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FRAUNHOFER INSTITUTE FOR RELIABILITY AND MICROINTEGRATION IZM

RESEARCH FOR TOMORROW'S PRODUCTS

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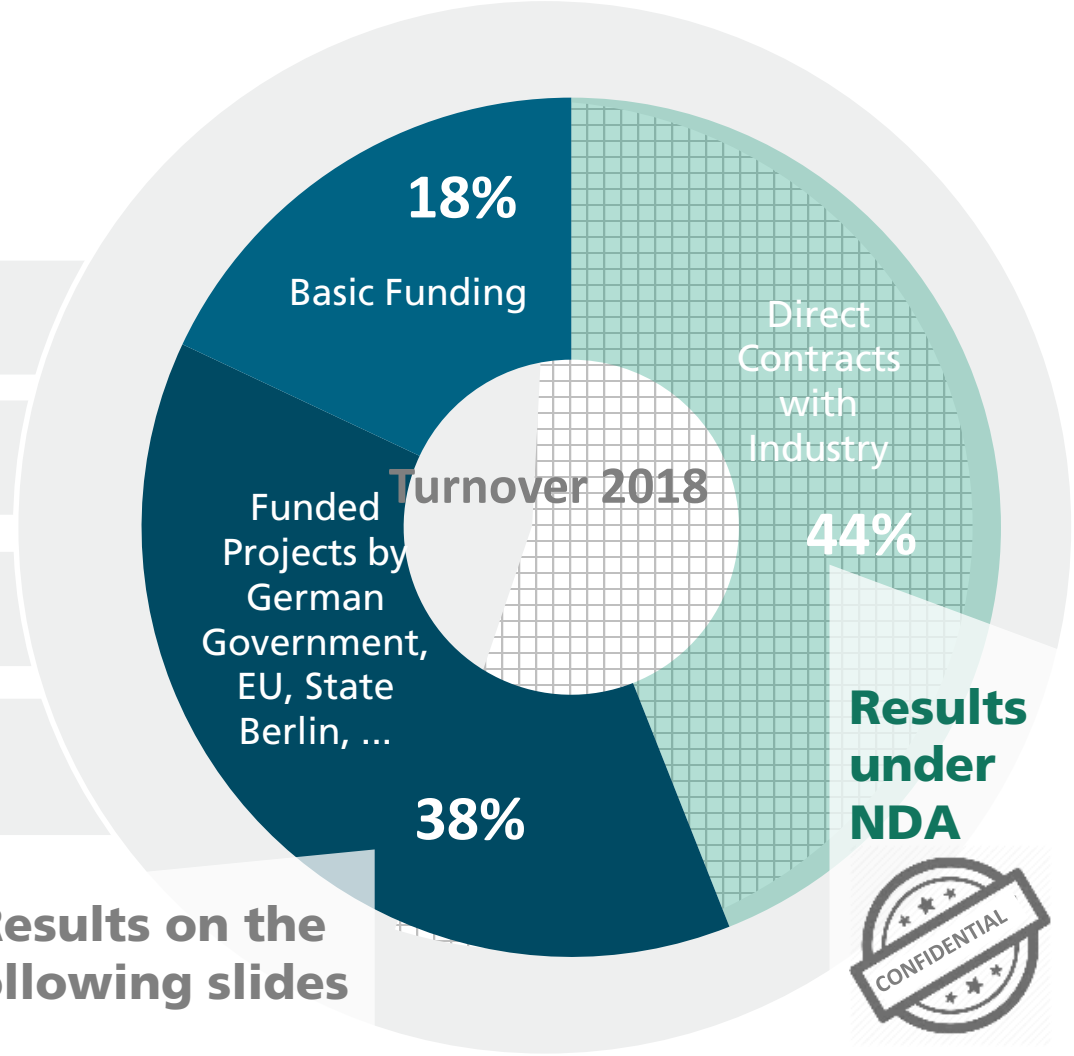
Fraunhofer IZM – Providing Answers to Technology Questions

