

Plenary Talk

PV II Mon 9:15 Audimax

Introducing the All-Optical Attoclock — •UWE MORGNER — Institute of Quantum Optics and Cluster of Excellence PhoenixD, Hannover, Germany

Theoretical physics and extensive computer simulations reveal the dynamic interaction of atoms and molecules with strong laser fields on attosecond time- and Angstrom length scales. However, experimental access is quite limited to indirect methods such as high-harmonic or electron spectroscopy.

Now, a novel method is introduced: The Optical Attoclock. After

ionization, the free electron is accelerated in the strong field of the light pulse; its exact trajectory depends on the field profile of the laser pulse, on the dynamic details of the tunnel ionization process, and on the local charge distribution in the atomic environment. The accelerated electrons emit light, the Brunel radiation, located in the VIS/UV spectral range. A precise analysis of this radiation opens up a novel window of access into the interaction dynamics of atoms, molecules, and solids.

The lecture introduces the theoretical and experimental state-of-the-art for exploring a topical area of today's physics.