Orissa Journal of Physics
ISSN 0974-8202

Vol. 27, No.1
February 2020
pp. 37-42

Electronic band structure of Graphene/h-BN Hetero junction: A Tight Binding Model Study

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Received: 22.11.2019 ; *Revised : 13.12.2019* ; *Accepted : 9.1.2020*

Abstract. We address here the electronic band dispersion of graphene/h-BN hetero junction in a transverse applied electric field. The system is described by kinetic energy with nearest neighbor electron-hopping with hopping energy t_1 and gate potential V across the two layers. The electron Green's functions are calculated by Zubarev's Green's function technique and electron band dispersion is found by equating the denominator of the Green's function to zero. It is observed that the graphene/h-BN system exhibits the band dispersion, where the two bands form a small gap and other two bands form a large gap near the Dirac point. For the application in the electronic devices, these two bands can be modified by the transverse hooping integral and the external biasing potential representing the suitable impurity effects.

Keywords. Graphene/h-BN system, Tight-binding method, Green's function, Electron band dispersion

PACS No. : 71.20., 81.05.ue, 31.15.aq

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