Abstracts

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

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A new type of rectangular waveguide ring cavity has been developed for applications to resonators, filters, and multiplexer. The circuits have advantages of high Q and high power handling capability. H-plane and E-plane waveguide ring cavities have been investigated thoroughly in single-mode and dual-mode operations. For single-mode operation, regular resonant modes, split resonant modes, and forced resonant modes were explained by resonant mode charts of E-field points. Mechanically tuned and electronically tuned resonators built by adjusting the resonant modes between regular resonant modes and forced resonant modes have been demonstrated. For dual-mode operation, a dual-mode filter using a single H-plane ring cavity has been built with a bandwidth of 0.77%, a stopband attenuation of more than 40 dB, and a sharp gain slope transition. Another dual-mode filter which was formed by cascading two E-plane ring cavities has also been fabricated with a bandwidth of 1.12%, a stopband attenuation of 70 dB, a mode purity of 2 GHz at the center frequency of 26.82 GHz, and a sharp gain slope transition.

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