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Disordered topological conductor KUN WOO KIM, California Institute of Technology, ALEXANDRA JUNCK, Freie Universitt Berlin & California Institute of Technology, DORON BERGMAN, California Institute of Technology, TAMI PEREG-BARNEA, McGill University & California Institute of Technology, GIL REFAEL, California Institute of Technology, FELIX VON OPPEN, Freie Universitt Berlin
— A topological conductor, like a topological insulator is a system in which the bands are characterized by non-trivial topological invariants such as the Chern numbers. However, unlike a topological insulator, in this system the Fermi energy does not lie in an energy gap but instead intersects at least one of the bulk bands. Although not an insulator the topological conductor supports chiral edge modes. In this work we consider a disordered topological conductor and analyze its properties. In particular we find that moderate disorder reduces the edge conductivity from its quantum value and stronger disorder increases it before the whole system is localized and the conductivity drops to zero. This effect is seen numerically on a lattice system and analytically in a disorder averaged continuum model.

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