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Effect of nonhomogenous dielectric background on the plasmon modes in graphene double-layer structures[1] SAMVEL BADALYAN, PREDRAG KRSTAJIC, FRANCOIS PEETERS, Department of Physics, University of Antwerp, B-2020 Antwerpen, Belgium — We have calculated the plasmon modes in graphene double layer structures, taking into account the non-homogeneity of the system dielectric background. The effective dielectric function is obtained from the solution of the Poisson equation in three-layer dielectric medium with the graphene sheets located at the interfaces, separating different materials. Due to the momentum dispersion of the effective dielectric function, the intra- and inter-layer bare Coulomb interactions in graphene double layer systems acquire additional momentum dependence–an effect of the order of inter-layer interaction itself. It has been shown that in the long wavelength limit the energies of optical and acoustical plasmons, respectively, with the square root and linear dispersions are determined by different dielectric permittivities.

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