Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Spin-Transfer Torques in Dual-Gated Bismuth Selenide Topological Insulator Devices JENNIFER GRAB, ALEX MELLNIK, Department of Physics, Cornell University, ANTHONY RICHARDELLA, NITIN SAMARTH, Department of Physics, Penn State University, DANIEL RALPH, Department of Physics, Cornell University — Recent theoretical and experimental work on topological insulator / ferromagnet bilayers suggests that bismuth selenide can act as a source of spin current for applying a spin transfer torque to an adjacent magnetic layer. To help determine the mechanism of the in-plane and out-of-plane spin torques, we fabricate dual-gated bismuth selenide devices with a ferromagnetic permalloy nanowire positioned between the gates to act as an absorber of spin currents. We use the spin-torque ferromagnetic resonance technique to measure current-induced torques acting on the permalloy nanowire. We will attempt to distinguish between surface and bulk mechanisms for the torque by sweeping a uniform voltage applied to both gates to tune the carrier density. We will also study whether the surface spin current can be modified by applying different gate voltages to induce a large gradient in the electron chemical potential near the permalloy wire. Such a modification is expected as a consequence of locking between the orientations of the electron wavevector and spin in topological insulator surface states.

Jennifer Grab
Department of Physics, Cornell University

Date submitted: 15 Nov 2013 Electronic form version 1.4