

We offer a PhD position

Advanced *in-situ* cryo-TEM on dynamics of solid state phenomena

A joint project of Universität Ulm and IFW Dresden e. V.

Modern solid state physics investigates collective phenomena in condensed matter. Topical examples are unconventional superconductivity, topological insulators, magnetic vortex lattices (Skyrmions), and charge density waves. The interest in these phenomena is both fundamental and for application. The microscopic structure and origin is often unknown. Here, *in-situ* cryo-TEM (transmission electron microscopy) and electron holography can help to reveal the inner structure of these ordering phenomena by mapping the potentials quantitatively on the nanometer scale.

We built a prototype *in-situ* microscope with a versatile sample chamber to be fitted with different experimental setups. The first main setup is a liquid He cryostat for arbitrary temperatures between < 10 K and 300 K. With this cryostat, the target temperature can be held stable for days and changed deliberately. Also, electrical transport measurements can be performed *in situ* at low temperatures *via* fixed cables, the incorporation of mobile probes is prepared. Other setups are planned. Additionally, a set of high-end microscopes is available for atomic resolution sample pre-characterization.

The candidate will be developing the method of *in-situ* TEM as well as operating the dedicated prototype microscope in order to study solid state phenomena *via in-situ* TEM and electron holography. The studies in advanced TEM and sample preparation will be based in Ulm and the *in-situ* work on solid state phenomena in Dresden.

Candidate requirements

Master/Diplom in physics, high degree of experimental skill, capacity to work autonomously, willingness to move between Ulm and Dresden. Experience in TEM, condensed matter physics, electrical measurements, programming, vacuum physics, and/or cryo-systems (liquid He) is of great benefit.

Contact

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