Abstracts

The Operation of Bolometers Under Pulsed Power Conditions

M. Sucher and H.J. Carlin. "The Operation of Bolometers Under Pulsed Power Conditions." 1955 Transactions on Microwave Theory and Techniques 3.4 (Jul. 1955 [T-MTT]): 45-52.

The dynamic behavior of Wollaston (thin platinum) wire bolometers under pulsed power conditions is examined and shown to be responsible for certain errors in the measurement of microwave power. These errors, in order of importance, arise from the nonlinearity of bridge null arm current as a function of bolometer resistance, from the nonlinear cooling of the bolometer in the interval between pulses, from the time variation of VSWR of the bolometer and from the time variation of bias power in the bolometer. The total error is found to be proportional to the bolometer resistance excursion during a pulse; the resistance excursion, in turn, is proportional to the pulse energy. All of these errors, with the exception of that due to nonlinear cooling, are amenable to calculation. The latter error was evaluated by subtracting the sum of the computed errors from the experimentally determined total error. The total error is about 14 to 15 per cent per 100 ohms resistance excursion for two widely used bolometer types under typical conditions. More than half of the above error may be eliminated by suitable design of the bridge circuitry.

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