Abstract Submitted
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Cyclotron resonance in graphene and Kohn's theorem KESHAV SHRIVASTAVA, University of Malaya — In 1961 Kohn has shown [1] that the cyclotron frequency is independent of the interaction. In the case of graphene there is some effort to suggest that the electron dispersion is linear in k, instead of $(h/2\pi)^2k^2/2m$ so that the Kohn theorem may not apply [2]. We find that the Kohn theorem does not use the dispersion relation and applies to graphene the same way as in some other material. We find that if e is replaced by $e^*=(1/2)ge$, the Kohn theorem applies with the cyclotron frequency $(h/2\pi)\omega_c= (1/2)geB/mc$. Hence there is no interaction and all of the interaction is contained in $g = (2j+1)/(2l+1)$ which is used only in the unperturbed Hamiltonian. The degeneracy of the levels is found to be related to the flux quantization. We have explained [3] the plateaus observed in the Hall effect resistivity of graphene without the use of interaction. Hence the Kohn's them applies to graphene.

[1] W. Kohn, Phys. Rev. 123, 1242-1244 (1961);
[2] E. A. Henriksen, et al., Phys. Rev. Lett. 104, 067404(2010).
[3] K. N. Shrivastava, AIP Conf. Proc. 1150, 59-67(2009); 1017,422-428(2008); Proc. SPIE 7155, 71552F(2008).

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