

Inter-Valley vs. Intra-Valley Scattering in Zigzag-Edge Graphene Nano-Ribbons

Tight-binding modeling of the current in zigzag-edge graphene nano-ribbons indicates that 120-degrees turns of the ribbon have virtually no effect on the ballistic transmission within single-band conduction window. At the same time 60-degrees turns are highly reflective. Figures below illustrate these statements. A simple pictorial explanation of the underlying physics is provided in the following article: [120 vs 60 Conductance 03 CNT Learning Materials.pdf](#) (728 KB, uploaded by Denis Areshkin 1 decade 3 years ago)

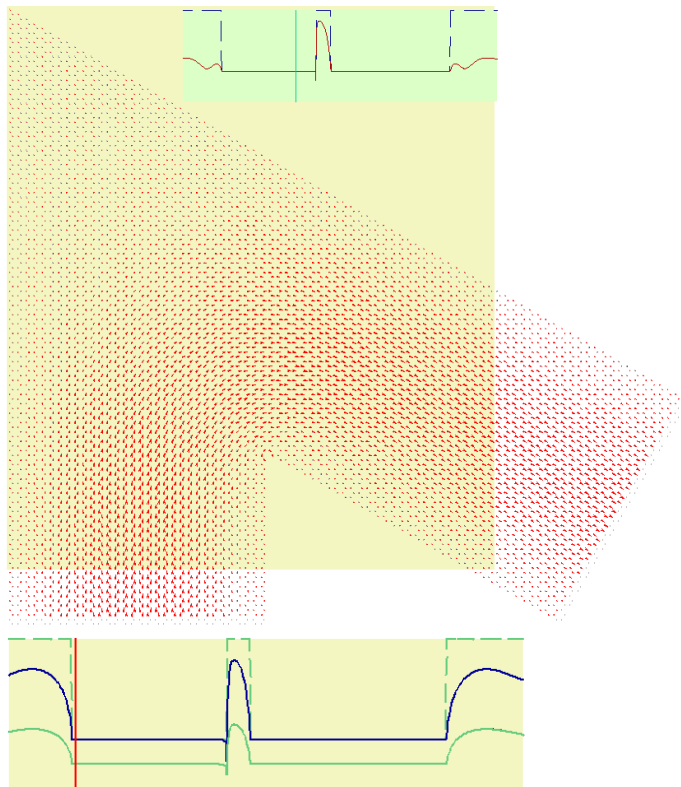


Figure 1 Atomically-resolved current in 120-degrees Z-GNR turn for the given energy E . The transmission plot is presented in insert. The dashed dark-blue line is the transmission of a perfect straight Z-GNR of the same width. The dark-red curve is the transmission of the 120-degrees turn. The green vertical line marks energy E . These Results were obtained using pi-orbital tight binding in the second nearest neighbor approximation.

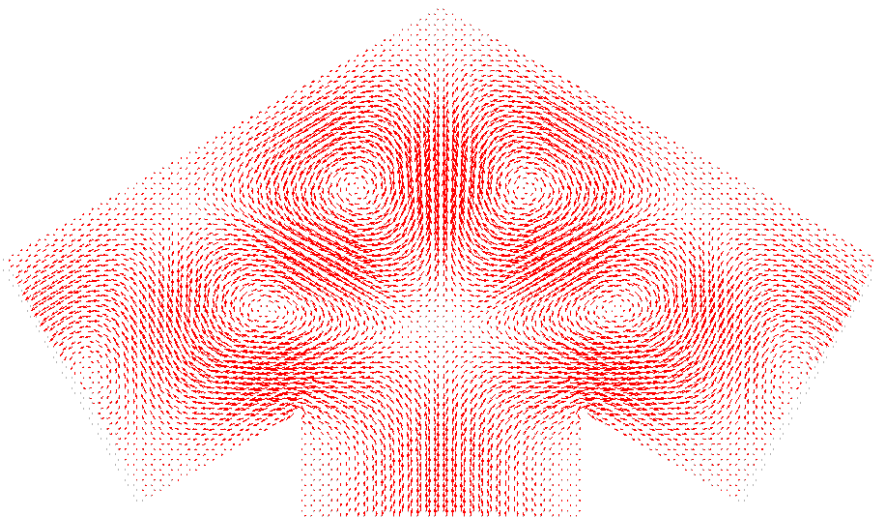
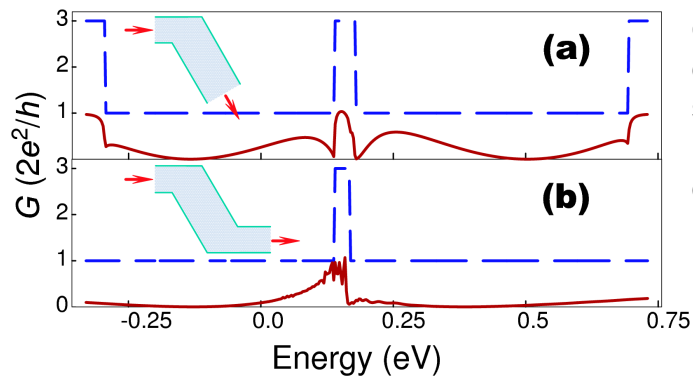


Figure 3 Transmission (dark-red curve) of a single 60-degrees turn (top) and two



consecutive 60-degrees turns (bottom). The dashed blue line is the transmission of the straight Z-GNR of the same width as the input lead. These results were obtained in the pi-orbital tight binding in the second nearest neighbor approximation.