

CMP Seminar
Michigan State University

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Phase Coherence and Majorana Fermions in Hybrid Topological Insulator Devices

Topological superconductors have been predicted to host exotic bound states commonly referred to as Majorana fermions, which can encode and process quantum information non-locally, thus evading many forms of decoherence. One can engineer a topological superconductor by coupling a conventional s-wave superconductor with the helical surface states present in a topological insulator. In this talk, I will describe our efforts to probe unconventional superconductivity using phase coherent transport in topological insulator interferometers with superconducting leads. We observe prominent Fabry-Perot oscillations that become strongly modified at low energies due to Andreev reflection. At high magnetic fields, we detect periodic π phase shifts in the Fabry-Perot oscillations whenever the superconducting lead encloses a magnetic flux quantum. We relate these observations to the on-going search for Majorana fermions in solid state systems.

Thursday, January 29, 2015

10:00 a.m.

BPS 1400

Prof. Norman Birge - Host