2004 Vol.42 No.2 pp.229-234 DOI:

Atomic Tunneling Effect in Two-Component Bose-Einstein Condensates with a Coupling Drive

JIAO Zhi-Yong, YU Zhao-Xian, and YANG Xin-Jian

Department of Applied Physics, University of Petroleum (East China), Dongying 257061, China
(Received: 2003-11-25; Revised:)

Abstract: In this paper, we have studied the atomic population difference and the atomic tunneling current of two-component Bose-Einstein condensates with a coupling drive. It is found that when the two-component Bose-Einstein condensates are initially in the coherent states, the atomic population difference may exhibit the step structure, in which the numbers of the step increase with the decrease of the Rabi frequency and with the increment of the initial phase difference. The atomic population difference may exhibit collapses, and revivals, in which their periods are affected dramatically by the Rabi frequency and the initial phase difference. The atomic tunneling current may exhibit damping oscillation behaviors, and exist the step structure for the time range of 10^{-10}～10^{-9} second.

PACS: 03.75.Lm, 74.50.+r
Key words: two-component Bose--Einstein condensates, atomic tunneling current, atomic population difference, collapses and revivals

[Full text: PDF]

Close