Abstracts

Plasma-Dielectric Sandwich Structure Used as a Tunable Bandpass Microwave Filter (Short Papers)

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A plasma-dielectric sandwich structure used as a tunable bandpass filter in a microwave spectrum is investigated in detail. The unique characteristics of this filter are that the center frequency of its passband and its bandwidth can be tuned electrically by varying the electron density of the plasma, which in turn can be adjusted by a voltage applied across the plasma electrodes. First, the principle in establishing the filtering effect is briefly discussed physically with an aim of suggesting a practical structure for theoretical analysis. A conventionsal multilayer theory is then employed to analyze this plasma-dielectric structure, and an optimization technique called the simplex method is used to find the center frequency. Both cases of having the TE/sub10/ dominant mode in a rectangular waveguide and the TEM mode in an unbounded structure are studied. Finally, included are the computed results for characterizing the filter such as reflection coefficients, center frequencies, bandwidths, quality factors, and Iossy effects, etc.

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