Abstract Submitted
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Aharonov-Bohm oscillations in disordered topological insulator nanowires JENS H. BARDARSON, Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California 94720, USA, P.W. BROUWER, Dahlem Center for Complex Quantum Systems and Institut fur Theoretische Physik, Freie Universitat Berlin, Arnimallee 14, 14195 Berlin, Germany, J.E. MOORE, Department of Physics, University of California, Berkeley, Berkeley, California 94720, USA — A direct signature of electron transport at the metallic surface of a topological insulator is the Aharonov-Bohm oscillation observed in a recent study of Bi_2Se_3 nanowires [Peng *et al.*, Nature Mater. 2010] where conductance was found to oscillate as a function of magnetic flux ϕ through the wire, with a period of h/e and *maximum* conductance at zero flux. This seemingly agrees neither with diffusive theory (period of $h/2e$) nor with ballistic theory, which in the simplest form predicts a period of h/e but a *minimum* at zero flux due to a nontrivial Berry phase. We show how the magneto-conductance depends on doping and disorder strength, provide a possible explanation for the experiments, and discuss further experiments that could verify the theory.

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