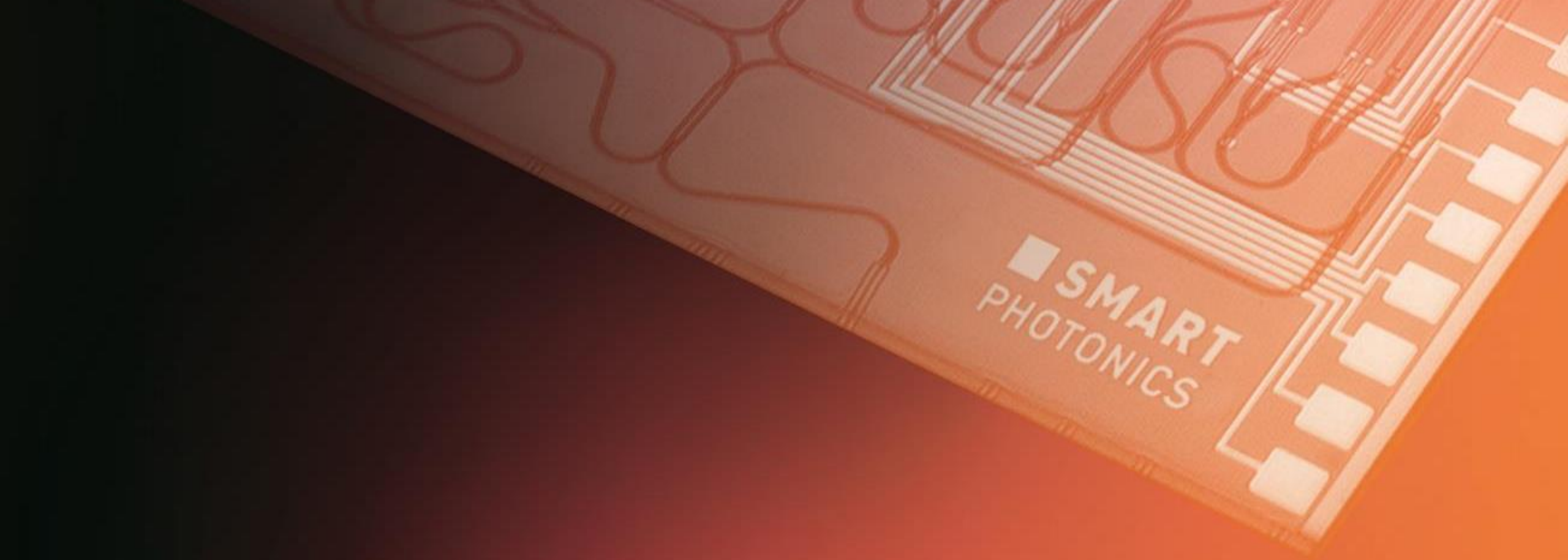


InP PHOTONICS INTEGRATED CIRCUITS

NAZANIN SHAFIEE

ABOUT SMART PHOTONICS FOUNDRY

- Independent Pure-play Foundry for InP based Photonic components
- Building on more than 40 years of technology heritage



Origin — PHILIPS

First commercialization components

Cooperation — TU/e with Eindhoven University of Technology

Acquisition — acquired by Uniphase for €1.2B

Spin-off SMART Photonics — SMART PHOTONICS

NanoLab established — Established first shared facility for integrated Photonics prototyping

First production — First Multi Project Wafer produced

First step in control — Move to HTC and installation of tool set in HTC facility (50% of process)

Full Control — €35M Investment round

New fab — Scale up to serve global customers as state of the art photonics foundry

Early 1980's | 1991 | 1994 | 1998 | 2002 | 2012 | 2013 | 2017 | 2020 | >2022

Total investment in fundamental InP and Photonics research estimated at €300M

SMART PHOTONICS
Independent InP Foundry

MARKET REPORTS

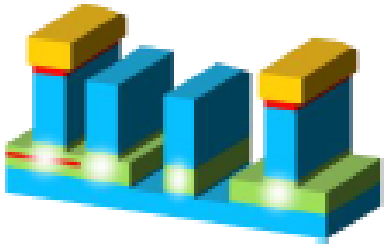
- InP is the **most advanced platform** for **high-performance large-scale PICs**

- In addition to fiber optic communication systems, InP PICs can impact other applications where **high performance** is required in conjunction with **low cost, size, weight and power**

SMART PHOTONICS
Independent InP Foundry

Source: Global Photonic Integrated Circuits (PIC) Market- Transparency Market Research, 2019

