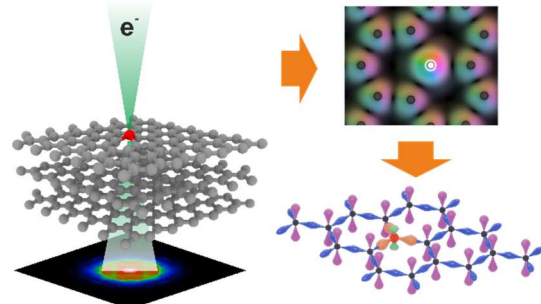


Ph. D. Researcher (F/M/D): Mapping Atomic Defects

(30 hours per week)

Within the **FWF project “AtomDensityMap”**, we are offering a **three-year PhD position** focused on **simulation-driven ptychography** for **atomic-scale defect characterisation**. Atomic defects dictate how materials behave, from energy storage to electronics and quantum devices, yet capturing their configuration and electrostatic landscape is a major challenge. AtomDensityMap tackles this by combining state-of-the-art electron microscopy with **physics-constrained electron phase reconstruction**, linking experimental data directly to realistic atomistic models to provide trustworthy defect-level insights.



Working on the experimental part of the project within an international consortium, including **TU Graz**, **Montanuniversität Leoben (MUL)**, **Fritz-Haber-Institut Berlin**, and **Forschungszentrum Jülich**, you will synthesize and characterize van der Waals (“2D”) materials with tailored defects at MUL and perform high-end STEM measurements at TU Graz. In close collaboration with our simulation partners, you will iteratively refine measurement strategies, benchmark results against modelling, and disseminate your findings through presentations and publications across the consortium's international network.

Your tasks:

You will be part of an international and interdisciplinary consortium that tightly integrates materials synthesis, electron microscopy, and materials modelling.

Your responsibilities will focus on:

- Preparation and initial characterization of thin vdW samples with tailored atomic defects.
- STEM measurements, including advanced scanning and spectroscopy methods.
- Optimization of measurement conditions and strategies based on simulations.
- Close collaboration with theory/simulation partners to align experiments and analysis.
- Presentation and publication of results within the international consortium.

Your profile:

- (Almost) completed Master in Physics, Materials Science, Chemistry, or equivalent.
- Strong interest in electron microscopy, diffraction/phase retrieval concepts, materials synthesis and development of novel quantitative characterization methodologies.
- Communication skills in spoken and written English.
- Independent and reliable working style; team-oriented, motivated to work across institutions.

Our offer:

We offer an international, ambitious environment for basic-research-oriented candidates seeking to conduct cutting-edge work with access to advanced characterization facilities. The earliest start date is 1 April 2026. Gross salary will be based on the salary scale of the Austrian Science Fund (FWF).

Applications should be submitted through the job portal of TU Graz: jobs.tugraz.at

Contact details:

Dr. Daniel Knez

daniel.knez@felmi-zfe.at

Institute of Electron Microscopy and Nanoanalysis - TU Graz

