

Paul-Drude-Institut für Festkörperelektronik (PDI) - Magnetic Materials for Spintronics and Magnetoacoustics



PDI is a research institute in Berlin, Germany. We perform basic and applied research at the nexus of materials science, condensed matter physics, and device engineering.

Exploring Ferrimagnetic Materials for Future Memory Technologies

Master Thesis Topic

City: Berlin; Starting date (earliest): At the earliest possible; Remuneration: 13,90 €/hour; Closing date: 31/03/26

Tasks

Ferrimagnetic spintronics combines the advantages of ferromagnetic and antiferromagnetic materials and has become a highly promising research field in modern condensed-matter physics. In particular, ferrimagnets offer exciting opportunities for next-generation data storage technologies, enabling ultrafast operation and ultrahigh storage density. In this project, the student will explore the ferrimagnetic material NiCo₂O₄ (NCO), which exhibits strong perpendicular magnetic anisotropy at room temperature. The main objective is to synthesize high-quality thin films using molecular beam epitaxy (MBE) and investigate their structural, magnetic and transport properties.

Your Mission:

- Optimize growth parameters for high-quality NCO thin films using MBE
- Characterize crystal structure using X-ray diffraction (XRD) and X-ray reflectivity (XRR)
- Investigate magnetic properties using superconducting quantum interference device (SQUID) magnetometry
- Study spin transport properties using anomalous Hall effect measurements

Expected Outcomes:

- Development of high-quality NCO films for ferrimagnetic spintronic applications
- Understanding the correlation between structural, magnetic, and spin transport properties

Skills You Will Build:

- Hands-on expertise in thin-film growth
- X-ray-related techniques to investigate crystal structures
- Practical skills in magnetic and spin transport measurements, including data analysis
- Experience in scientific writing and contributing to peer-reviewed publications
- Critical thinking and problem-solving in experimental condensed-matter physics

Requirements

Your Profile:

- Background in solid state physics, or a related field.
- Interest in magnetism and magnetic materials.
- High motivation, excellent interpersonal and project management skills.

What we offer

Opportunities and Benefits:

- Modern laboratories with a wide range of experimental techniques
- Supportive environment with experts for various scientific sub-fields
- International and culturally diverse community
- Location in the heart of Berlin with excellent public transport connections
- Possibility to participate in professional development programs.

Application

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More information at <https://stellenticket.de/201905/TUB/>
Offer visible until 26/03/26

