134
标题: Analysis and design of terahertz microstrip antenna on photonic bandgap material
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摘要: In this paper, a dielectric slab with periodic implantation of the air gaps has been analyzed. An effective dielectric permittivity of the 1-D photonic bandgap substrate material (PBG material) with host material as Polytetrafluoroethylene (PTFE) has been computed at 600 GHz. Based on the extracted effective dielectric permittivity, a rectangular microstrip patch antennas on thin and thick 2-D PBG material as substrate have been designed. The electrical performances of the antennas have been simulated by using two different simulators, CST Microwave Studio based on the finite integral technique and Ansoft HFSS based on the finite element method. This proposed antenna on the PBG material as substrate shows the significant enhancement in the directivity. To validate the homogenized medium approximation, the effect of the antenna position on the substrate material has been observed. The response of antenna has been found to be independent of its position. Various electrical parameters of the proposed antennas have been compared with reported literature. In addition to this, the operating frequency of one of the antenna has been scaled down by the factor of 50 and its various results have been compared with the results obtained at 600 GHz.
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