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Distorted weak anti-localization effects in $Bi_2Se_3/La_{0.70}Sr_{0.30}MnO_3$ (TI/FM) heterostructures grown by pulsed laser deposition FRANK HUNTE, RAJ KUMAR, YI-FANG LEE, SANDHYARANI PUNUGUPATI, JUSTIN SCHWARTZ, JAY NARAYAN, Materials Science and Engineering, North Carolina State University, Raleigh, NC - 27695 — Topological insulator/ferromagnet (TI/FM) heterostructures with broken time reversal symmetry by interface-induced magnetism are the potential platforms for the observation of novel quantum transport phenomena, magnetic monopoles and exotic quantum magneto-electric effects. TI/FM heterostructures with low Curie temperature ferromagnets i. e. GdN, EuS have been fabricated and studied. One of the challenges encountered with these heterostructures is their low Curie temperatures which limits their potential for applications in spintronic devices at room temperature. To address this issue, we have grown Bi_2Se_3/ $La_{0.70}Sr_{0.30}MnO_3$ (TI/FM) heterostructures by the method of pulsed laser deposition. $La_{0.70}Sr_{0.30}MnO_3$ (LSMO) is a strong ferromagnetic material with Tc ˜350 K and Bi_2Se_3 is the most studied topological insulator. XRD and phi scan results show that epitaxial thin films of Bi_2Se_3 are grown on the LSMO template. Strong in-plane magnetization is confirmed by magnetometry measurements of the Bi_2Se_3/LSMO heterostructure. Magneto-transport measurements show a distorted weak anti-localization effect with hysteretic behavior due to interface induced ferromagnetism in the Bi_2Se_3 TI films. This work was supported, in part, by National Science Foundation ECCS-1306400.

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