OFFERING



MPW

PICs

❖ **JePPIX Pilot Line Project**

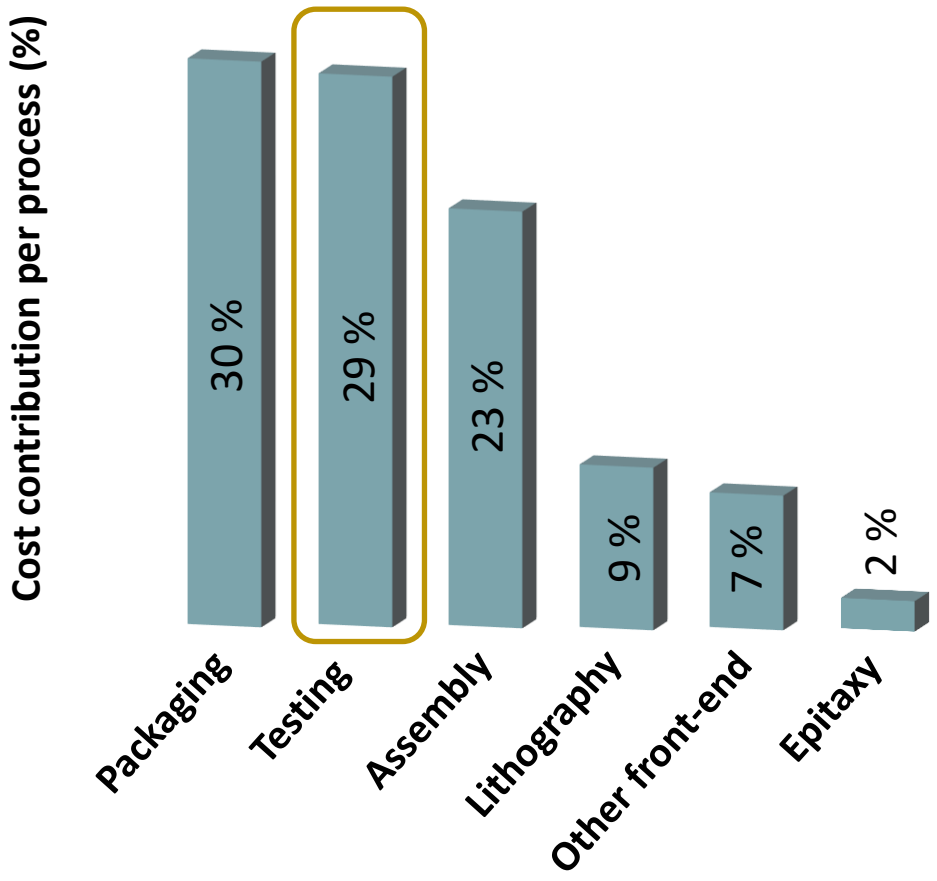
	Performance		
Building block	**InP**	**SiP**	**SiN**
Passive components	●●	●●	●●●
Lasers	●●●	H	H
Modulators	●●●	●●	●
Switches	●●●	●●●	●
Optical amplifiers	●●●	H	H
Detectors	●●●	●●●	H

