Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Probing the Superconducting Proximity Effect of Topological Insulator Bi_2Se_3 Using Scanning Tunneling Microscopy IAN DAYTON, NICHOLAS SEDLMAYR, VICTOR RAMIREZ, Michigan State University Department of Physics and Astrononmy, THOMAS CHASAPIS, Northwestern University Department of Chemistry, REZA LOLOEE, Michigan State University Department of Physics and Astrononmy, ALEX LEVCHENKO, University of Wisconsin-Madison Department of Physics, MERCOURI KANATZIDIS, Northwestern University Department of Chemistry, STUART TESSMER, Michigan State University Department of Physics and Astrononmy — Placing a 3D topological insulator (TI) in proximity to an s-wave superconductor is theoretically predicted to induce 2D p-wave superconductivity into the topologically protected surface state (TSS). In this talk, we will present cryogenic scanning tunneling microscopy measurements of a large Bi_2Se_3 crystal with nanometer scale islands of PbBi deposited on the surface. Local density of states measurements are consistent with p-wave superconductivity in the top Bi_2Se_3 quintuple layer, with coherence length of 540 ± 50 nm in the direction parallel to the layer. We see indications of a reverse proximity effect as well, where the TSS from the TI leaks back into local density of states measured on the superconducting islands. The density of states curves also exhibit structure which we interpret as McMillan-Rowell oscillations due to Andreev confinement perpendicular to the layer.

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Date submitted: 04 Nov 2015 Electronic form version 1.4