TECHNISCHE UNIVERSITÄT CHEMNITZ

PHYSIKALISCHES KOLLOQUIUM

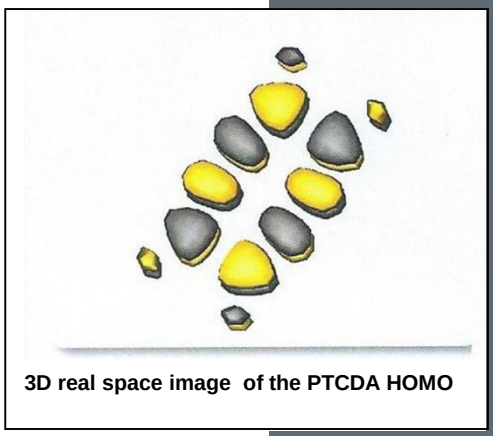
Mittwoch, 26.11.2014, um **16:00 Uhr**

Ort: Reichenhainer Str. 90; Neues Hörsaalgebäude, Raum: 2/N013

PD Dr. Achim Schöll

Experimentelle Physik VII
Universität Würzburg

PHOTOELECTRON SPECTROSCOPY OF ORGANIC LAYERS AND INTERFACES: FROM ORBITAL MAPPING TO KONDO RESONANCES



3D real space image of the PTCDA HOMO

Ultrathin organic films allow a very precise analysis of the electronic structure by means of angle resolved photoelectron spectroscopy (ARPES). On the example of organic dyes on metal surfaces I will demonstrate that the interaction at the interface leads to several new states which can crucially influence the charge transport properties [1]. The interfacial bonding results in the generation of metal-molecule hybrid states, which can be identified by analyzing the angular intensity distribution in the photoelectron spectra [2]. This method allows a tomographic imaging of the electronic wave functions in k-space [3]. I will demonstrate that by applying this technique with a photoelectron emission microscope (PEEM) in combination with synchrotron radiation with variable polarization and photon energy, the phase information can be recovered [4] and molecular orbitals can be imaged in real space in 3D, thus providing fascinating insight into molecular materials. I will furthermore show that the mixing of molecular orbitals with delocalized substrate states leads to very interesting phenomena in these hybrid systems. As a consequence the molecules communicate laterally via the substrate leading to dispersing hybrid bands [5,6]. The localized character of the molecular states manifests itself in very sharp excitation features at the Fermi level, which can be explained by a generalized Kondo scenario [7,8].

[1] Y. Zou et al. Surface Science, 600(6): p. 1240-1251 (2006).
[2] J. Ziroff et al. Physical Review Letters 104 (2010)
[3] M. Dauth et al. Physical Review Letters, 107(19): p. 193002 (2011).
[4] M. Wiessner et al. Nature Communications 5, 4156 (2014).
[5] M. Wiessner et al. Nature Communications 4,1514 (2013).
[6] M. Wiessner et al. Physical Review B, 88(075437) (2013).
[7] A. Schöll et al. Science, 329(5989): 303-305 (2010).
[8] J. Ziroff et al. Physical Review B Rapid communications, 86, 045417 (2012).

Alle Zuhörer sind ab 15:45 Uhr zum Kaffee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt Prof. Dr. Carsten Deibel, Tel.: 0371 531 34878