

Optical Readout System for Bi-Material Terahertz Sensors



The objective of this work is to design, assemble, and characterize an optical readout for bi-material MEMs sensor arrays that can be integrated into a THz imaging system. All this effort is a contribution to the goals of the research conducted by the Naval Postgraduate School Sensor Research Laboratory on designing and fabricating THz-optimized bi-material MEMs sensor arrays for THz imaging. Basic concepts of THz radiation and detection are presented. Several aspects of THz imaging, and sensors array readout possibilities, are discussed in terms of the principle of operation for this type of sensor. An experimental optical readout was assembled during this research, and its configuration is shown, as well as all of its component details. The experimental setup was characterized following a method described in this work, and the obtained results are analyzed. Finally, one possibility of optical readout integration with a THz imaging system is suggested.

Microelectromechanical systems bimaterial terahertz sensor - NCBI sensor arrays that can be integrated into a THz imaging system. All this effort SUBJECT TERMS Optical Readout, Terahertz, Sensor Array, Bi-material MEMs, .
Bi-material terahertz sensors using metamaterial - OSA Publishing Bi-material terahertz sensors using metamaterial - OSA Publishing THz sensing can be achieved by integrating a metamaterial absorber with bi-material legs to form a sensor. can cause a deflection of visible light and from it, the original image can be reconstructed using an optical readout system. OSA **Microelectromechanical systems bimaterial terahertz sensor** enhanced bimaterial cantilever pixels for far-infrared detection. . Uncooled Infrared Imaging System: Design, Microfabrication, and Performance, the development of an uncooled metamaterial enhanced THz detector with optical read-out. **Investigation of MEMS bi-material sensors with metamaterial** SUBJECT TERMS Terahertz Imaging, Bi-material sensors, Metamaterial Films,. Responsivity. . Schematic diagram of thermal response measurement system. The . are very convenient because they allow the use of external optical readout, . **MEMS terahertz focal plane array with optical readout** Microelectromechanical systems bimaterial terahertz sensor with integrated support, desired thermomechanical properties and optical readout access. **Sensors - Naval Postgraduate School** Microelectromechanical systems bimaterial terahertz sensor with integrated support, desired thermomechanical properties and optical readout access. **Characterization of terahertz bi-material sensors with integrated** by integrating a metamaterial absorber with bi-material legs to form a sensor. construction of the optical readout system for characterization of sensor pixels as. **Bimaterial MEMS THz Detectors!** - SIGE Jun 1, 2012 Microelectromechanical systems bimaterial terahertz sensor with support, desired thermomechanical properties and optical readout access. **14Sep_Toh_ - Naval Postgraduate School** Abstract. In this paper we report on the design, fabrication and characterization of terahertz (THz) bi-material sensors with metamaterial absorbers. **MEMS characterization of terahertz bi-material sensors with integrated** Jun

4, 2014 Micro- and Nanotechnology Sensors, Systems, and Applications VI One attractive option to achieve real time THz imaging is MEMS bi-material sensor thermomechanical properties and access to external optical readout. **MEMS terahertz focal plane array with optical readout - Naval** Microelectromechanical systems bimaterial terahertz sensor with integrated Uncooled CMOS terahertz imager using a metamaterial absorber and pn diode.

Microthermomechanical infrared sensors - De Gruyter Microelectromechanical systems (MEMS) based bi-material sensors have been greatly . strength, low stress, and a flat reflective surface for the optical readout. **High sensitivity metamaterial based bi-material terahertz sensor** Multi-folded bi-material and thermal insulating legs compensate the residual stress of the the sensors, making them attractive to be used in THz imaging systems with external optical readout, residual stress, THz MEMS bimaterial sensors, Aug 2, 2016 THz sensing can be achieved by integrating a metamaterial absorber with bi-material legs to form a sensor. a deflection of visible light and from it, the original image can be reconstructed using an optical readout system. **Microwave and Terahertz wave sensing with - OSA Publishing** THESIS. Approved for public release distribution is unlimited. OPTICAL READOUT SYSTEM FOR BI-MATERIAL. TERAHERTZ SENSORS by. Elison Montagner. **Optical Readout System for Bi-Material Microcantilever Terahertz** In 2013, Alves et al. reported an optical readout bimaterial terahertz sensor which integrated a high absorption metamaterial absorber [5]. In general, realizing **Bi-material terahertz sensors using metamaterial structures - Naval** The objective of this work is to design, assemble, and characterize an optical readout for bi-material MEMs sensor arrays that can be integrated into a THz **Implementation of an Optical Readout System for High-Sensitivity** systems bimaterial sensors with metamaterial absorbers for terahertz imaging desired thermomechanical properties and access to external optical readout. **Microelectromechanical systems bimaterial terahertz sensor with** sensor is based on a bi?material actuated micromechanical deflection, such as uncooled multiband infrared detection, high?speed infrared sensing and uncooled THz imaging. pacitive and optical readout techniques of thermomechanical infrared arrays . 95% of all thermal detectors, more bolometer based systems.

Improving sensitivity and defying residual stress in MEMS bi The Fourier 4F optical readout system that was implemented was able to profile the .. MEMS bi-material THz sensor pixel used for the system (all dimensions. **Bi-material terahertz sensors using metamaterial - OSA Publishing** characterization of terahertz (THz) bi-material sensors with metamaterial . T. Cheng, Q. Zhang, B. Jiao, D. Chen, and X. Wu, Optical readout sensitivity of Uncooled Infrared Imaging Arrays and Systems, P. W. Kruse and D.D. Skatrud, ed. **Images for Optical Readout System for Bi-Material Terahertz Sensors** imaging system is suggested. 14. SUBJECT TERMS Optical Readout, Terahertz, Sensor Array, Bi-material MEMs,. Imaging. 15. NUMBER OF. PAGES. 99. 16. **MEMS terahertz focal plane array with optical readout - Defense** by integrating a metamaterial absorber with bi-material legs to form a sensor. construction of the optical readout system for characterization of sensor pixels as. **Optical Readout System for Bi-Material Terahertz Sensors - Defense** Sep 30, 2015 THz Detectors ! Bi-Material MEMS Detectors (4 Generations)!. Readout Mechanism! .. systems bimaterial terahertz sensor with integrated metamaterial absorber Optics Optical Engineering 53 (9),. 097103-097103 **Characterization of Terahertz Bi-Material Sensors with Integrated** SUBJECT TERMS Terahertz Imaging, Bi-material sensors, Metamaterial Films,. Responsivity. . Schematic diagram of thermal response measurement system. The . are very convenient because they allow the use of external optical readout,.