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Loss-induced heating in a cold atom BCS superfluid RYAN M. KALAS, EDDY TIMMERMANS, Los Alamos National Lab — Loss-induced heating in a cold atom BCS superfluid The loss of fermion particles caused by the background scattering, spin relaxation, or three-body recombination processes that generally limit cold atom trap lifetimes gives rise to a heating mechanism that can be particularly significant in the weakly-interacting quantum degenerate regime. For weakly attractive fermions in multiple spin states, this heating was shown to compete significantly with the formation of the BCS superfluid state. The heat capacity and the excitation dispersions play an essential role in this calculation. In this poster, we calculate the loss-induced heating rate of a low temperature, homogeneous cold atom system that has reached the BCS state, thereby altering the heat capacity and quasiparticle dispersion from their analogues in the normal state. We find that the high momentum region of the quasiparticle distribution contributes significantly. As a consequence, the heating rate becomes sensitive to the high momentum dependence of the superfluid order parameter.

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