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Effect of strain on the electronic structure of graphene EDGAR MARTINEZ, Departamento de Fisica de Aplicada, Cinvestav-Merida, Yucatan, Mexico A.P. 73 Cordemex 97310 Merida, Yucatan, Mex, EDUARDO CIFUENTES, Facultad de Ingenieria, Universidad Autonoma de Yucatan, Mexico, ROMEO DE COSS, Departamento de Fisica de Aplicada, Cinvestav-Merida, Yucatan, Mexico — Graphene has been attracting interest due to its remarkable physical properties resulting from an electron spectrum resembling relativistic dynamics (Dirac fermions). Thus, is desirable to know methods for controling the charge carriers in graphene. In this work, we propose that the electronic properties of graphene can be modulated via isotropic and uniaxial strain. We have studied the electronic structure of graphene under mechanical deformation by means of first principles calculations. We present results for the charge distribution, electronic density of states, and band structure. We focus the analysis on the behavior of the Dirac cones and the number of the charge carriers as a function of strain. We find that an isotropic tensile strain increases the effective mass of carriers and an isotropic compression strain decrease it. Uniaxial tensile strain induce a similar behavior, as strain increase effective mass increase. Thus, our results show that strain allows controllable tuning of the graphene electronic properties. This research was supported by Consejo Nacional de Ciencia y Tecnología (Conacyt) under Grant No. 43830-F.

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