Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Far-infrared Kerr rotation spectroscopy of graphite and multilayer graphene JULIEN LEVALLOIS, MICHAËL TRAN, ALEXEY KUZMENKO, University of Geneva — Graphite attracts much attention nowadays as a reference 3D material for graphene. Since the early measurements of the cyclotron effect in graphite over fifty years ago [1], a satisfactory quantitative description of this spectacular phenomenon is missing. The analysis of magneto-optical data was hindered either by a limited set of the used photon energies or by the lack of the optical selectivity between electrons and holes. We overcome this issue by measuring the far-infrared magneto-optical Kerr rotation spectra [2] and achieve a highly accurate unified microscopic description of all spectra in a broad range of magnetic fields (0.5 – 7 T) by taking rigorously the c-axis band dispersion and the trigonal warping into account. We find that the second- and the forth-order cyclotron harmonics are optically almost as strong as the fundamental cyclotron resonance even at high fields. The same effects are expected to strongly influence the magneto-optical spectra of Bernal stacked multilayer graphene and therefore play a major role in the respective applications.

[1] J. K. Galt, W.A. Yager and H.W. Dail Jr., Phys. Rev. **103**, 1586 (1956)
[2] J. Levallois, M.K. Tran and A. B. Kuzmenko, arXiv:1110.2754v2; submitted.

Julien Levallois
University of Geneva

Date submitted: 14 Dec 2011 Electronic form version 1.4