Physikalisches Kolloquium Universität Kiel
Wintersemester 2013/2014

Dienstag, 17. Dezember 2013

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Ultrafast spectroscopy near liquid water interfaces employing high-harmonics radiation

For decades, ESCA or PES (termed XPS, for X-ray photoelectron spectroscopy, in the case of soft X-ray photons) was restricted to conventional laboratory X-ray sources or beamlines in synchrotron facilities. This approach enabled frequency domain measurements, but with poor time resolution. Indirect access to time-resolved processes in the condensed phase was only achieved if line-widths could be analyzed or if processes could be related to a fast clock, that is, reference processes that are fast enough and are also well understood in the condensed phase. Just recently, the emergence of high harmonic light sources, providing short-wavelength radiation in ultra-short light pulses, added the dimension of time to the classical ESCA or XPS technique and opened the door to (soft) X-ray photoelectron spectroscopy with ultrahigh time resolution.
The combination of high harmonic light sources (providing radiation with laser-like beam qualities) and liquid micro-jet technology recently enabled the first liquid interface PES experiments in the IR/UV-pump and extreme ultraviolet-probe (EUV-probe) configuration. In the talk features of the technology and a number of recent applications are highlighted, including extreme states of matter and the discovery and detection of short-lived transients of the solvated electron in water. Properties of the EUV radiation, such as its controllable polarization and features of the liquid micro-jet, enable unique experiments. PES measures electron binding energies and angular distributions of photoelectrons, which comprise unique information about electron orbitals and their involvement in chemical bonding. One of the future goals is to use this information to trace molecular orbitals, over time, in chemical reactions or biological transformations.

Der Vortrag findet um **17:00 Uhr** im Hans-Geiger-Hörsaal (LS13-R.52) des Physikzentrums statt.
Ab **16:45 Uhr** werden **Kaffee** und **Tee** angeboten.

Bitte Becher mitbringen!

B. Heber
für die Dozenten der Physik

Gastgeber: Prof. Dr. Michael Bauer, ITAP