

Atomic Tunnelling Dynamics of Two Squeezed Bose-Einstein Condensates

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Abstract: In this paper, tunnelling dynamics of squeezed Bose-Einstein condensates (BEC's) in the presence of the nonlinear self-interaction of each species, the interspecies nonlinear interaction, and the Josephson-like tunnelling interaction is investigated by using the second quantization approach. The influence of BEC squeezing on macroscopic quantum self-trapping (MQST) and quantum coherent atomic tunnelling is analyzed in detail. It is shown that the MQST and coherent atomic tunnelling between two squeezed BEC's can be manipulated through changing squeezing amplitude and squeezing phase of BEC squeezed states.

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Key words: atomic Bose-Einstein condensates, quantum tunnelling, squeezed states

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