**The role of hopping energy of electrons in graphene on bangap of a periodic graphehe-dielectric structure**

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**Abstract**

The effect of hoping energy on the electromagnetic wave propagation of 1D photonic structure which is formed by embedding alternative graphene layers, a 2D carbonic material with a honeycomb lattice, into a dielectric background is investigated. By using the complete expression of the tight-binding Hamiltonian of graphene layer, we numerically show that the hopping parameter can significantly affect the corresponding bandgap of the structure. Our study could be extend to different frequency region of electromagnetic spectrum.

Noticeable effects also due to the changing the amount of doping which in turn leads to changing the amount of chemical potential are obtained in the numerical part. It is clear that increasing the amount of chemical potential leads to creating wider bandgap. The other aspect of our research is finding out the effect of enhancing hopping energy which gives wider bandgap which by shrinking the layers of SiO_{2} as a dielectric background, the location of the bandgap will be in the upper part of the spectrum range of light.

Noticing the feasibility of various graphene applications in high-frequency range devices besides lack of the acceptable number of the performed research on the optical conductivity of the above mentioned type of photonic crystal beyond the Dirac approximation in graphene, motivate us to take step in this way. Below, just for abstract reviewing, we show two figures in this regards which shows bandgabs as a function of wavelength of electromagnetic waves.

**References**

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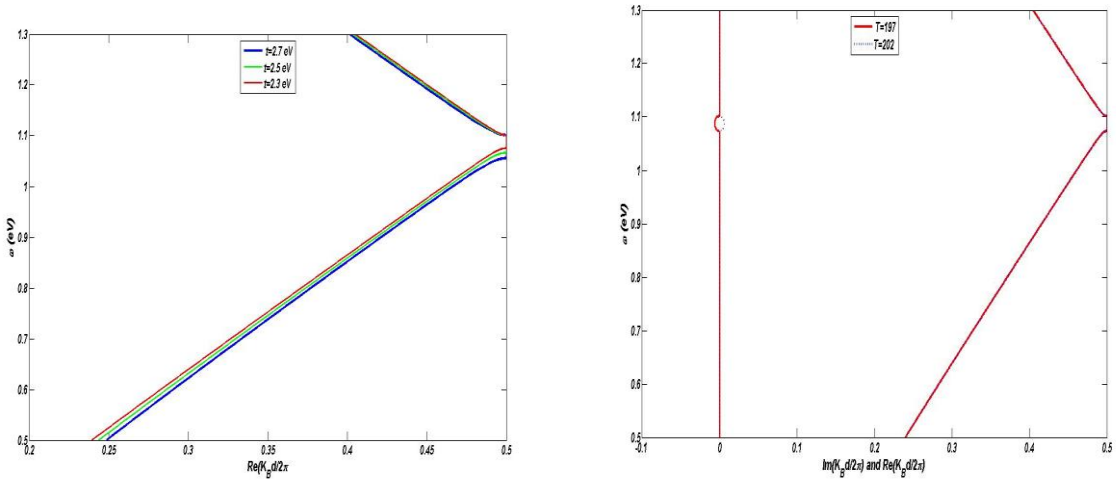
**Figures**




left: the effect of decreasing the hopping. Right:The effect of increasing the amount of chemical potential with the same *Hoping t* = 2.7 eV on the temperature range related to altering the sign of *Im*(*KB*) is depicted