ABSTRACT

Bose-Einstein condensate is a very robust state of a bosonic system below a certain critical temperature. Bosons have a much higher tendency to get accommodated in a single non-degenerate state than the distinguishable particles. Therefore, it is very diffcult to create stable fragmented condensates. But, there have been successful attempts to fragment or cut a single condensate experimentally by employing optical tweezers and knives. Fragmentation of a condensate naturally occurs when there are inherent degeneracies in a system. In this work, fragmentation of condensates is studied theoretically in the case of a symmetric double well trap. Fragmentation is shown to occur when a single well is made to oscillate very fast and with sufficiently large amplitude in the so-called Kramers-Henneberger framework. The dual-space information entropy for the condensate density is calculated for different oscillation parameters to understand the evolution of the state from a single condensate to a fragmented condensate. Besides, merging of fragmented condensates is also studied in the Kramers-Henneberger framework.