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Inter Landau Level Optical Absorption in Graphene Under Ultra-high Magnetic Field

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Graphene shows diverse novel physical properties arising from its peculiar electronic states, so called Dirac electrons. Especially, effect of magnetic field is very unique, exhibiting exotic Landau level (LL) splitting. LLs are substantially modified by spins of Dirac electrons and pseudo-spins. The degeneracy of LLs is lifted to show splitting by electron-electron interaction and by the Zeeman effect. We investigated the magneto-optical absorption of graphene subjected to ultra-high magnetic field. Samples were prepared by the CVD method deposited on GaAs and Quart substrate. We have confirmed existence of graphene on each substrate by the micro-Raman spectroscopy. Next, we conducted magneto-absorption measurements in magnetic field up to 120 T by the single-turn coil (STC) method. We could observe absorption peak at 65 T and 100 T, respectively, probably arising from the LL inter-band transitions.

Keywords: Graphene, Magneto-absorption, Landau level