Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Effects of nonmagnetic impurities on BCS-BEC crossover in atomic Fermi gases[1] YANMING CHE, QIJIN CHEN, Zhejiang University — We present a systematic investigation of the effects of nonmagnetic impurities on the s-wave BCS-BEC crossover within a pairing fluctuation theory. Both the pairing T-matrix and the impurity scattering T-matrix are treated self-consistently at the same time, in the context of ultracold atomic Fermi gases. While the system is less sensitive to impurity scattering in the Born limit, in the strong impurity scattering limit, both the frequency and the gap function are highly renormalized, leading to significant suppression of the superfluid T_c. In the BCS regime, the superfluidity may be readily destroyed by the impurity, leading to an effective power law dependence of T_c as a function of pairing strength. In comparison, T_c and (pseudo)gaps in the unitary and BEC regimes are relatively more robust. In either cases, the s-wave pairing is less sensitive to impurity than its d-wave counterpart. Calculations of superfluid density will also be presented. References: Q.J. Chen and J.R. Schrieffer, Phys. Rev. B 66, 014512 (2002).

[1]Supported by NSF, MOE and MOST of China

Qijin Chen
Zhejiang Univ

Date submitted: 14 Nov 2014 Electronic form version 1.4