Abstracts

Electromagnetic Resonances of Free Dielectric Spheres (Dec. 1967 [T-MTT])

M. Gastine, L. Courtois and J.L. Dormann. "Electromagnetic Resonances of Free Dielectric Spheres (Dec. 1967 [T-MTT])." 1967 Transactions on Microwave Theory and Techniques 15.12 (Dec. 1967 [T-MTT]): 694-700.

A systematic study is made of electromagnetic resonances of a spherical, free, and isotropic sample supposed to be without dielectric loss. The characteristic equation which is both complex and transcendant has been resolved with a computer. The results for the first modes (frequency and Q factor for epsilon varying between 1 and 100) are presented. The Q factor that is calculated represents the comparison between the energy stored by the resonance system and energy radiated per cycle; this is the theoretical maximum Q in the case of nonlossy materials. The different modes are classed in TE/sub nmr/ and TM/sub nmr/ modes which comprise exterior and interior modes. It is shown that for n >or= r the energy is concentrated in all directions near the surface; these are known as surface modes. This systematic study is confirmed by experiments in which numerous modes have been observed and identified.

❑ Return to main document.