

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Ultrafast Dynamics of Photoexcited Dirac Fermions in Few-layer Epitaxial Graphene**<sup>1</sup> TIANQI LI, Ames Laboratory and Department of Physics and Astronomy, Iowa State University, LIANG LUO, MYRON HUPALO, MICHAEL TRINGIDES, JIGANG WANG, Department of Physics and Astronomy and Ames Laboratory-USDOE, Iowa State University — Graphene – a single layer of carbon atoms – has been a topic of strong current interest due to its basic physical properties and application potential arising from two-dimensional (2D) quantum confinement and unique massless Dirac Fermion quasiparticles. The recent success in preparation of single- and few-layer epitaxial graphenes has rendered intrinsic optical properties and ultrafast electronic relaxation experimentally accessible in a well-controlled manner. We used ultrafast visible, mid-IR and terahertz spectroscopy to reveal various decay pathways of photo-excited, highly non-equilibrium carriers in graphene. We will discuss some evidence of multi-particle Auger scattering, manifesting in the pump power, and temperature and probe wavelength dependence of the transient signals. The new ultrafast carrier processes reported here have clear implications for designing future graphene-based high-speed nanoelectronic devices.

<sup>1</sup>Our work at the Ames Laboratory was supported by the U.S. Department of Energy-Basic Energy Sciences under Contract No. DE-AC02-07CH11358.

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Date submitted: 07 Dec 2009

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