

FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 18.04.2013, 16¹⁵ Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

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Strong-field attosecond phenomena in solids

The time it takes electrons in a solid to respond to an external electric field is on the order of a fraction of a femtosecond. Due to recent progress in ultrafast and attosecond science, it is now possible to perform attosecond-scale time-resolved measurements of extremely nonlinear phenomena that occur when intense few-cycle laser pulses interact with a solid, and opportunities related to this progress have recently begun to be explored. In measurements performed at the Max-Planck-Institute of Quantum Optics (MPQ), it was demonstrated that electric currents in a fused silica sample can be switched and driven by the instantaneous field of an optical waveform at intensities just below the damage threshold, which is an important step towards developing devices where electric signals are manipulated at optical frequencies. In our related theoretical work, which is the main topic of this talk, we used several complimentary models to study the dynamics of interband excitations and the light-driven motion of charge carriers under conditions where the conventional nonlinear optics breaks down, and the Bragg-like scattering of electrons at edges of the Brillouin zone (Bloch oscillations) starts to play an important role.

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