

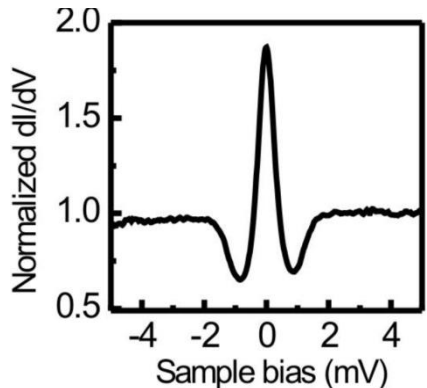
Master Thesis

Shadow Masks for the Structured Growth of the Superconductor Nb on the Topological Insulator $(\text{Bi}_{1-x}\text{Sb}_x)_2\text{Te}_3$

Majorana fermions have recently been discovered in solids, albeit originally predicted in elementary particle physics. They are non-local quasi-particles and their own antiparticles which both might be favorable for quantum computation. The arguably most **controlled experiment** to prove the existence of such Majorana excitations is the investigation of an interface between a **topological insulator** and a **superconductor** by **scanning tunneling spectroscopy**.

You will participate in this experiment performed in collaboration between two different groups in **Aachen** (group Prof. Morgenstern) and in **Jülich** (PGI9). **Your task** is the nanostructured growth of the superconductor Nb on top of the topological insulator $(\text{Bi}_{1-x}\text{Sb}_x)_2\text{Te}_3$. The focus of your thesis will be the processing of **shadow masks by different nanofabrication techniques**, which will allow to establish the required superconducting structures.

If you are interested in the topic and if you prefer experimental work with dedicated instruments and enthusiastic colleagues, you could **start immediately**.



Zero bias peak measured in the vortex of a type II superconductor on top of a topological insulator.

10.1103/PhysRevLett.114.017001

For more information **contact**

Philipp Küppers kueppers@physik.rwth-aachen.de or

Peter Schüffelgen p.schueffelgen@fz-juelich.de.