Abstracts

Reflection and Transmission of Guided Electromagnetic Waves at an Air-Chiral Interface and at a Chiral Slab in a Parallel-Plate Waveguide

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Recently, the conceal of chirowaveguides, which exhibit some novel and interesting properties due to electromagnetic chirality, was introduced and studied elsewhere. In this paper, we analyze theoretically another problem associated with chirowaveguides, namely, the problem of reflection and transmission of guided waves at an air-chiral interface and at a chiral slab located transversely in a parallel-plate waveguide. The notable features and the role of chirality of the medium on the reflected and transmitted guided waves are discussed, and physical insights into these results are provided. It is found that since the guided modes inside the chiral region of the waveguide are hybrid, in order to satisfy the boundary conditions at interfaces, the reflected and transmitted guided modes in the air regions of the waveguides need to be of TE and TM modes. The motivation behind this study is the potential applications of this problem to the design of novel measurement techniques for determining material parameters of chiral composites.

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