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Distorted weak anti-localization in pulsed laser-deposited $Bi_2Se_3/La_{0.70}Sr_{0.30}MnO_3$ heterostructures 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 potential platforms for the observation of novel quantum transport phenomena, magnetic monopoles and exotic quantum magneto-electric effects. One of the challenges encountered with TI/FM heterostructures is the low Curie temperatures of the ferromagnets studied so far which limits their potential for applications in spintronic devices at room temperature. In order to address this issue, we have grown $Bi_2Se_3/La_{0.70}Sr_{0.30}MnO_3$ heterostructures by the method of pulsed laser deposition. $La_{0.70}Sr_{0.30}MnO_3$ is a strong ferromagnetic material with T_c ˜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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