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A Fully Self-Consistent Mean-Field Study of Population Imbalanced Fermionic Gases In Anisotropic Traps H. LU, L. BAKSMATY, Rice University, C. BOLECH, University Of Cincinnati, H. PU, Rice University — Relying on a fully self-consistent numerical solver for Bogoliubov de Gennes (BdG) equations, we study the population imbalanced Femionic gases in anisotropic traps with realistic system size (up to 10^5 atoms). We find that for a large enough sample in a highly elongated trap, there are typically three types of solutions which are almost degenerate and have the ff. properties: (i) There is a solution very similar to the local density approximation (LDA) which is consistently the lowest in energy.(ii) However one of the other two solutions, connected by a smooth transition, and which are more consistent with experiment at high aspect ratio, supports a state very similar to the long sought FFLO (Fulde Ferrel Larkin Ovchinnikov) state. We submit that these solutions are relevant false vacua because, given high energy barriers and near degeneracy of the obtained solutions, the actual states observed in an experiment could be a strong function of the experimental procedure. Darpa OLE grant, ARO Grant no.W911NF-07-1-0464,Welch foundation (C-1669, C-1681) and NSF.

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