

## Mapping the phase diagram of a one-dimensional topological superconductor

SERGEY FROLOV, University of Pittsburgh

Tunneling spectroscopy measurements on one-dimensional superconducting hybrid materials have revealed signatures of Majorana fermions which are the edge states of a bulk topological superconducting phase. We couple strong spin-orbit semiconductor InSb nanowires to conventional NbTiN superconductors to obtain additional signatures of Majorana fermions and to explore the magnetic-field driven topological phase transition. With improved device fabrication, namely more transparent contacts to superconductors and stronger coupled gate electrodes, we are mapping out the phase diagram of the topological phase in the space of Zeeman energy and chemical potential, and investigating the apparent closing and re-opening of the superconducting gap. We are also investigating how the topological superconducting phase would manifest in finite size systems by electrostatically splitting the wire into segments of varied length.

In collaboration with Jun Chen<sup>1</sup>, Peng Yu<sup>1</sup>, Moira Hocevar<sup>2</sup>, Sebastien Plissard<sup>3</sup>, Diana Car<sup>3</sup>, Sasa Gazibegovic<sup>4</sup>, and Erik Bakkers<sup>4</sup>

<sup>1</sup> University of Pittsburgh

<sup>2</sup> Neel Institute, CNRS Grenoble, France

<sup>3</sup> LAAS, CNRS, Toulouse, France

<sup>4</sup> TU Eindhoven, The Netherlands