Abstract Submitted
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Proximity induced superconductivity in Bi_2Se_3 nanoribbons D.M. ZHANG, J. WANG, J.S. LEE, H.R. GUTIERREZ, M.H.W. CHAN, N. SAMARTH, Physics Dept., Penn State University, University Park PA 16802 — Proposals for possible realizations of Majorana fermions in condensed matter provide a strong motivation for interfacing superconductors with topological insulators (PRL **100**, 096407 (2008)). We describe experiments that accomplish an important first step in this context: the realization of proximity-induced superconductivity in a candidate topological insulator. We have measured the bias-dependent differential conductance in Bi_2Se_3 nanoribbons contacted with superconducting electrodes over a temperature range 0.5 K $\leq T \leq$ 6 K in magnetic fields up to 8 T. We observe signatures of both proximity-induced superconductivity and incoherent multiple Andreev reflections in these mesoscale devices. In addition, we find periodic magneto- resistance oscillations for magnetic field perpendicular to both the nanoribbon axis and the superconducting contacts. The temperature- and field-dependence of the magnetoresistance oscillation amplitude and period are suggestive of dissipative vortex dynamics in the vicinity of the contacts. Supported by NSF-MRSEC, NSF-NNIN and ONR.

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