Performance	
●●●	Very good
●●	Good
●	Modest

Fabrication Technology	
H	Hybrid/Heterogeneous

SMART PHOTONICS
Independent InP Foundry

PIC COST BREAKDOWN

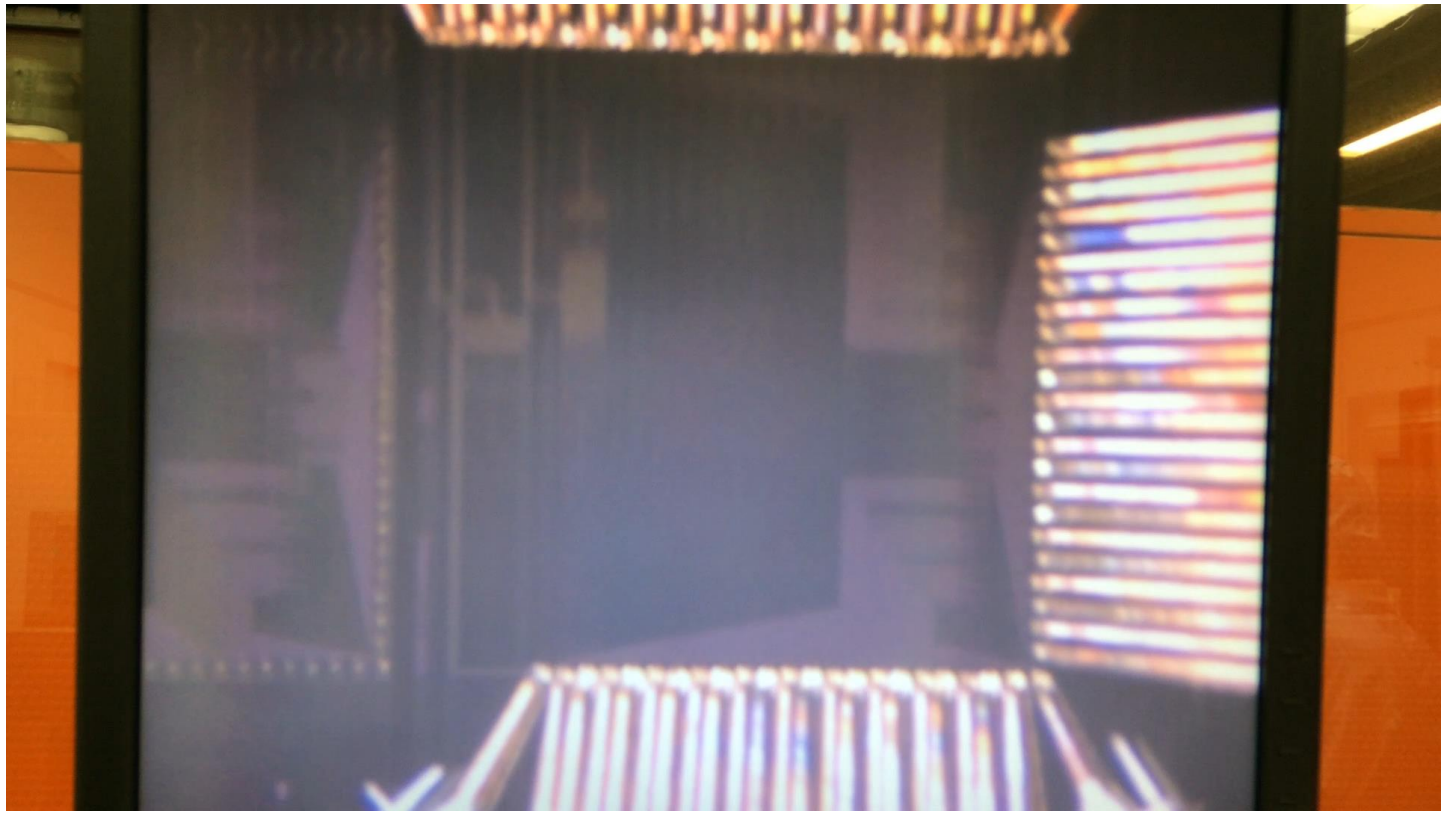


- Over 80 % of cost is in: packaging, testing, and assembly
- InP reduces assembly (and BOM) cost on module and system level

SMART PHOTONICS
Independent InP Foundry

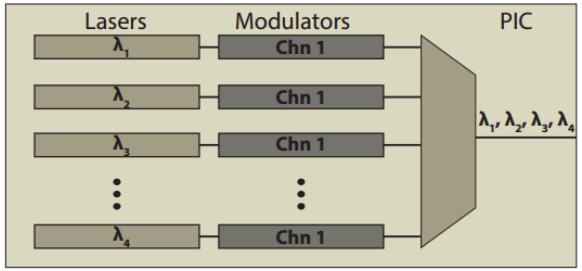
Chart based on data from a study of Erica R. H. Fuchs in IEEE JLT, vol. 24, No.8, 2006

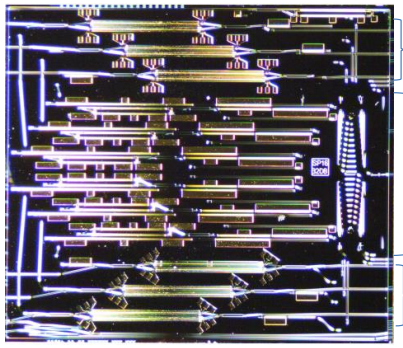
WAFER PROBER



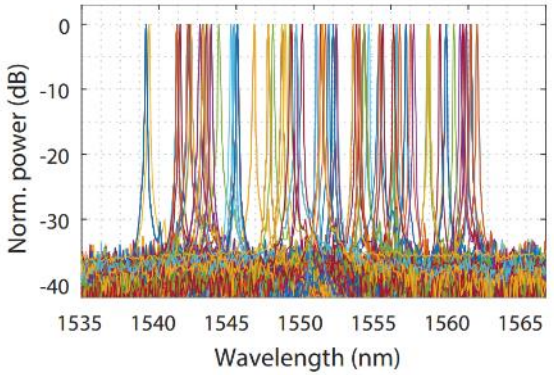
- Automated
- All electrical device level testing
- Standard pad layout needed

