Abstracts

High resolution resonator method for accurate measurement of inhomogeneous dielectric constants

A.S. Omar. "High resolution resonator method for accurate measurement of inhomogeneous dielectric constants." 1999 MTT-S International Microwave Symposium Digest 99.1 (1999 Vol. I [MWSYM]): 171-174 vol.1.

A new method for reconstructing the three-dimensional permittivity profile of an inhomogeneous dielectric object located within a cavity resonator is presented. It utilizes the measured frequency response of the scattering parameters associated with connecting the resonator to properly chosen coupling ports. The resolution of the method is arbitrarily controllable via the choice of the number and location of the coupling ports on the one hand and the frequency range over which the scattering parameters are measured on the other hand. Application to a simple one dimensional case shows excellent agreement between originally assumed and reconstructed dielectric profiles. The presented method represents a new basis for a wide class of inverse problems, e.g., filter design, microwave imaging and remote sensing.

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