

Abstract Submitted
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Persistence of Bose condensate after Fermi surface destruction in a Bose-Fermi Mixture¹ ERIC DUCHON, The Ohio State University, SHIZHONG ZHANG, The University of Hong Kong, SOON-YONG CHANG, MOHIT RANDEKIA, NANDINI TRIVEDI, The Ohio State University — We propose a single variational wave function to investigate the ground state properties of a Bose-Fermi mixture with equal boson and fermion population. We use variational and diffusion quantum Monte Carlo techniques to study this mixture as a function of increasing attraction between bosons and fermions. Sandwiched between the expected states in weak and the strong coupling limits, we find evidence for a novel state at intermediate coupling for which we make two predictions: (I) a complete destruction of the atomic Fermi surface and emergence of a molecular Fermi sea that coexists with a remnant of the Bose-Einstein condensate, and (II) evidence for fermion pairing correlations mediated by bosons.

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