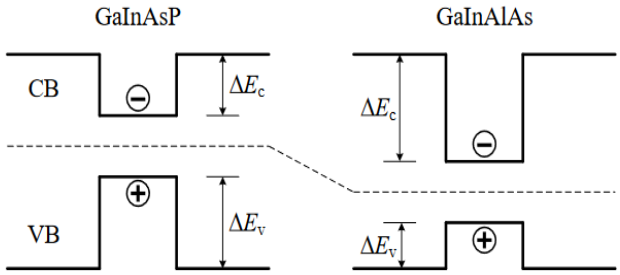
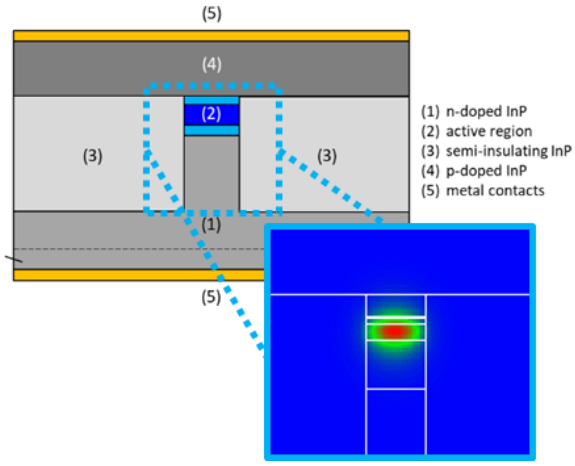
Indium Phosphide Photonic Integrated Circuit Open Foundry Offer (SIBH-OPIC-1.0)

The III-V Lab O-band SIBH-OPIC-1.0 InP Photonic Integrated Circuit technology is now available as a flexible Multi-Project-Wafers offer.

- **SIBH-OPIC-1.0 is a High-Performance O-Band Technology suitable for demanding Photonics Applications in terms of:**
  - Thermal Efficiency
  - Optical Power
  - Active and Passive Building Blocks Integration
- **Strong competitive advantage thanks to Semi Insulating Buried Heterostructure (SIBH) associated to Aluminium Quantum Wells:**
  - High energy efficiency for lasers and gain sections
  - Fully compatible with very high-speed modulators
  - Compatible with spot size converters
  - Good thermal dissipation
  - Suitable for high temperature operation



Aluminium Quantum Wells



SIBH

BB	Parameters	Performance Indicators
DFB 	Length	• Threshold Current @ 45°C: <10mA • Slope Efficiency @ 45°C: 0.15W/A • Emission Wavelength Range: 1260nm-1320nm • SMSR: >45dB
	Phase shift	
	Emission wavelength	
EAM 	Length	• SER @-2V: 9dB • E/O BW: >30GHz
SOA 	Length	• Gain: 47.8cm-1 @ 4.17kA/cm2 Current Density and -25dBm Pin

BB	Parameters	Performance Indicators
Straight WG 	Length	• Loss: <3dB/cm
Curved WG 	Bending radius	• Excess Loss < 0.5dB for bending radius > 500um
2x1 MMI* 	Length: 301µm	• Excess loss: <1dB
	Width: 15µm	
2x2 MMI* 	Length: 915µm	• Excess loss: <1dB
	Width: 23µm	
DBR	Length	• Reflectivity up to 95% • Thermal tuning range: <= 5nm
	Wavelength	
	Sampling	
SSC 	Maximum output mode diameter	• Mode diameter : H: 3µm x V: 3µm

(*) 2x1MMI and 2x2MMI have only fixed geometries. All other building blocks offer a larger range of geometries. Please refer to the Design Manual for more details.

