

量子光学

A simple scheme for realizing four-photon GHZ state based on cavity quantum electrodynamics

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摘要:

提出一种利用阶梯型三能级原子与两个双模腔谐振相互作用制备四光子GHZ态的方案。在该方案中, 量子信息编码在腔场的虎克态中。通过求解薛定谔方程, 得到相互作用系统的量子态。原子通过两个腔后被测量时, 场能崩塌到所需要的GHZ态。结果表明该方案简单且实验上可行。

关键词: 量子光学 GHZ态 阶梯型三能级原子 双模腔

A simple scheme for realizing four-photon GHZ state based on cavity quantum electrodynamics

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Abstract:

A scheme is presented for generating four-photon Greenberger-Horne-Zeilinger (GHZ) states with resonant interaction between a cascade type three-level atom and two bimodal cavities. In the proposed protocol, the quantum information is encoded on Fock states of the cavity fields. Schrödinger equation of the system is solved and quantum states of interaction system are obtained. The detection of atom can collapse cavity to the desired GHZ state. It is shown that the scheme is simple and the experimental implementation is feasible.

Keywords: quantum optics GHZ state cascade three-level atom bimodal cavity

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