CORE TECHNOLOGY CLUSTERS

- WAFER LEVEL PACKAGING
- PANEL LEVEL PACKAGING
- RF & SMART SENSOR SYSTEMS
- ENVIRONMENTAL & RELIABILITY ENGINEERING



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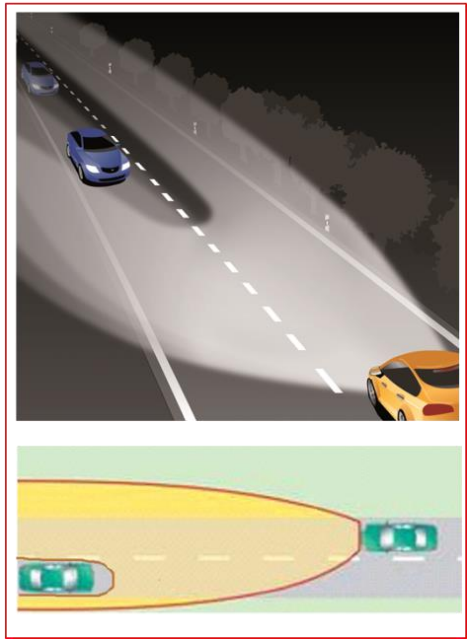
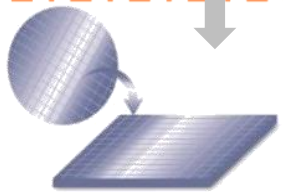
R&D Highlights

ADAPTIVE PIXELATED HEAD LIGHTS



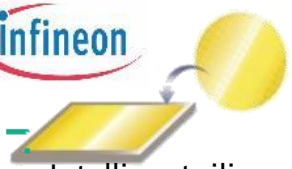
LED fabrication

OSRAM Opto Semiconductors



LED-Chip

Infineon



Intelligent silicon matrix controller

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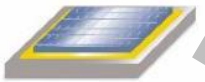
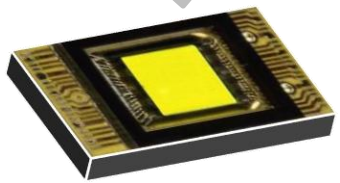
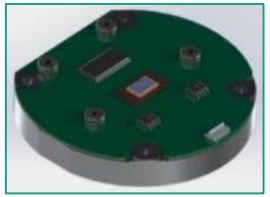


Heterointegration



Smart pixelated LED chip

OSRAM



µAFS module

DAIMLER

Module and head light system

Federal Ministry of Education and Research

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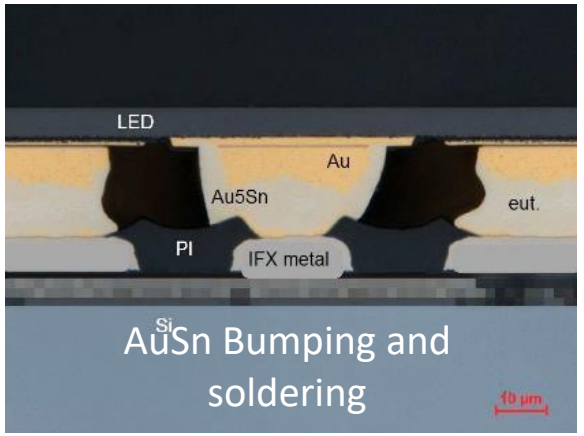

