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Magnetic-field induced Electron-K-Phonon Interaction in the optical response of multi-layer epitaxial graphene GERARD MARTINEZ, MILAN ORLITA, MAREK POTEMSKI, Laboratoire National des Champs Magetiques Intenses, CNRS, MIKE SPRINKLE, CLAIRE BERGER, WALTER DE HEER, School of Physics,Georgia Institute of Technology, Atlanta, LIANG TAN, STEVEN LOUIE, Department of Physics, University of California at Berkeley — Absolute magneto-optical transmission measurements have been performed in the far-infra-red range under magnetic fields up to 32 T and at a temperature of 1.8 K on a series of multi-layer epitaxial graphene samples. In all samples, transmission data show for the main optical transition involving the n=0 landau level a clear splitting of the transition in the field range 17-18 T corresponding to an energy of about 150 meV which coincides with that of the K zone boundary phonon of graphene. A global analysis of the data using a multi-dielectric model, to fit them with a single transition, reveals in that range of energies an additional increase of the line-width accompanied by a softening of the transition energy. The energy variation of these quantities is characteristic of the emission of phonons. Possible origins of this effect will be discussed but seems to be the consequence of electron-electron interactions between the two valleys K and K' assisted by K-phonons between these two valleys.

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