

LCLS-PULSE Seminar

## Study of Molecular Dynamics using Asymmetric Laser Pulses: From Electron Diffraction of Atoms towards Molecular Imaging

Thursday, July 2, 2009  
4:00 pm in Bldg 040, Cypress Room  
SLAC National Accelerator Laboratory

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Electron diffraction is a standard method for structural study of atoms (or molecules). We use the returning electrons extracted by the laser from the target atom itself to subsequently recollide and elastically scatter in situ, in order to study electron diffraction pattern from transient atoms (Xe, Ar and Kr). The target dependence of the angular distribution of the highest energy back-scattered photoelectrons as evident from comparison with theoretical calculation is explored.

Controlling the fragmentation pathways by manipulating the pulse shape is another major theme of ultrafast science today. Experiments showing strong left-right asymmetry in D<sup>+</sup> ion yield from D<sub>2</sub> molecules using two-color (800nm and 400nm) short linearly polarized laser light will be discussed.

New experimental observation of field-free dynamical orientation, as opposed to alignment, of a heteronuclear molecule (CO) using the same two-color technique to provide an asymmetric kick to the molecules will be shown.