Abstracts

Demonstration of Anisotropic Composites with Tuneable Microwave Permeability Manufactured from Ferromagnetic Thin Films

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Recently, we presented the microwave properties of laminated insulator ferromagnetic on the edge (LIFE) composites. For the fundamental mode propagating in a coaxial line, they exhibit large permeability and low permittivity. In this paper we investigate the properties of LIFE composites in the 0.1 to 18 GHz range when a static magnetic field is applied along the propagation direction. We show that the evolution of the resonance frequency with the external field can be described by conventional gyromagnetic resonance models. The effect of demagnetizing fields is analyzed. In particular, it is shown that LIFE materials exhibit comparatively low demagnetizing effects and large permeabilities. The evolution of the resonance linewidth with the external field is investigated. LIFE material may be used for a variety of microwave applications in a coaxial line or in a guide. In particular, we demonstrate a tuneable coaxial absorbing termination with peak attenuation frequency tuneable from 1.7 to 18 GHz with more than 15 dB maximum attenuation, and a switchable termination that can be either reflective or absorbing. The operation of a field-driven variable attenuator is also presented.

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