Abstracts

A Broadbanded Solid-State Microwave Maser Operating at 77.4°K

E.O. Ammann. "A Broadbanded Solid-State Microwave Maser Operating at 77.4°K." 1965 Transactions on Microwave Theory and Techniques 13.2 (Mar. 1965 [T-MTT]): 186-193.

This paper considers several aspects of the problem of obtaining solid-state microwave maser action at 77.4°K. A maser cavity, designed to have a large filling factor, high unloaded Q, and tunability over a two per cent range is described. Using this cavity, a study was made of ruby as a maser material at 77.4°K. An important result of this study is the determination of the optimum Cr/sup +++/ concentration for 77.4°K maser action. A well-known broadbanding technique was applied to the maser to increase its gain-bandwidth product. Two high-Q microwave cavities spaced three-quarters wavelength apart were placed in front of the maser cavity to produce the broadbanding. The experimental results are given, and the usefulness of this technique as a method of improving maser performance is evaluated. The broadbanded maser had a midband gain of 14.5 dB and a bandwidth of 7.5 Mc/s at a signal frequency of 9.3 Gc/s. Approximately 31 watts of pump power at 23.4 Gc/s were required.

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