Momentum Microscopy of Organic-Metal Interfaces – Unravelling Mysteries of Electronic and Geometric Structure

Thomas Georg Boné

Molecule-metal interfaces vary from their isolated constituents in numerous ways [2]. The electronic states and surface morphology change critically compared to the unmodified and non-interacting conditions due to interface formation [1]. Understanding the rules governing these changes requires comprehensive knowledge of key factors - foremost the workfunction, the electron level alignment of the involved components and spacial extent and orientation. Photoemission orbital tomography (POT) is able to answer many questions in this regard. In this talk the power of momentum microscopy and photoemission tomography in investigating the structure of surfaces in terms of electronic and geometric structure is shown by discussing experiments conducted on heptacene/copper(110) oxide nano structures and porphyrin/tungsten oxide/silver(100) surfaces. To put these capabilities into context a historical review will illustrate the methodology.

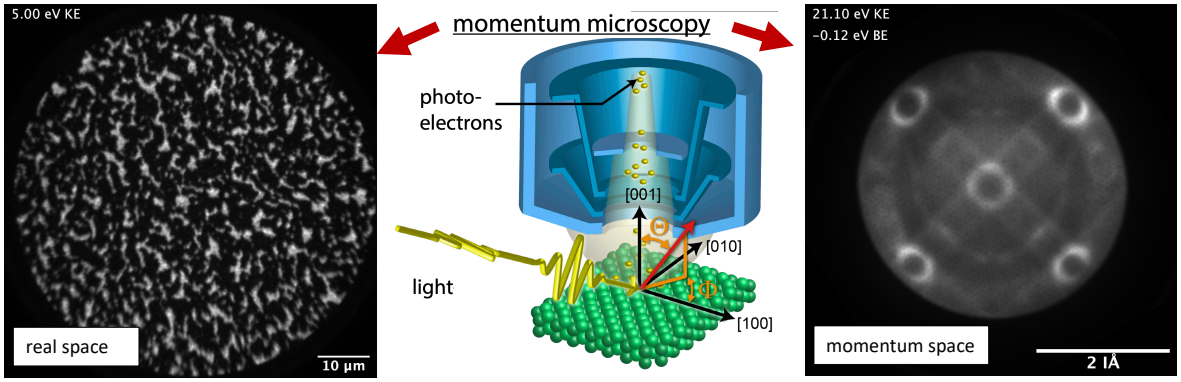

Figure 1: Illustration of momentum microscopy [3] using the example of WO_3/Ag(100).

[1] Hurdax P. et al. Controlling the charge transfer across thin dielectric interlayers. *Advanced Materials Interfaces*, 2020.

[2] Willenbockel M. et al. The interplay between interface structure, energy level alignment and chemical bonding strength at organic–metal interfaces. *Phys. Chem. Chem. Phys.*, 17:1530–1548, 2015.

[3] Patt M. Bulk and surface sensitive energy-filtered photoemission microscopy using synchrotron radiation for the study of resistive switching memories. Dissertation, Universität Duisburg-Essen, 2016.