Abstract Submitted
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Phase diagrams of disordered 3D topological insulators and superconductors[1] TOMI OHTSUKI, Sophia University, KOJI KOBAYASHI, Sophia Univeristy, KEN-ICHIRO IMURA, Hiroshima University, KEN NOMURA, Tohoku University — A global phase diagram of disordered weak and strong topological insulators belonging to the class AII is obtained by numerically calculating the conductance, the Lyapunov exponents and the density of states. The location of the phase boundaries, i.e., the mass parameter, is renormalized by disorder, a feature recognized in the study of topological Anderson insulator. We report quantized conductance on the phase boundaries between topologically distinct phases, which is interpreted as the robustness of conductance against disorder. This robustness is also confirmed by the large-scale numerical calculation of the density of states, which remains parabolic up to certain strength of disorder with renormalized Dirac electron velocity. From the size dependence of the conductance, we also point out that the surface states of weak topological insulator are either robust or "defeated". The nature of the two distinct types of behavior is further revealed by studying the Lyapunov exponents. (K. Kobayashi et al., Phys. Rev. Lett. vol. 110, 236803 (2013)). We also obtain the phase diagram of disordered topological superconductors belonging to the class DIII. Similar renormalization of mass and velocity due to disorder is found.

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