Abstracts

A 500-to-1000 MHz Magnetically Tunable Bandpass Filter Using Two YIG-Disk Resonators

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A magnetically tunable UHF bandpass filter designed in strip transmission line and with two disk-shaped resonators of yttrium-iron-garnet (YIG) is described. Single crystals of both pure YIG and gallium-substituted YIG were used. The properties of the disk resonators were first investigated by testing them in a bandstop filter configuration. Linewidths were measured as a function of both frequency and temperature over the band 500 to 1000 MHz and sometimes beyond. The effect of metal boundaries near the ferrimagnetic resonator on its linewidth and resonant magnetic field was determined. Magnetostatic modes were examined. Methods for adjusting the resonant frequency of a disk are discussed. A description is given of the filter coupling structure, which includes two 50-to-5-ohm transformers in strip line. The experimental tuning procedure is outlined. Tests of the filter with gallium-YIG disks revealed a midband insertion loss of less than 3.3 dB from 500 to 1200 MHz and less than 2 dB from 600 to 1100 MHz; the filter with pure YIG disks had a midband insertion loss of less than 3.2 dB from 450 to 1100 MHz and had fewer spurious responses than the gallium-YIG falter. Response curves, limiting characteristics, and other experimental results are also presented.

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