PRESSURE-DEPENDENT ELECTRODYNAMICS IN GRAPHITE

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One of the consequences of the "rise of graphene" [1], has been the flowering of a renewed interest in graphite. Interestingly, many of the new phenomena discovered in graphene, such as the linear (Dirac-like) band dispersion [2], the anomalous quantum Hall effect [3], or the universal conductance properties [4], have been found to be present in graphite as well. Understanding the transition from graphene to graphite is therefore of the uttermost importance. It is within this framework that one should address the role played by the interlayer interaction in graphene, and ask what happens as long as the interlayer distance is externally modulated. We have addressed this topic with pressure-dependent synchrotron infrared spectroscopy in a Diamond Anvil Cell, together with new first principles DFT-LDA calculations. Our main focus was to find what is the effect of pressure on the universal conductance properties, previously observed in ambient pressure graphite [4].

References

[1] A.K. Geim and K.S. Novoselov, Nature Materials, 6 (2007) 3.
[2] G. Li and E.Y. Andrei, Nature Physics, 3 (2007) 623.
[3] S.Y. Zhou *et al.*, Nature Physics 2 (2006) 595.
[4] A.B. Kuzmenko *et al.*, Phys. Rev. Lett., 100 (2008) 117401.