

Disorder Effect in Two-dimensional Topological Insulator

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We conduct a systematic study on the disorder effect in two-dimensional topological insulator by calculating Z_2 topological invariant¹. Starting from the trivial and nontrivial topological phases of the model describing *HgTe/CdTe* quantum wells², we introduce three different kinds of disorder into the system, including: random on-site potential, random hopping amplitude and random topological mass. These kinds of disorder commonly exist in *HgTe/CdTe* quantum wells grown experimentally. By explicit calculations, we show that all three kinds of disorder have the similar effect: the topological phase in the system is not only robust to them, but also can be brought about by introducing them to the trivial phase. These results make a further confirmation and extendability of the study on the disorder effect in topological phase³.

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