

Mott insulator phase transition in graphene

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Abstract

Mott insulator phase transition is one of the mechanisms that allow application of graphene on low power electronic devices. It has been shown in literature [1] that the phase transition of a spinless system into charge-density-wave (CDW) state occurs at a smaller short-range coupling when the long range coupling is increased. Here, we examine the Mott insulator phase transition into spin-density-wave (SDW) state by considering Gross-Neveu model with spin. Contrary to CDW phase transition and the conventional wisdom, our renormalization group (RG) calculation shows that the SDW phase transition occurs at a larger onsite potential when the nearest neighbor potential is increased.

References

[1] V. Juričić, I. F. Herbut, and G. W. Semenoff, Phys. Rev. B **80**, 081405 (2009).