Comparison of NEGF with TCAD model

Objectives:

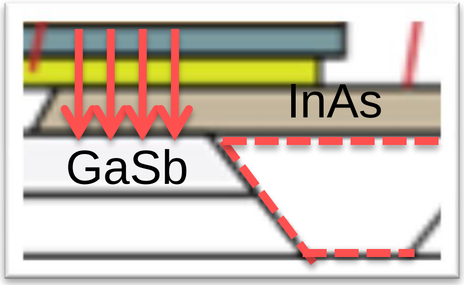
- Optimize design of top gated TFETs for low SS.
- Explore scaling limits of top gated TFETs.
- Evaluation the accuracy of transport models.

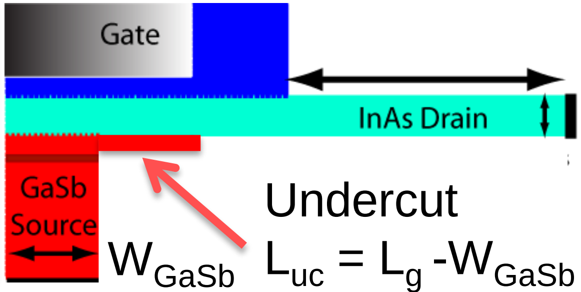
Methods:

- Drift-Diffusion potential + NEGF.
- Drift-Diffusion + dynamic non-local band to band tunneling model (Synopsys TCAD).

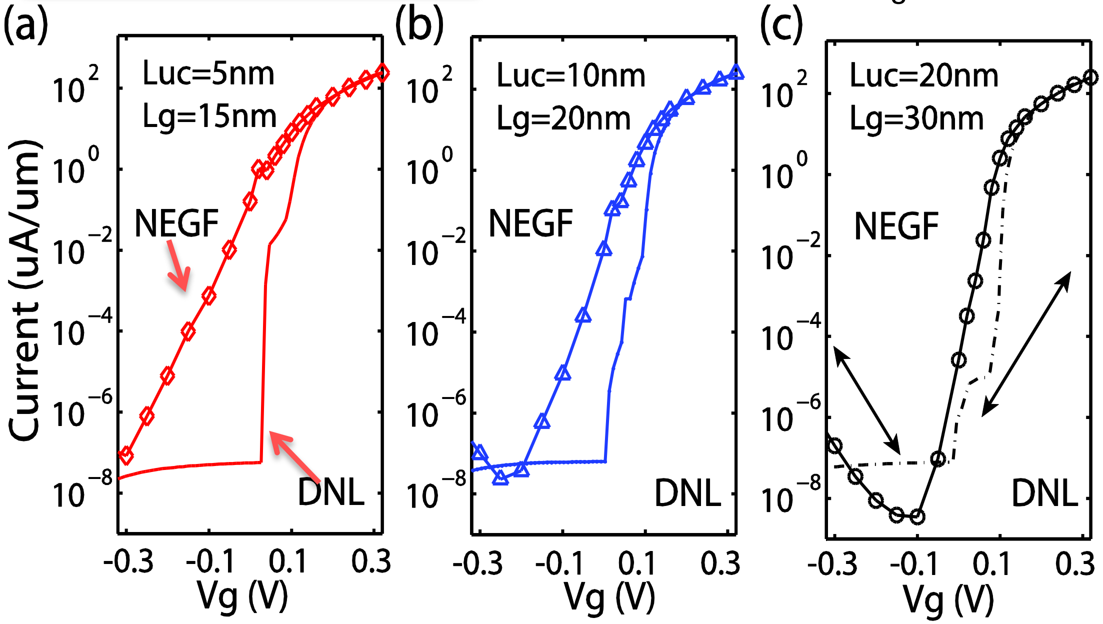
Results:

- Extract confined bandgap and DOS effective mass.
- Similar electrostatic potential from different models.
- Undercut length is important to reduce leakage.





Undercut $L_{uc} = L_g - W_{GaSb}$



Impacts:

- NEGF predicts more accurate scaling limit for top-gated TFET.
- Reduce simulation time compared with full self-consistent simulations.