SMART PHOTONICS
Independent InP Foundry

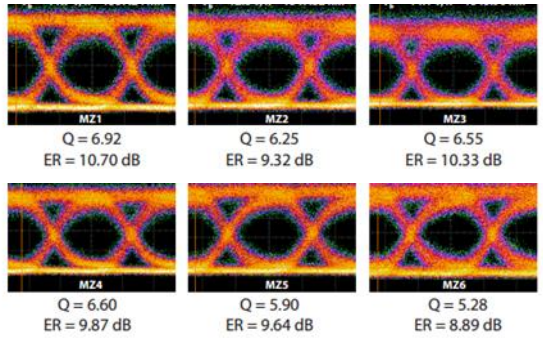




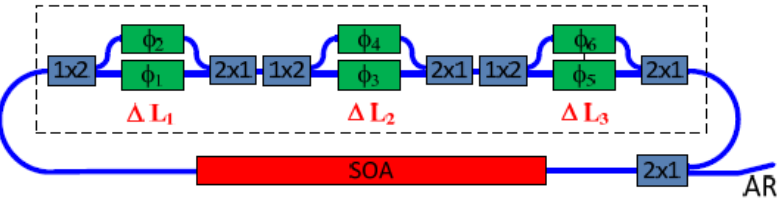
Wavelength tuning

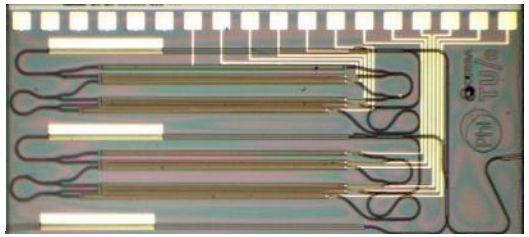


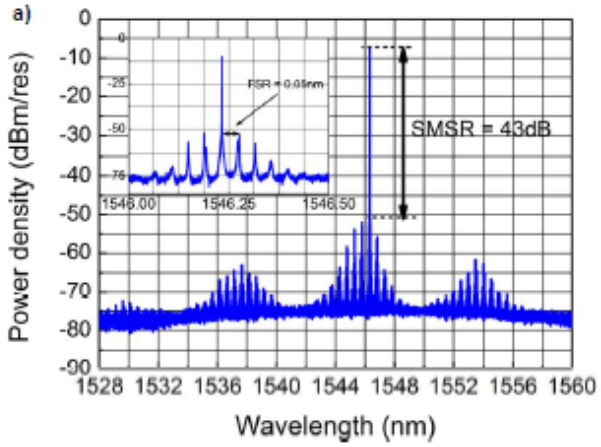
20 Gb/s per channel

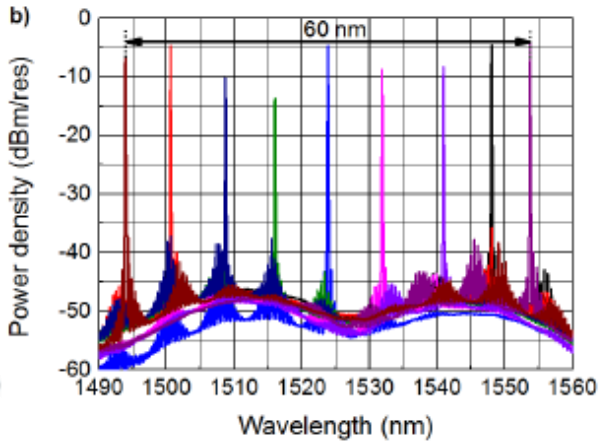


>100 Gb/s transmitter

