Abstract Submitted
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Hot-Carrier cooling at Graphene-Metal Contact Interface[1] JASON ROSS, Department of Materials Science & Engineering, University of Washington, Seattle, GRANT AIVAZIAN, DONG SUN, AARON JONES, Department of Physics, University of Washington, Seattle, WANG YAO, Department of Physics and Center of Theoretical and Computational Physics, The University of Hong Kong, DAVID COBDEN, XIAODONG XU, Department of Physics, University of Washington, Seattle — There has been a recent surge of interest in using graphene as broadband and ultrafast optoelectronics, however the mechanisms of photodetection are not yet fully understood. Our previous measurements at a top gated graphene pn junction and at a monolayer-bilayer interface have found the dominating mechanism to be photothermoelectric (PTE) in nature, whereas most graphene-metal contact (GM) studies attribute photocurrent to the photovoltaic effect. By performing comprehensive ultrafast optical pump-probe measurements of photocurrent as a function of temperature, Fermi level, and laser power at various GM interfaces, the current work differentiates the contributions of PTE and photovoltaic effects to the photocurrent and identifies a hot-carrier relaxation time of ∼2 ps at room temperature and ∼7 ps at cryogenic temperatures. This work provides valuable insight to the design of new graphene based optoelectronic devices for sensing and communication.

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