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Topological Insulator Proximity Effect: Emergence and Detection of Perfectly Conducting Channels VIKTOR KRUECKL, SVEN ESSERT, KLAUS RICHTER, University of Regensburg — We show that the proximity of a two-dimensional topological insulator can be employed to induce a channel with a perfect transmission eigenvalue hosted in the bulk of a conducting material with extended states. The perfectly conducting state inherits its topological protection from the adjacent topological insulator, and can be distinguished from a conventional edge state by its signatures in magneto transport. We present how these states are formed using band structure calculations of a model system and numerical calculations based on HgTe heterostructures. Furthermore, we propose two experimental configurations, which are able to verify the induction of a perfectly conducting channel in the localized and the diffusive regime by transport and shot noise signatures.

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