc Sciamanna[1,2] — [1]Chaire Photonique, LMOPS, CentraleSupélec, Metz, France — [2]Université de Lorraine, CentraleSupélec, LMOPS, Metz, France

We experimentally investigate unidirectional optical injection between two broad-area VCSELs with chaotic dynamics. We observe partial synchronization of the temporal dynamics and a strong impact on the transverse lasing modes of the slave VCSEL.

CB-P.13 13:00 Hall B0

**Improved quantum cascade laser performance by using stacked active region design** — •Kamil Pierściński, Dorota Pierścińska, Katarzyna Pieniak, Agata Krząstek, Dominika Niewczas, and Aleksandr Kużmicz — Łukasiewicz Research Network - Institute of Microelectronics and Photonics, Warsaw, Poland

This paper presents an analysis of QCLs with stacked active region stages and their integration with photonic platforms. The devices were fabricated and characterized in terms of electro-optical, spectral, far-field, and coupling performance.

CB-P.14 13:00 Hall B0

**Space-Qualified Ridge Waveguide Optical Amplifiers for Ultra-Cold Atom Experiments on the ISS** — •Karl Häusler, Jan Baumann, Carsten Netzel, Anna Mogilatenko, Johannes Glaab, Jos E. Boschker, Jörg Fricke, Andre Maaßdorf, Hans Wenzel, Andrea Knigge, Ahmad Bawamia, and Andreas Wicht — Ferdinand-Braun-Institut, Berlin, Germany

We demonstrate space-qualified ridge waveguide amplifiers for quantum sensor applications aboard the ISS. Our 767 nm and 1064 nm devices reliably provide up to 0.36 W and 0.7 W optical power, respectively, enabling extended operation in ultra-cold atom experiments.

CB-P.15 13:00 Hall B0

**Undamped Effective Rabi Frequency Triggers Harmonic Frequency Combs in ultrafast Semiconductor Laser** — Carlo Silvestri[1], Massimo Brambilla[2], Franco Prati[3], Mariangela Gioannini[4], and •Lorenzo Columbo[4] — [1]Institute of Photonics and Optical Science (IPOS), School of Physics, The University of Sydney, Sidney, Australia — [2]Dipartimento Interateneo di Fisica, Politecnico di Bari and CNR-IFN, UOS Bari, Bari, Italy — [3]Dipartimento di Scienza e Alta Tecnologia, Università dell'Insubria, Como, Italy — [4]Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino, Torino, Italy

Using a set of Effective Semiconductor Maxwell-Bloch Equations we show that an undamped effective Rabi frequency is at the basis of CW instability and Harmonic Frequency Combs self-generation in a unidirectional ring Quantum Cascade Laser

CB-P.16 13:00 Hall B0

**Modeling Dispersion and Cavity Engineering Effects on Mode-Locked Quantum Cascade Laser Operation** — •Lukas Seitner, Michael A. Schreiber, Michael Rinderle, Johannes Stowasser, Michael Haider, and Christian Jirauschek — Technical University of Munich, Garching, Germany

QCL-generated frequency combs enable advanced applications in the mid-infrared and THz spectral regions. This contribution models how cavity and dispersion engineering affects mode-locked QCL operation, aiming to optimize comb properties such as the bandwidth.

CB-P.17 13:00 Hall B0

**Locking the VCSEL polarization in the horizontal and diagonal polarization basis** — •Michael Jetter, Michael Zimmer, Katharina Dahler, and Peter Michler — Institut für Halbleiteroptik und Funktionelle Grenzflächen, Center for Integrated Quantum Science and Technology (IQST) and SCoPE, University of Stuttgart, Stuttgart, Germany

VCSEL with integrated sub-wavelength gratings to control their polarization between 0° and 180° with respect to the [0 -1 1] crystal direction, were fabricated and analyzed.

CB-P.18 13:00 Hall B0

**Power scaling of single frequency 2 $\mu$m GaSb-based VECSEL** — •Steffen Adler, Peter Holl, Elke Diwo-Emmer, Andreas Bächle, and Marcel Rattunde — Fraunhofer Institute for Applied Solid State Physics IAF, Freiburg, Germany

We are presenting narrow linewidth, 2 $\mu$m emission-wavelength VECSEL modules for quantum frequency conversation. The VECSELs based on the (AlGaIn)(AsSb) material system feature a low quantum deficit pumping scheme and exceed 3 W output power.

CB-P.19 13:00 Hall B0

**Coupling and fabrication for micro-transfer-printed O-band quantum dot lasers on silicon nitride platforms** — •Thi Ngoc Lam Tran[1,2,3], Tom Reep[1,2,3], Max Kiewiet[1,2,3], Arturo Fernández Gamez[1,2,3], Dongbo Wang[1,2,3], Kasper Van Gasse[1,2,3], Günther Roelkens[1,2,3], and Bart Kuyken[1,2,3] — [1]Photonics Research Group, Department of Information Technology, Ghent University-IMEC, Gent, Belgium — [2]Center for Nano- and Biophotonics (NB-Photonics), Ghent University, Gent, Belgium — [3]IMEC, Leuven, Belgium

We present the integration of edge-coupled O-band InAs/GaAs quantum dot lasers on an 800 nm Si3N4 platform using micro-transfer printing. The design incorporates adiabatic coupling tapers with large mode area facets to achieve high coupling efficiency (> 92%)

CB-P.20 13:00 Hall B0

**Highly Stabilized Integrated Frequency Comb Quantum-Dash Laser Via Voltage-Controlled Temperature Feedback Loop** — •Youcef Driouche[1], Guy Aubin[1], Abderrahim Ramdane[1], and Kamel Merghem[2] — [1]CNRS Centre de Nanosciences et de Nanotechnologies, Université Paris-Saclay, 10 Boulevard Thomas Gobert, 91220, Palaiseau, France — [2]ISTeC SAMOVAR, Télécom Sud-Paris, Institut Polytechnique de Paris, 91120, Palaiseau, France

We propose an alternative approach to stabilize quantum-dash comb laser using a voltage-controlled temperature feedback loop. This approach reduces frequency drift to 12 kHz and achieves a stability of $2.7 \times 10^{-9}$ at 1000 s averaging time.

# CG-P: CG Poster Session

Time: Thursday, 13:00–14:00 Location: Hall B0

CG-P.1 13:00 Hall B0

**Strong field electron emission driven by a bright squeezed vacuum** — •Andrei Rasputnyi[1,2], Jonas Heimerl[1], Jonathan Pölloth[1], Stefan Meier[1], Francesco Tani[2,3], Maria Chekhova[1,2], and Peter Hommelhoff[1,4] — [1]Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU),, Erlangen, Germany — [2]Max Planck Institute for the Science of Light, Erlangen, Germany — [3]UMR 8523—PhLAM—Physique des Lasers Atomes et Molécules, Université de Lille, CNRS, Lille, France — [4]Physics Department, LMU Munich, Munich, Germany

We experimentally study electron emission from a metal tip in the strong-field regime driven by a bright squeezed vacuum. We observe a significant extension of the electron energy spectrum compared to the classical drive case.

CG-P.2 13:00 Hall B0

*withdrawn*

CG-P.3 13:00 Hall B0

**Simultaneous Referencing in Attosecond Transient Spectroscopy via Application of Predictive Neural Networks** — •Marko Hollm, Sergej Neb, Florence Burri, and Lukas Gallmann — ETH Zürich, Institute for Quantum Electronics, Zurich, Switzerland

We demonstrate an approach to denoise Attosecond Transient Spectroscopy measurements based on a predictive neural network. This method is distinguished by being widely applicable and reducing noise beyond correlated source noise as shown elsewhere

CG-P.4 13:00 Hall B0

**High contrast, ultrabroadband, hybrid frontend for next generation high intensity laser systems** — •Roland Sándor Nagymihály[1], Mikhail Kalashnikov[1], Levente Lehotai[1], Viktor Pajer[1], János Bohus[1], Nóra Csernus-Lukács[1], János Csontos[1], Szabolcs Tóth[1], Balázs Tari[1], Ernestas Kucinskas[2], Ignas Balciunas[2], Tomas Stanislauskas[2], and Ádám Börzsönyi[1] — [1]ELI ERIC, ALPS Facility, Szeged, Hungary — [2]Light Conversion, Vilnius, Lithuania

Here we present a 100 Hz, hybrid architecture, high contrast, sub-14 fs frontend with 1 mJ output energy. Scaling to 15 mJ is in progress with 15 fs output duration and thorough spatio-spectral evolution investigation.

CG-P.5 13:00 Hall B0

*withdrawn*

CG-P.6 13:00 Hall B0

*withdrawn*

CG-P.7 13:00 Hall B0

**Proof-of-Concept Experiment on Quasi-Phase-Matching of High-Order Harmonic Generation Using a Transverse Disruptive Pulse and Selected-Zoning Method** — •Yao-Li Liu[1], Shin-Chi Kao[2], Yi-Yong Ou Yang[2], Zhong-Ming Zhang[2], and Hsu-Hsin Chu[2,3] — [1]Institute of Space and Plasma Sciences, National Cheng Kung University, Tainan , Taiwan — [2]Department of Physics, National Central University, Zhongli , Taiwan — [3]Center for High Energy and High Field Physics, National Central University, Zhongli , Taiwan

We demonstrate a proof-of-concept experiment on quasi-phase-matching of high-order harmonic generation in EUV spectral regime via selected-zoning method. Applying a transverse disruptive pulse to the out-of-phase region enhances the HHG yield by 35%.

CG-P.8 13:00 Hall B0

*withdrawn*

CG-P.9 13:00 Hall B0

*withdrawn*

CG-P.10 13:00 Hall B0

**Attosecond RayTracing and a practical application to refocusing relativistic high-order harmonics from a liquid sheet plasma mirror** — •André Kalouguine[1], Anthony Guillaume[1], Charles Bourassin-Bouchet[2], and Stefan Haessler[1] — [1]Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de Paris, ENSTA, Ecole Polytechnique, CNRS, Palaiseau, France — [2]Laboratoire Charles Fabry (LCF), Institut d'Optique Graduate School, CNRS, Université Paris-Saclay, Palaiseau, France

We present AttosecondRayTracing (ART), an open-source Python tool for the efficient design, optimization, and analysis of attosecond pulse transport setups, accompanied by a practical application example.

CG-P.11 13:00 Hall B0

**High-average-power multilayer dielectric grating compressor for the TW-class Ti:sapphire laser KALDERA** — •Christian M. Werle[1], Cora Braun[1,2], Abdullah Yousefi[1], Matthias Schnepp[2], Lutz Winkelmann[1], Caterina Vidoli[1], Tomasz Jezynski[1], Manuel Kirchen[1], Wim Leemans[1], Guido Palmer[1], and Andreas R. Maier[1] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]University of Hamburg, Institute for Experimental Physics, Hamburg, Germany

We report on an out-of-plane compressor based on MLD gratings for the high-repetition-rate Ti:sapphire laser KALDERA, a driver for laser-plasma acceleration. We present the design, implementation, and compression of pulses towards the 30fs-level.

CG-P.12 13:00 Hall B0

**Characterisation of Liquid Solution Sheets from Various Nozzle Diameters for Laser Ion Acceleration** — •Attila P. Kovács[1,2], Máté Karnok[1], Noémi Tóth[1], Tibor Gilinger[1], Javaria Razzaq[1], and Károly Osvay[1,2] — [1]National Laser-Initiated Transmutation Laboratory, University of Szeged, Szeged, Hungary — [2]Department of Optics and Quantum Electronics, University of Szeged, Szeged, Hungary

Our systematic study proved that the Hasson-Peck formula describes with high accuracy the thickness of liquid sheets created by colliding jets with various diameters and liquid solutions, providing a tool in designing high-repetition-rate laser-particle accelerators.

CG-P.13 13:00 Hall B0

**Laser-driven X-ray sources at ELI Beamlines: Recent results from commissioning and user operation** — •Jaroslav Nejdl[1,2], Ondřej Hort[1], Uddhab Chaulagain[1], Tomáš Parkman[1], Lucie Jurkovičová[1,2], Marcel Lamač[1], Jan Vábek[1,2], Antonia Morabito[1], Yelizaveta Pulnova[1,3], Matyáš Staněk[1,2], and Marek Raclavský[1,2] — [1]ELI Beamlines facility, Extreme Light Infrastructure ERIC, Dolní Břežany, Czech Republic — [2]FNSPE, Czech Technical University in Prague, Prague, Czech Republic — [3]FMP, Charles University, Prague, Czech Republic

The ELI Beamlines facility advances laser-driven sources of high-flux, coherent XUV and X-ray pulses. Key developments include precisely tunable high-order harmonics and advanced sources based on relativistic laser-matter interaction, employing both under-critical and over-dense plasmas.

CG-P.14 13:00 Hall B0

**Maximizing conversion efficiency in 3 $\mu$m optical parametric chirped pulse amplifier with pulse front tilt** — •Pritha Dey[1], Lutz Ehrentraut[1], Johannes Tümmler[1], Stefan Eisebitt[1,2], and Matthias Schnürer[1] — [1]Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany — [2]Institut für Optik und Atomare Physik, Technische Universität Berlin, Berlin, Germany

We observe a significant increase in pulse energy through pulse front tilt matching for 3 $\mu$m optical parametric chirped pulse amplifier, crucial for driving coherent soft X-ray sources beyond the water window in laboratory setup.

CG-P.15 13:00 Hall B0

**Effect of light ellipticity on the laser excitation and energy absorption by fused silica: ab initio simulations and experimental measurements** — •Thibault Derrien[1,2], Peter Jürgens[3], Mark Mero[3], Marc Vrakking[3], and Alexandre Mermillod-Blondin[3] — [1]FZU Institute of Physics, Prague, Czech Republic — [2]Laboratory of Quantum Computing, VSB-TUO IT4Innovation, Ostrava, Czech Republic — [3]Max-Born-Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Czech Republic

Elliptically polarized ultrashort laser pulses enables to tweak electron dynamics in solids. The effect of such a pulse was observed experimentally and theoretically using real-time quantum simulations on the example of fused silica.

CG-P.16 13:00 Hall B0

**Closed-loop noble gas recycling system for cost-effective high-harmonic generation** — •Jan-Hendrik Oelmann[1], Lennart Guth[1,2], Tobias Heldt[1,2], Thomas Pfeifer[1], and José R. Crespo López-Urrutia[1] — [1]Max Planck Institute for Nuclear Physics, Heidelberg, Germany — [2]Heidelberg Graduate School for Physics, Heidelberg, Germany

We present a compact closed-loop system for recycling noble gases in high-harmonic generation, minimizing consumption while maintaining purity. This cost-effective solution supports sustainable, high-repetition-rate XUV sources, appealing to academic and industrial users alike.

CG-P.17 13:00 Hall B0

**A high repetition HHG source of ultrafast XUV pulses for the SXP instrument at the European XFEL** — •Pranav Bhardwaj[1], Patrik Grychtol[1], Michael Heber[1,2], David Doblas-Jiménez[1], Vahagn Vardanyan[1], Serguei Molodtsov[1,3], and Manuel Izquierdo[1] — [1]European XFEL, Schenfeld, Germany — [2]DESY, Hamburg, Germany — [3] TU Bergakademie Freiberg, Freiberg, Germany

The Soft X-ray Port (SXP) at the European XFEL integrates a high-harmonic generation (HHG) source with the XFEL beamline, delivering ultrafast XUV beams at MHz rates, complementing the XFEL for advanced time-resolved spectroscopy and characterization of complex systems.

CG-P.18 13:00 Hall B0

**Controlled Particle Acceleration in Low-Density Gas Plasma Using THz Standing Waves** — •Szabolcs Turnár[1,3], Zoltán Tibai[1], László Pálfalvi[1,3], Gábor Almási[1,2], Csaba Korpa[1], and János Hebling[1,2] — [1]Institute of Physics, University of Pécs, Pécs, Hungary — [2]Szentágothai Research Center, University of Pécs, Pécs, Hungary — [3]HUN-REN–PTE High-field Terahertz Research Group, Pécs, Hungary

Our work introduces a numerical investigation of a laser-driven charge separation scheme, the standing-wave driven charge separation (SWCS) enabling efficient Coulomb explosion acceleration of ions and electrons, with scalable applications for ion and electron sources.

CG-P.19 13:00 Hall B0

**Machine Learning-Based Stoichiometric Analysis of $BaSrTiO_3$ (BST) via Synthetic LIBS Spectra Generated from a Two-Zone Plasma Model** — •Amogh Manikandan Sheebalatha[1], Sebin Sebastian Xavier[2], Jeena Rose Jose[1], Biju P R[1], and Reji Philip[2] — [1]School of Pure and Applied Physics, Mahatma Gandhi University, Kottayam, India — [2]Light and Matter Physics, Raman Research Institute , Bangalore, India

An ANN trained on synthetic LIBS spectra, generated using a two-zone plasma model, enables precise stoichiometric analysis. This approach ensures accurate in-situ elemental predictions, overcoming challenges in experimental data acquisition and nonlinear spectral complexities.

# CL-P: CL Poster Session

Time: Thursday, 13:00–14:00 Location: Hall B0

CL-P.1 13:00 Hall B0

**Direct print of cyanobacteria cells colloidal suspension by optical vortex laser induced forward transfer** — •Srinivasa Rao Allam[1,2,3], Kaito Sato[1], Ken-ichi Yuyama[4], Mitsumasa Hanaoka[5], and Takashige Omatsu[1,2] — [1]Graduate School of Engineering, Chiba University, Chiba, Japan — [2]Molecular Chirality Research Centre, Chiba University, Chiba, Japan — [3]Institute for Advanced Academic Research, Chiba University, Chiba, Japan — [4]Department of Chemistry, Osaka Metropolitan University, Osaka, Japan — [5]Graduate School of Horticulture, Chiba University , Chiba, Japan

We demonstrate the direct print of cyanobacteria cells, which have been widely

studied as a biological energy source (for instance, bio-solar cells) via oxygenic photosynthesis, with a high position accuracy of < 8 $\mu$m.

CL-P.2 13:00 Hall B0

**Lipid screening using spectroscopic OCT at 1.2 $\mu$m regime** — •Jiahao Wei[1,2], Jianran Zhang[1,2], Shuo Tang[1,2], Jiqiang Kang[1,2], and Kenneth Kin-Yip Wong[1,2] — [1]The University of Hong Kong, Hong Kong, China — [2]Advanced Biomedical Instrumentation Centre, Hong Kong, China

We present a spectroscopic optical coherence tomography (S-OCT) system operating in the 1.2 $\mu$m range. Utilizing a segmentation-based spectroscopy extraction method, we successfully acquired the lipid absorption spectrum in salmon belly samples.

CL-P.3 13:00 Hall B0

**Enhanced vibrational circular dichorism of plasmonic nanostructures embedding chiral drugs** — •Raju Adhikary[1], Matteo Venturi[1], Ambaresh Sahoo[1], Carino Ferrante[2], Paola Benassi[1,2], Fancesco Di Stasio[3], Andrea Toma[3], Hatice Altug[4], Massimiliano Aschi[1], and Andrea Marini[1,2] — [1]University of L'Aquila, L'Aquila, Italy — [2]CNR-SPIN, L'Aquila, Italy — [3]IIT, Genova, Italy — [4]EPFL, Lausanne, Switzerland

We explore the potential applications of localized surface plasmon resonances (LSPRs) to investigate mid-infrared chiroptical response of Al-doped ZnO (AZO)-based nanostructures embedding layers of chiral pharmaceutical drug solutions to develop novel chiroptical sensing techniques.

CL-P.4 13:00 Hall B0

**Three-photon excited autofluorescence microscopy with a gain-managed nonlinear fiber amplifier** — •Jakub Bogusławski, Katarzyna Kunio, Maciej Barna, and Grzegorz Soboń — Wrocław University of Science and Technology, Wrocław, Poland

We report the first application of Yb:fiber laser with a gain-managed nonlinear amplifier in three-photon autofluorescence microscopy. By integrating with a pulse-picker we obtained optimal conditions for imaging at extremely low excitation power level (<1mW).

CL-P.5 13:00 Hall B0

**Fiber-Optic Photothermal Ablation Catheter with Skin-Inspired Tactile Sensing for Minimally Invasive Therapy** — •Xiaoyan Guo[1], Jialin Tuo[1], Zhuozhou Li[1], Lijun Xu[1], and Jingjing Guo[1,2] — [1]School of Instrumentation and Optoelectronic Engineering, Beihang University, BeiJing, China — [2]Hangzhou International Innovation Institute, Beihang University, BeiJing, China

We propose a fiber-optic photothermal ablation catheter endowed with multimodal tactile sensing capabilities. The catheter can perceive local tissue temperature and contact pressure changes during the photothermal ablation process, thereby enabling highly accurate treatment.

CL-P.6 13:00 Hall B0

**Demonstration of Ex-vivo Evaluation for Gastric Cancer Onset Using Laser-Induced Photoacoustic Vibration** — •Katsuhiro Mikami[1], Tasuku Furube[2], Takuto Hatakeyama[3], Satoru Matsuda[2], and Daisuke Nakashima[3,4] — [1] Faculty of Biology–Oriented Science and Technology, Kindai University, Wakayama, Japan — [2] Department of Surgery, Keio University School of Medicine, Tokyo, Japan — [3] Department of Orthopaedic Surgery, Keio University School of Medicine, Tokyo, Japan — [4]Department of Clinical Biomechanics, Keio University School of Medicine, Tokyo, Japan

The detection of cancer tumor onset by applying the photoacoustic vibration in audible frequency using non-invasive laser irradiation for excised stomachs to detect differences in stiffness was demonstrated.

CL-P.7 13:00 Hall B0

*withdrawn*

CL-P.8 13:00 Hall B0

**Laser-two-focus Measurement of Cerebrospinal Fluid Flow Rate in a Hydrocephalus Shunt Tube using Indocyanine Green Fluorescence** — •Yuto Shimizu[1], Keigo Kimura[1], Yasuo Aihara[2], and Ichiro Shoji[1] — [1]Chuo Universitu, 1-13-27 Kasuga, Bunkyo-ku, Tokyo 112-8551, Japan — [2]Tokyo Women's Medical University, 8-1 Kawada-cho, Shinjuku-ku, Tokyo, 162-8666, Japan

We have developed a direct real-time measurement system for the flow rate of cerebrospinal fluid in a hydrocephalus shunt tube using laser-two-focus velocimetry with fluorescent indocyanine green as the target material.

CL-P.9 13:00 Hall B0

**Femtosecond Laser-Induced Self-Organized Microrod Arrays** — •Iaroslav Gnilitskyi[1,2], Kateryna Diedkova[3], Milena Yalyzhko[3], Maksym Pogorelov[3,4], George Tsibidis[5], and Anatoly V. Zayats[1] — [1]King's College London, London, United Kingdom — [2]Department of Applied Physics and Nanomaterial science, Lviv, Ukraine — [3]Sumy State University, Sumy, Ukraine — [4]University of Latvia, Riga, Ukraine — [5]Institute of Electronic Structure and Laser (IESL), Heraklion, Greece

This research conducts the development of laser-induced self-organized microrod arrays on titanium alloy surfaces by using femtosecond laser pulses at high speed. The results indicate significant potential for applications in orthopedic and cardiovascular implants.

CL-P.10 13:00 Hall B0

**Accurate identification of bacteria using a spectral transformer machine learning model for hyperspectral Raman images** — •Mikael Lassen[1], Yijian Meng[1], Jesper B. Christensen [1], Thomas Emil Andersen [2], Danylo Komisar[3], Andrii Kutsyk[3], and Oleksii Ilchenko[3] — [1]Danish Fundamental Metrology, Hørsholm , Denmark — [2]Research Unit of Clinical Microbiology, University of Southern Denmark and Odense University Hospital, Odense , Denmark — [3]Lightnovo ApS, , Birkerød, Denmark

We have implemented a spectral transformer machine learning model for hyperspectral Raman images of bacteria. We demonstrate that our model outperforms the standard CNN models in terms of accuracy and training time.

CL-P.11 13:00 Hall B0

**In-vivo mapping of nitrate distribution in wild-type Arabidopsis Thaliana roots with spontaneous and coherent Raman microscopy** — •Alma Fernández, Ze Tian Fang, Dipankar Sen, Brian Henrich, Yukihiro Nagashima, Alexei Sokolov, Sakiko Okumoto, and Aart Verhoef — Texas A&M University, College Station, USA

We use spontaneous and coherent Raman microscopy to study nitrate uptake in Arabidopsis seedling roots. We found that the nitrate concentration is higher in more mature parts of the root, likely in the mature vacuoles.

CL-P.12 13:00 Hall B0

**Polarization-based Optical System for Myocardial Tissue Characterization** — •Twinkle Bagha[1], Prasanna Simha Mohan Rao[2], and Hardik J. Pandya[1] — [1]Indian Institute of Science, Bangalore, India — [2]Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore, India

An optical system based on Mueller matrix polarimetry has been developed to differentiate healthy and fibrotic myocardial tissues ex vivo. This technology can revolutionize cardiac diagnostics and potentially mitigate the global burden of heart disorders.

CL-P.13 13:00 Hall B0

**3D beamshaping for laser ablation of tissue** — •Calum M. Brown, Jakob A. Gueye, Jonathan D. Shephard, Duncan P. Hand, and Richard M. Carter — Heriot-Watt University, Edinburgh, United Kingdom

We demonstrate how 3D beamshaping using custom optics can produce a modified Bessel-Gauss beam with a uniform on-axis intensity distribution over a finite distance, and how this can be advantageous for surgical tissue ablation.

CL-P.14 13:00 Hall B0

**Integrated Optical Tweezers and Microfluidic system for monitoring cellular response** — Le Roi Du Plessis[1], Gurthwin Bosman[1,2], and •Pieter Neethling[1,2] — [1]Stellenbosch Photonics Institute, Stellenbosch University, Stellenbosch, South Africa — [2]National Institute for Theoretical and Computational Sciences (NITheCS), Stellenbosch, South Africa

We demonstrate an integrated optical tweezers/microfluidic setup used to trap single cells and to manipulate the extracellular environment of these cells, while simultaneously monitoring the cell's response to stressors, using brightfield and fluorescence microscopy.

CL-P.15 13:00 Hall B0

*moved from CI-P.2*

**Tunable MOEMS Microring Resonator Based on In-Plane Bending Through Rotary Comb Drives** — •Nicolas Hanine[1], Alessio Buzzin[1], Lorenzo Giannini[1], Ahmadreza Alaeddini[1], Nicola Pio Belfiore[2], and Rita Asquini[1] — [1]Sapienza University of Rome, Rome, Italy — [2]University of Roma Tre, Rome, Italy

Mechanically tunable MOEMS ring resonator with voltage-actuated comb-drives offers high sensitivity (5.83 nm/V) and efficient wavelength tuning. Compact and SOI-compatible, it is designed for optical communication networks and photonic circuit applications.

# EB-P: EB Poster Session

Time: Thursday, 13:00–14:00 Location: Hall B0

EB-P.1 13:00 Hall B0

*moved to EB-4.6*

EB-P.2 13:00 Hall B0

**Portable Photon-Pair Source from Chip-Scale Cesium Vapor Cell** — •Heewoo Kim[1], Jiwon Yune[2], and Han Seb Moon[1,3,4] — [1]Department of Physics, Pusan National University, Busan, South Korea — [2]SDT Inc., Seoul, South Korea — [3]Quantum Sensors Research Center, Pusan National University, Busan, South Korea — [4]Quantum Science Technology Center, Pusan National University, Busan, South Korea

We present a compact, cesium-based photon-pair source using a microfabricated vapor cell, achieving a 382 kHz generation rate and a maximum second-order cross-correlation of 64, advancing applications in quantum communication.

EB-P.3 13:00 Hall B0

**Characterization of Ultrafast Charge-State Switching Dynamics in NV Centers of Diamond via IR Excitation** — •Marie Cherasse, Amélie Kies, Emmanuel Péronne, and Davide Boschetto — Laboratoire d'Optique Appliquée, ENSTA Paris, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris, 91761 Palaiseau, France

Nitrogen-vacancy center in diamond is a promising platform for quantum sensing due to its spin-dependent photoluminescence. Investigating ultrafast dynamics of photoluminescence and infrared absorption, we reveal an infrared-induced enhancement of charge state conversion.

EB-P.4 13:00 Hall B0

**Universal Encoder for Phase-, Time-Bin- and Polarization- based QKD schemes** — •Silas Eul[1,2,3], Thomas Hiemstra[2], Joost Vermeer[1,3], Julian Struck[2], and Christoph Marquardt[1,3] — [1]Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany — [2]Tesat-Spacecom GmbH & Co. KG, Backnang, Germany — [3]Max Planck Institute for the Science of Light, Erlangen, Germany

We present a QKD transmitter architecture, enabling fast and stable preparation of polarization- phase- and time-bin encoded quantum states in one optical setup. Additionally, drift effects are compensated while enabling PIC implementations and satellite applications.

EB-P.5 13:00 Hall B0

**Probing graph similarity through multiple photons in frequency-time bin modes generated by a silicon nitride microresonator** — •Massimo Borghi[1], Emanuele Brusaschi[1], Marco Liscidini[1], Matteo Galli[1], and Daniele Bajoni[2] — [1]Dipartimento di Fisica, Università di Pavia, Pavia, Italy — [2]Dipartimento di Ingegneria Industriale e dell'Informazione, Università di Pavia, Pavia, Italy

We report a bipartite gaussian boson sampling experiment with four photons over six frequency-time modes, using it to assess similarities between graph families with 6 vertices.

EB-P.6 13:00 Hall B0

**Investigating the Performance of Adaptive Optics on Different Bases of Spatial Modes in Turbulent Channels** — •Rojan Abolhassani[1], Lukas Scarfe[1], Alessio D'Errico[1,2], Francesco Di Colandrea[1], Khabat Heshami[1,2], and Ebrahim Karimi[1,2,3] — [1]Nexus for Quantum Technologies, University of Ottawa, Ottawa, Canada — [2]National Research Council of Canada, Ottawa, Canada — [3]Institute for Quantum Studies, Chapman University, Orange, USA

We execute a systematic investigation of the performance and behaviour of mutually unbiased bases and SIC-POVMs in different dimensions on OAM carrying beams through turbulent QKD channels using a fast adaptive optics system.

EB-P.7 13:00 Hall B0

**Direct intensity and phase modulation for QKD transmitter via optical injection locking** — •Hui Liu, Gleb Nazarikov, and Idelfonso Tafur Monroy — Department of Electrical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands

We present a high-speed QKD transmitter utilizing optical injection locking for direct intensity and phase modulation, demonstrating a BB84 system without modulators in the transmitter, achieving over 120km transmission with a simplified and efficient design.

EB-P.8 13:00 Hall B0

*withdrawn*

EB-P.9 13:00 Hall B0

**Inline waveguide-integrated SNSPDs** — Filippo Martinelli[1], Shuyu Dong[1], Pierre Brosseau[1], Ruixiang Guo[1], Mariia Sidorova[1,2], Anton Vetlugin[1], and •Cesare Soci[1] — [1]Center for Disruptive Photonic Technologies (CDPT), Nanyang Technological University, Singapore, Singapore — [2]German Aerospace Center (DLR), Institute of Optical Sensor Systems, Berlin, Germany

We present a scalable integration approach for SNSPDs using bound-states-in-the-continuum polymer waveguides that reduce parasitic losses and demonstrate high on-chip efficiency and fast recovery time, addressing current limitations in detector placement and functionality in quantum photonic circuits.

EB-P.10 13:00 Hall B0

*withdrawn*

EB-P.11 13:00 Hall B0

*withdrawn*

EB-P.12 13:00 Hall B0

*withdrawn*

EB-P.13 13:00 Hall B0

**Miniaturized Optical Frequency Reference and Crossed Beam Optical Dipole Trap Systems for Compact Atom-Based Quantum Sensors** — •Marc Christ[1,2], Conrad Zimmermann[1], Sascha Neinert[1], Oliver Anton[1,2], Elisa Da Ros[2], Klaus Döringshoff[1,2], and Markus Krutzik[1,2] — [1]Ferdinand-Braun-Institut (FBH), Berlin, Germany — [2]Humboldt-Universität zu Berlin, Berlin, Germany

We present developments toward compact, mobile quantum sensor physics packages featuring a miniaturized optical frequency reference and an ultra-stable, micro-integrated crossed-beam optical dipole trap, together with prospects of ceramic additive manufacturing.

EB-P.14 13:00 Hall B0

**Going to 2.1 $\mu$m for Space Quantum Key Distribution** — •Antoine Groulard[1], Selim Chaabani[1], Marina Zajnulina[2], Jean-Bernard Lecourt[2], Yves Hernandez[2], and Serge Habraken[1] — [1]Centre Spatial de Liège, Université de Liège, Angleur, Belgium — [2]Multitel Innovation Centre, Mons, Belgium

We present a comprehensive model that justifies the interest of working at 2.1 $\mu$m for Space Quantum Key Distribution. We then present a heralded single-photon source that produces signal photons at this wavelength.

EB-P.15 13:00 Hall B0

**GaSb Quantum Dots as a New Source of Single and Entangled-Photon Emission at Telecom wavelengths** — •Teemu Hakkarainen[1], Joonas Hilska[1], Markus Peil[1], Abhiroop Chellu[1], Metin Patli[1], Esperanza Luna[2], Robert Matysiak[3], Maja Wasiluk[3], Michał Gawełczyk[4], Anna Musiał[3], and Mircea Guina[3] — [1]Optoelectronics Research Centre, Physics Unit, Tampere University, Tampere, Finland — [2]Paul-Drude-Institut für Festkörperelektronik Leibniz-Institut im Forschungsverbund Berlin e.V., Berlin, Germany — [3]Department of Experimental Physics, Wroclaw University of Science and Technology, Wrocław, Poland — [4]Institute of Theoretical Physics, Wroclaw University of Science and Technology, Wrocław, Poland

We present the development prospects, fabrication, and emission properties of GaSb quantum dots formed by filling droplet-etched nanoholes. These recently-demonstrated quantum-photonics building blocks emit at 1.5 $\mu$m enabling wavelength compatibility with fiber optics and Si-photonics.

EB-P.16 13:00 Hall B0

**Implementation of Quantum Token Protocol with Trapped Ions** — •Manika Bhardwaj[1], Jan Thieme[1], Bernd Bauerhenne[1], Moritz Göb[1], Bo Deng[1,2], and Kilian Singer[1] — [1]Experimental Physics I, Institute of Physics, University of Kassel, Kassel, Germany — [2]Institute of Applied Physics, University of Bonn, Bonn, Germany

We present a new quantum token protocol utilizing quantum projection noise. The protocol is based on ensembles, and we plan to implement it on trapped $^{40}Ca^{+}$ due to their long coherence times and single-shot readout.

EB-P.17 13:00 Hall B0

**Full-stack entanglement-based quantum oblivious transfer for secure multi party computation applications** — Alessandro Trenti[1], Mariana F. Ramos[1], Michael Hentschel[1], Federico Valbusa[1], Costin Luchian[1], •Martin Achleitner[1], Marie-Christine Slater[1], Mariano Lemus[2], Thomas Lorünser[2], and Hannes Hübel[2] — [1]Austrian Institute of Technology, Vienna, Austria — [2]Instituto de Telecomunicações, Optical Quantum Communications Group, Aveiro, Portugal

A full-stack entanglement-based quantum oblivious transfer, assisted by quantum key distribution, is demonstrated in a practical secure multiparty computation application: fingerprint-matching at airports' gates against no-fly lists from Interpol and the United Nations.

EB-P.18 13:00 Hall B0

**Highspeed Polarization Preparation Scheme for Quantum Key Distribution for Visible Light** — •Mostafa Abasifard[1,2] and Tobias Vogl[1,2] — [1]Department of Computer Engineering, School of Computation, Information and Technology, Technical University of Munich, Munich, Germany — [2]Munich Center for Quantum Science and Technology (MCQST), Munich, Germany

A novel polarization preparation scheme for visible-light quantum key distribution leveraging acousto-optic modulators for high-speed key generation is demonstrated. Our scalable design enhances the practicality of daylight quantum communication, including satellite-to-ground channels, advancing quantum networks.

EB-P.19 13:00 Hall B0

**On contrast of strapdown quantum inertial sensors** — •Vincent Jarlaud[1,2], Joel Gomes Baptista[3], Leonid A. Sidorenkov[3], Vincent Ménoret[1,2], Camille Janvier[1], Cyrille Des Cognets[2], Guillaume Lenogue[2], Baptiste Monnereau[2], Baptiste Battelier[2], Cédric Majek[1], and Bruno Desruelle[1] — [1]Exail Quantum Systems, Gradignan, France — [2]Laboratoire Photonique, Numérique et Nanosciences (LP2N), Talence, France — [3]LTE, Observatoire de Paris, Université PSL, Sorbonne Université, Université Lille, LNE, CNRS, Paris, France

Cold atom quantum sensors show great promises for high performance inertial navigation. We focus here on the interferometer contrast and its optimization under strong accelerations and rotations in particular using a flat-top collimator.

EB-P.20 13:00 Hall B0

**Visibility Stokes parameters** — •Jorge Fuenzalida[1], Jaroslav Kysela[2], and Makrus Gräfe[3] — [1]ICFO, Barcelona, Spain — [2]University of Vienna, Vienna, Austria — [3]Technical University of Darmstadt, Darmstadt, Germany

We introduce a set of parameters that quantify the polarization of undetected photons based on visibilities. Based on this, we believe that several established quantum information protocols could be adapted for undetected photons.

EB-P.21 13:00 Hall B0

**Experimental Deployment of a 4-state Continuous-Variable QKD System with Rate-Adaptive Error Correction in an Urban Environment** — •Stefan Richter[1,2], Lukas Eisemann[1,2], Hüseyin Vural[1,2], Ömer Bayraktar[1,2], Kevin Jaksch[1,2], Imran Khan[2,3], Emanuel Eichhammer[2,3], Emmeran Sollner[2,3], and Christoph Marquardt[1,2] — [1]Lehrstuhl für Optische Quantentechnologien, Friedrich-Alexander-Universität Erlangen-Nürnberg, Staudstraße 7 / A3, Erlangen, Germany — [2]Max-Planck-Institut für die Physik des Lichts, Staudtstraße 2, Erlangen, Germany — [3]now with KEEQuant GmbH, Gebhardtstr. 28, Fürth, Germany

We report on the results of deploying our experimental 4-state continuous-variable QKD system in a realistic urban environment and the key rate improvements from using rate-adaptive error correction, compared to a fixed-rate implementation.

EB-P.22 13:00 Hall B0

**PIC transmitter for QKD in the c-band integrated on a commercially available InP platform** — •Borislav Hinkov[1], Delia Fugger-Schafhauser[1], Florian Dubois[1], Florian Prawits[2], Martin Achleitner[2], Jasmin Spettel[1], Tommaso Cassese[1], Axel Schönau[3], Moritz Kleinert[3], Hannes Hübel[2], and Andreas Poppe[4] — [1]Silicon Austria Labs (SAL), Villach, Austria — [2]Austrian Institute of Technology (AIT), Vienna, Austria — [3]Fraunhofer Heinrich-Hertz Institute (HHI), Berlin, Germany — [4]PoppeQ e.U., Perchtoldsdorf, Austria

We present a transmitter for time-bin encoded BB84 QKD with all required building blocks integrated on a InP-based PIC platform. Functionality on components level and characterization of the device will be presented.

EB-P.23 13:00 Hall B0

*withdrawn*

EB-P.24 13:00 Hall B0

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EB-P.25 13:00 Hall B0

**Analysis and comparison of interleaved SNSPDs photon number resolving modalities** — •Marco Caputo, Federica Facchin, Antonio Guardiani, Niels Noordzij, and Mario Usuga Castaneda — Single Quantum B.V., Delft, Netherlands

Photon Number Resolving (PNR) detectors are key to advancing photonic quantum technologies. We benchmark the PNR capabilities of interleaved SNSPDs, estimating fidelity across different configurations by exploiting space multiplexing or intrinsic PNR.

EB-P.26 13:00 Hall B0

**Waveguide Transmitter for Polarization-based Quantum Key Distribution** — •Chithrabhanu Perumangatt[1], Taofiq Paraiso[1], Oliver Crampton[1,2], Ravinder Singh[1], Thomas Roger[1], Mark Stevenson[1], and Andrew Shields[1] — [1]Toshiba Europe, CAMBRIDGE, United Kingdom — [2]School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, United Kingdom

We present a waveguide-based transmitter that can passively generate and combine different polarization states and demonstrate its application in quantum key distribution.

EB-P.27 13:00 Hall B0

**Superresolved Localisation of Blinking Sources of Light and Convexity of Fisher Information Matrix** — •Dmitri B. Horoshko[1], Alexander B. Mikhalychev[2], Fedor Jelezko[1], and Polina P. Kuzhir[3] — [1]Institut für Quantenoptik, Universität Ulm, Ulm, Germany — [2]Atomicus GmbH, Karlsruhe, Germany — [3]University of Eastern Finland, Joensuu, Finland

We prove the properties of weak matrix convexity for Fisher information matrix and quantum Fisher information matrix and show how these properties are related to the information advantage in single-molecule localisation microscopy.

EB-P.28 13:00 Hall B0

**Polarization-Encoded BB84 Quantum Key Distribution for the Nano-Satellite Mission QUBE-II** — •Michael Steinberger[1,2], Michael Auer[1,2], Adomas Baliuka[1,2], Moritz Birkhold[1,2], Harald Weinfurter[1,2,3], and Lukas Knips[1,2,3] — [1]Ludwig Maximilian University (LMU), Munich, Germany — [2]Munich Center for Quantum Science and Technology (MCQST), Munich, Germany — [3]Max Planck Institute of Quantum Optics (MPQ), Munich, Germany

QUBE-II - successor to our pathfinder mission QUBE - is aiming to complete the goal of economic global-scale Quantum Key Distribution with an eight-unit CubeSat. We here discuss our progress for BB84 polarization encoding with decoy states.

EB-P.29 13:00 Hall B0

**Characterization and Validation of CV-QKD Systems Traceable to the SI Units** — •Luiz C. Correa Pinto Filho, Jesper B. Christensen, and Mikael Lassen — Danish Fundamental Metrology (DFM), Hørsholm, Denmark

We present a robust, traceable calibration protocol for quantum detectors, enabling full-system efficiency characterization without individual assessment. Validated on free-space and fiber-based systems, it addresses key challenges in quantum communications, ensuring accuracy and security.

EB-P.30 13:00 Hall B0

**Anomaly Detection Based on Quantum Autoencoder** — •Siqi Li, Zikun Zhang, Xun Zhu, Yanni Ou, and Kun Xu — Beijing University of Posts and Telecommunications, Beijing, China

We present a quantum autoencoder anomaly detection framework based on an optical quantum neural network, which successfully detects anomalies in MNIST images with an accuracy of 89.09%.

EB-P.31 13:00 Hall B0

*withdrawn*

EB-P.32 13:00 Hall B0

**An 8-Channel Time-Tagger for Coincidence Measurement in Quantum Photonics Applications** — Mehmet Ali Uluisik, •Mehmet Caglar Koca, Francesco Malanga, Piergiorgio Daniele, Ivan Rech, and Giulia Acconcia — Politecnico di Milano, Milan, Italy

This paper presents an 8-channel time-tagging system featuring an ASIC TAC in 350-nm Si-Ge technology, achieving a timing jitter as low as 3.4 ps-rms. The scalable design is well-suited for quantum photonics applications.

EB-P.33 13:00 Hall B0

*withdrawn*

EB-P.34 13:00 Hall B0

*withdrawn*

# JSI-P: JSI Poster Session

Time: Thursday, 13:00–14:00 Location: Hall B0

JSI-P.1 13:00 Hall B0

**Parallel solution search using a spatial photonic Ising machine based on spatial multiplexing** — •Suguru Shimomura, Jun Tanida, and Yusuke Ogura — The University of Osaka, Suita, Japan

We propose a method of efficient search for optimal solution using the SPIM with parallel processing. In the experiment, the number of iterations for reaching the optimal solution decreased depending on the number of parallel processing.

JSI-P.2 13:00 Hall B0

**Optoelectronic nanowire neuron** — •Thomas K. Jensen[1], Joachim E. Sestoft[2], Vidar Flodgren[1], Abhijit Das[1], Rasmus D. Schlosser[2], David Alcer[3], Thomas Kanne[2], Magnus Borgström[3], Jesper Nygård[2], and Anders Mikkelsen[1] — [1]Division of Synchrotron Radiation Research, Department of Physics, and NanoLund, Lund University, Lund, Sweden — [2]Center for Quantum Devices & Nano-science Center, Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark — [3]Division of Solid State Physics, Department of Physics,and NanoLund, Lund University, Lund, Sweden

Three nanowires are interconnected to form an optoelectronic neuron device. We use external illumination and show that the device could operate in an insect-inspired neuromorphic broadcasting network.

JSI-P.3 13:00 Hall B0

**The Limits of Supercontinuum Generation for Photonic Neuromorphic Computing** — •Andrei V. Ermolaev[1], Mathilde Hary[2], Lev Leybov[2], Piotr Ryczkowski[2], Anas Skalli[1], Daniel Brunner[1], Goëry Genty[2], and John M. Dudley[1] — [1]Université Marie et Louis Pasteur, Institut FEMTO-ST, CNRS UMR 6174, Besançon, France — [2]Photonics Laboratory, Tampere University, Tampere, Finland

We report a realistic simulation pipeline of an extreme learning machine based on nonlinear fibre supercontinuum generation. Results show over 92% accuracy for MNIST digit classification for suitable choice of input parameters.

JSI-P.4 13:00 Hall B0

**Linear Information Forwarding in Highly Nonlinear Fibers** — •Glitta Rosalia Cheeran[1], Sobhi Saeed[1], Bennet Fischer[1], and Mario Chemnitz[1,2] — [1]Leibniz-Institute of Photonic Technology, Jena, Germany — [2]Institute of Applied Optics and Biophysics, Friedrich-Schiller-Universität, Jena, Germany

We investigate periodic spectral peaking in highly nonlinear fibers, with applications in phase imaging and optical neuromorphic computing. The results highlight mapping of input phase to output intensity, reconstruction and classification of MNIST digits.

JSI-P.5 13:00 Hall B0

**VCSEL based Time-Delayed Spiking Liquid State Machine for Event-Based Flow Cytometry Image Classification** — •Menelaos Skontranis[1], Georgios Moustakas[2], Ioannis Tsilikas[1], Adonis Bogris[2], and Charis Mesaritakis[1] — [1]Dept. Biomedical Engineering - University of West Attica, Egaleo-Athens, Greece — [2]Dept. Informatics and Computer Engineering- University of West Attica, Egaleo - Athens, Greece

In this work, a VCSEL spiking liquid-state machine processor targets the classification of experimental high-speed imaging flow cytometer data. Classification accuracy of 96.4% was achieved, alongside a significant parameter compression compared to digital processing

JSI-P.6 13:00 Hall B0

**Optical reservoir computing using frequency combs in Kerr microresonators** — •Negar Shaabani Shishavan[1], Egor Manuylovich[1], Morteza Kamalian-Kopae[2], and Auro M. Perego[1] — [1]Aston Institute of Photonic Technologies, Aston University, B4 7ET, Birmingham, United Kingdom — [2]Microsoft Azure Fibre, Ramsey, United Kingdom

We present a delay-line free and low power consumption optical reservoir computer scheme based on Kerr microresonator chaotic optical frequency combs. We numerically demonstrate GHz speed computation speed in prediction of random time series tasks.

JSI-P.7 13:00 Hall B0

**Enhancing the performance of diffractive neural networks with second-harmonic generation** — •Marie Braasch[1], Thomas Pertsch[1,2], and Sina Saravi[1] — [1] Institute of Applied Physics, Friedrich Schiller University , Jena, Germany — [2] Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

We theoretically investigate the inclusion of second harmonic generation (SHG) in diffractive neural networks (DNN), showing how and when a SHG activation layer can improve the classification accuracy and contrast in a trained DNN system.

JSI-P.8 13:00 Hall B0

**Phase and Amplitude Encoding For All Optical Kernel Methods With a Photonic Lantern** — Nolan Desnos, Stefano Negrini, Damien Labat, Géraud Bouwmans, Arnaud Mussot, Esben Ravn Andresen, and •Siddharth Sivankutty — Université de Lille, CNRS UMR 8523—PhLAM—Laboratoire de Physique des Lasers, Atomes et Molécules, Lille, France

We report the use of photonic lanterns as a random optical kernel for machine learning and demonstrate an increase in accuracy for classification tasks for both amplitude and phase encoded data.

JSI-P.9 13:00 Hall B0

**Analysis of Noise-Tolerant Free Space Optical Convolution Neural Networks** — •Maryam Dehbashizadeh Chehreghan and Ripalta Stabile — Technische Universiteit Eindhoven, EHCI, Den Dolech 2, 5612 AZ, Eindhoven, Netherlands

Optical neural networks have been proposed as a promising alternative to overcome the limitations of electronic systems, including power consumption, computational complexity, which challenge the scalability of different neural networks also convolutional neural networks.

JSI-P.10 13:00 Hall B0

**Complex Image Classification with Micro Laser Neurons Integrated with DNN-assisted Genetic Algorithm** — •gibaek kim[1], sylvain barbay[2], and laurie calvet[1] — [1]Ecole Polytechnique, IP-Paris, CNRS, Laboratory of Physics of Interfaces and Thin Layers, Palaiseau, France — [2]Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, Palaiseau, France

This study demonstrates the high computational efficiency of micro-laser neurons (MLNs) built with VECSELs for spiking neural networks, using a DNN-integrated genetic algorithm to achieve over 90% MNIST classification accuracy with ultrafast processing.

JSI-P.11 13:00 Hall B0

**Model of time-multiplexed Ising Machine using an optically injected dual-state quantum dot laser** — •Seán O'Donoghue and Bryan Kelleher — University College Cork, Cork, Ireland

We present a procedure for solving the Ising Model, ubiquitous in a vast array of combinatorial problems, using an optically injected quantum dot laser for ultrafast and reliable NP-hard problem solving

JSI-P.12 13:00 Hall B0

**Neuromorphic Computing with Nonlinear Dynamics in Photonic Crystal Fiber** — •Azka Maula Iskandar Muda and Uğur Teğin — Koç University, Istanbul, Turkiye

We numerically investigate photonic crystal fibers for neuromorphic computing, analyzing nonlinearity's impact on model performance. We observe overfitting and many-to-one mapping occurs in highly nonlinear model. Our study offers insights into photonic nonlinear dynamics for computing.

JSI-P.13 13:00 Hall B0

**High-speed Spike Rate-Coding in QD spin-VCSELs for Neuromorphic Encoding** — •Christos Tselios[1], Panagiotis Georgiou[2], Christina (Tanya) Politi[1], and Dimitris Alexandropoulos[2] — [1]University of Peloponnese, Patras, Greece — [2]University of Patras, Patras, Greece

We demonstrate spike rate coding in QD spin-VCSELs for image reconstruction, encoding pixel intensities as spiking frequencies through pump ellipticity adjustments. This high-speed operation highlights QD spin-VCSELs' potential in neuromorphic photonics functionalities.

JSI-P.14 13:00 Hall B0

**Wavelength-Multiplexed Operation of Photonic-Electronic Resonant Tunnelling Diode Neurons for Scalable Optical Neuromorphic Computing** — •Dylan Black[1], Joshua Robertson[1], José Figueiredo[2], Edward Wasige[3], Bruno Romeira[4], and Antonio Hurtado[1] — [1]Institute of Photonics, SUPA Department of Physics, University of Strathclyde, Glasgow, United Kingdom — [2]LIP and Departamento de Física da Faculdade de Ciências da Universidade de Lisboa, Lisboa, Portugal — [3]High Frequency Electronics Group, University of Glasgow, Glasgow, United Kingdom — [4]International Iberian Nanotechnology Laboratory, Braga, Portugal

We demonstrate experimentally the ability of photonic-electronic spiking RTD neurons to capitalise on an optical degree of freedom, using wavelength-multiplexed signals generated by different laser sources, for spike-based processing tasks.

