# Abstracts

## High T/sub c/ Superconductor-Sapphire Microwave Resonator with Extremely High Q-Values Up to 90 K (Dec. 1992 [T-MTT])

*Z.-Y. Shen, C. Wilker, P. Pang, W.L. Holstein, D. Face and D.J. Kountz. "High T/sub c/ Superconductor-Sapphire Microwave Resonator with Extremely High Q-Values Up to 90 K (Dec. 1992 [T-MTT])." 1992 Transactions on Microwave Theory and Techniques 40.12 (Dec. 1992 [T-MTT] (1992 Symposium Issue)): 2424-2432.*

A theoretical analysis was performed for an extremely high Q resonator formed by a sapphire rod sandwiched by a pair of high T/sub c/ superconductor (HTS) films. A number of these HTS-sapphire-HTS resonators in C-band and Ku-band were designed, fabricated and tested. At 5.552 GHz, Q/sub 0/ reached 2 x 10/sup 6/ at 90 K, 3 x 10/sup 6/ at 80 K and 1.4 x 10/sup 7/ at 4.2 K with circulating power up to 500 kW. Formulas for calculating the resonant frequency and Q-value derived from the theoretical analysis were verified by experimental data with good agreement. Three different thin film HTS materials: Tl/sub 2/Ba/sub 2/CaCu/sub 2/O/sub 8/, YBa/sub 2/Cu/sub 3/O/sub 7-delta/ and TI/sub 0.5/Pb/sub 0.5/Sr/sub 2/CaCu/sub 2/O/sub 7/ were tested. The sensitivity of the high Q-value and the parasitic coupling to the case modes are discussed. Applications, such as frequency stabilized oscillators, filters and characterization for HTS films are described.

❑ Return to main document.