Effect of charged impurity correlation on transport in monolayer and bilayer graphene

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We study both monolayer and bilayer graphene transport properties taking into account the presence of correlations in the spatial distribution of charged impurities. In particular we find that the experimentally observed sublinear scaling of the graphene conductivity can be naturally explained as arising from impurity correlation effects in the Coulomb disorder, with no need to assume the presence of short-range scattering centers in addition to charged impurities. We find that also in bilayer graphene correlations among impurities induce a crossover of the scaling of the conductivity at higher carrier densities. We show that in the presence of correlation among charged impurities the conductivity depends nonlinearly on the impurity density n_i and can even increase with n_i.

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