

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Study of the circular photo-galvanic effect in electrically gated $(\text{Bi,Sb})_2\text{Te}_3$ thin films YU PAN, TIMOTHY PILLSBURY, ANTHONY RICHARDELLA, THOMAS FLANAGAN, NITIN SAMARTH, The Pennsylvania State University — Illumination with circularly polarized light is known to produce a helicity dependent photocurrent in topological insulators such as Bi_2Se_3 [Nature Nanotech. 7, 96 (2012)]. Symmetry considerations suggest that this circular photo-galvanic effect (CPGE) arises purely from the surface. However, whether or not the CPGE is directly related to optical excitations from the helical surface states is still under debate. To clarify the origin of the CPGE, we first compare the helicity dependent photocurrent in intrinsic $(\text{Bi,Sb})_2\text{Te}_3$ to Cr doped $(\text{Bi,Sb})_2\text{Te}_3$ thin films in which the Dirac surface states are perturbed by magnetic coupling. Secondly, we discuss the tunable CPGE in electrically gated $(\text{Bi,Sb})_2\text{Te}_3$ thin films excited by optical excitations at different wavelengths. The dependence on the chemical potential and the photon energy of the excitation unveils the origin of the CPGE. Funded by ONR.

Yu Pan
The Pennsylvania State University

Date submitted: 06 Nov 2015

Electronic form version 1.4