



Scalable low loss SiN  
可量产低损耗  
氮化硅光集成芯片

European PIC Company with a global reach

## LIGENTEC key facts



2<sup>nd</sup> April '24

LIGENTEC,  
Ghent, Belgium



Europe based



LIGENTEC, Lausanne, Switzerland



Global Reach

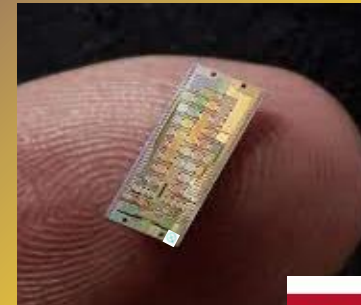
>70 photonic enthusiasts



LIGENTEC, Corbeil, France

Best-in-class integrated passive SiN

- Low Loss SiN (0.2 dB/cm to < 1 dB/m)
- 3 Technologies (AN150, AN350, AN800)
- Extensive PDK



ISO 9001  
BUREAU VERITAS  
Certification



# Seamless journey from Idea to Volumes

从想法到量产无缝衔接

## Entry: R&D & Prototyping

*Open access, low barrier*

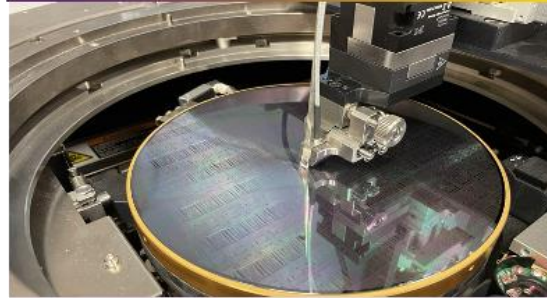


### Fast prototyping

- Established technology
- Fixed layer stack
- Extensive PDK
- **Regular MPW runs**
- Custom runs
- Design / layout support
- Characterization
- Packaging support

## Optimize: Development

*High flexibility & competence*



### Custom PIC Developments

- Engineering studies
- Layer stack adaptation
- Custom integrations

### Ligentec Labs

- Early technology access

## Manufacturing: Supply

*Quality and guarantee*



### Pilot Fabrication

- Pilot and niche quantities

### Volume Fabrication

- Large volumes
- High-capacity wafer fab
- Fully automated testing
- Automotive quality system

# Benefits of Silicon Nitride

Large transparency window: 400 – 4'000 nm

*Reference Silicon: 1'100 – 4'000 nm*

Low propagation loss: < 1dB/m

*Reference Silicon: 50-1000 dB/m*

High optical power: > 5 W per waveguide ( $10^9$  W/cm<sup>2</sup>)

