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Topological Bootstrap: Fractionalization From Kondo Coupling[1]
TIMOTHY HSIEH, Univ of California - Santa Barbara , YUAN-MING LU, Ohio State University, ANDREAS LUDWIG, Univ of California - Santa Barbara — We propose a route toward realizing fractionalized topological phases of matter (i.e. with in- trinsic topological order) by literally building on un-fractionalized phases. Our approach employs a Kondo lattice model in which a gapped electronic system of non-interacting fermions is coupled to non-interacting local moments via the exchange interaction. Using general entanglement-based arguments and explicit lattice models, we show that in this way gapped spin liquids can be induced in the spin system. We demonstrate the power of this "topological bootstrap" concept with two examples: (1) a chiral spin liquid induced by a Chern insulator and (2) a Z_2 spin liquid induced by a superconductor. In particular, in the latter example, the toric code is realized as an exactly solvable example of topological bootstrap. Our approach can be generalized to all lattices, higher dimensions, and non-abelian topological orders.

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