Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Electrically Tunable Magnetism in Magnetic Topological Insulators[1] SHOU-CHENG ZHANG, JING WANG, BIAO LIAN, Stanford Univ — The external controllability of the magnetic properties in topological insulators would be important both for fundamental and practical interests. Here we predict the electric-field control of ferromagnetism in a thin film of insulating magnetic topological insulators. The decrease of band inversion by the application of electric fields results in a reduction of magnetic susceptibility, and hence in the modication of magnetism. Remarkably, the electric field could even induce the magnetic quantum phase transition from ferromagnetism to paramagnetism. We further propose a topological transistor device in which the dissipationless charge transport of chiral edge states is controlled by an electric field. The simultaneous electrical control of magnetic order and chiral edge transport in such a device may lead to electronic and spintronic applications for topological insulators.

[1]This work is supported by the U.S. Department of Energy, Office of Basic Energy Sciences, Division of Materials Sciences and Engineering, under Contract No. DE-AC02-76SF00515.

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Date submitted: 12 Nov 2014 Electronic form version 1.4