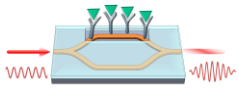
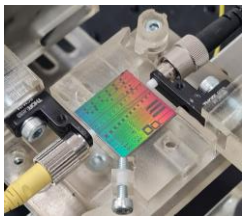
Institut für Elektrische Messtechnik und Sensorik

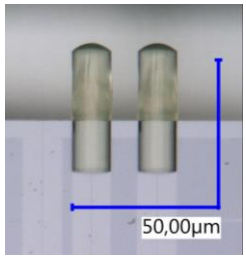
Advanced System Integration of Photonic Biosensors



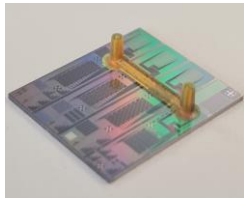
Thesis Description



Photonic integrated circuits represent a promising approach for mass produced biosensors that can be used for rapid medical testing in point-of-care diagnostics or Organ-on-Chip environments. The main advantages of using PICs, as compared to traditional biosensing approaches, are their high sensitivity, robustness, and capabilities towards miniaturization and integration. The concept of the sensor platform enables a broad variety of application such as early recognition of infectious diseases and monitoring of various biomarkers. While the sensor concept is well studied, system integration still poses a challenge. This master's thesis focusses on key elements of sensor integration, like efficient light-to-chip coupling, and robust readout schemes.

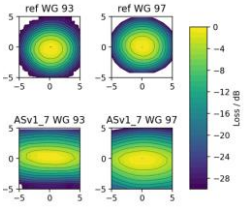


Objectives

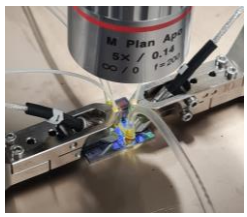


The project comprises of

- Literature research: Photonic Integrated Circuits, approaches for biosensing, efficient fiber-to-chip coupling
- Systematic comparison of different light-to-chip coupling techniques
- Improvement of custom-built coupling stage
- Simulation and design of micro optics and prototyping with an in-house two-photon polymerization printer
- Design of experiments and concentration measurements of bulk samples and biomarkers with the custom-built stage as well as with a state-of-the-art wafer prober
- Development of robust data readout schemes



Organizational Matters



Requirements:	Education in Electrical Engineering, Biomedical Engineering, Information and Computer Engineering, Advanced Material Science or similar (Physics)
Duration:	6 months
Workplace:	EMS, Inffeldgasse 33/I
Payment:	possible

Contact:

Alexander Bergmann
Phone: +43 (0) 316 873 - 30570
E-Mail: alexander.bergmann@tugraz.at

Gandolf Feigl
Phone: +43 (0) 316 873 - 30576
E-Mail: gandolf.feigl@tugraz.at