

# ANODE GROUP

## Advanced Nanometer DEvices

Permanent staff: F. DANNEVILLE, G. DAMBRINE, S. BOLLAERT, M. ZAKNOUNE, Y. ROELENS, N. WICHMANN

Non permanent staff: PhD: J. SHI, S. BAGUMAKO, M. DENG, F. WANG, S. OEUVRARD, M. DENG, Y. ANDEE, J. MORON GUERRA - Post-Doc: C. GARDES, M. EKIELSKI, J. MARZOUK

### OBJECTIVES

Study potentialities of advanced nanometer Devices for high frequency, low noise and low power applications including :

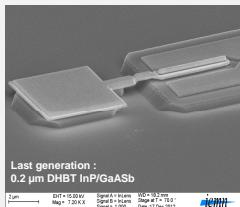
-Process development

-III-V based Narrow bandgap devices fabrication

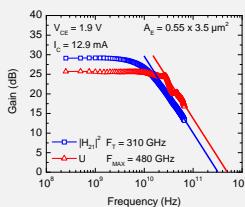
- Advanced nanometer Silicon Devices Investigation

-high frequency electrical characterization (small signal measurement, noise measurement and low temperature microwave measurement)

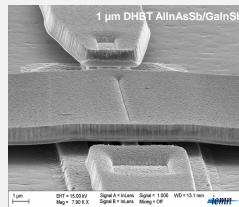
### III-V NARROW BANDGAP ACTIVITIES



Last generation : 0.2  $\mu\text{m}$  DHBT InP/GaAsb

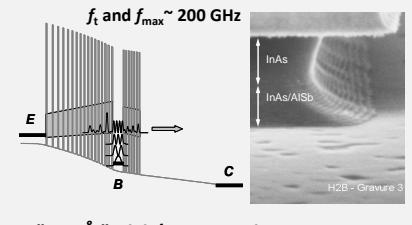
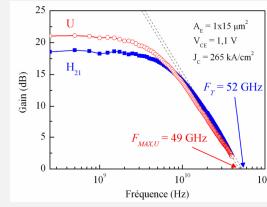


GaAsSb/InP Type-II Double HBT



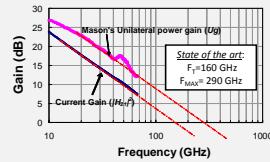
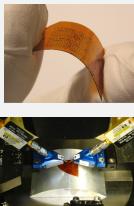
World first RF " 6.1 Å " AlInAsSb/GaInSb Double TBH

#### TeraHertz Application

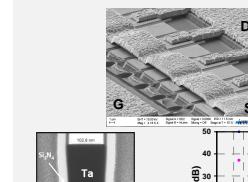


" 6.1 Å " AlSb/InAs Hot Electron Transistor  
World first RF at room temperature

#### Flexible Electronics

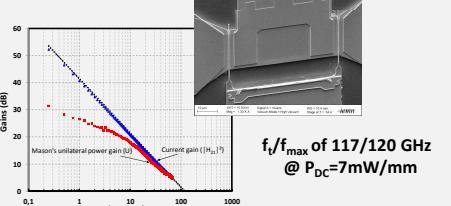


InGaAs/InAlAs HEMT on flexible substrate



Multi-gate III-V MOSFET

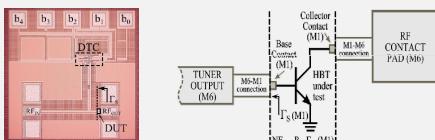
#### Low Power Consumption



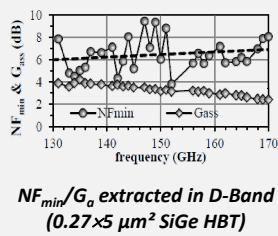
InAs/AlSb HEMT

### ADVANCED NANOMETER SILICON ACTIVITIES

#### Noise measurements Using in-situ Tuners on Si

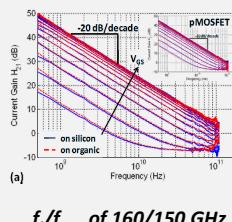
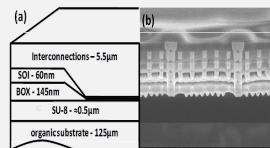


In-situ Tuner for D-band (130-170 GHz)



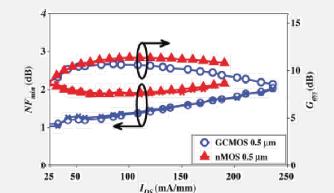
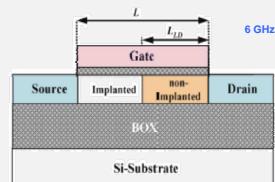
$NF_{min}/G_d$  extracted in D-Band  
( $0.27 \times 5 \mu\text{m}^2$  SiGe HBT)

#### Characterization of 65 nm SOI CMOS reported on Flexible Substrate



$f_T/f_{max}$  of 160/150 GHz

#### Study of HF Noise in Graded-Channel MOSFETs



Improvement of HF noise performance

### COLLABORATIONS / FUNDING