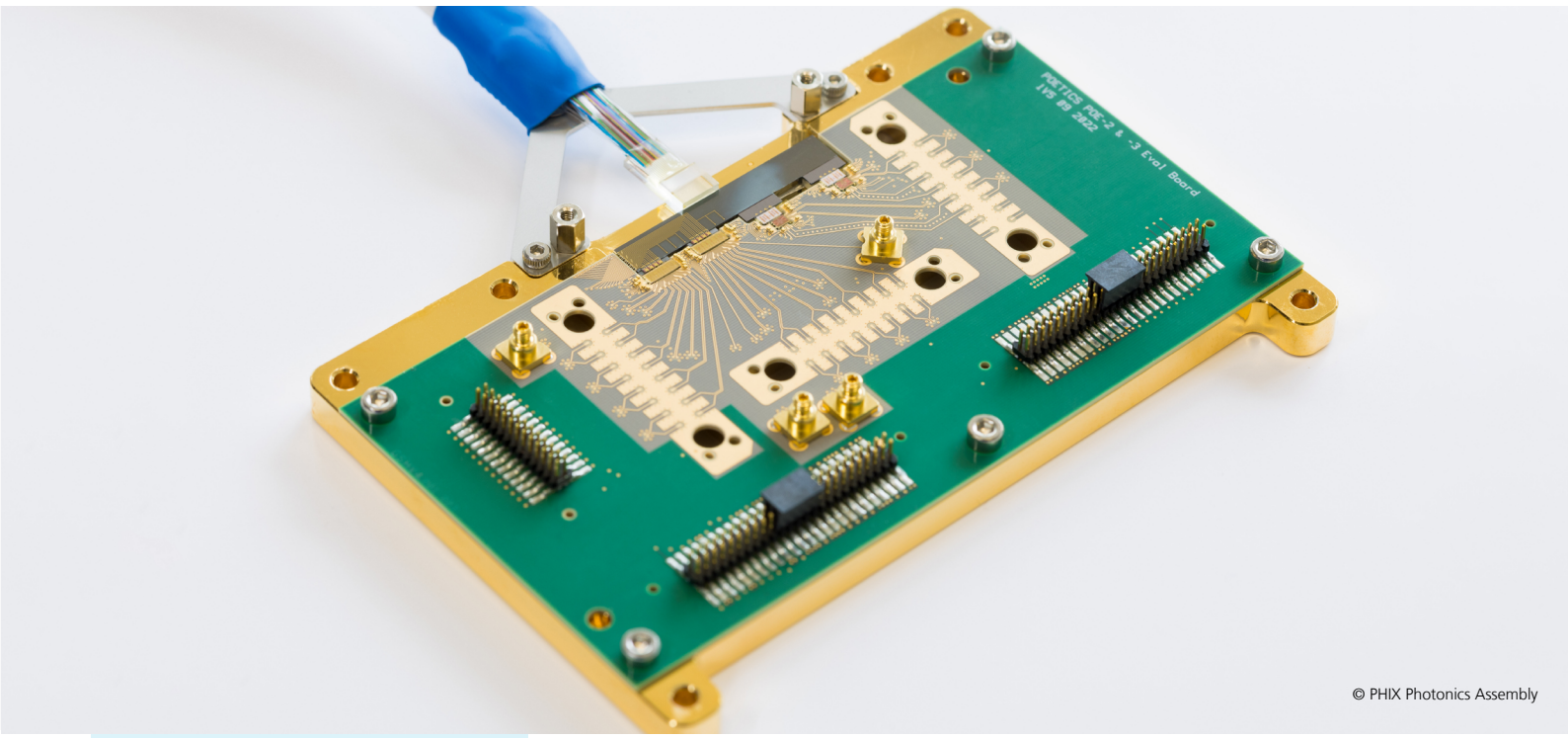
HYBRID PICS
BEST OF ALL WORLDS

Fraunhofer HHI



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AT A GLANCE

HHI's hybrid integration technology enables the fabrication of complex hybrid photonic integrated circuits (Hybrid PICs) based on the material systems polymer, SiN, TFLN, InP, GaAs and GaN.