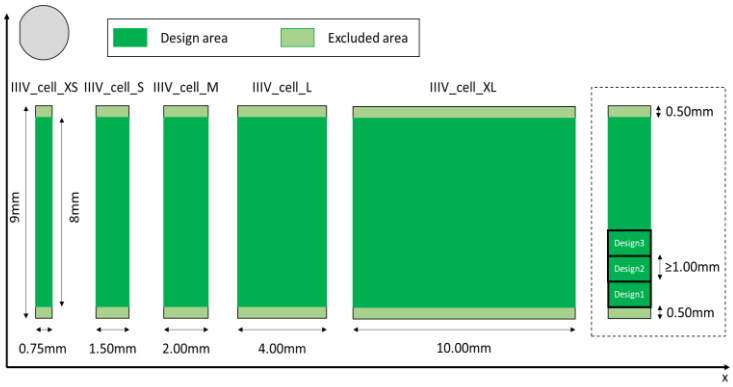
DFB : Distributed Feedback Laser
EAM : Electro Absorption Modulator
SOA : Semiconductor Optical Amplifier
WG : Waveguide

You can easily design your own high performance functions by using a comprehensive Process Design Kit compatible with the main photonic design and simulation tools available on the market. The main available building blocks are illustrated above. More are available in our Design Manual available on demand at foundry@3-5lab.fr.

Indium Phosphide Photonic Integrated Circuit Open Foundry Offer (SIBH-OPIC-1.0)

- **The design cell area can be selected to perfectly match with your project from 0.75x8.00 mm² to 10.00x8.00 mm² .**

- **Several cells can be ordered depending on the required amount of different PIC designs.**



- **A full turn-key MPW offer from Process Design Kit to diced PICs:**
  - 2 Multi-Project-Wafer runs per year / Dedicated runs on demand
  - Process Design Kit and PIC design support
  - Front-end: wafer manufacturing

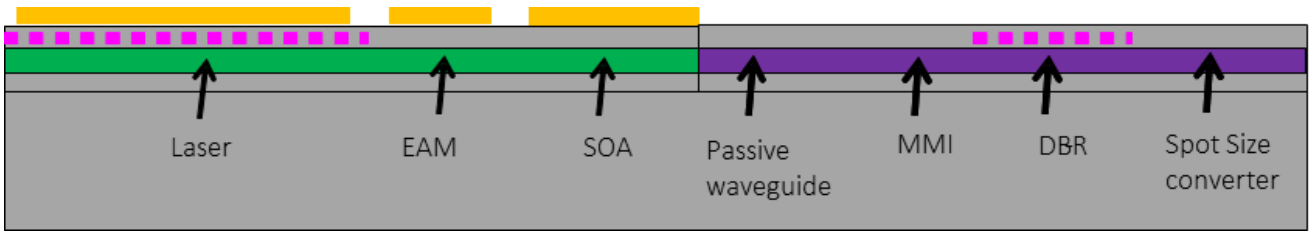
Base Epitaxy → **Active/Passive Integration** → **SIBH Waveguides** → **Metallization, Vias, Access pads**

  - Wafer processing compliance monitoring
  - Back-end: PICs preparation and shipment

Wafer Thinning → **Backside Metallization** → **Bars cleaving, AR coating, Dicing** → **Gel packs, Sealing, Shipment**

- **At least one MPW run every 6 months taking advantage of the latest building blocks of the yearly PDK release. 1st MPW scheduled for second half 2024.**

- **Future PDK releases will include:**
  - Selective area growth for active/active integration
  - Semi-Insulating substrates for increased modulation speed
  - Deep waveguides for better optical confinement and smaller waveguide bending radius
  - Electro-optical phase modulators for increased modulation speed
  - Photodiodes with telecom-grade bandwidth and responsivity



Cross-section view of a PIC

III-V Lab (*)
1, avenue Augustin Fresnel
91767 PALAISEAU CEDEX - France
(*) Joint lab between Nokia, Thales and CEA
www.3-5lab.fr
foundry@3-5lab.fr

AT35/C/2024/05/0383/ May. 30 2024

Early announcement,
1st MPW scheduled for second half 2024

III-V Lab is certified ISO9001-2015