Abstracts

Study of Whispering Gallery Modes in Anisotropic Single-Crystal Dielectric Resonators

J. Krupka, D. Cros, M. Aubourg and P. Guillon. "Study of Whispering Gallery Modes in Anisotropic Single-Crystal Dielectric Resonators." 1994 Transactions on Microwave Theory and Techniques 42.1 (Jan. 1994 [T-MTT]): 56-61.

The Rayleigh-Ritz method and the finite element method nongenerating spurious solutions are employed for analysis of whispering gallery modes (WGM's) in cylindrical single-crystal anisotropic dielectric resonators. These methods allow accurate computation of the resonant frequencies, the Q-factors (depending on the dielectric and on the conductor losses), and the electromagnetic field distributions for all WGM's in the presence of additional elements like metal shields, MIC substrate, or supports. Different families of modes are studied both theoretically and experimentally. The mode coupling phenomenon is investigated. A WGM single-crystal quartz resonator is presented having an unloaded Q-factor greater than 30000 at about 100 GHz, including radiation and dielectric losses.

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