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Interacting Topological Insulators

LUKASZ FIDKOWSKI, Microsoft Research, Station Q

Topological insulators and superconductors are new phases of matter whose physics is described by non-interacting fermions. They can be understood in terms of the topological "twisting" of the fermion's phase over the Brillouin zone, and using topology one can come up with a full classification of when such phases can occur. Strangely, this classification fails for some one dimensional systems once higher-order interactions are allowed. In this talk I will use the entanglement spectrum to understand the modified interacting classification, in one dimension. I will also discuss general one dimensional gapped models, and how matrix product states allow us to find their phases.