TECHNISCHE UNIVERSITÄT WIEN

INSTITUT FÜR ANGEWANDTE PHYSIK
Institute of Applied Physics
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IAP-SEMINAR

ANNOUNCEMENT

Date: **Tuesday, 5.7.2016**
Time: **16:00 p.m.**
Location: **Technische Universität Wien, Institut für Angewandte Physik, E134**
yellow tower „B“, 5th floor, Sem.R. DB gelb 05 B (room number DB05L03), 1040 Wien, Wiedner Hauptstraße 8-10

Lecturer: **Ph Dr. Hubertus Marbach**
Microscopy and Nanolithography Group, PC II, Universität Erlangen-Nürnberg/Germany

Subject: **On the energy to switch an individual molecule: scrutinizing dynamic processes of porphyrins on surfaces close to room temperature**

Abstract: Scanning tunneling microscopy (STM) enables to directly observe the dynamic behavior of organic molecules on surfaces. While imaging atoms and molecules in STM is certainly fascinating by itself, corresponding temperature-dependent measurements allow for the quantitative determination of the energetics and kinetics of the underlying molecular surface processes. Free-base porphyrins on Cu(111) proved to be particularly suitable for these studies due to the strong bonding interaction between the iminic nitrogen atoms in the porphyrin macrocycle with the Cu substrate atoms. As a consequence, the corresponding activation energies for surface diffusion, self-metalation reaction and conformational switching are of a magnitude that allows for monitoring the processes around room temperature, in contrast to most previous studies, which were performed at cryogenic temperatures. The Arrhenius type analysis shows that at room temperature the adsorption and switching behaviour of the investigated free base porphyrin on Cu(111) is dominated by entropic effects. Since the entropic energy contribution vanishes at low temperatures, the importance of entropic effects for functional molecular systems close to room temperature will be discussed. In addition it will be explained why one should generally deter from using the classical Arrhenius analysis but rather should apply the Eyring formalism developed in the framework of transition state theory.

All interested colleagues are welcome to this seminar lecture
(45 minutes presentation followed by discussion).

U. Diebold e.h.
(Seminar-Chairperson)

H. Störi e.h.
(LVA-Leiter)