Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

**Unconventional triplet pairing state in a polarized dipolar Fermi gas**[1] YUKI ENDO, DAISUKE INOTANI, YOJI OHASHI, Keio University — We theoretically discuss the possibility of a triplet superfluid state in a polarized dipolar Fermi gas. In this system, it is usually believed that a high-energy cutoff is necessary in solving the superfluid BCS gap equation, reflecting the non-convergent behavior of a dipole-dipole interaction in the high-momentum limit. Because of this, the superfluid theory for a dipolar Fermi gas is believed to need a regularization for the angular-dependent dipole-dipole interaction as in the case of the s-wave interaction. In this talk, we show that such a renormalization is actually unnecessary, when one carefully includes the detailed structure of a dipolar molecule. We present a superfluid theory for a dipolar Fermi gas where the dipole-dipole interaction is only described by the two physical parameters, dipole size and dipole-dipole coupling constant. Using this, we discuss the possibility of a triplet pairing state, as well as superfluid properties, of this system. Since our theory only involves observable physical parameters, it would be useful in quantitatively evaluating superfluid properties of a dipolar Fermi gas, such as the superfluid phase transition temperature.

[1]This work is supported by a Grant-in-Aid for JSPS Fellows.

Yuki Endo
Keio University

Date submitted: 08 Nov 2012 Electronic form version 1.4