Abstracts

Millimeter-wave magnetooptics: New method for characterization of ferrites in the millimeter-wave range

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This paper presents a new free-space millimeter-wave method based on the transverse magnetooptical effect, which provides the complete and accurate characterization of the ferrites for the first time in the millimeter-wave range. The described data analysis and processing methods lead to the separation of dielectric and magnetic effects and to the simultaneous determination of both millimeter-wave permittivity and permeability. It is demonstrated that this new method can be used for the characterization of soft ferrites as well as hard anisotropic ferrites. The magnetooptical measurements were realized using a millimeter-wave spectrometer combined with the electromagnet providing a transverse magnetic field up to 1 T. The backward-wave oscillators were used as a source of tunable coherent millimeter-wave radiation. It was shown that the freespace method applying the polarized Gaussian beams generates precise transmission data and enables the accurate determination of the optical constants of ferrites in the entire millimeter-wave range.

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