*Reference Silicon: 0.1 W per waveguide*

Scalable to volume

*Non exotic material*



Telecom



Data Center



AR / VR



Wearables



BioSensing



LIDAR



Space



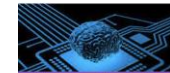
Quantum Computing



Atomic Clocks



Astronomy



Neurom. Computing



5G



Quantum Crypto

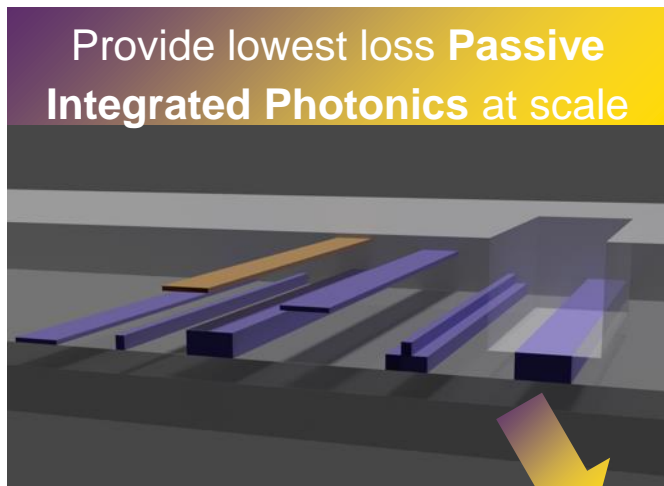


Next big thing

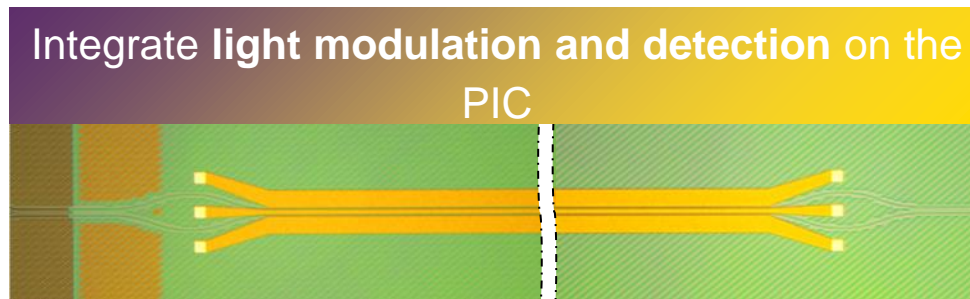
*required for many applications*

Our mission

# Our focus is to bring PICS into products

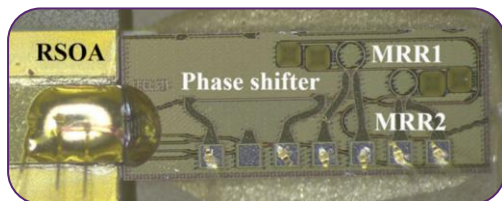
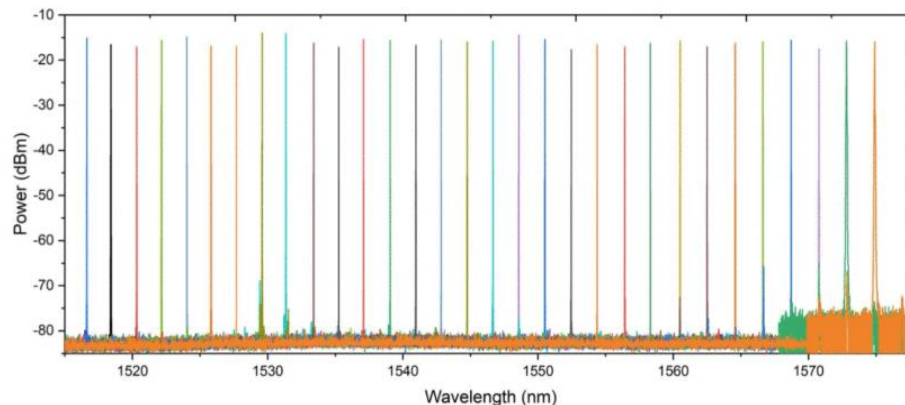
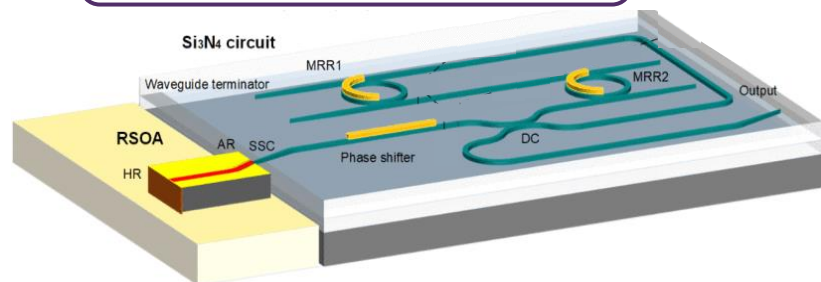


无源低损耗SiN光波导+调制器/探测器 → 产品



# Tunable Narrow Linewidth Lasers

**LIGEN TEC's capability to design, layout and fabrication**



## Narrow Linewidth External Cavity Lasers

**Linewidth: <3kHz**

**Max power: 34mW**

**SMSR: -70dB**

**Tuning: 58.5nm**

*The next step – enhance the SiN PIC platform*

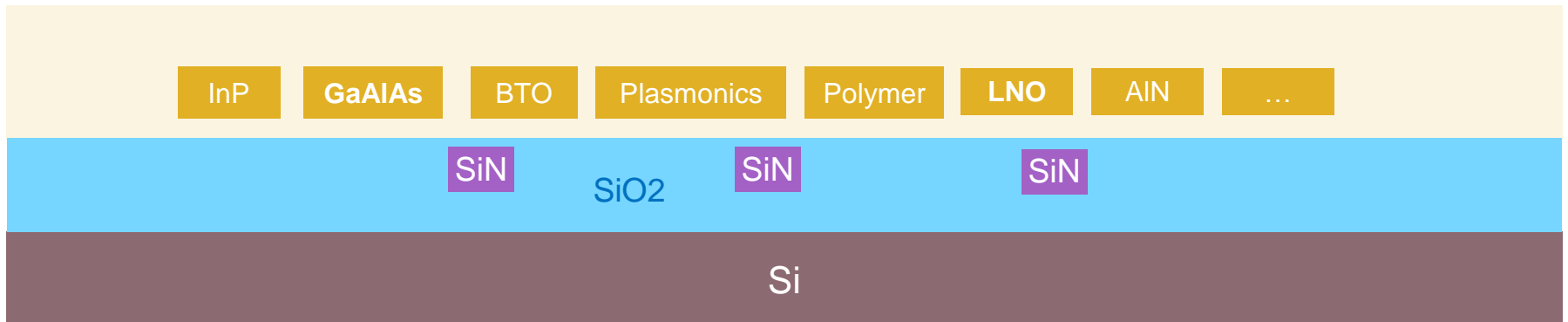
## SiN – The platform for heterogeneous integration



