Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Electronic structure studies on p-type $Pb_{1-x}Sn_xTe$ system above and below the band inversion topological transition[1] NASSER ALIDOUST, SU-YANG XU, M. NEUPANE, C. LIU, I. BELOPOLSKI, Department of Physics, Princeton University, D. QIAN, Department of Physics, Shanghai Jiao Tong University and Princeton University, J.D. DENLINGER, ALS, LBNL, Y.J. WANG, H. LIN, Department of Physics, Northeastern University, L.A. WRAY, ALS, LBNL and Princeton University, Q. GIBSON, Department of Chemistry, Princeton University, R. SANKAR, F.C. CHOU, Center for Condensed Matter Sciences, National Taiwan University, R.J. CAVA, Department of Chemistry, Princeton University, A. BANSIL, Department of Physics, Northeastern University, M.Z. HASAN, Department of Physics, Princeton University — We present systematic ARPES studies on p-type $Pb_{1-x}Sn_xTe$ samples at three different compositions with x = 0.26, 0.5, and 1.0. This material has been predicted as a topological crystalline insulator (TCI) upon band inversion at $x \simeq 0.3$. We show that the observed bulk valence band is a single hole-like band in the vicinity of the $\overline{X}$ points of the surface Brillouin zone, and reveal the 3D dispersive nature of the valence band with a clear k_z dispersion. We further show that despite the predicted band inversion and topological phase transition, the observed valence band electronic structure does not exhibit dramatic difference between these samples, demonstrating the critical importance of preparing in-gap or n-type samples for the realization of the TCI phase.

[1]This work is supported by the Office of Basic Energy Sciences, US DOE (grants DE-FG-02-05ER46200 and AC03-76SF00098).

Nasser Alidoust
Department of Physics, Princeton University

Date submitted: 27 Dec 2012 Electronic form version 1.4