Gerd Leuchs

Gerd Leuchs studied physics at the University of Cologne and holds a Ph.D. degree from the University of Munich. He is a full professor of physics at the Department of Physics of the University Erlangen-Nuremberg. His further distinctions are:

- Scientific member of the Max Planck Society and director at the Max Planck Institute for the Science of Light;
- Member of the Academy of Sciences Leopoldina, German Physical Society, European Physical Society, German Society of Applied Optics, Optical Society of America, Institute of Physics (London), the American Association for the Advancement of Science, and the Russian Academy of Sciences;
- Honorary doctoral degree from the Danish Technical University and honorary professor of St. Petersburg State University;
- Winner of the Quantum Electronics and Optics Prize of the European Physical Society.

2012 he obtained the Cross of Merit of the Federal Republic of Germany. Gerd Leuchs published more than 400 publications in peer reviewed scientific journals and numerous invited papers, he is editor of 3 books and inventor of 10 patents.

The research of Gerd Leuchs spans a wide range from classical optics via quantum optics to quantum communications. One project at the centre of his activity is the attempt to demonstrate the process corresponding to the time reversal of spontaneous light emission from a single atom in free space. Once this challenging goal is achieved, one will have the technology to impedance match a single photon to an atom in free space without the help of a cavity, allowing for the implementation of quantum gates operating at the few photon level. A unique feature will be the broad-band nature of the interaction in free space. Several required technological, classical and quantum optical challenges are currently being tackled: (1) the creation of aberration-free in-going vectorial dipole waves; (2) the generation of single photon waveform of adjustable temporal shape; (3) the preparation of a single doubly ionized ytterbium ion and its precise location in space; and the aberration correction of a deep parabolic mirror. Closely related is research in continuous variable quantum key distribution and quantum hacking, in the generation of quantum light e.g. from whispering gallery mode resonators, in quantum discord and entanglement measures, as well as in shaping and characterizing tightly focused light field distributions and in studying the optical response of custom tailored nano photonic particles.