

ASPHERE III at P04: Momentum, spin, and position resolved photoelectron spectroscopy

Wednesday, 24 February 2016 11:00 (30 minutes)

ASPHERE III is a BMBF funded angle-, spin-, and position-resolving photoelectron spectrometer that fully exploits the unique capabilities of the variable polarization soft X-ray beamline of PETRA III.

Combining a highly efficient Scienta R4000 photoelectron analyzer with the brilliant, widely tunable, and highly monochromatic photon beam of the beamline and, complementary, with the monochromatized beam of a VUV-He- and Xe-plasma source, the experimental setup enables the direct comparison between bulk and surface electronic structures of solids.

Since the analyzer can be rotated around the sample by a UHV goniometer, complete three-dimensional band structures and Fermi surfaces can be determined without sample rotation at a spatial resolution given by the synchrotron spot size. Moreover, the measured momentum- and position-resolved electronic structure can directly be connected with the geometric structure determined by XPD from the same spot on the sample and by STM and LEED from the same sample surface. In addition, the installed 3D-Mott spin detector enables the investigation of the momentum-dependent magnetic properties that can be compared to complementary atomic-site specific XMCD and XLD measurements.

All spectroscopic investigations can be performed *in situ* and in real time during sample temperature changes controlled with a He-flow cryostat as well as during deposition of alkali and transition metals on sample surfaces.

In this talk the current status as well as the further developments that are planned for ASPHERE III will be elucidated.

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Session Classification: User reports