Electronic and Transport Properties of 4-Terminal Crossed Graphene Nanoribbons Devices

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With the aim of exploring the potential of graphene in electronics, a lot of effort has been spent on the energy-gap engineering so to allow having an off state. Recently, it has been reported a current switching mechanism by voltage control in a graphene crossbar made by two H-passivated 14-armchair nanoribbons rotated by 90 °[1].

Despite of the fast improvement of experimental techniques over the past decade for producing and manipulating graphene nanoribbons, the fabrication of graphene crossbars with a high-precision control on the nanoribbons orientation and relative position is still a difficult task. Moreover, it has been shown that different stacking in graphene bilayer nanoribbons leads to differences on the electronic properties [2].

In this work we studied the electronic and the transport properties of crossed graphene nanoribbons systems varying the relative rotation angles and the inter-layer distances. We used the *ab initio* electronic transport code TranSIESTA [3], which has been recently generalized to consider multi-terminal devices.

References

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