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量子光学

腔QED中实现控制量子逻辑门的简易方案

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摘要： 受之前有关控制量子门工作的启发，提出了一个在腔QED中实现CNOT门，Toffoli门以及Fredkin门的简易方案。本方案只涉及到原子与腔场之间的大失谐相互作用，腔场处于虚激发，量子信息不会在原子和腔之间传递，因此对腔场的品质因子要求大大降低，在目前的实验技术条件下，该方案是是可行的。

关键词： 量子光学 控制逻辑门 控制变量法 腔量子点动力学

An easy scheme for implementing conditional logic gate in cavity QED

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Abstract: Inspired by the previous works on the conditional quantum logic gate, a scheme for realizing the C-NOT gate, Toffoli gate and Fredkin gate in cavity QED has been proposed. The scheme only involves atom-field interaction of large-detuning, so it is very simple and easy to realize because the cavity is only virtually excited, and the transfer of the quantum information between the atoms and cavity will not occur. Thus, it is insensitive to the cavity decay and the thermal field, and the requirement on the quality factor of the cavities is greatly loosened and the scheme is feasible with present experimental technology.

Keywords: quantum optics conditional logic gate control variable method cavity QED

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