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Dynamical instabilities obtained with initially immiscible coupled Bose-Einstein condensates

I will be reporting an investigation considering the emergence of Rayleigh-Taylor (RT) and Kelvin-Helmholtz (KH) instabilities, which occur in initially immiscible configurations of homogeneous Bose-Einstein condensates confined in a two-dimensional circular box. For the binary mixture, it has been considered the rubidium isotopes ^{85}Rb and ^{87}Rb . As verified, more sound wave generations are found to appear in the RT instability than in the KH instability. Further, it will be also reported instabilities that occur in the binary mixture when centrally and axially phase separated states are submitted to sudden transitions from immiscible to miscible regimes by reducing the inter-species interactions. In all the reported cases, it will be shown the behavior of the kinetic energy spectrum as a function of the wave number k , which follows approximated the $k^{-5/3}$ Kolmogorov behavior.

Note: Reporting a collaboration with R. Kishor Kumar, A. S. Bradley, S. Sabari, and A. Gammal.

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