

物理

热原子系综中双暗共振及亚多普勒吸收谱的实现

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摘要:

分别通过实验和数值模拟给出了在四能级倒Y模型原子系统中的双窗口电磁感应透明现象. 结果表明, 通过调解2个耦合场的失谐可控制透明窗口的位置. 双窗口电磁感应透明现象的物理本质是由于2个耦合场同时作用于原子系统中而形成的双暗共振, 同时双暗共振间的相互作用将探测场在目标频率处的吸收谱线压窄, 并在实验上得到频谱宽度(半高宽)约为30 MHz的探测场共振吸收谱线.

关键词: 双电磁感应透明(EIT) 亚多普勒吸收谱 双暗共振

Double Dark Resonances and Achievement of Sub-Doppler Absorption Spectrum in Thermal Atomic Ensemble

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Abstract:

The authors presented the experimental observations and theoretical calculations of double electromagnetically induced transparency (EIT) windows in a four-level inverted-Y atomic system. The results show that the locations of two EIT windows can be controlled by manipulating the parameters of the two coupled fields. The physical mechanism of double EIT is double dark resonances induced by the two coupled fields simultaneously interacting with the atomic system. The sub-Doppler spectral resolution in the center of the absorption spectrum is induced due to the interaction between double dark resonances. A narrow absorption peak with a width of 30 MHz is obtained in the experiment.

Keywords: double electromagnetically induced transparency (EIT) sub-Doppler absorption spectrum double dark resonances

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