Abstracts

Propagation in Longitudinally Magnetized Ferrite-Loaded Waveguide (Dec. 1968 [T-MTT])

D.C. Buck. "Propagation in Longitudinally Magnetized Ferrite-Loaded Waveguide (Dec. 1968 [T-MTT])." 1968 Transactions on Microwave Theory and Techniques 16.12 (Dec. 1968 [T-MTT]): 1028-1033.

Longitudinally magnetized reciprocal ferrite phase shifters have shown anomalous behavior in that some devices show increasing phase shift with increasing applied field, while others show decreasing phase shift with increasing applied field. This anomaly has been investigated theoretically by using a ferrite-filled parallel plane guide model. It is shown that for electrically thin guides the phase shift decreases with applied magnetic field, whereas with increased thickness, the phase shift becomes an increasing function of the applied field. The microwave electric and magnetic fields were calculated for various applied field values and reduced guide thicknesses. This showed that there are two competing mechanisms which govern the type of phase shift. These can be termed μ-effective" and "Faraday rotation." The latter sets in when the guide is thick enough to support a cross-polarized electric field of the same order of magnitude as the incident electric field. Similar analysis of the quasi-TE/sub 1/ and TM/sub 1/ modes were made, showing similar behavior at higher frequencies for a given guide thickness. Experimented verification of the quasi-TM/sub 0/ mode was made by observing transmission resonances versus applied field of resonated sections of ferrite-loaded reduced height guide.

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