

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**GHz response of bilayer graphene hot electron bolometer** M.-H. KIM, J. YAN, J.A. ELLE, A.B. SUSHKOV, G.S. JENKINS, H.M. MILCHBERG, M.S. FUHRER, H.D. DREW, Center for Nanophysics and Advanced Materials and Department of Physics, University of Maryland, College Park, MD 20742 — An intrinsic GHz speed of a hot-electron bolometer (HEB) based on dual-gated bilayer graphene (BLG) was recently reported (J. Yan, arXiv:1111.1202). The thermal response time is governed by the weak electron acoustic phonon scattering which also results in a high thermal resistance for the lattice cooling of the hot electrons. The time response of BLG HEB was measured as a function of temperature, bias current, and laser power using two time delayed pulses from a 1.03  $\mu\text{m}$  pulsed laser. In addition, we probed the energy gap dependence of the time response revealing information about the electron density in gapped BLG. We report the temperature dependence of the heat capacity and thermal resistance obtained from these measurements. This work is supported by IARPA grant #W911NF1010443

M.-H. Kim  
Center for Nanophysics and Advanced Materials and Dept of Physics,  
University of Maryland, College Park, MD 20742

Date submitted: 12 Dec 2011

Electronic form version 1.4