Abstracts

Exploratory Study of a Millimeter Resonance Isolator for the Circular Electric Waveguide Mode

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A feasibility study was made on a TE/sub 01/ mode circular waveguide resonance isolator at frequencies near 35 Gc. A design was developed which utilized circumferentially oriented and magnetized thin rings of hexagonal ferrite material in contact with the inner or outer surface of a ring of alumina ceramic mounted concentrically in the waveguide. Approximate experimental measurements indicated that appreciable nonreciprocal attenuation could be obtained without severe degradation of the mode purity. Expressions are given for the field distributions in the dielectric ring loaded wave guide and for the ellipticity of the magnetic fields at the surfaces of the ring. Magnetic field ellipticity is computed as a function of a "slow-wave mode" cutoff constant for an experimental ring configuration. For sufficiently large values of this constant, the magnetic fields at the boundary are almost circularly polarized and are relatively independent of mean ring radius. The analytical results tend to support the experimental findings.

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