Abstract Submitted
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Plateau-Plateau Transitions in Disordered Topological Chern Insulators[1] YING SU, Hong Kong University of Science and Technology, YSHAI AVISHAI, Ben-Gurion University of the Negev, XIANGRONG WANG, Hong Kong University of Science and Technology — Occurrence of the topological Anderson insulator (TAI) in the HgTe quantum well demonstrates that topological phase transition can be driven by disorder, where re-entrant $2e^2/h$ quantized conductance is contributed by helical edge states. Within a certain extension of the disordered Kane-Mele model for magnetic materials that violate time-reversal symmetry and inversion symmetry, it is shown that the physics of TAI becomes even richer due to lifted spin and valley degeneracies. Tuning either disorder or Fermi energy (in both topologically trivial and nontrivial phases) makes it possible to drive plateau-plateau transitions between distinct TAI phases characterized by different Chern numbers, marked by jumps of the quantized conductance from 0 to e^2/h and from e^2/h to $2e^2/h$. An effective medium theory based on the Born approximation yields an accurate description of different TAI phases in parameter space.

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