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标题: Asymmetric electromagnetic wave transmission of linear polarization via polarization conversion through chiral metamaterial structures
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来源出版物: PHYSICAL REVIEW B 卷: 85 期: 19 文献号: 195131 DOI: 10.1103/PhysRevB.85.195131 出版年: MAY 16 2012
在 Web of Science 中的被引频次: 0
被引频次合计: 0
引用的参考文献数: 24
摘要: In this paper a kind of chiral metamaterial structure is proposed that can achieve asymmetric transmission for forward and backward propagations of linearly polarized electromagnetic (EM) waves. We first give a theoretical analysis on a kind of bilayered metamaterial structure with specific structure asymmetry that enables the asymmetric EM wave transmission only for linear polarization. Then by constructing a proof-of-concept metamaterial sample with twisted split ring resonator patterns on both sides of a dielectric slab, we demonstrate substantial asymmetric transmission for linear polarizations, but none for circular polarizations through full-wave simulation and measurement at microwave frequency. Strong optical activity is found in the chiral metamaterial indicating that the intriguing asymmetric transmission is caused by the directional difference in cross polarization conversion. By scaling down the structure, the proposed concept could be utilized in other frequency bands, such as terahertz and optical range.
入藏号: WOS:000304104300001
语种: English
文献类型: Article
KeyWords Plus: DICHROISM
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出版商: AMER PHYSICAL SOC
出版商地址: ONE PHYSICS ELLIPSE, COLLEGE PK, MD 20740-3844 USA
Web of Science 分类: Physics, Condensed Matter
学科类别: Physics
IDS 号: 943EW
ISSN: 1098-0121
29 字符的来源出版物名称缩写: PHYS REV B
ISO 来源出版物缩写: Phys. Rev. B
来源出版物页码计数: 5