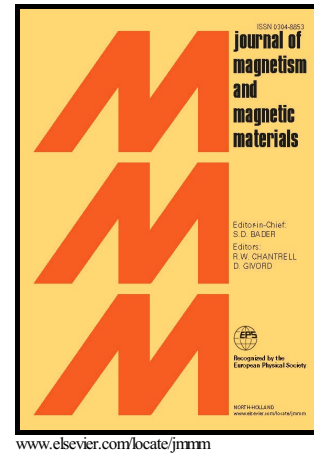


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Polaritons dispersion in a composite ferrite-semiconductor structure near gyrotropic-nihility state

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Abstract

In the context of polaritons in a ferrite-semiconductor structure which is influenced by an external static magnetic field, the gyrotropic-nihility can be identified from the dispersion equation related to bulk polaritons as a particular extreme state, at which the longitudinal component of the corresponding constitutive tensor and bulk constant simultaneously acquire zero. Near the frequency of the gyrotropic-nihility state, the conditions of branches merging of bulk polaritons, as well as an anomalous dispersion of bulk and surface polaritons are found and discussed.

Keywords: electromagnetic theory, polaritons, magneto-optical materials, effective medium theory, metamaterials

PACS: 42.25.Bs, 71.36.+c, 75.70.Cn, 78.20.Ci, 78.20.Ls, 78.67.Pt

1. Introduction

The polaritons are modes of the electromagnetic field coupled to normal modes (eigenwaves) which are inherent to a material and able to interact in a linear manner with the electromagnetic field by virtue of their electrical or magnetic character [1]. According to the quantum description, polaritons are related to some ‘quasi-particle’ excitations consisting a photon coupled to an elementary excitation like plasmon, phonon, exciton, etc., which bring

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