Abstracts

Dielectric Measurements of Millimeter-Wave Materials

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It is no longer necessary to use extrapolated microwave dielectric data when designing millimeter-wave components, devices, and systems. Precision measurements can now be made to generate highly accurate millimeter-wave (5 to 1/2 mm) continuous spectra on complex refractive index, complex dielectric permittivity, and loss tangent for a variety of materials such as common ceramics, semiconductors, crystalline, and glassy materials. The continuous spectra reveal an increase in dielectric loss with increase in frequency in this wavelength range for most materials. Reliable measurements also reveal that the method of preparation of nominally identical specimens can change the dielectric losses by many factors. These broad-band measurements were carried out employing dispersive Fourier transform spectroscopy applied to a modular two-beam polarization interferometer. Data obtained with Fabry-Perot open resonator methods at wavelengths of 5 mm and longer will also be compared.

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