Abstracts

Short-Pulse Propagation in a Hollow Waveguide: Analysis, Optoelectronic Measurement, and Signal Processing

D. Kralj, L. Mei, T.-T. Hsu and L. Carin. "Short-Pulse Propagation in a Hollow Waveguide: Analysis, Optoelectronic Measurement, and Signal Processing." 1995 Transactions on Microwave Theory and Techniques 43.9 (Sep. 1995, Part I [T-MTT]): 2144-2150.

An asymptotic analysis is performed for short-pulse propagation in a hollow waveguide. It is demonstrated that each time-domain mode supported by the guide is characterized by a time-dependent frequency which, as time proceeds, approaches the modal cutoff frequency. This phenomenon is demonstrated experimentally by performing short-pulse optoelectronic measurements for the case of rectangular waveguide. In these measurements a short-pulse laser is used to switch planar antennas photoconductively, generating freely propagating waveforms with instantaneous bandwidth from 15-75 GHz. Time-frequency signal processing is performed on the measured data, the results of which are in close agreement with the predictions of the asymptotic analysis.

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