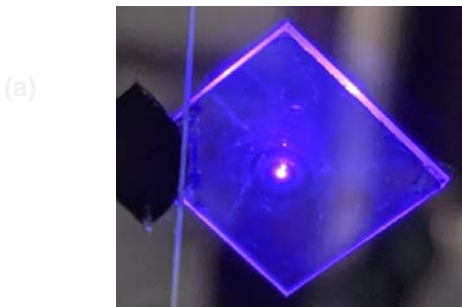


Bachelor thesis

Non-linear optics (Prof. Paulus)

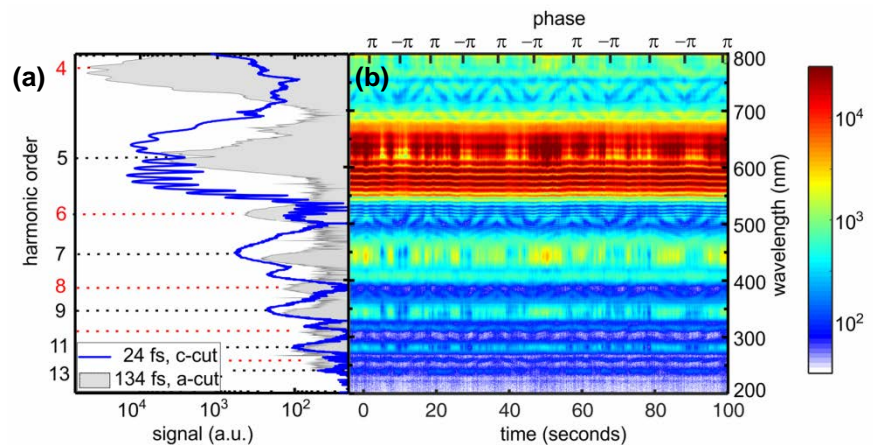
Non-linear interferometry and phase measurement

Femtosecond laser pulses in the mid-infrared have a number of emerging applications in strong-field science, including the generation of high-order harmonics (i.e. multiples) of the original laser frequency. We have recently demonstrated that this allows measuring the carrier-envelope phase.



An intense infrared laser pulses excites fluorescence and lasing at 385 nm in a zinc oxide sample, and creates high harmonics.

This project aims at developing an optical setup for phase measurements in the mid-IR. Spectra of harmonics (discrete peaks in (a)) will be recorded with a fast spectrometer. The interferences of adjacent harmonics gives rise to zig-zag pattern in (b), and allows us to measure the absolute phase of the carrier-envelope phase of the laser pulses.



We are looking for highly motivated students with an aptitude for research. A background in optics is beneficial. Basic programming skills are expected.

You will learn how to operate a femtosecond infrared laser system, measure optical spectra, and analyze your data.

Contact: Dr. Matthias Kübel – Room no. 303, Max-Wien-Platz 1, Matthias.kuebel@uni-jena.de

See also R. Hollinger, et al., "Carrier-envelope-phase measurement of few-cycle mid-infrared laser pulses using High Harmonic Generation in ZnO", *Optics Express*, *accepted* (2020)