

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Spin-Polarized Tunneling Study on Spin-Momentum Locking in the Topological Insulator Bismuth Selenide CHING-TZU CHEN, LUQIAO LIU, IBM TJ Watson Research Center, ANTHONY RICHARDELLA, Department of Physics, Penn State University, ION GARATE, Department of Physics, University of Sherbrooke, YU ZHU, IBM TJ Watson Research Center, NITIN SAMARTH, Department of Physics, Penn State University — In this talk, we will demonstrate that the helical spin texture on topological insulator (TI) surfaces can be electrically detected using four-terminal tunnel junction devices with ferromagnetic top electrodes. Consistent results are obtained in both the Edelstein and spin-galvanic effect configurations, allowing a quantitative determination of the charge-spin conversion efficiency in bismuth selenide. By applying finite DC biases at the junction, we further extract the energy dependence of the effective spin polarization in bismuth selenide. The observed temperature stability up to 200K suggests that TIs can be highly promising for room-temperature spintronics applications

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Date submitted: 07 Nov 2014

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