Abstract Submitted
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A theoretical study of the structure of suspended graphene
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Only one atom thick, graphene represents the ultimate crystalline membrane. I will use a self consistent extension of second order expansion, to show that this implies a flat phase characterized by scale invariant perturbations. Graphene, however, shows a preferred lengthscale, reveiling itself in the form of ripples on the surface of size 100-300 Angstrom. I trace this unusual feature to the free electrons on the surface. I show that ripples spontaneously appear, correlated to charge inhomogeneities, in agreement with the experimental data. In addition, a unique structural response is predicted in the case of doped graphene, with an inherent asymmetry between electron and hole doping.

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