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Accession number:20124415622943

Title:Terahertz detecting method using multi-reflection optical lever

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Source title:Hongwai yu Jiguang Gongcheng/Infrared and Laser Engineering

Abbreviated source title:Hongwai yu Jiguang Gongcheng Infrared Laser Eng.

Volume:41

Issue:8

Issue date:August 2012

Publication year:2012

Pages:2058-2062

Language:Chinese

ISSN:10072276

Document type:Journal article (JA)

Publisher:Chinese Society of Astronautics, P.O. Box 225-32, Tianjin, 300192, China

Abstract:A new micro-optical method for Terahertz radiation measurement was presented, which was based on optical lever and thermal radiation detection. A bi-material micro cantilever was used to generate micro-deformation caused by Terahertz radiant thermal effect, and the micro-deformation was measured by a multiple reflection optical lever composed of a pair of plane mirrors. Then radiation power of Terahertz waves were obtained. Micro-displacement theoretical resolution of this multiple reflection optical lever method could be less than 1 nm and a measuring system was set up to verify it. Experiments show that theoretical resolution of this test system is less than 4 nm and its actual resolution was less than 10 nm. Designs and parameters of a Terahertz detector based on this method were given. This approach had many advantages such as anti-air turbulence, anti-beam cross-talk, and working at room temperature. So this new method was suitable for realizing miniaturized Terahertz detectors with the features of uncooled, real-time, low-cost, and it was also appropriate for manufacturing array detectors for imaging detection.

Number of references:13

Main heading:Detectors

Controlled terms:Deformation - Nanocantilevers - Terahertz wave detectors - Terahertz waves

Uncontrolled terms:Array detectors - Bi-material - Detecting methods - Measuring systems - Micro-cantilevers - Microdeformations - Microdisplacement - Multi-reflection - Multiple reflections - Optical lever - Plane mirrors - Radiation detection - Radiation power - Room temperature - Tera Hertz - Terahertz detectors - Terahertz radiation - Test systems - Uncooled

Classification code:933 Solid State Physics - 914 Safety Engineering - 761 Nanotechnology - 732.2 Control Instrumentation - 711 Electromagnetic Waves - 422 Strength of Building Materials; Test Equipment and Methods - 421 Strength of Building Materials; Mechanical Properties

Database:Compendex

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