

Objective:

- Understand experimental data on III-V HEMT devices for logic applications
- How close to the ballistic limit are short channel III-V devices?
- What controls their performance?

Approach:

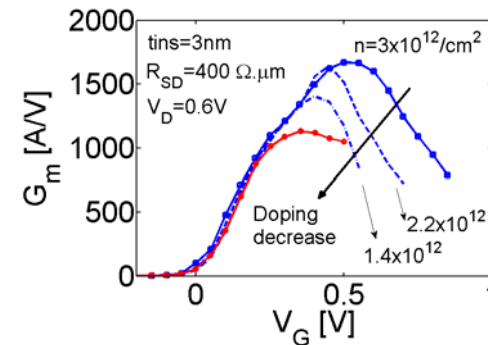
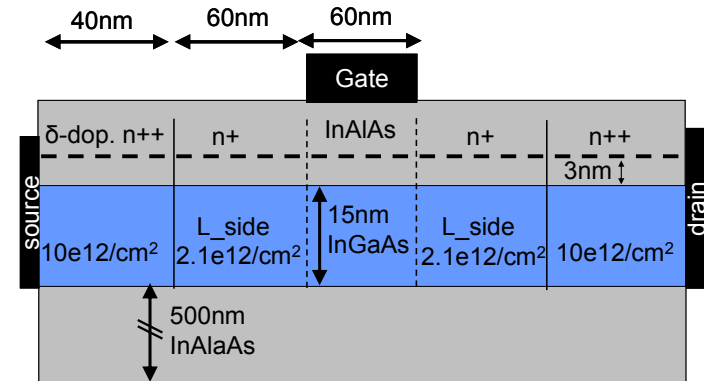
- Use a 2D quantum (NEGF) simulator
- Simulate the experimental structure using δ -doped doping
- Use the $sp^3d^5s^*$ TB model to extract the effective mass of the III-V channel

Impact:

- Devices as short as $L_G=60\text{nm}$ are close to the ballistic limit.
- The series resistance R_{SD} and the design of the contacts affects the performance.
- Identified the low doping in the contacts as the most possible reason for the G_m degradation observed in experimental data.

Publications:

- arxiv: 0810.1540



G_m rolls off as the gate bias increases, possibly due to source exhaustion

