Abstract Submitted
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Design and performance of graphene quantum dot bolometric detectors.[1] A EL FATIMY, P HAN, Department of Physics, Georgetown University, Washington DC, 20057, R.L MYERS-WARD, A.K BOYD, K.M DANIELS, U.S. Naval Research Laboratory, Washington, DC 20375, M.M JADIDI, Institute for Research in Electronics & Applied Physics, University of Maryland, College Park, Maryland 20742, A.B SUSHKOV, Department of Physics, University of Maryland, Maryland, 20742, T.E MURPHY, Institute for Research in Electronics & Applied Physics, University of Maryland, College Park, Maryland 20742, H.D DREW, Department of Physics, University of Maryland, Maryland, 20742, D.K GASKILL, U.S. Naval Research Laboratory, Washington, DC 20375, P BARBARA, Department of Physics, Georgetown University, Washington DC, 20057 — We recently demonstrated that quantum dots of epitaxial graphene on SiC are extremely sensitive bolometric detectors in the THz frequency range, with responsivity above 10^{10} V/W at 2.5 K and NEP for an absorbed THz power about 10^{-16} W $Hz^{-1}/2$[1]. Here we investigate how the bolometer response depends on the device design, by varying the graphene area and the number of quantum dots connected in parallel. We also investigate the effect of the gate voltage on the temperature dependence of the quantum dot resistance and its responsivity. Finally, we characterize the frequency dependence of the response and show that the quantum dots are broadband detectors, from THz to UV light. [1] A. El Fatimy, R.L.Myers-Ward, A.K. Boyd, K.M. Daniels, D. K. Gaskill, and P. Barbara, Nature Nanotechnology 11, 335–338 (2016) doi:10.1038/nnano.2015.303.-/.

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