# Abstracts

## Mode Control of Cryogenic Whispering-Gallery Mode Sapphire Dielectric-Ring Resonators

*D.G. Santiago, G.J. Dick and A. Prata, Jr.. "Mode Control of Cryogenic Whispering-Gallery Mode Sapphire Dielectric-Ring Resonators." 1994 Transactions on Microwave Theory and Techniques 42.1 (Jan. 1994 [T-MTT]): 52-55.*

This paper presents a technique for solving the mode purity problem that exists in cryogenic microwave frequency discriminators using X-band sapphire whispering-gallery mode resonators. The sapphire cavity resonates in a pair of quasi-degenerate modes split by a few kHz due to small geometrical imperfections. Since the nature and location of the geometrical imperfections are difficult to determine, variable coupling of the modes to a fixed output port results. Resonator applications require reproducible coupling to only one of these modes. This objective can be achieved by adding a larger dominant perturbation to the resonator. Results of tests show that a noncircularly-symmetric sapphire piece suspended above the resonator can provide controllable mode coupling and simultaneous frequency tuning.

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