Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Fabrication of THz Sensor with Metamaterial Absorber[1] HUGO GONZALEZ, Naval Postgraduate School, FABIO ALVES, Alion Science and Technology, GAMANI KARUNASIRI, Naval Postgraduate School — The terahertz (THz) portion of the electromagnetic spectrum (0.1-10 THz) has not been fully utilized due to the lack of sensitive detectors. Real-time imaging in this spectral range has been demonstrated using uncooled infrared microbolometer cameras and external illumination provided by quantum cascade laser (QCL) based THz sources. However, the microbolometer pixels in the cameras have not been optimized to achieve high sensitivity in THz frequencies. Recently, we have developed a highly sensitive micromechanical THz sensor employing bi-material effect with an integrated metamaterial absorber tuned to the THz frequency of interest. The use of bi-material structures causes deflection on the sensor to as the absorbed THz radiation increases its temperature, which can be monitored optically by reflecting a light beam. This approach eliminates the integration of readout electronics needed in microbolometers. The absorption of THz by metamaterial can be tailored by controlling geometrical parameters. The sensors can be fabricated using conventional microelectronic materials and incorporated into pixels to form focal plane arrays (FPAs). In this presentation, characterization and readout of a THz sensor with integrated metamaterial structure will be described.

[1]Supported by DoD

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Date submitted: 05 Nov 2015 Electronic form version 1.4