

Master/bachelor thesis

in the subject area of

High quality pulse compression to ultrashort pulses

A very powerful tool to obtain ultrashort laser pulses at high average power is the use of a concept called nonlinear compression. Thereby, a longer (typically few 100 femtosecond) pulse propagates in a gas-filled waveguide, where the nonlinear process of self-phase modulation leads to spectral broadening. A subsequent compressor using chirped mirrors then compresses the pulses in time to significantly shorter pulse durations. The latter ones are very attractive, because these mirrors essentially allow an almost lossless compression compared to e.g. grating compressors. However, these mirrors only allow for the compensation of second order phases, which degrades the pulse quality, in particular, for large compression ratios or few-cycle pulses.

The work aims at investigating novel mirror design with custom phase compensation profiles. For that reason device for spectral phase measurement (Frequency Resolved Optical Gating) has to be set up to fully characterize the compressed pulses. Based on these measurements strategies will be developed to realize large compression ratios from 200 femtoseconds to sub-10 femtoseconds in a single compression step with high temporal pulse quality.

Please, send your application preferably by email to

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