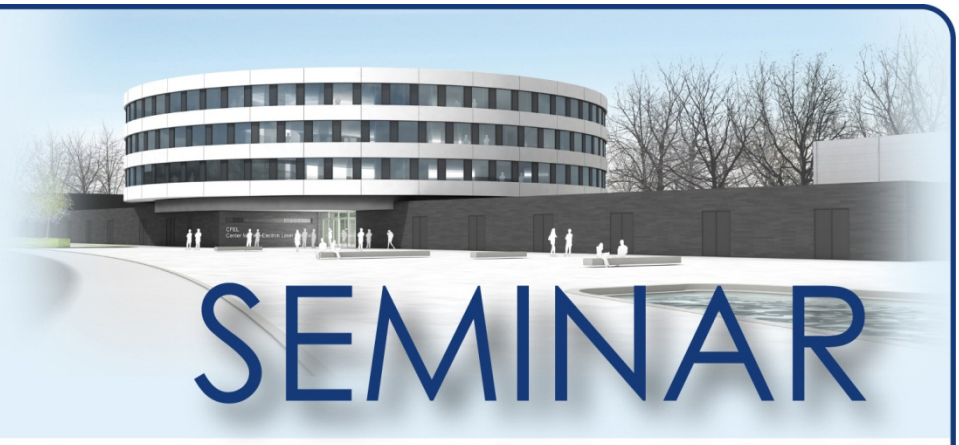
CFEL SCIENCE



SEMINAR

7th December 2010 - 14:15

FLASH HALL (28c) - Seminar Room

Thomas Möller

Institut für Optik und Atomare Physik, Technische Universität Berlin

Imaging ultrafast processes of clusters

The understanding of the interaction of high intensity, short-wavelength, short-pulse radiation with matter is essential for virtually all experiments with new superintense X-ray sources [1,2], in particular for flash imaging of nm sized particles. Clusters as a form of matter intermediate between atoms and bulk solids are ideal samples to study fundamental light – matter interaction processes. They are finite systems with the density of bulk solids allowing the investigation of inner- and interatomic phenomena. Very recently, initial experiments have shown that in nm-sized gas phase particles can be imaged by single shot scattering. X-ray lasers and advanced detectors [3] allow improving the resolution and going to smaller particles. This opens new fields in cluster and nanometer-scale science. Ultrafast electron and ion dynamics can be studied with nm spatial resolution by means of time-resolved scattering using pump-probe techniques as well as time of flight spectroscopy [4].

[1] Bostedt, C. et al. Experiments at FLASH. Nucl. Instr. Meth. 601, 108-122 (2009).

[2] Bostedt, C., et al., Clusters in intense FLASH pulses: ultrafast ionization dynamics and electron emission studied with spectroscopic and scattering techniques. Journal of Physics B-Atomic Molecular and Optical Physics. 43(19): p. 194011.

[3] Strüder, l. et al. Large-Format, High-Speed, X-ray pnCCDs Combined with Electron and Ion Imaging Spectrometers in a Multipurpose Chamber for Experiments at 4th Generation Light Sources. Nucl. Instr. Meth. A, accepted (2009).

[4] Bostedt, C. et al. Multistep ionization of argon clusters in intense femtosecond extreme ultraviolet pulses. Phys. Rev. Lett. 100 (2008).

Host: D. Rolles, CFEL MPG Advanced Study Group