

The surface science group at the Institute of Experimental Physics at Graz University of Technology investigates the surface structure and dynamics of novel emerging materials. For our FWF-funded project on energy dissipation at surfaces we offer a



Dr Anton Tamtögl, Priv.-Doz.  
Institute of Experimental Physics  
Graz University of Technology  
Petersgasse 16, 8010 Graz  
E-mail: tamtoegl@tugraz.at

## PhD position for studies of Dirac and 2D material surfaces

### Project description:

We seek to obtain a deeper understanding of how energy dissipates on Dirac and two-dimensional materials. The discovery of Dirac materials (graphene, topological insulators and an entire class of new two-dimensional materials and even superconductors) is so recent that many fundamental questions are still wide open, with a strong potential for groundbreaking discoveries.

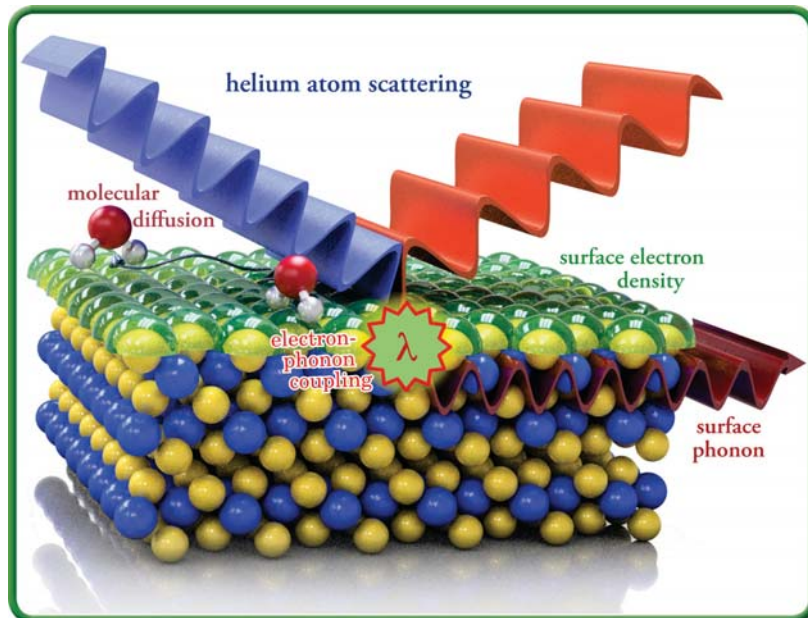
The first aspect of the project concentrates on how energy dissipates on these novel material surfaces, and the role of the electron-phonon (e-ph) coupling. The e-ph interaction at surfaces is one of the most important mechanisms for energy dissipation in electronic transport and its understanding is therefore of huge importance for future low-power technologies. It is also at the heart of conventional superconductivity.

As a second aspect, the project aims to quantify the role of energy dissipation in the motion and dynamics of molecules at surfaces. A central question for this motion is, in what way the molecule dissipates energy to the surface during its motion, which further governs the type of molecular motion and how fast and far the molecule may travel. Following the motion of individual molecules at surfaces is deceptively difficult and will be carried out at the Cambridge atom scattering centre.

As the successful candidate, you will perform helium atom scattering measurements of Dirac and 2D material surfaces. You will learn about reciprocal space techniques and in-depth data analysis. In addition, you will have the opportunity to perform He spin-echo measurements during a research stay at the University of Cambridge. Further complementary information can be obtained in collaboration with the photoemission electron microscopy (PEEM) group at TU Graz.

### Required skills and experience:

- Completed academic degree in physics, chemistry or materials science
- Good knowledge in at least one field:
  - Condensed matter and surface-/nanoscience
  - Ultrahigh vacuum technology
  - Scattering & reciprocal space techniques
  - Basic programming skills (Matlab and/or Python) are advantageous
- Social and communication skills
- Good English language skills
- Independent problem solving
- Good academic performance is appreciated



### Our offer:

The position is funded as part of an FWF (Austrian science fund) project, available from 1<sup>st</sup> October 2021 or later and will be limited to 3 years. Payment is based on the standard FWF salaries with 30 hours per week at € 2.237,60 gross per month (14 times a year).

Graz University of Technology strives to raise the proportion of women in its workforce and explicitly encourages applications from qualified women. Applications from disabled persons with essentially the same qualifications will be given preference.

### Application:

Please send your application to Dr. A. Tamtögl (tamtoegl@tugraz.at) by September 20<sup>th</sup> 2021. Further information on our research group is available at <https://www.tugraz.at/en/institutes/iep/research/surfaces/>.