

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Robust surface state and bulk carrier density in transport properties of Bi₂Se₃ films grown with MBE YONG SEUNG KIM, Sejong University, NAMRATA BANSAL, ELIAV EDREY, MATHEW BRAHLEK, GARY A. KAPILEVICH, SANG-WOOK CHEONG, SEONGSHIK OH, Rutgers University — One of the main predictions of 3D topological insulators (TI) is the existence of a surface metallic state, independent of the sample thickness. However, so far this simple prediction has never been experimentally verified because of significant parallel bulk conduction. Here, we report observation of a robust 2D surface state for MBE-grown thin films in their magneto-transport properties. We also observed that volume carrier density tends to decrease as film gets thicker. Even if a robust 2D surface state exists, its topological protection seems to degrade in thin films due to interference with the bulk carriers, and thus this bulk carrier problem will be the most important next step to solve in order to implement the full topological protection on this surface state.

Yong Seung Kim
Sejong University

Date submitted: 22 Dec 2010

Electronic form version 1.4