### Use SiN as base platform for general circuitry

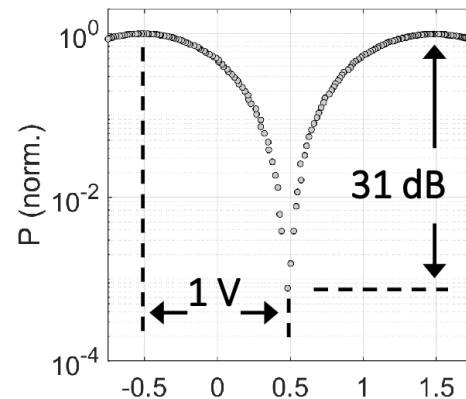
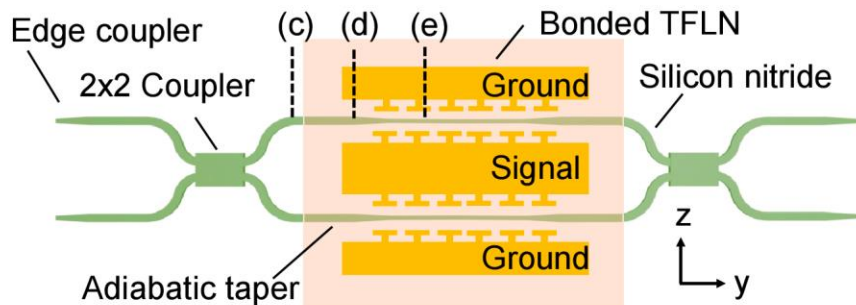
- Comprehensive PDK
- Standard I/Os
- Scalable to volume

Add materials as required by application



The next step – enhance the SiN PIC platform

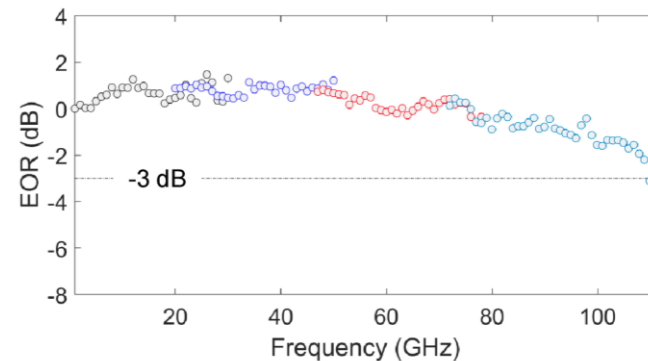
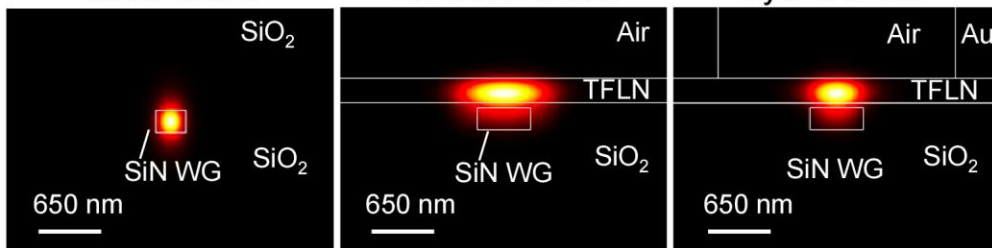
## Heterogeneous integration of modulators (GHz)



