Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Detection of one-dimensional helical mode in topological insulator nanowire interferometer SEUNG SAE HONG, YI ZHANG, JUDY CHA, XIAO-LIANG QI, YI CUI, Stanford University — In topological insulators (TIs), the spin-momentum locking together with time reversal symmetry (TRS) protects surface electrons from localization, which is the defining signature of TIs and the key property to realize exotic physics and applications. In quasi-one-dimensional (1D) TI nanowires, the surface electrons form 1D quantum modes of different topological natures, allowing us to observe topological protection via quantum interference modulated by magnetic flux[1,2]. We report low-temperature transport of bismuth selenide (Bi2Se3)-Se core-shell nanowire devices in parallel magnetic fields. Magneto-oscillations of different physical origins are studied systematically in ballistic regime and diffusive regime. Especially at strongly disordered limit, we observe a topologically-protected helical 1D mode at half magnetic flux quantum (h/2e). The quantum interference under TRS breaking magnetic field will be discussed as well.
[1] J.H. Bardarson, P.W. Brouwer, and J. E. Moore, Phys. Rev. Lett. **105**, 156803 (2010).
[2] Y. Zhang, A. Vishwanath, Phys. Rev. Lett. **105**, 206601 (2010).

Seung Sae Hong
Stanford University

Date submitted: 08 Nov 2012 Electronic form version 1.4