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Title:Three-dimensional subwavelength components utilizing THz surface plasmons
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Abstract:Since surface plasmons (SPs) are not constrained by the diffraction limit, they have important potential applications in the optical, terahertz (THz), and microwave components. In this paper, we firstly present a review of three-dimensional (3D) bidirectional and multi-directional THz SP splitters based on the rectangular metallic groove gratings with finite thickness, in which a metallic wire was used to excite the THz SPs. The experimental verifications of such splitters have been implemented in the microwave frequencies, and the measurement results have excellent agreements to the full-wave simulations. To improve the performance, a 3D bidirectional THz SP splitter with the transverse confinement and a 3D bidirectional bending THz SP splitter are then proposed, which have shown very good splitting performance, compact sizes, and better transverse confinement of EM fields. Finally, a broadband slow-wave system of subwavelength thickness is reviewed and a new bending slow-wave system utilizing THz SPs is proposed. Experiments and simulations in microwave frequencies have good agreements, showing the validity of these components.
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Uncontrolled terms:THz surface plasmon - microwave component - terahertz component - optical component - 3D bidirectional THz SP splitter - 3D multidirectional THz SP splitter - rectangular metallic groove grating - metallic wire - THz SP measurement - transverse confinement - EM field - broadband slow wave system - microwave frequency - 3D subwavelength component
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