

论文

基于杂质带的光子晶体矩形波滤波器实现

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摘要:

利用转移矩阵方法对基于杂质带的光子晶体矩形波滤波器的实现进行了研究.除了可选择不同折射率的材料外,该滤波器还可通过调整光子晶体本身的结构参量来实现.对较平杂质带的形成机制做了具体的理论分析和解释,通过数值计算光子晶体原子耦合成光子晶体分子的过程,发现光子晶体原子的线宽与光子晶体分子线宽之间的相对大小是决定能否形成较平杂质带的重要参量.

关键词: 光子晶体 杂质带 原子耦合

The Realization of Rectangular wave Filter Based on the Photonic Crystals Impurity Band

Abstract:

The realization of rectangular wave filter based on the photonic crystals impurity band has been investigated by means of transfer matrix method.The formation of the quasi-flat bands can be achieved not only by choosing different materials with different refractive indexes but also by adjusting the structure parameters of photonic crystal itself.The theory analysis about the rectangular wave formation mechanism was given.The processing when two PC atoms(signal defect) were coupled to form a PC molecule(two coupled defects) was analyzed.It is found that the ratio of the PC atom linewidth to the PC molecule linewidth plays an important role in the forming of quasi-flat bands.The physical picture about the rectangular wave was also clearly illustrated in this paper.

Keywords: photonic crystals impurity bands photonic atomic coupling

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