Abstracts

Birefringent Filter for Millimeter Waves (Jun. 1968 [T-MTT])

B.M. Schiffman and L. Young. "Birefringent Filter for Millimeter Waves (Jun. 1968 [T-MTT])." 1968 Transactions on Microwave Theory and Techniques 16.6 (Jun. 1968 [T-MTT]): 351-360.

A scale model (f/sub 0/ =20 GH/sub z/ of a Solc-type birefringent wave filter for millimeter wavelengths is described. The filter consists of five cascaded identical half-wave plates, or crystals, each composed of an artificial anisotropic dielectric medium with its reference axis tilted at some prescribed angle to the plane of the input polarization. The design and analysis of an individual plate, using Collin's second-order theory of the birefringence of artificial anisotropic dielectrics, and the analysis of multielement filters (filters composed of many plates), aided by Evans' matrix method, are discussed. The experimental filter was tested in the range of 18 to 33 GHz, and its measured performance was found to compare well with the theoretical performance over a major portion of the range of frequencies used in the tests. A synthesis procedure for optimum (equal-ripple stopband) response multielement filters is given, together with tables of plate angles for such filters. In this procedure, the Dolph approximation and the Harris synthesis are combined.

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