Abstracts

A Broad Tunable Bandwidth Traveling-Wave Maser

L.C. Morris and D.J. Miller. "A Broad Tunable Bandwidth Traveling-Wave Maser." 1964 Transactions on Microwave Theory and Techniques 12.4 (Jul. 1964 [T-MTT]): 421-428.

A new type of traveling-wave maser (TWM) has been developed, employing the meander line as the slow-wave circuit and rutile as the active maser crystal. This amplifier has achieved net gains in excess of 23 db across the band from 2.0 to 3.0 Gc, with an over-all noise temperature of 8° ±2°K. This marks the first time that rutile with a dielectric constant of 220 has been coupled to a slow-wave circuit. The maser material exhibited inversion ratios of 10:1 and saturated at an input signal of -47 dbm. In addition to the maser work, a ferrite material investigation was conducted, which led to the development of a gadolinium substituted yttrium iron garnet (YIG) as the ferrite isolator. Various concentrations of the gadolinium in YIG were investigated as ferrite isolators at 4.2°K and were found to have lower forward losses than pure YIG at S band.

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