

Abstract Submitted  
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**Emergent Fermi Sea in A System of Interacting Bosons<sup>1</sup>** YINGHAI

WU, Max Planck Institute of Quantum Optics, JAINENDRA JAIN, The Pennsylvania State University — An understanding of the possible ways in which interactions can produce fundamentally new emergent many-body states is a central problem of condensed matter physics. We ask if a Fermi sea can arise in a system of bosons subject to contact interaction. Based on exact diagonalization studies and variational wave functions, we predict that such a state is likely to occur when a system of two-component bosons in two dimensions, interacting via a species independent contact interaction, is exposed to a synthetic magnetic field of strength that corresponds to a filling factor of unity. The bosons each bind a single vortex as a result of the repulsive interaction, and these fermionic bound states, namely composite fermions, form a spin-singlet Fermi sea.

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