Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

P-wave Pairing in Two-Component Fermi System with Unequal Population near Feshbach Resonance[1] RENYUAN LIAO, FLORENTIN POPESCU, KHANDKER QUADER, Kent State University — We explore p-wave pairing in a single-channel two-component Fermi system with unequal population near Feshbach resonance. Our analytical and numerical study reveal a rich superfluid (SF) ground state structure as a function of imbalance. In addition to the state $\Delta_{\pm 1} \propto Y_{1\pm 1}$, a multitude of "mixed" SF states formed of linear combinations of Y_{1m}'s give global energy minimum under a phase stability condition; these states exhibit variation in energy with the relative phase between the constituent gap amplitudes. States with local energy minimum are also obtained. We provide a geometric representation of the states. A T=0 polarization vs. p-wave coupling phase diagram is constructed across the BEC-BCS regimes. With increased polarization, the global minimum SF state may undergo a quantum phase transition to the local minimum SF state.

[1]Work is partially supported by funding from ICAM.

Khandker Quader
Kent State University

Date submitted: 30 Nov 2007 Electronic form version 1.4