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Electron Transport Simulations of 4-Terminal Crossed Graphene Nanoribbons Devices[1] PEDRO BRANDIMARTE, CFM CSIC-UPV/EHU and DIPC, Spain, NICK R. PAPIOR, DTU Nanotech, Denmark, MADS ENGELUND, CFM CSIC-UPV/EHU and DIPC, Spain, ARAN GARCIA-LEKUE, THOMAS FREDERIKSEN, DIPC and IKERBASQUE, Spain, DANIEL SÁNCHEZ-PORTAL, CFM CSIC-UPV/EHU and DIPC, Spain — Recently, it has been reported theoretically a current switching mechanism by voltage control in a system made by two perpendicular 14-armchair graphene nanoribbons (GNRs) [1]. In order to investigate the possibilities of using crossed GNRs as ON/OFF devices, we have studied their electronic and transport properties as function structural parameters determining the crossing. Our calculations were performed with TranSIESTA code [2], which has been recently generalized to consider $N \geq 1$ arbitrarily distributed electrodes at finite bias. We find that the transmission along each individual GNR and among them strongly depends on the stacking. For a 60° rotation angle, the lattice matching in the crossing region provokes a strong scattering effect that translates into an increased interlayer transmission. [1] K. Masum Habib and R. Lake, Phys. Rev. B 86, 045418 (2012); [2] M. Brandbyge et al, Phys. Rev. B 65, 165401 (2002).

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Pedro Brandimarte
CFM CSIC-UPV/EHU and DIPC, Spain

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