

Abstract Submitted
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Fermion mixtures on an optical lattice SHAN-WEN TSAI, University of California, Riverside, TUN WANG, Institute for Quantum Optics and Quantum Information of the Austrian Academy of Sciences — We investigate mixtures of two species of fermionic ultracold atoms loaded on an optical lattice. We consider fermions with unequal masses and also fermions with unequal spin populations. We discretize the two Fermi surfaces and employ a functional renormalization-group (RG) approach to calculate the flows of effective interaction vertices in order to identify the instabilities of the system. Without any interactions produced via tuning of Feshbach resonances, a question arises as to whether there can be BCS pairing from repulsive interactions (produced by the optical trap) combined with lattice effects. For spin-independent bare contact interaction, the RG flows for unequal spin populations generate effective spin-dependent interactions. We investigate cases with different interactions, both attractive and repulsive, and different shapes of the Fermi surfaces, in particular the case when one of the fermion species has a nested Fermi surface and the other one does not.

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