MSc Thesis Project

Widely tunable mid-infrared laser source

Introduction: An increasing number of applications require single frequency laser sources in the mid-infrared spectral range as many molecules have their absorption peaks in this region. Only very few highly complicated and expensive methods exist to generate tunable single-frequency mid-infrared light. We have recently shown a relatively simple and potentially inexpensive route using difference frequency generation (DFG) to solve this problem [1]. This project intends to use a pure semiconductor laser based approach providing ultra-wide tuning range [2].

Contents: In this project, the student(s) will develop a coupled cavity diode laser system for DFG to generate mid-infrared light. The DFG laser system will be used for demonstration within different spectroscopic applications. The work on the DFG laser system can be extended to include infrared spectral imaging. The work will be carried out in a group working on diode laser systems and infrared spectral imaging. The project results will be presented at international conferences and published in scientific journals.

The project could involve:
- Coupled ring cavity diode laser system setup and characterization.
- Generation of mid-infrared light through DFG.
- Application of mid-infrared laser system.
- Mid-infrared spectral imaging.

Preferred prerequisites:

- Good hands-on experimental experience.
- Knowledge on lasers and optics.

Additional information:


Practical details: The project is intended for 1 or 2 students with 30 ECTS-points per student.

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