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Accession number:20115214642898

Title:Terahertz computed tomography helps ID chemical substances

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Source title:Photonics Spectra

Abbreviated source title:Photonics Spectra

Volume:45

Issue:12

Issue date:December 2011

Publication year:2011

Language:English

ISSN:07311230

CODEN:PHSAD3

Document type:Journal article (JA)

Publisher:Laurin Publishing Co. Inc., Berkshire Common - P.O. Box 4949, Pittsfield, MA 01202-4949, United States

Abstract:The development of highly sensitive detectors, efficient radiation sources and fast acquisition techniques makes this frequency range increasingly attractive for spectroscopy, imaging and tomography. Amplitude information is used in 2-D imaging technologies to detect inhomogeneities or delamination errors in samples. With amplitude and phase information, it is possible to determine thicknesses and refractive indices of multilayer systems. Spectral information from terahertz pulses is used for spectroscopic measurements. An optical delay line creates a temporal delay between a cycle of femtosecond and terahertz pulses. The pulse shape is acquired in the time domain by measuring the photocurrent while varying the time delay with the help of the delay line. A femtosecond laser source and a coherent detection arrangement make it possible to detect much more information with terahertz computed tomography than with x-ray computed tomography.

Abstract type:(Edited Abstract)

Number of references:9