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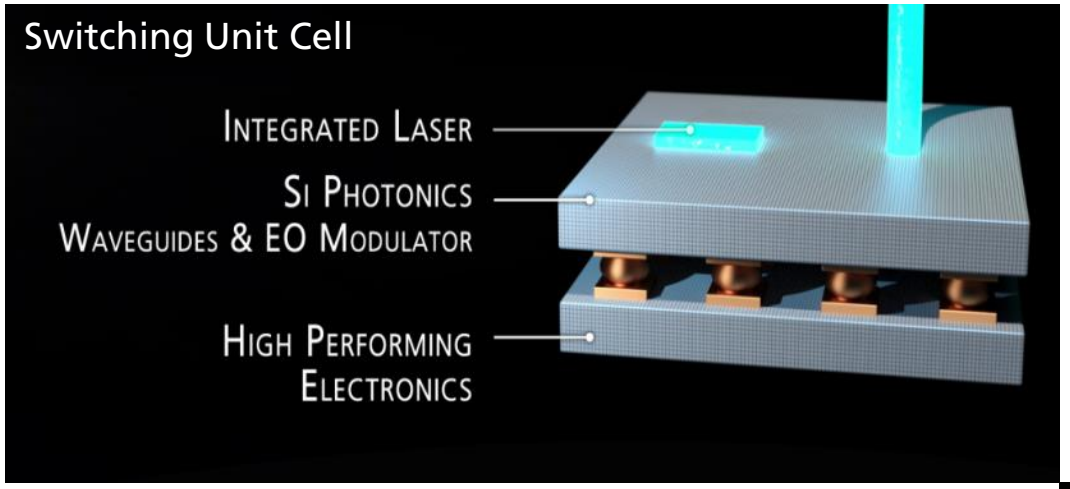
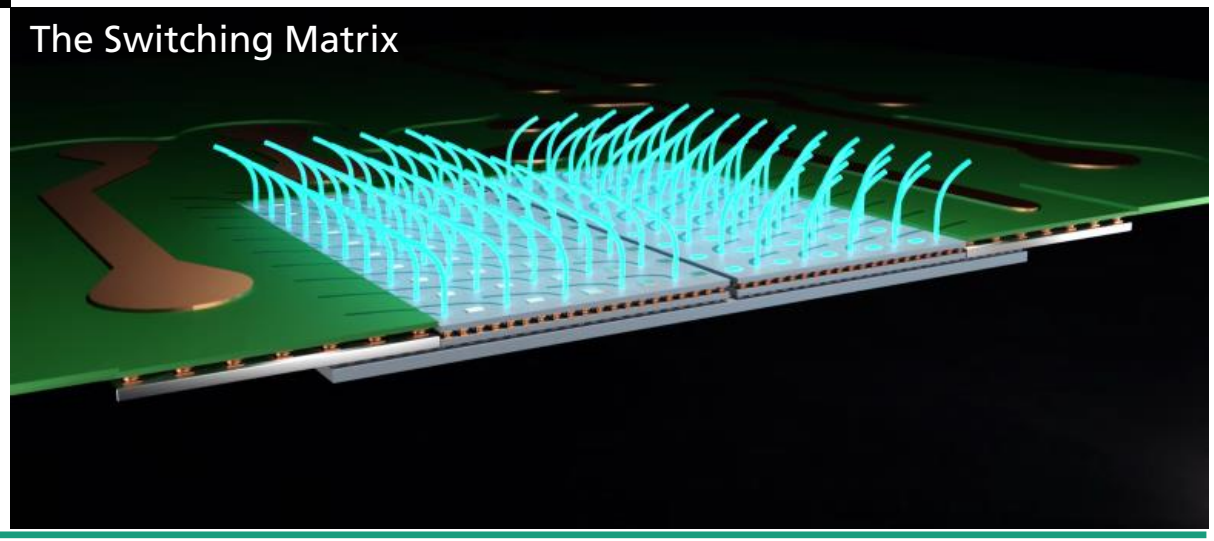
R&D Highlights

LARGE SCALE, LOW POWER AND LOW COST SWITCHING MATRIX



- Dense integration: ASIC with Silicon Photonics
- Embedded III-V laser sources on Silicon
- CMPOS compatible SiPh modulator
- Small cell size: <0.35mm^2/channel
- 25Gbaud/channel

