



Quantum Efficiency Seminar und Colloquium

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Time Resolved Experiments with Atoms and Molecules using XUV and IR Laser Pulses

The tremendous achievements in the fields short-pulse laser technology and the generation of extremely intense XUV-radiation with free-electron lasers (FEL) open new avenues for studies of the dynamical behaviour of atoms and molecules in ultra-short (5 – 20 fs) and very intense (up to 10^{16} W/cm²) laser fields. In pump-probe experiments with small molecules the rotational and vibrational motion was followed in real-time and under certain conditions even the emission direction of ionic fragments can be controlled by using laser pulses with adjustable shape of the laser pulse electric field. In measurements with XUV pulses at the FEL in Hamburg (FLASH) the correlated motion of two electrons is studied after ionization due to the simultaneous absorption of two or three photons, a regime that is widely unexplored up to now, and with pump-probe arrangements the conformational and electronic structure of molecules can be explored in utmost detail using very intense XUV laser pulses. Presently, work is in progress to visualize, for the very first time, the breaking of chemical bonds as a function of time and, thus, to produce “movies” of fundamental molecular reactions.

Date: Tuesday, June 19th, 2012 15:45 pm
Location: Lecture Hall 1, Hermann-Herder-Str. 3, Freiburg

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