

Evaluation of Superconducting Tl-Ca-Ba-Cu-O Thin-Film Surface-Resistance Using a Microstrip Ring Resonator

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The use of thin-film superconductors for microwave applications critically depends on the material parameters of surface resistance and penetration depth. These parameters are generally difficult to measure. A measurement technique is presented using microstrip ring resonators and contactless probing that determines these critical parameters. Analysis accounting for field penetration into the conductors is also presented. Normal metal resonators are used to calibrate/verify the measurement. The surface resistance of a Tl-Ca-Ba-Cu-O superconducting thin film measured at 8.03 GHz and 77 K was found to be about 0.5 m Ω .

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