

论文

耗散腔中双原子与光场的纠缠演化特性

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摘要:

采用全量子理论方法,研究了处于耗散腔中的双原子与单模相干光场相互作用系统,分析了双原子与光场之间以及两原子之间的纠缠演化特性,讨论了腔场的衰减以及原子与光场间的失谐量对双原子与光场之间以及两原子之间纠缠演化特性的影响.结果表明,当腔场存在损耗时,原子与光场之间可出现纠缠,但在长时极限下,纠缠逐渐消灭,而失谐量对原子与光场间的纠缠存在着显著影响,初始处于最大纠缠的两原子之间的纠缠,由于光场的衰变而逐渐减弱,但原子-光场之间的失谐可抑制这一衰减.

关键词: 耗散腔 量子纠缠 部分转置矩阵负本征值

Entanglement Properties of Two-atoms Interacting with Field in Dissipative Cavity

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Abstract:

By means of the quantum theory, the interaction between two-atoms located inside a dissipative cavity and single-mode coherent field was studied. The entanglement properties, between two atoms and between two-atoms and light fields, were analyzed. In addition, the reason that the decay of the cavity field and the detuning between the atom and cavity field affect the evolution of entanglement was discussed. The results show that when there is cavity loss, entanglement between the atoms and light fields may occur, however entanglement gradually disappear in the long time limit. Also, the detuning between the atom and cavity field significantly affects the entanglement. The entanglement between two atoms initially in the maximally entangled states is gradually weakened due to the decay of the light field, but the detuning between the atom and the cavity field can inhibit this decay.

Keywords: Dissipative cavity Quantum entanglement Negative eigenvalues of the partial transposition matrix

收稿日期 2010-11-25 修回日期 2011-01-18 网络版发布日期 2011-04-25

DOI: 10.3788/gzxb20114004.0607

基金项目:

国家自然科学基金(No. 60878004)和湖北省自然科学基金(No. 2008CDZ095)资助

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