MAX-PLANCK-INSTITUT
für Mikrostrukturphysik

Schröter lab for quantum materials & technologies

The Schröter lab at the Max Planck Institute for Microstructure Physics in Halle, Germany, is looking for motivated Postdocs and PhD students to lead our efforts in developing new materials for electronic interfaces that will enable future quantum technologies. Our main tools to drive this materials development will be angle-resolved photoelectron spectroscopy (ARPES) in combination with in-situ thin film growth and device fabrication. We are currently setting up a unique laser-ARPES system in Halle with ultimate spatial-, energy-, momentum-, and depth-resolution. This machine will be connected to growth chambers (MBE, PLD, and sputtering), as well as a glovebox to fabricate heterostructure devices with exfoliated 2D materials. Thin-film growth development will be performed in close collaboration with the group of Prof. Stuart Parkin, as well as other international partners, such as the Microsoft Quantum Materials Lab in Copenhagen. To complement these in-house facilities, we regularly travel to use synchrotrons around the world.

For graduate students, there will be opportunities for research placements (6-12 months) in two of Europe's leading synchrotrons, the Diamond Light Source in the UK, and the Swiss Light Source in Switzerland.

We will focus our research on three directions:

1. Interfaces of semiconductors, superconductors, and magnets to create topological superconductors that could form the basis for novel quantum computers
2. Interfaces of chiral topological semimetals to develop new spintronic devices
3. Interfaces of heterostructures involving two-dimensional materials that host new quantum phenomena - especially those related to nearly flat electronic bands - which could enable new electronic and magnetic quantum devices

If you are interested to learn more about our recent work, please consult the following publications

[1] N.B.M. Schröter et al., Nature Physics 15, 759–765 (2019), arXiv:1812.03310
[2] N.B.M. Schröter et al., Science 369, 179–183 (2020), arXiv:1907.08723
[3] Schuwalow, N.B.M. Schröter, et al., Advanced Science (2021), 2003087
[4] Peng, N.B.M. Schröter, et al., Advanced Materials (2017), 29, 1606741

Applications are considered for work in any of these areas. For more information, please send your CV and (if applicable) publication list, as well as contact details of two scientists that can provide references, to Dr Niels Schröter niels.schroeter@mpi-halle.mpg.de. The positions are available immediately, although the start date can be negotiated. The PhD and postdoc positions are fully funded and contain a competitive salary and social benefits package. The initial contract duration is 36 months for the PhD and 24 months for the postdoc position, but extensions are possible.