Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Magneto-transport study of magnetically-doped Bi2Se3 JOSEPH HAGMANN, JONATHON LEINER, DAVID HOWE, University of Notre Dame, YONGSEONG CHOI, Argonne National Laboratory, ABDEL AL-ASMADI, The Hashemite University, DAVID KEAVNEY, RICHARD ROSENBERG, Argonne National Laboratory, BRIAN KIRBY, NIST Center for Neutron Research, XINYU LIU, MARGARET DOBROWOLSKA, JACEK FURDYNA, University of Notre Dame — The interesting properties of topological insulators (TIs) arise from the zero energy gap at the Dirac point characterizing their surface states. These gapless chiral modes are attributed to spin-orbit coupling (typically very strong in TIs such as Bi2Se3), together with time reversal invariance (TRI). The introduction of magnetic dopants into a TI lattice can break TRI, providing a powerful tool for opening the gap in the Dirac cone, and for studying its consequences. In this paper we explore this phenomenon by introducing magnetic ions Mn and Fe into Bi sites in the Bi2Se3 lattice. A series of such magnetically-doped Bi2Se3 layers were grown by molecular beam epitaxy on GaAs (001) substrates, with the intention of studying the effects of such doping on the magnetic and electronic properties of this TI alloy. We discuss the results of magnetization, X-ray magnetic circular dichroism (XMCD), and extensive magneto-transport studies carried out to explore how the presence of magnetic ions in the TI lattice affects the magnetic and the electronic properties of these materials.

Joseph Hagmann
University of Notre Dame

Date submitted: 28 Nov 2012 Electronic form version 1.4