

18

Accession number:20122915254955

Title:Scanning laser terahertz near-field imaging system

Authors:Serita, Kazunori (1); Mizuno, Shori (1); Murakami, Hironaru (1); Kawayama, Iwao (1); Takahashi, Yoshinori (2); Yoshimura, Masashi (2); Mori, Yusuke (2); Darmo, Juraj (1); Tonouchi, Masayoshi (1)

Author affiliation:(1) Institute of Laser Engineering, Osaka University, 2-6 Yamadaoka, Suita, Osaka,565-0871, Japan; (2) Graduate School of Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka,565-0871, Japan; (3) Photonics Institute, Vienna University of Technology, Gusshausstrasse 27-29, 1040 Vienna, Austria

Corresponding author:Serita, K.(serita-k@ile.osaka-u.ac.jp)

Source title:Optics Express

Abbreviated source title:Opt. Express

Volume:20

Issue:12

Issue date:June 4, 2012

Publication year:2012

Pages:12959-12965

Language:English

E-ISSN:10944087

Document type:Journal article (JA)

Publisher:Optical Society of America, 2010 Massachusetts Avenue NW, Washington, DC 20036-1023, United States

Abstract:We have proposed and developed a scanning laser terahertz (THz) near-field imaging system using a 1.56 μ m femtosecond fiber laser for high spatial resolution and high-speed measurement. To obtain the two-dimensional (2D) THz images of samples, the laser pulses are scanned over a 2D THz emitter plate [DASC: 4'-dimethylamino-N-methyl-4- stilbazolium p-chlorobenzenesulfonate] by a galvano meter. In this system, THz wave pulses locally generated at the laser irradiation spots transmit through the sample set on the emitter, and the amplitude of the transmitted THz wave pulse is detected by using a typical THz time-domain spectroscopy (THz-TDS) technique. Using this system, we have succeeded in obtaining THz transmission images of a triangle shaped metal sheet of millimeter-size and a human hair sample with a spatial resolution of sub-wavelength order up to $\sim 27\mu$ m (~ 28 THz) at an imaging speed of about 47 seconds/image for 512 x 512 pixels. \copyright 2012 Optical Society of America.

Number of references:25

Main heading:Terahertz wave detectors

Controlled terms:Fiber lasers - Image resolution - Imaging systems - Laser pulses - Terahertz waves

Uncontrolled terms:Femtosecond fiber lasers - High spatial resolution - High speed measurements - Human hair samples - Imaging speed - Near-field imaging system - Sample sets - Scanning lasers - Spatial resolution - Sub-wavelength - Terahertz - THz emitters - THz time domain spectroscopy - THz waves - THz-TDS - Transmission images

Classification code:744.4 Solid State Lasers - 744.1 Lasers, General - 742 Cameras and Photography - 746 Imaging Techniques - 741.1.2 Fiber Optics - 732.2 Control Instrumentation -

711 Electromagnetic Waves - 741 Light, Optics and Optical Devices

DOI:10.1364/OE.20.012959

Database:Compendex

Compilation and indexing terms, Copyright 2012 Elsevier Inc.