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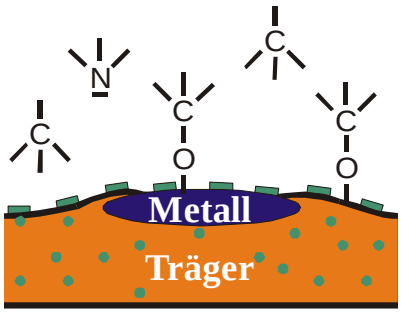

SFB 558
„Metall-Substrat-Wechselwirkungen in der heterogenen Katalyse“

Einladung zum Vortrag von

Prof. Dr. Mats Persson

Department of Applied Physics, Chalmers/Göteborg University of Technology

(Gast von Prof. Marx)

“Control and characterization of matter on the atomic scale”

Abstract: The fiction to control matter on the atomic scale is becoming a reality by the unique capabilities provided by the scanning tunnelling microscope (STM) to image, characterize and manipulate single atoms and molecules on surfaces. The recent demonstration of the ability to control the charge state of a single gold atom on a thin insulating, polar film [1] show that the control of matter on the atomic scale is not only limited to the ion core degrees of freedom. In this talk, I will first illustrate with a few examples from our own theoretical work done in collaboration with W. Ho’s group at UC Irvine, the status of modelling of the unique capabilities of the STM. In particular, we will focus on inelastic electron tunnelling mechanisms behind single molecule vibrational spectroscopy and microscopy [2,3], and single molecule chemistry [4]. At the end, I will present our work done in collaboration with the IBM Zurich group on the control of the charge state of a single gold adatom. We argue that this control involves an inelastic electron tunnelling (IET) attachment mechanism. Our theoretical framework is to a large extent based on density functional calculations and the Tersoff-Hamann approximation for elastic tunnelling and its many body extension to inelastic electron tunnelling.

References:

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