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Landau level-phonon resonances in graphene and their spectroscopic signatures in magneto-optical measurements LIANG Z. TAN, Department of Physics, University of California at Berkeley, and Materials Sciences Division, Lawrence Berkeley National Lab, CHEOL-HWAN PARK, Department of Materials, University of Oxford, GERARD MARTINEZ, LNCMI, CNRS, Grenoble, France, STEVEN G. LOUIE, Department of Physics, University of California at Berkeley, and Materials Sciences Division, Lawrence Berkeley National Lab — The excited states and the optical spectra of a two-dimensional electronic system under a magnetic field are strongly influenced by the electron-phonon interaction when the energy spacing of the Landau levels is resonant with the frequency of an optical phonon. We have performed a theoretical study of these excited states in graphene, and have calculated the optical absorption spectra for a range of magnetic fields. Electron-electron interactions are found to redistribute the spectral weight of the coupled modes and have important consequences for the absorption spectra. Our results are in good agreement with recent magneto-optical transmission experiments on epitaxial graphene on SiC. This work was supported by NSF Grant No. DMR10-1006184 and U.S. DOE Contract No. DE- AC02-05CH11231.

Liang Z. Tan
Department of Physics, University of California at Berkeley, and
Materials Sciences Division, Lawrence Berkeley National Lab

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