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**Excitonic Effects and Optical Absorption Spectrum of Doped Graphene** FELIPE JORNADA, University of California at Berkeley, JACK DESLIPPE, STEVEN LOUIE, University of California at Berkeley and Lawrence Berkeley National Laboratory — First-principles calculations based on the GW-Bethe-Salpeter Equation (GW-BSE) approach and subsequent experiments have shown large excitonic effects in the optical absorbance of graphene. Here we employ the GW-BSE formalism to probe the effects of charge carrier doping and of having an external electric field on the absorption spectrum of graphene. We show that the absorbance peak due to the resonant exciton exhibits systematic changes in both its position and profile when graphene is gate doped by carriers, in excellent agreement to very recent measurements[1]. We analyze the various contributions to these changes in the absorption spectrum, such as the effects of screening by carriers to the quasiparticle energies and electron-hole interactions. This work was supported by National Science Foundation Grant No. DMR10-1006184, the U.S. Department of Energy under Contract No. DE-AC02-05CH11231, and the U.S. DOD - Office of Naval Research under RTC Grant No. N00014-09-1-1066. Computer time was provided by NERSC.

[1]Tony F. Heinz, private communications.

Felipe Jornada
University of California at Berkeley

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