

Abstract Submitted  
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**Electrical modulation in Graphene based devices**<sup>1</sup> HASSAN RAZA, EDWIN KAN, School of Electrical and Computer Engineering, Cornell University Ithaca NY 14853 — Graphene due to its unique dispersion has attracted great attention lately. In a nanoribbon form, it can result in unique ‘bulk like’ states for armchair and edge states for zigzag nanoribbon. Both can be manipulated by an applied bias in the width direction and can result in interesting device concepts. Furthermore, the edge states can be engineered by modifying the edge termination, although atomic-precision is likely required. Moreover, a bandgap can be introduced in a bilayer using an electric field in the bilayer direction. This bandgap opening critically depends on the numbers of graphene layers. Motivated by this rich physics in one and two dimensional graphene structures, we present different bandstructure calculations of nanoribbons and multilayers of graphene. We extract important dispersion parameters from the above calculations. We further study the effect of electric field on these structures. Finally, we present the substrate effect on the electronic structure of graphene layers. We conclude by presenting transport calculations through nanoribbons in longitudinal direction with gate electric field in the width direction.

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