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Raman spectroscopy of graphite in high magnetic fields YOUNGHEE KIM, National High Magnetic Field Laboratory, ANTONIO LOM-BARDO, Engineering Department, Cambridge University, NIKOLAI G. KALU-GIN, Department of Materials and Metallurgical Engineering, New Mexico Tech, JUNICHIRO KONO, Department of Electrical & Computer Engineering, Rice University, ANDREA C. FERRARI, Engineering Department, Cambridge University, DMITRY SMIRNOV, National High Magnetic Field Laboratory — Recently, much attention has been paid to electron-phonon coupling in graphene. In particular, significant re-normalization and broadening of long-wavelength optical phonons are predicted to occur through resonant interaction with Landau-quantized Dirac fermions. We report here on a high-field magneto-Raman spectroscopy study of highly-oriented pyrolytic graphite (HOPG) and natural graphite at temperatures down to 5 K and in magnetic fields up to 45 T. The E_{2q} graphite phonon line exhibits anticrossinglike behavior at approximately 30 T, which we attribute to the magneto-phonon resonance (MPR) of graphite's massless holes at the H-point. Additionally, we observed features related to inter-Landau-level transitions at the K-point of graphite. We also observed weak graphene-like signatures of MPR, indicating the existence of graphene flakes on the graphite surface.

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