Abstract Submitted
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Single layer graphene plasmonic detector for broadband THz spectroscopy[1] DENNIS DREW, XINGHAN CAI, ANDREI SUSHKOV, GREGORY JENKINS, MICHAEL FUHRER, CNAM and MRSEC, Department of Physics, University of Maryland, L. NYAKITI, V.D. WHEELER, R.L. MYERS-WARD, N.Y. GARCES, C.R. EDDY, JR., D.K. GASKILL, U.S. Naval Research Laboratory, Washington, DC 20375 — Among many possible applications of graphene, THz detection is one of the most promising. The Drude-type absorption of THz radiation by free carriers is much stronger than the frequency-independent 2.3% absorption for interband transitions. By patterning the graphene sheet strips the Drude-type response is transformed into a Lorentzian peak corresponding to a THz plasmon resonance on the width w of each strip. The plasmon resonance frequency $\omega_0 \propto n^{1/4} w^{1/2}$, where n is carrier concentration which is tunable by gate(s) as was reported in Ref. 1 for graphene grown by chemical vapor deposition. We have reproduced results of Ref. 1 on our single layer graphene on Si-face SiC with electrolyte top gate. The next step to a detector is extraction of DC photocurrent without destroying plasmons. We will present our solution to this problem and compare the performance of our room-temperature detector to existing THz detector technologies. Other aspects of our graphene photodetectors such as device fabrication, response time, and response mechanism will be presented in other talks at this meeting. [1] L. Ju et al, Nature Nanotechnology, 6 (2011) 630-634.

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