

QMAP

QMAP will provide state-of-the-art photoemission capabilities with high total energy resolution down to 1 meV and high-efficiency spin-resolved measurements in combination with 100 nm focus of the photon beam, enabled by the high brilliance of BESSY III. HZB's expertise in both undulators and HHG sources will be exploited to offer a broad spectral range, from the EUV to soft X-rays, at high photon flux. The electronic structure of quantum and functional materials can be studied locally covering a large variety of applications such as local inhomogeneities (magnetic and structural domains), nanostructures, flakes of 2D materials and their heterostructures, and topological edge states. *In-operando* sample holders will allow investigations of small devices. QMAP will profit from links to the campus regarding sample preparation, in particular, of 2D materials.

Instrument	QMAP (<i>Quantum Materials ARPES</i>)
Contact	Oliver Rader (rader@helmholtz-berlin.de)
Source(s)	Undulator UE65 (80-4000 eV, fully variable polarisation) HHG source for EUV (5 - 180 eV, fully variable polarisation)
Beamline capabilities	• Energy range: 5 eV – 1000 eV • Resolving power: >10 000 • Spot size: down to 100 × 100 nm² • Flux: $\approx 5 \cdot 10^{11}$ ph/s
Techniques	• ARPES/XPS
Sample environment	• Low temperature cryostat (1.5 K) • 6x axis manipulator • Omicron type sample holders with multipin contact groups for <i>in-operando</i> measurements (Gating, strain, etc.) • Preparation chamber equipped with low and high temperature heating stages, ion source, LEED, variable gas inlets and valved ports for quick exchange effusion cells; additional valved port for user's vacuum suitcase or custom preparation chamber • Set of specialized preparation chambers (Gold assistant exfoliation, Perovskite deposition chamber)