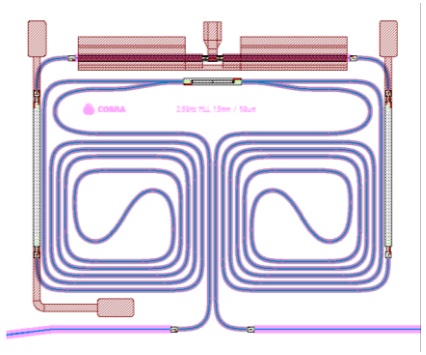


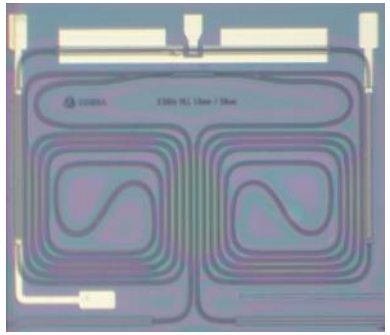


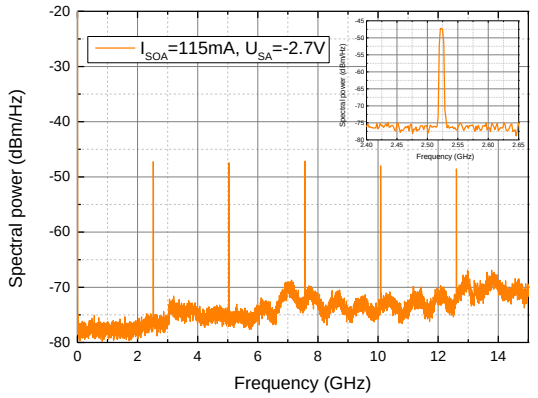




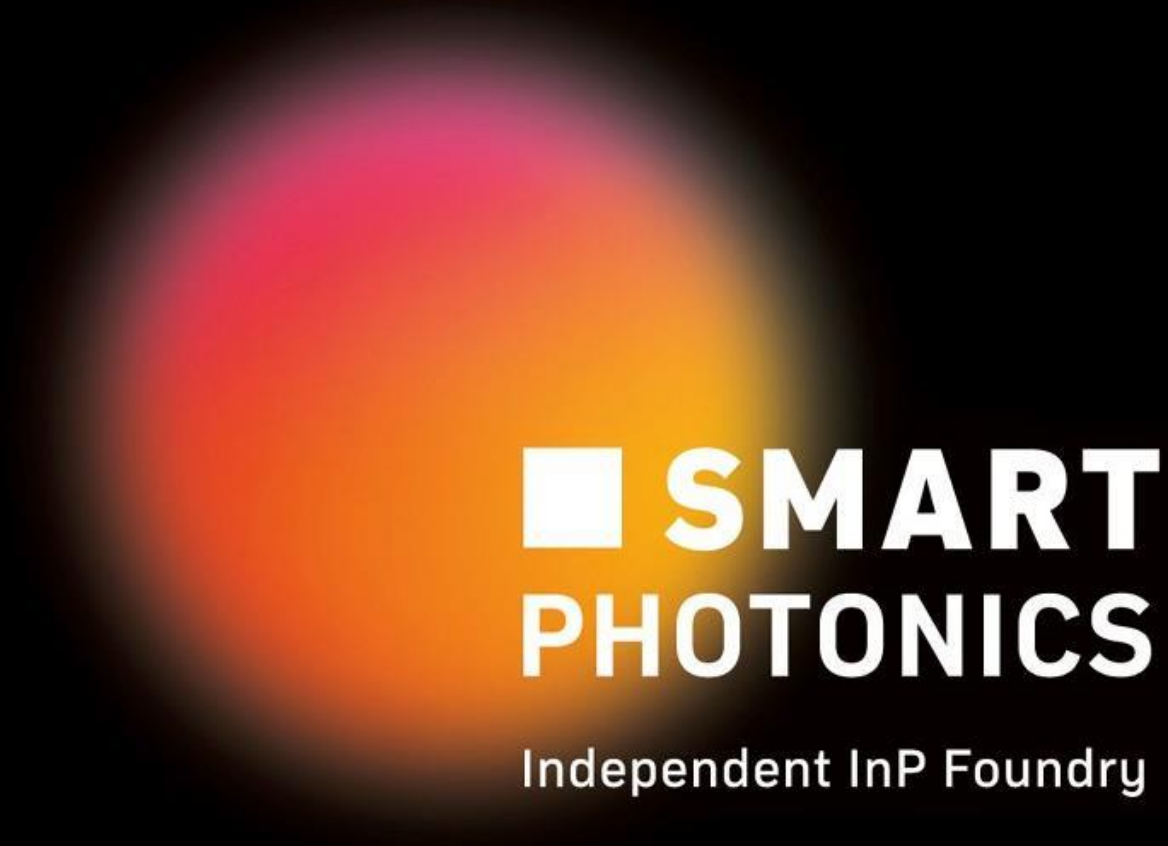
widely tunable laser > 60 nm tuning range







Frequency comb laser for gas sensing (3 cm cavity)



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