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Topological Superconductivity in Spin-Orbit Coupled Bands
AARON FARRELL, TAMI PEREG-BARNEA, McGill University — Topological superconductors have nontrivial winding of their order parameter phase and are expected to support Majorana Fermions in their vortex cores. For this reason they have been sought after in the past couple of decades. Over the past few years, a new and promising route for realizing topological superconductors has opened due to recent advances in the field of topological insulators. The current proposals are based on semiconductor heterostructures. In the proposed devices, spin-orbit coupled bands are Zeeman split by a magnetic field and superconductivity is induced by proximity to a conventional superconductor. This leads to heterostructures of two or three layers. This talk will focus on the prospect of realizing a topological superconductor in materials with inherent spin-orbital coupling and an intrinsic tendency for superconductivity. The proposed device will allow simplification of recently suggested devices as the need for a superconducting layer will be eliminated.

Aaron Farrell
McGill University

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