Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Charged Impurity Scattering in Graphene[1] MASA ISHIGAMI, JIANHAO CHEN, C. JANG, E.D. WILLIAMS, M.S. FUHRER, Physics Department, Materials Research and Engineering Center, and Center for Nanophysics and Advanced Materials, University of Maryland, College Park — We have measured the impact of charged impurity scattering on the transport properties of graphene sheets [1]. We vary the density of adsorbed potassium atoms in our experiment up to $5 \times 10^{12} K/cm^2$ on the surface of graphene based-devices which are otherwise devoid of any surface adsorbates [2] in ultra high vacuum environment. Adsorbed potassium decreases the charge carrier mobility, renders the gate-dependent conductivity linear, shifts the minimum conductivity point in gate voltage, broadens the width of minimum conductivity region, and lowers the minimum conductivity. Our results are in qualitative agreement with a recent Boltzmann transport calculation [3]. New features, such as asymmetric response of electron-hole mobility and the observation of a "residual" conductivity (the extrapolation of the linear gate-voltage dependent conductivity to the minimum conductivity point) near 2 e^2/h, indicate transport properties beyond the simple Boltzmann picture. [1] J.H.Chen et al., http://xxx.lanl.gov/abs/0708.2408. [2] M.Ishigami et al., Nano Letters, 7, 1643 (2007). [3] S. Adam et al., PNAS 104, 18392 (2007).

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Date submitted: 12 Dec 2007 Electronic form version 1.4