Metastable states of Fermionic condensates in highly elongated traps at unitarity[1] LESLIE BAKSMATY, HONG LU, Rice University, HAN PU, Rice Univeristy, CARLOS BOLECH, University of Cincinnati — We present results for a 3-dimensional fully self-consistent meanfield Bogoliubov-deGennes study of finite trapped samples of degenerate spin polarized Fermionic gases. Our findings indicate that for a large enough sample in a cigar-shaped trap and in the unitary regime, there are typically three types of solutions which are almost degenerate and possess the the ff. properties: (i) The solution most similar to the semi-classical approximation (LDA) is consistently the lowest in energy. (ii) However, the other two metastable solutions connected by a second-order transition are much more consistent with experimental observations and (iii) one of these metastable solutions supports an FFLO state. These results are highly relevant to recent experiments where significant and unexpected distortions were observed in density profiles. We submit that these metastable solutions are relevant false vacua because given the slow relaxation times, the actual states observed in an experiment could be a strong function of the experimental procedure.

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