JSI-P.15 13:00 Hall B0

**Light-induced Neuron-like Bursting and Oscillatory Dynamics in Neuromorphic Photonic Micropillars** — Bejoys Jacob[1], José Figueiredo[2], Jana Nieder[1], and •Bruno Romeira[1] — [1]INL—International Iberian Nanotechnology Laboratory, Braga, Portugal — [2]Universidade de Lisboa, Lisboa, Portugal

We present a neuromorphic photonic system based on III-V semiconductor micropillars that convert near-infrared optical stimuli into electrical oscillations, enabling energy-efficient sensory amplification and encoding. These scalable devices offer potential for neuromorphic computing, light-driven neurorobotics, and bioinspired sensory systems.

JSI-P.16 13:00 Hall B0

**Resonate-and-Fire Photonic-Electronic Spiking Neuron with a Photodetecting Resonant Tunnelling Diode** — •Andrew Adair[1], Dafydd Owen-Newns[1], Joshua Robertson[1], Jose Figueiredo[2], Edward Wasige[3], Bruno Romeira[4], and Antonio Hurtado[1] — [1]Institute of Photonics, University of Strathclyde, Glasgow, United Kingdom — [2]LIP and Departamento de Física, Universidade de Lisboa, Lisbon, Portugal — [3]High Frequency Electronics Group, University of Glasgow, Glasgow, United Kingdom — [4]International Iberian Nanotechnology Laboratory, Braga, Portugal

We present a first experimental demonstration of a fast and efficient photonic-electronic resonate-and-fire spiking neuron built with a photosensitive Resonant Tunnelling Diode, paving the way towards high-speed, scalable spike processing architectures for photonic neuromorphic computing.

JSI-P.17 13:00 Hall B0

**Plasmonically-enhanced phase-change integrated photonic memory device** — •Junchao Song[1], Joe Pady[1], Ivonne Bente[2], Wolfram Pernice[2,3], Harish Bhaskaran[4], and David Wright[4] — [1]University of Exeter, Exeter, United Kingdom — [2]University of Münster, Münster, Germany — [3]Heidelberg University, Heidelberg, Germany — [4]University of Oxford, Oxford, United Kingdom

Integrated phase-change photonic devices can provide fast, non-volatile, low-energy in-memory and neuromorphic computing. Here we explore plasmonic enhancement of such devices in order to improve their programming speed and energy consumption.

JSI-P.18 13:00 Hall B0

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JSI-P.19 13:00 Hall B0

**Readout Optimisation of Phase-Change Integrated Photonic Memory** — •Joseph Pady[1], Junchao Song[1], Rongyang Xu[2], Nikolaos Farmakidis[3], Harish Bhaskaran[3], Wolfram Pernice[2], and David Wright[1] — [1]University of Exeter, Exeter, United Kingdom — [2]Heidelberg University, Heidelberg, Germany — [3]University of Oxford, Oxford, United Kingdom

The geometry of Ge2Sb2Te5 phase-change material based integrated photonic memory devices is explored and optimised, using coupled finite-element and phase switching modelling techniques, to deliver improved readout performance.

## EB-10: Quantum Networks

Chair: Michał Karpiński, University of Warsaw, Warsaw, Poland

Time: Friday, 8:30–10:00 Location: ICM - Room 1

**Oral** EB-10.1 8:30 ICM - Room 1

**State Transfer in Latent-Symmetric Quantum Networks** — •Jonas Himmel[1], Max Ehrhardt[1], Matthias Heinrich[1], Sebastian Weidemann[1], Tom A. W. Wolterink[1], Malte Röntgen[2,3], Peter Schmelcher[2,4], and Alexander Szameit[1] — [1]Institute for Physics, University of Rostock, Rostock, Germany — [2]Zentrum für Optische Quantentechnologien, Universität Hamburg, Hamburg, Germany — [3]Eastern Institute for Advanced Study, Eastern Institute of Technology, Ningbo, China — [4]The Hamburg Centre for Ultrafast Imaging, Universität Hamburg, Hamburg, Germany

Our novel approach designing networks for efficient quantum state transfer uses latent symmetries, which appear exclusively in the network's spectral properties and promise applications in quantum cryptography and secure state transfer, while increasing design flexibility.

**Oral** EB-10.2 8:45 ICM - Room 1

**A municipal quantum network link with entangled infrared-photons emitted from Strontium ions** — •Norbert Linke — Joint Quantum Institute, Univ. of Maryland, College Park, MD, USA — Duke Quantum Center, Duke University, Durham, NC, USA

We present initial results from characterizing a municipal dark fiber link for quantum networking with infrared photons emitted from Strontium ions, entangled in their polarization state with a meta-stable qubit in the emitting ion.

**Oral** EB-10.3 9:00 ICM - Room 1

**Building a quantum network: from entanglement distribution in an intracity fiber link to quantum teleportation with remote emitters** — •Simone Luca Portalupi[1], Tim Strobel[1], Michal Vyvlecka[1], Ilenia Neureuther[1], Tobias Bauer[2], Marlon Schäfer[2], Stefan Kazmaier[1], Nand Lal Sharma[3], Raphael Joos[1], Jonas H. Weber[1], Cornelius Nawrath[1], Weijie Nie[3], Gatha Bhayani[3], Marc Geitz[4], Ralf-Peter Braun[4], Caspar Hopfmann[3], Christoph Becher[2], and Peter Michler[1] — [1]Institut für Halbleiteroptik und Funktionelle Grenzflächen, Center for Integrated Quantum Science and Technology (IQST) and SCoPE, University of Stuttgart, Stuttgart, Germany — [2]Fachrichtung Physik, Universität des Saarlandes, Saarbrücken, Germany — [3]Institute for Integrative Nanosciences, Leibniz IFW, Dresden, Germany — [4]Deutsche Telekom T-Labs, Berlin, Germany

Here we will discuss the experimental demonstration of high-fidelity polarization entanglement distribution within a 36 km fiber network. Furthermore, we will report on the use of two remote quantum emitters to perform photonic quantum teleportation

**Oral** EB-10.4 9:15 ICM - Room 1

**Experimental Quantum Triangle Network Nonlocality with an AlGaAs Multiplexed Entangled Photon Source** — •Othmane Meskine[1], Ivan Supic[2], Damian Markham[2], Félicien Appas[3], Fabien Boitier[4], Martina Morassi[5], Aristide Lemaître[5], Maria Amanti[1], Florent Baboux[1], Eleni Diamanti[2], and Sara Ducci[1] — [1]Université Paris Cité, CNRS, Laboratoire MPQ, Paris, France — [2]Sorbonne Université, CNRS, LIP6, Paris, France — [3]ICFO, Castelldefels, Spain — [4]Nokia Bell Labs, Massy, France — [5]Université Paris-Saclay, CNRS, C2N, Palaiseau, France

We demonstrate experimentally, for the first time, quantum nonlocality in a triangle network without assuming fully independent sources. We use an AlGaAs entangled-photon source and derive a noise-robust Bell-like inequality to validate our findings.

**Oral** EB-10.5 9:30 ICM - Room 1

**Non-Degenerate Photonic Sources for Entanglement-Based Quantum Networks** — •Ioanna Katsavou[1], Huazhuo Dong[1], Priyanka Giri[1], Lucas Aoyagi[1], Eleni Diamanti[2], Alban Urvoy[1], and Julien Laurat[1] — [1]Laboratoire Kastler Brossel, Sorbonne University, Paris, France — [2]LIP6, Sorbonne University, Paris, France

We develop frequency non-degenerate photonic sources compatible with atomic quantum memories and telecommunication fibers. These highly efficient sources generate strongly non-classically correlated photons, enabling straightforward integration into quantum repeater schemes.

**Oral** EB-10.6 9:45 ICM - Room 1

*withdrawn*

## CM-5: Laser-Based Surface Functionalization

Chair: Nathalie Destouches, Université Jean Monnet, Saint-Étienne, France

Time: Friday, 8:30–10:00 Location: ICM - Room 2

**Invited** CM-5.1 8:30 ICM - Room 2

**Femtosecond laser processing of materials at tens-of-nm** — •Saulius Juodkazis — Swinburne University of Technology, Melbourne, Australia

The near-field enhancement guided by the orientation of linear polarisation of the laser writing beam provides a method to structure and modify material on the surface and inside the volume with precision and resolution down to tens of

nanometers.

**Oral** CM-5.2 9:00 ICM - Room 2

**Crystalline high aspect ratio nano-pillars generated by ultrafast Bessel beam from sapphire** — Valeria Viviana Belloni[1], Anne-Magali Seydoux-Guillaume[2], Sergio Sao-Joao[3], Mostafa Hassan[1], Luca Furfaro[1], Remo Giust[1], and •Francois Courvoisier[1] — [1]Université Marie et Louis Pasteur, CNRS, institut FEMTO-ST, F-25000 Besancon, France, Besancon, France — [2]CNRS, Université Jean Monnet Saint-Etienne, Laboratoire de Géologie de Lyon: Terre, Planètes, Environnement (LGL-TPE), UMR5276, Saint Etienne, France — [3]Mines Saint-Etienne, CNRS, UMR 5307 LGF, Centre SMS, Saint Etienne, France

An ultrafast first-order Bessel beam can generate high-aspect-ratio nano-pillars on sapphire via material extrusion. Transmission Electron Microscopy analysis reveals that the nano-structures are monocrystals and provides new insights into the mechanisms behind their formation.

**Oral** CM-5.3 9:15 ICM - Room 2

**Circularly Polarized Ultrafast Laser-Fluid-Matter Interaction Induced Chiral Nanostructures Self-assembly** — •Yi Wang, Zhen-Ze Li, and Hong-Bo Sun — Department of Precision Instrument, Tsinghua University, Beijing, China

By developing a laser-induced Rayleigh-Taylor instability fluid effect to trigger seed symmetry breaking, chiral nanostructures self-assembly is realized solely via a circularly polarized ultrafast laser. The interactions between circular polarization, fluid and structure are revealed.

**Oral** CM-5.4 9:30 ICM - Room 2

**fs-Laser Induced Micro- and Nano-Structures on Polycarbonate and Cellulose Acetate Butyrate for Cell Alignment** — •Johannes Heitz, Lukas Wagner, Werner Baumgartner, and Agnes Weth — Johannes Kepler University Linz, Linz, Austria

Polycarbonate or cellulose acetate butyrate were irradiated with a 1040 nm Yb-based fs laser. The laser exposure results in a surface with oriented micro-grooves and nano-structures, which can be used for alignment of biological cells.

**Oral** CM-5.5 9:45 ICM - Room 2

**Ablation Cooling Mechanisms in MHz Femtosecond Laser Processing of Polymers** — •Andrés P. Bernabeu[1], Daniel Puerto[1,2], José Reyna[1], Sergi Gallego[1,2], Andrés Márquez[1,2], Inmaculada Pascual[1,3], and Augusto Beléndez[1,2] — [1]Dept. Física, Ingeniería de Sistemas y Teoría de la Señal, San Vicente del Raspeig, Spain — [2]I. U. Física Aplicada a las Ciencias y las Tecnologías, San Vicente del Raspeig, Spain — [3]Dept. Óptica, Farmacología y Anatomía, San Vicente del Raspeig, Spain

This work demonstrates that ablation cooling can be achieved in polymers under MHz femtosecond laser processing, while preventing plasma shielding effects. Enhanced ablation efficiency, reduced thermal effects and precise modifications are observed under these conditions.

## CL-3: Infrared Imaging and Spectroscopy

Chair: Thomas Huser, University of Bielefeld, Bielefeld, Germany

Time: Friday, 8:30–10:00 Location: ICM - Room 3

**Invited** CL-3.1 8:30 ICM - Room 3

**Brillouin microscopy for cell and tissue mechanics in vivo** — •Giuliano Scarcelli — university of maryland, college park, USA

Brillouin scattering has been widely investigated to characterize mechanical properties of samples. To translate this technology to biomedical applications, our lab has developed high-resolution spectrometers at high throughput to enable label-free imaging based on biophysical properties.

**Oral** CL-3.2 9:00 ICM - Room 3

**Fieldßresolved Sample-Modulation Spectroscopy for Mid-Infrared Molecular Fingerprinting** — •Wolfgang Schweinberger[1,2,3], Sebastian Gröbmeyer[1], Amaj Chamankar[1], Abhijit Maity[1,2], Csaba Liber[2], Eric Grießinger[1], Dennis Merrill[4], Ferenc Krausz[1,2,3], and Alexander Weigel[1,2,3] — [1]Ludwig-Maximillians-Universität, München, Germany — [2]Center for Molecular Fingerprinting Molekuláris-Ujjlenyomat Kutató Közhasznú Nonprofit Kft, Budapest, Hungary — [3]Max Planck Institute of Quantum Optics, Garching, Germany — [4]RedShift BioAnalytics Inc., Boxborough MA, USA

We suppress the influence of low-frequency laser noise in field-resolved infrared spectroscopy by introducing Hertz-rate sample modulation, combined with dual-oscillator kHz-rate electro-optic sampling.

**Oral** CL-3.3 9:15 ICM - Room 3

**Octave-spanning mid-infrared electric field-resolved molecular fingerprinting of human blood plasma** — •Abhijit Maity[1,2,3], Wolfgang Schweinberger[1,2,3], Sebastian Gröbmeyer[1,2,3], Sanchi Maithani[1,3], Csaba Liber [1], Amaj Chamankar[2], Michael Trubetskov[3], Behnam Abbasvand Jahedi[2], Aleksandar Sebesta[1,2], Zoltán Kovács[1], Mihaela Žigman[1,2,3], Ferenc Krausz[1,2,3], and Alexander Weigel[1,2,3] — [1]Center for Molecular Fingerprinting, Budapest, Hungary — [2]Ludwig-Maximilians-Universität München, Garching, Germany — [3]Max Planck Institute of Quantum Optics, Garching, Germany

We report a field-resolved infrared spectrometer with 5.5-12 $\mu$m spectral coverage, optimized for molecular fingerprinting of human blood plasma samples. We show first application on a set of plasma measurements from a clinical study.

**Oral** CL-3.4 9:30 ICM - Room 3

**Tunable W-doped VO2 Nanolayer at Body Temperature for Ultrasensitive Near-Infrared Plasmonic Biosensor** — •Nurzad Zakirov[1,2], Shaodi Zhu[1], Amine Zitouni[2], Etienne Charette[2], Wenqiang Xiang[2], Boris Le Drogoff[2], Mohamed Chaker[2], and Shuwen Zeng[1] — [1]French National Centre for Scientific Research (CNRS), Laboratory Light, nanomaterials and nanotechnologies – L2n, Troyes, France — [2]National Institute for Scientific Research (INRS), Energy, Materials and Telecommunications Center, University of Quebec, Varennes, Quebec, Canada

In this work, we developed a thermal-tunable optical biosensor with a W-doped VO2 nanolayer for ultrasensitive near-infrared detection, which is capable to be operated at body temperature with an enhanced plasmonic effect.

**Oral** CL-3.5 9:45 ICM - Room 3

**Spectroscopy with Undetected Photons for Biomedical Diagnostics in Mid-Infrared** — •Mahya Mohammadi[1], Isa Ahmadalidokht[1], Mohammad Sadraeian[1], Lana McClements[2], Christopher G. Poulton[1], Irina Kabakova[1], and Alexander S. Solntsev[1] — [1]School of Mathematical and Physical Sciences, University of Technology Sydney, Sydney, Australia — [2]School of Life Sciences, University of Technology Sydney, Sydney, Australia

Quantum spectroscopy with entangled photons enables cost-effective biomarker detection in fluids. By using visible-range detectors and lasers, it eliminates the need for expensive mid-infrared equipment used for many biomarkers, offering a practical diagnostic solution.

## EH-5: Tuneable and Reconfigurable Platforms

Chair: Nicolò Maccaferri, Umeå University, Umeå, Sweden

Time: Friday, 8:30–10:00 Location: ICM - Room 4a

**Oral** EH-5.1 8:30 ICM - Room 4a

**Spectrally Tunable Generation of Entangled Photon Pairs from a Tilted Nonlinear Metasurface** — Shaun Lung[1], Jinyong Ma[2], •Maximilian A. Weissflog[1], Jihua Zhang[2,3], Sina Saravi[1], Thomas Pertsch[1,4], Frank Setzpfandt[1,4], and Andrey A. Sukhorukov[2] — [1]Institute of Applied Physics, Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany — [2]ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS), Department of Electronic Materials Engineering, Research School of Physics, The Australian National University, Canberra, Australia — [3]Songshan Lake Materials Laboratory, Dongguan, China — [4]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

We experimentally demonstrate tunable generation of spectrally entangled photon pairs from a nonlinear metasurface. Tilting the metasurface enables frequency tuning with constant excitation wavelength, enhancing the potential of metasurfaces for quantum information and sensing applications.

**Oral** EH-5.2 8:45 ICM - Room 4a

**Transmissive Light Modulator and Switchable Beam Splitter Based on Thin-film Lithium Niobate and ITO** — •Zetian Chen, Noa Mazurski, Jacob Engelberg, and Uriel Levy — hebrew university of jerusalem, jerusalem, Israel

Based on thin-film lithium niobate and conductive low-loss ITO, we demon-

strate two types of transmissive electro-optically tunable metasurface devices in the near-infrared: a light modulator; and a switchable beam splitter with high-contrast grating.

**Oral** EH-5.3 9:00 ICM - Room 4a

**Active Phase-Change Metasurfaces for Optical Mode Conversion and Orbital Angular Momentum Control** — •Joe Shields[1], Carlota Ruiz de Galerreta[1,2], Stuart Kendall[1], Guoce Yang[3], Mengyun Wang[3], Nikolaos Farmakidis[3], Harish Bhaskaran[3], Jacopo Bertolotti[1], and C. David Wright[1] — [1]Centre for Metamaterials Research and Innovation, University of Exeter, Exeter, United Kingdom — [2]Institute of Materials Science of Barcelona (ICMAB-CSIC), Barcelona, Spain — [3]Department of Materials, University of Oxford, Oxford, United Kingdom

We demonstrate phase-change material metasurfaces for control of optical modes. These switchable devices enable ON/OFF $TEM_{00}$-to-$HG_{10}$ and $TEM_{00}$-to-$LG_{01}$ mode conversion, offering a route to compact optical mode conversion for communication, information processing, and quantum optics.

**Oral** EH-5.4 9:15 ICM - Room 4a

**Electrically Tunable LN Metasurfaces for Computational Spectrometers** — •Zhiying Song[1], Zesheng Chen[1], Tairan Li[2], Alfonso Ruocco[3], Zongyin Yang[4], Zhipei Sun[5], Weiwei Cai[6], and Tawfique Hasan[1] — [1]Cambridge Graphene Centre, University of Cambridge, Cambridge, United Kingdom — [2]Department of Engineering, University of Cambridge, Cambridge, United Kingdom — [3]Optical Networks Group, Department of Electronic & Electrical Engineering, University College London, London, United Kingdom — [4]College of Information Science and Electronic Engineering, Zhejiang University, Hangzhou, China — [5]Department of Electronics and Nanoengineering, Aalto University, Espoo, Finland — [6]School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai, China

We firstly propose an ultracompact computational spectrometer based on free-space tunable LiNbO3 metasurfaces. Simulation work presents that we achieve a high accuracy of 0.074 nm and a high resolution of 0.4 nm.

**Oral** EH-5.5 9:30 ICM - Room 4a

**Dynamic and reversible plasmonic nanogaps from isolated dimer nanoparticles via self-assembly** — •Vasanthan Devaraj[1], Isaac Azahel Ruiz Alvarado[1], Jongmin Lee[2], Jin-Woo Oh[3], Uwe Gerstmann[1], Wolf Gero Schmidt[1], and Thomas Zentgraf[1] — [1]Paderborn University, Paderborn, Germany — [2]Hallym University, Chuncheon, South Korea — [3]Pusan National University, Busan, South Korea

A novel self-assembly strategy fabricates low-density dimer gold nanoparticles in a nanoparticle-on-metallic-mirror (NPoM) platform with ~3 nm gaps, utilizing M13 bacteriophage as a template, enabling dynamic and reversible tunability for versatile plasmonic applications.

**Oral** EH-5.6 9:45 ICM - Room 4a

**Active Tunable Extraordinary Optical Tranmission in the Visible Regime** — •Hira Asif[1,2], Mehmet Emre Tasgin[3], Alpan Bek[4], and Ramazan Sahin[1,2] — [1]Department of Physics, Akdeniz University, Antalya, Turkey — [2]Turkish National Observatory (TUG), Antalya, Turkey — [3] Institute of Nuclear Sciences, Hacettepe University, Ankara, Turkey — [4]Department of Physics, Middle East Technical University, Ankara, Turkey

We propose all-optical and electro-optic tuning of intensity and operational bandwidth of extraordinary optical transmission (EOT) by controlling the dynamics of propagating and localized plasmon modes through ultrashort light pulse and voltage-tunable quantum emitter.

## CB-4: Mid-Infrared Semiconductor Lasers and LEDs

Chair: Jérôme Faist, ETH Zurich, Zurich, Switzerland

Time: Friday, 8:30–10:00 Location: ICM - Room 4b

**Oral** CB-4.1 8:30 ICM - Room 4b

**Advanced mid-IR photonic integrated circuits based on monolithic integrated quantum cascade lasers and detectors and plasmonics** — •Borislav Hinkov[1], Mauro Davd[2], Georg Marschick[2], Felix Jaeschke[1], Elena Arigliani[2], Xaver Gsodam[2], Florian Pilat[2], Andreas Schwaighofer[3], Alicja Dabrowska[3], Axel Evirgen[4], Salvatore Pes[4], Benedikt Schwarz[2], Bernhard Lendl[3], and Gottfried Strasser[2] — [1]Silicon Austria Labs (SAL), Villach, Austria — [2]Insitute of Solid State Electronics & Center for Micro- and Nanostructures, TU Wien, Vienna, Austria — [3]Institute of Chemical Technologies and Analytics, TU Wien, Vienna, Austria — [4]III-V Lab, a joint Thales, Nokia and CEA-LETI laboratory, Palaiseau, France

This work presents the realization of advanced mid-IR-PICs by combining quantum cascade lasers and detectors with plasmon-based waveguiding. Novel concepts are shown resulting in fully-monolithic beam-combiner devices and pathways to GHz-modulation PICs are discussed.

**Oral** CB-4.2 8:45 ICM - Room 4b

**Quantum cascade laser integration on photonic integrated circuits for compact mid-infrared sensing** — •Tingting Zhai[1], Harindra Kumar Kannojia[2], David Gachet[3], Geert Van Steenberge[2], and Bart Kuyken[1] — [1]Photonics Research Group, Department of Information Technology, Ghent University - IMEC, Gent, Belgium — [2]Center for Microsystem Technology (CMST), Ghent University - IMEC, Gent, Belgium — [3]Alpes Lasers SA, Saint-Blaise, Switzerland

A hybrid-assembled QCLs on PICs for mid-infrared sensing was demonstrated, which shows high output power of 19 mW in CW mode and 25 mW in PW mode.

**Oral** CB-4.3 9:00 ICM - Room 4b

**Widely tunable 2.1 $\mu$m III-V-silicon hybrid laser based on a single microring resonator** — •Jincheng Wei[1], Ruijun Wang[1], Zhengqi Geng[2], Chengao Yang[2], Zhichuan Niu[2], and Siyuan Yu[1] — [1]State Key Laboratory of Optoelectronic Materials and Technologies, School of Electronic and Information Technology, Sun Yat-sen University, Guangzhou, China — [2]State Key Laboratory for Superlattices and Microstructures, Institute of Semiconductors, Chinese Academy of Sciences, Beijing, China

We present a widely tunable III-V-silicon hybrid integrated laser with a single silicon microring resonator, achieving a 22 nm tuning range (2110-2132 nm) and an average SMSR close to 50 dB.

**Oral** CB-4.4 9:15 ICM - Room 4b

**Miniature Quantum Cascade Surface Emitting Ring Lasers** — •Réka-Eszter Vass[1], Philipp Täschler[1], David Stark[1], Mathieu Bertrand[1], Emilio Gini[2], Mattias Beck[1], and Jérôme Faist[1] — [1]Institute for Quantum Electronics, Department of Physics, ETH Zurich, Zurich, Switzerland — [2]FIRST Center for Micro- and Nanoscience, ETH Zurich, Zurich, Switzerland

In this work, we demonstrate the pulsed room temperature operation of mid-infrared Quantum Cascade Surface Emitting Lasers embedded in ring cavities with diameters as small as 30 $\mu$m.

**Oral** CB-4.5 9:30 ICM - Room 4b

**Low-Loss Tunnel Junction Integration in Mid-Infrared VCSELs** — •Andrea Simaz, Gerhard Böhm, Anna Köninger, and Mikhail A. Belkin — Walter Schottky Institute, Munich, Germany

Electrically pumped 3.4 $\mu$m VCSELs with a low-loss buried tunnel junction using a GaSb/InAs/AlSb superlattice achieve pulsed operation up to 20 °C, offering reduced optical loss and effective current confinement compared to traditional designs.

**Oral** CB-4.6 9:45 ICM - Room 4b

**Broad wavelength band GaSb SLEDs for mid-IR optical coherence tomography and spectroscopy** — •Jukka Viheriälä, Ifte Khairul Alam Bhuiyan, Joonas Hilska, Markus Peil, and Mircea Guina — Engineering and Natural Sciences, Tampere University, Tampere, Finland

We demonstrate very broad band 2 $\mu$m superluminecent diodes reaching as wide as 200 nm spectral broadband using asymmetric QW structure. Devices are expected to be optimal for OCT and multi-wavelength spectroscopy.

# EF-4: Nonlinear Effects in Complex Photonic Systems

Chair: Carlos Mas Arabi, Universitat Politècnica de València, València, Spain

Time: Friday, 8:30–10:00 Location: ICM - Room 5

**Oral** EF-4.1 8:30 ICM - Room 5

**Concurrent Symmetry Breakings in Microresonator Chains for Controlled Light Distribution** — •Alekhya Ghosh[1,2], Arghadeep Pal[1,2], Lewis Hill[1], Graeme N Campbell[1,3], Toby Bi[1,2], Yaojing Zhang[1], Abdullah Alabbadi[1,2], Shuangyou Zhang[4,1], and Pascal Del'Haye[1,2] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany — [3]SUPA & CNQO, Department of Physics, University of Strathclyde, Glasgow, United Kingdom — [4]Department of Electrical and Photonics Engineering, Technical University of Denmark, Lyngby, Denmark

We harness Kerr nonlinearities to control optical power distribution in one-dimensional chain of coupled resonators. This will be crucial for on-chip beam steering, optical computing, and for realizing complex soliton dynamics.

**Oral** EF-4.2 8:45 ICM - Room 5

**Mesoscopic transport of the second-harmonic light generated within a nonlinear disordered medium** — •Alfonso Nardi[1], Andrea Morandi[1], Romain Pierrat[2], Arthur Goetschy[2], Xuanchen Li[1], Frank Scheffold[3], and Rachel Grange[1] — [1]ETH Zurich, Department of Physics, Institute for Quantum Electronics, Optical Nanomaterial Group, 8093 Zurich, Switzerland — [2]ESPCI Paris, PSL University, CNRS, Institut Langevin, 75005 Paris, France — [3]Department of Physics, University of Fribourg, 1700 Fribourg, Switzerland

We report the first observation of mesoscopic transport of second-harmonic light generated within a nonlinear disordered medium. This outcome has relevant applications in broadband second-harmonic generation, nonlinear wavefront shaping, and photonic computing.

**Oral** EF-4.3 9:00 ICM - Room 5

**Broadband Pump-probe Tracking of Second Harmonic Generation Dynamics in Silicon Nitride Microresonators** — •Ji Zhou, Marco Clementi, Samantha Sbarra, Ozan Yakar, and Camille-Sophie Brès — École Polytechnique Fédérale de Lausanne, Photonic Systems Laboratory (PHOSL), Lausanne, Switzerland

We develop a pump-probe technique for tracking photo-induced second-harmonic generation dynamics in silicon nitride microresonators. The resulting broadband maps reveal that SHG can occur in highly-detuned conditions, potentially enable comb self-referencing within a single microresonator.

**Oral** EF-4.4 9:15 ICM - Room 5

**Thermo-optical spiking and mixed-mode oscillations in injected Kerr microcavities** — Elias Koch[1], •Julien Javaloyes[2], and Svetlana Gurevich[1,2,3] — [1]Institute for Theoretical Physics, University of Münster, Münster, Germany — [2]Departament de Física, Universitat de les Illes Balears & IAC-3, Palma de Mallorca, Spain — [3]Center for Nonlinear Science (CeNoS), University of Münster, Münster, Germany

We investigate the influence of thermal effects on the dynamics of vertically emitting Kerr microcavities under detuned optical injection, uncovering a rich spectrum of dynamical behaviors, including excitable thermo-optical pulses, mixed-mode oscillations, and chaotic spiking.

**Oral** EF-4.5 9:30 ICM - Room 5

**Spiking On-Chip Electro-Optomechanical Oscillator** — •Gregorio Beltramo[1,2], Robert Horvath[1], Sylvain Barbay[1], and Remy Braive[1,2,3] — [1]C2N, CNRS - Université Paris Saclay, Palaiseau, France — [2]Université Paris Cité, Paris, France — [3]Institut Universitaire de France, Paris, France

We show excitability (all-or-none) dynamics of an integrated electro-optomechanical oscillator. Its oscillation is locked to an external signal and it is perturbed by instantaneous increase of input power. Statistical data treatment shows typical excitable behavior.

**Oral** EF-4.6 9:45 ICM - Room 5

**Main Resonances and Width of RF Power Spectra of Chaotic Output from a Semiconductor Laser System Explained** — •Deb Kane[1] and Mindaugas Radziunas[2] — [1]Australian National University, Canberra, Australia — [2]Weierstrass Institute, Berlin, Germany

Semiconductor laser with delayed optical feedback system analysed using TW model combined with instantaneous frequency analysis explains the quantitative characteristics of bandwidth and key peak frequencies in the rf power spectra of the chaotic regime.

# CC-3: THz Photonics Generation and Detection

Chair: Benjamin Willenberg, ETH, Zürich, Switzerland

Time: Friday, 8:30–10:00 Location: ICM - Room 11

**Oral** CC-3.1 8:30 ICM - Room 11

**Broadband Millimetre Wave Comb Generation via Laser-Cavity Soliton Microcombs** — •Luke Peters[1,2], Andrew Cooper[1], Luana Olivieri[1,2], Antonio Cutrona[1,2], Fedor Getman[1], Vittorio Cecconi[1,2], Nitish Paul[1], Debayan Das[1,2], Maxwell Rowley[2], Sai T. Chu[3], Brent E. Little[4], Roberto Morandotti[5], David Moss[6], Juan Sebastian Totero Gongora[1,2], Alessia Pasquazi[1,2], and Marco Peccianti[1,2] — [1]Emergent Photonics Research Centre (EPicX), Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [2]Emergent Photonics Lab (Epic), Department of Physics and Astronomy, University of Sussex, Brighton, United Kingdom — [3]Department of Physics, City University of Hong Kong, , Hong Kong, China — [4]State Key Laboratory of Transient Optics and Photonics, Xi'an Institute of Optics and Precision Mechanics, Xi'an, China — [5]INRS-EMT, Quebec, Canada — [6]Optical Sciences Centre, Swinburne University of Technology, and ARC-COMBS, Hawthorne, Australia

We present a stable, low-jitter millimetre wave comb from a laser cavity-soliton microcomb at 1545 nm. With a 50 GHz comb spacing and 650 GHz spectrum, it enables ultra-fast communication, precision radar, and advanced spectroscopy applications.

**Oral** CC-3.2 8:45 ICM - Room 11

**All-Photonic THz Radar System Using Modulator-Based Optical Comb Source and Electro-Optic Detection** — •Isao Morohashi and Norihiko Sekine — National Institute of Information and Communications Technology, Tokyo, Japan

An all-photonic THz FM-CW radar system has been proposed using a modulator-based optical comb source. For the receiver, the electro-optic detection method was adopted. As a proof-of-concept, ranging measurement using SMFs has been demonstrated.

**Oral** CC-3.3 9:00 ICM - Room 11

**Sensitive detection of 4 THz radiation by nonlinear upconversion in an organic crystal BNA** — •Aswin Vishnu Radhan[1], Wei Cui[1], Hesam Heydarian[1], Eeswar Kumar Yalavarthi[1], Nicolas Couture[1], Angela Gamouras[1,2], and Jean-Michel Ménard[1,2] — [1]Department of Physics, University of Ottawa, Ottawa, Canada — [2]National Research Council Canada, Ottawa, Canada

We demonstrate a sensitive terahertz detection scheme using nonlinear upconversion in an organic crystal, BNA. The achieved sensitivity corresponds to the detection of a single terahertz pulse containing 100 photons with a probability exceeding 50%.

**Oral** CC-3.4 9:15 ICM - Room 11

**Terahertz generation from a spintronic emitter pumped by a two-optical-cycle Cr:ZnS oscillator** — •Mojtaba Aghakasiri[1], Daiki Okazaki[1,2], Philipp Steinleitner[1], Wolfgang Schweinberger[3,4], Dionysios Potamianos[3,4], Yang Gui[1,3], Aleksandar Sebesta[1,4], Behnam Abbasvand Jahedi[3], Tom Sebastian Seifert[5], Tobias Kampfrath[5], Shigeki Tokita[2], Ferenc Krausz[1,3,4], and Alexander Weigel[1,3,4] — [1]Max Planck Institute of Quantum Optics, München, Germany — [2]Institute for Chemical Research, Kyoto University, Kyoto, Japan — [3]Ludwig-Maximilians-Universität München, München, Germany — [4]Center for Molecular Fingerprinting, Budapest, Hungary — [5]Freie Universität Berlin Arnimallee, Berlin, Germany

We demonstrate single-cycle terahertz pulses from a spintronic emitter, driven by the 2.3-$\mu$m, two-optical-cycle pulses from a Cr:ZnS oscillator. The emitted terahertz electric field spans 0.1 to 8 THz and was characterized with electro-optic sampling.

**Oral** CC-3.5 9:30 ICM - Room 11

**External-Magnetic-Field-Free Spintronic Terahertz High-Field Emitters with One-dimensional Photonic Crystal Structure** — •Zehao Yang[1], Mingxuan Zhang[1], Chunyan Geng[1], and Xiaojun Wu[1,2] — [1]Beihang University, School of Electronic and Information Engineering, Beijing, China — [2]Beihang University, Hangzhou International Innovation Institute, Hangzhou, China

High-integrated, large-size, external-magnetic-field-free strong-field spin terahertz emitters were prepared, combined with broadband one-dimensional photonic crystals and high-resistance silicon substrates, to generate THz radiation above 650 kV/cm, accelerating the development of high-field THz science and applications.

**Oral** CC-3.6 9:45 ICM - Room 11

**Enhanced time-resolved terahertz detection using a plasmonic antenna and a semiconductor microstructured waveguide** — Hesam Heydarian[1], Aswin Vishnuradhan[1], David Girard[1], Ariana Rodríguez[1], Graham Jerrey Rivers Killaire[1], Arnaud Weck[1,2], Angela Gamouras[1,3], and •Jean-Michel Ménard[1,3] — [1]Department of Physics, University of Ottawa, Ottawa, Canada — [2]Department of Mechanical Engineering, University of Ottawa, Ottawa, Canada — [3]National Research Council Canada, Ottawa, Canada

We present a collinear EOS THz scheme using a laser-written metallic antenna combined with a semiconductor waveguide to increase nonlinear interaction length, optimize phase matching conditions, and enhance detection sensitivity by a factor of 10.

## CI-5: Fibre Communications and Fibre Devices

Chair: Peter Horak, University of Southampton, Southampton, United Kingdom

Time: Friday, 8:30–10:00 Location: ICM - Room 12a

**Oral** CI-5.1 8:30 ICM - Room 12a

**Brillouin-Based Carrier Amplification for Kramers-Kronig Receivers** — •Priyanshu Kumar Pandey[1,2], Rajveer Dhawan[1,3], Baljinder Singh Heera[1,3], and Amol Choudhary[1,2,3] — [1]Ultrafast Optical Communications and High-performance Integrated Photonics (UFO-CHIP) group, Indian Institute of Technology (IIT), Delhi, New Delhi, India — [2]Bharti School of Telecommunication Technology and Management, Indian Institute of Technology (IIT), Delhi, New Delhi, India — [3]Department of Electrical Engineering, Indian Institute of Technology (IIT), Delhi, New Delhi, India

This work integrates in-fiber Brillouin amplification for minimum-phase signal generation and the DC-Value Iteration (DCVI) method to eliminate upsampling requirement in Kramers Kronig receivers. The approach boosts CSPR, simplifies design, and ensures efficient signal recovery.

**Oral** CI-5.2 8:45 ICM - Room 12a

**Complex Valued Kernels for Mitigation of Signal Distortions in Parametrically Amplified Optical Links** — Long Hoang Nguyen, •Sonia Boscolo, and Stylianos Sygletos — Aston Institute of Photonic Technologies, Aston University, Birmingham, United Kingdom

We present two kernel-based online algorithms that are designed to simultaneously compensate for both the amplitude and phase distortions caused by pump-phase modulation in cascaded fibre-optical parametric amplifier links.

**Oral** CI-5.3 9:00 ICM - Room 12a

**Polarization dependence of a 100G simplified PolMux heterodyne coherent receiver for optical access networks** — •David Izquierdo, Pascual Sevillano, Miguel Barrio, Natalia Herguedas, Jorge Ciudad-Real, and Ignacio Garces — I3A, University of Zaragoza, Zaragoza, Spain

We present the impact of input SOP on the performance of a 100G simplified PolMux heterodyne coherent receiver. Results show a polarization dependence less than 1 dB across a wide range of input SOPs.

**Oral** CI-5.4 9:15 ICM - Room 12a

**Low-loss Stress-optic Phase Modulator in Standard Optical Fiber** — •Alice Christian-Edwards, Paolo L. Mennea, Rex H.S. Bannerman, Peter G.R. Smith, Corin B.E. Gawith, Patrick M. Ledingham, and James C. Gates — Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

We present an ultra-low loss phase modulator in unmodified standard telecom fiber utilizing the stress-optic effect induced by the thermal expansion of Joule heated stressor wires.

**Oral** CI-5.5 9:30 ICM - Room 12a

**Ptychographic imaging with a fiber endoscope via wavelength scanning** — •Kyriakos Skarsoulis[1,2], Konstantinos Makris[1,2], Cristophe Moser[3], and Demetri Psaltis[3] — [1]University of Crete (UoC), Heraklion, Greece — [2]Foundation for Research and Technology-Hellas (FORTH), Heraklion, Greece — [3]Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

We experimentally realize a hybrid model of an endoscope that utilizes multi-wavelength data with ptychography and deep learning to decode light collected by a fiber bundle. The spatial resolution and recovery radius are improved.

**Oral** CI-5.6 9:45 ICM - Room 12a

**Ultrafast All-Optical Cross-Switching Schemes as Logical Operations Based on Dual-Wavelength Interaction in Soft Glass Multicore Fiber** — Sarah P. Alex[1], Edgar Kaksis[1], Dariusz Pysz[2], Ryszard Buczyński[2], Audrius Pugžlys[1], Andrius Baltuška[1], and •Ignác Bugár[1] — [1]Institut für Photonik, Technische Universität Wien, Gusshausstrasse 27-29, 1040 Wien, Wien, Austria — [2]Łukasiewicz – Instytut Mikroelektroniki i Fotoniki, al. Lotników 32/46, 02-668 Warszawa, Warszawa, Poland

Ultrafast nonlinear all-optical switching is demonstrated in a multicore fiber containing five dual-core units in the C-band, enabling various digital operations through the proper selection of the input core for femtosecond control and signal pulses.

## EE-1: Field-Resolved Phenomena & Ultrafast Spectroscopy

Chair: Terence Mullins, DESY, Hamburg, Germany

Time: Friday, 8:30–10:00 Location: ICM - Room 12b

**Invited** EE-1.1 8:30 ICM - Room 12b

**Femtosecond Fieldoscopy** — •Hanieh Fattahi — Max Planck Institute for the Science of Light, Erlangen, Germany

Femtosecond Fieldoscopy achieves attosecond temporal and sub-diffraction spatial resolution using ultrashort laser pulses for label-free field-resolved spectroscopy at near-petahertz. With exceptional detection sensitivity and dynamic range, it promises to open new horizons in label-free sensing.

**Oral** EE-1.2 9:00 ICM - Room 12b

**All optical sampling of near-infrared waveforms at 505 kHz** — •Francesco Tani[1,2], Martin Butryn[1], Anton Husakou[3], and Dmitry A. Zimin[4,5] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]CNRS, UMR 8523—PhLAM—Physique des Lasers Atomes et Molécules, Lille, France — [3]Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany — [4]Laboratory of Physical Chemistry, ETH Zurich, Zürich, Switzerland — [5]Department of Physics, Cavendish Laboratory, Cambridge University, Cambridge, United Kingdom

We report the implementation of a generalized heterodyne optical sampling technique using a balanced detection scheme and its use to characterize 5-fs,

$\mu$J-level optical waveforms at an unprecedently high repetition rate of 505 kHz.

**Oral** EE-1.3 9:15 ICM - Room 12b

**Electron Transport under Atomic-Scale Spatio-Temporal Confinement** — •Sebastian Grossenbach, Marwin Gedamke, Matthias Falk, Ron Tenne, and Alfred Leitenstorfer — Department of Physics and Center for Applied Photonics, University of Konstanz, D-78457 Konstanz, Germany

Attosecond current bursts are induced by optical phase control with single-cycle near-infrared pulses in an atomic-scale tunnel junction. A significant barrier reduction due to image charges hints at a sub-nanometer gap size of the device.

**Oral** EE-1.4 9:30 ICM - Room 12b

**Ultrafast dissociation dynamics of iodomethane induced by few-fs UV pulses** — •Sergey Ryabchuk[1,2], Lorenzo Colaizzi[2,3], Erik P. Månsson[3], Krishna Saraswathula[3], Andrea Trabattoni[3,4], Jesús González-Vázquez[5,6], Fernando Martín[5,7], and Francesca Calegari[1,2,3] — [1]The Hamburg Centre for Ultrafast Imaging, Universität Hamburg, Hamburg, Germany — [2]Physics Department, Universität Hamburg, Hamburg, Germany — [3]Center for Free-Electron Laser Science, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [4]Institute of Quantum Optics, Leibniz Universität Hannover, Hannover, Germany — [5]Departamento de Química, Universidad Autonoma de Madrid, Madrid, Spain — [6]IADCHEM, Universidad Autónoma de Madrid, Madrid, Spain — [7]Instituto Madrileño de Estudios Avanzados en Nanociencia (IMDEA Nanoscience), Madrid, Spain

We studied the dissociative dynamics of iodomethane following ultraviolet photoexcitation with unprecedented temporal resolution. Our theoretical model provided a detailed interpretation of the experimental observations by precisely identifying the involved dissociation channels.

**Oral** EE-1.5 9:45 ICM - Room 12b

**Ultrafast Excited-State Dynamics in Halogen Terminated Polyynes: Influence of the Halogen group** — •Edoardo Carrraro[1], Simone Melesi[2], Andrea Iudica[1], Giulio Cerullo[1,3], Carlo S. Casari[2], Daniele Fazzi[4], and Margherita Zavelani-Rossi[1,3] — [1]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy — [2]Dipartimento di Energia, Politecnico di Milano, Milano, Italy — [3]Istituto di Fotonica e Nanotecnologie IFN-CNR, Milano, Italy — [4]Dipartimento di Chimica, Università degli studi di Bologna, Bologna, Italy

We investigate ultrafast excited-state processes in short, halogen-terminated polyynic carbon chains. Combining transient absorption with <50-fs temporal resolution and density functional theory calculations, we elucidate the effect of halogen electronegativity on excited state relaxation processes.

## CD-11: Speciality Nonlinear Optical Fibers

Chair: Nathalie Vermeulen, Vrije Universiteit Brussel, Brussels, Belgium

Time: Friday, 8:30–10:00 Location: ICM - Room 13a

**Oral** CD-11.1 8:30 ICM - Room 13a

**Ultrafast Cross-Switching of Long Wavelength Near-Infrared Pulses in Dual-Core Soft Glass Fibers for Time Gating of Spectroscopy Signals** — •Sarah Pulikottil Alex[1], Mateusz Winkowski[2], Mattia Longobucco[3], Edgar Kaksis[1], Ryszard Buczynski[2], Audrius Pugžlys[1], Andrius Baltuška[1], and Ignác Bugár[1] — [1]Institut für Photonik, Technische Universität Wien, Wien, Austria — [2] Łukasiewicz – Instytut Mikroelektroniki i Fotoniki, Warszawa, Poland — [3]Amplitude Laser, Pessac, France

High-contrast nonlinear all-optical switching of 1.7 $\mu$m femtosecond pulses using soft glass dual-core fiber is demonstrated via cross-switching with a sequence of four 1.03 $\mu$m control pulses facilitating application potential for single-shot time-resolved spectroscopy.

**Oral** CD-11.2 8:45 ICM - Room 13a

**All-optical self-switching of 1560nm femtosecond pulses in highly nonlinear soft glass multicore fiber.** — •Mateusz Winkowski[1,2], Mattia Longobucco[1,2], Dariusz Pysz[1], Ireneusz Kujawa[1], Ryszard Buczyński[1,2], and Ignac Bugar[3] — [1]Łukasiewicz Institute of Microelectronics and Photonics, Wólczyńska 133, 01-919, Warsaw, Poland — [2]University of Warsaw, Faculty of Physics, Pasteura 5, 02-093, Warsaw, Poland — [3]Photonics Institute, Vienna University of Technology, Gußhausstraße 25-29, Vienna, Austria

Ultrafast all-optical switching in multicore fiber is presented. Above 15 dB switching contrast with symmetrical character has been achieved in C-band at sub-100 pJ pulse energy accompanied by double switching performance.

**Oral** CD-11.3 9:00 ICM - Room 13a

**Continuously tunable frequency conversion in germanium doped photonic crystal fiber pumped near degeneracy** — •Leah Murphy[1], Mateusz Olszewski[1], Petros Androvitsaneas[1,2], Miguel Alvarez Perez[2], Will Smith[1], Anthony Bennett[2], Peter Mosley[1], and Alex Davis[1] — [1]University of Bath, Bath, United Kingdom — [2]Cardiff University, Cardiff, United Kingdom

We introduce a frequency converter based on Ge-doped photonic crystal fiber, and demonstrate small, tunable frequency shifts around 920 nm, frequency comb generation, and tunable downconversion of pulses around 918 nm to the telecoms C-band.

**Oral** CD-11.4 9:15 ICM - Room 13a

**High-efficiency interrogator for FSBS mechanical vibrations in optical fibers** — •Anna I. Garrigues-Navarro[1], Martina Delgado-Pinar[1,2], Antonio Díez[1,2], and Miguel V. Andrés[1,2] — [1]Institut de ciència dels materials Universitat de València, Paterna, Spain — [2]Departament de Física Aplicada i Electromagnetisme, Universitat de València, Burjassot, Spain

We present a novel technique for the optical detection of FSBS mechanical vibrations in short sections of optical fibers using an all-fiber ring resonator.

**Oral** CD-11.5 9:30 ICM - Room 13a

**Experimental Observation of of Complex Dark-Bright Soliton Coexisting regimes in Mode-Locked Fiber Lasers** — •Subrata Manna and Nithyanandan Kanagaraj — Ultrafast Fiber Optics and Smart Photonic Technologies, Dept. of Physics, IIT Hyderabad, sangareddy,Telangana, India

We demonstrate an experimental observation of multiple coexisting families of dark and bright soliton pairs in an erbium-doped fiber laser mode-locked by NPR, holding fundamental and applied interest in high-bit-rate data communications.

**Oral** CD-11.6 9:45 ICM - Room 13a

**Harnessing Optical Noise for Variational Reconstruction** — •Mehmet Müftüoğlu[2] and Mario Chemnitz[1,2] — [1]Institute of Applied Optics and Biophysics, Friedrich-Schiller-Universität Jena, Jena, Germany — [2]Leibniz-Institute of Photonic-Technologies, Jena, Germany

We investigate noise from fiber-optical reservoirs for reconstructing information. Our results indicate that a direct mapping, trained with linear regression, between the spectra to training data is sufficient to create new images.

## CJ-11: Frequency Combs and Supercontinuum Sources

Chair: Grzegorz Soboń, Wrocław University of Science and Technology, Wrocław, Poland

Time: Friday, 8:30–10:00 Location: ICM - Room 13b

**Oral** CJ-11.1 8:30 ICM - Room 13b

**All-PM fiber frequency combs delivering 70 fs pulse at 10 GHz repetition rate** — •Simon Boivinet, Debanuj Chatterjee, Alice Houard, Alexandre Kudlinski , Siddharth Sivankutty, Matteo Conforti, Francesco Tani, and Arnaud Mussot — Univ. Lille, CNRS, UMR 8523-PhLAM Physique des Lasers Atomes et Molécules, Lille, France

We report all-PM fiber 10 GHz frequency combs, delivering 70 fs pulses with 5.2 kW peak power. The temporal contrast is improved by 43% by exploiting time-space analogies.

**Oral** CJ-11.2 8:45 ICM - Room 13b

**Fully Programmable Kerr Comb Mode-Locked Fiber Laser** — •Alexis Bougaud[1], Manal Arbati[1], Bruno P.Chaves[1], Antonio Cutrona[2], Arnaud Mussot[3], Thomas Bunel[3], Alessia Pasquazi[2], and Benjamin Wetzel[1] — [1]XLIM, Limoges, France — [2]Emergent Photonics Research Centre, Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [3]Physique des Lasers Atomes et Molécules, Lille, France

This work proposes a numerical study of a fully programmable Kerr frequency comb mode-locked laser based on a photonic integrated programmable delay line, able to dynamically upgrade it pulse repetition rate.

**Oral** CJ-11.3 9:00 ICM - Room 13b

**Relative intensity noise characterization of supercontinuum generation in multimode fibers** — •Francesca Gallazzi[1], Inés Cáceres Pablo[2], Arun Surendran[1,3], Zahra Eslami[1], and Goëry Genty[1] — [1]Photonics Laboratory, Tampere University, Tampere, Finland — [2]Instituto de Óptica Daza de Valdés, IO-CSIC, Madrid, Spain — [3]Department of Electrical Engineering, Indian Institute of Technology, Bombay, India

We characterize the noise of supercontinuum generated in multimode step-index and graded-index fibers. Our results show that supercontinuum generated in graded-index fibers has noise levels close to that of supercontinuum generated in a single-mode fiber.

**Oral** CJ-11.4 9:15 ICM - Room 13b

**Compact, long-term stable 3-10 $\mu$m mid-IR supercontinuum generation from 150-ps thulium ultrafast laser source** — •Dmitry Gaponov[1], Vincent Tombelaine[1], Sébastien Venck[2], Franck Joulain[2], Jean Letourneur[2], Samuel Poulain[2], and Guillaume Huss[1] — [1]Leukos, 2 Rue Edouard Michaud Beaublanc, 87000 Limoges, France — [2]Le Verre Fluoré, Campus Kerlann, 35170 Bruz, France

We report on a compact and long-term stable mid-IR supercontinuum generated by a 150-ps thulium-based ultrafast laser source, capable of covering a spectral range extending up to nearly 10 $\mu$m.

**Oral** CJ-11.5 9:30 ICM - Room 13b

**Low-noise supercontinuum using a 1.85 $\mu$m fs pump and a normal dispersion ZBLAN fibre** — •Shreesha Rao D. S.[1,2], Anupamaa Rampur[2], Ole Bang[1,3,4], and Alexander M. Heidt[2] — [1]DTU Electro, Department of Electrical and Photonics Engineering, Technical University of Denmark, Ørsteds Plads, 2800 Kongens Lyngby, Denmark — [2]Institute of Applied Physics, University of Bern, Sidlerstrasse 5, 3012 Bern, Switzerland — [3]NKT Photonics A/S, Blokken 84, 3460 Birkerød, Denmark — [4]NORBLIS ApS, Virumgade 35D, 2830 Virum, Denmark

We have developed a low-noise supercontinuum source using a normal-dispersion PM-ZBLAN fibre and a 58-fs, 1.85 $\mu$m pump. We achieve a bandwidth of 900 nm (at -60 dB) and a minimum RIN of 0.22%.

