一维函数光子晶体的禁带特性理论

(吉林师范大学物理学院，吉林 四平 136000)

One-Dimensional Function Photonic Crystals

(Institute of Physics,Jilin Normal University,Siping 136000,Jilin China)

- 摘要
- 参考文献
- 相关文章

全文: PDF (506 KB)　HTML (1 KB)　**输出:** BibTeX | EndNote (RIS)　**背景资料**

摘要 提出了一种新型函数光子晶体，其折射率是一个空间位置函数.在费马原理的基础上，利用传输矩阵理论研究了光子晶体介质层的折射率、周期数、入射角等对光子晶体带隙变化的影响.为灵活实现某特定带隙的光子晶体的制备提供了理论依据.

关键词： 光子晶体　折射率　传输矩阵

Abstract： A new kind of function photonic crystals is presented,whose refractive index is a function of space position.Based on Fermat principle and by using the transfer matrix theory,the influences of the refractive index of photonic crystal dielectric layer,number of cycles,and angle of incidence on the band structure of photonic crystals are studied.This study provides a theoretical basis of the preparation of photonic crystals with specific band gap.

Key words: photonic crystals　refractive index　transfer matrix

作者简介：王清才（1984-），男，安徽宿州人，吉林师范大学物理学院硕士生，主要从事理论物理研究.

服务
- 把本文推荐给朋友
- 加入我的书架
- 加入引用管理器
- E-mail Alert
- RSS

作者相关文章
- 王清才
- 王岩
- 王光怀

引用本文:

[1]　YABLONOVITCH E.Inhibited Spontaneous Emission in Solid-State Physics and Electronics [J].Phys. Rev. Lett.,1987，58:2 059-2 062.

[2]　JOHN S.Strong Localization of Photons in Certain Disordered Dielectric Superlattices [J].Phys. Rev. Lett. 1987，58:2 486-2 489.

[3]　TRAN P.Photonic-Band-Structure Calculation of Material Possessing Kerr Nonlinearity [J].Phys. Rev. B,1995,52:10 673-10 676.

[4]　BUSCH K,JOHN S.Liquid-Crystal Photonic-Band-Gap Materials:The Tunable Electromagnetic Vacuum [J].Phys. Rev. Lett.,1999，83:967-970.

[5]　SCALORA M,et al.Optical Limiting and Switching of Ultrashort Pulses in Nonlinear Photonic Band Gap Materials [J].Phys. Rev. Lett.,1994,73:1 368-1 371.

[6]　YURII A VLASOV,MARTIN O' BOYLE,HENDRIK F HAMANN,et al.McNab Active Control of Slow Light on a Chip with Photonic Crystal Waveguides [J].Nature,2005，438：65-69.

[7]　KUSHWAHA M S,et al.Theory of Acoustic Band Structure of Periodic Elastic Composites [J].Phys. Rev. B,1994,49:2 313-2 322.

[8]　PENDRY J B,MACKINNON A.Calculation of Photon Dispersion Relations [J].Phys. Rev. Lett.,1992，69(19)：2 772-2 775.

[9]   PENDRY J B.Calculating Photonic Band Structure [J].J. Phys.:Condens. Matter,1996，8：1 085-1 108.

[10] KENJI ISHIZAKI,SUSUMU NODA.Manipulation of Photons at the Surface of Three-Dimensional Photonic Crystals [J].Nature,2009,460:367-370.

[11] SAJEEV JOHN.Photonics:Light Control at Will [J].Nature，2009,460:337-337.

[12] 王辉,李永平.用特征矩阵法计算光子晶体的带隙结构 [J].物理学报，2001,50(11):2 172-2 178.

[13] CHASSAGNEUX Y,et al.Electrically Pumped Photonic-Crystal Terahertz Lasers Controlled by Boundary Conditions [J].Nature,2009,457:174-178.

[14] TORRENT D,HAKANSSON A,CERVERA F,et al.Homogenization of Two-Dimensional Clusters of Rigid Rods in Air [J].Phys. Rev. Lett.,2006,96:204 302-204 305.

[15] TORRENT Dt,SANCHEZ-DEHESA J.Acoustic Metamaterials for New Two-Dimensional Sonic Devices [J].New. Jour. Phys.,2007,9:323-335.

[16] RUSSELL P.Photonic-Crystal Fibers [J].Science,2003，299:358-362.

[17] WU Xiang-yao,ZHANG Bai-jun,YANG Jing-hai,et al.Function Photonic Crystals [J].Physica：E,2011,43:1 694-1 700.

[1]   冉茂武. 基于双面金属包覆介质波导灵敏度的研究[J]. 吉首大学学报自然科学版, 2011, 32(5): 59-61.

[2]   周章文, 刘展, 孙冬. 诊断介质阻挡放电激励的空气密度扰动[J]. 吉首大学学报自然科学版, 2011, 32(5): 62-64.

[3]   冉茂武. 基于亚毫米尺度金属包覆波导的茅台酒折射率测量[J]. 吉首大学学报自然科学版, 2011, 32(2): 49-51.