Cyclotron Resonance in Bilayer Graphene

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Experiments into the properties of single layer graphene have demonstrated the existence of unusual charge carriers, analogous to massless, chiral Dirac particles having a Berry's phase of π and resulting in a new, half-integer quantum Hall effect. Bilayer graphene has shown equally exciting properties, creating a system of massive chiral particles with a Berry's phase of 2π and exhibiting another, distinct quantum Hall effect. In this work, we present the first measurements of the cyclotron resonance of electrons and holes in bilayer graphene. In magnetic fields up to B=18T we observe four distinct intraband transitions in both the conduction and valence bands. Transition energies between the lowest Landau levels are roughly linear in B, whereas they follow $\sqrt{B}$ for the higher transitions.

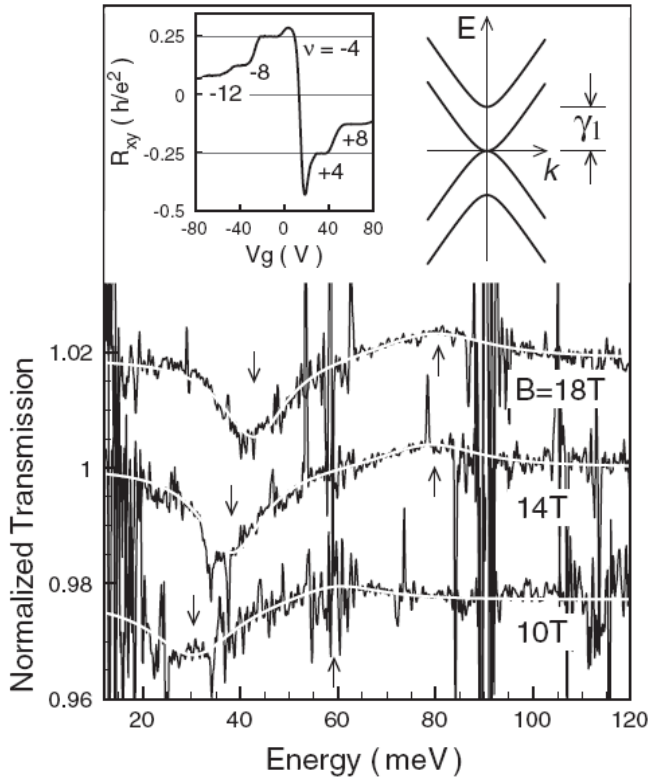

Figure: Normalized transmission spectra of bilayer graphene. Upper left inset: quantum Hall effect of bilayer graphene. Upper right inset: schematic of the zero-field dispersion relation of bilayer graphene.

Henriksen, E.A.; Jiang, Z.; Tung, L.-C.; Schwartz, M.E.; Takita, M.; Wang, Y.-J.; Kim, P., and Stormer H.L., **Phys. Rev. Lett.**, **100** (8), 087403 (2008)

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