

Short Course 1: Ultrashort Pulse Characterization

*Günter Steinmeyer, Max-Born-Institut , Berlin, Germany
email: steinmey@mbi-berlin.de*

Intended Audience:

This course is intended for researchers working with femtosecond laser pulses, both in academic institutions or industry. A basic understanding of ultrafast optics will be sufficient. Ultrashort pulse characterization methods will be covered from basic concepts to advanced techniques.

Benefits and Learning Objectives:

- Repetition of fundamental concepts of ultrafast optics and nonlinear optics
- Understand autocorrelation-based measurements and their limitations
- Learn how to get the maximum information out of an autocorrelation measurement
- Learn how to extend the autocorrelator to measure a FROG trace
- Making sense out of FROG traces: phase retrieval algorithms
- Learn about other important techniques like SPIDER, d-scan, and MIIPS
- Understand limiting issues of measurement techniques for few-cycle pulses
- Learn how to measure pulses with low peak power
- Obtain an understanding on which technique is most suited for what purpose
- Understand that commercial devices also have their limitations
- Learn about real-time and single-shot measurement techniques
- Avoid common pitfalls like the coherent artifact and the λ^2 correction
- Learn how to build and align pulse characterization devices yourself
- Understand how to measure the carrier-envelope phase