Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

**Quantum Phase Slips in Topological Josephson Junction Rings**
ROSA RODRIGUEZ MOTA, McGill University, SMITHA VISHVESHWARA , University of Illinois at Urbana-Champaign, TAMI PEREG-BARNEA, McGill University — We study quantum phase slip processes (QPS) in a ring of N topological superconducting islands joined by Josephson junctions and threaded by magnetic flux. In this array, neighboring islands interact through the usual charge 2e Josephson tunneling and the Majorana assisted charge e tunneling.[1]. When the charging energy associated with the island's capacitance is zero, the energy vs. flux relation of the system is characterized by parabolas centered around even or odd multiples of the superconducting flux quantum, depending on the parity of the system. For small but non-zero charging energy, quantum fluctuations can lead to tunneling between these classical states.[2] In this work, we calculate the amplitude of these tunneling processes, commonly known as quantum phase slips. We also add gate voltages to our system and study how the amplitude of QPS in these topological Josephson array is modified by Aharanov-Casher interference effects.

[1]A.Y. Kitaev, Phys.-Usp. 44, 131 (2001).
[2]K. A. Matveev, A. I. Larkin, and L. I. Glazman., Phys. Rev. Lett. 89, 096802 (2002).

Rosa Rodriguez Mota
McGill University

Date submitted: 04 Nov 2015 Electronic form version 1.4