

## Coexisting Condensates of Weakly Interacting Bose Gas in a Harmonic Trap

MIAO Yuan-Xiu, YANG Hong-Yu, ZHAI Hui, and CHANG Lee

Center for Advanced Study, Tsinghua University, Beijing 100084, China  
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Abstract: We study particles in a vortex state driven to a core state with lower energy and zero angular momentum by the trap potential asymmetries. We find that at  $T=0$  when the role of the thermal gas can be ignored, there will be coexisting condensates. We also calculate the fluctuation of the number difference and argue that in certain range of the parameters the state of the whole system is the macroscopic quantum self-trapping in the Josephson tunnelling regime.

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Key words: Bose-Einstein condensate, vortex, Josephson tunnelling

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