- **Large-Scale** - More than 100 channels connected to one ASIC
- **Low-Power** – High integration with Lasers and EO modulators
- **Low-Cost** – CMOS foundry / low cost assembly



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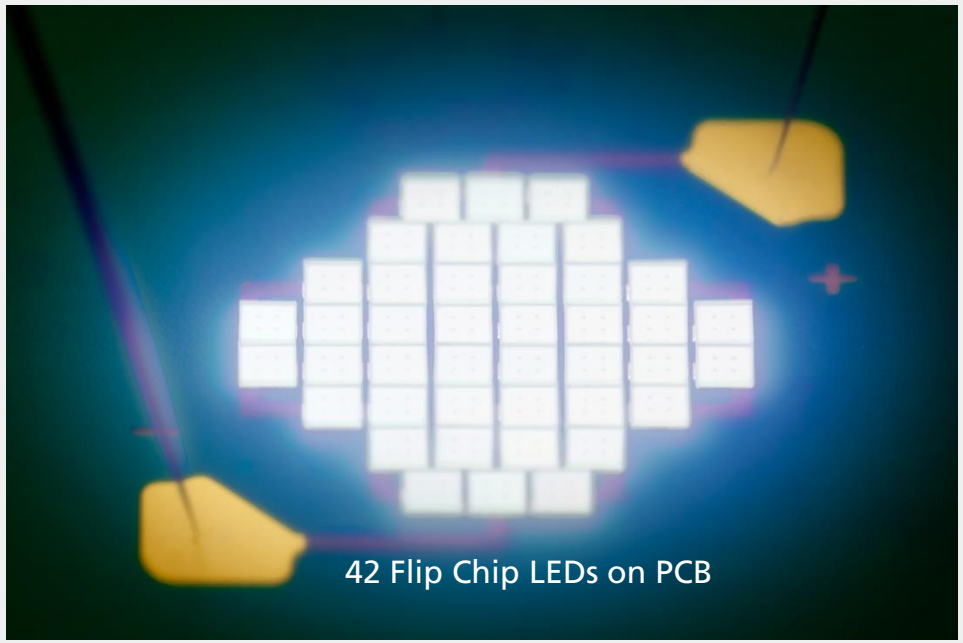
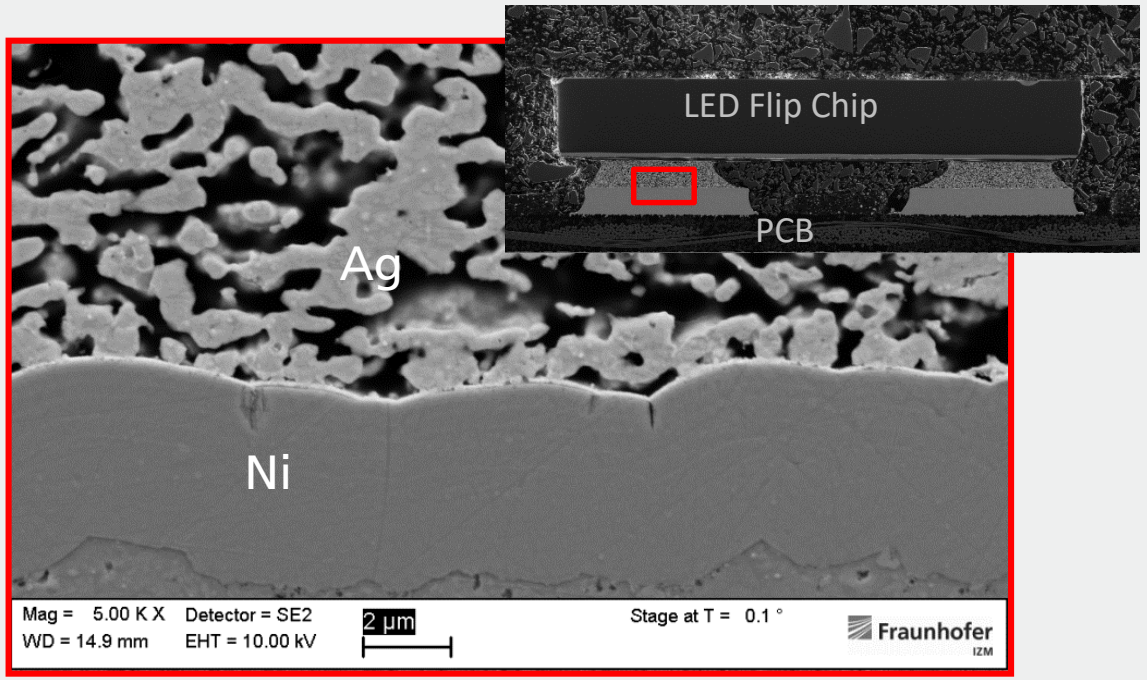
R&D HIGHLIGHTS

