

Analysis of topological properties of Chern insulators

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Chern insulators are band insulators exhibiting a nonzero Hall conductance but preserving the lattice translational symmetry. [1] Unusual protection of quantized conductance is related to nontrivial topology of energy bands characterized by topological invariant, Chern number; topological properties are stable against small perturbations. In this work we investigate different Chern insulator lattice models. We analyze their common features by looking at band structures, edge states behavior, and Berry curvature. We emphasize differences that can be responsible for distinct many body effects when electron-electron interactions are included. In particular, we indicate models that support stabilization of Fraction Chern Insulator (FCI) phases. [3-6]

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