Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Superfluidity of atomic Fermi gases with dipolar interactions[1]
YANMING CHE, QIJIN CHEN, Zhejiang University — While quantum degenerate dipolar Fermi gases have been made available in experiment, the superfluidity in such Fermi gases has been of very high interest. In this talk, we study the superfluidity and associated BCS-BEC crossover behavior of a two-component atomic Fermi gases in three dimensions in the presence of dipole-dipole interactions, such as polar molecules $^{40}K^{87}Rb$ and magnetic atoms ^{161}Dy, using a pairing fluctuation theory. The relative interaction strength can be tuned via the atomic number. Various geometric configurations will be explored. We show that in certain configurations, the superfluidity may disappear altogether for a narrow range of interaction strength, and the Tc curve throughout the BCS-BEC crossover exhibits a reentrant behavior. We argue that such disappearance of the superfluidity is associated with the long range nature of the dipole-dipole interaction. A pseudogap develops naturally as the relative interaction becomes strong.

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

Qijin Chen
Zhejiang University

Date submitted: 09 Nov 2012 Electronic form version 1.4