



Institutskolloquium

Am Donnerstag, **8. November 2007 um 16:00 Uhr** spricht

Prof. Dr. Marc Vrakking

**FOM-Institute for Atomic and Molecular Physics, AMOLF
Amsterdam**

über

“Attosecond time-resolved electron dynamics”

Abstract: Femtosecond time-resolved experiments allow the real-time observation of atomic and molecular processes. Often however, these experiments tell only half the story: they show the motion of atoms moving under the influence of potential energy curves that result from a time-average over the motion of all electrons in the system. *Real-time* observation of these electrons requires recently developed attosecond laser techniques.

In my talk I will present results from recent experiments where isolated attosecond pulses and attosecond pulse trains are used to gain insight into electronic processes that occur in atoms and molecules on these ultrafast timescales. I will discuss experiments on the dissociative ionization of molecular hydrogen,¹ where we have been able to control electronic motion and the subsequent dissociation of the molecule on attosecond timescales, as well experiments where attosecond pulses are used to develop a new type of interferometry, that may allow the reconstruction of molecular orbitals.² Finally I will discuss results from recent experiments where the ionization of Ne and Xe atoms has been investigated with attosecond time-resolution and where the sub-cycle time-scale of strong-field ionisation has been revealed.³

1. M.F. Kling et al., *Control of Electron Localization in Molecular Dissociation*, Science **312**, 246 (2006).
2. Th. Remetter et al., *Attosecond Electron Wave Packet Interferometry*, Nature Physics **2**, 353 (2006).
3. M. Uiberacker et al., *Attosecond real-time observation of electron tunneling and multi-electron dynamics in atoms*, Nature **446**, 627 (2007).

**Ort: Max-Born-Saal,
MBI, Max-Born-Str. 2a**

Prof. Dr. W. Sandner