

The **Center for Advancing Electronics Dresden** offers in its analytical center **Dresden Center for Nanoanalysis (DCN)**, subject to resources being available, a position as

Research Associate / PhD Student (m/f/x)

(subject to personal qualifications, employees are remunerated according to salary group E 13 TV-L)

starting **October 1, 2022**, limited for 3 years, with the option for extension. The period of employment is governed by the Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz - WissZeitVG). The position aims at obtaining further academic qualification (e.g. PhD).

Investigators: Dr. Darius Pohl

Terms: 75 % of the full-time weekly hours

Tasks: **Atomically resolved EMCD on ferrimagnets measured with electron vortex beams**

Requirements: excellent university degree (Master of Science or diploma) in physics, materials science, or chemistry; experience in experimental transmission electron microscopy. Additional experiences with magnetic materials, electron energy loss spectroscopy (EELS) or electron energy loss magnetic chiral dichroism (EMCD) are appreciated.

Position and tasks

Electron vortex beams carry a discrete orbital angular momentum, and are predicted to reveal electron energy loss magnetic chiral dichroism (EMCD) upon interacting with magnetic samples down to the atomic scale. However, proof-of-concept experiments so far failed since the weak magnetic signal is still hidden behind the poor signal-to-noise ratio (SNR) of the acquired spectra. Within this project we therefore seek to develop strategies to improve the SNR on the methodical side as well as on the materials side – both of which are essential for a successful proof-of-concept experiment. We anticipate to build a fundamental understanding of how electron vortex beams with high spatial coherence and purity can be generated and how different material properties impact on the SNR for the detection of an atomically resolved EMCD signal. Tasks of the PhD student are working on aberration corrected TEM with a newly developed path of rays for vortex microscopy, improvement of vortex aperture quality, data analysis, and magnetic material pre-characterization. In addition, the project is strongly supported by inelastic scattering simulations, which help to understand the complex interaction mechanisms.

General Requirements

- above-average university degree achieved in short study period,
- willingness and ability to think beyond the boundaries of your field, to act in an international and diverse environment and to live an open and constructive communication,
- strong analytic and problem-solving skills, creativity,
- an independent, target- and solution-driven work attitude,
- fluency in English, knowledge of German would be a plus.

What we offer

You will join an enthusiastic and ambitious research group, where your work will be inspired by the interactions with open-minded fellow scientists in a highly diverse research landscape.

About the DCN

The Dresden Center for Nanoanalysis (DCN) was founded in November 2012 as technology platform of the 'Center for Advancing Electronics Dresden'. Embedded in the DRESDEN-concept research alliance, it serves as a competence center of TU Dresden. Research at the DCN has a strong focus on the structural and chemical analysis of nanoscale materials using electrons and x-rays with an emphasis on novel in-situ and in-operando techniques. The center provides a highly interdisciplinary

working environment in a newly constructed state-of-the-art lab infrastructure including two ultra-low noise laboratories for analytical high-resolution transmission electron microscopy. Besides pursuing own research interest, the DCN offers its infrastructure and know-how as service to the TU Dresden as a whole. <https://cfaed.tu-dresden.de/dcn>

For informal enquiries, please contact Dr. Darius Pohl (darius.pohl@tu-dresden.de, +49-351-463-35452) or Linda Luther (linda.luther@tu-dresden.de, +49 351 463-41093).

Applications from women are particularly welcome. The same applies to people with disabilities.

Your application (in English or German) must include: a motivation letter, your CV with publication list, copy of degree certificate, and transcript of grades (i.e. the official list of coursework including your grades). Please include also a link to your Master's or diploma thesis. Complete applications should be submitted preferably via the TU Dresden SecureMail Portal <https://securemail.tu-dresden.de> by sending it as a single pdf document quoting the reference number **DCN-Vortex** in the subject header to recruiting.cfaed@tu-dresden.de or to: **TU Dresden, cfaed/DCN, z. Hd. Dr. Darius Pohl, Helmholtzstr. 10, 01069 Dresden, Germany**. The closing date for applications is **August 31, 2022** (stamped arrival date of the university central mail service applies). Please submit copies only, as your application will not be returned to you. Expenses incurred in attending interviews cannot be reimbursed.

Reference to data protection: Your data protection rights, the purpose for which your data will be processed, as well as further information about data protection is available to you on the website: <https://tu-dresden.de/karriere/datenschutzhinweis>.