

Abstract Submitted
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Matterwave Probe for Detecting Fermi Superfluidity¹ SATYAN BHONGALE, HAN PU, Rice University — We propose a matter wave probe for detecting BCS type superfluidity within a trapped two-component Fermi gas. While, previous theoretical/experimental attempts have addressed Fermi superfluidity via a global measurement, for example by demonstrating a vortex lattice, the current proposal allows for a local measurement of the pairing gap. For this, we study the phase diagram of a mixture of Bose-Einstein condensate and an interacting two-component Fermi gas. We identify regions of the parameter space where the Bose-Fermi mixture is unstable resulting in phase separation. We show that, under proper conditions, by employing a tunable scattering resonance, the phase separation phenomenon can be exploited as a robust probe of “local” fermion superfluidity.

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