

Abstract Submitted
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Quantum Phase Transitions in a Bose-Fermi Mixture¹ ERIC DUCHON, The Ohio State University, SHIZHONG ZHANG, The University of Hong Kong, SOON-YONG CHANG, MOHIT RANDEIRA, NANDINI TRIVEDI, The Ohio State University — Motivated by the recent experimental realization of stable Bose-Fermi mixtures with broad Feshbach resonances, we investigate possible quantum phases and phase transitions in this system using variational Monte Carlo. Within a single-channel model appropriate near broad Feshbach resonances, we show that as the boson-fermion coupling increases, the Bose-Einstein condensate disappears and the atomic Fermi surface is destroyed while the Fermi surface of the composite molecules emerges. We calculate the momentum distribution of atomic and molecular fermions and demonstrate that the atomic fermion's quasi-particle weight Z vanishes at a critical coupling.

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