Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

**Topological Superconductivity and the Strong Coupling Expansion** AARON FARRELL, TAMI PEREG-BARNEA, McGill University — Due to the nontrivial winding of their order parameter phase, topological superconductors are expected to support Majorana Fermions in their vortex cores and for this reason have been an area of intense interest over the past couple decades. Current proposals for a device that may support Majorana Fermions are based on semiconductor heterostructures, where pairing is driven by proximity to a normal superconductor. We have recently found mean field results supporting the existence of topological superconductivity in a model with spin-orbit coupled electrons and pairing induced by interactions rather than proximity effect. This talk will look at developing methods to treat the opposite limit of this model, that of strongly coupled electrons. Results of a strong coupling expansion and the development of an analogy to the Gutzwiller approximation will be presented as well as data from renormalized mean field theory.

Aaron Farrell
McGill University

Date submitted: 15 Nov 2013 Electronic form version 1.4