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Carrier renormalization effects on the optical response of doped semiconducting single-walled-carbon nanotubes[1] SHENG JU, Department of Physics, University of California, Berkeley, California 94720, USA, CHEOL-HWAN PARK, STEVEN LOUIE, Department of Physics, University of California, Berkeley, California 94720, USA and Materials Science Division, Lawrence Berkeley National Laboratory — It is known that many-electron effects dramatically change the optical properties of single-walled carbon nanotubes (SWCNTs). Recently, researchers have succeeded in tuning the Fermi energy of an individual SWCNT by applying a gate voltage or by introducing adsorbate dopants. Therefore, the optical response of doped SWCNTs is not only interesting from a pure scientific point of view but also important for the application of these systems. We present here first-principles calculations, based on the GW-Bethe Salpeter equation (GW-BSE) approach, of the quasiparticle (single-particle excitation) spectrum and the optical (electron-hole excitation) spectrum of doped SWCNTs.

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