Abstracts

Dielectric Slab-Loaded Resonant Cavity for Applications Requiring Enhanced Field Uniformity (Short Papers)

J.T. Bernhard and W.T. Joines. "Dielectric Slab-Loaded Resonant Cavity for Applications Requiring Enhanced Field Uniformity (Short Papers)." 1996 Transactions on Microwave Theory and Techniques 44.3 (Mar. 1996 [T-MTT]): 457-460.

This paper introduces and analyzes a rectangular resonant structure that provides an alternative to the multimode resonant cavity in applications requiring enhanced field uniformity. The resonant cavity contains four dielectric loading slabs placed along the cavity walls. Its first resonant mode is related to the uniform field distribution supported in a rectangular TEM waveguide. The electromagnetic fields within the cavity are described using a closed-form approach, with approximations taken to account for the presence of two of the loading slabs. Application of the boundary conditions leads to an eigenvalue formulation, which is used to determine resonant frequencies and electromagnetic field distributions within the cavity. Measurements of both resonant frequencies and electric field magnitudes confirm the analysis. This work provides the basis for future analyses and implementation of slab-loaded cavities in both scientific and industrial settings.

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