Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Gate-tuned superconducting proximity effect in 3D topological insulator (Bi,Sb)2Se3-Nb bilayer heterostructures PHILIP KRATZ, Stanford Unviersity, ILYA SOCHNIKOV, PHILLIP WU, JUNG HO YU, Stanford University, KRISTIE KOSKI, Brown University, YI CUI, ROBERT HAMMOND, MALCOLM BEASLEY, JOHN KIRTLEY, KATHRYN MOLER, Stanford University — Interfacial superconductivity in three-dimensional topological insulators (3DTIs) is a promising avenue for topological superconductivity. We have used scanning SQUID microscopy to measure the diamagnetic susceptibility as a function of temperature in few QL (Bi,Sb)2Se3-Nb bilayer heterostructures. Local suppression of both the diamagnetic susceptibility and the critical temperature are consistent with an inverse proximity effect. We can model the relative contribution of the surface states to the overall superconductivity of the hybrid structures through gated susceptibility measurements and compare the fitted parameters to clean and dirty limit models within the general framework of Eilenberger's quasiclassical theory. Our work may contribute to understanding the complex interplay between topological and trivial surface states in real 3DTI interfaces.

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Date submitted: 14 Nov 2014 Electronic form version 1.4