
# ]NON-ADDITIVE EFFECTS OF INHIBITION OF THE FERMI VELOCITY RENORMALIZATION IN A GRAPHENE SHEET IN A CAVITY

Wagner P. Pires[1,2], Jefferson D. L. Silva[3], Alessandra N. Braga[4], Van Sérgio Alves[1], Danilo T. Alves[1,5], E. C. Marino[6]

*[1]Faculdade de Física, Universidade Federal do Pará, 66075-110 Belém, Brazil*
*[2]Programa de Ciências Exatas, Universidade Federal do Oeste do Pará, 68040-470 Santarém, Brazil*
*[3]Campus de Parauapebas, Universidade Federal Rural da Amazônia, 68515-000 Parauapebas, Brazil*
*[4]Instituto de Estudos Costeiros, Universidade Federal do Pará, 68600-000 Bragança, Brazil*
*[5]Center of Physics, Universidade do Minho, P-4710-057 Braga, Portugal*
*[6]Instituto de Física, Universidade Federal do Rio de Janeiro, 21941-972 Rio de Janeiro, Brazil*

Recently, in the literature, it was shown that the logarithmic renormalization of the Fermi velocity in a plane graphene sheet (which, in turn, is related with the Coulombian static interaction between electrons in the sheet) is inhibited by the presence of a single parallel conducting plate. When one considers the suspended graphene sheet in a cavity formed by two conducting plates parallel to the sheet, the effect of this cavity on the interaction between electrons in the graphene is not a merely the superposition of the effects of each plate individually. From this, one can conjecture that the inhibition of renormalization of the Fermi velocity generated by a cavity is not expressed by the mere superposition of the inhibition induced by each single plate or, in other words, the simple addition of the result for the inhibition of the renormalization of the Fermi velocity found in the literature for a single plate could not be used to predict the exact behavior of the inhibition for the graphene between two plates. We show that, in fact, this is what occurs and calculate how the presence of a cavity formed by two conducting plates parallel to the suspended graphene sheet affects, in non-additive manner, the inhibition of the logarithmic renormalization of the Fermi velocity. In the limit of a single plate, our formulas recover those found in the literature.

**Palavras-chave:** Fermi velocity renormalization, Graphene, Cavity Pseudo-quantum electrodynamics