Feeder Mode

Transition Mode

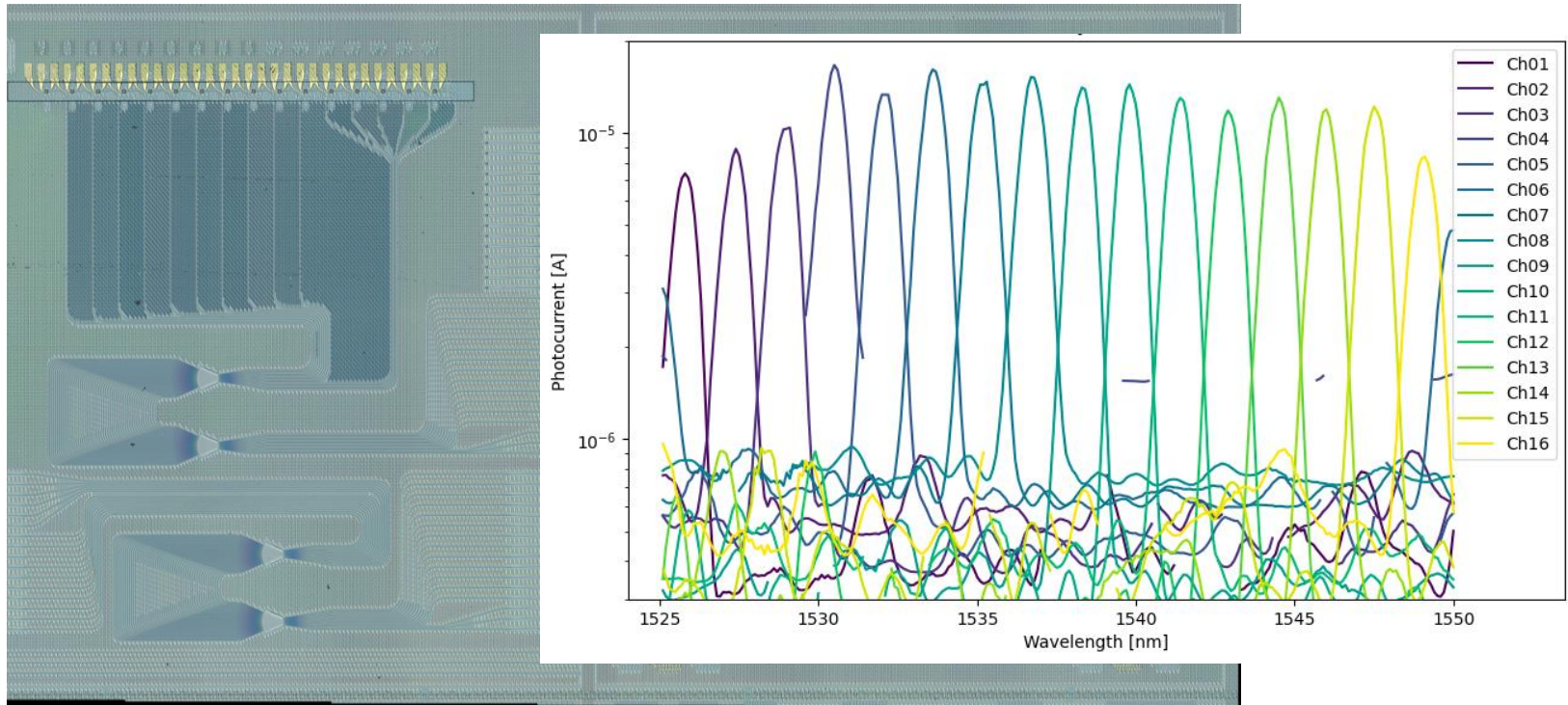
Hybrid Mode





The next step – enhance the SiN PIC platform

## Integration of photodiodes

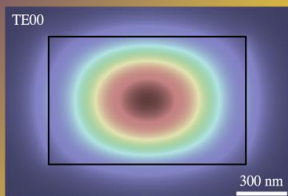


# Summary

## Low Loss SiN - Platform Overview



### Low loss waveguides



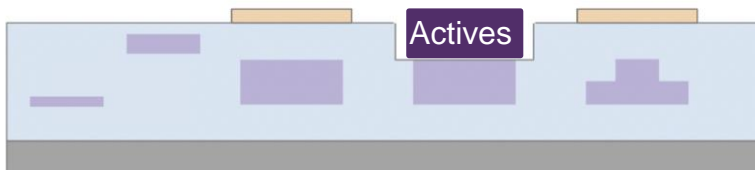
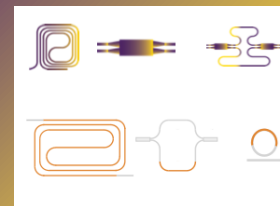
MPW / Dedicated runs

Short turn around

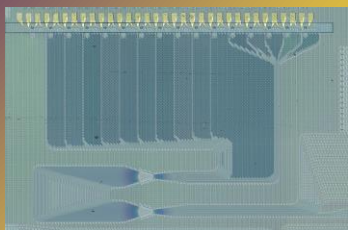
Flexible R&D line

Volume line

### Extensive PDK



### Actives Integration



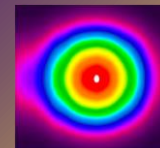
LIGENTEC微信公众平台



LIGENTEC微信联系人



### Low loss optical I/O



MFD [μm]	9.7
M <sup>2</sup>	1.06