**Oral** CJ-11.6 9:45 ICM - Room 13b

**Supercontinuum Generation with Ultralong Ring Fibre Lasers in Highly Nonlinear Fibres** — •Inés Cáceres-Pablo[1], Laura Hernández-Martín[1], Francesca Gallazzi[2], Pedro Corredera[1], Goery Genty[2], and Juan-Diego Ania-Castañón[2] — [1]Instituto de Óptica "Daza de Valdés", IO-CSIC, Madrid, Spain — [2]Photonics Laboratory, Physics Unit, Tampere University, Tampere, Finland

Ultralong ultrafast fibre lasers are shown to generate flexible pulsed supercontinuum spanning up to 800 nm with 20 fs pulse durations and tunable repetition rates in the range of 100 kHz using highly nonlinear fibres.

## CH-14: Photoacoustic & Photothermal Sensing

Chair: Adrian Podoleanu, University of Kent, Canterbury, United Kingdom

Time: Friday, 8:30–10:00 Location: ICM - Room 14a

**Oral** CH-14.1 8:30 ICM - Room 14a

**Cantilever-enhanced photoacoustic instrument for field measurements of black carbon** — •Tommi Mikkonen[1], Juho Karhu[1,2], Joel Kuula[1,3], Aki Virkkula[3], Erkki Ikonen[2,4], Hilkka Timonen[3], Markku Vainio[1,5], and Tuomas Hieta[1,6] — [1]University of Helsinki, Helsinki, Finland — [2]Aalto University, Helsinki, Finland — [3]Finnish Meteorological Institute, Helsinki, Finland — [4]VTT Technical Research Centre Finland, Espoo, Finland — [5]Tampere University, Tampere, Finland — [6]Gasera Ltd., Turku, Finland

We present a new photoacoustic instrument for in-situ measurement of black carbon (soot). Recent field campaign demonstrates the instrument's excellent sensitivity, high correlation with a reference instrument, and simultaneous detection of nitrogen dioxide.

**Oral** CH-14.2 8:45 ICM - Room 14a

**Resolving hidden nano-structures with ultrafast photoacoustics** — •Komal Chaudhary[1], Maksym Illienko[1], Matthijs Velsink[1], and Stefan Witte[1,2] — [1]Advanced research center for nanolithography (ARCNL), Amsterdam, Netherlands — [2]Imaging Physics, Faculty of Applied Sciences, TU Delft, Delft, Netherlands

Ultrafast photoacoustic enables nondestructive characterization of nanoscale periodic structures beneath opaque layers. Optically-generated high-frequency-sound waves diffract from 10-100 nm structures providing quantitative insights into grating linewidths and shapes with nanometer precision, overcoming optical metrology limits.

**Oral** CH-14.3 9:00 ICM - Room 14a

**Self-Correction for Sensitive Resonant Photoacoustic Gas Analyzer** — •Xuan Wang[1], Linbo Tian[1], Yufu Xu[2], Ke Chen[2], and Liqun Sun[1] — [1]Department of Precision Instruments, Tsinghua University, Beijing, China — [2]School of Optoelectronic Engineering and Instrumentation Science, Dalian University of Technology, Dalian, Liaoning, China

The self-correction solution suited for resonant photoacoustic spectroscopy is presented, including T-type resonant cell with solid absorber and corresponding self-corrected algorithms. Interference factors including laser power fluctuation and microphone sensitivity change are eliminated.

**Oral** CH-14.4 9:15 ICM - Room 14a

**Detection of impurities in hydrogen using quartz-enhanced photoacoustic spectroscopy** — •Andrea Zifarelli[1], Chaofan Feng[2], Giansergio Menduni[1], Lei Dong[2], Hongpeng Wu[2], Vincenzo Spagnolo[1], and Pietro Patimisco[1] — [1]PolySense Lab - Dipartimento Interateneo di Fisica, University and Polytechnic of Bari, Bari, Italy — [2]State Key Laboratory of Quantum Optics and Quantum Optics Devices, Institute of Laser Spectroscopy, Shanxi University, Taiyuan, China

Hydrogen technologies face challenges from impurities affecting fuel cell performance. A quartz-enhanced photoacoustic spectroscopy sensor was developed to detect ammonia in hydrogen, achieving ~100 ppb limits, demonstrating sensitive, real-time, in situ monitoring of hydrogen impurities

**Oral** CH-14.5 9:30 ICM - Room 14a

**Photothermal Lens-based Trace Water Detection in Organic Solvents using Quantum Cascade Laser as Pump Source** — •Gustavo V. B. Lukasievicz[1,2], Elizandra Sehn[1,2], Alicja Dabrowska[1], Hongtu Cheng[1], Leopold Lindenbauer[1], and Bernhard Lendl[1] — [1]Institute of Chemical Technologies and Analytics, TU Wien, Vienna, Austria — [2]Departamento de Física, Universidade Tecnológica Federal do Paraná, Medianeira, Brazil

The mid-infrared photothermal lens technique was applied to determine water content in chloroform. The results show the great potential of the method to be used to analyze different liquids and mixtures.

**Oral** CH-14.6 9:45 ICM - Room 14a

**Photothermal Multi-Gas Detection Using a Fiber Fabry-Perot Interferometer** — •Grzegorz Machura[1], Lukas Tenbrake[2], Florian Giefer[2], Dieter Meschede[2], Sebastian Hofferberth[2], Hannes Pfeifer[2], and Karol Krzempek[1] — [1]Laser Spectroscopy Group, Wroclaw University of Science and Technology, Wrocław, Poland — [2]Institute of Applied Physics, University of Bonn, Bonn, Germany

The work focuses on developing a fiber optic Fabry-Perot Interferometer (FFPI) based Photothermal Spectroscopy (PTS) sensor capable of simultaneous detection of multiple gases, utilizing affordable, commercially available hardware, while maintaining a compact size.

# CK-12: Light Generation and Active Devices 2

Chair: Ryszard Piramidowicz, Warsaw University of Technology, Warsaw, Poland

Time: Friday, 8:30–10:00 Location: ICM - Room 14b

**Oral** CK-12.1 8:30 ICM - Room 14b

**An Ultra-broadband Gallium Phosphide Optical Parametric Amplifier** — •Nikolai Kuznetsov[1], Alberto Nardi[1,2], Johann Riemensberger[1,3], Alisa Davydova[1], Mikhail Churaev[1], Paul Seidler[2], and Tobias J. Kippenberg[1,4] — [1]Institute of Physics, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [2]IBM Research Europe, Zurich, Säumerstrasse 4, Rüschlikon, Switzerland — [3]Department of Electronic Systems, Norwegian University of Science and Technology, Trondheim, Norway — [4]Institute of Electrical and Micro Engineering (IEM) Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland

We demonstrate continuous-wave optical parametric amplification with 10 dB gain across 140 nm, covering the optical S, C, and L-bands, and a maximum off-chip net gain of 25 dB in a dispersion-engineered gallium phosphide waveguide.

**Oral** CK-12.2 8:45 ICM - Room 14b

**Planar high-Q evanescent whispering gallery mode perovskite lasers** — •Racha Akrour[1,2], Hong Hai Nguyen[1,2], Karim Elkhouly[1], Iakov Goldberg[1], Paul Heremans[1,2], Robert Gehlhaar[1], and Jan Genoe[1,2] — [1]IMEC, Leuven, Belgium — [2]KU Leuven, Leuven, Belgium

We demonstrate high-Q thin film perovskite lasers (Q ≈ 8000) by combining planar SiN-based whispering-gallery-mode resonators with planar active layers. This new integration route paves the way towards thin film injection lasers with outstanding performance.

**Oral** CK-12.3 9:00 ICM - Room 14b

**Single and multi-mode lasing emission by quasi-BIC TiO2 metasurfaces** — •Ayesheh Bashiri[1,2], Aleksandr Vaskin[2], Katsuya Tanaka[1,2,4], Marijn Rikers[1,2,5], Daniel Repp[2], Thomas Pertsch[2,3,4], and Isabelle Staude[1,2,4] — [1]Friedrich Schiller University Jena, Institute of Solid-State Physics, Jena, Germany — [2]Friedrich Schiller University Jena, Institute of Applied Physics, Abbe Center of Photonics, Jena, Germany — [3]Fraunhofer-Institute of Applied Optics and Precision Engineering IOF, Jena, Germany — [4]Max Planck School of Photonics, Jena, Germany — [5]Research School of Physics, Australia National University, Canberra, Australia

In this work, we demonstrate single and multi-mode lasing from broken-symmetry TiO2 metasurfaces integrated with Rh6G laser dyes, achieving true zeroth-order and oblique-angle lasing emission and the ability to passive tunability of the lasing wavelength.

**Oral** CK-12.4 9:15 ICM - Room 14b

**Whispering Gallery Mode Yellow Lasing From Dy3+-doped Silica Glass Microspheres** — •Abhishek Sureshkumar[1], Jonathan Demaimay[2], Georges Perin[1], Shahaz Hameed[1], Mohammed Guendouz[1], Helene Ollivier[1], Yannick Dumeige[1], Pavel Loiko[2], Gurvan Brasse[2], Alain Braud[2], Patrice Camy[2], and Stéphane Trebaol[1] — [1]Université de Rennes, CNRS, Institut FOTON—UMR 6082, Lannion, France — [2]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen, Normandie, France

Silica microspheres doped with Dy3+ ions are fabricated using a fusion splicer. Cavity-filtered yellow fluorescence and stimulated emissions are observed inside the doped microsphere, demonstrating the potential for narrow-linewidth visible light sources by direct emission.

**Oral** CK-12.5 9:30 ICM - Room 14b

**CMOS-compatible Er:Ta2O5 chip for ultrashort pulse amplification** — •Harsh Vaid[1], Sharashti Saxena[1], Rajveer Dhawan[1], Ganapathy Senthil Murugan[2], James S Wilkinson[2], and Amol Choudhary[1] — [1]Indian Institute of Technology, Delhi, New Delhi, India — [2]University of Southampton, Southampton, United Kingdom

An on-chip CMOS-compatible Er:Ta2O5 waveguide optical pulse amplifier is presented. Amplification of picosecond and femtosecond pulse signals in the C-band is achieved. Also, device was used for amplifying QPSK channels for radio over fiber applications.

**Oral** CK-12.6 9:45 ICM - Room 14b

**CW Amplified Upconverted Emission in Blended NaYF4:Yb3+, Tm3+ and NaYF4:Yb3+, Er3+ Supraparticles** — •Emma McCormick, Charlotte Eling , Pedro Alves, and Nicolas Laurand — Institute of Photonics, Department of Physics, SUPA University of Strathclyde, Glasgow, United Kingdom

Here we present amplified stimulated emission under continuous wave NIR-excitation for a novel, blended NaYF4:Yb3+, Tm3+ and NaYF4: Yb3+, Er3+ supraparticle (7.0 ± 0.5) $\mu$m in diameter, synthesized using a temperature-controlled oil-in-water emulsion technique.

# CF-10: Parametric Ultrafast Sources

Chair: Jean-Christophe Delagnes, CELIA - Université de Bordeaux, Bordeaux, France

Time: Friday, 8:30–10:00 Location: ICM - Room 14c

**Oral** CF-10.1 8:30 ICM - Room 14c

**Efficient few-cycle pulse amplification using an optical parametric multi-pass cell amplifier** — •Supriya Rajhans[1], Esmerando Escoto[1], Arthur Schoenberg[1], Nikolas Rupp[1], Ingmar Hartl[1], Christoph M. Heyl[1,2,3], and Tino Lang[1] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Helmholtz Institute Jena, Jena, Germany — [3]GSI Helmholtzzentrum fuer Schwerionenforschung GmbH, Darmstadt, Germany

We numerically demonstrate the symbiosis of multi-pass cell (MPC) technology with optical parametric amplification to efficiently generate high-power ultrashort laser pulses. The optical parametric MPC (OPMPC) amplifier yields excellent pulse parameters approaching the Manley-Rowe limit.

**Oral** CF-10.2 8:45 ICM - Room 14c

**A universal CEP-stable OPCPA seeder for high-power amplifiers** — Raman Maksimenka[1], Simone Bux[1], Christina Alexandridi[2], Benoit Bussière[2], Nicolas Thiré[1], Thomas Pinoteau[1], Franck Falcoz[2], and •Yoann Pertot[1] — [1]Fastlite by Amplitude, Antibes, France — [2]Amplitude, Evry, France

Passive CEP stability of 200 mrad (single-shot, 1000 pulses) and pulse contrast >10^12 are demonstrated for an OPCPA seeder.

**Oral** CF-10.3 9:00 ICM - Room 14c

**High-Repetition Rate 2.3-Cycle Shortwave-Infrared Source for Next-Generation Field-Resolved Spectroscopy** — •Felix Ritzkowsky[1], Matthew Yeung[1], Lu-Ting Chuo[2], Gian Luca Dolso[1], and Phillip Keathley[1] — [1]Massachusetts Institute of Technology, Cambridge, USA — [2]Institute of Biophotonics, Taipei, Taiwan

We present a passively CEP-stable, 2.3-cycle source for next-generation field-resolved spectroscopy, operating at a 400 kHz repetition rate and delivering 16.1 fs duration pulses at a 2.1 $\mu$m wavelength with pulse energies of 2.25 $\mu$J.

**Oral** CF-10.4 9:15 ICM - Room 14c

**Yb-Pumped Chirped-Pulse Optical Parametric Oscillator based on Pellin-Broca Prisms** — •Miguel Moran Coto and Richard Alexander McCracken — Institute of Photonics and Quantum Sciences, Heriot-Watt University, Edinburgh, United Kingdom

We present a tunable ring-cavity MgO:PPLN-based OPO incorporating Pellin-Broca prisms. Pumped by chirped pulses from a Yb:fiber laser, it achieves a 33.3% pump–signal efficiency, yielding 647 mW of output power at 50°C.

**Oral** CF-10.5 9:30 ICM - Room 14c

**Widely-tunable, Narrow-linewidth Picosecond Optical Parameter Oscillators Based On Intracavity Dispersion Management** — •Zhenyu Yang[1], Songyin Yu[1], Mengke Qin[1], and Zhaowei Zhang[1,2] — [1]Huazhong University of Science and Technology, Wuhan, China — [2]Wuhan National Laboratory for Optoelectronics, Wuhan, China

We report a novel scheme based on intracavity dispersion management for controlling the linewidth of picosecond OPOs. Experimentally, we obtain picosecond pulses tunable over 1404-2048 nm and 2094-3953 nm, with a bandwidth of <5cm-1.

**Oral** CF-10.6 9:45 ICM - Room 14c

**Single-Shot Pulse Retrieval of Femtosecond Bright Squeezed Vacuum** — •Yuval Kern[1,2], Ido Nisim[1,2], Michael Birk[1,2], Andrei Rasputnyi[3,4], Zhaopin Chen[1,2], Pavel Sidorenko[2,5], Ido Kaminer[2,5], Oren Cohen[1,2], and Michael Krüger[1,2] — [1]Department of Physics, Technion – Israel Institute of Technology, Haifa, Israel — [2]Solid State Institute and Helen Diller Quantum Center, Technion – Israel Institute of Technology, Haifa, Israel — [3]Max Planck Institute for the Science of Light, Erlangen, Germany — [4]Friedrich–Alexander Universität Erlangen–Nürnberg, Erlangen, Germany — [5]Electrical and Computer Engineering, Technion – Israel Institute of Technology, Haifa, Israel

We report the first full single-shot characterization of femtosecond single-mode bright squeezed vacuum (BSV). Applying spectral interferometry to 1030-nm BSV, we find an average duration of 44fs and consistent shot-to-shot behavior of the group delay.

## JSI-3: Neuromorphic Photonics 2

Chair: Bruno Romeira, International Iberian Nanotechnology Laboratory, Braga, Portugal

Time: Friday, 8:30–10:00 Location: ICM - Room Osterseen

**Oral** JSI-3.1 8:30 ICM - Room Osterseen

**Achieving more with less: Training a spiking neural network of 40.000 neurons with rank order coding, leveraging sparsity** — •RIA TALUKDER, Anas Skalli, and Daniel Brunner — Université Marie et Louis Pasteur, CNRS, institut FEMTO-ST, Besançon, France

A scalable photonic spiking neural network with 40,000 neurons is presented, emulating biological neuron behavior. Leveraging sparsity with rank order coding, it achieves high energy efficiency, rapid processing, and learning for advanced photonic neuromorphic computing.

**Oral** JSI-3.2 8:45 ICM - Room Osterseen

**Retinomorphic Machine Vision in a Nonlinear Photonic Lasing Network** — •Jack Gartside — Imperial College London, London, United Kingdom

Photonics is attractive for neuromorphic AI, but suffers from a lack of nonlinearity and large physical footprints. Here we demonstrate that on-chip InP network lasers can deliver strong nonlinearity and neuromorphic performance in micron-scale footprints.

**Oral** JSI-3.3 9:00 ICM - Room Osterseen

**Non-fading all-optical memory in a silcon microresonator network for machine learning** — •Alessio Lugnan[1], Stefano Biasi[1], Alessandro Foradori[2,1], Peter Bienstman[2], and Lorenzo Pavesi[1] — [1]Nanoscience Laboratory, Department of Physics, University of Trento, Trento, Italy — [2]Photonics Research Group, Department of Information Technology, Ghent University-imec, Ghent, Belgium

We experimentally demonstrate machine learning exploiting all-optical long-term memory (lasting at least 10 microseconds) within a simple and compact network of silicon microring resonators. This enables application to optical sensing tasks with slow timescales.

**Oral** JSI-3.4 9:15 ICM - Room Osterseen

**Image Classification Based on Exceptional Point Bifurcations in Nanolaser Arrays** — •Kaiwen Ji[1], Giulio Tirabassi[2,3], Cristina Masoller[2], and Alejandro Yacomotti[1] — [1]Laboratoire Photonique Numérique et Nanosciences, Institut d'Optique d'Aquitaine, Université Bordeaux, CNRS, Talence, France — [2]Departament de Física Universitat Politècnica de Catalunya, Barcelona, Spain — [3]Departament de Informàtica, Matemàtica Aplicada i Estadística, Universitat de Girona, Carrer de la Universitat de Girona 6, Girona, Spain

We experimentally show that coupled nanolasers are able to process compressed data as a complex layer in optical computing architectures. We obtain an accuracy exceeding 95% in binary image classification of handwritten digits.

**Oral** JSI-3.5 9:30 ICM - Room Osterseen

**On-chip optical communication to small footprint nanowire neurons** — •Joachim E. Sestoft[1], Thomas K. Jensen[2], Vidar Flodgren[2], Rasmus D. Schlosser[1], David Alcer[3], Thomas Kanne[1], Magnus Borgström[3], Anders Mikkelsen[2], and Jesper Nygård[1] — [1]Center for Quantum Devices & Nanoscience Center, Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark — [2]Division of Synchrotron Radiation Research, Department of Physics and NanoLund, Lund University, Lund, Sweden — [3]Division of Solid State Physics, Department of Physics and NanoLund, Lund University, Lund, Sweden

We apply on-chip generated light to address an optoelectronic neuron built using three semiconductor nanowires. Its small circuit footprint and low operating powers show a promising path forward for using nanowires in photonic neural networks.

**Oral** JSI-3.6 9:45 ICM - Room Osterseen

**Enhancing Cell Sorting Accuracy in Flow Cytometry Using High-Dimensional Computing** — •Yuanli Yue[1], Muhammed Gouda[1], Satoshi Sunada[2], and Peter Bienstman[1] — [1]Ghent University, Ghent, Belgium — [2]Kanazawa University, Kanazawa, Japan

An enhanced cell sorting system leveraging High-Dimensional Computing (HDC) and an event-based camera is demonstrated, achieving a classification accuracy of 93.06%. This approach shows great potential for improving flow cytometry applications in medical diagnostics.

## EG-3: Plasmonics and Metasurfaces for Optical Control

Chair: Thorsten Feichtner, University of Würzburg, Würzburg, Germany

Time: Friday, 8:30–10:00 Location: ICM - Room 21

**Oral** EG-3.1 8:30 ICM - Room 21

**Full control of the electric and magnetic light-matter interactions through a nanomirror on a near-field tip** — Benoît Reynier[1], •Eric Charron[1], Obren Markovic[1], Bruno Gallas[1], Alban Ferrier[2], Sébastien Bidault[3], and Mathieu Mivelle[1] — [1]Institut des NanoSciences de Paris, Sorbonne Université, CNRS, Paris, France — [2]Institut de Recherche de Chimie Paris, PSL University, CNRS, PARIS, France — [3]Institut Langevin, ESPCI Paris, PSL University, Paris, France

Here, by generating a standing wave with a nanomirror at the end of a near-field optical tip, we report the selective excitation and emission control of electric and magnetic dipolar transitions in Y2O3:Eu3+ doped nanoparticle.

**Oral** EG-3.2 8:45 ICM - Room 21

**Enhancing the luminescence of MoS2 using an epsilon-near-zero underlayer** — •Sraboni Dey, Renjith Nadarajan, and Joy Mitra — Indian Institute of Science Education and Research Thiruvananthapuram, Thiruvananthapuram, India

Transition metal di-chalcogenides have gained strong interest for their optical properties which are important for advanced device engineering. This work proposes a new strategy to leverage emission from monolayer molybdenum disulphide using an epsilon-near-zero underlayer.

**Oral** EG-3.3 9:00 ICM - Room 21

**Lithium niobate metasurface for GHz and efficient electro-optical modulation in the linear and nonlinear regime** — •Agostino Di Francescantonio[1], Alessandra Sabatti[2], Helena Weigand[2], Elise Bailly[2], Maria Antonietta Vincenti[3], Luca Carletti[3], Jost Kellner[2], Attilio Zilli[1], Marco Finazzi[1], Michele Celebrano[1], and Rachel Grange[2] — [1]Politecnico di Milano, Milano, Italy — [2]ETH Zurich, Zurich, Switzerland — [3]Università di Brescia , Brescia, Italy

We present a lithium niobate nonlocal metasurface for efficient GHz electro-optical modulation of reflectivity with CMOS-compatible voltages. We also demonstrate CW-pumped second harmonic modulation exceeding by one order of magnitude the linear one.

**Oral** EG-3.4 9:15 ICM - Room 21

**Accessing Optical Magnetic Dipole Transitions in Eu3+ ions by Manipulating Light Properties and Sample Morphology** — •Elizaveta Gangrskaia[1], Alessandra Bellissimo[1], Christoph Eisenmenger-Sittner[2], Thomas Schachinger[3], Hongtao Hu[1], Andrius Baltuška[1,4], and Audrius Pugžlys[1,4] — [1]Photonics Institute, TU Wien, Vienna, Austria — [2]Institute of Solid State Physics, TU Wien, Vienna, Austria — [3]University Service Centre for Transmission Electron Microscopy (USTEM), TU Wien, Vienna, Austria — [4]Center for Physical Sciences & Technology, Vilnius, Lithuania

We report on the fabrication and experimental verification of a luminescent Eu3+:Y2O3 nanopillar probe integrated into a microstructured metallic antenna for spatially and spectrally selective optical magnetic dipole excitation with azimuthally polarized ultrashort laser pulses.

**Oral** EG-3.5 9:30 ICM - Room 21

**Plasmonic effects on information flow in optical localization metrology** — •Huanli Zhou[1], Thomas A. Grant[1], S. Rotter[2], Kevin F. MacDonald[1], and Nikolay I. Zheludev[1,3] — [1]Optoelectronics Research Centre, University of Southampton, Highfield, Southampton, SO17 1BJ, UK, United Kingdom — [2]Institute for Theoretical Physics, Vienna University of Technology (TU Wien), A-1040 Vienna, Austria — [3]Hagler Institute for Advanced Study, Texas A&M University, College Station, Texas, 77843, USA

Fisher information analysis reveals that in optical localization metrology, plasmonic resonances increase the information content of light diffracted on nanoparticles but have the opposite effect for light scattered from apertures in plasmonic films.

**Oral** EG-3.6 9:45 ICM - Room 21

**Detector of Topologically Structured Light** — •Luka Vignjevic[1], Eric Plum[1], Nikitas Papasimakis[1], and Nikolay Zheludev[1,2] — [1]Optoelectronics Research Centre & Centre for Photonic Metamaterials, Southampton, United Kingdom — [2]Texas A&M University, Institute for Advanced Study, USA, College Station, USA

We report an absorption-based detector selective to the topological spatial structure of light, where a radially polarized beam or toroidal electromagnetic pulse is fully absorbed, while plane waves of any polarization are rejected.

## EJ-1: Computational Nanophotonics

Chair: Fabian Maucher, Delft University of Technology, Delft, The Netherlands

Time: Friday, 8:30–10:00 Location: ICM - Room 22a

**Invited** EJ-1.1 8:30 ICM - Room 22a

**Theoretical and Computational Advances in Nanophotonic Scattering** — •Carsten Rockstuhl, Ivan Fernandez-Corbaton, Christof Holzer, Marjan Krstic, Markus Nyman, Thomas Sturges, Nigar Asadova, Jan David Fischbach, Puneet Garg, Mariia Poleva, Lukas Rebholz, Marie Louise Schubert, and Nikita Ustimenko — Karlsruhe Institute of Technology, Karlsruhe, Germany

We provide an overview of recent advancements in the theory and numerics to describe nanophotonic scattering. We focus on spatiotemporal photonic crystals, multi-scale modeling of molecular photonic devices, and the inverse design of such devices.

**Oral** EJ-1.2 9:00 ICM - Room 22a

**Polarization mixing, bound states in a continuum, and exciton-polaritons in photonic crystal slabs by a guided-mode expansion approach** — Simone Zanotti[1], Momchil Minkov[2], Davide Nigro[1], Dario Gerace[1], Shanhui Fan[3], and •Lucio C. Andreani[1] — [1]Department of Physics, University of Pavia, Pavia, Italy — [2]Flexcompute Inc., Watertown, MA, USA — [3]Ginzton Laboratory and Department of Electrical Engineering, Stanford University, Stanford, CA, USA

We present a theoretical approach, with a free software named "legume", that allows calculating photonic modes of photonic crystal slabs. We focus on symmetry properties and polarization mixing, bound states in a continuum, and exciton-polaritons.

**Oral** EJ-1.3 9:15 ICM - Room 22a

**Retrieving intrinsic resonances of optical materials and metasurfaces from their spectral response in the far field** — Isam Ben Soltane and •Nicolas Bonod — Aix Marseille Univ, CNRS, Centrale Marseille, Marseille, France

In this work, we show how to extract resonances without a priori knowledge on the associated physical system. The method relies on the spectral analysis of the optical response of the system in the framework of the scattering matrix formalism.

**Oral** EJ-1.4 9:30 ICM - Room 22a

**Neural network inverse design of nanophotonic scintillators** — •Nathan Regev[1], Avner Shultzman[1], Francis Loignon-Houle[2], Charles Roques-Carmes[3], and Ido Kaminer[1] — [1]Technion – Israel Institute of Technology, , Haifa, Israel — [2]Universitat Politècnica de València, Valencia, Spain — [3]Stanford University, Stanford, USA

Nanophotonic inverse-design cannot address incoherently-driven processes such as scintillation, which requires non-differentiable Monte-Carlo simulations. We train a physics-informed neural network surrogate model for high-energy particle absorption, demonstrating the first end-to-end optimization of nanophotonic scintillators.

**Oral** EJ-1.5 9:45 ICM - Room 22a

**Exploring Parasitics and Coupling between Optically Driven Nanoantennas and Interconnects in Petahertz Electronic Circuits** — •Adina Bechhofer, John Simonaitis, Felix Ritzkowsky, Luca Daniel, Karl K. Berggren, and Phillip D. Keathley — Massachusetts Institute of Technology, Cambridge, MA, USA

We present a compact circuit model used for fast simulations of complex optically-driven nanoantenna-based circuits. The model predicts parasitic effects which are significant in systems, thus paving the way for designing petahertz frequency electronic systems.

## EB-11: Quantum Light Sources

Chair: Priyanka Giri, The Kastler–Brossel Laboratory, Paris, France

Time: Friday, 10:30–12:00 Location: ICM - Room 1

**Oral** EB-11.1 10:30 ICM - Room 1

**Tunable generation of spatial entanglement in nonlinear waveguide arrays** — Arnault Raymond[1], Alessandro Zecchetto[1], José Palomo[2], Martina Morassi[3], Aristide Lemaître[3], Fabrice Raineri[4], Maria Amanti[1], Sara Ducci[1], and •Florent Baboux[1] — [1]Université Paris Cité, MPQ, Paris, France — [2]Université PSL, LPENS, Paris, France — [3]Université Paris-Saclay, C2N, Palaiseau, France — [4]Université Côte d'Azur, InPhyNi, Nice, France

We demonstrate a nonlinear waveguide array, where photon pairs generated by SPDC are simultaneously spread over the whole array through cascaded quantum walks. This concept implements a compact and versatile source of spatially entangled states.

**Oral** EB-11.2 10:45 ICM - Room 1

*withdrawn*

**Oral** EB-11.3 11:00 ICM - Room 1

**Generation of Hyperentangled Photon Pairs in the Frequency-bin and Time-bin Domains with a Silicon Photonic Chip** — •Sara Congia[1,2], Massimo Borghi[1], Federico A. Sabattoli[1], Houssein El Dirani[2], Laurene Youssef[2], Camille Petit-Etienne[2], Erwine Pargon[2], Corrado Sciancalepore[2], Marco Liscidini[1], Johan Rothman[2], Ségolène Olivier[2], Matteo Galli[1], and Daniele Bajoni[3] — [1]Dipartimento di Fisica, Università di Pavia, Pavia, Italy — [2]Université Grenoble Alpes, CEA-Leti, Grenoble, France — [3]Dipartimento di Ingegneria Industriale e dell'Informazione, Università di Pavia, Pavia, Italy

Generation of hyperentangled photon pairs in time and frequency domain, showing measured CHSH parameter of 2.4(1) for the former and visibility of 0.9(4) for the latter, using spontaneous four-wave mixing in silicon integrated high-finesse microrings.

**Oral** EB-11.4 11:15 ICM - Room 1

**Active frequency shifting of single photons from a quantum dot** — Sanjay Kapoor, Aleksander Rodek, Michał Mikołajczyk, Jerzy Szuniewicz, Filip Sośnicki, Tomasz Kazimierczuk, Piotr Kossacki, and •Michał Karpiński — Faculty of Physics, University of Warsaw, Warszawa, Poland

Central frequency of single-photon pulses emitted from a quantum dot source is modified on demand using serrodyne electro-optic phase modulation. We experimentally verify tunability of the spectral shift and preservation of purity and indistinguishability.

**Oral** EB-11.5 11:30 ICM - Room 1

**Edge-coupling arrays of site-controlled quantum dots to arrays of integrated silicon nitride waveguides and devices at cryogenic temperatures** — •John O'Hara, Nicola Maraviglia, Mack Johnson, Jesper Håkansson, Salvador Medina, Gediminas Juska, Luca Colavecchi, Frank H. Peters, Brian Corbett, and Emanuele Pelucchi — Tyndall National Institute, Cork, Ireland

As a significant step towards the scalability of quantum photonics, we demonstrate consistent edge-coupling of arrays of site-controlled and high-uniformity quantum dots to arrays of silicon nitride waveguides and devices at cryogenic temperatures.

**Oral** EB-11.6 11:45 ICM - Room 1

**Compact chirped fiber Bragg gratings for single-photon generation from quantum dots** — •Vikas Remesh[1], Ria Krämer[2], René Schwarz[1], Florian Kappe[1], Yusuf Karli[1], Malte Per Siems[2], Thomas Bracht[3], Saimon Covre da Silva[4], Armando Rastelli[4], Doris Reiter[3], Daniel Richter[2], Stefan Nolte[2], and Gregor Weihs[1] — [1]University of Innsbruck, Innsbruck, Austria — [2]Friedrich Schiller University Jena, Jena, Germany — [3]TU Dortmund, Dortmund, Germany — [4]Johannes Kepler University Linz, Linz, Austria

We report a compact, plug-and-play and high-efficiency method for robust generation of high-purity single-photon generation from quantum dots, relying on chirped fiber Bragg gratings. This enables a direct fiber-coupled photon source for practical quantum communication.

## CM-6: Ultrafast In-Volume Processing

Chair: Johannes Heitz, Linz University, Linz, Austria

Time: Friday, 10:30–12:00 Location: ICM - Room 2

**Oral** CM-6.1 10:30 ICM - Room 2

**Ultrafast ablation of transparent materials by heating excited electrons** — •Yusuke Ito, Guoqi Ren, and Naohiko Sugita — The University of Tokyo, Tokyo, Japan

We elucidated the ultrafast dynamics of selective heating of excited electrons in transparent materials, and achieved the ultrafast processing of sapphire with a speed 25,000 times faster than conventional femtosecond laser processing.

**Oral** CM-6.2 10:45 ICM - Room 2

**Ultrashort Pulse Laser Welding of Fused Silica and Polymethyl Methacrylate: Experimental and Theoretical Insights** — •Felice Alberto Sfregola[1], Raffaele De Palo[1], Caterina Gaudiuso[2], Stefania Caragnano[1], Francesco Paolo Mezzapesa[2], Pietro Patimisco[1], Antonio Ancona[1], and Annalisa Volpe[1] — [1]Intercollegiate Department of Physics "M. Merlin," University of Bari and Polytechnic University of Bari, Bari, Italy — [2]Institute for Photonics and Nanotechnologies (IFN), National Research Council (CNR), Bari, Italy

This study explores femtosecond laser transmission welding of fused silica and polymethyl methacrylate, developing a heat accumulation model to optimize parameters. The approach achieves robust bonds, enabling hybrid microfluidic devices suitable for high-pressure applications.

**Oral** CM-6.3 11:00 ICM - Room 2

**Efficient nanostructuring in silica glass with ultrashort laser pulses down to 10 fs** — •Sergei Shevtsov[1], Huijun Wang[1], Oleg Pronin[2], Yuri Svirko[3], and Peter Kazansky[1] — [1]University of Southampton, Southampton, United Kingdom — [2]n2-Photonics GmbH, Hamburg, Germany — [3]University of Eastern Finland, Joensuu, Finland

The effect of pulse duration on the formation of birefringent voxels in fused silica has been demonstrated. Shortening the pulse duration to 10 fs enhances imprinting efficiency and reduces slow-axis azimuth error.

**Oral** CM-6.4 11:15 ICM - Room 2

**Towards ultra-fast femtosecond-laser-assisted chemical etching of mid-IR transmitting Barium Germano-Gallate (BGG) glass** — •Yann Serre[1,2], Théo Guérineau[2], Fouad Alassani[1], Jérôme Lapointe[2], Réal Vallée[2], and Lionel Canioni[1] — [1]Institute for Condensed Matter Chemistry of Bordeaux (ICMCB – UMR 5026), Bordeaux, France — [2]Center for Optics, Photonics and Lasers (COPL), Université Laval, Quebec, Canada

To our knowledge, we report on the first demonstration of femtosecond-laser-assisted chemical etching in Barium Germano-Gallate (BGG) glass. A maximum etching rate of 2270 $\mu$m/h was obtained after 5 min of immersion in a 1 mol/L HCl bath.

**Oral** CM-6.5 11:30 ICM - Room 2

**All-in-One Femtosecond Laser Fabrication and Welding of Multilayer Glass Microfluidic Devices** — •Gizem Alpakut[1], Mehmet Burcin Unlu[2], Bora Akgun[1], and Seydi Yavas[1,2,3] — [1]Department of Physics, Bogazici University, Istanbul, Turkey — [2]Faculty of Engineering, Ozyegin University, Istanbul, Turkey — [3]Lumos Laser Inc, Istanbul, Turkey

We demonstrate a single femtosecond laser system for micromachining and welding multilayer glass microfluidic devices, using spiral welding for uniform energy deposition, achieving precise channels, hermetic sealing, and simplified production without bonding or cleanroom needs.

**Oral** CM-6.6 11:45 ICM - Room 2

**Self-organised UV femtosecond laser induced modifications in the bulk of fused silica** — •Ernesto Gribaudo and Yves Bellouard — École polytechnique fédérale de Lausanne (EPFL), Neuchâtel, Switzerland

We report the use of a UV femtosecond laser for the generation of highly periodic self-organised micro-structures inside of fused silica. We show how to control their periodicity and investigate their formation mechanism.

## CL-4: Plasmonic Biosensors

Chair: Michele Celebrano, Politecnico di Milano, Milan, Italy

Time: Friday, 10:30–12:00 Location: ICM - Room 3

**Tutorial** CL-4.1 10:30 ICM - Room 3

**Photonic Nanoantennas for Biology** — •Maria Garcia-Parajo — ICFO-Institute of Photonic Sciences, Barcelona, Spain

Plasmonic nanostructures exhibit strong field confinement and enhancement, rendering these devices as potentially outstanding biosensors. I will provide an overview on the working principles and implementation of these nanostructures for in-vitro and in-vivo biosensing applications.

**Oral** CL-4.2 11:30 ICM - Room 3

**Label-Free Plasmonic Biosensor for Cancer Marker Detection Based on Phase Singularity-Induced Lateral Position Shift** — •Fusheng Du[1], Kevin Kim[1,2], Kathrine Nygaard Borg[1,3], Rodolphe Jaffiol[1], Aurélien Bruyant[1], Jeremy Mallet[1,2], and Shuwen Zeng[1] — [1]French National Centre for Scientific Research (CNRS), Laboratory Light, nanomaterials and nanotechnologies – L2n, Troyes, France — [2]Laboratoire de Recherche en Nanosciences (LRN), Université de Reims Champagne-Ardenne, Reims, France — [3]Department of Biomedical Engineering, The Chinese University of Hong Kong, Hong-Kong, China

In this paper, we have demonstrated the use of MXenes for precise plasmonic control in nanoscale. A significantly improved lateral position shift for an ultra-low detection limit for cancer biomarker up to 1fM was achieved.

**Oral** CL-4.3 11:45 ICM - Room 3

**Light-induced Acceleration of $\alpha$-synuclein Aggregation with Nanobowl Substrate** — •Masatoshi Kanoda[1,2,3], Kota Hayashi[1,2], Mamoru Tamura[2,4], Shuichi Toyouchi[1,2], Ikuhiko Nakase[1,2], Shiho Tokonami[2,3], Masafumi Ohtsubo[5], Yu Nagashima[5], and Takuya Iida[1,2] — [1]Graduate School of Science, Osaka Metropolitan University, Osaka, Japan — [2]Research Institute for Light-induced Acceleration System (RILACS), Osaka Metropolitan University, Osaka, Japan — [3]Graduate School of Engineering, Osaka Metropolitan University, Osaka, Japan — [4]Graduate School of Engineering Science, Osaka University, Osaka, Japan — [5]Institute for Photonics Medicine, Hamamatsu University School of Medicine, Shizuoka, Japan

Neurodegenerative diseases are strongly linked to abnormal protein aggregation, including $\alpha$-synuclein. Optical condensation with a nano-bowl substrate achieved $\alpha$-synuclein aggregation within 5 minutes much faster than spontaneous aggregation. Our results enhance medical research performance.

## EI-1: Light-Matter Coupling in Low-Dimensional Materials

Chair: Nicolò Maccaferri, Umeå University, Umeå, Sweden

Time: Friday, 10:30–12:00 Location: ICM - Room 4a

**Invited** EI-1.1 10:30 ICM - Room 4a

**Ultrafast imaging of polariton propagation and nonlinear optics in semiconductor microcavities** — Ding Xu[1], Yongseok Hong[1], Arkajit Mandal[2], Chiara Trovatello[3], Dmitri Basov[1], James Schuck[1], David Reichman[1], and •Milan Delor[1] — [1]Columbia University, New York, USA — [2]Texas A&M, College Station, USA — [3]Politecnico di Milano, Milan, Italy

Polaritons are at the forefront of research in ultrafast light-matter interactions and nonlinear optics. I will describe our efforts on direct imaging of polariton propagation in semiconductor cavities and waveguides in low-dimensional materials.

**Oral** EI-1.2 11:00 ICM - Room 4a

**Ultracompact entangled-photon sources based on periodically poled layered semiconductors** — •C. Trovatello[1,2], C. Ferrante[3], B. Yang[1], J. Bajo[4], B. Braun[4], Z. H. Peng[1], X. Xu[1], P. K. Jenke[4], A. Ye[5], M. Delor[1], D. N. Basov[1], J. Park[5], P. Walther[4], C. R. Dean[1], L. A. Rozema[4], A. Marini[3], G. Cerullo[2], and P. J. Schuck[1] — [1]Columbia University, New York, USA — [2]Politecnico di Milano, Milano, Italy — [3]CNR-SPIN, L'Aquila, Italy — [4]University of Vienna, Vienna, Austria — [5]University of Chicago, Chicago, USA

Here we realize ultracompact entangled photon sources by periodically poling 2D semiconductors (3R-MoS2), demonstrating quasi-phase-matched up- and down-conversion over micron-thick pathlengths.

**Oral** EI-1.3 11:15 ICM - Room 4a

**Coherently stacked boron nitride nanotubes with a strong nonlinear chiroptical response** — •Chenjun Ma[1], Chaojie Ma[1], Chang Liu[2], Quanlin Guo[1], Hao Hong[1], and Kaihui Liu[1,2] — [1]State Key Lab for Mesoscopic Physics, Frontiers Science Centre for Nano-optoelectronics, Peking University, Beijing, China — [2]International Centre for Quantum Materials, Collaborative Innovation Centre of Quantum Matter, Peking University, Beijing, China

The multiwalled boron nitride nanotubes, featuring coherent-stacking structures, exhibit a scalable nonlinear chiroptical response with a SHG conversion efficiency up to 0.01% and a chirality-dependent SHG circular dichroism tunable from –0.7 to 0.7.

**Oral** EI-1.4 11:30 ICM - Room 4a

**Nonlinear thermoplasmonics in photoexcited graphene nanoribbons** — •Line Jelver and Joel D. Cox — POLIMA, Mads Clausen Institute, University of Southern Denmark, Odense, Denmark

We apply ab initio modeling to demonstrate that thermoplasmons in narrow graphene nanoribbons can be activated at mid- and near-IR frequencies with moderate absorbed energy density and drive substantial third-harmonic generation and optical Kerr nonlinearities.

**Oral** EI-1.5 11:45 ICM - Room 4a

**Ultrafast Nonlinear Optical Properties and Carrier Dynamics of Ta4C3Tx and Mo2Ti2C3Tx MXene Nanosheets** — •Michalis Stavrou[1], Benjamin Chacon[2], Maria Farsari[1], Anna Maria Pappa[3], Lucia Gemma Delogu[3], Yury Gogotsi[2], and David Gray[1] — [1]Foundation for Research and Technology-Hellas, Heraklion, Greece — [2]A. J. Drexel Nanomaterials Institute and Department of Materials Science and Engineering, Philadelphia, USA — [3]Department of Biomedical Engineering Khalifa University of Science and Technology, Abu Dhabi, UAE

The present study reports on the exceptional ultrafast nonlinear optical response of two kinds of MXenes, namely Ta4C3Tx and ordered-phase Mo2Ti2C3Tx, surpassing that of all previously studied MXenes and other 2D nanomaterials.

## CB-5: Surface-Emitting Semiconductor Lasers

Chair: Michael Jetter, University of Stuttgart, Stuttgart, Germany

Time: Friday, 10:30–12:00 Location: ICM - Room 4b

**Oral** CB-5.1 10:30 ICM - Room 4b

**Ring shaped lithographic aperture VCSEL** — •Giacomo Graziano[1,2], Marc Ganzhorn[1], Stefano Tirelli[1], Donato Bonfrate[1], Martin Spieser[1], and Evgeny Zibik[1] — [1]. Coherent, II-VI Laser Enterprise GmbH, Zurich, Switzerland — [2]James Watt School of Engineering, University of Glasgow, Glasgow, United Kingdom

We report lithographic aperture VCSELs where the aperture is patterned with a ring geometry. Reduced spectral width and thermal resistance is achieved, enabling higher rollover current compared to circular apertures VCSELs with same aperture area.

**Oral** CB-5.2 10:45 ICM - Room 4b

**Relative Intensity Noise in multi-mode VCSELs with and without polarization control: theory and experiments** — Cristina Rimoldi[1], •Marco Novarese[1], Lorenzo Columbo[1], Sebastian Romero Garcia[2], Christian Raabe[2], and Mariangela Gioannini[1] — [1]Politecnico di Torino, Corso Duca degli Abruzzi 24, Torino, Italy — [2]Cisco Optical, Nordostpark 12, Nuremberg, Germany

We study the RIN spectra of multi-mode VCSELs; our model fits and explains the experimental results of the fine structure of the optical spectrum and the RIN of different VCSELs with and without polarization control.

**Oral** CB-5.3 11:00 ICM - Room 4b

**Estimate of the nonlinear coupling between circular eigenstates in a spin-VCSEL** — •Quentin Le Mignon[1,2], Ghaya Baili[2], Daniel Dolfi[2], Sophie Bouchoule[3], Marco Romanelli[1], and Mehdi Alouini[1] — [1]University of Rennes, CNRS, Institut FOTON, UMR6082, Rennes, France — [2]Thales Research and Technology, Palaiseau, France — [3]Centre de Nanosciences et de Nanotechnologies, C2N UMR9001, CNRS, Palaiseau, France

We present the experimental estimate of the Lamb coupling constant for circular polarizations in a VCSEL device for spin-injection. The coupling constant is found to be very close to 1, which is ideal for spintronics.

**Oral** CB-5.4 11:15 ICM - Room 4b

**A Semiconductor Membrane External-Cavity Surface-Emitting Laser (MECSEL) in a Microchip Configuration** — Jakob Hirlinger-Alexander[1,2], Michael Scharwaechter[2], Franzisca Bader[1], Julius Steck[1], Matthias Seibold[2], Marco Werner[2], Roman Bek[2], and •Hermann Kahle[3] — [1]Institute for Functional Nanosystems, Ulm University, Ulm, Germany — [2]Twenty-One Semiconductors GmbH, Neckartenzlingen, Germany — [3]Department of Physics & Astronomy, The University of New Mexico, Albuquerque, USA

We present the first microchip membrane external-cavity surface-emitting laser achieving >3 W output at 1123 nm with high beam quality ($M^2 < 1.05$) and

51.4 % slope efficiency. The compact, alignment-free, and efficient design enables versatile applications.

**Oral** CB-5.5 11:30 ICM - Room 4b

**In-well pumped membrane external-cavity surface emitting lasers (MECSELs) for laser guide star applications** — Trevor Rubin[1], Mingyang Zhang[1], Catherine L. Nguyen[2], Garrett D. Cole[2], •Hermann Kahle[1], and Alexander R. Albrecht[1] — [1]Department of Physics & Astronomy, The University of New Mexico, 210 Yale Blvd NE, New Mexico, 87106 Albuquerque, USA — [2]Thorlabs Crystalline Solutions, 114 E Haley St., Suite G , California, 93101 Santa Barbara, USA

MECSELs were developed to optimize the thermal impedance of the optically pumped active region. We demonstrate a multi-pass in-well pumped, frequency-doubled, high-power MECSEL for sodium guide star applications.

**Oral** CB-5.6 11:45 ICM - Room 4b

**Towards red-emitting VECSELs based on an active grating waveguide structure** — •Maxim Leyzner[1], Peter Gierss[2], Ana Ćutuk[2], Michael Jetter[2], Peter Michler[2], Thomas Graf[1], and Marwan Abdou Ahmed[1] — [1]Institut für Strahlwerkzeuge (IFSW), Universität Stuttgart, Pfaffenwaldring 43, 70569 Stuttgart, Germany — [2]Institut für Halbleiteroptik und Funktionelle Grenzflächen, Center for Integrated Quantum Science and Technology (IQST) and Research Center SCoPE, Universität Stuttgart, Allmandring 3, 70569 Stuttgart, Germany

We present the design and the characterization of an active grating waveguide structure based on the AlGaInP platform. Using genetic algorithm, we could retrieve the microscopic parameters of the grating by fitting the measured spectra.

## EF-5: Nonlinear Fiber Dynamics

Chair: Katarzyna Krupa, Institute of Physical Chemistry - Polish Academy of Sciences, Warsaw, Poland

Time: Friday, 10:30–12:00 Location: ICM - Room 5

**Oral** EF-5.1 10:30 ICM - Room 5

**Symmetry broken localized structures in a coherently-driven Fabry-Pérot Kerr resonator** — •Yohann Sanvert[1], Abdullah Alabbadi[2], Lewis Hill[2], Gian-Luca Oppo[3], Stéphane Coen[4], Erwan Lucas[1], Pascal Del'Haye[2], and Julien Fatome[1] — [1]Laboratoire Interdisciplinaire Carnot de Bourgogne, Dijon, France — [2]Max Planck Institute for the Science of Light, Erlangen, Germany — [3]University of Strathclyde, Glasgow, United Kingdom — [4]The University of Auckland, Auckland, New Zealand

We demonstrate that fibre-based Fabry-Pérot resonators can provide an efficient protection of the polarization spontaneous symmetry-breaking phenomenon by introducing a $\pi/2$-phase birefringent defect, which enables the generation of robust vectorial localized temporal structures.

**Oral** EF-5.2 10:45 ICM - Room 5

**High detuning cavity solitons in a long fiber resonator with Raman gain** — •Georges Semaan[1], Yifan Sun[1], Nicolas Englebert[2], Corentin Simon[1], Simon-Pierre Gorza[1], and François Léo[1] — [1]Service OPERA-Photonique, Université libre de Bruxelles, 50 Ave. F. D. Roosevelt, B-1050, Brussels, Belgium — [2]Department of Electrical Engineering, California Institute of Technology, Pasadena, USA

We investigate the dynamics of high-detuning active cavity solitons in a fiber Kerr resonator with Raman gain, observing various soliton interactions. This system serves as a novel and robust platform for fundamental cavity soliton research.

**Oral** EF-5.3 11:00 ICM - Room 5

**Observation of polarization symmetry-broken platicons in a passive Kerr resonator with normal dispersion** — •Pengxiang Wang, Changqing Li, Ziang Xiao, and Gang Xu — Huazhong University of Science and Technology, Wuhan, China

We report theoretical and experimental investigations on the bright and dark polarized platicons in Kerr resonators with normal dispersion, where the coupled-Lugiato-Lefever-equation based analysis uncovers the novel multi-sunken structures.

**Oral** EF-5.4 11:15 ICM - Room 5

**Manipulation of the spatiotemporal trajectories of solitons using arbitrary potentials in recirculating fiber loop** — •François Copie, Pierre Suret, and Stéphane Randoux — Univ. Lille, CNRS, UMR8523 - PhLAM - Physique des Lasers Atomes et Molécules, F-59000, Lille, France

We report experiments realized in a fiber loop in which an external potential modifies the motion of solitons in a controlled way. Trapped solitons are shown to behave as interacting particles, exhibiting intricate yet regular trajectories.

**Oral** EF-5.5 11:30 ICM - Room 5

**Generation of THz Repetition-Rate Femtosecond Pulse Trains at 1030 nm Using Dual-Frequency Beat Compression in Photonic Crystal Fiber** — •Abdelkrim Bendahmane[1], Fedele Pisani[1,2,3], Giorgio Santarelli[1], Gianluca Galzerano[2,3], and Eric Cormier[1] — [1]Laboratoire Photonique Numérique et Nanosciences (LP2N), Talence, France — [2]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy — [3]Istituto di Fotonica e Nanotecnologie – CNR, Milano, Italy

we demonstrated the generation of ultra-short pulse (< 120 fs) trains in an all PM-fibered system around 1030 nm with pulse repetition rates ranging between 300 GHz to 1 THz.

**Oral** EF-5.6 11:45 ICM - Room 5

**Experimental observation of self-frequency-shifting Raman quasi-solitons in fiber Fabry-Perot resonators** — •Thomas Bunel, Matteo Conforti, and Arnaud Mussot — University of Lille, PhLAM, CNRS, Lille, France

In this work, we demonstrate the transition from frequency-locked cavity solitons to self-frequency-shifting Raman quasi-solitons within a high-finesse fiber Fabry-Perot resonator by tunning the synchronization mismatch between the pulsed pump and the cavity.

