63
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Title:Analysis of Doubly Corrugated Spoof Surface Plasmon Polariton (DC-SSPP) Structure With Sub-wavelength Transmission at THz Frequencies
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Abstract:Devices utilizing spoof surface plasmon polariton (SSPP) effect in the terahertz (THz) domain has attracted increasing attention because such devices can be potentially used in fast signal processing and storages. In this paper, we present a comprehensive mathematical model of the doubly corrugated SSPP (DC-SSPP) structure derived from full-field analysis. Based on the proposed model, a complete characterization of the structure is carried out and properties such as dispersion relationships and S-parameters are obtained. The results show the existence of slow light modes in the DC-SSPP structure. Discrete sub-wavelength transmission bands, and sometimes sharp transmission peaks with strong EM field localization can also be achieved under certain device designs. They are compared with the simulation results obtained from the CST software package developed by Computer Simulation Technology AG. The validation as well as limitations of the derived results is also discussed in detail.
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