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Berry Curvature Invariants in Disordered Topological Insulators

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Abstract

We analyze real-space localizer index formulations for evaluating topological invariants in three-dimensional tight-binding models subjected to correlated Anderson disorder and strain gradients. Spectral localizer eigenvalues permit direct tracking of mobility-gap closure across heterogeneous crystalline interfaces without momentum-space periodicity. Benchmark calculations confirm quantized boundary conductance plateaus up to disorder strengths comparable to half the bulk inversion gap.

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