# Epitaxial wafers offer

## III-V Lab offers an unique capability in Europe for epitaxial wafers based on the four III-V materials families (GaN, InP, GaAs and GaSb).

### From R&D to niche market production

- III-V Lab can support your projects thanks to a pool of 7 MBE, MOVPE, GSMBE reactors at the state of the art and located in Paris-Saclay (France).

### A dual offer

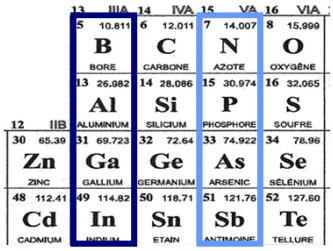
- Standard epitaxial structures,
- Advanced epitaxy development studies,

on wafers ranging from 2 inches to 200 mm.

### Standard epitaxial structures

- at reduced non-recurring costs,
- and in a short cycle-time,

thanks to more than 20 years of experience in high-end and advanced epitaxial III-V materials growth :




| STANDARD | Epitaxial structures or building blocks | Materials | | Max. wafer diameter |
|---|---|---|---|---|
| | | Substrate | Typical epitaxy stacks | |
| Photonics products | QCL / QCD(1) | InP | AlInAs/GaInAs | 100mm |
| | QCL | GaAs | AlAs/AlGaAs | 200mm |
| | | GaSb | AlSb/InAs | 100mm |
| | MQW (2) for laser diodes | GaAs | Stacks for wavelength from 780nm to 1.06µm | 100mm |
| | | InP | Stacks for wavelength from 1.3 to 1.6µm | 100mm |
| | | GaSb | AlGaAsSb/GaInAsSb for wavelength from 2 to 2.5µm | 100mm |
| | SOA (3) | InP | Stacks for C and O bands | 3 inches |
| | APD-UTC (4) detectors | InP | Quaternary alloys on InP | 3 inches |
| | Infrared Detectors | GaAs, GaSb, InP | Stacks for SWIR (7), MWIR (8) & LWIR (9) | 100mm |
| | SIBH regrowth | InP | Semi-insulating InP (Fe, Ru) | 3 inches |
| | Regrowth on grating | InP, GaAs | Buried gratings for DFB laser diodes | 100mm |
| | Butt Joint Integration | InP | Passive structures | 3 inches |
| | Zn diffusion | InP | - | 100mm |
| Electronics products | InP HBT Transistors (5) | InP | InGaAs/InP | 100mm |
| | GaN HEMT Transistors (6) | SiC | InAlGaN, AlGaN/GaN | 100mm |

*(1): QCL: Quantum Cascade Laser / QCD: Quantum Cascade Detector*
*(2) : MQW: Multi Quantum Wells*
*(3) : SOA: Semiconductor Optical Amplifier*
*(4) : APD: Avalanche Photodiode / UTC: Unitravelling Carrier*
*(5): HBT: Heterojunction Bipolar Transistor*
*(6): HEMT: High Electron Mobility Transistor*
*(7): SWIR: Short Wave Infra-Red (1.3-1.7µm)*
*(8): MWIR: Medium Wave Infra-Red (3-5µm)*
*(9): LWIR: Long Wave Infra-Red (8-12µm)*



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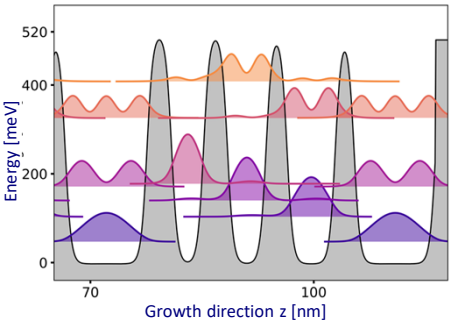
III-V Lab is certified ISO9001-2015

# Epitaxial wafers offer

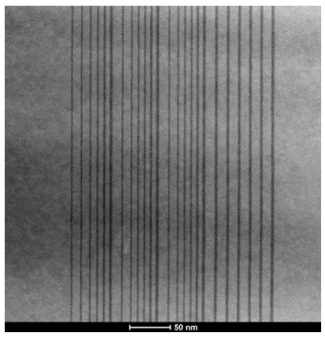
## ► Advanced developments

**III-V Lab can assist your project in order to match with your specifications and propose :**

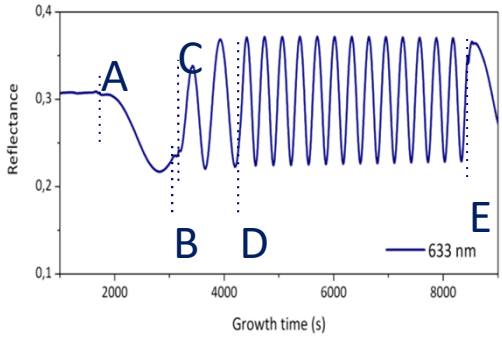
- Specification definition based on long track record experience,
- Epitaxial structure optimization by design in simulation,
- Fast wafer manufacturing and validation with in situ and post-manufacturing controls,
- Process stabilization through statistical data-meaning and DOEs.




Stack simulation




Stack manufacturing




Stack controls

## ► Advanced epitaxial structures can be developed on demand by adjusting process parameters, alloys and doping elements, according to the available options given below :

| Technology | Services | | | III-V alloys families | | | | Doping elements | Max wafer diameter |
|---|---|---|---|---|---|---|---|---|---|
| | Epi. wafer | Regrowth | Zn diffusion | Nitrides (N) | Phosphides (P) | Arsenides (As) | Antimonides (Sb) | | |
| MBE | X | | | | | X | X | Si, Te, Be | 200mm |
| MOVPE | | X | | | X | X | | Fe, Si, Ru | 100mm |
| | X | X | | X | | | | Mg, Si | 150mm |
| | X | X | X | | X | X | | Zn, C, S, Si, Te | 200mm |
| GSMBE | X | X | | | X | X | | Si, Be | 100mm |

Capabilities



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