

586. 标题: Membrane metamaterial resonators with a sharp resonance: A comprehensive study towards practical terahertz filters and sensors

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来源出版物: AIP ADVANCES 卷: 2 期: 2 文献号: 022109 DOI: 10.1063/1.4704549 出版年: JUN 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: 23

摘要: We investigate the resonant properties of high quality-factor membrane-based metamaterial resonators functioning in the terahertz regime. A number of factors, including the resonator geometry, dielectric loss, and most importantly the membrane thickness are found to extensively influence the resonance strength and quality factor of the sharp resonance. Further studies on the membrane thickness-dependent-sensitivity for sensing applications reveal that high quality-factor membrane metamaterials with a moderate thickness ranging from 10 to 50  $\mu\text{m}$  are the most promising option towards developing realistic integrated terahertz filters and sensors. Copyright 2012 Author(s). This article is distributed under a Creative Commons Attribution 3.0 Unported License. [<http://dx.doi.org/10.1063/1.4704549>]

入藏号: WOS:000305831300010

语种 : English

文献类型: Article

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出版商: AMER INST PHYSICS

出版商地址: CIRCULATION & FULFILLMENT DIV, 2 HUNTINGTON QUADRANGLE, STE 1 N O 1, MELVILLE, NY 11747-4501 USA

Web of Science 类别: Nanoscience & Nanotechnology; Materials Science, Multidisciplinary; Physics, Applied

研究方向: Science & Technology - Other Topics; Materials Science; Physics

IDS 号: 966IO

ISSN: 2158-3226

29 字符的来源出版物名称缩写: AIP ADV

ISO 来源出版物缩写: AIP Adv.

来源出版物页码计数: 9