Thermodynamics of ultracold fermions in traps in the strongly interacting regime\textsuperscript{1} QIJIN CHEN, University of Chicago, JELENA STAJIC, Los Alamos National Lab, KATHRYN LEVIN, University of Chicago — We discuss the entropy $S$, energy $E$ for trapped fermionic gases, over the entire range from BCS to BEC, and over all $T$ from below to above $T_c$. Our work, which is based on the conventional mean field ground state, shows that both “bosonic” and fermionic excitations contribute to $S$, and that boson-fermion interactions are essential. Trap edge effects lead to low $T$ power law contributions for the fermions in the unitary and BCS regimes, while bosons contribute to $S$ with a $T^{3/2}$ dependence. Comparison with recent experiments by the Thomas group (cond-mat/0409283) shows very good quantitative agreement. This lays the groundwork for implementing thermometry in strongly interacting Fermi gases.


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