Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

P-wave Paired Ground state Structure of Two-component Population Imbalanced Fermi Systems with Unequal Mass[1] FLORENTIN POPESCU, RENYUAN LIAO, KHANDKER QUADER, Kent State University —
Effects of unequal mass on p-wave pairing in population imbalanced two-component Fermi systems is studied using a single-channel fermionic Hamiltonian. Provided certain phase criteria are satisfied among the orbital gap parameters, a rich structure of the ground state is obtained. The global and local minima ground state energies are determined analytically. By numerically solving the gap and number equations, we construct T=0 polarization versus p-wave coupling phase diagrams across the BEC-BCS regime for different mass ratios. This shows the existence of two superfluid phases, SF1 and SF2, corrsponding to the global and local energy minima respectively; phase separation occurs at higher polarizations. For small mass ratios, SF1 is enhanced; SF2 is not significantly affected. Competition between mass ratio and polarization is studied; the superfluid transition temperature shows interesting behavior versus the mass ratio at high polarizations. At large polarizations, a stable p-wave superfluid would survive only for small mass ratios, and for mass ratios close to unity.

[1]The work is partially supported by funding from ICAM.

Khandker Quader
Kent State University

Date submitted: 30 Nov 2007 Electronic form version 1.4