

Influence of External Magnetic Fields on Tunneling of Spin-1 Bose Condensate

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(Received: 2004-3-11; Revised: 2004-4-12)

Abstract: In this letter, we have studied the influence of the external magnetic fields on tunneling of the spin-1 Bose condensate. We find that the population transfer between spin-0 and spin- ± 1 exhibits the step structure under the external cosinusoidal magnetic field and a combination of static and cosinusoidal one, respectively. Compared with the longitudinal component of the external magnetic field, the smaller the transverse component of the magnetic field is, the larger the time scale of exhibiting the step structure does. The tunneling current may exhibit periodically oscillation behavior when the ratio of the transverse component of the magnetic field is smaller than that of the longitudinal component, otherwise it exhibits a dampedly oscillating behavior. This means that the dynamical spin localization can be adjusted by the external magnetic fields.

PACS: 75.45.+j, 03.75.Lm, 05.30.Jp

Key words: tunneling, population transfer, spinor Bose condensate

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