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Unimpeded Tunneling in Graphene Nanoribbons[1] ANDRII IUROV, OLEKSIY ROSLYAK, GODFREY GUMBS, Hunter College/CUNY, DANHONG HUANG, AFRL, Kirtland, NM, HUNTER COLLEGE, CUNY TEAM, AFRL, KIRTLAND, NM TEAM — The Klein paradox is unimpeded tunneling of the purely bonded Dirac electron state across arbitrary wide gated region. Its another manifestation is perfect reflection in the graphene stacks. We studied the Klein paradox in zigzag (ZNR) and anti- zigzag (AZNR) graphene nanoribbons. For ZNR (AZNR), the number N of lattice sites across the nanoribbon is even (odd). Since the ZNR and AZNR (configurations are indistinguishable in the Dirac formalism, we supplemented the model with a pseudo-parity operator whose eigenvalues correctly give the dependence on N for the sublattice wavefunctions, in agreement with the tight-binding model. We have shown that the Klein tunneling in zigzag nanoribbons is determined by conservation of the pseudo-parity rather than pseudo-spin which is required in infinite graphene. Chirality is the projection of the pseudo-spin on momentum at different corners of the Brillouin zone. Perfect transmission for head-on incidence is replaced by perfect transmission at the center of the ribbon.

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