Abstracts

Some Design Considerations and Realizations of Iris-Coupled YIG-Tuned Filters in the 12-40 GHz Region

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YIG filters covering the frequency ranges 12 to 18, 18 to 26, and 26 to 40 GHz have been designed and developed. The filters in the 18- to 40-GHz range were of three sections and achieved 80-MHz bandwidth and greater than 40 dB of higher order mode rejection. The filter in the 12- to 18-GHz region was of four sections utilizing staggered spheres in order to achieve a larger bandwidth filter with a minimum magnet gap. The bandwidth of this filter was 50 to 60 MHz with greater than 55 dB of higher order mode rejection. Useful information for the design of these filters was obtained with a special test fixture built to measure mutual coupling between spheres as a function of the angle between the line joining the sphere centers and the dc magnetic field. This data is reported for various iris sizes, shapes, and sphere spacings and indicates large differences in mutual coupling as the angle is varied from 0 to 90°. The effect of various types of discontinuities and iris sizes and shapes on higher order mode excitation and coupling are discussed as well as constructional problems and the design of high field magnets from vanadium permendur.

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