FC LEDS DIRECTLY JOINED TO PCB: SILVERSINTERING AND SAC SOLDERING





- Successful Development of Printing and Reflow Processes for SAC Solder
- Ag Sintering (pressure and pressure-less) down to 150 µm space

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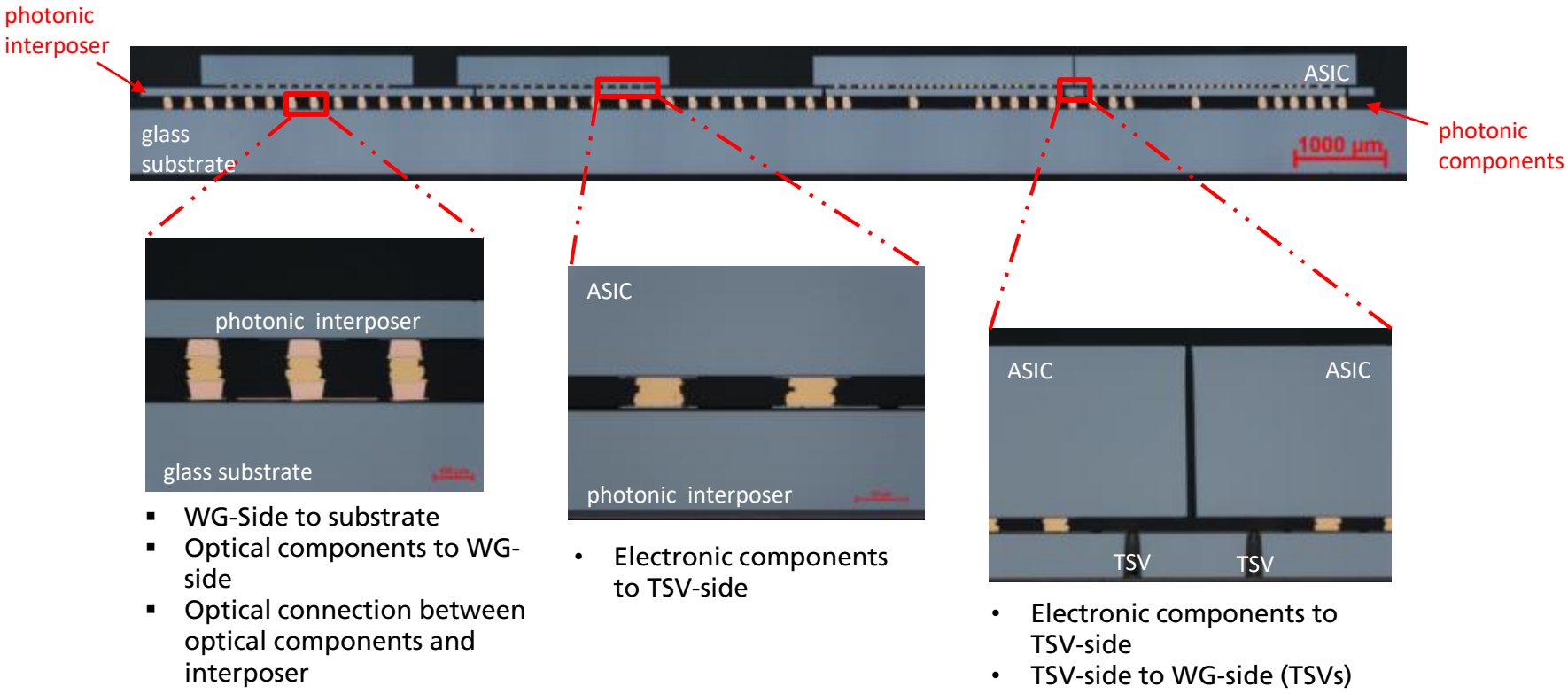
R&D Highlights

