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论文

各向异性介质缺陷单负媒质光子晶体的新型缺陷模

李建明

湖北第二师范学院 物理与电子信息学院,武汉 430205

摘要:

电负媒质和磁负媒质组成的一维光子晶体中存在一种几乎不受电磁波入射角和极化影响的零相位能隙.为了能够调节这种能隙的频率,通过在此类光子晶体中心插入一层各向异性媒介,构造出两层电负和磁负媒质交替的一维光子晶体.采用Berreman 4×4矩阵法计算了该结构的透射谱,结果显示:调节双轴晶体主轴围绕实验坐标系*z*轴的旋转角度可以改变缺陷模频率的大小,并且该缺陷模的频率不随入射角度的变化而改变.该特性可以用于光波频率可调的单通道窄带滤波器的制作.

关键词: 零有效相位能隙 缺陷模 单通道可调滤波器

A Novel Defect Mode of Single-negative Media Photonic Crystal with Anisotropic Defect

LI Jian-ming

College of Physics and Electronics Information, Hubei University of Education, Wuhan 430205, China

Abstract:

A kind of zero-phase-shift gap appears in the one-dimensional photonic crystal composed ofalternate epsilon-negative materialand mu-negative material, and the gap does not vary with electromagnetic wave incident angle and polarization direction. To tune the defect mode frequency, a layer of anisotropic media is introduced into the center of that photonic crystal. The transmission spectra are investigated by Berreman 4×4 matrix. The result indicatesthat frequency of defect mode can be tuned by rotating the anisotropic media around *z*-axis in laboratory coordinate, and does not changed by different incident angles. These phenomena can be applied to tunable single tunnel omnidirectional filter in light wave.

Keywords: Zero-phase-shift gap Defect mode Tunable single tunnel omnidirectional filter

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作者简介:

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