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Quantum Statistical Properties in Two-Species Bose-Einstein Condensates

YU Zhao-Xian[1,3] and ZHANG Wei-Gang[2]

[1] Theoretical Physics Division, Nankai Institute of Mathematics, Nankai University, Tianjin 300071, China
[2] Institute of Modern Optics, Nankai University, Tianjin 300071, China
[3] Department of Physics, Petroleum University (East China), Dongying 257061, Shandong Province, China
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Abstract: We have studied quantum statistical properties in a zero-temperature two-species Bose-Einstein condensate system in the presence of the nonlinear self-interaction of each species, the interspecies nonlinear interaction, and the Josephson-like tunneling interaction. It is found that the two condensates may periodically exhibit sub-Poissonian distribution. It is revealed that the correlation between the two condensates can be nonclassical, which means that there exists a violation of Cauchy-Schwartz inequality. The nonclassical effect about the correlation between the two condensates can be realized experimentally by properly preparing the total number of atoms in the two condensates.

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