Interaction-induced Shift of the Cyclotron Resonance in Monolayer Graphene

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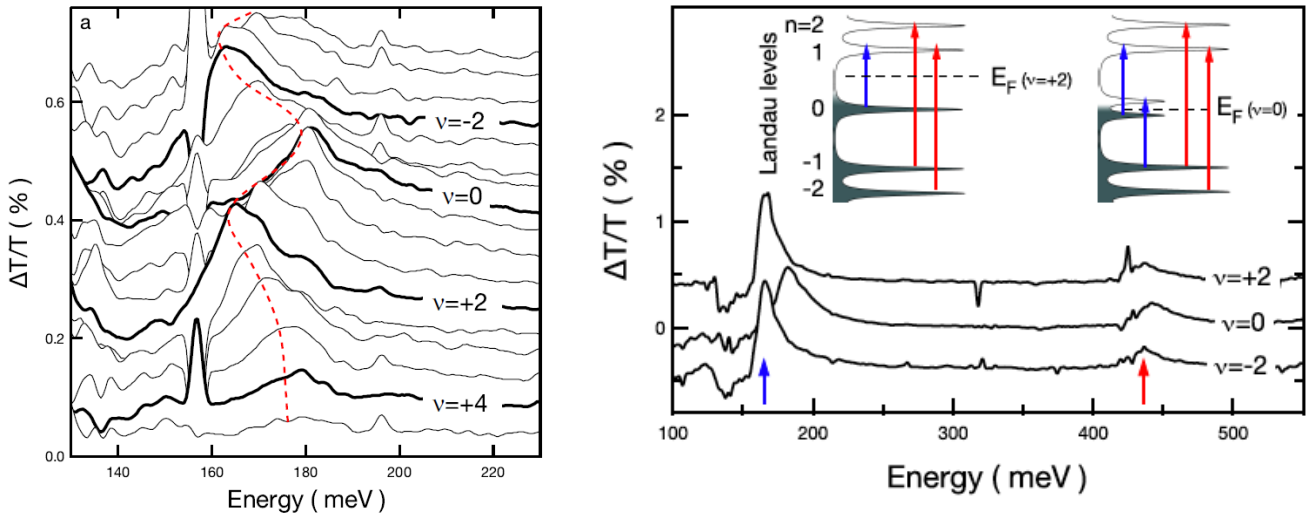

While the lack of a zero in the longitudinal resistance of monolayer graphene precludes some of the traditional methods for characterizing its intriguing n = 0 Landau level (LL) through edge state conductance, the bulk properties of this level can be directly probed by examining the cyclotron resonance (CR) transitions into and out of this level. By measuring the infrared absorption of graphene in high fields (using SCM2 magnet), we track the evolution of these absorption energies as the Fermi level is gradually tuned through the charge-neutrality point. Though the interband transitions from n = -1 → 2 and n = -2 → 1 exhibit no change in CR energy as the Fermi level is changed, large shifts (~15 meV at 18 T) are observed in the absorption energy for transitions into and out of the n = 0 LL, indicative of a gap opening in this LL.