

<<超颖材料电动力学>>

图书基本信息

书名：<<超颖材料电动力学>>

13位ISBN编号：9787301212660

10位ISBN编号：7301212666

出版时间：2012-9

出版时间：北京大学出版社

作者：(俄罗斯)萨雷切夫, (美)沙拉耶夫 著

页数：247

字数：305000

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

<<超颖材料电动力学>>

内容概要

本书是影印英文版物理学专著，原书由世界科技出版社于2007年出版。

本书对近年来该领域的发展做了系统介绍。

本书首先综述了等离子体激元结构和超颖材料的基础理论，以及它们在传导和控制光方面的应用。

接着，本书也给出了拉曼信号表面增强的一般理论，以及在金属—介质材料中的非线性光学现象的理论。

本书适合材料科学、光学、凝聚态物理学，以及其他相关专业的研究人员和研究生作为参考，同时也是所有对这一令人着迷的新材料感兴趣的读者了解这一领域的很好的途径。

<<超颖材料电动力学>>

作者简介

作者：（俄罗斯）萨雷切夫（A.K.Sarychev）（美国）沙拉耶夫（V.M.Shalaev）

<<超颖材料电动力学>>

书籍目录

Preface

1. Introduction

1.1 Surface Plasmon Resonance

1.2 Percolation Threshold: Singularities in Metal-dielectric

Composites

2. Conducting Stick Composites and Left Handed Metamaterials

2.1 Metamaterial

2.2 Conductivity and Dielectric Constant: Effective Medium Theory

2.3 High-frequency Response

2.3.1 Scattering of electromagnetic wave by conducting stick

2.3.2 High-frequency effective dielectric function

2.4 Giant Enhancements of Local Electric Fields

2.5 Optical Magnetism, Left-handed Optical Materials and Superresolution

2.5.1 Analytical theory of magnetic plasmon resonances

2.5.2 Numerical simulation of two-dimensional nanowire structures

2.5.3 Capacitance and inductance of two parallel wires

2.6 Planar Nanowire Composites

3. Semicontinuous Metal Films

3.1 Introduction

3.2 Giant Field Fluctuation

3.2.1 Lattice model

3.2.2 Numerical method

3.2.3 Field distribution on semicontinuous metal films

3.3 Localization of Surface Plasmon

3.3.1 Localization length and average intensity of local electric field

3.3.2 High-order moments of local electric fields

3.3.3 Properties of the localized eigenmodes

3.3.4 Scaling theory of giant field fluctuation

3.4 Anomalous Light Scattering from Semicontinuous Metal Films

3.4.1 Rayleigh scattering

3.4.2 Scaling properties of correlation function

3.5 Surface Enhanced Raman Scattering (SERS)

3.6 Giant Enhancements of Optical Nonlinearities

3.7 Percolation-enhanced Nonlinear Scattering: High Harmonic Generation

4. Optical Properties of Metal-dielectric Film: Beyond Quasistatic Approximation

4.1 Generalized Ohm's Law (GOL) and Basic Equation

4.2 Transmittance, Reflectance, and Absorbance

4.3 Numerical Simulation of Local Electric and Magnetic Fields

4.4 Spatial Moments of Local Electric and Magnetic Fields

4.5 Extraordinary Optical Transmittance (EOT)

4.5.1 Resonant transmittance

<<超颖材料电动力学>>

4.5.2 Light-induced and light-controlled transmittance

4.5.3 Discussion

5. Electromagnetic Properties of Metal-dielectric Crystals

5.1 Metal-dielectric Composites

5.2 Electromagnetic Crystals

5.2.1 Cubic lattice of metal spheres

5.2.2 A wire-mesh electromagnetic crystal

Bibliography

章节摘录

版权页：插图：2.3 High-frequency Response Composite materials containing conducting sticks dispersed in a dielectric matrix have unusual properties at high frequencies. When frequency increases, the wavelength $\lambda = 2\pi c/\omega$ of an external electromagnetic field becomes comparable with the stick length $2a$. In this case, one might think that the sticks act as an array of independent micro-antennas and the external EM wave should be scattered in all directions. Yet, the composite materials have well defined dielectric and magnetic properties at these frequencies, and we will demonstrate that. The description based on the "effective-medium" theory is possible because a thin conducting stick interacts with the external field like an elementary dipole. Therefore, we can still use the effective dielectric constant ϵ_e or effective conductivity $\sigma_e = i\omega\epsilon_e/4\pi$ to describe the interaction of stick composites with the external electromagnetic wave. We note, however, that the formation of large stick clusters near the percolation threshold may result in scattering. Since conducting stick composites do have effective parameters for all concentrations p outside the percolation threshold, we can use the percolation theory to calculate their effective conductivity σ_e . However, the theory has to be generalized to take into account the nonquasistatic effects.

<<超颖材料电动力学>>

编辑推荐

《超颖材料电动力学(影印版)》由北京大学出版社出版。

<<超颖材料电动力学>>

版权说明

本站所提供下载的PDF图书仅提供预览和简介, 请支持正版图书。

更多资源请访问:<http://www.tushu007.com>