Professorship Theoretical Methods in Spectroscopy
TUM School of Natural Sciences
Technische Universität München

Opportunities for Talents

2 PhD Positions in Electronic Structure Theory and Quantum Transport

We are seeking two Research Associates (f/m/d) to work on the methodological development and application of advanced electronic-structure approaches, with the opportunity to pursue a PhD.

Project Description:

The project will be carried out in the research group of Prof. Dr. Frank Ortmann at the Technical University of Munich (TUM). Our research focuses on the development of efficient theoretical and computational methods to describe electronic, optical, and transport properties of complex materials.

The first advertised project (a) is dedicated to the methodological enhancement of the linear-scaling Wannier optics approach, with the goal of enabling predictive simulations of optical excitations in large and structurally complex systems. Particular emphasis lies on the theoretical description of excitonic phenomena, quantum dynamics, and many-body effects in realistic materials. The second project (b) focuses on quantum transport in polymer materials with electron-phonon coupling in an efficient transport framework. The positions are expected to commence in summer 2026; the exact starting date is flexible and can be agreed upon mutually.

The group is part of the Cluster of Excellence **e-conversion** and is closely connected to the Munich Center for Quantum Science and Technology (**MCQST**), providing an interdisciplinary environment linking condensed-matter physics, quantum theory, and materials science. TUM is ranked among the top universities in Europe and provides an outstanding research environment.

Your activities will primarily involve theoretical formulation, numerical implementation, and validation of linear-scaling electronic-structure and optical-response methods. This includes the advancement and use of efficient algorithms, benchmarking against established approaches, and application to representative material systems. Strong motivation to work on a challenging project, as well as the ability to work both independently and collaboratively within an international research team, are expected.

As a successful candidate, you will benefit from membership in the TUM Graduate School, be embedded in an active international scientific network, and present your results at national and international conferences.

Your qualifications:

A Master's degree in Physics, Chemistry, or a closely related field is required at the start of the PhD project. The candidate should have a background in theoretical solid-state physics or theoretical chemistry, with interest in electronic-structure theory and method development. Experience in computer simulations and programming is advantageous. Very good communication and writing skills in English are expected.

Our offer:

We offer each of the two positions as research associate with the opportunity to pursue a doctoral degree. The position is available for the duration of three years. Payment will be based on the Public Sector Collective Agreement of the Länder (TV-L E13 scale). TUM strives to raise the proportion of women in its workforce and explicitly encourages applications from qualified women. Applications from handicapped persons with essentially the same qualifications will be given preference.

Application:

Complete application documents (CV, motivation letter, transcripts of records, and degree certificates) should be submitted as a **single PDF** file to **office.tms@nat.tum.de**
Up to two reference letters may be sent separately and confidentially by the referees to the same email address; these must clearly indicate the applicant's name and the position applied for. Applicants should specify their preferred topic in the application. Please use the subject line "Application PhD2026-2a" or "Application PhD2026-2b". The application deadline is 21.04.2026.

As part of your application, you provide personal data to the Technical University of Munich (TUM). Please view our privacy policy on collecting and processing personal data in the course of the application process pursuant to Art. 13 of the General Data Protection Regulation of the European Union (GDPR) at https://portal.mytum.de/kompass/datenschutz/Bewerbung/. By submitting your application you confirm to have read and understood the data protection information provided by TUM. Find out more about us at www.tum.de.