Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Charged Impurity Scattering in Bilayer Graphene SHUDONG XIAO, JIANHAO CHEN, ELLEN D. WILLIAMS, MICHAEL S. FUHRER — Materials Research Science and Engineering Center and Center for Nanophysics and Advanced Materials, Department of Physics, University of Maryland, College Park, MD, 20742, USA We have examined the impact of charged impurity scattering on the charge carrier transport in bilayer graphene in ultra-high vacuum (UHV) at low temperatures. Bilayer graphene sheets are mechanically exfoliated on Si/SiO_2 substrates, and the number of layers is verified by micro-Raman spectroscopy. Charged impurity density is varied over a wide range (up to $2x10^{13}$ cm^{-2}) by deposition of potassium atoms on clean bilayer graphene in UHV. At a gate-induced charge carrier density of 4.3 x 10^{12} cm^{-2}, the mobility is inversely proportional to the charged impurity density $\mu = 5x10^{15}$ $V^{-1}s^{-1}/n_{imp}$. Surprisingly, the coefficient relating μ to $1/n_{imp}$ has a similar magnitude to that for single-layer graphene, indicating a similar strength for charged impurity scattering at this carrier density. The magnitude of charged impurity scattering, as well as the implications for the source of disorder in undoped bilayer graphene, will be discussed in the context of Boltzmann transport theory.

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Date submitted: 17 Dec 2008 Electronic form version 1.4