Abstracts

Walk-Off Effects in Fabry-Perot Diplexers

J.A. Arnaud, A.A.M. Saleh and J.T. Ruscio. "Walk-Off Effects in Fabry-Perot Diplexers." 1974 Transactions on Microwave Theory and Techniques 22.5 (May 1974 [T-MTT]): 486-493.

Fabry-Perot (FP) resonators working under oblique incidence can be used in the millimeter and far infrared bands as diplexers or channel dropping filters. The response of two-grid Fabry-Perot resonators under Gaussian beam excitation is evaluated by adding the fields of the successive passes of the beam. The results coincide with those obtained from a plane wave expansion of the incident field. Closed form expressions are obtained for the losses due to diffraction walk-off, geometrical walk-off, and mismatch. Excellent agreement is obtained with experiments in the 70-80-GHz band. For a 1-GHz-bandwidth filter, working at an incidence angle of 15 degrees, and an incident beam waist radius of 40 mm, the transmission loss at resonance does not exceed 1 dB. The reflection loss off-resonance is about 0.1 dB. This type of diplexer is particularly useful when used in conjunction with quasioptical guiding systems.

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