Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Pairing and Density-Wave Phases of Population Imbalanced Fermi-Fermi Mixture on Optical Lattice CHEN-YEN LAI, CHUNTAI SHI, SHAN-WEN TSAI, University of California Riverside — We study a two species fermion mixture with different populations on a square lattice, which can be modeled by a Hubbard Hamiltonian with on-site inter-species interaction. Such a model can be realized in a cold atom system with fermionic atoms in two different hyperfine states loaded on an optical lattice, and with interaction strength that can be tuned by an external magnetic field. When one of the fermion species is close to half-filling, the system is highly affected by lattice effects. We find several correlated phases for this system, including spin density wave state, d-wave charge density wave state, and p-wave superfluid state for the minority species. We study this system using a functional renormalization group method, determining its phase diagram and providing an estimate for the critical temperature of each phase. These phases emerge from a combination of interaction, population imbalance, and lattice effects. Lattice effects in particular lead to a much richer phase diagram than that of a imbalanced mixture of fermionic gas.

Chen Yen Lai
University of California Riverside

Date submitted: 08 Nov 2011 Electronic form version 1.4