

How to deal with femtosecond pulses

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The objective of this series of two Lectures and three practicals is to provide key elements on the manipulation and characterization of femtosecond pulses after their generation. The first Lecture will introduce basic concepts of time-frequency representations, and will discuss the influence of different events in the life of a femtosecond pulse: propagation, reflection on optics, focusing, temporal shaping, polarization control... Some of these events will be simulated in the first practical in order to better understand the scope of the studied observables. All the practicals will be developed using python as a programming language. A preliminary session, combining an install party and a first step lecture, will be organized so as to keep the prerequisites as low as possible and these practicals open to all.

The second Lecture will introduce a few characterization techniques, to measure the temporal profile of femtosecond pulses including some spatio-temporal couplings. The practical will highlight how to setup characterization techniques in the lab using a virtual instrument setup based on PyMoDAQ. You will be able to simulate various pulse characterization situations and see how to extract the spatio-temporal profile using some existing algorithm.