Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

**Electrical Detection of Spin-Polarized Surface States Conduction in $(Bi_{0.53}Sb_{0.47})_2Te_3$ Topological Insulator**[1] JIANSHI TANG, LI-TE CHANG, XUFENG KOU, KOICHI MURATA, MURONG LANG, YABIN FAN, MOHAMMAD MONTAZERI, WANJUN JIANG, LIANG HE, KANG L. WANG, Univ of California - Los Angeles, EUN SANG CHOI, National High Magnetic Field Laboratory, YING JIANG, YONG WANG, Zhejiang University — Strong spin-orbit interaction and time-reversal symmetry in topological insulators enable the spin-momentum locking for the helical surface states. Here we report the electrical detection of spin-polarized surface states conduction using a $Co/Al_2O_3$ ferromagnetic tunneling contact, in which the compound topological insulator $(Bi_{0.53}Sb_{0.47})_2Te_3$ was used to achieve low bulk carrier density [1]. Resistance (voltage) hysteresis was observed when sweeping the magnetic field to change the relative orientation between the Co electrode magnetization and the spin polarization of surface states. The two resistance states were reversible by changing the electric current direction, affirming the spin-momentum locking in the topological surface states. Angle-dependent measurement was also performed to further confirm that the abrupt change in the voltage (resistance) was associated with the magnetization switching of the Co electrode. Our results show a direct evidence of spin polarization in the topological surface states conduction. It might open up great opportunities to explore energy-efficient spintronic devices based on topological insulators.

[1]J. Tang, et al., Nano Letters, 14, 5423-5429 (2014).

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Date submitted: 13 Nov 2014 Electronic form version 1.4