p-wave superfluid with imbalanced atomic population in harmonic trap\textsuperscript{1} AMMAR KIRMANI, KHANDEER QUADER, MAXIM DZERO, Kent State Univ - Kent — We consider the problem of $p$-wave superfluid pairing in an atomic Fermi gas across Feshbach resonance for imbalanced populations in presence of an optical trap. For our harmonic trapping potential, we employ Local Density Approximation (LDA) through chemical potential. In two-channel mean field approximation pairing model, we show that depending on the distance from the trap’s center, the $p$-wave superfluid state will have the lowest energy. The ground state order parameter configuration we find is not invariant under parity and time-reversal symmetry operations. We also present phase diagrams and density profiles in one-channel model for our singlet $p$-wave pairing and show that the center of trap is occupied by $p$-wave superfluid. The work of A. K. and M. D. was financially supported by the National Science Foundation Grant No. DMR-1506547.

\textsuperscript{1}National Science Foundation Grant No. DMR-1506547