

Topological insulators: interaction effects and new states of matter

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Topological insulators are recently discovered states of matter that are electrically insulating in the bulk but support novel conducting boundary states which are exceptionally robust to perturbations. The physics of topological insulators is due to strong spin-orbit coupling and, despite its exotic character, is well understood in a single-particle picture where electron-electron interactions are neglected. A topic of tremendous current interest in the field is to understand how the physics of topological insulators is affected in the presence of substantial electron-electron interactions. In this talk I will argue that the combination of a topological bandstructure and strong electron-electron interactions can give rise to novel phenomena that have no counterpart in either noninteracting topological systems or nontopological interacting systems.