Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

FFLO and Topological Superfluid Phases in 2D Spin-Orbit Coupling Fermionic Optical Lattices[1] YONG XU, CHUNLEI QU, MING GONG, CHUANWEI ZHANG, The University of Texas at Dallas — We investigate the phase diagram of 2D spin-orbit coupled ultra-cold Fermi atoms confined in a square lattice. By numerically solving the corresponding Bogoliubov-de Gennes equation self-consistently, we show that a finite Zeeman field can induce Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) and /or topological superfluid phases (which support Majorana fermions) in the presence of spin-orbit coupling. We find that the perpendicular Zeeman field favors the topological superfluid phase, while the in-plane Zeeman field favors the FFLO state. A simple physical explanation for the above results is also provided.

[1]This work is supported by ARO, AFOSR, and NSF.

Yong Xu
The University of Texas at Dallas

Date submitted: 13 Nov 2012 Electronic form version 1.4