MAX PLANCK INSTITUTE
OF MICROSTRUCTURE PHYSICS

NISE
NANO-SYSTEMS FROM IONS,
SPINS AND ELECTRONS

Ph.D. / postdoc position in low temperature scanning probe microscopy (LTSPM)

Local probe instruments like the scanning tunneling microscope (STM) or the atomic force microscope (AFM) are surface characterization methods with ultimate space resolution. Working in a low-temperature setup they unfold a great arsenal of analysis methods by enabling high-resolution local spectroscopy under ultra-stable conditions.

The LTSPM lab/group is currently looking for motivated **PhD students / postdocs** to reinforce our team of low-temperature scanning probe specialists. The position will be based in **Prof. Stuart Parkin's Department "Nanosystems from Ions, Spins and Electrons" (NISE) at the Max Planck Institute of Microstructure Physics, Halle (Saale), Germany** that has significant research programs in spintronics, atomically engineered and topological magnetic materials.

YOUR TASKS

The candidate will learn to perform the following tasks:

- handling ultra-high vacuum (10^{-11} mbar) and cryogenic systems (50 mK)
- femto-scale electrical current detection
- preparation of samples with ultra-clean surfaces
- characterizing novel material surfaces with atomic precision
- analyze complex datasets with physical understanding

A **more detailed description** of the position can be found here.

YOUR PROFILE

For the PhD position: MSc degree (or equivalent, e.g. 4 years Bachelors) in physics, materials science, or related fields, including a final thesis project.
For postdocs: Ph.D. in physics, materials science, or related fields is a requirement.
Candidates with prior experience of SPM, thin-film growth, or 2D materials will be preferred.

WE OFFER

- Access to state-of-the-art facilities for material growth and SPM analysis;
- An open and engaging working environment addressing some of the most impactful problems in the field with the encouragement to contribute your own ideas to solve high-impact problems;
- Schedule flexibility;
- Remuneration amounting to 65% (Ph.D.) / 100% (postdoc) EG13 TVöD-Bund.
- Alternatively, self-funded applicants (e.g. scholarship) can also be admitted.
- All necessary training will be carried out after admission. The starting date is flexible.

YOUR APPLICATION

- For applications and any other questions, please email **michael.strauch@mpi-halle.mpg.de** with reference to job code **LTPSM-2024** including CV, motivation letter, and two academic reference letters **until July 31, 2024**.
- The Max Planck Institute of Microstructure Physics gives priority to applications from severely disabled candidates with equivalent qualifications. Furthermore, we strive to increase the proportion of female employees and therefore specifically encourage women to apply. For more information, please visit **www.mpi-halle.mpg.de/nise**

List of recent publications

- Sessi et al., *Handedness-dependent quasiparticle interference in the two enantiomers of the topological chiral semimetal PdGa.*
  Nature communications **11**, 3507 (2020)
  https://doi.org/10.1038/s41467-020-17261-x
- Zhang et al., *Competing Energy Scales in Topological Superconducting Heterostructures.*
  Nano Letters **21**, 2758-2765, (2021).
  https://doi.org/10.1021/acs.nanolett.0c04648
- Chang et al., *Vortex-Oriented Ferroelectric Domains in SnTe/PbTe Monolayer Lateral Heterostructures.*
  Advanced Materials, **33**, 2102267 (2021).
  https://doi.org/10.1002/adma.202102267
- Küster et al., *Correlating Josephson supercurrents and Shiba states in quantum spins unconventionally coupled to superconductors.*
  Nature communications **12**, 1108 (2021).
  https://doi.org/10.1038/s41467-021-21347-5
- Küster et al., *Long range and highly tunable interaction between local spins coupled to a superconducting condensate.*
  Nature communications **12**, 6722 (2021).
  https://doi.org/10.1038/s41467-021-26802-x
- Brinker et al., *Anomalous excitations of atomically crafted quantum magnets.*
  *Science advances **8**, eabi7291 (2022).*
  DOI:10.1126/sciadv.abi7291
- Küster et al., *Non-Majorana modes in diluted spin chains proximitized to a superconductor.* Proceedings of the National Academy of Sciences **119**, e2210589119 (2022).
  https://doi.org/10.1073/pnas.2210589119
- Soldini et al., *Two-dimensional Shiba lattices as a possible platform for crystalline topological superconductivity.*
  Nature Physics **19**, 1848–1854 (2023).
  https://doi.org/10.1038/s41567-023-02104-5
- Wagner et al., *Designer-Supraleiter nehmen Form an.*
  Physik unserer Zeit (2024)
  https://doi.org/10.1002/piuz.202401701