

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Inducing magnetism onto the surface of a topological crystalline insulator¹ BADIH A. ASSAF, Northeastern University, FERHAT KATMIS, PENG WEI, MIT, BISWARUP SATPATI, Saha Institute of Nuclear Physics, JAGADEESH S. MOODERA, MIT, DON HEIMAN, Northeastern University — Magnetically-doped topological crystalline insulators (TCI) have been predicted to host a quantum anomalous Hall state characterized by a Chern number, as large as $C=4$ [1]. An alternative way to achieve this quantum state is by inducing magnetism onto the surface via magnetic proximity with a ferromagnetic insulator such as EuS. Similar to the proximity effect achieved in EuS/Bi₂Se₃ bilayers [2], we have induced magnetism onto the TCI SnTe in an MBE-grown SnTe/EuS/SnTe trilayer. Transport measurements at $T=2\text{K}$ exhibit an anomalous Hall effect that is induced at the SnTe surfaces by the insulating ferromagnet EuS. The in-plane magnetoresistance (MR) exhibits a pronounced hysteresis that is isotropic with the direction of the applied magnetic field. Unlike the case of ferromagnetic semiconductors and metals, where the in-plane MR is highly anisotropic as a result of spin-scattering, the present MR is evidence of additional conduction inside the domain-walls at the EuS-SnTe interfaces. Further MR measurements in the minor loop regime confirm this effect. This work is a significant step to realizing exotic quantum states in TCI thin films. [1] C. Fang, et al. Phys. Rev. Lett. **112**, 046801 (2014). [2] P. Wei et al. Phys. Rev. Lett. **18**, 186807 (2013).

¹Supported by NSF-ECCS1402738, NSF-DMR-0907007, NSF-DMR-1207469, ONR-N000141310301, STC-CIQM-NSF-DMR-1231319

Badih A. Assaf
Northeastern University

Date submitted: 14 Nov 2014

Electronic form version 1.4