

Abstract Submitted
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Global Properties of 3D Topological Insulator Surface/Superconductor Junctions MATTHEW GILBERT, Department of Electrical and Computer Engineering, University of Illinois, 1406 W. Green St., Urbana IL 61801, TAYLOR HUGHES, CHING-KAI CHIU, Department of Physics, University of Illinois, 1110 West Green St., Urbana IL 61801, ANDREI BERNEVIG, Department of Physics, Princeton University, Princeton, NJ 08544 — The ability to precisely find and manipulate non-Abelian anyons¹ has long been sought after as a potential means for the realization of robust quantum information processing. The simplest of these particles, Majorana fermions, have been predicted to exist in a new class of materials commonly referred to as topological insulators² when they are coupled with s-wave superconducting contacts.³ This proposal is the focus of intense experimental research whose aim is to prove the existence of Majorana fermions trapped at the surface of topological insulators paired with superconductors. We will present our initial theoretical investigations into the surface properties of 3D topological insulator/superconductor junctions.

¹A. Kitaev, *Ann. Phys (N.Y.)* **303**, 2 (2003).

²B. A. Bernevig and S. C. Zhang, *Phys. Rev. Lett.* **96**, 106802 (2006).

³L. Fu and C. L. Kane, *Phys. Rev. Lett.* **100**, 096407 (2008).

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