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Title:Reflective terahertz tunable polarization controller

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Abstract:This paper proposes an optical device which can continuously change the polarization state of terahertz (THz) waves. The device consists of metal gate, anti-reflection coatings, liquid crystal and mirror. By changing the refractive index of liquid crystal in the interface between the metal gate and the mirror, the phase difference between two beams with orthogonal polarization is varied and a continuous phase shift is achieved. The phase shift of the device is calculated by using the finite difference time domain (FDTD) method, and the transmittance and reflectance are calculated by using the rigorous coupled wave analysis (RCWA) method. The results reveal that the structure can realize continuously tunable phase shift for THz wave at 1 THz. © 2012 Tianjin University of Technology and Springer-Verlag Berlin Heidelberg.

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Main heading:Terahertz waves

Controlled terms:Finite difference time domain method - Liquid crystals - Mirrors - Phase shift - Phase shifters - Polarization - Refractive index

Uncontrolled terms:Continuous phase - Finite-difference time-domain (FDTD) methods - Metal gate - Orthogonal polarizations - Phase difference - Polarization controllers - Polarization state - Rigorous coupled wave analysis - Tera Hertz - THz waves - Two beams

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