

Abstract Submitted
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Robust Transport Signatures of Topological Superconductivity in Topological Insulator Nanowires FERNANDO DE JUAN, Lawrence Berkeley National Laboratory, RONI ILAN, University of California, Berkeley, JENS H. BARDARSON, Max Planck Institute for the Physics of Complex Systems, Dresden — Finding a clear signature of topological superconductivity in transport experiments remains, to this date, an outstanding challenge. In this work, we propose to exploit the unique properties of nanowires made from three-dimensional topological insulators to generate a normal-superconductor junction in the single-mode regime, where an exactly quantized $2e^2/h$ zero-bias conductance can be observed over a wide range of realistic system parameters. Magnetic fields allow to reach the single mode regime in the normal part and to tune into and out of the topological regime in the superconducting region independently. The measurement proposed is insensitive to disorder, and the quantization of conductance survives at finite temperatures. Our proposal may be understood as an experimentally feasible variant of a Majorana interferometer.

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