Abstracts

YIG Oscillators: Is a Planar Geometry Better? (Short Papers)

R.L. Carter, J.M. Owens and D.K. De. "YIG Oscillators: Is a Planar Geometry Better? (Short Papers)." 1984 Transactions on Microwave Theory and Techniques 32.12 (Dec. 1984 [T-MTT] (1984 Symposium Issue)): 1671-1674.

Two yttrium-iron-garnet (YIG) oscillator technologies are compared: the more mature YIG sphere oscillator technology which is based on the uniform (resonant) precession of the electron spins in a small sphere of YIG, and the new planar YIG technology which utilizes the propagation of magnetostatic waves in an epitaxial film of YIG. The YIG sphere technology has been used for microwave oscillators for more than 25 years, but has two significant areas of difficulty in applications the alignment of the YIG sphere in the magnetic bias field coupling cavity requires great precision and the gain element requires a negative resistance element to sustain oscillation. The MSW technology is much newer and less well understood, but the resonator elements are fabricated using a 50- µm line width planar technology making it an appealing candidate. Both technologies are reviewed herein with regard to resonant element theory, temperature, and noise characteristics. New data and theory are presented on MSW resonator optimization.

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