

Abstract Submitted
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Tuning between s-wave and p-wave superconductors as well as emerging Majorana fermions in extended Hubbard lattices KUEI SUN, University of Cincinnati, CHING-KAI CHIU, University of Illinois at Urbana-Champaign, JIANSHENG WU, Hong Kong University of Science and Technology — We study spin-half fermions in one dimensional extended Hubbard lattices in which the superconducting pairing orders are induced by the tuning of nearest-neighbor charge and spin interactions. We derive gap equations for three p-wave (triplet) as well as one s-wave (singlet) pairing orders and obtain a phase diagram characterizing these orders as a function of interaction couplings. We find that the system can evolve between s-wave and p-wave pairing states, accompanied with the emergence of Majorana fermions in the p-wave regime, identified as a time-reversal invariant Kitaev Majorana chain. Finally we discuss the effects on the topological non-trivial states when time-reversal or $SU(2)$ symmetry breaks.

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