

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Single-ion magnetic anisotropy of transition metal impurities in Bi_2Se_3 bulk and thin film topological insulators FHOKRUL ISLAM, ANNA PERTSOVA, Dept. of physics, Linnaeus University, REZA MAHANI, KTH Royal Institute of Technology, CARLO CANALI, Dept. of physics, Linnaeus University — The breaking of time reversal symmetry in a topological insulator (TI) by magnetic doping is one of the most studied phenomena among the properties of Dirac materials. The robustness of the topological surface states (TSS) against magnetic impurities is of critical importance for spin-dependent transport in these systems. The interaction between TSS and magnetic impurities can open a gap, provided that the magnetic order is oriented normal to the surface of the TI. Such gap opening is crucial for realizing TI-based spintronic devices and for the observation of different fundamental phenomena, such as the anomalous quantum Hall effect. Using density functional theory as implemented in the WIEN2k ab-initio package, we have investigated the effect of the magnetization orientation on the gap opening at the Dirac point, for substitutional Mn and Fe impurities on the Bi_2Se_3 surface, and have calculated the associated single-ion anisotropy (SIA). We also have studied bulk SIA in order to compare the role played by TSS on the surface SIA.

Fhokrul Islam
Dept. of physics, Linnaeus University

Date submitted: 05 Nov 2015

Electronic form version 1.4