Bachelor / Master Thesis:

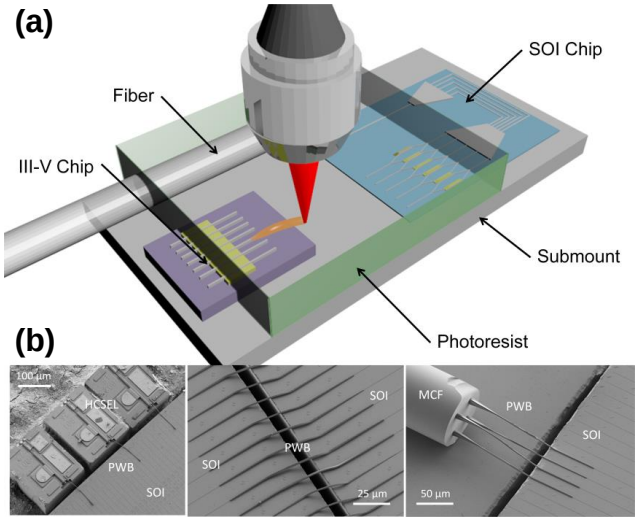
Wavelength Division Multiplex Receiver Based on Photonic Wire Bonding

Karlsruhe Institute of Technology

We use laser-induced two-photon lithography to structure three dimensional polymer waveguides, so called photonic wire bonds (PWB). During the fabrication, a tightly focused laser spot scans in programmable patterns through a resist, that polymerizes and forms the desired structures. Photonic wire bonding allows combining known-good dies from different materials and enables new options of photonic multi-chip modules like WDM receivers. The key components of such a system are demultiplexers (DEMUX) and photodetectors.

Your tasks:

- Characterize integrated photodiode (PD) chips in our labs at IPQ, as well as arrayed waveguide gratings (AWG).
- Design a PWB structure for coupling between AWG and PD.
- Fabricate the proposed receiver module and measure the performance of the device.



(a) Schematic of the fabrication process of photonic wire bonds.
(b) From left to right: SEM images of PWB between horizontal-cavity surface-emitting laser (HCSEL) and a standard silicon-on-insulator (SOI) chip, PWB connecting two SOI chips and PWB connecting the cores of a four-core fiber to SOI-waveguides.

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