## CC-4: THz Applications

Chair: Clara Saraceno, Ruhr University Bochum, Bochum, Germany

Time: Friday, 10:30–12:00 Location: ICM - Room 11

**Oral** CC-4.1 10:30 ICM - Room 11

**Lamb-dip Spectroscopy in Rotational Levels of Acetonitrile Molecules using a Narrow-Linewidth UTC-PD Terahertz Light Source** — •Koichiro Tanaka[1,2] and Kohei Eguchi[1] — [1]Kyoto University, Kyoto, Japan — [2]RIKEN, Wako, Japan

Terahertz Lamb-dip spectroscopy was performed in the rotational levels of acetonitrile molecules with the counter-propagation pump and probe configuration. The results demonstrate that the homogeneous linewidth at zero pressure is limited by the transit-time broadening.

**Oral** CC-4.2 10:45 ICM - Room 11

**Terahertz Phase Imaging from a Sequence of Diffraction Patterns** — •Pitambar Mukherjee[1], Vivek Kumar[2], Frédéric Fauquet[1], Sylvain Gigan[2], and Patrick Mounaix[1] — [1]IMS Laboratory, University of Bordeaux, UMR CNRS 5218, Talence (33405), France — [2]Laboratoire Kastler Brossel, ENS-Université PSL, CNRS, Sorbonne Université, Collège de France, Paris (75005), France

In this work, we demonstrate lens-less THz phase retrieval using multiple diffraction patterns captured after free space propagation. By setting up a nonlinear optimization scheme, we show rapid, high-fidelity phase imaging at THz spectral range.

**Oral** CC-4.3 11:00 ICM - Room 11

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**Oral** CC-4.4 11:15 ICM - Room 11

**Demethylation of Cancer DNAs by Resonant High-Power Terahertz Irradiation** — •Chaeyoon Kim[1], Seung Won Jin[2], Seong Cheol Lee[1], Donghak Oh[1], Soojeong Baek[1], Bumki Min[1], Hee-Jin Yang[2,3], Joo-Hiuk Son[4], and Fabian Rotermund[1] — [1]Department of Physics, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea — [2]Department of Neurosurgery, SMG-SNU Boramae Medical Centre, Seoul, South Korea — [3]College of Medicine, Seoul National University, Seoul, South Korea — [4]Department of Physics, University of Seoul, Seoul, South Korea

We investigate cancer DNA demethylation using high-power THz irradiation with metamaterial-based filters, demonstrating that irradiation including 1.6 THz, which is the resonance frequency of cancer DNA, effectively induces sig-

nificant demethylation.

**Oral** CC-4.5 11:30 ICM - Room 11

**On-Off-Keying Data Transmission Achieved with Terahertz-to-Optical Carrier Conversion Using Optical Comb and Electro-Optic Polymer Modulator** — Yudai Matsumura[1], Hiroki Kishikawa[1], Yu Tokizane[1], Yasuhiro Okamura[1,2], Naoya Kuse[1], Eiji Hase[1], Jun-ichi Fujikata[1], Masanobu Haraguchi[1], Takahiro Kaji[3], Akira Otomo[3], Atsushi Kanno[3,4], Shintaro Hisatake[5], and •Takeshi Yasui[1] — [1]Tokushima University, Tokushima, Japan — [2]University of Yamanashi, Kofu, Japan — [3]National Institute of Information and Communications Technology, Koganei, Japan — [4]Nagoya Institute of Technology, Nagoya, Japan — [5]Gifu University, Gifu, Japan

We demonstrate On-Off-Keying data transmission using THz-to-optical carrier conversion, facilitated by dual-wavelength optical carriers referenced to optical comb and electro-optic polymer modulator, achieving successful detection of 270-MHz-OOK-modulated THz signals in the 100 GHz band.

**Oral** CC-4.6 11:45 ICM - Room 11

**Frequency-Resolved THz Thermometry of Nanoparticle Solutions** — •Tim Vogel[1], Fabio Novelli[2,3], and Clara J. Saraceno[1,4] — [1]Photonics and Ultrafast Laser Science, Ruhr-University Bochum, Bochum, Germany — [2]Physical Chemistry II, Ruhr-University Bochum, Bochum, Germany — [3]School of Physics and Astronomy, University of Southampton, Southampton, United Kingdom — [4]Research Center Chemical Science and Sustainability, University Alliance Ruhr, Bochum, Germany

We present the full temperature- and frequency-dependent complex THz refractive index of a colloidal solution of nanospheres in water. By using a 400 kHz Yb-based driving laser, we were able to quickly measure subtle effects on the THz signal.

## CI-6: Devices for Communcations, Storage, and Computing

Chair: Sonia Boscolo, Aston University, Birmingham, United Kingdom

Time: Friday, 10:30–12:00 Location: ICM - Room 12a

**Oral** CI-6.1 10:30 ICM - Room 12a

**Heterogeneous III-V-on-SOI EAM for high speed communication** — •Akeem Safiriyu[1], Amin Souleiman[2], Salim Faci[1], Anne-Laure Billabert[1], Catherine Algani[1], and Joan Ramirez[2] — [1]Univ. Gustave Eiffel, CNRS, CNAM, ESYCOM, ., 292 rue Saint-Martin, 75003 Paris, France — [2]III-V Lab, 1 Avenue Augustin Fresnel, 91767 Palaiseau, France

Electro-absorption modulators are employed in high-speed communication due to their high modulation efficiency and compact size. we demonstrate the characterization of heterogeneous III-V-on-SOI EAM with a 15 dB extinction ratio and SFDR of 78 $dB.Hz^{2/3}$

**Oral** CI-6.2 10:45 ICM - Room 12a

**Bias Circuit-Integrated DC-160 GHz Ultra-Broadband Photodetector for Advanced Optical Fiber Communication** — •Toshimasa Umezawa, Shinya Nakajima, Atsushi Matsumoto, Kouichi Akahane, and Naokatsu Yamamoto — National Institute of Information and Communications Technology (NICT), Tokyo, Japan

In this study, we designed a bias circuit-integrated PD device capable of high-speed operation well above 145 GHz, assuming the implementation with a 0.8 mm coaxial connector in a PD module.

**Oral** CI-6.3 11:00 ICM - Room 12a

**High-speed lithium tantalate-based silicon photonic modulators** — •Margot Niels[1,2], Tom Vanackere[1,2], Ewoud Vissers[1,2], Tingting Zhai[1,2], Patrick Nenezic[1,2], Jakob Declercq[1,2], Cédric Bruynsteen[2,3], Shengpu Niu[2,3], Arno Moerman[2,3], Olivier Caytan[2,3], Nishant Singh[2,3], Sam Lemey[2,3], Xin Yin[2,3], Sofie Janssen[2], Peter Verheyen[2], Neha Singh[2], Dieter Bode[2], Martin Davi[2], Filippo Ferraro[2], Philippe Absil[2], Sadhishkumar Balakrishnan[2], Joris Van Campenhout[2], Günther Roelkens[1,2], Bart Kuyken[1,2], and Maximilien Billet[1,2] — [1]Department of Information Technology (INTEC), Photonics Research Group, Ghent University–imec, Ghent, Belgium — [2]imec, Leuven, Belgium — [3]Department of Information Technology (INTEC), IDLab, Ghent University–imec, Ghent, Belgium

This paper presents a heterogeneously integrated lithium tantalate-based silicon Mach-Zehnder modulator with competitive characteristics, compared to devices using monolithic thin-film lithium tantalate on insulator technology.

**Oral** CI-6.4 11:15 ICM - Room 12a

**Programmable Photonic Chips as Versatile Physical Unclonable Functions** — •Georgios Aias Karydis[1], George Sarantoglou[2], Benoit Charbonnier[3], Olivier Castany[3], Stéphane Brision[3], Quentin Wilmart[3], Charis Mesaritakis[2], and Adonis Bogris[1] — [1]Department of Informatics and Computer Engineering, University of West Attica, Egaleo , Greece — [2]Department of Biomedical Engineering, University of West Attica, Egaleo, Greece — [3]CEA-Leti, Grenoble, France

We demonstrate versatile physical unclonable functions with the use of programmable photonics. By leveraging the unpredictability of the phase bias at each tunable programmable unit cell, we highlight unique spectral fingerprints at different chip areas

**Oral** CI-6.5 11:30 ICM - Room 12a

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**Oral** CI-6.6 11:45 ICM - Room 12a

**Bypassing the von Neumann Bottleneck via Direct 300-GHz RF Conversion of Optical Computation Results** — •Junnosuke Kokubu[1], Ko Sato[1], Ayaka Yomoda[1], Satoki Kawanishi[1], Ryo Sugano[1], Mantaro Imamura[1], Hitomi Uemura[1], Shun Fujii[2], and Takasumi Tanabe[1] — [1]Department of Electronics and Electrical Engineering, Faculty of Science and Technology, Keio University, Yokohama, Japan — [2]Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan

Optical computers offer high speed and low power consumption, but face the von Neumann bottleneck. We propose bypassing it by directly converting computational results into 300-GHz electromagnetic waves, potentially realizing their full performance.

## EE-2: Ultrafast Material Science

Chair: Terence Mullins, DESY, Hamburg, Germany

Time: Friday, 10:30–12:00 Location: ICM - Room 12b

**Oral** EE-2.1 10:30 ICM - Room 12b

**Order from Chaos: Probing Supramolecular Self-Assembly with 2D Spectroscopy** — •Maxim Pshenichnikov and Sundar Raj Krishnaswamy — Zernike Institute for Advanced Materials, University of Groningen, Groningen, Netherlands

Using 2D spectroscopy in microfluidic settings, we explore the self-assembly of chaotically moving precursor molecules in aqueous solution into well-organized supramolecular structures, providing insight into the self-assembly mechanism and intermediate stages under dynamic realistic conditions.

**Oral** EE-2.2 10:45 ICM - Room 12b

**Strain-controlled growth of transition metal dichalcogenides and its influence on ultrafast exciton dynamics** — •Eon-Taek Oh[1], Seongdae Kwon[2], Kibum Kang[2], and Fabian Rotermund[1] — [1]Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon 34341, South Korea — [2]Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology, Daejeon 34341, South Korea

Compressive strain in monolayer MoS2 accelerates hot exciton cooling via electron-phonon interactions, boosting radiative recombination efficiency. These results provide valuable insights for strain engineering to optimize the optical properties of two-dimensional materials.

**Oral** EE-2.3 11:00 ICM - Room 12b

**Enhanced Photon-Driven Ultrafast Spin Transfer through Mn Paramagnetic-to-Antiferromagnetic Phase Transitions in Mn/Co Bilayers** — •Ming-Shian Tsai[1,2], Li-Han Chang[1], Ming-Chang Chen[1], and Bo-Yao Wang[2] — [1]Institute of Photonics Technologies, National Tsing Hua University, Hsinchu 30013, Taiwan — [2]Department of Physics, National Changhua University of Education, Changhua 50007, Taiwan

We demonstrate Mn's paramagnetic-to-antiferromagnetic transitions significantly enhance the direct photon-driven demagnetization of Co in Mn/Co bilayers, highlighting AFM order's potential to advance femtosecond spintronic technologies.

**Oral** EE-2.4 11:15 ICM - Room 12b

**Spatio-temporal visualization of individual phonon and magnon propagation in a magnetic thin film** — •S. Watanabe, D. Nishikawa, K. Maezawa, R. Shibata, and S. Fujii — Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan

Using dual-frequency-comb-based asynchronous optical sampling at 250 frames/ns, isotropic SAW and anisotropic magnon dynamics induced by ultrafast photoexcitation were visualized, offering a platform for magnon-phonon coupling research in spintronic devices.

**Oral** EE-2.5 11:30 ICM - Room 12b

**Ultrafast time-resolved demagnetization imaging in a ferromagnet** — •Alessandro Baserga[1], Federico Visentin[1], Davide Benettin[1], Giovanni Gandini[1], Christian Rinaldi[1], Ettore Carpene[1], Giulio Cerullo[1], Stefano Dal Conte[1], and Franco V.A. Camargo[1,2] — [1]Politecnico di Milano, Milano, Italy — [2]IFN-CNR, Milano, Italy

We demonstrate ultrafast imaging of light-induced demagnetization in a Pt/CoFeB/MgO ferromagnet using holographic microscopy. Sub-micrometer, femtosecond resolution reveals spatially dependent magnetization dynamics, providing insights into lateral demagnetization behaviour and spatially varying decay times.

**Oral** EE-2.6 11:45 ICM - Room 12b

**Widefield Femtosecond Spin Polarization Imaging via Multiplexed Off-axis Holography** — •Federico Visentin[1,2], Martin Hörmann[1], Julia A. Gessner[3], Felix Deschler[3], Giulio Cerullo[1,2], and Franco V. A. Camargo[2] — [1]Dipartimento di Fisica, Politecnico di Milano, Milan, Italy — [2]Istituto di Fotonica e Nanotecnologie, CNR, Milan, Italy — [3]Physikalisch-Chemisches Institut, Universität Heidelberg, Heidelberg, Germany

We present an ultrafast polarization-resolved holographic microscope that simultaneously measures optical rotatory dispersion and circular dichroism, while being automatically self-balanced against excess laser noise. Therewith we observe spin-polarized dynamics and spin diffusion in hybrid perovskites.

## CD-12: Optical Frequency Combs

Chair: Luca Carletti, University of Brescia, Brescia, Italy

Time: Friday, 10:30–12:00 Location: ICM - Room 13a

**Oral** CD-12.1 10:30 ICM - Room 13a

**Dual-comb generation in monolithic high-Q fiber Fabry-Perot resonators** — •Thomas Bunel[1], Antonio Cutrona[2], Debanuj Chatterjee[1], Julien Lumeau[3], Antonin Moreau[3], Alexis Bougaud[4], Manal Arbati[4], Benjamin Wetzel[4], Alessia Pasquazi[2], Matteo Conforti[1], and Arnaud Mussot[1] — [1]University of Lille, PhLAM, CNRS, Lille, France — [2]Emergent Photonics Research Centre (EPicX), Dept. of Physics, Loughborough University, Loughborough, United Kingdom — [3]Aix Marseille University, Institut Fresnel, CNRS, Marseille, France — [4]XLIM Research Institute, University of Limoges, Limoges, France

This work demonstrates novel approaches to dual-comb generation using monolithic high-Q fiber Fabry-Perot resonators, leveraging the spatial multiplexing properties of fiber systems to separate each comb while maintaining a high mutual coherence.

**Oral** CD-12.2 10:45 ICM - Room 13a

**Harnessing Electro-Optic Modulation and On-Chip Temporal Interleaving Towards Versatile Frequency Comb Generation** — •Manal Arbati[1], Alexis Bougaud[1], Bruno P. Chaves[1], Thomas Bunel[2], Sébastien Février[1], Brent E. Little[3], Sai T. Chu[4], David J. Moss[5], Roberto Morandotti[6], Arnaud Mussot[2], and Benjamin Wetzel[1] — [1]XLIM Research Institute, CNRS UMR 7252, Université de Limoges, Limoges, France — [2]Université de Lille, CNRS, UMR 8523—PhLAM—Physique des Lasers Atomes et Molécules, Lille, France — [3]QXP Technologies Inc., Xi'an, China — [4]Department of Physics, City University of Hong Kong, Hong Kong, China — [5]Optical Sciences Centre, Swinburne University of Technology and the Australian Research Council (ARC) Centre of Excellence in Optical Microcombs for Breakthrough Science, COMBS, Hawthorn, Australia — [6]INRS-EMT, Varennes, Canada

We study the generation of tunable electro-optic frequency combs leveraging on-chip picosecond temporal interleaving. Experimental results show the ability to selectively shape the RF spectrum within an optical spectrum spanning 80 nm across the C-band.

**Oral** CD-12.3 11:00 ICM - Room 13a

**Generalized theory of multicolor microcombs** — Carlo Silvestri[1,2], Justin Widjaja[1,3], Austin Lin[1], •C. Martijn de Sterke[1,2], and Antoine F. J. Runge[1,2] — [1]Institute of Photonics and Optical Science (IPOS), School of Physics, University of Sydney, Sydney, Australia — [2]ARC Centre of Excellence for Optical Microcombs for Breakthrough Science (COMBS), University of Sydney, Sydney, Australia — [3]Department of Applied Physics, California Institute of Technology, Pasadena, USA

We present an analytic theory for multicolor microcombs by applying a multiscale approach to the Lugiato-Lefever equation. This allows us to quantify their enhanced nonlinear effects, leading to low pump power, and their wide bandwidth.

**Oral** CD-12.4 11:15 ICM - Room 13a

**Phase Noise Reduction of an Electro-Optic Dual Comb Source with a Twisted Multicore Fiber** — •Debanuj Chatterjee[1], Alexandre Parriaux[2], Géraud Bowmans[1], Damien Labat[1], Andy Cassez[1], and Arnaud Mussot[1,3] — [1]Laboratoire de Physique des Lasers, Atomes et Molécules, Villeneuve-d'Ascq, France — [2]Institut de Physique, Université de Neuchâtel, Neuchâtel, Switzerland — [3]Institut universitaire de France, Paris, France

We report a 4 dB improvement in the phase noise of an electro-optic modulation based dual comb spectrometer by using a twisted multicore fiber rather than a standard multicore fiber, at the nonlinear broadening stage.

**Oral** CD-12.5 11:30 ICM - Room 13a

*withdrawn*

**Oral** CD-12.6 11:45 ICM - Room 13a

**20-GHz Structured Optical Frequency Combs via Temporal and Spatial Modulation** — •Ziang Xiao, Pengxiang Wang, Changqing Li, and Gang Xu — School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan, China

A flexible scheme is proposed for generating high-repetition-rate structured optical frequency combs with customizable repetition rates and transverse mode structure, enabling diffraction-free, interference-resistant beams for fields like high-capacity telecommunications.

# CJ-12: Hollow-Core and Photonic-Crystal Fibres and for Laser Applications

Chair: Sze Y. Set, University of Tokyo, Tokyo, Japan

Time: Friday, 10:30–12:00 Location: ICM - Room 13b

**Oral** CJ-12.1 10:30 ICM - Room 13b

**Efficient Anti-resonant Hollow-core Fiber-based Pulse Compressor for High-energy Ytterbium Fiber Laser** — •Jikun Yan[1], Duanyang Xu[1], Seyed Mousavi[1,2], Yongmin Jung[1], David Richardson[1,2], Francesco Poletti[1], and Lin Xu[1] — [1]Optoelectronics Research Centre, University of Southampton, SOUTHAMPTON, United Kingdom — [2]Microsoft Azure, Romsey, United Kingdom

We demonstrate an efficient pulse compressor based on an in-house fabricated anti-resonant hollow-core fiber for high-energy ultrafast ytterbium fiber laser. The compressor provides >86% overall transmission and generates 56 fs pulses with 424 nJ energy.

**Oral** CJ-12.2 10:45 ICM - Room 13b

**Demonstration of deep UV fiber delivery patchcord down to 213 nm** — •Frédéric Delahaye[1], Foued Amrani[1], Maciej Popenda[1], Ali Al Dhaybi[1,2], Kostiantyn Vasko[1], Ando Randriamahefa[1], Benoît Beaudou[1], Frédéric Gérôme[1,2], and Fetah Benabid[1,2] — [1]GloPhotonics, Limoges, France — [2]GPPMM group Xlim, LImoges, France

We report on the fabrication of inhibited-coupling hollow-core photonic-crystal fibers with reduced core size to efficiently guide into the DUV domain. Patchcords for beam delivery at 213 nm are also demonstrated for the first time.

**Oral** CJ-12.3 11:00 ICM - Room 13b

**High-efficiency flexible transmission of broadband mid-infrared ultrafast pulses in hollow-core photonic crystal fibre** — •Wei Lin[1,2,3], Zeqing Li[1,3], Yuewen Teng[1,2,3], Jiapeng Huang[1,3], Yun Zhao[1,3], Zhuozhao Luo[1,3], Weiyi Sun[1,3], Cong Jiang[1,3], Ruochen Yin[1], Yu Zheng[4], Xin Jiang[1,3,4], and Meng Pang[1,2,3] — [1]Russell Centre for Advanced Lightwave Science, Shanghai Institute of Optics and Fine Mechanics and Hangzhou Institute of Optics and Fine Mechanics, Hangzhou, China — [2]School of Physics and Optoelectronic Engineering, Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences, Hangzhou, China — [3]Shanghai Institute of Optics and Fine Mechanics, Shanghai, China — [4]iFiber (Ningbo) Optoelectronics Technology Co., LTD., Ningbo, China

We report the high-fidelity delivery of mid-infrared ultrafast pulses (~100 fs) spanning 2.7–3.1 $\mu$m through a 5-meter-long hollow-core photonic crystal fibre, achieving a throughput efficiency exceeding 70%.

**Oral** CJ-12.4 11:15 ICM - Room 13b

**Self-phase Modulation Induced Beam Quality Degradation In Hollow-Core Fibers** — •Bowen Chen, Tim Kühlthau, Thomas Graf, and Marwan Abdou Ahmed — Institut für Strahlwerkzeuge, Stuttgart, Germany

The degradation of beam quality induced by self-phase modulation in inhibited-coupling guiding hollow-core fibers operated in air was investigated. Using coupled mode theory, coupling coefficients were determined for two hollow-core fibers with different core diameters.

**Oral** CJ-12.5 11:30 ICM - Room 13b

**Polarization-maintaining hollow-core fibers for radially and azimuthally polarized light** — •Tim Kühlthau, Bowen Chen, Götz Kleem, Thomas Graf, and Marwan Abdou Ahmed — Institut für Strahlwerkzeuge, Universität Stuttgart, Stuttgart, Germany

The transmission of radially and azimuthally polarized laser beams through hollow-core fibers was investigated. Optimized fiber designs showed confinement losses <16dB/km while preserving modes with a degree of radial polarization >99%, enabling practical applications.

**Oral** CJ-12.6 11:45 ICM - Room 13b

**Optimized Compensation of High Third Order Dispersion of Few-meters-long Commercially Available Hollow Core Fibres** — •Andrea Villa, Bartłomiej Siwicki, Iacopo Tempra, and Martin Engelbrecht — Coherent Scotland, Glasgow, United Kingdom

This work discusses the importance of third order dispersion (TOD) compensation in high-power, fibre-delivered lasers exploiting hollow core fibres (HCF) to ensure high quality pulse shapes for bio-photonic applications, such as two photon microscopy.

# CH-15: Fiber Optics Sensing

Chair: Crina Cojocaru, Universitat Politècnica de Catalunya, Barcelona, Spain

Time: Friday, 10:30–12:00 Location: ICM - Room 14a

**Oral** CH-15.1 10:30 ICM - Room 14a

**In-fiber Mach–Zehnder Interferometer Sensor for Ultrasound Sensing** — •Ningbo Chen[1], Shuo Tang[1], Zhang Jianran[1,2], Yulong Cao[3], Jiqiang Kang[1,2], and Kenneth K. Y. Wong[1,2] — [1]Department of Electrical and Electronic Engineering, The University of Hong Kong, Hong Kong, China — [2]Advanced Biomedical Instrumentation Centre, Hong Kong Science Park, Hong Kong, China — [3]Institue of Applied Electronics, China Academy of Engineering Physics, Mianyang, China

We present an in-fiber Mach–Zehnder interferometer sensor for ultrasound sensing, demonstrating a free spectral range of 11 nm with fringe visibility of 9.3 dB. The sensor exhibits broadband capabilities and potential applications in bio-sensing and biomedical imaging.

**Oral** CH-15.2 10:45 ICM - Room 14a

**High-Resolution and Broad-Dynamic-Range Fiber Temperature Sensing via Photopolymer Self-Growing Micro-Cones** — •Lingyi Xiong, Wenyu Wang, Jianwei Huang, Shaoxiang Duan, Wei Lin, Hao Zhang, Haifeng Liu, and Bo Liu — Institute of Modern Optics, College of Electronic Information and Optical Engineering, Nankai University, Tianjin, China

We present a novel approach utilizing the vernier effect, achieved through a double FPI cavity constructed from a photopolymer self-growing micro-cone. Simultaneous implementation of enhanced resolution and large dynamic range for fiber temperature sensing.

**Oral** CH-15.3 11:00 ICM - Room 14a

**Investigations on the laser spectral purity in high-resolution distributed acoustic sensors based on optical frequency domain reflectometry** — •Clément Charliac[1,2], Vincent Kemlin[1], Inès Ghorbel[1], Luc Pastur[2], and Vincent Crozatier[1] — [1]Thales Research & Technology, Palaiseau, France — [2]Mechanical Engineering Dpt, LMI, ENSTA, Palaiseau, France

We investigate the impact of laser phase noise on high-resolution distributed acoustic sensors using optical frequency domain reflectometry, comparing two lasers probing a 1 km fiber with 10 cm spatial resolution and 1.5 kHz bandwidth.

**Oral** CH-15.4 11:15 ICM - Room 14a

**Simultaneous Bending and Twist Measurement using a Simple Multimode Fibre Sensor with Selective Mode Excitation** — •Shouju Liu, Yue Feng, Yuanli Yue, and Chao Wang — University of Kent, Canterbury, United Kingdom

We present a learning-free, multimode fiber sensor for simultaneous bending and twist measurement using selective mode excitation. By exploiting distinct sensitivities of spatially separated mode groups, our approach achieves high sensitivity and linearity.

**Oral** CH-15.5 11:30 ICM - Room 14a

**Enabling Maximum Precision in Polarimetric Fiber Sensors Using Fisher Information** — •Tiago D. Ferreira[1,2], Catarina Monteiro[1,2], and Nuno A. Silva[1,2] — [1]INESC TEC, Centre of Applied Photonics, Porto, Portugal — [2]Departamento de Física e Astronomia, Faculdade de Ciências, Universidade do Porto, Porto, Portugal

This work employs the Mueller matrix formalism and Fisher information for enabling maximum precision in polarimetric fiber sensors. Optimizing input polarization states enhances accuracy in deformation detection, facilitating high-resolution monitoring and advanced diagnostic applications

**Oral** CH-15.6 11:45 ICM - Room 14a

**Flat Space Fibre Telescope** — •Erez N Ribak[1] and Tzachi Levin[2] — [1]Physics dept, Technion - Israel Institute of Technology, Haifa, Israel — [2]Rafael Advanced Systems Ltd, Haifa, Israel

We construct a mirrorless telescope, using multiple spread collimating lenses and fibres to interfere on the detector. The resolution is high but the volume and mass are small, reducing the drag.

# CK-13: Mid-Ir Devices

Chair: Christelle Monat, École Centrale de Lyon - Institut des Nanotechnologies de Lyon, Lyon, France

Time: Friday, 10:30–12:00 Location: ICM - Room 14b

**Oral** CK-13.1 10:30 ICM - Room 14b

**Raman Frequency Combs in Integrated Silicon Nitride Microresonators** — Alekhya Ghosh[1,2], •Arghadeep Pal[1,2], Shuangyou Zhang[3], Toby Bi[1,2], Masoud Kheyri[1,2], Haochen Yan[1,2], Yaojing Zhang[4], and Pascal Del'Haye[1,2] — [1]Max Planck Institute for Science of Light, Erlangen, Erlangen, Germany — [2]Friedrich-Alexander-Universität, Erlangen, Germany — [3]Technical University of Denmark, Kgs. Lyngby, Denmark — [4]The Chinese University of Hong Kong (Shenzhen), Guangdong, China

We observe the generation of Raman lasing and Raman frequency combs in integrated silicon-nitride microresonators. We optimized the resonator's structure thereby facilitating the interplay between the Kerr and Raman effects.

**Oral** CK-13.2 10:45 ICM - Room 14b

**On-chip dual quantum walk comb source for spectroscopy applications** — Miguel Montesinos Ballester, •Alessio Cargioli, Emilio Gini, Mattias Beck, and Jérôme Faist — ETH Zurich, Zurich, Switzerland

In this work, we report an integrated dual-comb source operating in the mid-infrared, which benefits from the unique stability and control advantages of quantum walk combs.

**Oral** CK-13.3 11:00 ICM - Room 14b

**One Million Q-Factor integrated SiGe-on-Si Ring Resonator in the Mid-Infrared** — •Rémi Armand[1,2], Marko Presetjuk[1,3], Miguel Gerardo Sandoval Campos[1], Ujjal Chettri[1], Lamine Ferhat[1], Jean-Michel Hartmann[2], Vincent Mathieu[2], Guanghui Ren[3], Andreas Boes[4], Arnan Mitchell[3], Nicolas Bresson[2], Vincent Reboud[2], Christelle Monat[1], and Christian Grillet[1] — [1]Institut des Nanotechnologies de Lyon INL, UMR5270, CNRS, Ecole Centrale de Lyon, INSA Lyon, Universite Claude Bernard Lyon 1, CPE Lyon, F- 69134 Ecully, France — [2]CEA-Leti, Université Grenoble Alpes, F-38054 Grenoble, France — [3]School of Engineering, RMIT University, VIC 3001 Melbourne, Australia — [4]Institute for Photonics and Advanced Sensing, The University of Adelaide, SA 5005 Adelaide, Australia

We report ring resonators on a silicon germanium on silicon platform operating in the mid-infrared wavelength range around 3.5 - 4.6 $\mu$m with quality factors reaching up to one million.

**Oral** CK-13.4 11:15 ICM - Room 14b

**One octave supercontinuum generation in silicon germanium on silicon-nitride platforms for mid-infrared applications** — •Lamine Ferhat[1], Marko Perestjuk[1,2], Adam Bieganski[1,2], Rémi Armand[3], Vincent Reboud[3], Nicolas Bresson[3], Jean-Michel Hartmann[3], Guanghui Ren[2], Arnan Mitchell[2], Christelle Monat[1], and Christian Grillet[1] — [1]Institut des Nanotechnologies de Lyon, CNRS-UMR-5270, Ecole Centrale de Lyon, Ecully, France — [2]School of Engineering, RMIT University, Melbourne, Australia — [3]Univ. Grenoble Alpes, CEA, LETI, Grenoble, France

One octave mid-infrared supercontinuum light is generated from 2.3 $\mu$m to 4.49 $\mu$m wavelength in silicon germanium on silicon nitride waveguides pumped at 3.6 $\mu$m central wavelength in the transverse electric polarization mode.

**Oral** CK-13.5 11:30 ICM - Room 14b

**Near-Field Spatiotemporal Nanoscopy of Lead Telluride Meta-Atoms** — •Sukanta Nandi[1,2] and Tomer Lewi[1,2] — [1]Faculty of Engineering, Bar-Ilan University, Ramat Gan, Israel — [2]Institute of Nanotechnology and Advanced Materials, Bar-Ilan University, Ramat Gan, Israel

We investigate the mid-infrared optical properties of PbTe hoppercubes using spatiotemporal nanospectroscopy, revealing local spatial variations in scattered fields, high-Q resonant Mie-modes (Q ≈100), and ultrafast tunability and carrier dynamics via pump-probe near-field technique.

**Oral** CK-13.6 11:45 ICM - Room 14b

**Pioneering a new generic platform - unlocking the potential of mid-IR photonic integrated circuits** — •Ryszard Piramidowicz[1,2,3], Stanisław Stopiński[1,2,3], Krzysztof Anders[1,2,3], Anna Jusza[1,3], Marcin Lelit[1,4], Andrzej Połatyński[1,5], Piotr Wiśniewski[4], Mateusz Słowikowski[4], Marcin Juchniewicz[4], Jacek Olszewski[2], Rafał Ciechański[2], Krzysztof Machałowski[2], Jarosław Jureńczyk[2], Kamil Pierściński[6], and Dorota Pierścińska[6] — [1]Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, Warsaw, Poland — [2]VIGO Photonics S.A., Ożarów Mazowiecki, Poland — [3]LightHouse Sp. z o.o., Lublin, Poland — [4]Warsaw University of Technology, Centre for Advanced Materials and Technologies CEZAMAT, Warsaw, Poland — [5]VPIphotonics GmbH, Berlin, Germany — [6]Łukasiewicz Research Network - Institute of Microelectronics and Photonics, Warsaw, Poland

In this work, a new photonic integration technology platform (MIRPIC) is presented and discussed. MIRPIC is based on heterogeneous integration of quantum cascade lasers, antimonide superlattice photodetectors and germanium-on-silicon passive waveguiding circuits.

# CF-11: Ultrafast Laser Technology 2

Chair: Nicolas FORGET, Université Côte d'Azur, Nice, France

Time: Friday, 10:30–12:00 Location: ICM - Room 14c

**Oral** CF-11.1 10:30 ICM - Room 14c

**Phase noise properties of super-continuum generation in all-normal dispersion fibers** — •Matis Marcadier[1,2], Nicolas Forget[1], Yoann Pertot[2], and Aurelie Jullien[1] — [1]Institut de Physique de Nice (INPHYNI), Université Côte d'Azur, CNRS, UMR 7010, 17 Rue Julien Lauprêtre, Nice, France — [2]Fastlite, 165 route des Cistes, Antibes, France

Spectral coherence properties of supercontinuum generation in all normal dispersion fibers are analyzed. Stochastic phase noise under energy fluctuations and spectrally-resolved intensity-to-phase transfer coefficients are quantified, confirming the high coherence quality of the generated supercontinuum.

**Oral** CF-11.2 10:45 ICM - Room 14c

**Generation of 39 fs, 3.1 MW Pulses from a Gain-managed Mode-locked Fiber Oscillator** — Ziheng Zhuang[1,2], Yuhua Lu[1,2], •Shan Wang[1,2], Di Lin[1,2], Jianping Li[1,2], Songnian Fu[1,2], and Yuwen Qin[1,2] — [1]Institute of Advanced Photonics Technology, School of Information Engineering, Guangdong University of Technology, Guangzhou, China — [2]Key Laboratory of Photonic Technology for Integrated Sensing and Communication, Ministry of Education of China, Guangdong University of Technology, Guangzhou, China

We experimentally demonstrate a large-mode area all-normal-dispersion fiber oscillator operating in the gain-managed nonlinear amplification regime, directly generating 200 nJ pulses, which can be compressed to 39 fs with a peak power of 3.1 MW.

**Oral** CF-11.3 11:00 ICM - Room 14c

**Study of Nonlinearities in Terahertz-Repetition-Rate mJ-CPA** — •Vinzenz Stummer[1], Edgar Kaksis[1], Audrius Pugžlys[1,2], and Andrius Baltuška[1,2] — [1]TU Wien, Institut für Photonik, Vienna, Austria — [2]Center for Physical Sciences & Technology, Vilnius, Lithuania

We investigate and minimize Kerr-induced nonlinearities during amplification of terahertz-repetition-rate bursts of pulses chirped far beyond their temporal spacing. A recurring regime of peak-intensity increase is identified at extremely low pulse spacings.

**Oral** CF-11.4 11:15 ICM - Room 14c

**High Power Quantum Walk Comb at 1.6 $\mu$m With a Repetition Rate of 2.3 GHz** — •Lucius Miller, Bahareh Marzban, Mathieu Bertrand, Alexander Dikopoltsev, Giacomo Scalari, and Jérôme Faist — Institute for Quantum Electronics, ETH Zürich, Zürich, Switzerland

An infrared Quantum Walk Frequency Comb is presented with a tunable repetition rate of 2.3 GHz and significantly increased output power compared to previous realisations.

**Oral** CF-11.5 11:30 ICM - Room 14c

**A novel all-normal dispersion photonic crystal fiber design for low-noise coherent supercontinuum generation with 1030 nm pumping** — •R. Morel[1], V. Thibaut[2], M. Marcadier[3], A. Jullien[2], N. Forget[2], A. Cassez[4], V. Andrieux[4], S. Garzandat[4], A. Kudlinski[4], J. M. Dudley[1], and T. Sylvestre[1] — [1]Institut FEMTO-ST, CNRS, Université Marie et Louis Pasteur, Besancon, France — [2]Université Côte d'Azur, CNRS, Institut de Physique de Nice (INPHYNI), Nice, France — [3]Fastlite, Antibes, France — [4]Université de Lille, CNRS,—PhLAM—Physique des Lasers Atomes et Molécules, Lille, France

We present a polarization-maintaining all-normal dispersion photonic crystal fiber designed for 1030 nm femtosecond pumping, enabling ultrafast applications with supercontinuum generation spanning 750 nm–1300 nm.

**Oral** CF-11.6 11:45 ICM - Room 14c

**Single-Shot Carrier-Envelope Phase Measurement at 586 kHz Using Optical Fourier-Transform Interferometry** — •Chen Guo[1], Miguel Miranda[2,3], Ann-Kathrin Raab[1], Anne-Lise Viotti[1], Paulo Tiago Guerreiro[2,3], Vitor Amorim[2,3], Piotr Matyba[4], Rosa Romero[2,3], Helder Crespo[3,5], Anne L'Huillier[1], and Cord L. Arnold[1] — [1]Department of Physics, Lund University, Lund, Sweden — [2] IFIMUP-IN and Departamento de Física e Astronomia, Universidade do Porto, Porto, Portugal — [3]Sphere Ultrafast Photonics SA, Porto, Portugal — [4]Department of Physics, Umeå University, Umeå, Sweden — [5]Central Laser Facility, STFC, Rutherford Appleton Laboratory, Didcot, United Kingdom

We propose a single-shot, high-repetition rate measurement scheme of the CEP offset of ultrashort laser pulses. The spectral fringes resulting from f-2f nonlinear interferometry, encoding the CEP, are evaluated completely optically via optical Fourier transform.

## JSI-4: Photonics for Optimisation Problems and Ising Machines

Chair: Angelina Totovic, Celestial AI, San Jose, USA

Time: Friday, 10:30–12:00 Location: ICM - Room Osterseen

**Invited** JSI-4.1 10:30 ICM - Room Osterseen

**Accelerating ML models and NP-hard optimisation problems using light** — •Francesca Parmigiani, Hitesh Ballani, Grace Brennan, Burcu Canakci, Jiaqi Chu, James Clegg, Daniel Cletheroe, Fabian Falk, Christos Gkantsidis, Jannes Gladrow, Kirill Kalinin, Doug Kelly, Heiner Kremer, Greg O'Shea, Babak Rahmani, and Ant Rowstron — Microsoft Research, Cambridge, United Kingdom

In this talk, I shall introduce the Analog Optical Computer, which, through co-design of applications and integrated 3D hardware, has the potential to accelerate by >100-fold machine learning tasks and real-world optimization problems, like medical imaging and financial transactions

**Oral** JSI-4.2 11:00 ICM - Room Osterseen

**Experimental Demonstration of an Intensity-resolved Coherent Ising Machine based on Polarization Symmetry Breaking** — Liam Quinn[1,2], Yiqing Xu[1,2], Julien Fatome[3], Gian-Luca Oppo[4], Stuart G. Murdoch[1,2], Miro Erkintalo[1,2], and •Stéphane Coen[1,2] — [1]Physics Department, The University of Auckland, Auckland, New Zealand — [2]The Dodd-Walls Centre for Photonic and Quantum Technologies, Dunedin, New Zealand — [3]Laboratoire Carnot de Bourgogne, UMR 6303 CNRS, Université Bourgogne Europe, Dijon, France — [4]SUPA and Department of Physics, University of Strathclyde, Glasgow, Scotland

We experimentally demonstrate a novel coherent Ising machine based on optical polarization, avoiding complex phase stabilization. The polarization alternates at every pass, providing topological protection and robust performance that could benefit complex combinatorial optimization tasks.

**Oral** JSI-4.3 11:15 ICM - Room Osterseen

**Using a spatial light modulator to achieve massive-parallelization in analog Ising machines** — •Toon Sevenants, Guy Van der Sande, and Guy Verschaffelt — Vrije Universiteit Brussel, Brussels, Belgium

We propose and develop a novel analog optical Ising machine using a spatial light modulator and gradient descent-based feedback. The system efficiently handles large-scale optimization problems with millions of spins by leveraging light's inherent parallelism.

**Oral** JSI-4.4 11:30 ICM - Room Osterseen

**Ising machine based on nonlinear polarization oscillators** — •Salvatore Chiavazzo[1], Marcello Calvanese Strinati[3], Claudio Conti[2,3], and Davide Pierangeli[1,2] — [1]Institute for Complex Systems, National Research Council, Rome, Italy — [2]Department of Physics, Sapienza University, Rome, Italy — [3]Enrico Fermi Research Center, Rome, Italy

We propose a new photonic Ising machine that is based on nonlinear polarization oscillators in third-order nonlinear media. We demonstrate that this polarization Ising machine achieves superior ground-state accuracy on benchmark problems.

**Oral** JSI-4.5 11:45 ICM - Room Osterseen

**Optical single-pixel sensing for Nonlinear Ising Machines** — •Luana Olivieri, Andrew Cooper, Luke Peters, Vittorio Cecconi, Alessia Pasquazi, Marco Peccianti, and Juan Sebastian Totero Gongora — Emergent Photonics Research Centre (EPicX), Loughborough University, Loughborough, United Kingdom

Photonic Ising machines leverage large-scale parallelism for solving large combinatorial problems, yet multiple minima hamper Metropolis-based algorithms. A double single-pixel detection approach enables energetic transitions from non-local to local Hamiltonians, finding the GS of complex landscapes.

## EG-4: Single and Coupled Emitter Properties and Manipulation

Chair: Elise Bailly, ETH Zurich - Institute for Quantum Electronics, Zurich, Switzerland

Time: Friday, 10:30–12:00 Location: ICM - Room 21

**Oral** EG-4.1 10:30 ICM - Room 21

**On-Chip Stark Tuning of Molecular Resonances in Nanoprinted Crystals** — •Mohammad Musavinezhad[1,2], Alexey Shkarin[1], Jan Renger[1], Tobias Utikal[1], Stephan Götzinger[1,2], and Vahid Sandoghdar[1,2] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

This work demonstrates precise control over spatial and spectral position of individual molecular quantum emitters doped into nanocrystals printed onto closely-spaced microelectrodes. It represents a promising platform for next generation quantum nanophotonic devices.

**Oral** EG-4.2 10:45 ICM - Room 21

**Spontaneous emission beyond dipolar approximation: Two-photon emission, interferences and large emitters** — Steve Smeets, Mhamad Hantro, Bjorn Maes, Colin Van Dyck, and •Gilles Rosolen — University of Mons, Mons, Belgium

We show strong enhancement of the two-photon spontaneous emission rate and significant interferences between dipolar and quadrupolar orders. The one-photon emission of extended quantum emitters shows deviations up to 70% compared to the point-dipole approximation.

**Oral** EG-4.3 11:00 ICM - Room 21

**Arrangement-Dependent Photon Pair Generation in 2D Arrays of Nonlinear Emitters** — •Sergey Krasikov[1], Maximilian A. Weissflog[1,2], Thomas Pertsch[1,3], Frank Setzpfandt[1,3], and Sina Saravi[1] — [1]Institute of Applied Physics, Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany — [2]Max Planck School of Photonics, Jena, Germany — [3]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

We study photon-pair generation by periodic and disordered nonlinear metasurfaces. We find a detection configuration in which the two-photon directionality pattern is arrangement-independent and robust to disorder due to the symmetry of the two-photon interference.

**Oral** EG-4.4 11:15 ICM - Room 21

*moved from EG-P.8*

**Plasmon-induced low energy interband transitions in porous gold films** — •Tlek Tapani[1], Jonas M. Pettersson[1], Nils Henriksson[1], Denis Garoli[2], and Nicolò Maccaferri[1] — [1]Department of Physics, Umeå University, Umeå, Sweden — [2]Dipartimento di Scienze e Metodi dell'ingegneria, Università di Modena e Reggio Emilia, Reggio Emilia, Italy

We study ultrafast charge dynamics in porous gold films. Pump-probe experiments, supported by a semi-classical model, reveal transient plasmon-induced interband transitions below 2 eV, where these excitations are not observed in bulk gold.

**Oral** EG-4.5 11:30 ICM - Room 21

**Coherent Transient Absorption Features of Hot and Cold Excitons in a Single Quantum Dot** — •Darius Hashemi Kalibar, Sarah Linder, Lorenz Möhrle, Alfred Leitenstorfer, and Ron Tenne — Department of Physics and Center for Applied Photonics, University of Konstanz, D-78457 Konstanz, Germany

We demonstrate coherent oscillations in a single quantum dot directly in the time domain by transient-transmission spectroscopy. Thanks to a phonon bottleneck, exciton states beyond the band edge remain coherent over long times.

**Oral** EG-4.6 11:45 ICM - Room 21

**Dynamics and Decoherences in Artificial Light-Harvesting Complexes** — •Lukas Strauch[1], Stefan Nimmrichter[2], and Mario Agio[1,3] — [1]Laboratory of Nano-Optics, University of Siegen, 57072 Siegen, Germany — [2]TQO, University of Siegen, 57072 Siegen, Germany — [3]National Institute of Optics (INO), National Research Council (CNR), 50125 Florence, Italy

We theoretically study the effect of decoherence and the observation of cooperative emission dynamics of artificial light-harvesting complexes in a solid-state system by experimentally achievable Purcell modified decay rates.

## EJ-2: Quantum-Inspired Photonics & Structured Light

Chair: Ihar Babushkin, Leibniz University Hannover, Hanover, Germany

Time: Friday, 10:30–12:00 Location: ICM - Room 22a

**Oral** EJ-2.1 10:30 ICM - Room 22a

**Quantum treatment of two-color-induced THz field generation** — •Paul David Peregrina, Fabrice Catoire, and Luc Bergé — Centre des Lasers Intenses et Applications, Université de Bordeaux, Talence, France

We address quantum descriptions of two-color plasma terahertz generation and compare ionization probabilities computed from the Strong Field Approximation, Time-Dependent Schrödinger Equation and classical models. Their discrepancies and agreement with Brunel radiation theory are discussed.

**Oral** EJ-2.2 10:45 ICM - Room 22a

**Sub-2-fs VUV pulse generation carrying orbital angular momentum** — •Amadou DIALLO[1], Marc HANNA[2], Dominique DESCAMPS[1], and Fabrice CATOIRE[1] — [1]Université de Bordeaux-CNRS-CEA, Centre des Lasers Intenses et Applications, Talence, France — [2]Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, Palaiseau, France

We address the Orbital Angular Momentum transfer from short intense IR pulse to VUV ultrashort pulse. The nonlinear Schrödinger equation is solved and shows an efficient transfer mechanism based on Kerr and ionization effects.

**Oral** EJ-2.3 11:00 ICM - Room 22a

**Stochastic modeling of quantum signatures in driven two-level systems** — •Felix Hitzelhammer[1], Johannes Stowasser[2], Michael Haider[2], Christian Jirauschek[2], Gaby Slavcheva[1,3], and Ulrich Hohenester[1] — [1]University of Graz, Graz, Austria — [2]Technical University of Munich, Munich, Germany — [3]Quantopticon, Chicago, USA

We introduce a new stochastic approach to simulate quantum optical signatures, such as the Mollow spectrum, with the advantage to couple stochastic solutions of two-level system dynamics to a Maxwell solver.

**Oral** EJ-2.4 11:15 ICM - Room 22a

**Modeling of Microwave Modulated Quantum Cascade Lasers** — •Michael A. Schreiber[1], Urban Senica[2,3], Johannes Stowasser[1], Lukas Seitner[1], Michael Haider[1], Giacomo Scalari[2], and Christian Jirauschek[1] — [1]Technical University of Munich (TUM), Garching, Germany — [2]ETH Zürich, Zürich, Switzerland — [3]Harvard University, Cambridge, USA

We report a novel model for the dynamics of strongly microwave modulated quantum cascade lasers, which is validated via simulations of real-world devices used for the generation of frequency combs and mode-locked ultrashort pulse trains.

**Oral** EJ-2.5 11:30 ICM - Room 22a

**Power control in non-Hermitian lattices through singular value decomposition** — •Konstantinos Makris[1] and Demetri Psaltis[2] — [1]Institute of Electronic Structure and Laser (IESL)-FORTH, Heraklion, Greece — [2]Optics Laboratory, Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland, Lausanne, Switzerland

By applying singular value decomposition techniques of non-normal propagators, we can identify the amplitude and phase of the initial wavefront that will lead to predetermined output. Pertinent examples of dissipative and topological lattices are given.

**Oral** EJ-2.6 11:45 ICM - Room 22a

**Optical Vortex Rings: Reconnections and Catastrophes** — •Zhamila Kulchukova[1], Albert Ferrando[2], and Anton Desyatnikov[1] — [1]Nazarbayev University, Astana, Kazakhstan — [2]Institute of Material Science (ICMUV), University of Valencia, Valencia, Spain

We theoretically demonstrate how topological transformations of optical vortex rings are accompanied by the emergence of catastrophes in the parameter domain governing destructive interference of elliptic Gaussian beams and a plane wave.

## EB-12: Quantum Communication

Chair: Mohamed Bourennane, Stockholm University, Stockholm, Sweden

Time: Friday, 14:00–15:30 Location: ICM - Room 1

**Oral** EB-12.1 14:00 ICM - Room 1

**Squeezed states continuous-variable quantum key distribution over 40 km fibre with local local oscillator** — •Huy Nguyen[1], Ivan Derkach[2], Hou-Man Chin[1], Adnan Hajomer[1], Nitin Jain[1], Ulrik Andersen[1], Vladyslav Usenko[2], and Tobias Gehring[1] — [1]Technical University of Denmark, Kongens Lyngby, Denmark — [2]Palacký University Olomouc, Olomouc, Czech Republic

We demonstrate a 40 km squeezed states CV-QKD system, showing significant improvement over the conventional coherent state system. Digital signal processing replaces complex locking mechanisms, enhancing practicality for real-world implementations.

**Oral** EB-12.2 14:15 ICM - Room 1

**Entanglement Swapping for Deployment in Low-Earth Orbit** — Jennifer Ellis, Danny Kim, Sofiane Merkouche, Brett Yurash, Cameron Taggesell, and •Shanying Cui — HRL Laboratories, LLC, Malibu, USA

We present entanglement swapping in a satellite for long distance entanglement distribution, using low size, weight, and power components that operate over a wide ambient temperature range, and is robust to certain single point failures.

**Oral** EB-12.3 14:30 ICM - Room 1

**Photonic Integrated Circuit for compact Quantum key distribution** — •Martin Achleitner[1], Aaron Stadler[1], Marie-Christine Slater[1], Mariana F. Ramos[1], Julian Konig[2], Ozan Çirkinoglu[2], Xaveer Leijtens[2], and Hannes Hübel[1] — [1]Austrian Institute of Technology, Wien, Austria — [2]Eindhoven University of Technology, Eindhoven, Netherlands

We demonstrated the QKD performance of a InP photonic integrated circuit (PIC) comprising a ring laser source, MZI modulator and attenuators. Resulting in a excellent QBER of 1.3% with a secret key rate of 89kbps.

**Oral** EB-12.4 14:45 ICM - Room 1

**Photonic Integrated Phase Encoding Transmitter for Satellite QKD** — •Joost Vermeer[1,2], Jonas Pudelko[1,2], Ömer Bayraktar[1,2], Kevin Günthner[1,2], and Christoph Marquardt[1,2] — [1]Friedrich-Alexander-Üniversitat Erlangen-Nürnberg, Erlangen, Germany — [2]Max Planck Institute for the Science of Light, Erlangen, Germany

We present our QKD transmitter for the QUBE-II CubeSat mission and its matching receiver. The transmitter consists of a pulsed laser, IQ modulator and SOA integrated in an InP photonic integrated circuit.

**Oral** EB-12.5 15:00 ICM - Room 1

**All-fibre frequency reference for Twin-Field Quantum Key Distribution** — •Hilma Karlsson, Erik A.T. Svanberg, Giulio Foletto, Vaishali Adya, and Katia Gallo — Department of Applied Physics, KTH - Royal Institute of Technology, Stockholm, Sweden

Twin-field quantum key distribution enables repeater-less long-distance secure communication but requires high coherence. We demonstrate an all-fiber frequency reference for laser stabilisation, achieving a secret key rate of over 10bits/s in a 300km asymmetric link.

