

Master Thesis:

Integrated optical coherence tomography with 3D printed optical components

Optical coherence tomography (OCT) looks back on great advances in the past decades. Its microscopic resolution in **volumetric imaging** opened a wide field of applications reaching from ophthalmology in medical diagnostics to **particle and defect characterization** in material sciences. Current systems are however bulky and expensive. To integrate OCT on a chip single-mode optical coupling is required. Using **3D-printing** of lenses at a chip facet we have already demonstrated a highly scalable and miniaturized OCT-chip.^[1] Based on our demonstration our goal is to establish a new generation of OCTs that are penetrating mass market.

Your tasks:

- Pre-characterization of integrated OCT circuits
- Build up chip integrated OCT systems utilizing micrometer-scale 3D printed components
- Characterization of system performance
- Demonstration of OCT measurements with different sample materials

The thesis is focused on realization of integrated OCT systems and the demonstration of the system performance by acquiring volumetric images of various samples.

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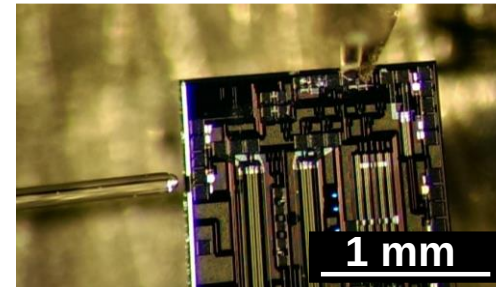


Fig. 1: OCT system integrated on silicon photonic chip. ^[1]

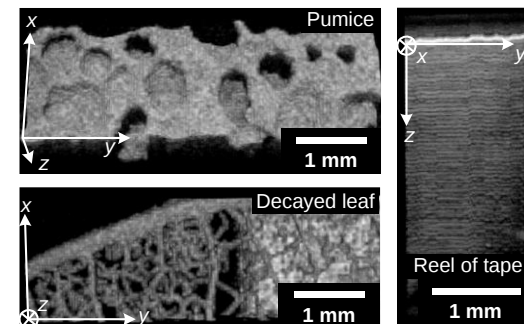


Fig. 2: Cross-sectional scans of different materials. ^[1]

One cent coin to scale

[1] S. Schneider et al., CLEO, ATu2P.4, San Jose, CA, USA, 2014.