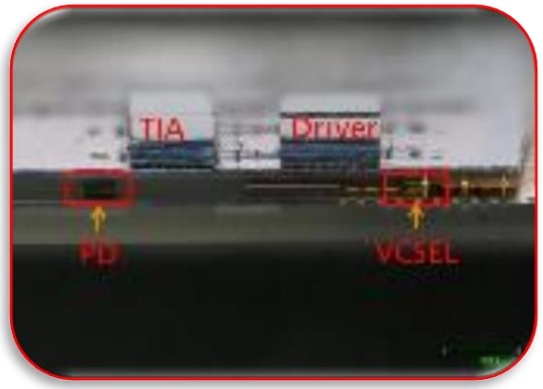
WORLD'S FIRST 3D PHOTONIC MODULE SILICON PHOTONICS INTERPOSER



- WG-Side to substrate
- Optical components to WG-side
- Optical connection between optical components and interposer

- Electronic components to TSV-side

- Electronic components to TSV-side
- TSV-side to WG-side (TSVs)



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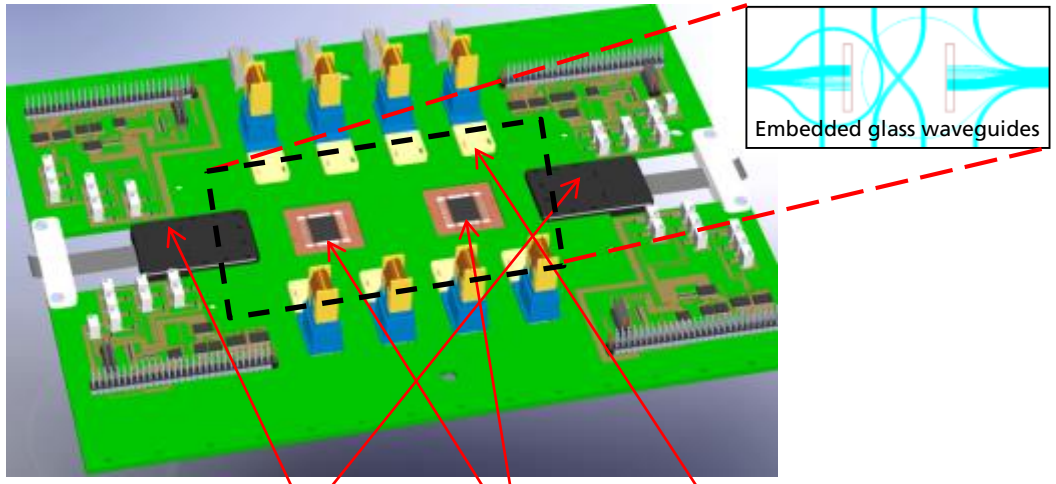
R&D Highlights