**Oral** EB-12.6 15:15 ICM - Room 1

**Clock Synchronization without Frequency References under Weak Timing Correlations** — •Justin Yu Xiang Peh[1], Darren Ming Zhi Koh[1], Zifang Xu[1], Xi Jie Yeo[1], Peng Kian Tan[1], and Christian Kurtsiefer[1,2] — [1]Center for Quantum Technologies, Singapore, Singapore — [2]Department of Physics, National University of Singapore, Singapore, Singapore

We demonstrate successful synchronization of quartz clocks using weakly time-correlated photons of 180 ns coherence time, achieving a synchronization timing jitter of 10 ns over symmetric -102 dB optical loss channels.

## CM-7: Direct Laser Writing of Photonic Components

Chair: Lionel Canioni, Université de Bordeaux, Bordeaux, France

Time: Friday, 14:00–15:30 Location: ICM - Room 2

**Oral** CM-7.1 14:00 ICM - Room 2

**Laser written waveguides in glass with controlled optical aberration** — •Patrick Salter, Mohan Wang, Bangshan Sun, ZhiKai Pong, and Martin Booth — Department of Engineering Science, University of Oxford, Oxford, United Kingdom

We present a technique for laser writing waveguides in glass up to the sample edge without the need for polishing after processing. We also show that adding spherical aberration can enhance the refractive index change.

**Oral** CM-7.2 14:15 ICM - Room 2

**Sapphire Integrated Photonics Written by Femtosecond Laser** — •Mohan Wang, Patrick S Salter, Frank P Payne, Tongyu Liu, Martin J Booth, and Julian A J Fells — University of Oxford, Oxford, United Kingdom

Photonic devices were fabricated on sapphire substrates using depressed cladding waveguides that are single-mode and polarization-independent. This work enables scalable integration of photonics on crystalline material platforms for applications in quantum technology, sensing, and communication.

**Oral** CM-7.3 14:30 ICM - Room 2

**Elasto-optic phase modulators in a femtosecond-laser written waveguide platform** — •Roberto Memeo[1,2], Abhiram Rajan[2], Francesco Ceccarelli[1], Andrea Crespi[2,1], and Roberto Osellame[1] — [1]Istituto di Fotonica e Nanotecnologie - Consiglio Nazionale delle Ricerche (IFN-CNR), Milano, Italy — [2]Dipartimento di Fisica - Politecnico di Milano, Milano, Italy

We present a non-lithographic approach to integrate piezo-electric actuators with femtosecond-laser written waveguides. The actuator is directly bonded to the substrate, where waveguides are inscribed, enabling static and dynamic phase reconfiguration, suitable for quantum photonics.

**Oral** CM-7.4 14:45 ICM - Room 2

**Mitigation strategies for depolarisation effects of ultrashort pulse written fused silica VBGs** — Daniel Richter[1], •Malte P. Siems[1], Ria G. Krämer[1], Georg R. Schwartz[1], and Stefan Nolte[1,2] — [1]Friedrich Schiller University Jena, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

Stress induced during ultrashort pulse-based inscription of VBG in fused silica results in depolarization of transmitted beams. We investigate options to reduce or mitigate depolarisation effects for potential high power lasers applications.

**Oral** CM-7.5 15:00 ICM - Room 2

**On the use of UV femtosecond pulses to write waveguides in fused silica** — •Lisa Ackermann and Yves Bellouard — Galatea Laboratory, École polytechnique fédérale de Lausanne (EPFL), Neuchâtel, Switzerland

We investigate and compare UV laser waveguide writing techniques in fused silica using 450 fs pulses. Multi-track writing features propagation losses below 0.1 dB/cm at high writing speed and slit beam shaping enables mode tailoring.

**Oral** CM-7.6 15:15 ICM - Room 2

**Laser-inscribed flexible Bragg gratings containing silicon oxynitride doped silicon thin film for authentication applications and their electronic and structural properties from X-ray absorption Spectroscopy and Ab Initio Calculations** — Ali Karatutlu[1], Timuçin Emre Tabaru[1,2], Umut Taylan[1,3], •Zehra Gizem Mutlay[1], Doğukan Hazar Özbey[1], Hamid-Reza Bahari[1], Esra Kendir Tekgül[1], Andriy Budnyk[1], Mustafa Fatih Genisel[4], Zeynep Reyhan Öztürk[4,5], Engin Durgun[1], and Bülend Ortaç[1] — [1]National Nanotechnology Research Center (UNAM) and Institute of Materials Science Nanotechnology, Bilkent University, 06800, Ankara, Turkey — [2]Sivas University of Science and Technology, Mecnun Otyakmaz Street No:1, 58100, Sivas, Turkey — [3]Empa, Swiss Federal Laboratories for Materials Science & Technology, Laboratory for Advanced Materials Processing, Feuerwerkerstrasse 39, CH-3602, Thun, Switzerland — [4]Synchrotron-light for Experimental Science and Applications in the Middle East, Allan, Jordan — [5]Turkish Accelerator Radiation Laboratory (TARLA), Bahçelievler District 306 St. No: 11/N 06830 Gölbaşı, Ankara, Turkey

An innovative approach in silicon photonics through the synthesis of silicon oxynitride-doped silicon (SiON-doped Si) on flexible substrates was demonstrated for the development of distributed Bragg gratings for anti-counterfeiting applications and, encoding and decoding micro-information.

## CL-5: Raman and Ptychography Microscopy

Chair: Kenneth Wong, The University of Hong Kong, Hong Kong, China

Time: Friday, 14:00–15:30 Location: ICM - Room 3

**Invited** CL-5.1 14:00 ICM - Room 3

**Macroscopic Raman and fluorescence imaging in the shortwave infrared (SWIR)** — •Oliver Bruns — National Center for Tumor Diseases (NCT/UCC), Dresden, Germany

I present wide-field Raman scattering imaging in the shortwave infrared (SWIR) spectral region as a powerful approach for macroscopic biomedical applications. Our approach suppresses tissue autofluorescence and achieves high chemical contrast.

**Oral** CL-5.2 14:30 ICM - Room 3

**Nanoscale chemical mapping of bacterial structures and compositions with table-top EUV ptychography** — •Chang Liu[1,2,3], Leona Licht[1,2,3], Wilhelm Eschen[1,2,3], Soo Hoon Chew[2,4], Christina Wichmann[5,6,7], Felix Hildebrandt[5,6], Dainel S. Penagos Molina[1,2,3], Christian Eggeling[5,6,7], Jens Limpert[1,2,3,4], and Jan Rothhardt[1,2,3,4] — [1]Helmholtz Institute Jena, Jena, Germany — [2]Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena, Jena, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [4]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany — [5]Institute of Applied Optics and Biophysics, Friedrich Schiller University Jena, Jena, Germany — [6]Leibniz Institute of Photonic Technology (Leibniz-IPHT), Jena, Germany — [7]Cluster of Excellence Balance of the Microverse, Friedrich Schiller University Jena, Jena, Germany

We utilize ptychographic EUV imaging as a label-free method to study bacterial structures and composition with sub-50 nm spatial resolution, revealing physiological diversity in Escherichia coli and Bacillus subtilis and morphological changes induced by antibiotics.

**Oral** CL-5.3 14:45 ICM - Room 3

**Advancing Histopathology with Multiplex Stimulated Raman Scattering** — •Eric Michele Fantuzzi[1], Francesco Crisafi[1], Eleonora Erriquez[1], Andrea Ragni[1], Federico Monti[1], Gabriele Di Noia[1], Mujeeb Rahman[2], Tiago Azevedo[3], Moe Vali[3], Renzo Vanna[4], David Pertzborn[5], Daniela Pelzel[5], Ulrike Weyer[5], Anna Xylander[5], Anna Mühlig[5], Orlando Guntinas-Lichius[5], Pietro Liò[3], Giulio Cerullo[6], and Matteo Negro[1] — [1]Cambridge Raman Imaging Srl, Milan, Italy — [2]Cambridge Raman Imaging Ltd, Cambridge, United Kingdom — [3]Department of Computer Science and Technology, University of Cambridge, Cambridge, United Kingdom — [4]CNR IFN, Milan, Italy — [5]Jena University Hospital, Jena, Germany — [6]Politecnico di Milano, Dipartimento di Fisica, Milan, Italy

Multiplex stimulated Raman scattering (SRS) enhances tissue analysis by capturing the entire CH vibrational stretching region in a single shot. This innovative method enables virtual staining, tissue segmentation, and chemometric analysis, advancing clinical diagnostics.

**Oral** CL-5.4 15:00 ICM - Room 3

**Clinical Use cases for Fourier Ptychography Microscopy** — •Mohiudeen Azhar[1], Mark Dethlefsen[2], Gaby Marquardt[2], Ishita Chakraborty[1], Kausik Das[3], Thomas Engel[4], Jeffrey Jasperse[3], Mohammed Arfan[1], Manohar Kollegal[1], and Abhijeet Joshi[5] — [1]Center for Innovation in Diagnostics(CID), Siemens Healthineers, Bangalore, India — [2]Center for Innovation in Diagnostics(CID), Siemens Healthineers, Forcheim, Germany — [3]Point of Care, Siemens Healthineers, Norwood, MA, USA — [4]Siemens AG, Foundational Technologies, Garching, Germany — [5]Technology, Siemens Technology and Services Pvt. Ltd, Bangalore, India

The unique advantages of Fourier Ptychography Microscopy, including high-resolution imaging over a wide field of view and the computational retrieval of phase images, were explored for clinical use cases in haematology and urine sediment analysis.

**Oral** CL-5.5 15:15 ICM - Room 3

**Optical coherence tomography and Raman spectroscopy can predict germination of cotton seeds** — Brian Henrich, Marshall Tolleson, David Torck, Alexei Sokolov, Alma Fernández, and •Aart Verhoef — Texas A&M University, College Station, USA

Development and demonstrations of state-of-the-art optical technologies such as OCT and Raman spectroscopy are important for improvements in precision agriculture. We show that by combining OCT and Raman spectroscopy, cotton seed viability can be measured.

## EH-6: Tailoring and Enhancing Light Emission

Chair: Margherita Maiuri, Politecnico di Milano, Milan, Italy

Time: Friday, 14:00–15:30 Location: ICM - Room 4a

**Oral** EH-6.1 14:00 ICM - Room 4a

**AlGaAs Nonlinear Pancharatman-Berry Metasurfaces** — •Luca Carletti[1], Andrea Gerini[2], Paolo Franceschini[1], Andrea Tognazzi[3], Davide Rocco[1], Maria A Vincenti[1], Domenico de Ceglia[1], Costantino De Angelis[1], and Giuseppe Leo[2] — [1]Department of Information Engineering, University of Brescia, Brescia, Italy — [2]Matériaux et Phénomènes Quantiques, Université Paris Cité , Paris, France — [3]Department of Engineering, University of Palermo, Palermo, Italy

We propose AlGaAs-based nonlinear Pancharatmann-Berry metasurfaces for wavefront shaping of second-harmonic generation. By combining geometric phase and anisotropy of the nonlinear response of AlGaAs we achieve novel phase functions compared to existing demonstrations.

**Oral** EH-6.2 14:15 ICM - Room 4a

**Nonlinear harmonic generation in sub-5 nm plasmonic nanogap metasurfaces** — Sebastian Beer[1], •Jeetendra Gour[1], Pallabi Paul[2], Alessandro Alberucci[1], Adriana Szeghalmi[3], Thomas Siefke[1,3], Ulf Peschel[4], Uwe Detlef Zeitner[1,3,5], and Stefan Nolte[1,3] — [1]Friedrich Schiller University Jena, Institute of Applied Physics, Jena, Germany — [2]Ferdinand Braun Institute for High Frequency Technology, Berlin, Germany — [3]Fraunhofer Institue for Applied Optics and Precision Engineering IOF, Jena, Germany — [4]Friedrich Schiller University Jena, Institue of Solid State Theory and Optics, Jena, Germany — [5]Munich University of Applied Sciences, Munich, Germany

We experimentally investigate second and third order harmonic generation in plasmonic periodic metasurfaces encompassing nano-antennas with gaps of few nanometers. Emergence of a new nonlinear regime for gaps below 3 nm is demonstrated.

**Oral** EH-6.3 14:30 ICM - Room 4a

**Quasi three dimensional gold plasmonic metasurfaces for enhanced harmonic generation and light conversion to UV** — Shroddha Mukhopadhyay[1], Ana Conde-Rubio[2], Agustín Mihi[2], Jose Trull[1], Maria Antonietta Vincenti[3], Michael Scalora[4], and •Crina Cojocaru[1] — [1]Department of Physics, Universitat Politècnica de Catalunya, Terrassa (Barcelona), Spain — [2]Institute of Materials Science of Barcelona ICMAB – CSIC, Bellaterra (Barcelona), Spain — [3]Department of Information Engineering – University of Brescia, Brescia, Italy — [4]4Aviation and Missile Center, US Army CCDC, Alabama, USA

We report a combined experimental-theoretical investigation on nanoscale light-matter interaction in quasi-3D photonic crystals of gold. Using ultrafast optical pulses we produce strongly localized surface plasmon resonances to enhance nonlinear frequency conversion from visible/NIR to ultraviolet ranges.

**Oral** EH-6.4 14:45 ICM - Room 4a

**Enhancing Photon Outcoupling from Metasurface-Embedded Single Quantum Emitters** — •Samuel Prescott[1], Prasad P Iyer[2,3], Sadhvikas Addamane[2,3], Hyunseung Jung[2,3], Jaeyeon Yu[2,3], Igal Brener[2,3], and Oleg Mitrofanov[1,2] — [1]University College London, London, United Kingdom — [2]Center for Integrated Nanotechnologies, Sandia National Laboratories, Albuquerque, USA — [3]Sandia National Laboratories, Albuquerque, USA

We developed two Mie metasurface designs to boost photon outcoupling for single embedded quantum dots to free space using fundamental Mie modes. We also experimentally demonstrate the tuning of single quantum dots within a metasurface.

**Oral** EH-6.5 15:00 ICM - Room 4a

**Tailoring the luminesce properties of strong excitonic emitters with dielectric metasurfaces** — •Marco Marangi, Alexander Dubrovkin, Andrea Zacheo, Giorgio Adamo, and Cesare Soci — Centre for Disruptive Photonic Technologies, TPI, SPMS, Singapore, Singapore

Bound-state-in-the-continuum (BIC) dielectric metasurfaces coupled to excitonic emitters (TDBC J-aggregates, MAPbI3) demonstrate enhanced light-matter interactions, superradiant photon emission, and polaritonic lasing, showcasing their potential for bright and power-efficient quantum light sources.

**Oral** EH-6.6 15:15 ICM - Room 4a

**Precise positioning of quantum dots at the tips of gold bipyramids for room-temperature strong coupling** — •Kseniia Mamaeva[1,3], Hodjat Hajian[1], Carolyn Elliot[1,3], Teodora Faraone[2], Colm Delaney[2], Larisa Florea[2], and A. Louise Bradley[1,3] — [1]School of Physics and AMBER, Trinity College Dublin, Dublin, Ireland — [2]School of Chemistry, Trinity College Dublin, Dublin, Ireland — [3]IPIC, Tyndall National Institute, Cork, Ireland

Using plasmon-assisted two-photon polymerization, quantum dots are precisely integrated with a single plasmonic nano-bipyramid. Strong coupling between single excitons and localized surface plasmon polaritons, with Rabi splitting of 350 meV, is observed at room-temperature.

# CB-6: Tunable and Narrow Linewidth Semiconductor Lasers Based on Photonic Integration

Chair: Dries Van Thourhout, Ghent University, Ghent, Belgium

Time: Friday, 14:00–15:30 Location: ICM - Room 4b

**Oral** CB-6.1 14:00 ICM - Room 4b

**Ultrafast tunable photonic integrated extended-DBR Pockels laser** — Anat Siddharth[1], •Simone Bianconi[1], Rui Ning Wang[2], Zheru Qiu[1], Andrey S. Voloshin[1], Mohammad J. Bereyhi[2], Johann Riemensberger[3], and Tobias J. Kippenberg[1] — [1]Institute of Physics, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [2]Luxtelligence SA, St. Sulpice, Switzerland — [3]Norwegian University of Science and Technology, Trondheim, Norway

We present the first hybrid Pockels E-DBR laser on a wafer-scale lithium niobate-on-insulator process, with >10 GHz tuning range and >3 PHz/s speed, enabling cm-resolution coherent ranging and HCN spectroscopy for advanced sensing and communication.

**Oral** CB-6.2 14:15 ICM - Room 4b

**Continuous wavelength-sweeping of a narrow-linewidth hybrid-integrated extended-cavity laser** — •Albert van Rees[1], Rob Lammerink[1], Wilson Tsong[1], Willy Bergsma[2], Edwin Klein[2], and Dimitri Geskus[1] — [1]Chilas Lasers B.V., Enschede, Netherlands — [2]LioniX International B.V., Enschede, Netherlands

Hybrid-integrated extended-cavity lasers deliver sub-kHz intrinsic linewidths and wide wavelength tunability. However, wide tuning is usually done in discrete steps. We demonstrate continuous wavelength sweeping over more than 50 nm by piecewise mode-hop free tuning.

**Oral** CB-6.3 14:30 ICM - Room 4b

**Monolithically Integrated GaAs-based Ring-Resonator-Coupled Lasers** — •Jan-Philipp Koester, Hans Wenzel, Jörg Fricke, Poojitha Sammeta, Olaf Brox, Pietro Della Casa, and Andrea Knigge — Ferdinand-Braun-Institut (FBH), Berlin, Germany

We report on a monolithically integrated ring-resonator-coupled laser emitting up to 14 mW around 1050 nm based on our newly developed GaAs PIC platform featuring on-chip gain as well as passive shallow- and deep-etched waveguides.

**Oral** CB-6.4 14:45 ICM - Room 4b

**Narrow Linewidth GaSb/$Si_3N_4$ Hybrid Integrated 2 $\mu$m DBR Laser** — •Samu-Pekka Ojanen[1], Nouman Zia[1], Jukka Viheriälä[1], Eero Koivusalo[1], Joonas Hilska[1], Ajwaad Quashef[1], Anders Wallin[2], Kalle Hanhijärvi[2], Thomas Fordell[2], and Mircea Guina[1] — [1]Optoelectronics Research Centre, Physics Unit, Tampere University, Tampere, Finland — [2]VTT Technical Research Centre of Finland Ltd, National Metrology Institute VTT MIKES, Espoo, Finland

We demonstrate a hybrid GaSb/$Si_3N_4$ DBR laser at 2 $\mu$m with 8 kHz linewidth in free-running operation and over 17 mW output power, enabling compact, energy-efficient integrated spectroscopic sensors with potential for tunability.

**Oral** CB-6.5 15:00 ICM - Room 4b

**Low-SWaP, Narrow-Linewidth, and Tunable Laser System For The Next Generation Of Quantum Technologies** — Mateus Corato-Zanarella[1], Matthias Lommel[2], Dimitri Mayzlin[3], Jovana Nojic[3], Alexander Eras[3], Christian Nölleke[3], Björn Globisch[2], and •Christopher Haimberger[1] — [1]TOPTICA Photonics Inc., Pittsford, USA — [2]TOPTICA EAGLEYARD Photonics GmbH, Berlin, Germany — [3]TOPTICA Photonics AG, Gräfelfing, Germany

Compact quantum systems enabled by photonic integrated lasers require co-design of optics and electronics to meet stringent performance. We demonstrate a low-SWaP, narrow-linewidth, tunable laser system based on PICs and programmable electronics in the near-infrared.

**Oral** CB-6.6 15:15 ICM - Room 4b

**Quantum noise in nanolasers: A new approach** — •Matias Bundgaard-Nielsen[1,2] and Jesper Mørk[1,2] — [1]Department of Electrical and Photonics Engineering, Technical University of Denmark, Lyngby, Denmark — [2]NanoPhoton-Center for Nanophotonics, Technical University of Denmark, Lyngby, Denmark

A stochastic approach for modeling quantum noise in nanolasers accurately predicts phase noise, linewidth, and photon statistics, particularly addressing the mesoscopic regime with tens to hundreds of emitters.

# EF-6: Optical Frequency Combs and Cavity Solitons 1

Chair: Julien Javaloyes, University of the Balearic Islands (UIB), Palma de Mallorca, Spain

Time: Friday, 14:00–15:30 Location: ICM - Room 5

**Invited** EF-6.1 14:00 ICM - Room 5

**On the Kerr-Induced Synchronizations of Cavity Solitons and their Applications** — •Grégory Moille — Joint Quantum Institute, College Park, USA — NIST, Gaithersburg, USA

We discuss how Kerr-induced synchronization (KIS) enables all-optical cavity soliton control. We also present KIS variants and how each of these architectures helps toward metrological applications such as fully-integrated optical clocks and on-chip microwave synthesis.

**Oral** EF-6.2 14:30 ICM - Room 5

**Interplay between cavity solitons and doubly resonant Brillouin lasing** — •Corentin Simon[1], Mattéo Conforti[2], Loïc Van Bellingen[1], Maxime Fournier[1], François Leo[1], Arnaud Mussot[1], and Simon-Pierre Gorza[2] — [1]Université libre de Bruxelles, Bruxelles, Belgium — [2]Université de Lille, Lille, France

We present cavity solitons coexisting in a fiber resonator with doubly resonant Brillouin lasing. We model their interactions using a novel mean-field system of coupled equations resulting in great agreement with experimental results.

**Oral** EF-6.3 14:45 ICM - Room 5

**Soliton auto-generation within Kerr resonators under pulsed-driving** — •Matthew Macnaughtan[1,2], Zongda Li[1,2], Yiqing Xu [1,2], Xiaoming Wei[3], Zhongmin Yang[3], Stéphane Coen[1,2], Miro Erkintalo[1,2], and Stuart G. Murdoch[1,2] — [1]Department of Physics, University of Auckland, Auckland, New Zealand — [2]The Dodd-Walls Centre for Photonic and Quantum Technologies, Auckland, New Zealand — [3]School of Physics and Optoelectronics, South China University of Technology, Guangzhou, China

We unveil a novel dynamical regime in which dissipative Kerr cavity solitons spontaneously emerge in a coherent, pulse-driven passive Kerr resonator. The regime is robust against perturbations, ensuring reliable and deterministic cavity soliton generation.

**Oral** EF-6.4 15:00 ICM - Room 5

**Transition of parametrically driven cavity soliton to soliton crystals** — •Yifan Sun, Clément Dupont, Edem Akakpo, Francesco De Lucia, Georges Semaan, Simon-Pierre Gorza, and François Leo — Université libre de Bruxelles, Brussels, Belgium

We identify diverse Parametrically driven Kerr cavity soliton crystals in a double-resonant resonator with quadratic and cubic nonlinearities, mediated by the pump depletion.

**Oral** EF-6.5 15:15 ICM - Room 5

**Perfect Soliton Crystals in Photonic-Crystal Microresonators** — •Bastian Ruhnke[1], Alexander E. Ulanov[1], Thibault Wildi[1], Alexandra Sakharova[1], and Tobias Herr[1,2] — [1]Deutsches Elektronen Synchrotron DESY, Hamburg, Germany — [2]Physics Department, Universität Hamburg UHH, Hamburg, Germany

We present the generation of Perfect Soltion Crystals in Photonic-Crystal Microresonators, leveraging a single artificially shifted mode. The resulting optical lattice trap promotes the generation of Soliton Crystals in the cavity.

# CC-5: Solid State THz Sources

Chair: Misha Belkin, Technical University of Munich, Munich, Germany

Time: Friday, 14:00–15:30 Location: ICM - Room 11

**Oral** CC-5.1 14:00 ICM - Room 11

**Continuous-wave 5-11 THz difference-frequency generation using nonlinear metasurfaces operating in the Reststrahlenband** — •Jonas H. Krakofsky, Markus Rieder, and Mikhail A. Belkin — Walter Schottky Institute, Munich, Germany

We demonstrate optically-thin nonlinear intersubband metasurfaces optimized for terahertz difference-frequency generation in the 1-6 THz range. Widely-tunable continuous-wave THz power output of up to 1 $\mu$W is obtained using low-power(100–200 mW) mid-infrared lasers as pumps

**Oral** CC-5.2 14:15 ICM - Room 11

**A modulator for generating high-energy Terahertz rate pulse trains** — •Christian Rentschler[1,2], Nicholas Matlis[1], Umit Demirbas[1,3], Zhelin Zhang[1], Mikhail Pergament[1], and Franz Kärtner[1,2,4] — [1]Center for Free-Electron Laser Science CFEL, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Physics Department, University of Hamburg, Hamburg, Germany — [3]Antalya Bilim University, Antalya, Turkey — [4]The Hamburg Centre for Ultrafast Imaging, Hamburg, Germany

We demonstrate the generation of high-energy THz-rate pulse trains by modulating a narrowband Joule-class laser with intense terahertz fields. Our method allows to scale up the energy of pulse train drivers for narrowband terahertz generation.

**Oral** CC-5.3 14:30 ICM - Room 11

**Compact, thermoelectrically cooled surface emitting THz QCL sources** — •Sebastian Gloor[1], Adrian Weisenhorn[1], Léo Hetier[2], Urban Senica[1], Richard Maulini[2], Mattias Beck[1], Jérôme Faist[1], and Giacomo Scalari[1] — [1]Institute for Quantum Electronics, Zürich, Switzerland — [2]Alpes Lasers, St. Blaise, Switzerland

We present THz QCLs operating on four-stage Peltier coolers inside compact high heat load housings. The devices feature a dry-etched surface-emitting patch array antenna and high reflectivity loop mirror for increased power outcoupling and reduced mirror losses.

**Oral** CC-5.4 14:45 ICM - Room 11

**Two-color laser emission from optically cascaded intersubband transitions from 1.3 THz to 2 THz and above 3 THz** — •Marco Raffa, Valerio Digiorgio, Sebastian Gloor, Mattias Beck, Jérôme Faist, and Giacomo Scalari — Quantum Optoelectronics Group, ETH Zürich, Zürich, Switzerland

Dual-region THz QCLs emitting below 2 THz and above 3 THz achieved via a GaAs/AlGaAs active region with optically cascaded transitions, overcoming low-gain challenges and confirmed through lasing and electroluminescence spectra

**Oral** CC-5.5 15:00 ICM - Room 11

**Coupling Measurements in Terahertz Quantum Cascade Random Lasers** — •Anna Invernici[1,2], Michael Jaidl[1,2], Marie Christine Ertl[1,2], Dominik Theiner[1,2], Lucas Aaron Grandits[1,2], Miriam Giparakis[1,2], Aaron Maxwell Andrews[2,3], Juraj Darmo[1,2], and Karl Unterrainer[1,2] — [1]Photonics Institute, TU Wien, Wien, Austria — [2]Center for Micro-and Nanostructures, TU Wien, Wien, Austria — [3]Institute of Solid State Electronics, TU Wien, Wien, Austria

The study explores coupling in terahertz quantum cascade random lasers, where disordered gain media enable multimodal and broadband spectra. Coupled cavities exhibit broader spectral ranges, new modes, and enhanced randomness, emphasizing strong feedback interactions and unique properties.

**Oral** CC-5.6 15:15 ICM - Room 11

**High-power coherent emission from arrays of resonant-tunneling-diode (RTD) oscillators** — •Fanqi Meng[1], Zhenling Tang[2], Petr Ourednik[3], Jahnabi Hazarika[1], Michael Feiginov[3], Safumi Suzuki[2], and Hartmut G. Roskos[1] — [1]Goethe-University Frankfurt, Frankfurt Am Main, Germany — [2]Tokyo Institute of Technology, Tokyo, Japan — [3]TU Wien, Vienna, Austria

We demonstrated coherent emission from a linear 11-RTD oscillator array and a 3x3 two-dimensional RTD oscillator array. Both arrays operated at approximately 700 GHz and emitted about 1 mW of power.

# EI-2: Nonlinear Effects in Low-Dimensional Materials

Chair: Nicolò Maccaferri, Umeå University, Politecnico di Milano, Sweden Milan, Italy

Time: Friday, 14:00–15:30 Location: ICM - Room 12a

**Oral** EI-2.1 14:00 ICM - Room 12a

**Spatially Single-Cycle Polaritons in 2D Materials** — Arthur Niedermayr[1], •Tomer Bucher[1], Xihang Shi[1], Yakov Fridman[1], Harel Nahari[1], Raphael Dahan[1], Ron Ruimy[1], Alexey Gorlach[1], Eli Janzen[2], James H. Edgar[2], Frank H. L. Koppens[3,4], Hanan Herzig Sheinfux[5], and Ido Kaminer[1] — [1]Andrea & Erna Viterbi Dep. of ECE., Technion–Israel Institute of Technology, Haifa, Israel — [2]Tim Taylor Dep. of Chemical Eng., Kansas State Uni, Manhattan, USA — [3]ICFO-Inst. de Ciencies Fotoniques, The Barcelona Inst. of Sci. & Tech, Castelldefels, Spain — [4]ICREA-Institucio Catalana de Recerca i Estudis Avanats, Barcelona, Spain — [5]Department of Physics, Bar Ilan University, Ramat-Gan, Israel

Single-cycle pulses are challenging to create, requiring extremely broad bandwidths. We observe the first single-cycle polariton wavepackets, maintaining sub-cycle profiles despite a narrow spectrum due to the flat phonon-polariton dispersion in hexagonal boron nitride.

**Oral** EI-2.2 14:15 ICM - Room 12a

**Ultrafast Coherent Control of Valley Polarization in a 2D Semiconductor** — •Francesco Gucci[1], Eduardo B. Molinero[2], Mattia Russo[1], Pablo San Jose[2], Franco V. A. Camargo[3], Margherita Maiuri[1], Misha Ivanov[4,5,6], Álvaro Jiménez-Galán[2,4], Rui E. F. Silva[2,4], Stefano Dal Conte[1], and Giulio Cerullo[1,3] — [1]Department of Physics, Politecnico di Milano, Milan, Italy — [2]Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain — [3]CNR-IFN, Milan, Italy — [4]Max-Born-Institute, Berlin, Germany — [5]Department of Physics, Humboldt Universität zu Berlin, Berlin, Germany — [6]Technion—Israel Institute of Technology, Haifa, Israel

By employing a sequence of phase-locked collinear pulses, with precise sub-femtosecond-scale delay control, we experimentally demonstrate a new all-optical coherent ultrafast protocol for manipulating exciton valley polarization in a two-dimensional semiconductor at room temperature.

**Oral** EI-2.3 14:30 ICM - Room 12a

**Extreme-Ultraviolet Optical Response of Atomically Thin MoS2 Crystals** — Nicola Di Palo[1], Giacomo Inzani[1], Gian Luca Dolso[1], •Simone Bonetti[1], Qiuyang Li[2], Fang Liu[2,3], Xiaoyang Zhu[2], Angelo Giglia[4], Nicola Mahne[4], Luca Pasquali[4,5], Marco D'Alessandro[6], Mikhail Malakhov[7], María Camarasa-Gómez[8], Juan José Esteve-Paredes[9], Juan José Palacios Burgos[9], Rocío Borrego-Varillas[10], Mauro Nisoli[1,10], Antonio Picón[11], Davide Sangalli[12], and Matteo Lucchini[1,10] — [1]Department of Physics, Politecnico di Milano, Milano, Italy — [2]Department of Chemistry, Columbia University, New York, USA — [3]Department of Chemistry, Stanford University, Stanford, USA — [4]CNR-IOM-Istituto Officina dei Materiali, National Research Council of Italy, Trieste, Italy — [5]Dipartimento di Ingegneria E. Ferrari, Università di Modena e Reggio Emilia, Modena, Italy — [6]Istituto di Struttura della Materia-CNR (ISM-CNR), Roma, Italy — [7]M.N. Mikheev Institute of Metal Physics of the Ural Branch of the Russian Academy of Sciences, Yekaterinburg, Russia — [8]Centro de Física de Materiales (CFM-MPC), CSIC-UPV/EHU, Donostia-San Sebastián, Spain — [9]Departamento de Física de la Materia Condensada, Universidad Autónoma de Madrid, Madrid, Spain — [10]Institute for Photonics and Nanotechnologies, Milano, Italy — [11]Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC), Madrid, Spain — [12]Istituto di Struttura della Materia-CNR (ISM-CNR), Monterotondo Scalo, Italy

We report the first optical characterization of mono- and bilayer MoS2 crystals in the extreme-ultraviolet energy range with multi-angle reflectivity measurements. Due to strong electron correlations, their response does not present sharp excitonic signatures.

**Oral** EI-2.4 14:45 ICM - Room 12a

**Anomalous Lifetime of Optical Phonons in Graphene at Buried Interfaces** — •Tsuneto Kanai[1], ChengXiang Jin[1,2], Hibiki Tsunekawa[1,2], Atsunori Sakurai[1,2,3], and Toshiki Sugimoto[1,2,3] — [1]Institute for Molecular Science, Okazaki, Japan — [2]Graduate Institute for Advanced Studies, Okazaki, Japan — [3]RIKEN SPring-8 Center, Sayocho, Japan

Using time- and frequency-resolved coherent Raman spectroscopy, we observed,

for the first time, anomalously extended optical phonon lifetimes in single layer graphene at solid-liquid interfaces, influenced by electron-hole plasma dynamics and substrate-mediated cooling mechanisms.

**Oral** EI-2.5 15:00 ICM - Room 12a

**Tracing the Internal Fine Structure of Quasi-1D Excitons Controlled by Magnetic Order in CrSBr** — •Anastasios D. Koulouklidis[1,2], Marlene Liebich[1], Matthias Florian[3], Niloufar Nilforoushan[1], Fabian Mooshammer[2], Ludwig Wittmann[1], Kseniia Mosina[4], Zdeněk Sofer[4], Florian Dirnberger[5], Mackillo Kira[3], and Rupert Huber[1,2] — [1]Department of Physics, University of Regensburg, Regensburg, Germany — [2]Regensburg Center for Ultrafast Nanoscopy, University of Regensburg, Regensburg, Germany — [3]Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, USA — [4]Department of Inorganic Chemistry, University of Chemistry and Technology Prague, Prague, Czech Republic — [5]Institute of Applied Physics, Dresden University of Technology, Dresden, Germany

In a joint experiment-theory study, phase-locked mid-infrared pulses trace internal transitions of quasi-1D excitons in CrSBr revealing a strong anisotropy-induced fine-structure splitting. The internal structure changes from strongly-bound, monolayer-localized to weakly-bound, interlayer-delocalized states across the magnetic phase transition.

**Oral** EI-2.6 15:15 ICM - Room 12a

**All-optical polarization encoding and modulation by nonlinear interferometry at the nanoscale** — •Michele Celebrano[1], Yigong Luan[1], Attilio Zilli[1], Agostino Di Francescantonio[1], Vincent Vinel[2], Paolo Biagioni[1], Lamberto Duò[1], Aristide Lemaitre[3], Giuseppe Leo[2], and Marco Finazzi[1] — [1]Politecnico di Milano, Physics Department, Milano, Italy — [2]Université de Paris, CNRS, Laboratoire Matériaux et Phénomènes Quantiques, Paris, France — [3]Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, Palaiseau, France

We perform all-optical polarization encoding of the light upconverted by a dielectric metasurfaces. By tuning the delay between two pump pulses the polarization state switches from linear to circular with a degree of circular polarization > 80%

## EE-3: Nonlinear Propagation Dynamics

Chair: Francesco Tani, Université de Lille, Lille, France

Time: Friday, 14:00–15:30 Location: ICM - Room 12b

**Oral** EE-3.1 14:00 ICM - Room 12b

**Real-time measurements of beam self-cleaning dynamics** — •Jiaqi Li[1], Joshua Ruelle[1,2], Piotr Ryczkowski[1], John M. Dudley[2], and Goëry Genty[1] — [1]Tampere university, Tampere, Finland — [2]Université Marie et Louis Pasteur, Institut FEMTO-ST, CNRS UMR 6174, Besançon, France

Self cleaning: We report real-time measurements of spatial self-cleaning dynamics in multimode fiber and show that self-cleaning is a manifestation of the spectral broadening induced by self-phase modulation.

**Oral** EE-3.2 14:15 ICM - Room 12b

**Leveraging Machine Learning and a Photonic Integrated Chip for the Spectro-Temporal Tailoring of Supercontinuum Generation** — •Bruno P. Chaves[1], Jérémy Saucourt[1], Van Thuy Hoang[1], Alexis Bougaud[1], Brent E. Little[2], Sai T. Chu[3], David J. Moss[4], Roberto Morandotti[5], Vincent Couderc[1], and Benjamin Wetzel[1] — [1]XLIM Research Institute, CNRS UMR 7252, Université de Limoges, Limoges, France — [2]QXP Technologies Inc., Xi'an, China — [3]Department of Physics, City University of Hong Kong,, Hong Kong, China — [4]Optical Sciences Centre, Swinburne University of Technology, Victoria, Australia — [5]Institut National de la Recherche Scientifique - Centre Énergie Matériaux Télécommunications, Varennes, Canada

We experimentally demonstrate spectro-temporal control and tailoring of supercontinuum generation using an on-chip programmable delay line and asynchronous X-FROG measurements. We employ optimization strategies and machine learning to shape the supercontinuum into desired spectro-temporal patterns.

**Oral** EE-3.3 14:30 ICM - Room 12b

**Optimization of Geometric Parametric Instability using Beam Shaping** — •Ekaterina Krutova[1], Joshua Ruelle[2], and Goëry Genty[1] — [1]Photonics Laboratory, Physics Unit, Tampere University, Tampere, Finland — [2]Institut FEMTO-ST, Université Bourgogne Franche-Comté, Besançon, France

We demonstrate the spectral evolution of the GPI gain regarding the size of the injected beam into GRIN MMF showing the presence of the optimal beam size leading to the most efficient sideband generation.

**Oral** EE-3.4 14:45 ICM - Room 12b

**Tunable Megahertz Repetition-Rate Few-Femtosecond Laser-Based UV Source for Pump-Probe Experiments at the European XFEL** — Aswan Alangattuthodi[1], Joachim Meier[1], Joleik Nordmann[2], Dimitrios Rampotis[1], Radu Secareanu[1], Max Lederer[1], Francesca Calegari[3,4,5], Christian Brahms[2], John C. Travers[2], Michael Meyer[1], Daniel E. Rivas[1], and •Terence Mullins[3,4] — [1]European XFEL, Schenefeld, Germany — [2]Institute of Photonics and Quantum Sciences, Heriot-Watt University, Edinburgh, United Kingdom — [3]Center for Free-Electron Laser Science, Deutsches Elektronen-Synchrotron, Hamburg, Germany — [4]The Hamburg Centre for Ultrafast Imaging, Universität Hamburg, Hamburg, Germany — [5]Physics Department, Universität Hamburg, Hamburg, Germany

We demonstrate generation of microjoule UV laser pulses in burst mode via resonant dispersive wave emission in a hollow capillary fiber filled with Argon gas, pumped at 1030nm at 1.1 MHz intra-burst repetition rate.

**Oral** EE-3.5 15:00 ICM - Room 12b

**Characterization of a high-repetition-rate laser filament-induced plasma in air using optical emission spectroscopy** — •Malte C. Schroeder[1], Robin Löscher[1], Nikita Bibinov[2], Ihor Korolov[2], Peter Awakowicz[2], Thomas Mussenbrock[2], and Clara J. Saraceno[1,3] — [1]Institute of Photonics and Ultrafast Laser Science, Bochum, Germany — [2]Institute of Applied Electrodynamics and Plasma Technology, Bochum, Germany — [3]Research Center Chemical Science and Sustainability, Bochum, Germany

We present a first characterization of a laser filament plasma generated at a repetition rate of 10 kHz using optical emission spectroscopy. These nanosecond-resolved measurements, combined with collisional-radiative plasma models, yield multiple relevant plasma parameters.

**Oral** EE-3.6 15:15 ICM - Room 12b

**Steering Laser-produced THz Radiation in Air with Flying Focus** — Silin Fu[1,2], Baptiste Groussin[1], Yi Liu[3,4], André Mysyrowicz[1], Vladimir Tikhonchuk[5,6], and •Aurélien Houard[1] — [1]LOA, ENSTA Paris, Ecole Polytechnique, CNRS, IP Paris, Palaiseau, France — [2]School of Nuclear Science and Technology, Lanzhou University, Lanzhou, China — [3]Shanghai Key Lab of Modern Optical System, USST, Shanghai, China — [4]CAS Center for Excellence in Ultra-intense Laser Science, Shanghai, China — [5]Centre Lasers Intenses et Applications, Université de Bordeaux-CNRS-CEA, Bordeaux, France — [6]Extreme Light Infrastructure ERIC, ELI-Beamlines Facility, Dolní Břežany, Czech Republic

We show that THz radiation emitted by a short femtosecond laser filament in air can be tuned in any direction using the flying focus technique, which determines the speed and direction of the ionization front.

# CD-13: Integrated Nonlinear Optics 2

Chair: Christelle Monat, École Centrale de Lyon - Institut des Nanotechnologies de Lyon, Lyon, France

Time: Friday, 14:00–15:30 Location: ICM - Room 13a

**Oral** CD-13.1 14:00 ICM - Room 13a

**Rapid tuning of optical delay lines via optical phase amplification in a silicon photonic four-wave mixing interferometer** — Yuanfei Zhang, Honghui Zhang, Zunyue Zhang, Ziyue Zhang, Hon Ki Tsang, and •Chester Shu — The Chinese University of Hong Kong, Hong Kong, China

We demonstrate optical phase amplification using phase-sensitive four-wave mixing in a silicon nanowire waveguide, achieving a magnification factor of 9. Fast tuning of the magnification results in high-speed switching of optical delay over 40 GHz.

**Oral** CD-13.2 14:15 ICM - Room 13a

*withdrawn*

**Oral** CD-13.3 14:30 ICM - Room 13a

**Ultrafast dynamics in semiconductor nanocavities with deep sub-wavelength confinement of light** — •Gaoneng Dong[1,2], Ali Nawaz Babar[1,2], Rasmus Ellebæk Christiansen[2,3], Søren Engelberth Hansen[1,2], Søren Stobbe[1,2], Yi Yu[1,2], and Jesper Mørk[1,2] — [1]Department of Electrical and Photonics Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark — [2]NanoPhoton – Center for Nanophotonics, Technical University of Denmark, Kgs. Lyngby, Denmark — [3]Department of Civil and Mechanical Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark

Dielectric bowtie cavities outperform standard point-defect cavities with conventional light confinement in both switching contrast and recovery time, highlighting its potential for high-speed and low-power optical devices.

**Oral** CD-13.4 14:45 ICM - Room 13a

*moved from CD-P.21*

**Mid-infrared Raman-enhanced four-wave mixing in silicon waveguides** — •Tuoyang Chen, Meng Huang, Shiyu Sun, Callum Stirling, Collin Mitchell, Milos Nedeljkovic, Goran Mashanovich, and Anna Peacock — Optoelectronics Research Centre, University of Southampton, SOUTHAMPTON, United Kingdom

Raman-enhanced four-wave mixing in the mid-infrared region is demonstrated using a silicon waveguide. A conversion efficiency of -25 dB is achieved with a continuous-wave pump power as low as 46 mW.

**Oral** CD-13.5 15:00 ICM - Room 13a

**Towards Integrated on-Chip Liquid Sensing based on Correlated Photons** — •Joschka Schöner[1,2], Chiara Lindner[2], Simon Herr[2], Frank Kühnemann[2], and Ingo Breunig[1] — [1]Laboratory for Optical Systems, Department of Microsystems Engineering - IMTEK, University of Freiburg, Freiburg, Germany — [2]Franhofer Institute for Physical Measurement Techniques IPM, Freiburg, Germany

For MIR spectroscopy of liquid media using a chip-integrated nonlinear quantum interferometer, waveguides with heights of several micrometer are ideal. It is crucial that height variations in the SPDC sections remain significantly below 100 nm.

**Oral** CD-13.6 15:15 ICM - Room 13a

**Repetition Rate Stabilization of Brillouin-Assisted Soliton Microcomb via Soliton Power Stabilization** — •Dohyeong Kim[1], In Hwan Do[2], Daewon Suk[1], Jae Hoon Lee[3], and Hansuek Lee[1] — [1]Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon, South Korea — [2]Graduate School of Nanoscience and Technology, Korea Advanced Institute of Science and Technology, Daejeon, South Korea — [3]Korea Research Institute of Standards and Science, Daejeon, South Korea

We propose a straightforward method to improve the duration and the long-term stability of soliton repetition rate in Brillouin-assisted solitons by stabilizing soliton power through feedback, compared to the case of a free-running pump laser.

# CJ-13: Specialty Fiber and Devices 2

Chair: Laurent Bigot, CNRS - Universite of Lille, Lille, France

Time: Friday, 14:00–15:30 Location: ICM - Room 13b

**Oral** CJ-13.1 14:00 ICM - Room 13b

**Overcoming depolarization in TMI-limited polarization-maintaining fiber amplifiers** — •Friedrich Möller, Gonzalo Palma-Vega, Till Walbaum, and Thomas Schreiber — Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

We study transverse mode instabilities (TMI) in polarization-maintaining (PM) Yb-doped fiber amplifiers in 20/400 $\mu$m geometry. Our findings reveal that depolarization limits off-axes operation in PM fiber amplifiers and we provide a solution to address this.

**Oral** CJ-13.2 14:15 ICM - Room 13b

**Experimental investigations on passive stabilization of coherently combined multicore fiber systems** — •Felix Wanitschke[1], Cèsar Jauregui[1,4], Arno Klenke[1,2,3,4], Yahia Khalil[1], Mehran Bahri[1], and Jens Limpert[1,2,3,4] — [1]Institute of Applied Physics, Abbe Center of Photonics, Jena, Germany — [2]Helmholtz-Institute Jena, Jena, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [4]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

Multicore fibers enable scalability of high-power lasers with compact footprints and manageable complexity. We present the first experimental evidence of passive their phase stability, proving their potential for coherent beam combining without active phase stabilization.

**Oral** CJ-13.3 14:30 ICM - Room 13b

**Operation of incoherently combined multicore fibers above the TMI threshold** — •Yahia Khalil[1], Cesar Jauregui[1,4], and Jens Limpert[1,2,3,4] — [1]Friedrich Schiller University Jena, Institute of Applied Physics, Abbe Center of Photonics, Jena, Germany — [2]Helmholtz-Institute Jena, Jena, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [4]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

This work demonstrates that incoherent beam combination of multi-core fibers can enable operation beyond the TMI threshold, overcoming a strict power limit while maintaining an acceptable beam quality and temporal stability in high-average-power applications.

**Oral** CJ-13.4 14:45 ICM - Room 13b

**100 W all-fiber side-pump combiner on a passive large-pitch photonic crystal fiber** — Yakup Midilli, Bartu Şimşek, and •Bülend Ortaç — . National Nanotechnology Research Center (UNAM) and Institute of Materials Science and Nanotechnology, Bilkent University, 06800, Bilkent, Ankara, Turkey, Ankara, Turkey

A side pump combiner has been fabricated on a large pitch photonic crystal fiber with a high-power pump combining more than 100 W with a high pump coupling efficiency of %94.

**Oral** CJ-13.5 15:00 ICM - Room 13b

**Improvement of Beam Stability in Yb-doped Tapered Fiber amplifiers** — •Mikhail Likhachev, Egor Mikhailov, and Yulia Gromova — GREITLEX PHOTONICS DOO, Novi Beograd, Serbia

High-order-modes excitation (and output beam position variation) in Yb-doped tapered fibers coursed by cladding light propagated in the thin tapered fiber end was observed. Beam stability improvement was demonstrated by utilization of cladding mode stripper.

**Oral** CJ-13.6 15:15 ICM - Room 13b

**O-band mode-locked femtosecond praseodymium-doped fluoride fiber laser using a nickel metal-organic framework** — Harith Ahmad[1,2,3], Bilal Nizamani[1], Muhamad Zharif Samion[1], Saliha Mutlu[4,5], Sevil Savaşkan Yılmaz[4,5], Nergis Arsu[6], Kavintheran Thambiratnam[7], and •Bülend Ortaç[5] — [1]Photonics Research Centre, Universiti Malaya, 50603, Kuala Lumpur, Malaysia — [2]Physics Department, Faculty of Science, Universiti Malaya, 50603, Kuala Lumpur, Malaysia — [3]Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang, 65145, Malang, Indonesia — [4]Department of Chemistry, Karadeniz Technical University, 61080, Trabzon, Turkey — [5]National Nanotechnology Research Center (UNAM), Bilkent University, 06800, Ankara, Turkey — [6]Department of Chemistry, Yildiz Technical University, Davutpasa Campus, 34220, Istanbul , Turkey — [7]IIUM Photonics and Quantum Centre (iPQC), Kulliyyah of Science, International Islamic University Malaysia, 25200, Kuantan, Malaysia

We demonstrated a laser-induced synthesis of Ni-MOF, as a novel saturable absorber for femtosecond pulse generation in a praseodymium-doped fluoride fiber laser. 450 fs duration was obtained at the wavelength of 1298.1 nm.

## CH-16: Numerical and Experimental Light Characterization and Modeling

Chair: Adrian Podoleanu, University of Kent, Canterbury, United Kingdom

Time: Friday, 14:00–15:30 Location: ICM - Room 14a

**Oral** CH-16.1 14:00 ICM - Room 14a

**Optical Wavefront Shaping and Extinction on Small Particles, Clusters, and 3D Finite Samples** — Ad Lagendijk[1], Allard P. Mosk[2], and •Willem L. Vos[1,3] — [1]Complex Photonic Systems (COPS), MESA+ Institute, University of Twente, Enschede , Netherlands — [2]Nanophotonics, Debye Institute for Nanomaterials Science, Utrecht University, Utrecht , Netherlands — [3]Institut Langevin, ESPCI Paris, PSL University, CNRS, Paris, France

We extend the study of wavefront shaping to materials and objects that are finite in 3D. Using new theory, exact numerics, and Rayleigh-Gans theory, we study not only speckle enhancement but also extinction enhancement.

**Oral** CH-16.2 14:15 ICM - Room 14a

**A New Method for Removing Internal Scattering Noise in iToF Camera** — •Yansong Du[1], Jingtong Yao[1], Feiyu Jiao[1], Yuting Zhou[1], Qiang Jin[1], Bangyao Wang[1], Kang An[2], Zhaoxiang Jiang[2], and Xun Guan[1] — [1]Tsinghua Shenzhen International Graduate School, Tsinghua University, Shenzhen, 518055, China — [2]Guangdong Laboratory of Artificial Intelligence and Digital Economy (SZ), Shenzhen, 518060, China

We proposed an innovative approach combining wavelet transforms and multi-scale Point Spread Function (PSF) to effectively eliminate internal scattering noise in iToF cameras. This method outperforms traditional noise reduction techniques, offering significant improvements in accuracy.

**Oral** CH-16.3 14:30 ICM - Room 14a

**Phase space tomography for reconstruction of partially coherent light** — •Jaime Moreno[1], Juho Korri[1], Rafael Barros[1,2], and Robert Fickler[1] — [1]Tampere University, Tampere, Finland — [2]Universidade de Sao Pablo, Sao Pablo, Brasil

We implemented a method to reconstruct partially coherent light fields by exploding the analogy between Fock space and paraxial modes of light. The method is based in the direct probing of the Wigner function.

**Oral** CH-16.4 14:45 ICM - Room 14a

**A Deep-Learning Approach for Estimating the Zernike Coefficient of the Wavefront for Plenoptic Wavefront Sensing** — •Jian-Zong Lai and Fan-Ching Chien — National Central University, Taoyuan 32001, Taiwan

The Zernike coefficients of the wavefront were directly estimated using a deep-learning approach from the plenoptic wavefront sensing. The model demonstrated improved accuracy and robustness under various signal levels, particularly in reduced photon numbers.

