

Abstract Submitted
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The spectral function of the normal phase in the BCS-BEC crossover TARA DRAKE, JILA and University of Colorado, YOAV SAGI, Technion, Israel, RABIN PAUDEL, ROMAN CHAPURIN, JILA and the University of Colorado, DEBORAH JIN, NIST and the University of Colorado and JILA — The nature of the normal phase of an ultracold Fermi gas in the BCS-BEC crossover regime is an interesting and unresolved question. While the many-body ground state remains a condensate of paired fermions, the normal state must evolve from a Fermi liquid to a Bose gas of molecules as interactions increase. We explore how this occurs with measurements of the distribution of single-particle energies and momenta in a nearly homogeneous gas above T_c . We find that the data fit well to a two-part function that includes a peak corresponding to fermionic quasiparticles and an “incoherent background” that can be modeled using the dispersion of thermal molecules. The data show signatures of both Fermi liquid behavior and pairing. As the strength of interactions is increased, the quasiparticle spectral weight vanishes, which signals the breakdown of a Fermi liquid description.

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