



Sonderkolloquium des SFB 450 (FU) und des MBI

am Dienstag, den 18.11.2003, um 16.30 Uhr

Max-Born-Saal

es spricht

**Dr. Michael Bauer, Fachbereich Physik,
Universität Kaiserslautern**

über

**„ New approaches to the investigation and
manipulation of ultrafast processes at surfaces ”**

Abstract

The study of ultrafast processes at surfaces by means of real-time experiments has been a topic of increasing interest in recent years.

One very attractive goal in this connection is to follow the entire progress of a chemical reaction at a surface. A promising experimental attempt is time-resolved UPS/XPS, where changes of the chemical state at the surface during the course of the reaction are monitored by successive measurement of the state-characteristic photoemission spectrum. The required time-resolution can be achieved e.g. by the use of ultra-short UV pulses from a high harmonic source. Using this technique we recently succeeded in recording different steps involved in the chemical transition of an adsorbate on a femtosecond time-scale. Besides electronic excitations and changes in the chemical state we find indications that also vibrational excitations can be probed in real-time.

Another experimental challenge is the realization of techniques capable of monitoring ultrafast surface dynamics at high lateral resolution. One possible approach is the combination of time-resolved two photon photoemission (TR-2PPE) and photoemission electron microscopy (PEEM). This technique enables us to directly map the lifetime of excited electron states at heterogeneous surfaces. It is a promising tool to study the

influence of nanoscopic and low-dimensional structures on the carrier dynamics of metals and semiconductors.

In our most recent project we focus on the *manipulation* of ultrafast processes at surfaces. One possible experiment involves the technique of pulse-shaping of femtosecond laser pulses driving e.g. surface localized excitations. In this connection we are in particular interested in the control of population and decay of surface localized electronic states.

Interessenten sind herzlich eingeladen

Prof. W. Radloff