Line Edge Roughness in GNR Tunneling FETs

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Objectives:

- Simulation of Graphene Nanoribbon band-to-band tunneling FETs
- Study the influence of Line Edge Roughness (LER) on their performances

Approach:

- Non-equilibrium quantum transport with on single orbital per carbon atom
- Atomistic description of the graphene ribbon
- Edge atoms randomly removed with a given probability P
- Statistical sampling of LER (100 random samples per roughness probability)

Results and Impacts:

- LER causes drastic increase of OFF-current and decrease of ON/OFF ratio (band gap states)
- Help experimentalists design better devices, less sensitive to LER

Image Caption

Up: Single-gate graphene nanoribbon tunneling transistor and sample of a graphene nanoribbon with random LER

Down: Transfer characteristics I_d-V_{gs} of graphene nanoribbon tunneling FETs with different LER probabilities. Each curve represents the average of 100 different samples