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Higgs mode in a superfluid Fermi gas in the BCS-BEC crossover
JUN TOKIMOTO, SHUNJI TSUCHIYA, Chuo Univ, TETSURO NIKUNI, Tokyo University of Science — In quantum many-body systems with spontaneous breaking of a continuous symmetry, Higgs modes emerge as collective amplitude oscillations of order parameters. Recently, Higgs modes have been observed in superconductors and in Bose gases in optical lattices. However, it has yet to be observed in Fermi gases. We use the time-dependent Bogoliubovde Gennes equations to investigate Higgs amplitude oscillations of the superfluid order parameter in a trapped Fermi gas induced by a sudden changes of the s-wave scattering length. In particular, we investigate the Higgs mode with different values of the initial scattering length and discuss how the frequency and damping of the Higgs mode changes in the BCS-BEC crossover.

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