498. Accession number:13110078
Title:Surface electromagnetic modes contribution to the anomalous terahertz transmission through double-layered metal hole array
Authors:Rao Lei (1); Yang DongXiao (1)
Author affiliation:(1) Dept. of Inf. Sci. & Electron. Eng., Zhejiang Univ., Hangzhou, China
Source title:Science China: Information Sciences
Abbreviated source title:Sci. China, Inf. Sci. (Germany)
Volume:55
Issue:1
Publication date:Jan. 2012
Pages:90-7
Language:English
ISSN:1674-733X
Document type:Journal article (JA)
Publisher:SP Science in China Press
Country of publication:Germany
Material Identity Number:GF93-2012-002
Abstract:Terahertz transmission spectra through both single-layered and double-layered sub-wavelength metal hole arrays were calculated using rigorous mode-matching method. The dispersion relations of the single-layered and double-layered metal hole arrays were obtained by FDTD method. There are three anomalous peaks in the spectrum of the double-layered metal hole array, which arise from the three surface electromagnetic modes appearing in the dispersion relation. By comparing the transmission spectra and the dispersion relations of the single-layered and double-layered metal hole arrays, it was found that the two surface electromagnetic modes at higher frequencies are introduced by the single-layered metal hole array, while the one at lower frequencies is introduced by the double-layered metal hole array. The validity of the analysis was qualitatively verified by the experimental results. This structure can be finely designed for potential applications, such as wideband filtering.
Number of references:14
Inspec controlled terms:finite difference time-domain analysis - surface electromagnetic waves - terahertz waves
Uncontrolled terms:surface electromagnetic modes - anomalous terahertz transmission - double-layered metal hole array - terahertz transmission spectra - single-layered subwavelength metal hole arrays - double-layered subwavelength metal hole arrays - rigorous mode-matching method - FDTD method - double layered metal hole array - dispersion relations - single-layered metal hole array - wideband filtering
Inspec classification codes:A4110H Electromagnetic waves: theory - A0260 Numerical approximation and analysis - B5210 Electromagnetic wave propagation - B0290Z Other numerical methods
Treatment:Practical (PRA); Theoretical or Mathematical (THR)
Discipline:Physics (A); Electrical/Electronic engineering (B)
DOI:10.1007/s11432-011-4517-z
Database:Inspec