Abstract Submitted
for the OSS18 Meeting of
The American Physical Society

Evidence for Time-Reversal Symmetry breaking in 4f-doped Bismuth Selenide STEPHEN HOFER, DIPANJAN MAZUMDAR, Southern Illinois University - Carbondale — Time-Reversal Symmetry (TRS) is a hallmark of Topological Insulator (TI) systems. TRS in conjuction with the strong Spin-Orbit Coupling (SOC) present in Bismuth Selenide is responsible for the uniquely robust surface states shown in this material. Breaking TRS in these systems in order to achieve strong spin polarization requires the presence of a magnetic field throughout the material. We achieve this effect by doping the system with 4f elements whereby the magnetic field is provided by the local magnetic moments of the dopants manifesting ferromagnetic behavior. In this work we show high quality crystal growth using X-Ray Diffraction, ferromagnetic behavior in our doped system using SQUID, and Electronic Bandstructure using Resonant ARPES.

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Date submitted: 02 Mar 2018 Electronic form version 1.4