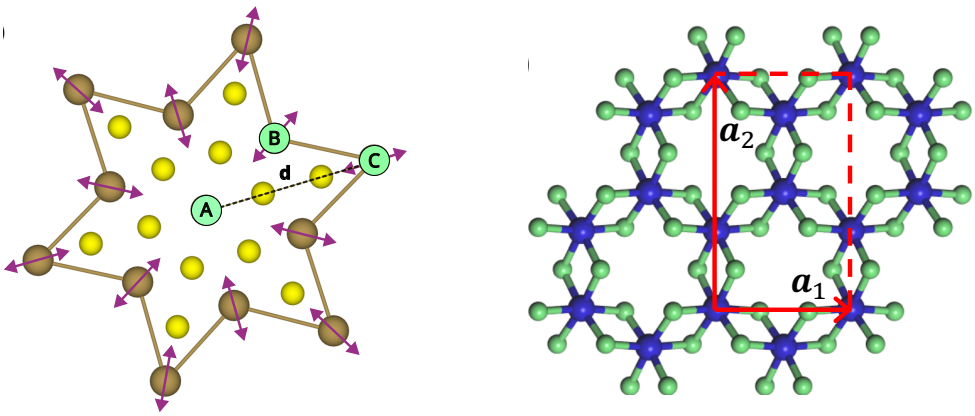
Master thesis projects

in the research group of Dr. Anna Galler,
Institute of Theoretical and Computational Physics, TU Graz

Magnetic and charge order in 2D quantum materials

Quantum materials with a 2D structure, such as transition-metal dichalcogenides, can host magnetically and charge-ordered phases, making them promising candidates for future nonvolatile memory devices. Predicting their electronic and magnetic properties, however, requires advanced electronic-structure and many-body techniques.
In this project, we will investigate several emerging 2D materials such as 1T-TaS_2, 1T-$TaSe_2$, CrI_3 and $MnPS_3$, with the goal of understanding their electronic and magnetic behaviour. The project will combine density functional theory with diagrammatic many-body methods, with a particular focus on computing charge and spin susceptibilities.



Lattice structures of 1T-TaS_2 and CrI_3.

Prerequisites: Solid background in quantum mechanics and solid-state physics, good programming and data analysis skills.

What you will gain: hands-on experience in computational materials science and high-performance computing, participation in a cutting-edge research project.

Employment: student assistant position for 6 months, (10h/week, 700 € gross per month)

Start date: preferably April/May 2026

Contact: If you are interested, please send a short motivation letter, your CV and your transcript of records to Dr. Anna Galler **anna.galler@tugraz.at**