PHOTONIC INTERCONNECTS FOR DATA CENTER, EMBEDDED GLASS WAVEGUIDES, SI INTERPOSER, 3D INTEGRATION

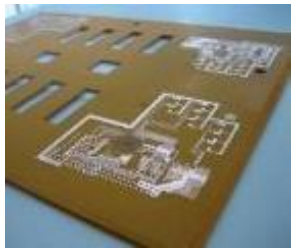


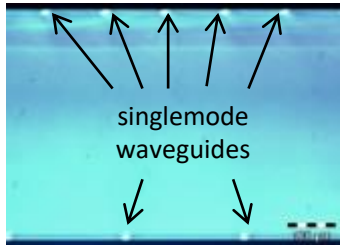

Components assembled on the interposer

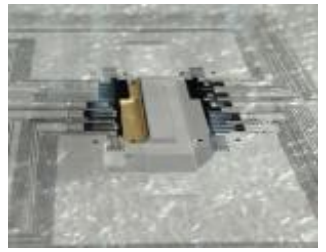

Fiber-to-Board connector


Interposer-to-Board coupling element


Board-to-Board connector







Special Issues for

- Assembled 3D Si interposer
- Glass SM waveguides embedded on PCB
- Optical board-to-board connectors
- Optical board-to-fiber interface (96-CH V-groove assembly) with FC/PC connectors
- Optical Interposer-to-board coupling element

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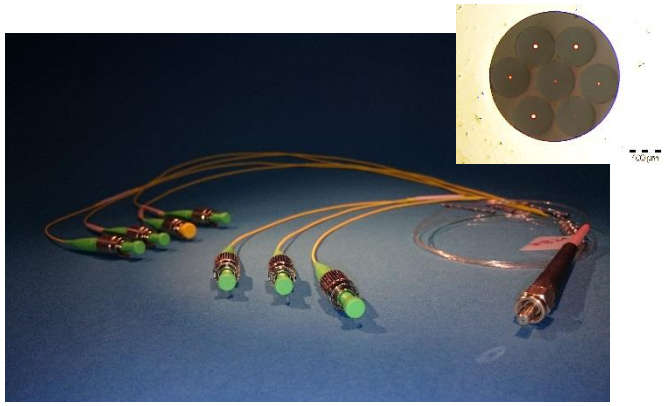
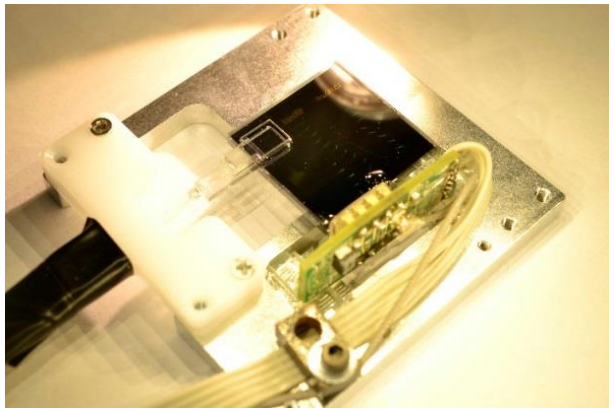
R&D Highlights

HYBRID INTEGRATED PHOTONIC SPECTRAL TISSUE SENSING DEVICE

- **Goal**:
  - Broad-band VIS-NIR spectrometer based on a fiber interconnected PIC chip: low-cost, compactness and high spectral resolution
- **Tasks**:
  - Defining a broadband MM-to-SM converter
  - Design and fabrication of a robust chip package
  - Assembly strategy in cooperation with partners
- **Results**:
  - Packaging strategies for photonic chips operating at visible-NIR-SWIR wavelengths
  - Application field: Imaging diagnosis for cancer



1x7 Fiber bundle for optical interconnecting



Assembled nanospectrometer demonstrator

InSPECT

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You Can Join us at Any Stage of the Value Chain

1	2	3	4	5	6
Consulting/ Innovation Workshop	Target Specification List	System Specification List	Functional Model	Prototype	Manufacturing
Understanding	Contract	Concept	Feasibility	Realization	Characterization	Transfer

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This presentation was presented at EPIC World Photonics Technology Summit 2019

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