

Master / Bachelor Thesis:

High-speed Transmitter combining Photonic Wire Bonding and Silicon-Organic Hybrid Modulators

Photonic wire bonding (PWB), a hybrid integration method based on 3D lithography utilizing two-photon polymerization, has been demonstrated for fiber-to-chip coupling [1] as well as interfaces to InP lasers [2]. The aim for this thesis is to combine PWB with silicon-organic hybrid (SOH) [3] modulators to build lab-scale wavelength division multiplexer (WDM) transmitter for Tbit/s data transmission.

Your Task:

- Simulation/characterization of PWB
- Functionalization of SOH modulators
- Assembly of WDM transmitter
- PWB fabrication and its characterization
- High speed data transmission experiment

For detailed information contact:

M. Sc. Muhammad Billah Dr. Yasar Kutuvantavida
muhammad.billah@kit.edu yasar.kutuvantavida@kit.edu
Tel. +49 721-608-41934 Tel. +49 721-608-47170

Prof. Dr. Christian Koos
christian.koos@kit.edu
Tel. 0721-608-42481

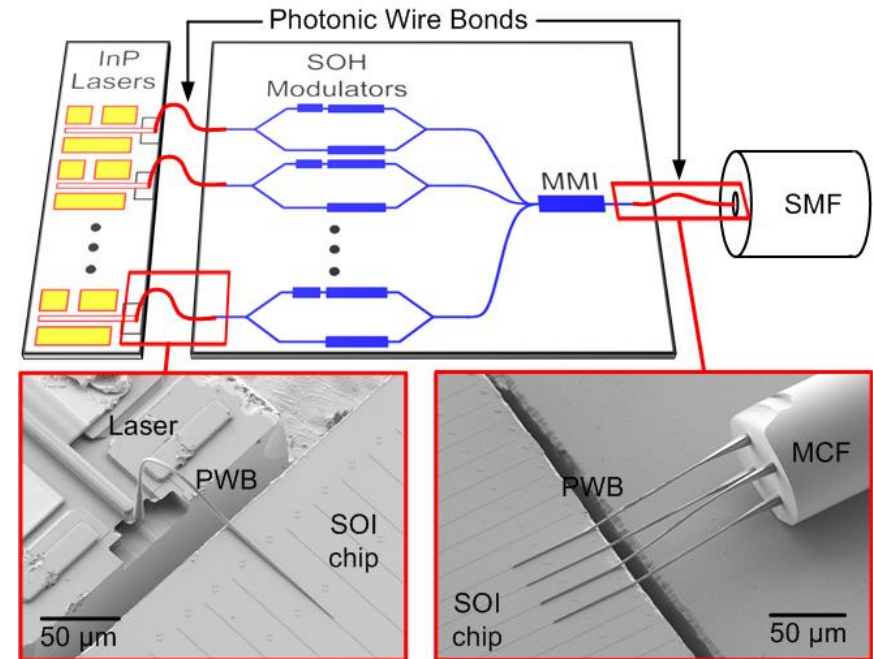


Fig. 1. The concept of high-speed WDM transmitter realized with PWB as interconnect between chips and SOH modulators [3]. The graphs from left to right show the fabricated PWB for laser-to-silicon nanowire [2] and from silicon nanowires-to-multi-core fiber [1].

Further reading:

- [1] N. Lindenmann *et al.*, "Connecting Silicon Photonic Circuits to Multi-Core Fibers by Photonic Wire Bonding", *JLT* 2014
- [2] M. Billah *et al.*, "Multi-Chip Integration of Lasers and Silicon Photonics by Photonic Wire Bonding", *CLEO* 2015
- [3] C. Koos *et al.*, "Silicon-Organic Hybrid (SOH) and Plasmonic-Organic Hybrid (POH) Integration", *JLT* 2016