Matter wave probe for detecting Fermi superfluidity in trapped ultra-cold atom experiments\textsuperscript{1} SATYAN BHONGALE, HAN PU, Rice University

— We propose a robust matter wave probe for detecting Bardeen-Cooper-Schrieffer (BCS) superfluidity in a trapped two-component Fermi gas. In hear the matter wave corresponds to a Bose condensed state (BEC) of some third species of atoms—‘probes’-atoms’. This detection scheme is based on the extreme control of atom-atom interactions that is made available by techniques based on scattering resonances such as a magnetic/optical Feshbach. We show that when the experimental parameters are fine tuned within a certain region of parameter space, the density of the bosonic atoms give a direct measure of the BCS gap associated with the fermions.

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