CARL VON OSSIETZKY universität OLDENBURG
Institut für PHYSIK

PHYSICAL COLLOQUIUM

INVITATION

Monday, 03.06.2019, 4.15 p.m., W2-1-148

speaks

Dr. Markus Kitzler-Zeiler

Technical University of Vienna, Photonics Institute

about

“Accessing ultrafast dynamics with two-dimensional laser fields”

In my talk, I will present examples of our recent research where strong, two-dimensional laser waveforms are used for exploring and driving electronic dynamics on the attosecond time-scale. With such laser fields, the sub-cycle rotations of the electric field vector can be exploited as a timing reference on the attosecond time-scale, while the envelope of the pulse can serve as a femtosecond timing reference.

In the first group of examples, elliptically polarized few-cycle pulses are applied. I will show that by combining the two mentioned timing-references, one can construct a molecular clock for tracing electronic and nuclear dynamics in molecules with attosecond temporal and picometer spatial resolution. This molecular clock can be improved by the carrier-envelope phase of the few-cycle pulses which opens up further applications such as control of molecular bond-breakage in two spatial dimensions.

The second group of examples will highlight our achievements in controlling the trajectory of ionizing electron wavepackets in two spatial dimensions using orthogonally polarized two-color fields. I will show that this trajectory-engineering can be exploited in attosecond electron wavepacket interferometry and for controlling the population of highly excited electronic states in atoms and molecules.

All interested persons are cordially invited.
Sgd. Prof. Dr. Matthias Wollenhaupt