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Stable Topological Superconductivity in a Family of Fermion Lattice Models MENG CHENG, KAI SUN, VICTOR GALITSKI, SANKAR DAS SARMA, University of Maryland, College Park — Motivated by the exotic non-Abelian topological order emerging in $p_x + ip_y$ superconductor, we present a general theorem based on mean-field energetics and symmetry arguments that topological superconducting phase is stabilized in a large family of spinless fermion lattice models with very general band structures and attractive interactions. To illustrate the theorem, we examine the phase diagrams of two specific lattice models with nearest-neighbor hopping and attraction on a square lattice and a triangular lattice. The former one only supports a $p_x + ip_y$ pairing phase and the latter exhibits a topological phase transition driven by doping from $p + ip$-pairing state to topologically trivial f-wave state. This work is supported by DARPA-QuEST, JQI-NSF-PFC, and US-ARO

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