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Single impurity in cold Fermi superfluids LEI JIANG, HAN PU, Department of Physics and Astronomy, Rice University — Single impurity will change local properties in ultracold Fermi superfluids. Spatially resolved radio frequency spectroscopy gives us a tool to detect local properties of ultracold Fermions and hence can be used to investigate the effects of impurities. Here we calculate the radio frequency spectrum using the T-matrix formalism with single impurity. This impurity can be either potential scattering or scattering with other atoms; either magnetic or non-magnetic. We find single impurity can be used as a probe to detect Fermi pairing in radio frequency spectrum in population balanced system. It can be used to detect whether the system is in BEC region or in BCS region. We compare magnetic impurity spectra with non-magnetic ones. We also discuss the appearance of bound states near the impurity site.

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