Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Competing instabilities in a two band Hubbard model on a square lattice CHUNTAI SHI, SHAN-WEN TSAI, Department of Physics and Astronomy, University of California Riverside — We study a two band Hubbard model on a two dimensional square lattice. In particular, we focus on the cases wherein one band is doped to have a small electron pocket while the other band is doped to have a hole pocket and the Fermi lines of these two pockets are nearly nested. Similar models have been studied extensively in the context related to the Iron-based material where the interactions between electrons are always repulsive. Here we investigate the generalized cases that the interactions between the fermions within the same band U_1 and U_2 and the interactions between electrons in different bands U_{12} can be tuned independently. Such models can potentially be realized in a cold atom system where the manipulation of the interaction is possible by taking advantage of the Feshbach resonance. The freedom of tuning the strength and the sign (repulsive or attractive) of the interactions, combined with the nearly nested Fermi lines, allows both the density wave phases and the pairing phases to be potential candidates for the ground state. We employ the functional renormalization group approach so that we can investigate the competition between these possible instabilities on an equal footing.

Chuntai Shi
Department of Physics and Astronomy, University of California Riverside

Date submitted: 28 Nov 2011 Electronic form version 1.4