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Ab-initio study of the Kohn anomalies in strained graphene[1] M.E. CIFUENTES-QUINTAL, R. DE COSS, Department of Applied Physics, Cinvestav-Merida, Mexico, O. DE LA PEÑA-SEAMAN, R. HEID, K.-P. BOHNEN, Institute for Solid State Physics, Karlsruhe Institute of Technology, Germany — Recent experimental studies have show that the electronic and vibrational properties of graphene can be modulated by means of strain. However, there are not studies on strain effects on the Kohn anomalies, which is a principal key to understand the electron phonon coupling in graphene. In this work we have studied the phonon band structure of graphene under biaxial and uniaxial strain using the mixed basis pseudopotential method, within the framework of the density functional perturbation theory. For tensile/compressive biaxial strain, we found an increasing/decreasing behavior on the slop of the phonon frequencies close to Kohn anomalies. Under uniaxial strain, the two highest optical branches show a discontinuity in the frequency derivative at gamma point, instead of only one branch like in the biaxial and unstrained case. The present results suggest that the electron-phonon coupling in graphene can be modulated via strain.

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