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Plasma Excitations of Dressed Dirac Electrons in Graphene[1]
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— The dispersion relation for the collective plasma excitations of optically dressed Dirac electrons in single and double graphene layers is calculated in the random-phase approximation. The presence of circularly polarized light gives rise to an energy gap ϵ_g between the conductance and valence bands. The value of ϵ_g may be adjusted by varying the frequency and intensity of the light which could be sizable compared to that which is generated by spin-orbit coupling or sub-lattice symmetry breaking. We present numerical results for the dispersion relation for plasma excitations for various energy gaps and separation between graphene layers. The induced ϵ_g opens up a gap in the particle-hole continuum thus allowing plasmon excitations of short wave-length. An optical and acoustic phonon-like modes are obtained in the double layer configuration. Those are very sensative to the induced energy gap and symmtry breaking between the layers.

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