

Abstract Submitted  
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**Universal properties of ultracold Fermi gases** SHIZHONG ZHANG,  
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properties of a two-component ultra-cold Fermi gas along the BEC-BCS crossover.  
It is shown that the interaction energy and the free energy can be written in terms  
of a single dimensionless function  $h(\xi, \tau)$ , where  $\xi = -(k_F a_s)^{-1}$  and  $\tau = T/T_F$ . The  
function  $h(\xi, \tau)$  incorporates all the many-body physics and naturally occurs in other  
physical quantities as well. In particular, we show that the average rf-spectroscopy  
shift  $\bar{\phi}(\xi, \tau)$  and the molecular fraction  $f_c(\xi, \tau)$  in the closed channel can be expressed  
in terms of  $h(\xi, \tau)$  and thus have identical temperature dependence. The conclusions  
should have testable consequences in future experiments.

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