

Abstract Submitted
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Composite quasiparticles in strongly-correlated dipolar Fermi liquids BILAL TANATAR, Bilkent University, IRAN SEYDI, SAEED H. ABEDINPOUR, Institute for Advanced Studies in Basic Sciences (IASBS), REZA ASGARI, Institute for Research in Fundamental Sciences (IPM) — Strong particle-plasmon interaction in electronic systems can lead to composite hole-plasmon excitations. We investigate the emergence of similar composite quasiparticles in ultracold dipolar Fermi liquids originating from the long-range dipole-dipole interaction. We use the G_0W technique with an effective interaction obtained from the static structure factor to calculate the quasiparticle properties and single-particle spectral function. We first demonstrate that within this formalism a very good agreement with the quantum Monte Carlo results could be achieved over a wide range of coupling strengths for the renormalization constant and effective mass. The composite quasiparticle zero sound excitations which are undamped at long wavelengths emerge at intermediate and strong couplings in the spectral function and should be detectable through the radio frequency spectroscopy of nonreactive polar molecules at high densities.

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