

# Condensed Matter Theory Center Seminar



Wednesday, May 25  
11:00 am – 12:30 pm  
2205 Toll Physics Building

**Sergey Frolov**  
University of Pittsburgh

## “Are these Majoranas?”

**Abstract:** 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. We find that it is important to develop robust approaches to distinguishing topological states from trivial Andreev states in these devices.

Host: Jay Sau & Will Cole

Web: <http://www.physics.umd.edu/cmtc/seminars.html>