**Oral** CH-16.5 15:00 ICM - Room 14a

**Light propagation in oil-immersed weakly disordered glass** — •Arnaud Poisson[1], André Lecomte[2], Christine Restoin[1], Vincent Couderc[1], Armand Passelergue[1], Jean-Louis Auguste[1], and Alessandro Tonello[1] — [1]University of Limoges, XLIM, UMR CNRS 7252, 123 Av. Albert Thomas, Limoges, France — [2]University of Limoges, Ceramics Research Institute (IRCER), UMR CNRS 7315, Limoges, France

We experimentally and numerically study the light propagation in oil-immersed weakly disordered glass excited by a multimode fiber. We observe that the laser beams splits into branches, whose position is influenced by the input conditions.

**Oral** CH-16.6 15:15 ICM - Room 14a

**Bayesian Autocorrelation Spectroscopy** — •Jakob Schröder[1] and Andreas Döpp[1,2] — [1]Ludwig-Maximilians-Universität, Munich, Germany — [2]Department of Physics, Clarendon Laboratory, University of Oxford, Oxford, United Kingdom

We present Bayesian Autocorrelation Spectroscopy (BAS), a novel framework for Fourier transform spectroscopy that incorporates prior knowledge and enables adaptive sampling. Applied to FTIR, BAS achieves superior reconstruction speed and accuracy compared to traditional methods.

## CK-14: Photonic Crystals

Chair: Ivo Tanghe, Ghent University, Ghent, Belgium

Time: Friday, 14:00–15:30 Location: ICM - Room 14b

**Oral** CK-14.1 14:00 ICM - Room 14b

**Strong Group Delay Dispersion in 3D Photonic Band Gap Crystals and Planar Microcavities** — •L. (Bert) Mulder, Ad Lagendijk, and Willem L. Vos — University of Twente, Enschede, Netherlands

We developed a broadband interferometric optical microscope to observe phase-sensitive reflectivity. In planar microcavities and 3D silicon photonic band gap crystals we observe major group delays corresponding to resonances and photonic slow light.

**Oral** CK-14.2 14:15 ICM - Room 14b

**Observation of Cartesian Light Propagation through a Three-Dimensional Cavity Superlattice in Silicon Photonic Band Gap Crystals** — Manashee Adhikary, Marek Kozoň, Ravitej Uppu, and •Willem L. Vos — 1. Complex Photonic Systems (COPS), MESA+ Institute, University of Twente, 7500 AE Enschede, Netherlands

We experimentally investigate peculiar light propagation inside a 3D superlattice of coupled cavities confined within a 3D photonic band gap. Reflectivity and lateral scattering yield evidence that photons “dance like pieces on a Go board”.

**Oral** CK-14.3 14:30 ICM - Room 14b

**Carrier Transport in Electrically-Driven Photonic Crystal Membrane Lasers** — •Mathias Marchal[1,2], Nikolaos Chatzaras[1,2], Evangelos Dimopoulos[1,2], Andrey Marchevsky[1,2], Aurimas Sakanas[1,2], Marco Saldutti[1,2], Kasper Spiegelhauer[1,2], Yi Yu[1,2], Kresten Yvind[1,2], Meng Xiong[1,2], and Jesper Mørk[1,2] — [1]Department of Electrical and Photonics Engineering, Technical University of Denmark, 2800 Kgs. Lyngby, Denmark — [2]NanoPhoton - Center for Nanophotonics, 2800 Kgs. Lyngby, Denmark

We developed a 2D model of carrier transport in photonic cyrstal lasers that predicts the presence of unconventional leakage paths. This explains experimental observations of low injection efficiencies and enhanced spontaneous emission at doping interfaces.

**Oral** CK-14.4 14:45 ICM - Room 14b

**Wavelength Dependent Light Trapping in a Chirped 3D Photonic Crystal** — •Eva Otero[1], Bertran Soria[1], Mangirdas Malinauskas[2], Darius Gailevicius[2], Vygantas Mizeikis[3], Kestutis Staliunas[1,2], Jose Trull[1], and Crina Cojocaru[1] — [1]1. Department of Physics, Universitat Politècnica de Catalunya, Terrassa, Spain — [2]2. Laser Research Center, Faculty of Physics, Vilnius University, Vilnius, Lithuania — [3]3. Research Institute of Electronics, Shizuoka University, Hamamatsu, Japan

We experimentally and numerically demonstrate wavelength dependent light localization at different positions along propagation inside a 3D chirped woodpile photonic crystal in the infrared regime.

**Oral** CK-14.5 15:00 ICM - Room 14b

**Coupling efficiency in multimodal photonic crystal cavities** — •Loredana Maria Massaro[1] and Fabrice Raineri[2] — [1]Center of Nanosciences and Nanotechnologies, Palaiseau, France — [2]Université Côte d'Azur, Institut de Physique de Nice, Sophia Antipolis, France

We present coupling efficiency evaluation between a multimodal PhC-cavity and a waveguide. A 'switching-coupling' regime is introduced, opening new avenues in the design of coupled systems for both single-mode and multimodal applications on chip.

**Oral** CK-14.6 15:15 ICM - Room 14b

**Identifying and Mapping Planar Defect States in a 3D Photonic Band Gap** — •Timon J. Vreman[1], Melissa J. Goodwin[1], Lars J. Corbijn van Willenswaard[1], William L. Barnes[2,1], Ad Lagendijk[1], and Willem L. Vos[1] — [1]Complex Photonic Systems (COPS), MESA+ Institute, University of Twente, Enschede, Netherlands — [2]Department of Physics and Astronomy, University of Exeter, Exeter, United Kingdom

We study the momentum-resolved reflectivity of surface defect waves on top of 3-dimensional photonic band gap crystals. We observe backward-propagating waves at frequencies in the band gap, whose dispersion matches well with theory and simulations.

## CF-12: Ultrafast Spectroscopy and Imaging 2

Chair: Takao Fuji, Toyota Technological Institute, Nagoya, Japan

Time: Friday, 14:00–15:30 Location: ICM - Room 14c

**Oral** CF-12.1 14:00 ICM - Room 14c

**4D Near-Field Electron Tomography** — •Tamir Shpiro, Ron Ruimy, Kaizad Rustomji, and Ido Kaminer — Solid State Institute, Technion – Israel Institute of Technology, Haifa, Israel

Sensing of ultrafast electromagnetic pulses is limited by detectors' spatio-temporal resolution. Utilizing electrons spatial resolution and their coherent interaction with fields, we develop a novel technique for reconstructing 3+1D vectorial near-fields in ultrafast electron microscopy.

**Oral** CF-12.2 14:15 ICM - Room 14c

**Time-domain terahertz spectrometer with 1-18 THz spectral coverage based on a Cr:ZnS oscillator** — •Daiki Okazaki[1,2], Mojtaba Aghakasiri[1], Philipp Steinleitner[1], Wolfgang Schweinberger[3,4], Dionysios Potamianos[3,4], Yang Gui[1,3], Aleksandar Sebesta[1,4], Behnam Jahedi[3], Shigeki Tokita[2], Ferenc Krausz[1,3,4], and Alexander Weigel[1,3,4] — [1]Max-Planck-Institute of Quantum Optics, Munich, Germany — [2]Institute for Chemical Research, Kyoto University, Kyoto, Japan — [3]Ludwig-Maximilians-Universität München, Munich, Germany — [4]Center for Molecular Fingerprinting, Budapest, Hungary

We developed a field-resolved terahertz spectrometer based on a Cr:ZnS femtosecond oscillator. Utilizing optical rectification in DSTMS and electro-optic sampling with ZnTe, it achieves broadband spectral coverage spanning from 1 to 18 THz.

**Oral** CF-12.3 14:30 ICM - Room 14c

**Ultrafast Imaging Below the Diffraction Limit with High Harmonic Deactivation Microscopy** — •Tanya W.P. van Horen[1], Kevin Murzyn[1], Pieter J. van Essen[1], Zhonghui Nie[1], Leo Guery[1], Maarten van der Geest[1], Stefan Witte[1,2], and Peter M. Kraus[1,2] — [1]Advanced Research Center for Nanolithography, Amsterdam, Netherlands — [2]Vrije Universiteit Amsterdam, Amsterdam , Netherlands

We combine super-resolution and label-free microscopy by using a donut-shaped pump beam to confine harmonic generation to a sub-diffraction region. This Harmonic Deactivation Microscopy (HADES) can enable (sub-)fs temporal and at least 100-nm spatial resolution.

**Oral** CF-12.4 14:45 ICM - Room 14c

**Fundamental limits on ultrafast electron holography** — •Walter Schaap[1,2,4], Chen Mechel[1], Ron Ruimy[1], Arthur Niedermayr[1], Yonatan Israel[1,3], Alexey Gorlach[1], Rafael Dunin-Borkowksi[4], Jom Luiten[2], and Ido Kaminer[1] — [1]Solid State Institute and Faculty of Electrical & Computer Engineering, Technion-Israel Institute of Technology, Haifa, Israel — [2]Department of Applied Physics, Eindhoven University of Technology, Einhoven, Netherlands — [3]Raymon & Beverly Sackler Faculty of Exact Sciences, Tel Aviv University, Tel Aviv, Israel — [4]Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons, Forschungszentrum Jülich, Jülich, Germany

We show that ultrafast electron phase imaging of any time-dependent phenomenon is fundamentally limited by blurring and contrast reduction, imposing guidelines on required electron pulse durations for each experiment.

**Oral** CF-12.5 15:00 ICM - Room 14c

**Are Transverse Mode-Locked Beams Identical to Periodically Deflected Beams?** — •Jan Wichmann, Michael Zwilich, and Carsten Fallnich — University of Münster, Münster, Germany

Periodically scanning beams generated by transverse mode-locking and by common opto-mechanical beam deflection are compared to showcase their expected similarities and unexpected discrepancies of their intensity as well as phase characteristics.

**Oral** CF-12.6 15:15 ICM - Room 14c

**Post-compression of an Ytterbium laser in two steps for attosecond spectroscopy** — •Nicolas Lericheux, Thierry Auguste, Matthieu Guer, Titouan Gadeyne, Olivier Girad, Hussein Taleb, Fabien Lepetit, Fabrice Réau, Olivier Tcherbakoff, Pascal Salière, Jean-François Hergott, and Hugo Marroux — Université Paris-Saclay, CEA, Laboratoire Interactions Dynamiques et Lasers, Gif-sur-Yvette, France

We demonstrate the post-compression of millijoule-level ytterbium laser pulses to near-single optical cycle regime, achieving a transmission efficiency exceeding 40%, utilizing a multipass cell and a stretched hollow-core fiber.

## JSI-5: Free-Space Photonics for AI

Chair: Antonio Hurtado, Institute of Photonics - University of Strathclyde, Glasgow, United Kingdom

Time: Friday, 14:00–15:30 Location: ICM - Room Osterseen

**Invited** JSI-5.1 14:00 ICM - Room Osterseen

**Nonlinear computation in optical neural networks** — •Demetri Psaltis — EPFL, Lausanne, Switzerland

The advantage of optics is the low energy with which linear transformations are implemented with light. However, nonlinearity is a necessary element in neural networks. In this presentation we explore nonlinear methods for optical neural networks.

**Oral** JSI-5.2 14:30 ICM - Room Osterseen

**Multichannel Optical Computing With Multi-plane Light Converters** — •Fatma Nur Kilinc, Azka Maula Iskandar Muda, and Ugur Tegin — Koc University, Istanbul, Türkiye

We proposed a multichannel optical computing platform using multi-plane light converters to process RGB data. Achieving 93% test accuracy, it overcomes grayscale limitations and demonstrates high-performance optical computing for advanced AI and imaging applications.

**Oral** JSI-5.3 14:45 ICM - Room Osterseen

**Degree-of-Polarization Sensing with a Photonic Neural Network** — •Alessandro Petrini[1], Claudio Conti[2], and Davide Pierangeli[1,2] — [1]Institute for Complex Systems, National Research Council, 00185 Rome, Italy — [2]Department of Physics, Sapienza University, 00185 Rome, Italy

We report a novel single-shot full-Stokes polarimeter made by a photonic random neural network capable of measuring also the degree of polarization of light.

**Oral** JSI-5.4 15:00 ICM - Room Osterseen

**Single Pixel Image Classification using Ultrafast Optoelectronic Hardware** — Aisha Kanwal[1], Graeme Johnstone[1], Johannes H. Herrnsdorf[1], Robert K. Henderson[2], Martin D. Dawson[1], •Xavier Porte[1], and Michael J. Strain[1] — [1]Institute of Photonics, University of Strathclyde, Glasgow, United Kingdom — [2]School of Engineering, University of Edinburgh, Edinburgh, United Kingdom

We experimentally demonstrate ultrafast image classification based on a single pixel imaging system. Furthermore, we study the performance of our classification approach for increasing levels of image compression, achieving accuracies above 91% at kHz rates.

**Oral** JSI-5.5 15:15 ICM - Room Osterseen

**Photonic Neural Networks with Random Projection Kernel Optimization** — •Bora Çarpınlıoğlu and Uğur Teğin — Department of Electrical and Electronics Engineering, Koç University, Istanbul, Turkey

We present a photonic neural network where a disordered medium is modeled as a collection of different random projection kernels. Kernel optimization is performed with genetic algorithm, resulting in better performances in machine learning datasets.

## EG-5: Charges and Light Interacting at the Nanoscale

Chair: Nicolas Bonod, CNRS - Aix Marseille Université - Institut Fresnel, Marseille, France

Time: Friday, 14:00–15:30 Location: ICM - Room 21

**Invited** EG-5.1 14:00 ICM - Room 21

**Electrical modulation of plasmonic nano particle surfaces** — •Thorsten Feichtner[1], Luka Zurak[1], Jessica Meier[1], René Kullock[1], Christian Wolff[2], Asger Mortensen[2], and Bert Hecht[1] — [1]Nano-Optics and Biophotonics Group, Experimentelle Physik 5, Universität Würzburg, Würzburg, Germany — [2]POLIMA–Center for Polariton-driven Light-Matter Interactions, University of Southern Denmark, Odense, Denmark

Plasmonic resonators can be electrically contacted by means of nanometer thin monocrystalline wires. This opens a plethora of experimental possibilities. I will focus on the tuning of surface properties, hinting towards a quantum mechanical description of metal-dielectric boundaries.

**Oral** EG-5.2 14:30 ICM - Room 21

**Free-space optical modulation of continuous free-electron beams** — •Cruz I. Velasco[1] and F. Javier García de Abajo[1,2] — [1]ICFO - Institut de Ciencies Fotoniques, The Barcelona Institute of Science and Technology, Castelldefels (Barcelona), Spain — [2]ICREA - Institució Catalana de Recerca i Estudis Avançats, Barcelona, Spain

We show that stimulated Compton scattering can be exploited to enable significant temporal compression of an electron beam in the continuous wave regime, without relying on pulsed light or optical scattering by material structures.

**Oral** EG-5.3 14:45 ICM - Room 21

**Probing nonlinear optical states with free electrons** — •Jasmin Kappert[1,2], Yujia Yang[3,4], Jan-Wilke Henke[1,2], Arslan S. Raja[3,4], Germaine Arend[1,2], Guanhao Huang[3,4], Armin Feist[1,2], Zheru Qiu[3,4], Rui Ning Wang[3,4], Aleksandr Tusnin[3,4], Alexey Tikan[3,4], Tobias J. Kippenberg[3,4], and Claus Ropers[1,2] — [1]Max Planck Institute for Multidisciplinary Sciences, Göttingen, Germany — [2]4th Physical Institute, University of Göttingen, Göttingen, Germany — [3]Institute of Physics, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [4]Center for Quantum Science and Engineering, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland

Employing inelastic electron-light scattering, we study nonlinear optical phenomena in high-Q cavities at the nanoscale. This expands the understanding of free electron-light interaction and enables new avenues for THz electron beam modulation.

**Oral** EG-5.4 15:00 ICM - Room 21

**Nonreciprocal Interactions of Toroidal Charge-Current Configurations** — •Chaitanya Mididoddi[1], Nikitas Papasimakis[1], and Nikolay I. Zheludev[1,2] — [1]University of Southampton , Southampton, United Kingdom — [2]Texas A&M University, Texas, USA

We report on the violation of Newtonian action-reaction in interacting charge-current configurations of toroidal topology that resembles active matter dynamics and can underpin phase transitions into the time crystal state.

**Oral** EG-5.5 15:15 ICM - Room 21

**Electron tomography of optical phase singularities** — •Tamir Shpiro, Ron Ruimy, Qinghui Yan, and Ido Kaminer — Solid State Institute, Technion – Israel Institute of Technology, Haifa, Israel

2D phase singularities of electromagnetic waves attract vast scientific interest. However, 3D singularities are difficult to measure, limiting understanding of their properties. We propose a novel tomography method for reconstructing them using ultrafast electron microscopy.

## EJ-3: Computational Nonlinear Optics

Chair: Stefan Skupin, Université Claude Bernard Lyon 1 - CNRS, Lyon, France

Time: Friday, 14:00–15:30 Location: ICM - Room 22a

**Oral** EJ-3.1 14:00 ICM - Room 22a

**Nonlinear optical properties of molecular materials, structures and devices thereof: A theoretical multi-scale approach** — •Marjan Krstić[1], Mariia Poleva[1], Bendikt Zerulla[1], Christof Holzer[1], Ivan Fernandez-Corbaton[2], and Carsten Rockstuhl[1,2] — [1]Institute of Theoretical Solid State Physics, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany — [2]Institute of Nanotechnology, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany

We developed a novel scale bridging theoretical description of nonlinear optical properties of molecular materials and photonic devices thereof, combining quantum chemistry calculations with Maxwell scattering simulations. We apply our workflow on two distinctive applications.

**Oral** EJ-3.2 14:15 ICM - Room 22a

**A semi-analytic model for tightly focused ultrashort pulses in the nonlinear regime** — •Alessandro Alberucci[1], Chandroth P. Jisha[1], and Stefan Nolte[1,2] — [1]Friedrich Schiller University Jena, Institute of Applied Physics, Jena, Germany — [2]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

A theoretical model for the nonlinear propagation of ultrashort pulses is discussed. A system of two ODEs allows a fast estimation of the local power and beam width in good agreement with simulations.

**Oral** EJ-3.3 14:30 ICM - Room 22a

**A time-delayed renewal model for Kerr frequency combs** — •J. Yelo-Sarrión[1], J. Sieber[3], S.V. Gurevich[1,2], and J. Javaloyes[1] — [1]Departament de Física and IAC3, Palma de Mallorca, Spain — [2]Institute for Theoretical Physics, Münster, Germany — [3]Department of Mathematics and Statistics, Exeter, United Kingdom

We developed a time-delayed renewal model that allows to perform numerical path-continuation of Kerr combs with arbitrary dispersion relation and that takes into account previously neglected physical phenomenon such as Kelly sidebands.

**Oral** EJ-3.4 14:45 ICM - Room 22a

**Modeling frequency micro-combs with second kind Fredholm equations** — •Pol Molina Grífols[1], Carlos Mas Arabí[2], Pedro Fernandez de Córdoba[2], Jose Alberto Conejero[2], Alejandro Martínez[1], and Carles Milián[2] — [1]Nanophotonics Technology Center, Universitat Politècnica de València, Valencia, Spain — [2]Institut Universitari de Matemàtica Pura i Aplicada, Universitat Politècnica de València, Valencia, Spain

A model to study micro-combs with second kind Fredholm equations where the

driving field can be composed of any geometry. We provide a framework for numerical modeling by unifying Ikeda maps and modal decomposition approaches

**Oral** EJ-3.5 15:00 ICM - Room 22a

**Spectral-crystal efficiency-mapping (SCEM): A powerful analytical tool for modelling quasi-phase-matched interactions** — •Sebastian C. Robarts and Richard A. McCracken — Heriot-Watt University, Edinburgh, United Kingdom

We introduce spectral-crystal efficiency-mapping (SCEM), an analytical model of quasi-phase-matched interactions. Incorporating higher-order and cascaded nonlinear interactions, SCEM fully captures the experimentally-accessible spectral output for any input spectrum and nonlinear crystal, agreeing with full-field simulations.

**Oral** EJ-3.6 15:15 ICM - Room 22a

*withdrawn*

## EB-13: Quantum State Generation and Characterization

Chair: Huy Quang Nguyen, Technical University of Denmark, Kongens Lyngby, Denmark

Time: Friday, 16:00–17:30 Location: ICM - Room 1

**Oral** EB-13.1 16:00 ICM - Room 1

**Simultaneous Detection of Multimode Squeezing** — •Mahmoud Kalash[1,2], Aditya Sudharsanam[1,2], Ui-Nyung Han[3], Young-Sik Ra[3], and Maria Chekhova[1,2] — [1]Friedrich-Alexander Universität Erlangen-Nürnberg, Staudtstraße 7/B2, 91058 , Erlangen, Germany — [2]Max Planck Institute for the Science of Light, Staudtstraße 2, 91058, Erlangen, Germany — [3]Department of Physics, Korea Advanced Institute of Science and Technology (KAIST), Daejeon 34141, South Korea

We present multimode optical parametric amplification as a method for detecting multimode squeezed light. The novelty of our work lies in achieving real-time spatial multimode squeezing detection, a crucial capability for advancing high-dimensional quantum technologies.

**Oral** EB-13.2 16:15 ICM - Room 1

**Demonstration of programmable temporal-waveform shaping for optical non-Gaussian quantum states** — •Yu Nishizawa[1], Hiroko Tomoda[1], Akihiro Machinaga[1], Takahiro Kashiwazaki[2], Takeshi Umeki[2], Shigehito Miki[3], Masahiro Yabuno[3], Hirotaka Terai[3], and Shuntaro Takeda[1] — [1]Department of Applied Physics, School of Engineering, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan — [2]NTT Device Technology Labs, NTT Corporation, 3-1, Morinosato Wakamiya, Atsugi, Kanagawa 243-0198, Japan — [3]Advanced ICT Research Institute, National Institute of Information and Communications Technology, 588-2 Iwaoka, Nishi-ku, Kobe, Hyogo 651-2492, Japan

We demonstrate programmable temporal-waveform shaping for various optical non-Gaussian quantum states while preserving their fragile non-classicality. Our work leads to realizing optimal temporal mode matching and efficient temporal mode encoding, advancing optical quantum information processing.

**Oral** EB-13.3 16:30 ICM - Room 1

**Certifying High Dimensional Quantum Entanglement with a Time-stamping Camera** — •Raphael Guitter[1], Baptiste Courme[1,2], Chloe Vernieres[1], Peter Svihra[3], Andrei Nomerotski[3], and Hugo Defienne[1] — [1]Institut des Nanosciences de Paris, Paris, France — [2]Laboratoire Kastler Brossel, Paris, France — [3]Faculty of Nuclear Sciences and Physical Engineering, Prague, Czech Republic

We certify entanglement in photon pairs produced by Spontaneous Parametric Down Conversion without the usual need for accidental coincidences subtraction, using a single-photon sensitive Tpx3Cam camera to measure correlations in photon position and momentum.

**Oral** EB-13.4 16:45 ICM - Room 1

**Experimental Noiseless Quantum Amplification of Coherent States of Light by Two-Photon Addition and Subtraction** — Michal Neset, Jiří Fadrný, Martin Bielak, Miroslav Ježek, Jaromír Fiurášek, and •Jan Bílek — Palacký University, Olomouc, Czech Republic

We demonstrate an advanced noiseless quantum amplifier using conditional addition and subtraction of two photons, achieving high gain and quality. Our method offers an efficient, experimentally feasible alternative to multiplexing and advances quantum state engineering capabilities.

**Oral** EB-13.5 17:00 ICM - Room 1

**Experimentally Verifiable Criteria for Non-Gaussian Coherence in Bosonic Quantum Systems** — •Priyanka Giri[1], Beate E. Asenbeck[1], Lukas Lachman[1,2], Ambroise Boyer[1], Albane Lapras[1], Alban Urvoy[1], Radim Filip[2], and Julien Laurat[1] — [1]Laboratoire Kastler Brossel, Sorbonne Universite, CNRS, ENS-Universite PSL, College de France, Paris, France — [2]Dept of Physics, Palacky University, Olomouc, France

Non-Gaussianity, crucial for quantum technologies, demands precise characterization. This study proposes a hierarchical framework for verifying non-Gaussian coherence in the Fock basis through tailored thresholds. We successfully apply it to experimental optical quantum states.

**Oral** EB-13.6 17:15 ICM - Room 1

**More than one bit quantum randomness certification and expansion** — •Mohamed Bourennane, Amelie Piveteau, Alban Seguinard, Piotr Mironowicz, Nassim Mahammedi, Hammad Anwer, and Marcus Grünfeld — Department of Physics, Stockholm University, Stockholm, Sweden

Here, we will present a comprehensive analysis of the design and performance optimization of a Quantum Random Number Generator (QRNG) based on Bell inequality violations and generalized measurements in prepare&measure and entanglement scenarios.

## JSII-1: Free-Electron Lasers 1

Chair: Luca Giannessi, ELETTRA, Triest, Italy

Time: Friday, 16:00–17:30 Location: ICM - Room 12b

**Invited** JSII-1.1 16:00 ICM - Room 12b

**Unleashing Light: The Cutting-Edge World of Free-Electron Laser (FEL) Sources** — •Gianluca Geloni — European XFEL, Schenefeld, Germany

I will discuss the newest capabilities of FELs at short radiation wavelengths, down to hard x-rays, and what is possible to obtain in terms of relevant parameters such as coherence, power, duration, spectral density.

**Invited** JSII-1.2 16:30 ICM - Room 12b

**Nanoscale polarization transient gratings** — •Laura Foglia — Elettra Sincrotrone Trieste S.C.p.A., Trieste, Italy

In time-resolved spectroscopies, helicity-dependent responses of chiral systems are often hidden by the dominating thermoelastic response. This work presents how extreme ultraviolet intensity and polarization transient gratings can selectively disentangle the two contributions, uncovering helicity-dependent responses previously undetected.

**Oral** JSII-1.3 17:00 ICM - Room 12b

**Twin Echo-Enabled Harmonic Generation for Enhanced Coherent Bunching at Short Wavelength** — •Eugenio Ferrari — Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

We present a novel externally seeded cascaded free-electron laser (FEL) scheme based on two echo-enabled har- monic generation stages to obtaining unprecedented bunching independently on the final FEL wavelength.

**Oral** JSII-1.4 17:15 ICM - Room 12b

**The EuPRAXIA@SPARC_LAB project: AQUA FEL beamline** — •Fabio Villa — Infn - Lnf , Frascati , Italy

We present the EuPRAXIA@SPARC_LAB project, focusing on the FEL beamline AQUA. This FEL beamline is driven by plasma accelerated electrons and it is designed to work in the water window (between 3 and 14 nm).

# CM-8: Characterization and Sensing

Chair: Johannes Heitz, Johannes Kepler University Linz, Linz, Austria

Time: Friday, 16:00–17:30 Location: ICM - Room 2

**Oral** CM-8.1 16:00 ICM - Room 2

**Spectral monitoring during laser processing for activation of single group-IV colour centres in diamond** — Xingrui Cheng[1], Andreas Thurn[2], Guangzhao Chen[1], Gareth Jones[1], Maddison Coke[3], Mason Adshead[3], Cathryn Michaels[2], Osman Balci[4], Andrea Ferrari[4], Mete Atature[2], Richard Curry[3], Jason Smith[1], •Patrick Salter[5], and Dorian Gangloff[2] — [1]Department of Materials, University of Oxford, Oxford, United Kingdom — [2]Cavendish Laboratory, University of Cambridge, Cambridge, United Kingdom — [3]Photon Science Institute, University of Manchester, Manchester, United Kingdom — [4]Department of Engineering, University of Cambridge, Cambridge, United Kingdom — [5]Department of Engineering Science, University of Oxford, Oxford, United Kingdom

We demonstrate laser activation of single tin vacancy colour centres in diamond using an ultrashort pulsed laser. Monitoring the photoluminescence from the laser processed region with spectral resolution is shown to be critical.

**Oral** CM-8.2 16:15 ICM - Room 2

**Femtosecond laser micromachined glass microfluidic platform with nanoporous membranes for advanced blood-brain barrier modeling** — •Alessandra Nardini[1,2], Leonardo Cherubin[3], Claudio Conci[3], Chiara Boncristiani[2], Manuela T. Raimondi[3], Roberto Osellame[1], Viviana Vergaro[2], and Rebeca Martínez Vàzquez[1] — [1]Istituto di Fotonica e Nanotecnologie (IFN), Consiglio Nazionale delle Ricerche (CNR), Milano, Italy — [2]Department of Experimental Medicine, Università del Salento, Lecce, Italy — [3]Department of Chemistry, Materials and Chemical Engineering "Giulio Natta", Politecnico di Milano, Milano, Italy

This study presents a glass-based microfluidic platform with nanoporous membranes for co-cultured brain spheroids and VOC detection. Fabricated via femtosecond laser irradiation, it ensures precise fluid dynamics and molecular diffusion for advanced blood-brain-barrier models.

**Oral** CM-8.3 16:30 ICM - Room 2

**Laser-Induced Breakdown Spectroscopy by nJ Pulses at GHz Repetition Rate** — Ayesha Noor[1], Emre Hasar[2], and •Parviz Elahi[1,3] — [1]Department of Electrical and Electronics Engineering, Ozyegin University, Istanbul, Türkiye — [2]Department of Physics, Bogazici University, Istanbul, Türkiye — [3]Department of Natural and Mathematical Sciences, Ozyegin University, Istanbul, Türkiye

We employed a burst mode with GHz intraburst repetition rate pulses in laser-induced breakdown spectroscopy, reducing the required pulse energy by several orders of magnitude to the nanojoule level.

**Oral** CM-8.4 16:45 ICM - Room 2

**Models for the temperature-dependent absorptivity of copper surfaces during high-power laser processing** — •Christoph Sauer, Stefan Reich, Marcel Goesmann, Sebastian Schäffer, and Martin Lueck — Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut, EMI, Freiburg, Germany

We investigate the behaviour of copper plates under high-power laser irradiation in the range of several kW focused on spot diameters in the cm range. The combined numerical and experimental study focuses on temperature-dependent absorptivity.

**Oral** CM-8.5 17:00 ICM - Room 2

**Quartz Wafer Processing with Femtosecond Lasers for Eco-Friendly Micro-Resonator fabrication** — •Annalisa Volpe[1,2], Raffele De Palo[1], Jaka Mur[3], Felice Alberto Sfregola[1,2], Matevž Marš[3], Pietro Patimisco[1,4], Vincenzo Spagnolo[1,4], Antonio Ancona[1,2], and Rok Petkovšek[3] — [1]Dipartimento Interateneo di Fisica, Polytechnic of Bari & University of Bari, Bari, Italy — [2]National Research Council of Italy, Institute for Photonics and Nanotechnologies, Via G. Amendola 173, Bari 70125, Italy , Bari, Italy — [3]FOLAS LAB, Faculty of Mechanical Engineering, University of Ljubljana, Ljubljana, Slovenia — [4]PolySense Innovations srl, Bari, Italy

Femtosecond laser processing offers a sustainable and precise method for fabricating micro-optical devices from quartz wafers. Our results demonstrate the feasibility of producing high-quality cuts with minimized edge defects.

**Oral** CM-8.6 17:15 ICM - Room 2

*withdrawn*

# CL-6: Novel Light Sources for Biomedical Applications

Chair: Kenneth Wong, The University of Hong Kong, Hong Kong, China

Time: Friday, 16:00–17:30 Location: ICM - Room 3

**Oral** CL-6.1 16:00 ICM - Room 3

**Structural Biomedical Two-Photon Microscopy using a sub-35 fs, High-Energy (>40 nJ), Pre-Chirp Managed Yb:Fiber Laser System** — •Marvin Edelmann[1,2,3], Susanna Gevorgyan[4], Mikhail Pergament[1], Christian Betzel Betzel[4], and Franz Kärtner[1,2,3] — [1]Center for Free-Electron Laser Science CFEL, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Department of Physics, Universität Hamburg, Hamburg, Germany — [3]Max Planck School of Photonics, Jena, Germany — [4]Institute for Structural Biology of Infection and Inflammation, Universität Hamburg, Hamburg, Germany

We present a highly optimized Yb:fiber laser design delivering sub-35 fs pulses with >40 nJ energy for biomedical two-photon microscopy. It enables high-resolution multimodal imaging of dual-stained mouse kidney and protein crystals.

**Oral** CL-6.2 16:15 ICM - Room 3

**Photoacoustically Generated Ultrasound for Light Guiding inside Transparent and Scattering Media** — •Mateu Colom[1], Pietro Ricci[1,2], Blanca Mestre-Torà[1], and Martí Duocastella[1,2] — [1]Department of Applied Physics, Universitat de Barcelona, Barcelona, Spain — [2]Institut de Nanociència i Nanotecnologia (IN2UB), Universitat de Barcelona, Barcelona, Spain

We present a non-invasive method that enables deep light penetration inside tissue using photoacoustic pressure waves. Our results show significant light enhancement in both transparent and scattering media with unprecedented temporal control and flexibility.

**Oral** CL-6.3 16:30 ICM - Room 3

**A Blue-Diode-Pumped Broadband Ti:sapphire Laser and an Axicon Enabling Low-Cost Ultrahigh-Resolution Optical Coherence Tomography** — •Manuel Zeyen[1], Gregory Zaugg[2], Milan Liepelt[2], Lea Mühlebach[2], Marko Loparic[2], and Bojan Resan[1] — [1]Fachhochschule Nordwestschweiz (FHNW), Windisch, Switzerland — [2]ARTIDIS AG, Basel, Switzerland

We present a low-cost ultrahigh-resolution optical coherence tomography system using a blue-diode-pumped mode-locked Ti:sapphire laser. The lateral and axial resolutions are < 3 $\mu$m and 4.5 $\mu$m in air, respectively. Biomedical images are shown.

**Oral** CL-6.4 16:45 ICM - Room 3

**Investigation of collagen crosslinks introduced by a femtosecond laser** — •Daniel Fischer[1], Axel Stöcker[2,3], Astrid Tannert[4,5], Timea Koch[1], Ute Neugebauer[4,5], Roland Ackermann[1], Jeannine Missbach-Guentner[6], Stefan Nolte[1,7], and Christoph Rußmann[2] — [1]Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-Universität, Jena, Germany — [2]Faculty of Engineering and Health, University of Applied Science and Arts, Goettingen, Germany — [3]Faculty of Chemistry, Georg-August-University, Goettingen, Germany — [4]Leibniz Institute of Photonic Technology (Member of Leibniz Health Technologies, Member of the Leibniz Centre for Photonics in Infection Research, LPI), Jena, Germany — [5]Center for Sepsis Control and Care, Jena University Hospital, Jena, Germany — [6]Department of Clinical and Interventional Radiology, University Medical Center, Goettingen, Germany — [7]Fraunhofer Institute for Applied Optics and Precision Engineering, Albert-Einstein-Straße 7, Jena, Germany

Shaping of corneas by crosslinking collagen with femtosecond lasers might improve the situation for growing numbers of myopia patients. We show that autofluorescence spectra and lifetimes might serve as a footprint of the lasing pro-

cess.

**Oral** CL-6.5 17:00 ICM - Room 3

**Conical Refraction: Forgotten Phenomenon or Novel Tool for Phase Preservation of Orbital Angular Momentum of Light Propagating Through Scattering Media** — •Diana Galiakhmetova[1], Nawal Mohamed[1], Fatima Khanom[1], Anton Sdobnov[2], Ivan Lopushenko[2], Alexander Bykov[2], Igor Meglinski[1], and Edik Rafailov[1] — [1]Aston University, Birmingham, United Kingdom — [2]University of Oulu, Oulu, Finland

We investigate conical refraction-generated Lloyd ring-shaped beam light with phase-preserved OAM as a potentially sensitive tool for detecting refractive index changes within complex scattering media, possibly enabling non-invasive glucose evaluation within the skin.

**Oral** CL-6.6 17:15 ICM - Room 3

**Long-range aligned assembly of dispersoids by fiber-type optical condensation** — •Kota Hayashi[1,2,3], Mamoru Tamura[2,4], Masazumi Fujiwara[2,5], Shiho Tokonami[1,3], and Takuya Iida[1,2] — [1]Research Institute for Light-induced Acceleration System, Osaka Metropolitan University, Osaka, Japan — [2]Graduate School of Science, Osaka Metropolitan University, Osaka, Japan — [3]Graduate School of Engineering, Osaka Metropolitan University, Osaka, Japan — [4]Graduate School of Engineering Science, Osaka University, Osaka, Japan — [5]Graduate School of Life, Environmental, Natural Science and Technology, Okayama University, Okayama, Japan

We demonstrated large-scale assembly of dispersoids with a length on the order of several millimeters using a fiber-type optical condensation module coated with a metallic nanofilm by guiding a near-infrared continuous-wave laser into the module.

## EH-7: Novel Concepts and Effects in Nanophotonics

Chair: Leonardo Menezes, Ludwig Maximilian University of Munich (LMU), Munich, Germany

Time: Friday, 16:00–17:30 Location: ICM - Room 4a

**Oral** EH-7.1 16:00 ICM - Room 4a

**Experimental evidence of intervalence plasmons in boron doped diamond** — Souvik Bhattacharya[1], Jonathan Boyd[2], Sven Reichardt[1], Valentin Allard[4], Amir Hossein Talebi[3], •Nicolò Maccaferri[5], Olga Shenderova[6], Aude L. Lereu[4], Ludger Wirtz[1], Giuseppe Strangi[2], and R. Mohan Sankaran[1] — [1]Department of Nuclear, Plasma, and Radiological Engineering, University of Illinois Urbana-Champaign, Champaign, USA — [2]Department of Physics, Case Western Reserve University, Cleveland, USA — [3]Department of Physics and Materials Science, University of Luxembourg, Luxembourg, Luxembourg — [4]Aix Marseille Univ, CNRS, Centrale Med, Institut Fresnel, Marseille, France — [5]Department of Physics, Umeå University, Umeå, Sweden — [6]Adamas Nanotechnologies, Raleigh, USA

We combine electron energy loss spectroscopy, near-field infrared microscopy, and first principles calculations, to unveil a new mechanism for inducing plasmon-like behavior in doped semiconductors, due to electronic excitations between valence subbands.

**Oral** EH-7.2 16:15 ICM - Room 4a

**First Experimental Observation of Edge Bound State in the Continuum on Silicon Photonic Crystal** — •Andrei Lavrinenko, Rodrigo Sato, Christian Vinther Bertelsen, Maxim Nikitin, Elena Lopez Aymerich, Radu Malureanu, Winnie Edith Edith Svendsen, and Osamu Takayama — Technical University of Denmark, Kongens Lyngby, Denmark

We present the first experimental demonstration of the bound states in the continuum mode supported at the edge of a truncated photonic crystal composed of silicon pillars in the square lattice arrangement.

**Oral** EH-7.3 16:30 ICM - Room 4a

**Noether's theorem in nanophotonics** — •Iñigo Liberal — Public University of Navarre , Pamplona, Spain

We highlight how composite symmetries enable a broader usage of Noether's theorem in nanophotonics. As an example, we consider spatiotemporal translation symmetries and the conservation of the a nonrelativistic energy-momentum in spatiotemporal metamaterials.

**Oral** EH-7.4 16:45 ICM - Room 4a

**Multimode Lasing from High-Refractive-Index 2D Periodic Photonic Architectures** — •Luis Cerdán[1], Ana Conde-Rubio[2], Juan R. Deop-Ruano[1], Alejandro Manjavacas[1], and Agustín Mihi[2] — [1]Instituto de Química Física Blas Cabrera (CSIC), Madrid, Spain — [2]Institute of Materials Science of Barcelona (ICMAB-CSIC), Belaterra, Spain

We achieve multimode low-threshold lasing in a high-refractive-index dielectric cavity based on a 2D periodic array of cylindrical holes patterned into a layered structure (SU-8/$TiO_2$/dye-doped SU-8) by means of a scalable soft nanoimprinting lithography method.

**Oral** EH-7.5 17:00 ICM - Room 4a

**The nonlinear limit of Babinet's Principle** — •Valentin Dichtl, Thorsten Schuhmacher, and Markus Lippitz — University of Bayreuth, Bayreuth, Germany

Diffraction patterns of complementary shapes (e.g. hole and disk) are related by Babinet's principle. It is strictly valid for idealized media and is applicable to plasmonic nanostructures. We explore its limits at nonlinear plasmonic emission.

**Oral** EH-7.6 17:15 ICM - Room 4a

*withdrawn*

## CB-8: Novel and High-Power Semiconductor Lasers

Chair: Jan-Philipp Koester, Ferdinand-Braun-Institut (FBH), Berlin, Germany

Time: Friday, 16:00–17:30 Location: ICM - Room 4b

**Oral** CB-8.1 16:00 ICM - Room 4b

**A Novel Surface-Emitting Laser Using Coupled InGaAs/GaAs Nano-Ridges on Si: Insights from Cathodoluminescence** — •Eslam Fahmy[1], Toon Coenen[2], Zhongtao Oyuang[1], Davide Colucci[1,3], Joris Van Campenhout[3], Bernardette Kunert[3], and Dries Van Thourhout[1] — [1]Ghent University-IMEC, Gent, Belgium — [2]DELMIC B.V, Delft, Netherlands — [3]IMEC, Leuven, Belgium

We present an optically pumped surface-emitting nano-ridge laser leveraging bound states in the continuum grown on a silicon wafer. Cathodoluminescence provides insights into underlying physics, while lasing is validated via microphotoluminescence.

**Oral** CB-8.2 16:15 ICM - Room 4b

**Time Crystals in Active Mode-locked lasers** — •J. Yelo-Sarrión[1], R. Weng[1], E. R. Koch[1,2], J. Batle[1], J. Javaloyes[1], and S. V. Gurevich[1,2] — [1]Departament de Física and IAC3, Palma de Mallorca, Spain — [2]Institute for Theoretical Physics, Münster, Germany

We present the experimental observation of Time-Crystals in an active mode-locked system, as well as solutions where both two states can coexist and persist

for several minutes at room temperature. Moreover, we reproduced our experimental results with a time-delayed model.

**Oral** CB-8.3 16:30 ICM - Room 4b

**Spontaneous synchronization of transverse modes in a quantum-well laser** — •Stefan Bittner[1,2] and Marc Sciamanna[1,2] — [1]Université de Lorraine, CentraleSupélec, LMOPS, Metz, France — [2]Chaire Photonique, LMOPS, CentraleSupélec, Metz, France

We present experimental evidence of spontaneous phase locking between transverse modes in a free-running broad-area semiconductor laser. This unexpected dynamics of partial synchronization is similar to chimera states found in coupled oscillator networks.

**Oral** CB-8.4 16:45 ICM - Room 4b

**Efficient 970 nm Ridge Waveguide Lasers for Space-Based Power Beaming Application** — •Seval Arslan[1], Paul S. Basler[1], Martin Wilkens[1], Marko Hübner[1], Igor P. Marko[2], Stephen J. Sweeney[1,2,3], and Paul Crump[1,2] — [1]Ferdinand-Braun-Institut (FBH), Berlin, Germany — [2]James Watt School of Engineering, College of Science and Engineering, University of Glasgow, Glasgow, United Kingdom — [3]ZiNIR Ltd, Eastbourne, United Kingdom

970nm spatially single-mode ridge waveguide lasers assembled in a miniaturized collimated assembly operate under continuous wave conditions with peak conversion efficiency of ~65%…70(+/-)2% from 298K…204K, promising for future space-based power beaming application.

**Oral** CB-8.5 17:00 ICM - Room 4b

**Improved compact 1 kW diode laser module emitting at 780 nm for the efficient direct additive manufacturing of aluminium** — •Martin Wilkens[1], Seval Arslan[1], Marko Hübner[1], Lucas Wittenbecher[1], Johannes Zender[1], Bernd Eppich[1], Dominik Martin[1], Pietro Della Casa[1], Arnim Ginolas[1], Paul-Simon Basler[1], Neysha Lobo-Ploch[1], Manuel Rozycki[2], Arnardo Schulze[2], Uriel Tradowski[3], Andreas Knaub[3], Holger Alder[3], and Paul Crump[1] — [1]Ferdinand-Braun-Institut (FBH), Berlin, Germany — [2]SKDK GmbH, Berlin, Germany — [3]Photon Laser Manufacturing GmbH, Berlin, Germany

Efficiency- and brightness-scaled wide-aperture 780 nm diode lasers suitable are presented, delivering 20W CW output at 54% efficiency within 40 mm·mrad, for realising performance-scaled compact kilowatt diode laser modules for the additive manufacturing of aluminium.

**Oral** CB-8.6 17:15 ICM - Room 4b

**Wavelength-stabilized multi-active region DBR ridge-waveguide lasers for high peak-power pulsed operation** — •Heike Christopher, Maximilian Beier, Jörg Fricke, Sonja Nozinic, Armin Liero, Hans Wenzel, and Andrea Knigge — Ferdinand-Braun-Institut (FBH), Berlin, Germany

Results of nanosecond pulsed DBR lasers with different numbers of active regions (one and three) and ridge waveguide designs (straight and tapered) and a power of up to 20 W for scanning LIDAR are presented.

## EF-7: Optical Frequency Combs and Cavity Solitons 2

Chair: Gian-Luca Oppo, University of Strathclyde, Glasgow, United Kingdom

Time: Friday, 16:00–17:30 Location: ICM - Room 5

**Oral** EF-7.1 16:00 ICM - Room 5

**Optical Frequency Comb Generation in Quadratic Resonator with Spectral Filtering** — •Minji Shi[1], Nicolas Englebert[2], François Leo[3], Dmitry Skryabin[4], and Auro M. Perego[1] — [1]Aston Institute of Photonic Technologies, Aston University, Birmingham, United Kingdom — [2]Department of Electrical Engineering, California Institute of Technology, Pasadena, USA — [3]OPERA-photonics, Universit'e libre de Bruxelles (U.L.B.), Brussels, Belgium — [4]Department of Physics, Centre for Photonics and Photonic Materials, University of Bath, Bath, United Kingdom

We present a novel method for generating optical frequency combs in a normal dispersion quadratic resonators with a spectral filter. The comb line spacing can be changed by controlling the filter-pump frequency detuning.

**Oral** EF-7.2 16:15 ICM - Room 5

**Dark Pulse Formation in an Integrated Optical Parametric Oscillator** — •Nicolas Englebert[1], Robert M. Gray[1], Thomas Zacharias[1], Rithvik Ramesh[1], Ryoto Sekine[1], Luis Ledezma[1], Benjamin K Gutierrez[1], Pedro Parra-Rivas[2], and Alireza Marandi[1] — [1]California Institute of Technology, Pasadena, USA — [2]University of Almeria, Almeria, Spain

We theoretically describe and experimentally demonstrate dark soliton formation in a quadratic nonlinear resonator in lithium niobate nanophotonic. The dark pulses have a temporal duration of 40 fs and form a 120-nm-wide coherent frequency comb.

**Oral** EF-7.3 16:30 ICM - Room 5

**Investigating the Mechanism Behind the Formation of a Stable sech 2 -shaped Raman Comb in a Silica Microtoroid Driven by Continuous-Wave with Specific Dispersion** — •Heng Wang[1], Ryo Otake[1], Riku Imamura[1], Liu Yang[1], Hayato Matsuyama[1], Shun Fujii[2], and Takasumi Tanabe[1] — [1]Department of Electronics and Electrical Engineering, Faculty of Science and Technology, Keio University, Yokohama, Japan — [2]Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan

We generated a stable sech2-shaped Raman comb in a microtoroid using continuous-wave pumping. Numerical simulations further demonstrate the formation of mode-locked ultrashort Raman pulses in a microtoroid with tailoring dispersion.

**Oral** EF-7.4 16:45 ICM - Room 5

**Multi-color solitons in second-order dispersion microresonators** — •Alioune Niang, Pradyoth Shandilya, Gary Carter, and Curtis R. Menyuk — University of Maryland, Baltimore County , Baltimore, USA

We present experimental and numerical results which demonstrate multi-color solitons in dual- pumped microresonators with only second-order dispersion. We show the formation of multi-color single solitons, molecules, and crystals that exhibit interleaved combs.

**Oral** EF-7.5 17:00 ICM - Room 5

**Transdimensional approach for studying multidimensional cavity solitons** — •Yifan Sun[1,2], Pedro Parra-Rivas[3,2], François Leo[1], Carles Milián[4], and Stefan Wabnitz[2] — [1]Université libre de Bruxelles, Brussels, Belgium — [2]Sapienza University of Rome, Rome, Italy — [3]University of Almeria, Almeria, Spain — [4]Universitat Politècnica de València, València, Spain

We propose a dimensional reduction framework for investigating the stability of multidimensional solitons. We show the stability reduces as the dimension increases in bifurcation diagrams.

**Oral** EF-7.6 17:15 ICM - Room 5

**Coherent dissipative structures in arbitrary dispersion-engineered Gallium Phosphide Fabry-Pérot resonators** — •Alisa Davydova[1], Andrey Gelash[1], Alberto Nardi[2], Nikolai Kuznetsov[1], Paul Seidler[2], and Tobias J. Kippenberg[1] — [1]Institute of Physics, Swiss Federal Institute of Technology Lausanne (EPFL), Lausanne, Switzerland — [2]IBM Research Europe, Zurich, Switzerland

We demonstrate frequency comb generation in a high-refractive-index photonic crystal cavity on chip with an arbitrary dispersion profile. This work opens up an opportunity to observe new possible coherent structures in unconventional dispersion profiles.

## CC-6: On-Chip THz Generation and Detection

Chair: Giacomo Scalari, ETH Zurich, Zurich, Switzerland

Time: Friday, 16:00–17:30 Location: ICM - Room 11

**Invited** CC-6.1 16:00 ICM - Room 11

**Photonic integrated frequency-domain terahertz spectrometer** — •Lauri Schwenson[1], Simon Nellen[1], Florian Walter[1], Shahram Keyvaninia[1], Lars Liebermeister[1], Martin Schell[1,2], and Robert B. Kohlhaas[1] — [1]Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute, Berlin, Germany — [2]Technische Universität Berlin, Institute for Solid State Physics, Berlin, Germany

We present a photonic integrated frequency-domain terahertz spectrometer that matches the tuning range of state-of-the-art commercial systems. We demonstrate terahertz measurements with 90 dB dynamic range and 4 THz bandwidth, unprecedented for an integrated spectrometer.

**Oral** CC-6.2 16:30 ICM - Room 11

**Single-chip for Terahertz Emission and Detection on Thin-film Lithium Niobate Platform** — •Xuhui Cao[1], Yazan Lampert[1], Shima Rajabali[2,3], Leticia Magalhaes[2], Amirhassan Shams-Ansari[2,4], Alessandro Tomasino[1], Marko Loncar[2], and Ileana-Cristina Benea-Chelmus[1] — [1]École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland — [2]Harvard University, Cambridge, USA — [3]Delft University of Technology, Delft, Netherlands — [4]DRS Daylight Solutions, San Diego, USA

We present a dual-functional integrated chip realized on a thin-film lithium niobate platform, serving as both terahertz emitter and detector, enabling broadband emission and detection from 0.1 to 2.5 THz.

**Oral** CC-6.3 16:45 ICM - Room 11

**Active inverse-designed WDM integrated with surface emitting THz quantum cascade laser** — •Valerio Digiorgio, Urban Senica, Paolo Micheletti, Mattias Beck, Jérôme Faist, and Giacomo Scalari — Institute for quantum electronics, ETH Zürich, Zürich, Switzerland

We present an on-chip active wavelength division multiplexer integrated with a THz QCL. We report a maximum amplification of 5.4 dB and a maximum crosstalk of -6 dB in the 2.6 - 3.2 THz bandwidth.

**Oral** CC-6.4 17:00 ICM - Room 11

**Field-Resolved Detection of Broadband Terahertz Pulses with Thin-Film Lithium Niobate Integrated Microring Resonators** — •Alessandro Tomasino, Jiawen Liu, and Ileana-Cristina Benea-Chelmus — EPFL, Lausanne, Switzerland

We report on the recovery of both the amplitude and phase of broadband THz pulses mediated by on-chip microring resonators realized on a thin-film lithium niobate platform

**Oral** CC-6.5 17:15 ICM - Room 11

**Phased Antenna Arrays Beyond 1 THz from Lithium Niobate Photonic Circuit** — •Yazan Lampert[1], Shima Rajabali[2], Xuhui Cao[1], Amirhassan Shams-Ansari[2], Alessandro Tomasino[1], Aleksei Gaier[1], Leticia Magalhaes[2], Marko Lončar[2], and Ileana-Cristina Benea-Chelmus[1] — [1]EPFL, Lausanne, Switzerland — [2]Harvard John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, USA

Narrowband terahertz emission is realized using photonics-integrated antenna arrays on lithium niobate, with simultaneous resonances at 1.25 THz (broadside) and 2.1 THz (end-fire), enabling potential advancements in on-chip sensing and spatial multiplexing.

