论文

纠缠相干态的纠缠浓缩

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摘要：

利用线性光学元器件对光场量子态进行操纵,可以实现远程的量子纠缠调控和量子通讯.通过分析光学分束器对相干态光场的作用,发现当初始光场态是两个两部分纠缠态的直乘时,让其中的两模通过光学分束器作用后再对其进行光子计数,另外两模将会塌缩到新的纠缠态.基于这个特点,提出了一个实现部分纠缠相干态纠缠浓缩的方案.在这个方案中,两个部分纠缠相干态被用来作为量子信道,通过光学分束器作用后对光场进行光子数探测时,如果测量到光场的两模分别处于奇光子数态和零光子数态,则光场另外的两模将塌缩到最大纠缠态,从而完成纠缠浓缩的过程.计算结果表明,对于纠缠相干态,无论其初始的纠缠是多么微弱,利用这种方法总有一定的几率可以从中提纯出最大纠缠态.

关键词： 纠缠相干态 纠缠浓缩 光束分离器 光子探测

Entanglement Concentration of Entangled Coherent States

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Abstract:

With linear optical components to manipulate quantum states of optical fields,the quantum entanglement control and quantum communication can be implemented remotely.By analyzing optical splitter and its use of coherent states,it was found that when the initial state was a direct product of two partially entangled coherent states|another two modes would collapse to a new entangled state using optical splitter and photon-detectors on two modes.Based on this feature,the scheme on entanglement concentration was presented.In this scheme,the two partially entangled coherent states were utilized as the quantum channel,when zero photon and odd photons were detected in two modes separately,and another two modes would collapse to the maximum entangled state,thereby completing the process of the entanglement concentration.It was proved that,no matter how small the initial entanglement is,to distill some maximally entangled states from partially entangled pure states is possible.

Keywords: Entangled coherent state Entanglement concentration Beam-splitters Detection of photon

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