544.
标题: Mapping inter-element coupling in metamaterials: Scaling down to infrared
作者: Tatartschuk, E (Tatartschuk, E.); Gneiding, N (Gneiding, N.); Hesmer, F (Hesmer, F.); Radkovskaya, A (Radkovskaya, A.); Shamonina, E (Shamonina, E.)
来源出版物: JOURNAL OF APPLIED PHYSICS 卷: 111 期: 9 文献号: 094904 DOI: 10.1063/1.4711092 出版年: MAY 1 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: 46
摘要: The coupling between arbitrarily positioned and oriented split ring resonators is investigated up to THz frequencies. Two different analytical approaches are used, one based on circuits and the other on field quantities that includes retardation. These are supplemented by numerical simulations and experiments in the GHz range, and by simulations in the THz range. The field approach makes it possible to determine separately the electric and magnetic coupling coefficients which, depending on orientation, may reinforce or may cancel each other. Maps of coupling are produced for arbitrary orientations of two co-planar split rings resonant at around 2 GHz and then with the geometry scaled down to be resonant at around 100 THz. We prove that the inertia of electrons at high frequencies results in a dramatic change in the maps of coupling, due to reduction of the magnetic contribution. Our approach could facilitate the design of metamaterials in a wide frequency range up to the saturation of the resonant frequency. (C) 2012 American Institute of Physics. [http://dx.doi.org/10.1063/1.4711092]
入藏号: WOS:000304109900151
语种: English
文献类型: Article
KeyWords Plus: SPLIT-RING RESONATORS; DISPERSION CHARACTERISTICS; OPTICAL METAMATERIALS; FREQUENCIES; WAVES; NANOPARTICLES; MOLECULES; FIELD; CLOAK
地址: [Tatartschuk, E.; Gneiding, N.] Univ Erlangen Nurnberg, Erlangen Grad Sch Adv Opt Technol, D-91052 Erlangen, Germany
[Hesmer, F.] Univ Osnabruck, Dept Phys, D-49069 Osnabruck, Germany
[Radkovskaya, A.] Moscow MV Lomonosov State Univ, Magnetism Div, Fac Phys, Moscow 119992, Russia
[Shamonina, E.] Univ London Imperial Coll Sci Technol & Med, Elect & Elect Engn EEE Dept, Opt & Semicond Devices Grp, London SW7 2BT, England
通讯作者地址: Tatartschuk, E (通讯作者),Univ Erlangen Nurnberg, Erlangen Grad Sch Adv Opt Technol, D-91052 Erlangen, Germany
电子邮件地址: e.shamonina@imperial.ac.uk
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 分类: Physics, Applied
学科类别: Physics
IDS 号: 943GY
ISSN: 0021-8979

29 字符的来源出版物名称缩写: J APPL PHYS
ISO 来源出版物缩写: J. Appl. Phys.
来源出版物页码计数: 9