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标题: Low-loss multimode interference couplers for terahertz waves
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摘要: The terahertz (THz) frequency region of the electromagnetic spectrum is located between the traditional microwave spectrum and the optical frequencies, and offers a significant scientific and technological potential in many fields, such as in sensing, in imaging and in spectroscopy. Waveguiding in this intermediate spectral region is a major challenge. Amongst the various THz waveguides suggested, metal-clad plasmonic waveguides and specifically hollow core structures, coated with insulating material are the most promising low-loss waveguides used in both active and passive devices. Optical power splitters are important components in the design of optoelectronic systems and optical communication networks such as Mach-Zehnder Interferometric switches, polarization splitter and polarization scramblers. Several designs for the implementation of the 3dB power splitters have been proposed in the past, such as the directional coupler-based approach, the Y-junction-based devices and the MMI-based approach. In the present paper a novel MMI-based 3dB THz wave splitter is implemented using Gold/polystyrene (PS) coated hollow glass rectangular waveguides. The H-field FEM based full-vector formulation is used here to calculate the complex propagation characteristics of the waveguide structure and the finite element beam propagation method (FE-BPM) and finite difference time domain (FDTD) approach to demonstrate the performance of the proposed 3dB splitter.
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