## EI-3: Ultrafast Phenomena for Photonics and Optoelectronics

Chair: Milan Delor, Columbia University, New York, USA

Time: Friday, 16:00–17:30 Location: ICM - Room 12a

**Oral** EI-3.1 16:00 ICM - Room 12a

**Exciton-polaritons in van der Waals heterostructure metasurfaces** — •Luca Sortino — Chair in Hybrid Nanosystems, Nanoinstitute Munich, Faculty of Physics, Ludwig-Maximilians-Universität München, Munich, Germany

Van der Waals heterostructure metasurfaces merge 2D materials and nanophotonic, enabling strong light confinement leveraging bound states in the continuum resonances, and with demonstrations of room-temperature strong coupling in $WS_2$ monolayers and ultralow-threshold nonlinearities.

**Oral** EI-3.2 16:15 ICM - Room 12a

**Ultrafast polariton coherent oscillations in a $WS_2$ monolayer-based microcavity at room temperature** — •Cristina Cruciano[1], Francesco Gucci[1], Mattia Russo[1], Charalambos Louca[1], Kyriacos Georgiou[2], Chiara Trovatello[1,3], Nicholas Olsen[4], P. James Schuck[3], Xiaoyang Zhu[4], David G. Lidzey[5], Renzo Vanna[1], Margherita Maiuri[1], Stefano Dal Conte[1], Giulio Cerullo[1], and Armando Genco[1] — [1]Dipartimento di Fisica, Politecnico di Milano, Milano, Italy — [2]Department of Physics, Laboratory of Ultrafast Science, University of Cyprus, Nicosia, Cyprus — [3]Department of Mechanical Engineering, Columbia University, New York, USA — [4]Department of Chemistry, Columbia University, New York, USA — [5]Department of Physics and Astronomy, University of Sheffield, Sheffield, United Kingdom

Rabi oscillations in strongly coupled systems can lead to an improvement in all-optical switches and quantum information. In this work we present the study of Rabi oscillations in a $WS_2$ microcavity at room temperature.

**Oral** EI-3.3 16:30 ICM - Room 12a

*withdrawn*

**Oral** EI-3.4 16:45 ICM - Room 12a

**Condensation of cavity exciton-polaritons in perovskite nanocrystals at room-temperature** — •Ioannis Georgakilas[1,2], David Tiede[3], Darius Urbonas[1], Rafał Mirek[1], Clara Bujalance[3], Laura Caliò[3], Virginia Oddi[1,4], Rui Tao[4,5], Dmitry N. Dirin[4,5], Gabriele Rainò[4,5], Simon C. Boehme[4,5], Juan F. Galisteo-López[3], Rainer F. Mahrt[1], Maksym V. Kovalenko[4,5], Hernán Miguez[3], and Thilo Stöferle[1] — [1]IBM Research Europe – Zurich, Rüschlikon, Switzerland — [2]Institute of Quantum Electronics, ETH Zurich, Zürich, Switzerland — [3]Multifunctional Optical Materials Group, Institute of Materials Science of Sevilla, Consejo Superior de Investigaciones Científicas – Universidad de Sevilla (CSIC-US), Sevilla, Spain — [4]Laboratory of Inorganic Chemistry, Department of Chemistry and Applied Biosciences, ETH Zürich, Zürich, Switzerland — [5]Laboratory for Thin Films and Photovoltaics, Empa – Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland

We report room-temperature polariton condensation in perovskite quantum dots placed inside a tunable, patterned microcavity. The onset of condensation is corroborated by nonlinear increase of the emission, linewidth narrowing, blueshift and extended temporal coherence.

**Oral** EI-3.5 17:00 ICM - Room 12a

**Purcell enhancement of single CsPbBr3 perovskite quantum dots embedded in a tunable microcavity** — •virginia oddi[1,2], darius urbonas[1], etsuki kobiyama[1], ioannis georgakilas[1], ihor cherniukh[2,3], kseniia shcherbak[2,3], chenglian zhu[2,3], maksym kovalenko[2,3], rainer mahrt[1], gabriele rainò[2,3], and thilo stöferle[1] — [1]IBM Research, zurich, Switzerland — [2]ETH Zurich, zurich, Switzerland — [3]EMPA, zurich, Switzerland

We demonstrate Purcell enhanced emission of single CsPbBr3 quantum dots in a tunable, open microcavity with a Gaussian-shaped deformation, reaching a Purcell factor up to 3.3 at 7 K and 5.4 at 50 K.

**Oral** EI-3.6 17:15 ICM - Room 12a

**A macroscopic QED approach to superconductivity** — •Daniel Teitelman[1], Lu I-Te[2], Nicholas Rivera[3,4], Ángel Rubio[2,5], Ofer Neurfeld[6], and Ido Kaminer[1] — [1]Faculty of Electrical and Computer Engineering, Technion – Israel Institute of Technology, Haifa 32000, Israel — [2]Max Planck Institute for the Structure and Dynamics of Matter and Center for Free-Electron Laser Science, Luruper Chaussee 149, 22761 Hamburg, Germany — [3]Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA — [4]School of Applied and Engineering Physics, Cornell University, Ithaca, New York 14853, USA — [5]Initiative for Computational Catalysis (ICC), The Flatiron Institute, 162 Fifth avenue, New York NY 10010, USA — [6]Faculty of Chemistry, Technion – Israel Institute of Technology, Haifa 32000, Israel

We develop a unified macroscopic-QED description of superconductivity mediated by photonic quasi-particles (excitons, plasmons, phonons, magnons, etc.) in general electromagnetic environments, capturing both conventional phonon-mediated superconductors and cavity-enhanced ones, predicting width-dependent critical temperature under weak-coupling.

# CD-14: Optical Parametric Oscillators 2

Chair: Christelle Monat, Ecole Centrale Lyon, Lyon, France

Time: Friday, 16:00–17:30 Location: ICM - Room 13a

**Oral** CD-14.1 16:00 ICM - Room 13a

**High-power optical parametric oscillators in silicon nitride** — •Yi Sun, Fuchuan Lei, Yan Gao, and Victor Torres-Company — Chalmers University of Technology, Gothenburg, Sweden

We achieved a record-high output signal power of 215 mW from a chip-based optical parametric oscillator, utilizing the Kerr nonlinearity of silicon nitride.

**Oral** CD-14.2 16:15 ICM - Room 13a

**Coherent Control and Enhanced Parametric Gain by Dual-Beam Pumping of 2D Nonlinear Photonic Crystals** — •Dena K. Wibowo, Daniel Qvarngård, Giulio Foletto, Vaishali B. Adya, and Katia Gallo — KTH Royal Institute of Technology, Stockholm, Sweden

Optical parametric generation in a hexagonally poled LiTaO3 with a dual pump at 532 nm produces collinear signal-idler pairs at 822-1507 nm with amplitudes controlled by the pump differential phase, in excellent agreement with theory.

**Oral** CD-14.3 16:30 ICM - Room 13a

**Spectral translation of optical frequency combs with optical parametric oscillation** — •David Long[1], Jordan Stone[1,2], Garrett Mathews[3], Carl Mathurin[3], Matthew Cich[4], Augustine Frymire[3], Gregory Rieker[3], Kartik Srinivasan[1,2], and Adam Heiniger[4] — [1]National Institute of Standards and Technology, Gaithersburg, USA — [2]Joint Quantum Institute, College Park, USA — [3]University of Colorado, Boulder, USA — [4]TOPTICA Photonics, Pittsford, USA

Recently we have demonstrated that optical frequency combs can be spectrally translated via optical parametric oscillation. Here we will discuss these approaches which we have demonstrated in both bulk and nanophotonic platforms.

**Oral** CD-14.4 16:45 ICM - Room 13a

*withdrawn*

**Oral** CD-14.5 17:00 ICM - Room 13a

**Wavelength and Linewidth Stability of a Nearly Degenerate Backward Wave Optical Parametric Oscillator in the Nanosecond Regime** — Antoine Zheng[1], •Jean-Baptiste Dherbecourt[1], Jean-Michel Melkonian[1], Antoine Godard[1], Andrius Zukauskas[2], Valdas Pasiskevicius[2], and Myriam Raybaut[1] — [1]DPHY, ONERA, Université Paris-Saclay, Palaiseau, France — [2]Department of Applied Physics, Royal Institute of Technology (KTH), Stockholm, Sweden

Narrowband Backward Wave OPO spectral properties are investigated near degeneracy at 2 $\mu$m in terms of fine central frequency drift, linewidth, and spectral purity in the prospect of future spaceborne differential absorption lidar missions.

**Oral** CD-14.6 17:15 ICM - Room 13a

**Dynamics and stability of on-chip dual-pumped degenerate optical parametric oscillation** — •Luca O. Trinchão[1,2], Eduardo S. Gonçalves[1,2], Luiz H. Peres[1,2], Miguel Nienstedt[1,2], Paulo F. Jarschel[1,2], Nathalia B. Tomazio[2,3], Thiago P. M. Alegre[1,2], and Gustavo S. Wiederhecker[1,2] — [1]Gleb Wataghin Physics Institute, Universidade Estadual de Campinas (UNICAMP), Campinas, Brazil — [2]Photonics Research Center, Universidade Estadual de Campinas (UNICAMP), Campinas, Brazil — [3]Experimental Physics Department, Institute of Physics, University of Sao Paulo (USP), São Paulo, Brazil

We experimentally investigate the dynamics and stability of an on-chip silicon nitride degenerate optical parametric oscillator in the anomalous dispersion regime, identifying two distinct stability regimes governed by the pump dynamics.

# CJ-14: Novel Fiber and Waveguide Lasers and Amplifiers 2

Chair: Laurent Bigot, CNRS - Universite of Lille, Lille, France

Time: Friday, 16:00–17:30 Location: ICM - Room 13b

**Oral** CJ-14.1 16:00 ICM - Room 13b

**Efficient Green Ho:ZBLAN Fiber Laser with 450-nm Diode Pumping** — Esrom Kifle[1,2], •Pavel Loiko[2], Solenn Cozic[3], Thiphaine Rault[3], Thierry Georges[1], Gilles Recoque[1], Alain Braud[2], and Patrice Camy[2] — [1]Oxxius SA, Lannion, France — [2]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France — [3]Le Verre Fluoré, Bruz, France

Green fiber laser employing a 9 cm-long 5000 ppm Ho:ZBLAN single-clad fiber is pumped by high-brightness 450-nm laser diodes. It generates 178 mW at 543 nm (the 5S2+5F4→5I8 transition) with 22.7% overall optical efficiency.

**Oral** CJ-14.2 16:15 ICM - Room 13b

*moved from CJ-P.2*

**A ~88% internal slope efficiency of a Ho3+ doped ZBLAN waveguide chip laser at 2.1 $\mu$m** — •Junha Jung[1], Yongsop Hwang[2], Dale Otten[2], Ju Han Lee[1], and David Lancaster[2] — [1]University of Seoul, Seoul, South Korea — [2]University of South Australia, Adelaide, Australia

This study demonstrates a highly efficient Ho3+-doped ZBLAN waveguide chip laser at 2.1 $\mu$m, achieving a record-breaking 88% internal slope efficiency. Using a 70% reflectivity output coupler, the laser produces 298 mW output power with a 49 mW threshold.

**Oral** CJ-14.3 16:30 ICM - Room 13b

**Output power of noble gas fiber lasers pumped by microwave radiation** — •Igor Bufetov, Alexey Gladyshev, Dmitry Komissarov, Sergey Nefedov, Alexey Kosolapov, Vladimir Velmiskin, and Alexander Mineev — Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

Laser generation in hollow core fibers filled with mixtures of noble gases was demonstrated in the wavelength range 2-2.5 mcm. The power parameters of He-Xe, He-Ar, and He-Kr fiber lasers were investigated and compared.

**Oral** CJ-14.4 16:45 ICM - Room 13b

**Photoacoustic Spectroscopy Using a Widely Tunable Pulsed Cascaded Raman Fiber Laser** — •Abhigyan Goswami[1], Swathi Padmanabhan[2], Sarthak Dash[1], Jaya Prakash[2], and VR Supradeepa[1] — [1]Centre for Nano Science and Engineering, Indian Institute of Science, Bengaluru, India — [2]Department of Instrumentation and Applied Physics, Indian Institute of Science, Bengaluru, India

Nanosecond pulsed cascaded Raman fiber laser, tunable in NIR-II (1060-1600nm, >10uJ pulse-energy) and visible (530-640nm, >0.1uJ pulse-energy), tunable repetition-rate 20-80kHz, tunable pulse-width 40-200ns, developed for photoacoustic imaging. Photoacoustic spectroscopy of cholesterol from 1145-1257nm is demonstrated.

**Oral** CJ-14.5 17:00 ICM - Room 13b

**Broadband all-fiber-based seed source for cryogenic Yb:YLF amplifiers at 1016 nm** — •Martin Kellert[1], Sedigheh Malekmohamadi[1], Marvin Edelmann[1,2], Mikhail Pergament[1], and Franz X. Kärtner[1,2] — [1]Center for Free-Electron Laser Science CFEL, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Department of Physics, Universität Hamburg, Hamburg, Germany

We present a compact broadband fiber based seed source with a central wavelength of 1016 nm and a bandwidth of 12 nm, enabling sub-500 fs pulses in subsequent cryogenically cooled Yb:YLF amplifies chains.

**Oral** CJ-14.6 17:15 ICM - Room 13b

**Numerical modeling of Bi-doped phosphosilicate fiber amplifiers** — •Michelangelo Federico and Federica Poli — Dept. of Engineering and Architecture, University of Parma, Parma, Italy

A matrix model based on rate equations is presented to analyze the performance of Bi-doped phosphosilicate fiber amplifiers, considering the two BAC types independently. Simulation results have been validated with measurements in the O+E bands.

# CH-17: Specialty Fiber Sensing & Imaging

Chair: Lyuba Amitonova, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

Time: Friday, 16:00–17:30 Location: ICM - Room 14a

**Oral** CH-17.1 16:00 ICM - Room 14a

**Multimode Imaging with Hollow-Core Fibres** — •Kerrianne Harrington[1], José Gilson de Melo Nascimento Neto[2,3], Robbie Mears[1], José C. A. Rocha[2,4], James M. Stone[1], William J. Wadsworth[1], Alcenísio Jesus-Silva[3], Tim A. Birks[1], and David B. Phillips[2] — [1]Centre for Photonics and Photonic Materials, Department of Physics, University of Bath, Bath, United Kingdom — [2]Physics and Astronomy, University of Exeter, Exeter, United Kingdom — [3]Optics and Nanoscopy Group, Institute of Physics, Federal University of Alagoas, Maceió, Alagoas, Brazil — [4]. School of Electrical Engineering and Computer Science, The University of Queensland, Brisbane, Australia

We measure the transmission matrix of a multi-mode hollow-core fibre at a wavelength of 633 nm, and explore its imaging capabilities in simulations. Further work could lead to endoscopic imaging at UV or mid-IR wavelengths.

**Oral** CH-17.2 16:15 ICM - Room 14a

**Transverse Doppler velocimetry of optically propelled microparticles in anti-resonant hollow-core fiber** — •Rui Wang[1,2], Chenjie Liang[1,2], Yi Jiang[1,2], and Shangran Xie[1,2] — [1]School of Optics and Photonics, Beijing Institute of Technology, Beijing, China — [2]Key Laboratory of Photonic Information Technology, Ministry of Industry and Information Technology, Beijing, China

We report the observation of angle-dependent transverse Doppler frequency shifts of optically propelled microparticles in anti-resonant hollow-core fiber. The technique may be exploited to resolve multi-dimensional Brownian motions and to realize active cooling in optical traps.

**Oral** CH-17.3 16:30 ICM - Room 14a

**Impulsively-Driven Motion of 100 nm Particles in Hollow Core Photonic Crystal Fibre at Atmospheric Pressure** — •Soumya Chakraborty[2,1], Gordon K. L. Wong[1], Philip St.J. Russell[1,2], and Nicolas Y. Joly[2,1] — [1]Max Planck Institute for the Science of Light, Erlangen, Germany — [2]Department of Physics, Friedrich-Alexander-Universität, Erlangen, Germany

Silica particles 100 nm in diameter, optically trapped at atmospheric pressure in a hollow photonic crystal fibre core, are impulsively propelled by repeated momentary axial trapping and viscous drag in a moving interference pattern.

**Oral** CH-17.4 16:45 ICM - Room 14a

**Compact, micro-optic hollow core fibre device for fibre-enhanced gas-phase Raman spectroscopy** — •Thomas Kelly, Ian Davidson, Natalie Wheeler, and Yongmin Jung — University of Southampton, Southampton, United Kingdom

We design, fabricate and characterise an integrated micro-optics device for hollow-core fibre enhanced gas-phase Raman spectroscopy. All the optics are combined into a compact, single monolithic structure with dimensions 70 × 12 × 9 mm.

**Oral** CH-17.5 17:00 ICM - Room 14a

**Distributed Few-Mode Fiber Point Sensor** — •Lars Grüner-Nielsen[1,2], Mads H. Vandborg[2], Karsten Rottwitt[2], and Mikael Lassen[3] — [1]Danish Optical Fiber Innovation, Brønshøj, Denmark — [2]DTU Electro, Kgs. Lyngby, Denmark — [3]Danish Fundamental Metrology A/S, Hørsholm, Denmark

Distributed sensing is demonstrated using different lengths of few-mode fiber interference sensors. The sensing points are distinguished using Fourier filtering. Sensing is demonstrated, with a short and a long distance between the sensing points

**Oral** CH-17.6 17:15 ICM - Room 14a

**In-situ X-ray monitoring using specialty optical fibers and determination of their synchrotron X-ray computed tomography imaging conditions** — •Ali Karatutlu[1], Zehra Gizem Mutlay[1], Esra Kendir Tekgül[1], Andriy Budnyk[1], Gianluca Iori[2], Philipp Hans[3], Fareeha Hameed[3], and Bülend Ortaç[1] — [1]National Nanotechnology Research Center (UNAM) and Institute of Materials Science Nanotechnology, Bilkent University, 06800, Ankara , Turkey — [2]Paul Scherrer Institute PSI, Forschungsstrasse 111, 5232 PSI, Villigen , Switzerland — [3]SESAME - Synchrotron-light for Experimental Science and Applications in the Middle East, , Allan, Jordan

In-situ X-ray monitoring was conducted using in-house fabricated Yb-doped active fibers using the radiation-induced attenuation and its online recovery. The XCT imaging conditions of different specialty fibers at once were also determined.

# CK-15: Quantum Optics

Chair: Charles Roques-Carmes, Stanford University, Stanford, CA, USA

Time: Friday, 16:00–17:30 Location: ICM - Room 14b

**Oral** CK-15.1 16:00 ICM - Room 14b

**Enhanced photon-pair generation from a van der Waals metasurface** — •Tongmiao Fan[1], Yilin Tang[2,3], Shaun Lung[4,5], Maximilian Weissflog[4,5], Jinyong Ma[1], Saniya Shinde[4,5], Sina Saravi[4,5], Mudassar Nauman[1], Wenkai Yang[2], Hao Qin[2], Shuyao Qiu[2], Andrey Sukhorukov[1], Yuerui Lu[2,3], and Frank Setzpfandt[4,5] — [1]ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS), Department of Electronic Materials Engineering, Research School of Physics, The Australian National University, Canberra, ACT 2601, Australia — [2]School of Engineering, College of Engineering, Computing and Cybernetics, The Australian National University, Canberra, Australia — [3]ARC Centre for Quantum Computation and Communication Technology, The Australian National University, Canberra, Australia — [4]Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany — [5]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

This work demonstrates the first experimental implementation of SPDC using a 3R-MoS2 metasurface, achieving a 20-fold SPDC rate increase and generating nondegenerate quantum photon pairs, highlighting its potential for advanced quantum applications.

**Oral** CK-15.2 16:15 ICM - Room 14b

**Nonlinearity symmetry breaking for generating tunable quantum entanglement in semiconductor metasurfaces** — •Tongmiao Fan[1], Jinyong Ma[1], Tuomas Haggren [1], Laura Molina[1,2], Matthew Parry[1], Saniya Shinde[1,2], Jihua Zhang[1,3], Rocio Morales[1], Frank Setzpfandt[2,4], Hoe Tan[1], Chennupati Jagadish[1], Dragomir Neshev[1], and Andrey Sukhorukov[1] — [1]ARC Centre of Excellence for Transformative Meta-Optical Systems (TMOS), Department of Electronic Materials Engineering, Research School of Physics, The Australian National University, Canberra, ACT 2601, Australia — [2]Abbe Center of Photonics, Friedrich Schiller University Jena, Jena, Germany — [3]Songshan Lake Materials Laboratory, Guangdong 523808, China — [4]Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany

Asymmetric nonlinear responses in quantum metasurfaces enable continuous tuning of polarization entanglement, achieving ultra-high coincidence-to-accidental ratios and robust spatial anti-correlations, opening new directions for on-demand quantum state tailoring.

**Oral** CK-15.3 16:30 ICM - Room 14b

**Reliable fabrication of electrically tunable quantum dot emitters on SiN via micro-transfer printing** — •Jasper De Witte[1,2], Atefeh Shadmani[3], Zhe Liu[3,4], Gunther Roelkens[1,2], Leonardo Midolo[3], Bart Kuyken[1,2], and Dries Van Thourhout[1,2] — [1]Photonics Research Group, Ghent University-imec, Ghent, Belgium — [2]Center for Nano- and Biophotonics (NB-Photonics), Ghent University, Ghent, Belgium — [3]Center for Hybrid Quantum Networks, Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark — [4]Sparrow Quantum ApS, Copenhagen, Denmark

In this work, we heterogeneously integrated InGaAs quantum dot emitters embedded in p-i-n GaAs devices on top of a SiN platform to showcase proper charge control and electrical tuning using reliable micro-transfer printing.

**Oral** CK-15.4 16:45 ICM - Room 14b

**Quantum Emitter Enhancement in Epsilon-Near-Zero Environment** — •Sven Stengel[1], Abhishek Solanki[2], Hamza Ather[2], Pei-Gang Chen[2], Jae Ik Choi[2], Brandon M. Triplett[2], Mustafa Ozlu[2], Kyu Ri Choi[2], Alexander Senichev[2], Wallace Jaffray[1], Alexei L. Lagoutchev[2], Marcello Ferrera[1], Alexandra Boltasseva[2], and Vladimir M. Shalaev[2] — [1]Heriot-Watt University, Edinburgh, United Kingdom — [2]Purdue University, West Lafayette, USA

By coupling near-infrared quantum dots to epsilon-near-zero transparent conductive oxide layers a thirty-fold reduction in emission lifetime and strong emission cone narrowing was achieved. These findings further advance the development of on-chip quantum sources.

**Oral** CK-15.5 17:00 ICM - Room 14b

**Efficient Integration of Quantum Emitters in Laser Written Optical Channel Waveguides in Silica** — Symeon Tsintzos[1], Konstantinos Tsimvrakidis[1], James Gates[2], Oleksandr Buchnev[2], Ali Elshaari[3], Val Zwiller[3], Peter Smith[2], and •Christos Riziotis[1] — [1]Theoretical & Physical Chemistry Institute, National Hellenic Research Foundation, Athens, Greece — [2]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom — [3]Department of Applied Physics, Royal Institute of Technology (KTH), Stockholm, Sweden

A method for integration and efficient light coupling of nanowires with quantum dots in silica channel waveguides, based on suitably designed microspheres' arrangement, is proposed, overcoming current limitations and enabling scalable quantum circuits in silica.

**Oral** CK-15.6 17:15 ICM - Room 14b

**Generation of Polarization-Hologram Entangled States Using Metasurfaces** — •Jensen Li[1], Hong Liang[2], Wai Chun Wong[2], and Tailin An[2] — [1]University of Exeter, Exeter, United Kingdom — [2]The Hong Kong University of Science and Technology, Hong Kong, China

We demonstrate metasurfaces that generate polarization-hologram entangled states, enabling quantum holograms and exploring quantum erasers with holographic content. These metasurfaces are valuable for quantum communication and anti-counterfeiting, leveraging high-dimensional entanglement and wave-particle duality.

## CF-13: Semiconductor Ultrafast Lasers

Chair: Jean-Christophe Delagnes, Bordeaux University, Bordeaux, France

Time: Friday, 16:00–17:30 Location: ICM - Room 14c

**Oral** CF-13.1 16:00 ICM - Room 14c

**Semiconductor-based amplification of femtosecond soliton microcombs** — •Alexandra Sakharova[1], Thibault Wildi[1], Bastian Ruhnke[1], and Tobias Herr[1,2] — [1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Physics Department, Universität Hamburg UHH, Hamburg, Germany

We demonstrate semiconductor-based amplification of a 25 GHz femtosecond soliton microcomb to 3 pJ pulse energy and bandwidth-limited 160 fs pulse duration, suitable for on-chip broadening and integrated ultrafast applications.

**Oral** CF-13.2 16:15 ICM - Room 14c

**Dual-Comb generation in III-V semiconductor laser: Transverse modes versus modeless cavities** — •Mohamed Nadrani[1], Baptiste Chomet[1], Adrián Bartolo[1], Nathan Vigne[1], Luc Le Gratiet[2], Grégoire Beaudouin[2], Konstatinos Pantzas[2], Isabelle Sagnes[2], Fernando Flores Gonzalez-Posada[1], Stéphane Blin[1], and Arnaud Garnache[1] — [1]Institut d'Electronique et des Systèmes, Univ Montpellier, CNRS, Montpellier, France — [2]Centre de Nanosciences et de Nanotechnologies,Université Paris-Saclay, CNRS UMR 9001, Palaiseau, France

We developed two passively mode-locked dual frequency-combs configurations based on III-V semiconductor VECSEL technology, operating at 1.06 $\mu$m. A dual Laguerre-Gauss oscillator on one optical axis and a modeless cavity with two optical axes.

**Oral** CF-13.3 16:30 ICM - Room 14c

**Broadband Mode-locked III-V/$LiNbO_3$ Microcomb Laser** — •Xujia Zhang, Yuyao Guo, Tianyi Li, Zekun Cui, Jianping Chen, and Kan Wu — State Key Laboratory of Advanced Optical Communication Systems and Networks, Department of Electronic Engineering, Shanghai Jiao Tong University, Shanghai, China

We report a broadband mode-locked III-V/$LiNbO_3$ microcomb laser that covers a 27-nm spectral range, with a 10-dB bandwidth of 12 nm, a repetition rate of 6.10 GHz, and an off-chip average power of 26 mW.

**Oral** CF-13.4 16:45 ICM - Room 14c

*withdrawn*

**Oral** CF-13.5 17:00 ICM - Room 14c

**Versatile SESAM platform for 1560 nm operation based on strain-free, InP-based MBE growth** — Alexander Dohms[1], Steffen Breuer[1], Lars Liebermeister[1], Martin Schell[1,2], and •Robert B. Kohlhaas[1] — [1]Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute, Berlin, Germany — [2]Technische Universität Berlin, Institute for Solid State Physics, Berlin, Germany

We present versatile, strain-free, InP-based SESAMs with iron-doped, bulk InGaAs absorber, which facilitate all critical requirements for ultrashort pulse generation at 1560 nm: adjustable ultrafast response and modulation depth as well as low non-saturable losses.

**Oral** CF-13.6 17:15 ICM - Room 14c

**Composition-controlled recovery time of SWIR (2 – 2.4 $\mu$m) GaSb-based SESAMs** — •Maximilian C. Schuchter[1,2], Marco Gaulke[1], Nicolas Huwyler[1], Matthias Golling[1], Mircea Guina[2], and Ursula Keller[1,3] — [1]ETH Zurich, Department of Physics, Institute for Quantum Electronics , Zurich, Switzerland — [2]Optoelectronics Research Centre, Physics Unit, Faculty of Engineering and Natural Sciences, Tampere, Finland — [3]ETH Zurich, Department of Electrical Engineering and Information Technology, Zurich, Switzerland

We presents composition-controlled recovery times in SWIR GaSb-based SESAMs. QW strain in quaternary InGaAsSb and the composition of AlGaAsSb barrier materials allows engineering of absorption recovery times from 1 picosecond to the nanosecond time-scale.

## JSI-6: Photonic Extreme Learning Machines and Reservoir Computers

Chair: Francesca Parmigiani, Microsoft Research Cambridge, Cambridge, United Kingdom

Time: Friday, 16:00–17:30 Location: ICM - Room Osterseen

**Oral** JSI-6.1 16:00 ICM - Room Osterseen

**Photonic Extreme Learning with Chaotic Microcavities** — •Matthew R Wilson, Jack A Smith, Michael J Strain, and Xavier Porte — Institute of Photonics, University of Strathclyde, Glasgow, United Kingdom

We implement a Photonic Extreme Learning Machine based on silicon nitride chaotic microcavities, demonstrating good performance in image classification. The fast decorrelation of the microcavity's outputs with wavelength suggests their application for integrated spectral classification.

**Oral** JSI-6.2 16:15 ICM - Room Osterseen

**Realtime inferences every 125 ps using a semiconductor laser recurrent neural network** — Romain Lance, Anas Skalli, and •Daniel Brunner — FEMTO-ST, CNRS, Besancon, France

We experimentally implement a recurrent neural network (RNN) in an multimode semiconductor laser comprising 300 neurons and in-situ trainable weights. We demonstrate realtime inference at 8 Giga inferences/second and show realtime channel equalization at telecommunication wavelengths.

**Oral** JSI-6.3 16:30 ICM - Room Osterseen

**Properties of information processing with semiconductor laser networks** — •Moritz Pflüger[1], Gemma Infantes Llinares[2,3], Miguel C. Soriano[1], and Apostolos Argyris[1] — [1]Institut de Física Interdisciplinària i Sistemes Complexos, Palma, Spain — [2]Universitat de les Illes Balears, Palma, Spain — [3]Universidad de Murcia, Murcia, Spain

We demonstrate a novel photonic platform for AI using coupled semiconductor laser networks, offering a scalable approach to high-speed unconventional computing. Numerical and experimental results show consistent and diverse laser responses, crucial for information processing.

**Oral** JSI-6.4 16:45 ICM - Room Osterseen

**Extreme Learning Machine using Highly Nonlinear Fiber** — •Mathilde Hary[1,2], Daniel Brunner[2], Lev Leybov[1], Piotr Ryczkowski[1], John Michael Dudley[2], and Goëry Genty[1] — [1]Photonics Laboratory, Tampere University, FI-33104, Tampere, Finland — [2]Université Marie et Louis Pasteur, CNRS UMR 6174, Institut FEMTO-ST, Besancon, France

We use a highly nonlinear fiber to implement an extreme learning machine. We study the impact of input encoding and fiber parameters on its size and evaluate its performance with the MNIST dataset.

**Oral** JSI-6.5 17:00 ICM - Room Osterseen

**Photonic Neural Networks with Multimode Fibers at the Edge of Spatiotemporal Chaos** — •Bahadır Utku Kesgin and Uğur Teğin — Department of Electrical and Electronics Engineering, Koç University, Istanbul, Turkey

Utilizing complex propagation in a graded-index fiber, we implement a spatiotemporal chaotic photonic neural network. This methodology demonstrates the use of chaotic dynamics in optical computing by reaching accuracies on par with conventional neural networks.

**Oral** JSI-6.6 17:15 ICM - Room Osterseen

**Performance Trends of Optical and Digital Neural Networks** — •Sobhi Saeed[1], Mehmet Müftüoğlu[1], Glitta Cheeran[1], Thomas Bocklitz[1], Bennet Fischer[1], and Mario Chemnitz[1,2] — [1]Leibniz Institute of Photonic Technology, Jena, Germany — [2]Institute of Applied Optics and Biophysics, Jena, Germany

We introduce a systematic approach to quantify inference capacity in optical neural networks using parametrized tasks of increasing complexity, highlighting performance trend similarities with digital neural networks, as both their nonlinear mapping capabilities are changing.

## EG-6: Ultrafast and Collective Behaviors at the Nanoscale

Chair: Elise Bailly, ETH Zurich - Institute for Quantum Electronics, Zurich, Switzerland

Time: Friday, 16:00–17:30 Location: ICM - Room 21

**Oral** EG-6.1 16:00 ICM - Room 21

**Excitation of Bound States in the Continuum with Structured Beams in Periodic Arrays of Dipoles** — •Luis Cerdán[1], Juan R. Deop-Ruano[1], Miguel Angel Martín[1], Rosario Martínez-Herrero[2], and Alejandro Manjavacas[1] — [1]Instituto de Química Física Blas Cabrera (IQF-CSIC), Madrid, Spain — [2]Departamento de Optica, Universidad Complutense de Madrid, Madrid, Spain

Bound States in the Continuum -resonant eigenmodes with infinite Q-factors- are notoriously difficult to excite from the far-field. Here, we report their efficient excitation in periodic arrays of polarizable objects using radially polarized beams.

**Oral** EG-6.2 16:15 ICM - Room 21

**Ultrafast Coulomb blockade in an atomic-scale quantum dot** — •Laric Bobzien[1], Jonas Allerbeck[1], Nils Krane[1], S. Eve Ammerman[1], Daniel E. Cintron Figueroa[2], Chengye Dong[3], Joshua A. Robinson[2,3], and Bruno Schuler[1] — [1]Empa - nanotech@surfaces Laboratory, 8600 Dübendorf, Switzerland — [2]Department of Chemistry, The Pennsylvania State University, 16802 University Park, USA — [3]Two-Dimensional Crystal Consortium and Materials Research Institute, The Pennsylvania State University, 16802 University Park, USA

Ultrafast charge rectification via the localized states of a single atomic vacancy enables orbital snapshots in the time domain, revealing the Coulomb blockade with sub-ps to few-10 ps lifetime in light-wave driven scanning tunnelling microscopy.

**Oral** EG-6.3 16:30 ICM - Room 21

**All-optical microscopy with combined atomic-scale spatial and subcycle temporal resolution** — •Felix Schiegl, Tom Siday, Johannes Hayes, Fabian Sandner, Peter Menden, Valentin Bergbauer, Martin Zizlsperger, Svenja Nerreter, Sonja Lingl, Jascha Repp, Jan Wilhelm, Markus A. Huber, Yaroslav A. Gerasimenko, and Rupert Huber — Department of Physics and Regensburg Center for Ultrafast Nanoscopy (RUN), University of Regensburg, Regensburg, Germany

We present a new nonlinear contrast mechanism based on ultrafast tunneling currents in near-field light-matter interaction. This enables atomic-scale all-optical microscopy, providing unprecedented access to atomically confined tunneling currents with subcycle temporal resolution.

**Oral** EG-6.4 16:45 ICM - Room 21

**Ultrafast scanning tunnelling spectroscopy of an individual single-atom quantum emitter in a monolayer semiconductor** — •Yaroslav Gerasimenko, Carmen Roelcke, Lukas Kastner, Maximilian Graml, Andreas Biereder, Jan Wilhelm, Jascha Repp, and Rupert Huber — Department of Physics and Regensburg Center for Ultrafast Nanoscopy, University of Regensburg, Regensburg, Germany

Deciphering the interplay of atomic and electronic motion requires probing at intrinsic space-time-energy scales. We resolve bound-state modulation of phonon-driven vacancy by sampling electronic spectra with atomic and sub-ps precision, faster than a vibration period.

**Oral** EG-6.5 17:00 ICM - Room 21

**Ultrafast nonreciprocal transmission modulation in metasurfaces with epsilon-near-zero materials** — •Albert Mathew[1], Rebecca Aschwanden[2], Aditya Tripathi[1], Piyush Jangid[1], Basudeb Sain[2,3], Thomas Zentgraf[2], and Sergey Kruk[4] — [1]Research School of Physics, The Australian National University, Canberra 2601, Australia — [2]Department of Physics, Paderborn University, Paderborn 33098, Germany — [3]Department of Physics and Electronics, Christ University, Bangalore, 560029, India — [4]Australian Research Council CoE QUBIC, IBMD, MaPS, University of Technology, Sydney 2007, Australia

We demonstrate ultrafast optical isolation using a metasurface integrated with epsilon-near-zero material indium tin oxide. The isolation, driven by Kerr nonlinearity, occurs at 40–70 GW/cm$^2$ power and within a wavelength range of 1200-1300 nm.

**Oral** EG-6.6 17:15 ICM - Room 21

**Ultrafast Nanoscopy of Carrier Dynamics and Nanoscale Morphology in Metal Halide Perovskites** — •Svenja Nerreter[1], Martin Zizlsperger[1], Qimu Yuan[2], Kilian B. Lohmann[2], Fabian Sandner[1], Felix Schiegl[1], Christian Meineke[1], Yaroslav A. Gerasimenko[1], Laura M. Herz[2], Thomas Siday[1,2], Markus A. Huber[1], Michael B. Johnston[2], and Rupert Huber[1] — [1]Department of Physics and Regensburg Center for Ultrafast Nanoscopy (RUN), University of Regensburg, Regensburg, Germany — [2]Department of Physics, University of Oxford, Clarendon Laboratory, Oxford, United Kingdom

Femtosecond shifts of terahertz near-field waveforms unravel the interplay between ultrafast carrier dynamics and nano-morphology in metal halide perovskites. Nanoscale vertical diffusion is found to be remarkably robust against chemical or structural variations.

## CC-P: CC Poster Session

Time: Friday, 13:00–14:00 Location: Hall B0

CC-P.1 13:00 Hall B0

**Terahertz Spatiotemporal Imaging by Multiangle Beam Projection** — •Vivek Kumar[1], Pitambar Mukherjee[2], Lorenzo Valzania[1], Amaury Badon[3], Patrick Mounaix[2], and Sylvain Gigan[1] — [1]Laboratoire Kastler Brossel, ENS-Université PSL, CNRS, Sorbonne Université, Collège de France, 24 rue Lhomond, 75005 Paris, France, Paris, France — [2]IMS Laboratory, University of Bordeaux, UMR CNRS 5218, 351 Cours de la Libération Bâtiment A31, 33405 Talence, France, Bordeaux, France — [3]Laboratoire Photonique Numérique et Nanosciences (LP2N), UMR 5298, University of Bordeaux, F-33400 Talence, France, Bordeaux, France

In this work, we address the limited spatial resolution of the THz imaging system by acquiring high-spatial frequencies using the Fourier synthetic aperture approach combined with time-domain spectroscopy, thus surpassing the diffraction-limited resolution and facilitating time-resolved imaging solutions.

CC-P.2 13:00 Hall B0

**Photo-mixing of chirped ultra-short optical pulses at 1 $\mu$m for the generation of broadband long THz pulses** — •Gabriel Taton, Frederic Fauquet, Ilyes Betka, Jean-Paul Guillet, Frederic Darraccq, Patrick Mounaix, and Damien Bigourd — Laboratoire IMS, UMR CNRS 5218, Université de Bordeaux, Talence, France

We demonstrate the generation of 1 THz broadband long THz pulses using a novel technique based on photo-mixing of chirped optical pulses, extending emission possibilities of photo-conductive antennas as well as their integration in devices.

CC-P.3 13:00 Hall B0

**Ultrafast dynamic response of nanoscale 2D semiconductor InSe** — •Mingcong Dai[1,2], Zijian Zhang[1,2], and Xiaojun Wu[1,2] — [1]Hangzhou International Innovation Institute, Beihang University, Hangzhou, China — [2]School of Electronic and Information Engineering, Beihang University, Beijing, China

Using THz s-SNOM surpassing the diffraction limit, we discovered $\gamma$-InSe's layer-dependent ultrafast carrier responses and directly observed carrier injection, diffusion, and annihilation at nanoscale. This paves the way for exploring semiconductors and developing THz devices.

CC-P.4 13:00 Hall B0

**Organic semiconductor-based metadevice for THz amplitude modulation** — •Federico Grandi[1,2], Cristiano Bortolotti[3,4], Francesco Modena[4], Lorenzo Gatto[1,2], Matteo Butti[4], Iain McCulloch[5], Caterina Vozzi[2], Mario Caironi[4], Giorgio E. Bonacchini[3], and Eugenio Cinquanta[2] — [1]Department of Physics, Politecnico di Milano, Milan, Italy — [2]CNR IFN – Istituto di Fotonica e Nanotecnologie, Milan, Italy — [3]Department of Electronics, Information and Bioengineering, Politecnico di Milano, Milan, Italy — [4]Center for NanoScience and Technology, IIT, Milan, Italy — [5]Department of Chemistry, Chemistry Research Laboratory, University of Oxfor, Oxford, United Kingdom

We show the feasibility and performance of a THz amplitude modulator based on a metasurface gated by an organic mixed ion-electron conductor (OMIEC).

CC-P.5 13:00 Hall B0

**Route to 4-Dimensional Terahertz Near-Field Tomography** — •Abhishek Paul, Akash Dominic Thomas, Luana Olivieri, Luke Peters, Vittorio Cecconi, Juan Sebastian Totero Gongora, Alessia Pasquazi, and Marco Peccianti — Loughborough University, Loughborough, United Kingdom

We present a Nonlinear Ghost Imaging field retrieval framework—encompassing both theoretical and numerical techniques—to retrieve hyperspectral information from deeply subwavelength features in microscopic volumes, forming the basis of a four-dimensional THz near-field tomography

CC-P.6 13:00 Hall B0

**Carrier density and carrier-phonon coupling in tin halide perovskites by THz spectroscopy** — •Federico Grandi[1,2], Lorenzo Gatto[2], Isabella Poli[3], Antonella Treglia[3], Daniele Meggiolaro[4], Giulia Folpini[2,3], Michele Devetta[2], Filippo De Angelis[4,5], Annamaria Petrozza[3], Caterina Vozzi[2], and Eugenio Cinquanta[2] — [1]Department of Physics, Politecnico di Milano, Milan, Italy — [2]CNR IFN – Istituto di Fotonica e Nanotecnologie, Milan, Italy — [3]Center for NanoScience and Technology, IIT, Milan, Italy — [4]CLHYO, CNR - SCITEC, Perugia, Italy — [5]Department of Chemistry, Biology and Biotechnology, University of Perugia, Perugia, Italy

We observed how different doping densities induce a coupling between charge and low energy phonons in tin iodide perovskite by the means of time domain THz spectroscopy and DFT simulations

CC-P.7 13:00 Hall B0

**Strong-Field 59-mW Terahertz Source Based on High-Repetition-Rate Femtosecond Yb: YAG Laser** — •Deyin Kong[1,2] and Xiaojun Wu[1,2] — [1]Hangzhou International Innovation Institute, Beihang University, Hangzhou, China — [2]School of Electronic and Information Engineering, Beihang University, Beijing, China

A THz average power of ~59 mW is generated using a 50 W industrial Yb: YAG laser to excite the lithium niobate crystal based on the tilted pulse front technique.

CC-P.8 13:00 Hall B0

**Investigation of Plasmonic Mode Coupling in Three-Dimensional Metallic Wire Terahertz Metamaterials** — •Simon Rossel, Wentao Zhang, Hassan A. Hafez, Savio Fabretti, and Dmitry Turchinovich — Universität Bielefeld, Bielefeld, Germany

We numerically investigate the plasmonic properties of three-dimensional metallic wire terahertz metamaterials, aiming to elucidate plasmonic mode coupling within these structures and highlight their potential applications in the terahertz frequency range.

CC-P.9 13:00 Hall B0

**Photonic Broadband Characterisation of a 415 GHz Filter** — •Sebastian Mueller[1], Timo Noack[2], Martin Wittmann[2], Nico Vieweg[1], Gerd Hechtfischer[2], and Thomas Puppe[1] — [1]TOPTICA Photonics AG, 82166 Graefelfing, Germany — [2]Rohde Schwarz GmbH & Co. KG, 81671 Munich, Germany

We report on the broadband characterisation of a 415 GHz band-pass filter based on a frequency comb phase-locked photonic terahertz difference frequency source covering several rectangular wave guide bands.

CC-P.10 13:00 Hall B0

**Progress towards a highly efficient, compact, scalable THz pulse source** — •Gergő Krizsán[1,2,3], Bálint Jurasits[1], Gábor Almási[1], and János Hebling[1,2] — [1]Institute of Physics, Pécs, Hungary — [2]Szentágothai Research Centre, Pécs, Hungary — [3]HUN-REN-PTE High-Field Terahertz Research Group, Pécs, Hungary

Significant improvements in THz pulse generation efficiency were achieved using the NLES-VPHG setup. Detailed investigations into the effects of microstructured surface quality on efficiency highlight opportunities for further optimization and performance enhancement.

CC-P.11 13:00 Hall B0

**Mamyshev oscillator-pumped organic crystals for single-pulse THz generation** — •Dario Giannotti[1,3], Francesco Canella[2], Riccardo Gotti[4], Sara Pizzurro[4], Lorenzo Mosesso[5,6], Stefano Lupi[5,6], Federico Pirzio[4], Antonio Agnesi[4], and Gianluca Galzerano[2,3] — [1]Politecnico di Milano, Milan, Italy — [2]Consiglio Nazionale delle Ricerce, Milan, Italy — [3]Istituto Nazionale di Fisica Nucleare, Milan, Italy — [4]Università di Pavia, Pavia, Italy — [5]Università degli Studi di Roma "La Sapienza", Rome, Italy — [6]Istituto Nazionale di Fisica Nucleare, Rome, Italy

We investigate THz generation from organic and inorganic crystals pumped by an amplified Mamyshev oscillator at 8 MHz, demonstrating high-power, broadband THz radiation with enhanced efficiency, highlighting the potential of Mamyshev oscillators for advanced THz applications.

CC-P.12 13:00 Hall B0

**Dual Non-Diffractive Beam Generation via Spin-and-Frequency-Multiplexed All-Dielectric Metasurfaces at Terahertz Frequencies** — Chunyu Liu, Fan Huang, •Yanfeng Li, Quan Xu, Jianqiang Gu, and Jiaguang Han — Tianjin University, Tianjin, China

Metasurfaces provide extraordinary capabilities in manipulating electromagnetic waves. Spin-dependent all-dielectric metasurfaces that could generate two distinct non-diffractive beams (Bessel beams and abruptly autofocusing beams) at frequencies of 0.75 THz and 1.25 THz are demonstrated.

CC-P.13 13:00 Hall B0

**Non-destructive Dielectric Characterization of Secondary Mill Scale on Hot-rolled Steel** — •Min Zhai[1], Wenlong He[1], Alexandre Locquet[2,3], and D.S. Citrin[2,3] — [1]Shenzhen university, Shenzhen, China — [2]Georgia Institute of Technology, Atlanta, USA — [3]Georgia Tech-Europe, Metz, France

Transmission measurements of FeO/PE, $Fe_2O_3$/PE and $Fe_3O_4$/PE were conducted using terahertz time-domain spectroscopy, and the optical parameters of iron oxides inclusions were calculated based on Maxwell-Garnett effective medium theory and Vegard porosity law.

CC-P.14 13:00 Hall B0

**Highly-stable laser-driven single-cycle intense terahertz source with 100 kHz repetition rate** — •Alexandre Fahy[1], Léo Guiramand[1], Anna Martinez[2], Said Idlahcen[1], Jonathan Houard[3], Thomas Godin[1], Angela Vella[3], and Ammar Hideur[1] — [1]CORIA UMR 6614 CNRS - Université de Rouen Normandie - INSA Rouen, Rouen, France — [2]Dipartimento di Fisica E. Pancini, Università Federico II, Naple, Italy — [3]GPM UMR 6634 CNRS - Université de Rouen Norm, Rouen, France

We report on a high-power THz source driven by a high-repetition rate industrial-grade femtosecond laser. It delivers 700 fs single-cycle THz transients with few-100kV/cm intensity and less than 0.4% amplitude fluctuations.

CC-P.15 13:00 Hall B0

**Linearity of Fast and Highly Sensitive LiTaO3 Pyroelectric Detectors in the Terahertz Range** — Ashutosh Sharma[1], Vineet Gupta[1], Joon-Gon Son[1], Abhishek Gupta[1], Janos Bohus[1], •Jozsef Fulop[1], and Thomas Gebert[2] — [1]ELI-ALPS, Szeged, Hungary — [2]WiredSense Gmbh, Hamburg, Germany

In response to single-cycle THz pulses, we measured the linearity of an uncoated lithium tantalate pyroelectric detector, over three orders of magnitude in pulse energy, up to 2 $\mu J$. The response was linear up to 1 $\mu J$ pulse energy.

CC-P.16 13:00 Hall B0

**Widely Tunable Optical Frequency Comb Generator on a Generic InP Platform** — •Y Durvasa Gupta[1], Stephen Cardenas Giraldo[1], Patrick Runge[1], and Martin Schell[1,2] — [1]Fraunhofer Heinrich Hertz Institute, Berlin, Germany — [2]Technical University Berlin, Berlin, Germany

High bandwidth (480 GHz), widely tunable (5 GHz – 20 GHz comb line spacing, 1531 nm – 1565 nm wavelength) electro-optic modulation-based frequency comb generation on a monolithic photonic integrated chip fabricated in a generic InP foundry platform.

CC-P.17 13:00 Hall B0

**Intersubband polaritonic metasurfaces for widely-tunable continuous-wave difference-frequency generation in the 2-6 THz range** — •Markus A. Rieder, Jonas H. Krakofsky, and Mikhail A. Belkin — Walter Schottky Institute, Technical University of Munich, Garching, Germany

We demonstrate optically-thin nonlinear intersubband metasurfaces optimized for terahertz difference-frequency generation in the 1-6 THz range. Widely-tunable continuous-wave THz power output of up to 1 $\mu$W is obtained using low-power (100-200 mW) mid-infrared lasers as pumps.

CC-P.18 13:00 Hall B0

**Optimizing Terahertz Driven Electron Acceleration Efficiency Within a Ring-Like Paraboloid Vacuum Accelerator** — László Pálfalvi[1,2], •Zerihun Tadele Godana[1,3,4], György Tóth[1,3], and János Hebling[1,2,3] — [1]Institute of Physics, University of Pécs, H-7624 Pécs, Hungary — [2]HUN-REN–PTE High-Field Terahertz Research Group, H-7624 Pécs, Hungary — [3]Szentágothai Research Centre, University of Pécs, H-7624 Pécs, Hungary — [4]Department of Physics, College of Natural & Computational Science, Dilla University, Dilla, Ethiopia

We investigate the optimization of electron acceleration efficiency by focusing a radially polarized single-cycle THz pulse within a ring-shaped paraboloid vacuum accelerator. Numerical simulations predict an energy gain in the MeV range.

# CF-P: CF Poster Session

Time: Friday, 13:00–14:00 Location: Hall B0

CF-P.1 13:00 Hall B0

**Fast recovery dynamics of GaSbBi-based SESAMs for high-fluence operation** — •Maximilian Schuchter[1,2], Joonas Hilska[1], Markus Peil[1], Eero Koivusalo[4], Marco Gaulke[2], Ursula Keller[2,3], and Mircea Guina[1] — [1]Optoelectronics Research Centre, Physics Unit Tampere University, Tampere, Finland — [2]ETH Zurich, Department of Physics, Institute for Quantum Electronics, Zurich, Switzerland — [3]ETH Zurich, Department of Electrical Engineering and Information Technology, Zurich, Switzerland — [4]Reflekron Ltd, Tampere, Finland

We present GaSbBi QWs above 2-$\mu$m as a viable alternative to InGaSb SESAMs. GaSbBi QWs embedded in AlAsSb barriers can be used for reduced two-photon absorption while still exhibiting fast recovery suitable for passive modelocking.