Applications

- Telecom / datacom
- Quantum technology
- Micowave photonics
- Sensing and analytics
- Medical and life science

Features

- Rapid prototyping
- Short iteration cycles
- Low upfront development effort

Services

- Design and simulation
- Process developement
- Device fabrication
- Characterization
- Assembly
- Qualification

Hybrid PICs

The Hybrid PICs team develops photonic components and hybrid integrated circuits based on PolyBoard, SiN and thin film lithium niobate (TFLN) single mode waveguides in combination with active elements made of InP, GaAs or GaN.

We are working to harness the unique properties of light for applications in fiber-based communications, quantum technologies, microwave photonics and 6G wireless networks and beyond, as well as life sciences, medicine, sensing and analytics.

Our technology enables rapid prototyping, short iteration cycles and low development effort and cost. Our expertise includes design and simulation, CAD, technology development and device fabrication as well as characterization, assembly and qualification.

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References

International R&D projects
PHOENICS
POETICS
POLYNICES
QSNP
Qu-Test / Qu-Pilot
SPRINTER
TERA 6G
TERAMEASURE
TERAWAY
(funded by EU commission)

National R&D projects
PolyChrome Berlin
PoLiSiQ
QuNET
Silhouette
VOMBAT
(funded by BMBF)

Association
PolyPhotonics e.V.
www.polyphotonics-berlin.de

Assembly Partner
PHIX
www.phix.com
ficonTEC
www.ficontec.com

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Hybrid Integration Technology

PolyBoard platform based on polymer waveguides
- Passive WG structures: MMIs, AWGs, gratings
- Thermo-optic structures: TO-shifters, VOAs, tunable gratings
- µBench with slots, U grooves, vertical mirrors to integrate micro lenses, NLO crystals, isolators, and thin film elements (PBS, λ/2 plates, filters);
- 3D photonic integrated elements: 3D MMIs, 3D optical phased arrays for beam steering;

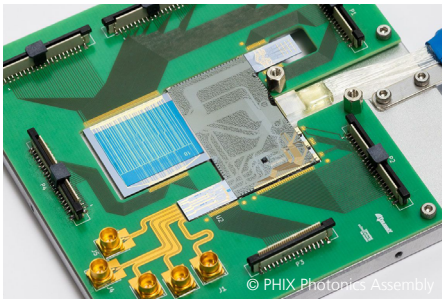
SiN platform based on silicon nitride waveguides:
- Passive WG structures: Ring resonators, MMIs, AWGs, gratings.
- Thermo-optic structures: TO-shifters, VOAs, tunable gratings;

TFLN platform based on thin film lithium niobate waveguides.

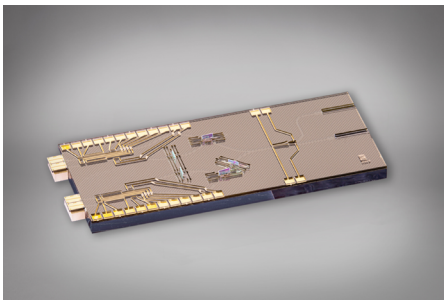
Hybrid Integration for more complex functions:
Platforms can be combined and hybrid integrated with InP, GaAs or GaN active elements: lasers, detectors, gain chips and modulators to form complex hybrid photonic integrated circuits.

RF Flexlines based on electrical coplanar waveguides:
Connecting optical and electronical componens at very high speed (200 GHz and beyond)

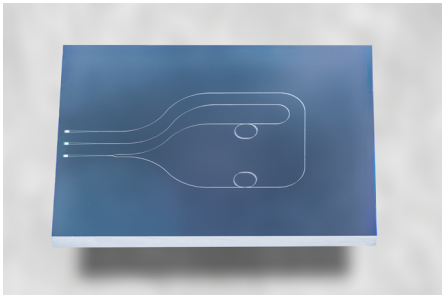
Applications



Photonic enabled THz transceiver for 5G networks and beyond (EU TERAWAY)



BB84 Transmitter for Quantum Communication (BMBF QuNET)



Micro Ring Resonator (MRR) with tolerant grating couplers for bio analytics

Bundesministerium für Bildung und Forschung