

A New Type of Annular Ring Waveguide Cavity for Resonator and Filter Applications

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A new type of annular ring waveguide cavity has been developed as a waveguide component for the design of resonators, filters, and multiplexer. H-plane and E-plane annular ring waveguide cavities have been investigated thoroughly as regular and forced mode resonators. A dual resonant mode filter using a single H-plane annular ring waveguide cavity has been built with a bandwidth-center-frequency ratio of 0.77%, a stopband attenuation of more than 40 dB, and a sharp gain slope transition. Another dual resonant mode filter which was formed by cascading two E-plane annular ring waveguide cavities has also been fabricated with a bandwidth-center-frequency ratio of 1.12%, a stopband attenuation of 60 dB, a mode purity of 2 GHz around the center frequency of 26.82 GHz, and a sharp gain slope transition. Electronically-tuned resonators are also discussed in this paper.

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