MAX PLANCK INSTITUTE
OF MICROSTRUCTURE PHYSICS

NISE
NANO-SYSTEMS FROM IONS, SPINS AND ELECTRONS

PhD Position in 3D Magnetism and Superconductivity

- Extension of the application deadline -

We invite applications for a fully funded PhD position in 3D Magnetism and Superconductivity, focusing on advanced nanofabrication techniques and cryogenic transport experiments. This exciting project will contribute to cutting-edge research at the intersection of **superconductivity, magnetism, and nanotechnology**. For more details, see our recent publication: *Interplay of geometrical and spin chiralities in 3D twisted magnetic ribbons.* Nature (2025). DOI: 10.1038/s41586-024-08582-8.

YOUR TASKS

The student will primarily work with a novel **Multi-Photon Lithography (MPL)** based 3D printer, developed in-house from a modified super-resolution microscope. Key aspects of the project include:

- **Fabrication of 3D superconducting and magnetic structures** with nanoscale precision.
- Investigations of the domain wall motion in **3D magnetic structures** using techniques such as Magneto-Optical Kerr Effect (MOKE) microscopy**.**
- **Cryogenic transport experiments** of engineered 3D superconductors to explore their fundamental properties and potential applications.

YOUR PROFILE

We are seeking a highly motivated PhD candidate with:

- An MSc degree (or equivalent, e.g. 4 years Bachelors) in physics, materials science, or related fields, including a final thesis project.
- A demonstrated **track record of excellence** in research and coursework.
- **Expertise in magnetism and superconductivity**.
- Familiarity with **Multi-Photon Lithography (MPL)** is advantageous but not required.

WHY JOIN US?

This PhD position provides the opportunity to work in a **dynamic research environment** equipped with state-of-the-art nanofabrication and cryogenic measurement facilities. The project offers significant scope for **high-impact research** at the forefront of condensed matter physics and nanotechnology. This project is closely linked with 3D racetrack memory technology and has potential applications in cryogenic superconducting racetrack devices.

WE OFFER

- Access to state-of-the-art facilities for materials growth, device preparation, and assessment;
- An open and engaging working environment addressing some of the most impactful problems in the field with the freedom to contribute your ideas to solve high-impact problems;
- Schedule flexibility;
- Remuneration amounting to 65% EG13 TVöD-Bund.

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 **PhD-TRR-404** until **31.08.2025** including the following documents:
  - A **CV** including academic achievements and research experience.
  - A **cover letter** detailing your interest in the position and relevant expertise.
  - **Two reference letters**. (You may also ask your referees to send their letters directly to us.)
- 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 https://www.mpi-halle.mpg.de/nise.

Join us in pushing the boundaries of **3D nanomagnetism and superconductivity!**