Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Infrared Hall Conductivity in Graphene C.T. ELLIS, M.-H. KIM, T. WU, G. SAMBANDAMURTHY, J. CERNE, Physics Dept., University at Buffalo, SUNY, V. LEE, S. BANERJEE, Chemistry Dept., University at Buffalo, SUNY —
Among the many different techniques which have revealed graphene's remarkable properties, infrared conductivity (σ_{xx}) (Jiang, PRL 2007) and the DC Hall effect (Novoselov, Nature 2005; Zhang, Nature 2005; Zhang, PRL 2006) have provided new insights into this material. In our study we determine the infrared Hall conductivity (σ_{xy}) for graphene in the 120-1000 meV range at temperatures down to 7K and magnetic fields up to 7T using Faraday measurements. Unlike σ_{xx}, which measures the sum of the optical responses for left and right circularly polarized light, σ_{xy} measures the difference and therefore is sensitive to small changes in symmetry. We compare graphene samples that are prepared using several methods, including cleaving from parent materials such as highly ordered pyrolytic graphite, as well as sonication-assisted solution-phase exfoliation of natural flake graphite powder. The films are then deposited onto Si/SiO_2 substrates for infrared measurements. This work is supported by the NSF-CAREER-DMR0449899, also GS and SB thank the UB-IRDF for financial support.

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Date submitted: 08 Dec 2008 Electronic form version 1.4