Temperature and final state effects in radio frequency spectroscopy experiments on atomic Fermi gases

YAN HE, CHIH-CHUN CHIEN, QIJIN CHEN, KATHY LEVIN, University of Chicago — We present a simple and systematic characterization of the radio frequency (RF) spectra of homogeneous, paired atomic Fermi gases at general temperatures, $T$, in the presence of final state interactions. The spectra, consisting of possible bound states and positive as well as negative detuning ($\nu$) continua, satisfy exactly the zeroth- and first-moment sum rules at all $T$. We show how to best extract the pairing gap and how to detect the $\nu < 0$ continuum arising from thermally excited quasiparticles, not yet seen experimentally. We explain semi-quantitatively recent RF experiments on “bound-bound” transitions, predicting effects of varying temperature.

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