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**Infrared Kerr and Faraday Measurements in Gated, Multi-Layer SiC Graphene** C.T. ELLIS, A.V. STIER, A. STABILE, M.-H. KIM, G. SAMBANDAMURTHY, B.D. MCCOMBE, J. CERNE, Dept of Physics, University at Buffalo, SUNY, B.J. SCHULTZ, S. BANERJEE, Dept of Chemistry, University at Buffalo, SUNY, J.G. TISCHLER, Naval Research Laboratory — Magneto-optical Kerr and Faraday measurements are used to probe the Landau level structure of SiC graphene in the mid- and far-infrared regimes (100-1000 meV and 3-10 meV, respectively). Transmittance/reflectance spectroscopy probes the longitudinal conductivity ($\sigma_{xx}$), which is related to the sum of chiral response. In contrast, polarization sensitive techniques provide new insights into the electronic structure by probing the Hall conductivity ($\sigma_{xy}$), which reflects the difference in the chiral response. Samples, which are studied in applied fields (B) up to 7T and temperatures ranging from 10-300K, show robust features arising from two distinct sets of Landau level transitions. One set displays transition energies that are $\sqrt{B}$ dependent as expected of monolayer graphene. Interestingly, below a critical photon energy (~100 meV) these features become symmetric with B. The other set is consistent with expectations of bilayer graphene and graphite, showing a linear B dependence and the expected odd symmetry in B. Further investigation of Landau level behavior is accomplished by tuning the Fermi energy in samples with a gate. Work supported by NSF-DMR1006078.

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