Scalable GaSb/InAs Tunnel FETs With Non-Uniform Body Thickness*

Problem:

- *GaSb/InAs heterojunction TFETs are NOT scalable* **<-** *large tunneling leakage* **<-** *small band gap and effective mass of the InAs channel*

Objective:

- *To have a scalable design*

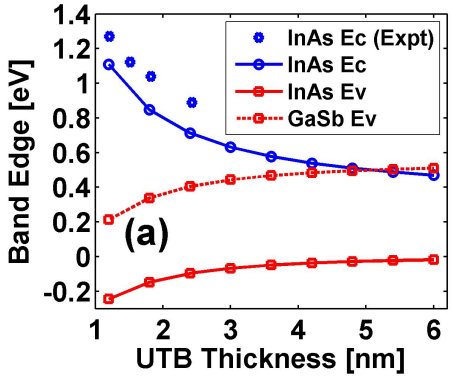
Approach:

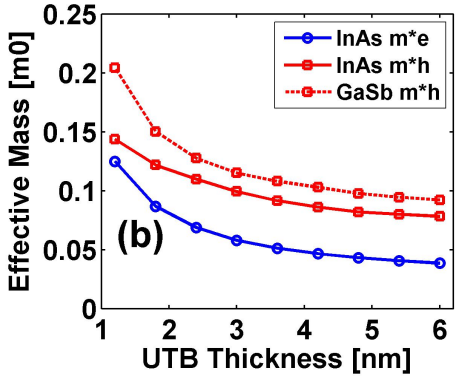
Non-uniform body thickness design:

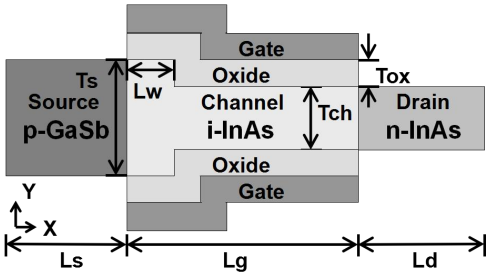
- *Thin InAs channel* **->** *a large band gap and large effective masses* **->** *small tunnel leakage at OFF state*
- *Thick GaSb/InAs tunnel junction* **->** *a low tunnel barrier and small tunnel effective masses* **->** *large tunnel probability at ON state*

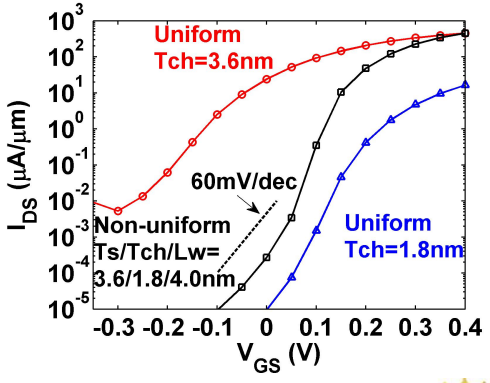
Results / Impact:

- *@Lg=15nm, V_{DD}=0.3V and I_{OFF}=1nA/um, I_{ON}=284uA/um, an order of magnitude larger than the uniform case (25uA/um).*
- *Scalable to sub-10nm channel length*









*J. Z. Huang *et al.*, *IEEE TED*, vol. 64, no. 1, pp. 96–101, Jan. 2017.