

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Carbon Nanotube Bolometer for Absolute FTIR Spectroscopy

SOLOMON WOODS, NIST, JORGE NEIRA, Jung Research and Development Corp., NATHAN TOMLIN, JOHN LEHMAN, NIST — We have developed and calibrated planar electrical-substitution bolometers which employ absorbers made from vertically-aligned carbon nanotube arrays. The nearly complete absorption of light by the carbon nanotubes from the visible range to the far-infrared can be exploited to enable a device with read-out in native units equivalent to optical power. Operated at cryogenic temperatures near 4 K, these infrared detectors are designed to have time constant near 10 ms and a noise floor of about 10 pW. Built upon a micro-machined silicon platform, each device has an integrated heater and thermometer, either a carbon nanotube thermistor or superconducting transition edge sensor, for temperature control. We are optimizing temperature-controlled measurement techniques to enable high resolution spectral calibrations using these devices with a Fourier-transform spectrometer.

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Date submitted: 06 Nov 2015

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