

## Master Thesis

### „ Characterization of photonic mid-infrared microsensors“

#### About us

CTR Carinthian Tech Research AG is an industry-oriented research and development center for smart sensors and system integration. As the largest non-university research center in southern Austria, CTR has gained a reputation for expertise in R&D sensor technologies serving science and industry at both a national and international level. CTR focuses on four main research areas: Microsystem Technologies, Packaging & Hetero-integration, Photonic Sensor Systems and Smart Systems. In the Austrian COMET program, CTR features with "ASSIC Austrian Smart Systems Integration Research Center" as a K1 center of excellence.

#### Short description and tasks

Recent years have seen increasing efforts in pushing the size of optoelectronic devices down to the micro- and nanoscale. Miniaturized photonic sensors are of particular interest because they can potentially be integrated in small, cheap and portable devices. The objective of this thesis is to characterize existing photonic sensors on chip and at a wafer level. On the basis of the results, the successful candidate will have the chance to elaborate a design for a new generation of sensors with enhanced performance in the mid-IR spectral region.

In particular, the candidate will:

- gain a fundamental understanding of both, the sensing principle and the critical parameters influencing the sensing properties of the current devices;
- familiarize with special light sources (e.g. quantum-cascade lasers) and detectors required for operation in the mid-IR spectral range
- experimentally characterize novel mid-IR sensors, among them waveguides and photonic crystals, and analyze measured data
- improve the present test-bench
- apply the theoretical and experimental knowledge acquired during the time of the thesis to elaborate new concepts for mid-IR sensors

#### Profile / Requirements

- Master student in physics, photonics, microsystem technology, electrical engineering or similar fields, good teamwork skills, well organized work strategies
- Hands-on experience in an optics lab.
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- Good communication skills in English and/or German.
- Advanced MS office skills.
- Experience with control-, evaluation- and visualization software (e.g. Matlab, Mathematica, Python,...) is beneficial.

#### We offer

- State-of-the-art laboratories and equipment, including the opportunity to work with quantum-cascade lasers
- An international scientific environment and contacts with our industrial network
- Payed thesis work with focus on sensor development

#### Start Date / Duration / Contract

Start date (planned): as soon as possible

Contract: We offer you a salaried position including all related rights and duties for employer and employee. The position will be time-limited according to the duration of the master thesis

Duration (planned): 6 months

Place: Villach, Austria

Suggestions with regards to the academic supervision are welcome.

**Application:** [www.ctr.at/en/application](http://www.ctr.at/en/application) or [www.ctr.at/bewerbung](http://www.ctr.at/bewerbung)