Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Dipolar Fermions in Quasi-Two-Dimensional Square Lattice CHEN-YEN LAI, SHAN-WEN TSAI, University of California Riverside — Motivated by recent experimental realization of quantum degenerate dipolar Fermi gas, we study a system of ultralcold single- and two-species polar fermions in a double layer two-dimensional square lattice. The long-range anisotropic nature of dipole-dipole interaction has shown a rich phase diagram on a two dimensional square lattice*. We investigate how the interlayer coupling affects the monolayer system. Our study focuses on the regime where the fermions are closed to half-filling, which is when lattice effects play an important role. We find several correlated phases by using a functional renormalization group technique, which also provides estimates for the critical temperature of each phase. [*] S. G. Bhongale et. al. arXiv:1209.2671 and Phys. Rev. Lett. 108 145301 (2012).

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Date submitted: 20 Dec 2012 Electronic form version 1.4