Vibrational Excitations in Single Walled Carbon Nanotube

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The Single Wall Carbon Nano Tubes (SWNT) have drawn considerable attention in recent years due to their possible technological applications. These nanostructures are predicted to be semiconductor or metal depending on diameter and chirality. The basic properties of SWNT are in general analysed in terms of 2D graphite sheet or graphane as such a system is ideal in understanding the underlying basic physics. In the present paper we report the results of our systematic study on the vibrational spectrum of graphene and carbon nanotube. Our theoretical approach is based on the dynamical theory of Born and Huang and includes various forces due to bond stretching and bending in the carbon chains. We have calculated the phonon spectrum for both 'arm-chair' and 'zig-zag' symmetry in a SWNT. The breathing mode vibrations at low energy observed in Raman Scattering measurements, could be explained well from our theoretical results.