Abstracts

Measurement of Dielectric Properties with Superconducting Resonators: Theory and Practice

W. Meyer. "Measurement of Dielectric Properties with Superconducting Resonators: Theory and Practice." 1977 MTT-S International Microwave Symposium Digest 77.1 (1977 [MWSYM]): 124-128.

The paper deals with theoretical and practical investigation of a test method using superconducting cavity- and helical resonators in an oscillator loop, which allows precision measurements to be performed on solid dielectrics in the range of 0.1 to 10 GHz and below 9K.The underlying formulas are an extension of the well-known perturbation formalism and are not restricted to low temperatures. Our experiments resulted in unloaded quality factors of Q /spl sime/ 5 /spl dot/ 10/sup 7/ between 0.2 and 10 GHz with a maximum Q (2.2K, 0.19 GHz) of 9 /spl dot/ 10/sup 8/, which enabled us to observe the smallest loss tangent so far: tan delta (2.2K, 6.5 GHz) = 3.7 /spl dot/ 10/sup 7/ /spl plusmn/ 5% in polyethylene.

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