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Classification of interacting fermionic phases by dimensional reduction RAQUEL QUEIROZ, ESLAM KHALAF, Max Planck Institute for Solid State Physics, ADY STERN, Weizmann Institute of Science — Topological phases of noninteracting fermions are classified in each spatial dimension according to their symmetry class, in a periodic way [1]. When including interactions, however, this classification can be modified. It was first shown that in one-dimensional chains, the Z classification of the BDI symmetry class is reduced to Z_8 [2]. That is, every group of 8 Majorana states at the edge of a BDI chain can be gapped out through a suitable interaction, despite preserving its fundamental symmetries. In this work, we present a dimensional reduction argument to derive the role of interactions in the classification of fermionic symmetry protected topological phases. For symmetry classes classified by a Z invariant in odd dimensions, we propose a general n-particle quartic interaction that renders the system topologically trivial. We argue that all phases characterized by a topological invariant smaller than n in the noninteracting limit remain topologically distinct once interactions are included, thereby reducing the noninteracting Z classification to Z_n. [1] Ryu, S., *et. al.*, NJP 12, 065010 (2010); [2] Fidkowski, L. and Kitaev, A., PRB 81, 134509 (2010).

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