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基于共面两囚禁冷离子的信息读写

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Information Reading and Writing Based on Two Cold Ions in a Two-Dimensional Trap

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摘要 利用离子阱内共面两囚禁冷离子，在库仑势的条件下，Schr dinger方程的精确解（即离散的本征态和本征能量）表明：径向运动量子数为1/2的整数倍变化；费米子和玻色子交替出现；质心运动磁量子数mc和相对运动磁量子数m使量子态产生一个mcβ+mθ的随机相位因子.并以2个冷H+为例，给出1个用量子态作资源，采用量子编码的方法，提出了在量子信息处理时，利用离散的本征态ψnc,mc,l,m，通过操控相位的变化，从而实现了对信息读写操作.

关键词:

quantum state trap frequency phase change">8" leftzone="0 离子阱8">离子阱1" leftzone="8 ')" href="#">1"> 13" leftzone="9 量子态13">量子态1" leftzone="22 ')" href="#">1"> 14" leftzone="23 陷阱频率14">陷阱频率1" leftzone="37 ')" href="#">1"> 12" leftzone="38 相变')" href="#">12">相变

Abstract: When the Coulomb potential is considered,a set of exact solutions of Schr?dinger equation are obtained based on two trapped cold ions in a two-dimensional ion trap.Discrete eigenstates and eigenenergies indicate that the radial motion quantum number is changed in an integral multiple of 1/2,fermions and bosons appear alternately,the motion of mass center magnetic quantum number mc and relative motion magnetic quantum number m make the quantum state generate a stochastic phase factor mcβ+mθ.Taking several states with cold two H+ as examples,a kind of ways of quantun coding by quantum state are obtained.In quantum information processing,utilizing discrete eigenstates ψnc,mc,l,m is generated in order to realize the quantum information reading and writing by phase change.

Key words: ion trap quantum state trap frequency phase change

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