CF-P.2 13:00 Hall B0

**Dramatic Enhancement of Supercontinuum Generation by Using Dissonant Two-Color Laser Fields** — •Tsuneto Kanai[1], ChengXiang Jin[1,2], Hibiki Tsunekawa[1,2], Atsunori Sakurai[1,2,3], and Toshiki Sugimoto[1,2,3] — [1]Institute for Molecular Science, Okazaki, Japan — [2]Graduate Institute for Advanced Studies, Okazaki, Japan — [3]RIKEN SPring-8 Center, Sayocho, Japan

By using a dissonant two-color filamentation scheme, we demonstrate dramatic enhancement of Kerr-dominated supercontinuum generation in water, whose efficiency is three orders of magnitude higher than the so-called harmonics-enhanced supercontinuum generation in the plasma-dominated regime.

CF-P.3 13:00 Hall B0

*withdrawn*

CF-P.4 13:00 Hall B0

**Ultrafast Time-stretch Spectroscopy Using Broadband Mamyshev Oscillator at 1.7 $\mu$m** — •Xiaoxiao Wen[1], Huajun Tang[1], Jixiang Chen[1], Yitian Tong[1], and Kenneth Kin-Yip Wong[1,2] — [1]The University of Hong Kong, Department of Electrical and Electronic Engineering, Hong Kong, China — [2]Advanced Biomedical Instrumentation Centre, Hong Kong Science Park, Hong Kong, China

We present an ultrafast time-stretch spectroscopy using a broadband Mamyshev oscillator at 1.7 $\mu$m with 100-nm wide bandwidth and 7-MHz rapid spectral refresh rate to measure the absorption properties of various substances.

CF-P.5 13:00 Hall B0

**High Vacuum Compatible Large Dynamic Range Mechanical Deformable Mirror for Aberration Correction at Full Laser Power** — •Alok Kumar Pandey, Lionel Nicolas, Jerôme Legrand, and Xavier Levecq — Imagine Optic, Orsay, France

This work presents the enhanced performance of Imagine Optic's ILAO-Star deformable mirrors, achieving over 99.9% linearity, <0.1% hysteresis, and 12 Hz closed-loop correction, fully eliminating the breathing effect for precise wavefront control in full laser power mode.

CF-P.6 13:00 Hall B0

*withdrawn*

CF-P.7 13:00 Hall B0

**Spatial Mode Cleaning and Nonlinear Compression of an Innoslab-based Laser in a Gas-Filled Multipass Cell** — •Jie Guo[1], Luqi Guo[2], Zichen Gao[1], Jinfeng Li[1], Yuguang Huang[1], and Xiaoyan Liang[1] — [1]Shanghai Institute of Optics and Fine Mechanics, Shanghai, China — [2]Zhangjiang Laboratory, Shanghai, China

We demonstrate a gas-filled multipass cell which cleaned the spatial mode of a spatial-filter-free 250 W, 100 kHz, 445 fs driven source based on Innoslab amplifier and compressed the pulse duration to 29 fs simultaneously.

CF-P.8 13:00 Hall B0

**Suppression of carrier-phase random-walk in harmonically mode-locked fiber laser through Kelly sidebands enhancement** — Benhai Wang[1], •Wenbin He[1], Xiaocong Wang[1], Xintong Zhang[1], Qi Huang[1], and Meng Pang[1,2] — [1]Russell Centre for Advanced Lightwave Science, Shanghai Institute of Optics and Fine Mechanics and Hangzhou Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai, China — [2]State Key Laboratory of High Field Laser Physics and CAS Center for Excellence in Ultra-intense Laser Science, Shanghai Institute of Optics and Fine Mechanics Chinese, Academy of Sciences, Shanghai, China

We measured the supermode carrier-phase noise of the pulses in a harmonically mode-locked fiber laser using dispersive time-delay interferometry, revealing that the random-walk rate of pulse carrier-phases can be suppressed dramatically through Kelly sidebands enhancement.

CF-P.9 13:00 Hall B0

**All-fiber picosecond optical parametric oscillator at 933 nm based on Raman-assisted XMPI in a step-index PM fiber** — •Arnaud Viry[1], Raphael Florentin[1], Thierry Robin[2], Kilian Le Corre[2], Hervé Gilles[1], Sylvain Girard[1], and Mathieu Laroche[1] — [1]CIMAP, Caen, France — [2]Exail, Lannion, France

We present an all-fiber picosecond FOPO system synchronously pumped by a Neodymium-doped fiber laser source at 914nm. XPMI gain is exploited in a simplified PM-fiber ring cavity resonant at the Stokes wavelength of 933nm.

CF-P.10 13:00 Hall B0

**Diode-pumped femtosecond alexandrite oscillators and towards regenerative amplification** — •Tobias Grätzer, Manuel Zeyen, Daniel Hug, and Bojan Resan — University of Applied Science and Arts Northwestern Switzerland, Windisch, Switzerland

We report diode-pumped femtosecond alexandrite oscillators with sub-100 fs pulse duration and nJ pulse energy. We are working towards regenerative amplification and have achieved sufficient small signal gain for a positive net gain.

CF-P.11 13:00 Hall B0

**Comparison of Metaheuristic Algorithms for Supercontinuum Control** — •Mathilde Hary[1,2], Teemu Koivisto[1], John Michael Dudley[2], and Goëry Genty[1] — [1]Photonics Laboratory, Tampere University, FI-33104, Tampere, Finland — [2]Université Marie et Louis Pasteur, CNRS UMR 6174, Institut FEMTO-ST, Besancon, France

We compare the performance of three metaheuristic algorithms for two distinct tasks: shaping single and multi-wavelengths in a supercontinuum. Our approach gives valuable insight for optimizing any optical setup.

CF-P.12 13:00 Hall B0

*withdrawn*

CF-P.13 13:00 Hall B0

**AI-Driven Design of High-Performance Optical Thin Film Coatings for Ultrafast Lasers** — •Utsa Chattopadhyay[1,2], Florian Carstens[5], Andreas Wienke[5], Ingmar Hartl[2], Nihat Ay[1], Christoph M. Heyl[2,3,4], and Henrik Tünnermann[2] — [1]Institute for Data Science Foundations, Technical University of Hamburg, Hamburg, Germany — [2]Deutsches Elektronen-Synchrotron, Hamburg, Germany — [3]Helmholtz Institute Jena, Jena, Germany — [4]GSI Helmholtz Centre for Heavy Ion Research, Darmstadt, Germany — [5]Laser Zentrum Hannover e.V, Hannover, Germany

We present a physics-informed neural network for dielectric mirror coating design. We demonstrate its capabilities by designing a broadband high-reflectivity mirror with $-200\,fs^2$ GDD.

CF-P.14 13:00 Hall B0

**Controlling the group velocity of a Bessel Beam** — •Lilian Franchois, Valeria V Belloni, Remo Giust, Luc Froehly, and François Courvoisier — Université Marie et Louis Pasteur, CNRS, institut FEMTO-ST,, Besançon, France

We have written a program that simulates the group velocity of a Bessel beam on any setup. We also studied the influence of the relative distance of the components on the group velocity.

CF-P.15 13:00 Hall B0

**A fiber laser source for parallel dual-window multiplex SRS (DWM-SRS): single-shot CH-stretching and fingerprint imaging** — •Gabriele Di Noia[1], Francesco Crisafi[1], Fedele Pisani[2], Mujeeb Rahman[3], Andrea Ragni[1], Federico Monti[1], Eleonora Erriquez[1], Gianluca Galzerano[4], Giulio Cerullo[2], and Matteo Negro[1] — [1]Cambridge Raman Imaging S.r.l., Milan, Italy — [2]Politecnico di Milano, Milan, Italy — [3]Cambridge Raman Imaging Ltd, Cambridge, United Kingdom — [4]Institute for Photonics and Nanotechnologies, National Research Council, Milan, Italy

We present a fiber laser system for dual-window multiplex SRS, covering CH-stretching (2800–3100 $cm^{-1}$) and fingerprint (1000–1350 $cm^{-1}$) regions, using three synchronized oscillators for simultaneous spectral imaging with a multichannel lock-in detector.

CF-P.16 13:00 Hall B0

**Self-starting Mamyshev oscillator at 915 nm using an intra-cavity SESAM** — •Arnaud Viry[1], Raphaël Florentin[1], Thierry Robin[2], Kilian Le Corre[2], Hervé Gilles[1], Sylvain Girard[1], and Mathieu Laroche[1] — [1]CIMAP, ENSICAEN-CNRS-CEA, Normandie Université, Boulevard Maréchal Juin, Caen, France — [2]Exail, rue Paul Sabatier, Lannion, France

We demonstrate a ring-cavity femtosecond Mamyshev oscillator at 915 nm based on Nd3+-doped PM fiber amplifiers. Self-starting and stable mode-locking is achieved by incorporating an intracavity SESAM, generating 71 fs compressed output pulses.

CF-P.17 13:00 Hall B0

**Single-shot spatially-multiplexed ultrafast imaging with 682 billion frames per second** — •Dilem Eşlik and Uğur Teğin — Koc University, Istanbul, Turkey

We propose a cost-efficient spatially-multiplexed ultrafast imaging technique, achieving 685 billion FPS with a sequence depth of 10 frames. Utilizing a microlens array and spatially-varying delay unit, this system offers high-resolution temporal and multidimensional imaging.

CF-P.18 13:00 Hall B0

**White-light seeded, collinear OPCPA front-end for LPA drive lasers at 800 nm** — •Thomas Hülsenbusch, Timo Eichner, Caterina Vidoli, Tino Lang, Lutz Winkelmann, Guido Palmer, and Andreas R. Maier — Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

We present a white-light seeded, collinear OPCPA system delivering > 45 $\mu$J pulse energy, with superior pulse energy and wavelength stability, required to produce high quality electron bunches from a next-generation laser plasma accelerator.

CF-P.19 13:00 Hall B0

**Ballistic Photon Imaging by Direct Two-Photon Sensor Gating** — •Viktor Kadan[1,2], Andriy Dmytruk[1], Darya Akhtaryarazar[2], Igor Dmytruk[1,4], Arian Goodarzi[3], and Ihor Pavlov[1,2] — [1]Institute of Physics of NAS of Ukraine, Kyiv, Ukraine — [2]Middle East Technical University, Ankara, Turkey — [3]GUNAM Center for Solar Energy Research and Applications, Ankara, Turkey — [4] Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

We proposed ultrafast optical gating using non-degenerate two-photon absorption directly within the sensor material, implementing it with a photomultiplier tube and a CMOS camera. We demonstrated ballistic photon imaging through the scattering media.

CF-P.20 13:00 Hall B0

**Ultrafast laser source tunable around 920 nm for quantum applications** — •Tigran Mansuryan[1,2], Lamine Ferhat[1], Johan Boullet[2], and Sébastien Février[2] — [1]XLIM, UMR 6172 CNRS, University of Limoges, 123 Avenue A. Thomas, , 87060 Limoges, France — [2]NAQUIDIS, Institut d'Optique Graduate School, 1 Avenue François Mitterrand, , 33400 Talence, France

We proposed a few picosecond laser source, tunable around the 920 nm, for quantum applications. Self-shifted soliton is generated from the fiber laser, then doubled in a PPLN crystal. 20nm tunability is demonstrated.

CF-P.21 13:00 Hall B0

*withdrawn*

CF-P.22 13:00 Hall B0

**Generation of 1300-nm femtosecond laser based on the optical parametric amplification with dual 1560-nm CPA laser system** — •Rong Xu[1], Yizhou Liu[2], and Aimin Wang[1,3] — [1]Academy for Advanced Interdisciplinary Studies, Peking University, Beijing, China — [2]School of Information Science and Engineering, and Shandong Provincial Key Laboratory of Laser Technology and Application, Shandong University, Qingdao, China — [3]School of Electronics, State Key Laboratory of Advanced Optical Communication System and Networks, Peking University, Beijing, China

This work demonstrated a 1.946-MHz, 186-mW, 114-fs laser operating at 1300 nm, which generated via optical parametric amplifier (OPA) using a home-built 1560-nm chirped-pulse amplifier (CPA) laser, showing potential for three-photon microscopy applications.

CF-P.23 13:00 Hall B0

**Generation of sub 50-fs Pulses at 920 nm by Frequency-Doubling using an Aperiodically-Poled Lithium-Niobate Crystal** — •Robert Herda and Axel Friedenauer — TOPTICA Photonics AG, Gräfelfing, Germany

We used an aperiodically poled crystal for simultaneous frequency doubling and spectral broadening of an 80-MHz 109-fs fiber laser. We generated 45-fs pulses at 920 nm with an average power of 1.97 W.

CF-P.24 13:00 Hall B0

*withdrawn*

CF-P.25 13:00 Hall B0

**Highly Sensitive Dispersion Characterization of Silicon Nitride Waveguides Using Femtosecond Time-of-Flight Measurements** — •Nathalie Vermeulen[1], Ryu Niigaki[2], Takashi Inoue[2], Hugo Thienpont[1], and Koyo Watanabe[2] — [1]Vrije Universiteit Brussel, Brussels, Belgium — [2]Hamamatsu Photonics K. K., Hamamatsu, Japan

We present a new dispersion measurement technique for on-chip waveguides, combining ultrafast time-of-flight measurements with advanced spatial light modulator technology. We apply it to short silicon nitride waveguides with dispersion-length products around 5×10-5 ps/nm.

CF-P.26 13:00 Hall B0

**Spatio-Temporal Couplings in Ultrashort Vortex Pulses Generated by Spiral Phase Plates** — •Erick Ramon Baca Montero[1], Volodymyr Fesenko[1,2], and Oleksiy Shulika[1] — [1]University of Guanajuato, Salamanca, México — [2]Institute of Radio Astronomy of National Academy of Sciences of Ukraine, Kharkiv, México

First-order spatio-temporal couplings in ultrashort visible (550nm) vortices formed different spiral phase plates (SPP) are analyzed and quantified. Achromatic SPP shows an order of magnitude better performance revealing the crucial role of conversion efficiency bandwidth.

CF-P.27 13:00 Hall B0

**Nonlinear polarization rotation in bulk multipass cells for mode-locking applications** — •Semyon Goncharov[1], Marius Puetz[1], and Oleg Pronin[1,2] — [1]Helmut Schmidt University, Hamburg, Germany — [2]n2-Photonics GmbH, Hamburg, Germany

We report nonlinear polarization rotation in a bulk multipass cell. We suggest utilizing this effect for realizing nonlinear polarization rotation (NPR) mode-locking of thin-disk oscillators and report on the preliminary results.

CF-P.28 13:00 Hall B0

**Implementation Of A Single-Shot Dispersion Scan At 2 $\mu$m For Optimizing A High-Power Few-Cycle OPCPA Source** — •Caroline Juliano, Ivan Sytcevich, Roya Garayeva, Daniel Díaz Rivas, Miguel Canhota, Chen Guo, Anne-Lise Viotti, Anne L'Huillier, and Cord Arnold — Department of Physics, Lund University, Box 118, 22100, Lund, Sweden

In this work, we present the development of a high-power, high repetition rate (200 kHz) few-cycle OPCPA system centered at 2 $\mu$m together with a single-shot dispersion scan technique for real-time monitoring and performance optimization.

CF-P.29 13:00 Hall B0

**Advancing Few-Cycle Pulse Diagnostics with the Amplitude Swing Method** — Miguel López-Ripa[1], Óscar Pérez-Benito[2], Benjamín Alonso[1,3], •Rosa Weigand[2], and Íñigo Sola[1,3] — [1]Grupo de Investigación en Aplicaciones del Láser y Fotónica, Departamento de Física Aplicada, Universidad de Salamanca, E-37008, Salamanca, Spain — [2]Department of Optics, Faculty of Physics, Universidad Complutense de Madrid, Plaza de Ciencias 1, 28040, Madrid, Spain — [3]Unidad de Excelencia en Luz y Materia Estructuradas (LUMES), Universidad de Salamanca, E-37008, Salamanca, Spain

This work establishes the amplitude swing technique as a precise, robust method for characterizing few-cycle laser pulses, enabling advanced ultrafast optics applications with a compact setup adaptable across broad spectral ranges.

CF-P.30 13:00 Hall B0

*withdrawn*

CF-P.31 13:00 Hall B0

**Bulk lateral shearing interferometry applied to spatiotemporal pulses in the visible and near-infrared** — Miguel López-Ripa[1], •Cristian Barbero[1], Íñigo Sola[1,2], and Benjamín Alonso[1,2] — [1]Grupo de Investigación en Aplicaciones del Láser y Fotónica (ALF), Salamanca, Spain — [2]Unidad de Excelencia en Luz y Materia Estructuradas (LUMES), Salamanca, Spain

This work demonstrates spectral generation and precise spatiotemporal characterization of optical vortices using bulk lateral shearing interferometry (BLASHI) with a single and robust setup, benefiting applications in ultrafast optics across visible and near-infrared ranges.

CF-P.32 13:00 Hall B0

**1.5 mJ, 350 fs spectral broadening in a gas-filled concave-convex multipass cell** — •Kevin Schwarz[1], Christoph Fenzl[1], Tomin Joy[2], Kilian Fritsch[2], Valdas Maslinskas[3], and Oleg Pronin[1,2] — [1]Helmut Schmidt University, Hamburg, Germany — [2]n2 Photonics GmbH, Hamburg, Germany — [3]Light Conversion, UAB, Vilnius, Lithuania

Cocave-convex multipass cell with 646 mm length operating with 1.5 mJ, 350 fs input pulses is demonstrated in a pressurized Argon environment. The pulses are broadened with no onset of self-focusing and beam distortions.

CF-P.33 13:00 Hall B0

**Electro-optic frequency combs for high flux X-ray generation via high-intensity laser-particle interactions at CERN** — •Eva Roikova[1,2], Andrea Latina[1], Vlad Musat[1,3], Vitaliy Goryashko[2,4], and Eduardo Granados[1] — [1]CERN, Geneva, Switzerland — [2]Department of Physics and Astronomy, Uppsala University, Uppsala, Sweden — [3]JAI, University of Oxford, Oxford, United Kingdom — [4]RIKEN, SPring-8 Center, Hyogo, Japan

We present a 3 GHz Electro-Optic frequency comb for high-intensity laser-particle interactions in compact accelerators. Using a Fabry-Perot cavity enables X-ray flux of up to $10^{10}$ ph/s, advancing material science and medical applications.

CF-P.34 13:00 Hall B0

**Temporal Contrast Enhancement of Gemini Laser System with a Nonlinear Temporal Filter at the Front End** — •Oleg Chekhlov, Steve Hawkes, Yunxin Tang, Cristina Hernandez-Gomez, and Pattathil P. Rajeev — Central Laser Facility,STFC Rutherford Appleton Laboratory, Didcot, United Kingdom

We present the results of temporal contrast improvement of Gemini laser system with a modified front end with a temporal filter. We experimentally demonstrated temporal contrast enhancement to 10-12 level.

CF-P.35 13:00 Hall B0

**Calculation of Phase Aperture Kerr-lens mode-locking** — •Masaki Tokurakawa[1,2] and Ayu Konno[1] — [1]Univeristy of Electro-Communcations, Institute for Laser Science, Tokyo, Japan — [2]Univeristy of Electro-Communcations, Center for Neuroscience and Biomedical Engineering, Tokyo, Japan

We propose a phase aperture Kerr-lens mode locking (PAKLM) which is based on a phase plate aperture. Our calculation shows the PAKLM could provide larger modulation depth than that of standard KLM.

CF-P.36 13:00 Hall B0

**Simultaneous linear and nonlinear optical autocorrelation measurement with Fabry-Pérot laser diodes** — •Adrian Chlebowski, Lukasz Sterczewski, and Jaroslaw Sotor — Wroclaw University of Science and Technology, Wroclaw, Poland

We present simultaneous optical spectrum and nonlinear autocorrelation measurement using a commercial laser diode device incorporating a monitoring photodiode. Our approach facilitates pulse diagnostics thanks to the device's sensitivity to peak- and average optical power.

# CJ-P: CJ Poster Session

Time: Friday, 13:00–14:00 Location: Hall B0

CJ-P.1 13:00 Hall B0

**Widely Tunable O-Band High-Power Laser** — •Dmitrii Stoliarov[1], Aleksandr Donodin[1], Caolan Murphy[2], Vitaly Mikhailov[3], Shane Duggan[2], Jiawei Luo[3], David J. DiGiovanni[3], Frank Smyth [2], and Sergei K. Turitsyn[1] — [1]Aston Institute of Photonics Technologies, Aston University, Birmingham, United Kingdom — [2]Pilot Photonics, DCU Alpha Innovation Campus, Glasnevin, Dublin 11, Ireland — [3]OFS Laboratories, Somerset, NJ, USA

We present a compact hybrid laser that combines a monolithically integrated InP-based semiconductor ring-cavity laser, with a Bi-doped fiber amplifier. The system delivers Watt-level power with precise wavelength control across the O-band (1280–1315 nm).

CJ-P.2 13:00 Hall B0

*moved to CJ-14.2*

CJ-P.3 13:00 Hall B0

**A fiberized multichannel ~2.1 $\mu$m Ho:ZBLAN planar waveguide laser array for atmospheric transmission applications** — •Dale E. Otten[1], Dmitrii Y. Stepanov[2], and David G. Lancaster[1] — [1]University of South Australia, STEM, Adelaide, SA, Australia — [2]Defence Science and Technology Group, Edinburgh, SA, Australia

We present a robust, compact, fiberized, 4-channel and 4-wavelength laser source optimized for atmospheric transmission at ~2.1 $\mu$m with >150 mW/channel. We discuss design, performance and translation to other wavelengths (e.g. 1 $\mu$m).

CJ-P.4 13:00 Hall B0

**Microring Lasers based on Single Crystal Er:$Gd_2O_3$ Thin Films on Silicon** — •Xuejun Xu[1], Tomohiro Inaba[1], Takuma Aihara[2], Atsushi Ishizawa[3], Takehiko Tawara[4], and Haruki Sanada[1] — [1]NTT Basic Research Laboratories, Atsugi, Japan — [2]NTT Device Technology Laboratories, Atsugi, Japan — [3]College of Industrial Technology, Nihon University, Narashino, Japan — [4]College of Engineering, Nihon University, Koriyama, Japan

Erbium-doped single crystal rare-earth oxide (e.g, $Gd_2O_3$) thin films grown on silicon are promising platform to realize active photonic devices. We have demonstrated lasing at cryogenic temperatures by using high Q-factor microring resonators.

CJ-P.5 13:00 Hall B0

**430-fs Mode-Locked fiber laser at 1560 nm Using NiFeP as a Novel Saturable Absorber** — Radomyr Diachenko[1] and •Kwanil Lee[1,2] — [1]Korea Institute of Science and Technology, Seoul, South Korea — [2]University of Science and Technology, Daejon, South Korea

The laser incorporating NiFeP as a saturable absorber exhibits exceptional long-term stability exceeding 50 hours and excellent pulse characteristics, positioning NiFeP as a promising material for next-generation photonic devices.

CJ-P.6 13:00 Hall B0

**A 20 $\mu$m-core PM endlessly single-mode photonic crystal fiber for delivery of high-power single frequency lasers** — •Sébastien VIDAL[1], Luna GIBERT[1], Marie ZAMBELLI[1], Théau RATEL[1], Michael BERISSET[1], Laurent PROVINO[2], Achille MONTEVILLE[2], Robin POUYET[2], Olivier LE GOFFIC[2], Sébastien CLAUDOT[2], Thierry CHARTIER[3], Christophe PIERRE[1], and Marc CASTAING[1] — [1]ALPhANOV, TALENCE, France — [2]Photonics Bretagne, LANNION, France — [3]Institut Foton, LANNION, France

We report on the development of a 20 $\mu$m-core polarization maintaining endlessly single mode photonic crystal fiber for the use in delivery of high-power single frequency lasers especially for quantum physics experiments

CJ-P.7 13:00 Hall B0

**Temperature-dependent emission spectra around 800 nm and 1800 nm of the thulium-doped fibers pumped at 1565 nm** — •Bára Švejkarová[1,2], Martin Grábner[1], Jan Aubrecht[1], and Pavel Peterka[1] — [1]Institute of Photonics and Electronics of the Czech Academy of Sciences, Prague, Czech Republic — [2]Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Prague, Czech Republic

One of the limiting factors of thulium-doped fiber lasers is associated with thermal effects in fiber. We present results of temperature-dependent emission spectra of thulium-doped silica fibers pumped at 1565 nm in 77-475 K range.

CJ-P.8 13:00 Hall B0

**Dispersion-managed Compact All-Fiber Ytterbium-based Mamyshev Oscillator** — •Benedikt Schuhbauer[1], Frithjof Haxsen[1], Uwe Morgner[1,2,3], Jörg Neumann[1,2], and Dietmar Kracht[1,2,4] — [1]Laser Zentrum Hannover e.V., Hannover, Germany — [2]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering Innovation Across Disciplines),, Hannover, Germany — [3]Institut für Quantenoptik, Leibniz Universität Hannover, Hannover, Germany — [4]Leibniz University Hannover, Institute of Photonics , Hannover, Germany

We present a compact, core-pumped, monolithic, polarization-maintaining fiber Mamyshev oscillator with a single gain segment, which incorporates only standard PM980 fiber as passive fibers. The emitted pulses could be compressed to sub 70 fs pulse duration.

CJ-P.9 13:00 Hall B0

**Talbot Effect Between Bend-Localised Modes in Multicore Fibre Array** — •Wenhong Lai[1], Philip St.J. Russell[1], Yang Chen[2], and Xin Jiang[1] — [1]RCALS Centre for Advanced Lightwave Science, Hangzhou Institute of Optics and Fine Mechanics, Hangzhou 311400, China — [2]School of Computing, Engineering and Physical Sciences, University of the West of Scotland, Paisley PA1 2BE, United Kingdom

A linear array of coupled cores incorporated into an optical fibre exhibits a Talbot-like effect when the fibre is bent around an axis normal to the array plane. Possible applications include wavelength filtering and spectrometry.

CJ-P.10 13:00 Hall B0

**Enhancing microcomb efficiency via pump recycling in a chip-integrated gain medium** — •Mahmoud A. Gaafar[1,2], Bastian Ruhnke[1,5], Thibault Wildi[1,5], Markus Ludwig[1], Alexander Ulanov[1], Thibault Voumard[1,5], Kai Wang[3], Milan Sinobad[1,5], Jan Lorenzen[1,5], Henry Francis[4], Jose Carreira[4], Michael Geiselmann[4], Neetesh Singh[1], Franz X. Kärtner[1,5], Sonia M. Garcia-Blanco[3], and Tobias Herr[1,5] — [1]Center for Free-Electron Laser Science, CFEL, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany — [2]Technology Innovation Institute, Abu Dhabi, United Arab Emirates — [3]Integrated Optical Systems, MESA+ Institute for Nanotechnology, University of Twente, Enschede, Netherlands — [4]LIGENTEC SA, EPFL Innovation Park, Ecublens, Switzerland — [5]Department of Physics, Universität Hamburg, Hamburg, Germany

Here, we demonstrate a new approach to enhancing the pump-to-comb conversion efficiency. This approach leverages a chip-integrated rare-earth (Tm3+) optical amplifying gain medium that is arranged after the microcomb generation process.

CJ-P.11 13:00 Hall B0

**Flat supercontinuum generation with high-order soliton pre-compression** — •Minghe Zhao[1], Ruoao Yang[2], Xinyi Chen[3], Haonan Li[3], Honglei Yang[3], Aimin Wang[2], Qian Li[1], and Zhigang Zhang[2] — [1]School of Electronic and Computer Engineering, Peking University, Shenzhen, China — [2]State Key Laboratory of Advanced Optical Communication Systems and Networks, School of Electronics, Peking University, Beijing, China — [3]Science and Technology on Metrology and Calibration Laboratory, Beijing Institute of Radio Metrology and Measurement, Beijing, China

We demonstrate a flat supercontinuum using higher-order soliton pre-compression to achieve the spectrum flatness of 9 dB, enabling robust carrier-envelope offset frequency detection with a signal-to-noise ratio exceeding 35 dB for advanced applications.

CJ-P.12 13:00 Hall B0

**Higher-Order Mode Pumping in Erbium-Doped Fiber Amplifiers** — •Robert Petersen[1], Lars Grüner-Nielsen[2], Poul Kristensen[3], and Karsten Rottwitt[1] — [1]Technical University of Denmark, Kongens Lyngby, Denmark — [2]Danish Optical Fiber Innovation, Brønshøj, Denmark — [3]OFS Fitel Denmark Aps, Brøndby, Denmark

We experimentally compare an erbium-doped fiber amplifier pumped by the higher-order LP11 mode with fundamental mode pumping and observe similar gain and noise figures that expand design possibilities for doped fiber amplifiers.

CJ-P.13 13:00 Hall B0

*withdrawn*

CJ-P.14 13:00 Hall B0

**Ultrashort Power-Dips in Fourier Domain Mode-Locked Lasers: Impact of Picosecond Carrier Recovery** — •Özüm Emre Aşırım[1], Robert Huber[2], and Christian Jirauschek[1] — [1]Technical University of Munich, Garching, Germany — [2]University of Lübeck, Lübeck, Germany

Picosecond carrier recovery in Fourier Domain Mode-Locked (FDML) lasers, while enhancing bandwidth and stability, reveals consistent ultrashort, sinc-shaped power dips at high output powers. These dips persist as artifacts in FDML lasers, challenging high-power applications.

CJ-P.15 13:00 Hall B0

*withdrawn*

CJ-P.16 13:00 Hall B0

*withdrawn*

CJ-P.17 13:00 Hall B0

**Optimization of Mode Locking in a Tm-doped Fiber Oscillator with Frequency Shifted Feedback** — •Pius Marcellinus Eshun[1], Frithjof Haxsen[1], Jörg Neumann[1,2], and Dietmar Kracht[1,3] — [1]Laser Zentrum Hannover e.V., Hannover, Germany — [2]Cluster of Excellence PhoenixD, Hannover, Germany — [3]Leibniz University Hannover, Hannover, Germany

We investigated intensity fluctuations in a FSF Tm-doped fiber oscillator by adjusting AOM-transmission in controlling cavity dynamics. Intensity fluctuations below 1% were achieved at the best points-of-operation coupled with improved mode-locking sensitivity at reduced AOM-transmission.

CJ-P.18 13:00 Hall B0

**U-shaped relative intensity noise characteristics of high spectral purity higher order cascaded random Raman fiber laser** — •Shantanu Dambare, V. Meher, and V. Balaswamy — Indian Institute of Science, Bengaluru, India

We report U-shaped relative intensity noise (RIN) characteristics of upto 7th Stokes order, band-pass filtered cascaded random-Raman fiber laser pumped at 1064nm. RIN for any Stokes order is minimised when the in-band power is maximized.

CJ-P.19 13:00 Hall B0

**Ultra-Short-Pulse laser beam delivery through inhibited-coupling hollow-core photonic crystal fiber at 2 $\mu$m** — •Frédéric Delahaye[1], Alexandre Gorse[1], Dmitry Gaponov[2], Vincent Tomblaine[2], Benoît Beaudou[1], Guillaume Huss[2], Frédéric Gérôme[1,3], and Fetah Benabid[1,3] — [1]GloPhotonics, Limoges, France — [2]Leukos, Limoges, France — [3]GPPMM group Xlim, Limoges, France

We report on use of commercially available hollow-core photonic crystal fibers with losses of 25 dB/km at 2 $\mu$m for efficient delivery demonstrations of ps and fs pulse regime of a thulium CPA laser system..

CJ-P.20 13:00 Hall B0

**Low-noise supercontinuum in a normal dispersion ZBLAN fibre employing a pump with cascaded compression** — •Shreesha Rao D. S.[1,2], Anupamaa Rampur[2], Ole Bang[1,3,4], and Alexander M. Heidt[2] — [1]DTU Electro, Department of Electrical and Photonics Engineering, Technical University of Denmark, Ørsteds Plads, 2800 Kongens Lyngby, Denmark — [2]Institute of Applied Physics, University of Bern, Sidlerstrasse 5, 3012 Bern, Switzerland — [3]NKT Photonics A/S, Blokken 84, 3460 Birkerød, Denmark — [4]NORBLIS ApS, Virumgade 35D, 2830 Virum, Denmark

Using a cascaded compression stage, we have developed a sub-10 femtosecond pump centred at 1.85 $\mu$m. We use this to generate a low-noise supercontinuum in a normal-dispersion PM-ZBLAN fibre spanning 0.780-2.716 $\mu$m (at -30 dB).

CJ-P.21 13:00 Hall B0

**1.7 $\mu$m Flexible Nanosecond Pulse Generation** — •Ji-Xiang Chen[1], Huajun Tang[1], Xiaoxiao Wen[1], Yitian Tong[1], Yang Xiao[2], Jiqiang Kang[1,2], and Kenneth Kin-Yip Wong[1,2] — [1]The University of Hong Kong, Department of Electrical and Electronic Engineering, Hong Kong, China — [2]Advanced Biomedical Instrumentation Centre, Hong Kong Science Park, Hong Kong, China

We report a flexible 1.7 $\mu$m nanosecond pulsed laser based on a semiconductor optical amplifier with continuously adjustable central wavelength, repetition rate, and pulse duration, offering great potential for hyperspectral PAI.

CJ-P.22 13:00 Hall B0

**Nonlinear Refractive Index of Chalcogenide Glass in the Mid-infrared Region** — Satoshi Nakamura, Jonathan de Clermont-Gallerande, Takenobu Suzuki, and •Yasutake Ohishi — Toyota Technological Institute, Nagoya, Japan

We measured the nonlinear refractive index dispersion of Ge33As12Se55 glass in the mid-infrared region by the Z-scan method and clarified its effect on the mid-infrared supercontinuum generation for the first time in the author's knowledge.

CJ-P.23 13:00 Hall B0

**A Polarization Maintaining Cladding Light Stripper with Ultra-low Backscattering, Based on 20/400-um Double Clad Fiber** — Jihwan Kim[1] and •Ju Han Lee[1,2] — [1]Kromanet Inc., Seoul, South Korea — [2]University of Seoul, Seoul, South Korea

The design and fabrication results of a CLS based on polarization-maintaining (PM) 20/400-um LMA DCF with ultra-low backward scattering are presented. The cladding power attenuation, backscattering, and PER were ~98.7%, ~0.13%, and ~19.7 dB, respectively.

CJ-P.24 13:00 Hall B0

**A dual-wavelength pumped 544 W Er/Yb co-doped fiber amplifier** — •Guanzhong Li[1,2], Yuexuan Cai[1,2], Dan Li[1,2], Qirong Xiao[1,2], Mali Gong[1,2], and Ping Yan[1,2] — [1]Department of Precision Instrument, Tsinghua University, Beijing, China — [2]State Key Laboratory of Precision Space-time Information Sensing Technology, Beijing, China

We report a 544 W, 1568 nm, Er/Yb fiber amplifier dual-wavelength pumped by 1018 nm and 1535 nm fiber lasers.

CJ-P.25 13:00 Hall B0

**100 W Green Femtosecond Ytterbium-Fiber Master Oscillator Power Amplifier** — •In Chul Park[1,2], Eun Kyoung Park[1,2], Hoon Jeong[3], and Ji Won Kim[1,2] — [1]Department of Photonics and Nanoelectronics, Hanyang University ERICA, Ansan, South Korea — [2]BK21 FOUR ERICA-ACE Center, Hanyang University ERICA, Ansan, South Korea — [3]Korea Institute of Industrial Technology, Cheonan, South Korea

We report efficient second harmonic generation of a Yb fiber-based femtosecond laser master oscillator power amplifier system that yields 100 W of green output at a repetition rate of 1.83 GHz.

CJ-P.26 13:00 Hall B0

**Herriott cell optical isolators and amplifiers - Rayleigh length of the beam envelope** — •Johann Gabriel Meyer, Andrea Zablah, Kristaps Kapzems, Nazar Kovalenko, and Oleg Pronin — Helmut Schmidt University, Hamburg, Germany

Employing a Herriott cell, we could demonstate a Faraday isolator with simple plates of fused silica for a wavelength of 532 nm. This approach enables the use of various materials at otherwise difficult wavelength ranges.

CJ-P.27 13:00 Hall B0

**Tunable Phosphosilicate Fiber Oscillator Mode-locked With a Nonlinear Inline Interferometer** — •Gerrit Gercke[1,2], Marvin Edelmann[1,2], Jingyi Cui[1,2], Mikhail Pergament[1], and Franz X. Kärtner[1,2] — [1]Center for Free-Electron Laser Science (CFEL), DESY, Hamburg, Germany — [2]Department of Physics, Universität Hamburg, Hamburg, Germany

We demonstrate an inline nonlinear interferometer mode-locked phosphosilica Yb-fiber laser, tuneable between 1026 and 1016 nm in in the soliton regime or stretched pulse mode-locked covering 1007-2025 nm with a single pulse of 50 fs duration.

CJ-P.28 13:00 Hall B0

**Hysteresis-Free Piezoelectric Phase Controller for Optical Fibers at kHz Bandwidth for Coherent Beam Combination** — •William Kerridge-Johns, Zedi Zhang, Dominic Blackledge, and Johan Nilsson — Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

A piezoelectric fiber stretcher providing a phase control range of 680 radians at 800 Hz 3dB bandwidth for coherent beam combination applications at low cost, using a closed-loop piezoelectric to remove hysteresis.

CJ-P.29 13:00 Hall B0

**Intelligent control of mode-locked fiber laser via residual neural network** — Wei Zhu[1], Chuhui Zhang[1,2], and •Xueming Liu[1,2] — [1]Southeast University, Nanjing , China — [2]Nanjing University of Information Science and Technology, Nanjing , China

This study experimentally demonstrates an intelligent controllable mode-locked fiber laser enabled by residual neural network, which can automatically locking onto multiple operation states, such as fundamental mode-locking and Q-switching without physically altering its structure.

# EE-P: EE Poster Session

Time: Friday, 13:00–14:00 Location: Hall B0

EE-P.1 13:00 Hall B0

**Dynamics of supercontinuum generation from light filaments in ceramic Nd:YAG polycrystals** — Nicholas Bagley[1], Sahar Wehby[2,3], Tigran Mansuryan[2], Rémi Boulesteix[4], Alexandre Maître[4], Yago Arosa[5], Mario Ferraro[6], Fabio Mangini[6], Yifan Sun[6], Katarzyna Krupa[7], Benjamin Wetzel[2], Stefan Wabnitz[6], Alejandro Aceves[1], •Alessandro Tonello[2], and Vincent Couderc[2] — [1]Southern Methodist University, Dallas, Texas, USA — [2]Université de Limoges, XLIM UMR CNRS 7252, Limoges, France — [3]ALPhANOV, Optics and Lasers Technology Center, Institut d'optique d'Aquitaine, Talence, France — [4]Université de Limoges, IRCER, UMR CNRS 7315, Limoges, France — [5]University of Santiago de Compostela, Santiago de Compostela, Spain — [6]DIET, Sapienza University of Rome , Rome, Italy — [7]Institute of Physical Chemistry, Polish Academy of Sciences, Warsaw, Poland

We analyze numerically and experimentally the supercontinuum generation by controlled wave collapse in crystal or ceramic Nd:YAG rods, with applications to spectroscopy. Our analysis identifies key parameters to further improve this nonlinear propagation's stability.

EE-P.2 13:00 Hall B0

**Unusual features of time-cavities** — •Ihar Babushkin[1,2,3], Oliver Melchert[1,2], Uwe Morgner[1,2], and Ayhan Demircan[1,2] — [1]Leibniz University Hannover, Hannover, Germany — [2]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering – Innovation Across Disciplines), Hannover, Germany — [3]Max Born Institute, Berlin, Germany

We consider "time-cavities" – photonic trapping inside a strong optical pulse, copropogating with photons. We show that such trapping demonstrates rather unconventional features, such as zero leakage through the walls and breaking several fundamental limits.

EE-P.3 13:00 Hall B0

*withdrawn*

EE-P.4 13:00 Hall B0

**Generation of tunable broadband OAM beams in large ring core multimode fibers** — •Jiaqi Li[1], Samuli Ranto[1], John M. Dudley[2], and Goëry Genty[1] — [1]Tampere university, Tampere, Finland — [2]Université Marie et Louis Pasteur, Institut FEMTO-ST, CNRS UMR 6174, Besançon, France

We report the generation of vortex beams carrying orbital angular momentum with tunable topological charge and broad wavelength operation in a multimode fiber without the need for input field shaping.

EE-P.5 13:00 Hall B0

**Composition-dependent charge carrier dynamics in bulk Mo1-xWxSe2 alloys** — •Junho Park, Seonggeon Gim, Yeongkwan Kim, and Fabian Rotermund — Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon, South Korea

We investigate the correlation between composition-dependent band structure, spin-orbit coupling (SOC) strength, and charge carrier dynamics in bulk Mo1-xWxSe2 alloys, confirming that SOC significantly influences exciton recombination kinetics at the K point.

EE-P.6 13:00 Hall B0

**Plasma-driven secondary radiations for nonharmonic two-color mixing** — •Luc Bergé[1], Viktorija Tamuliene[2], Virgilijus Vaicaitis[2], Mateusz Rebarz[3], and Shirly Josefina Espinoza[3] — [1]Centre des Lasers Intenses et Applications (CELIA), Université de Bordeaux, Talence, France — [2]Laser Research Center, Vilnius University, Vilnius, Lithuania — [3]The Extreme Light Infrastructure ERIC (ELI Beamlines Facility), Dolni Brezany, Czech Republic

Brunel harmonics created by photocurrents are experimentally and theoretically studied for two-color pulses with non-integer frequency ratios. Besides spectral emissions by four-wave mixing, satellite components associated with different ionization regimes along plasma generation are reported.

EE-P.7 13:00 Hall B0

**Optimum pulse duration for THz yield from the air-based plasma** — •Olga Kosareva[1], Irina Nikolaeva[1], Jiayi Xie[2], Daniil Shipilo[1], Nikolay Panov[1], Andrei Savel'ev[1], Haizhu Zhao[2], and Weiwei Liu[2] — [1]Physics Faculty, Lomonosov Moscow State University, Moscow, Russia — [2]Institute of Modern Optics, Nankai University, Tianjin, China

By scanning ($\omega$–$2\omega$) phase shift for 800+400-nm, 50-fs pulse chirped between -200—200fs in air filament, we found the duration responsible for the maximum THz yield to be almost independent of the chirp sign.

EE-P.8 13:00 Hall B0

*withdrawn*

EE-P.9 13:00 Hall B0

*withdrawn*

EE-P.10 13:00 Hall B0

**Temporal reflections via intermodal interactions in multimode fibers** — Alexis C. Sparapani[1], •Yifan Sun[1,2], Fabio Mangini[1], Mario Ferraro[3], Govind P. Agrawal[4], and Stefan Wabnitz[1] — [1]Sapienza University of Rome, Rome, Italy — [2]Université libre de Bruxelles, Brussels, Belgium — [3]University of Calabria, Rende, Italy — [4]University of Rochester, Rochester, USA

We study nonlinear interactions between a soliton pump and a DW probe pulse in different modes of a MMF.

# EI-P: EI Poster Session

Time: Friday, 13:00–14:00 Location: Hall B0

EI-P.1 13:00 Hall B0

*withdrawn*

EI-P.2 13:00 Hall B0

*withdrawn*

EI-P.3 13:00 Hall B0

*withdrawn*

EI-P.4 13:00 Hall B0

*withdrawn*

EI-P.5 13:00 Hall B0

**Ultrafast carrier dynamics in $HgPSe_3$** — •Alessandro Baserga[1], Micol Bertolotti[1], Valentino Jadriško[1], Nikolas Antonatos[2], Zdenek Sofer[3], Antonella Treglia[4], Annamaria Petrozza[4], Samim Sardar[4], Giuseppe Parternò[1], Giulia Folpini[4], Cosimo D'Andrea[4], Giulio Cerullo[1], Christoph Gadermaier[1], and Stefano Dal Conte[1] — [1]Politecnico di Milano, Milano, Italy — [2]Wrocław University of Science and Technology, Wrocław, Poland — [3]Institute of Chemical Technology, Technická, Prague, Czech Republic — [4]Istituto Italiano di Tecnologia, Milano, Italy

We explore the ultrafast optical properties of $HgPSe_3$ using time-resolved photoluminescence and pump-probe spectroscopy. Results reveal distinct spectral features, including defect-state emission and band-edge recombination, providing insights into carrier trapping dynamics and potential optoelectronic applications.

EI-P.6 13:00 Hall B0

*withdrawn*

EI-P.7 13:00 Hall B0

*withdrawn*

EI-P.8 13:00 Hall B0

**Applicated Transformer model for vdW materials identify process** — •Wing-Sing Cheung, Min-Hsuan You, Si-Yao Syu, Yu-Hsun Chou, and Chi-Yeh Chen — National Cheng Kung University, Taiana, Taiwan (R.O.C)

Use deep learning model to reduce mechanical exfoliation single layer vds materials identify process and realized automatic detection. Also, use semantic-adaptive transformer to enhance IoU scores and accuracy of detection.

EI-P.9 13:00 Hall B0

**Pt- and Pd- noble-metal dichalcogenides: synthesis, properties and applications** — •Vera Marinova[1], Nikolay Minev[1], Blagovest Napoleonov[1], Vladimira Videva[1,2], and Dimitre Dimitrov[1,3] — [1]IOMT-BAS, Sofia, Bulgaria — [2]Sofia Univeristy , Sofia, Bulgaria — [3]ISSP-BAS, Sofia, Bulgaria

We present synthesis of 2D PtSe2 and their integration as transparent, conductive layers in PDLC structures, functioning as near-infrared light shutters. In addition, PdSe2 single crystals have been obtained by self-flux method demonstrating unique in-plane anisotropy.

EI-P.10 13:00 Hall B0

**Isotype Heterojunction n+-ZnO/n-Si Photodetector with Tunable Wavelength-Selective, High-Speed, and Self-Powered Operation** — Michael Tsanakas[1], Angelina Jaros[2], Yves Fleming[3], Metamorfi Efthimiadou[4], Tobias Voss[2], Renaud Leturcq[3], Spiros Gardelis[4], and •Maria Kandyla[1] — [1]National Hellenic Research Foundation, Athens, Greece — [2]Technische Universität Braunschweig, Braunschweig, Germany — [3]Luxembourg Institute of Science and Technology , Luxembourg, Luxembourg — [4]National and Kapodistrian University of Athens, Athens, Greece

Self-powered, wavelength-selective ZnO/Si photodetectors. Engineering of constituting materials converts them from white-light to only NIR-sensitive. With external power, the wavelength selectivity is tuned to different spectral ranges. High-speed operation, with <100 $\mu$s response times.

# EJ-P: EJ Poster Session

Time: Friday, 13:00–14:00 Location: Hall B0

EJ-P.1 13:00 Hall B0

*withdrawn*

EJ-P.2 13:00 Hall B0

*withdrawn*

EJ-P.3 13:00 Hall B0

**Advanced Bragg grating reflectance analysis using FDTD for coupled mode theory-based surrogate models** — •Yasmin Rahimof, Igor A. Nechepurenko, M. R. Mahani, and Andreas Wicht — Ferdinand-Braun-Institut (FBH), Berlin, Germany

This study optimizes FDTD simulations for surface Bragg gratings by minimizing numerical errors through refined parameters. Coupled mode theory fits simulate reflectivity, enabling efficient surrogate modeling for designing longer gratings with improved accuracy and efficiency.

EJ-P.4 13:00 Hall B0

*withdrawn*

EJ-P.5 13:00 Hall B0

**Improving conditional generative adversarial networks for inverse design of plasmonic nanostructures using label projection and embedding methods** — Petter Persson, •Nils Henriksson, and Nicolò Maccaferri — Department of Physics, Umeå University, Umeå, Sweden

We introduce label projection and embedding methods to improve generative adversarial networks. As proof of concept, we generate images of plasmonic nanostructures with different shapes by using a model trained on their linear optical response.

EJ-P.6 13:00 Hall B0

**Fidelity estimation of linear pixel array photon number detectors** — •Leonardo Limongi[1,2], Martino Bernard[1,3], Mirko Lobino[2,3], Alberto Quaranta[2,3], Alessandro Gaggero[4], Francesco Martini[4], Francesco Mattioli[4], and Andrea Salamon[5] — [1]Department of Industrial Engineering, University of Trento, Trento, Italy — [2]Center for Sensors and Devices, Bruno Kessler Foundation, Trento, Italy — [3]INFN - TIFPA, Trento, Italy — [4]IFN - CNR, Roma, Italy — [5]INFN - Sezione di Roma 2, Roma, Italy

We investigate fidelity in photon-number-resolving linear pixel arrays, analyzing detection schemes with fixed efficiency. A recursive algorithm to evaluate fidelity's dependence on efficiency is derived and analyzed.

EJ-P.7 13:00 Hall B0

**Estimating the transverse dimension of speckle throughout propagation using Wigner function moments** — •Yanis Abdelmoumni-Prunes[1], Hervé Coïc[1], Claude Rouyer[1], and Didier Bénisti[2] — [1]CEA, CESTA, F-31116, Le Barp, France — [2]CEA, DIF, F-912197, Arpajon, France

We propose a method to determine the transverse dimension of speckle using moments of the field Wigner function. Using moment propagation laws, we can thus study speckle throughout propagation by calculating only a few scalars.

EJ-P.8 13:00 Hall B0

*withdrawn*

EJ-P.9 13:00 Hall B0

**Digital Compensation of Signal Distortions in Fiber Communication Lines Based on Perturbation Theory and Machine Learning** — •Paul Ilyushin, Daniil Shipilo, Irina Nikolaeva, Nikolay Panov, and Olga Kosareva — Lomonosov Moscow State University, Moscow, Russia

A perturbation theory solution of nonlinear Schrodinger equation is derived in the form of 3D convolution. We investigate its applicability to digital compensation of the distortions of optical signal in fiber communication lines.

EJ-P.10 13:00 Hall B0

**A Theoretical Framework for the First Principles Simulation of Laser Properties in Molecular Compounds** — •Luis Cerdán[1], Antonio Francés-Monerris[2], and Daniel Roca-Sanjuán[2] — [1]Instituto de Química Física Blas Cabrera (IQFCSIC), Madrid, Spain — [2]Institut de Ciencia Molecular (ICMol), Universitat de Valencia, Valencia, Spain

Here, we report a theoretical framework, combining Quantum Mechanical calculations, Machine Learning, and laser rate equations, to simulate the laser properties of molecular compounds from first principles. We have tested this methodology on *anti*-$B_{18}H_{22}$.

EJ-P.11 13:00 Hall B0

*withdrawn*

## JSII-P: JSII Poster Session

Time: Friday, 13:00–14:00 Location: Hall B0

JSII-P.1 13:00 Hall B0

**Temporal Shaping of UV Picosecond Pulses for Photoinjectors** — •Denis Ilia[1,2], Nihat Ay[3], Meng Cai[1,2], Ye Chen[1], Uwe Grosse-Wortmann[1], Ingmar Hartl[1], Wolfgang Hillert[1,2], Yujiao Jiang[1], Alexander Klemps[3], Christoph Mahnke[1], Harsha Panuganti[1], Federico Pressacco[1], Hamed Tavakol[1], and Henrik Tünnermann[1] — [1]Deutsches Elektronen Synchrotron, Hamburg, Germany — [2]Universitat Hamburg, Hamburg, Germany — [3]Institute for Data Science Foundation, Technische Universitat Hamburg, Hamburg, Germany

We demonstrate the temporal pulse shaping capabilities of the photocathode laser NEPAL, utilizing spatial light modulators to achieve picosecond UV pulse profiles that promise enhanced EuXFEL performance and new operational regimes.

JSII-P.2 13:00 Hall B0

**Seed Laser Pulse Shaping for Free-Electron Laser FLASH** — •Andreas Thiel[1], Margarit Asatrian[1], Giovanni Cirmi[2], Eugenio Ferrari[2], Nhat-Phi Hoang[2], Pardis Niknejadi[2], Lucas Schaper[2], Jiaan Zheng[2], Wolfgang Hillert[1], Ingmar Hartl[2], and Tino Lang[2] — [1]Universität Hamburg, Hamburg, Germany — [2]Deutsches Elektronen-Synchrotron, Hamburg, Germany

We present a concept for the application of spatial-light-modulator-based pulse shaping for external seeding, designed for the FEL facility FLASH. The goal is to increase its flexibility in output pulse properties.