



TECHNISCHE
UNIVERSITÄT
DARMSTADT

Master-Thesis / Bachelor-Thesis / ADP

Development and application of a modular high-speed FPGA-based laser diode and temperature control system in LabVIEW

Entwicklung und Anwendung eines modularen Hochgeschwindigkeits-FPGA-basierten Laserdioden- und Temperaturkontrollsystems in LabVIEW

Motivation:

Climate change and rising health concerns have led to increasingly strict regulatory emission standards for combustion engines over the past few years.

In order to investigate the compliance with these regulations, special measurement techniques are required. Specifically, in the context of Real Driving Emissions (RDE), compact systems that allow for in situ measurement at engine tailpipe are necessary.

Tunable diode laser absorption spectroscopy (TDLAS) is a measurement technique well suited for this task, as it allows simultaneous high speed in-situ measurement of a variety of gases. A large benefit of this technique is the application of small diode lasers which can be connected via glass-fibers and thus allowing for very small measurement devices outside the vehicles.

The Laser Diode and Temperature control (LDC & TEC) of these lasers needs to be very precise but at the same time also compact.

The goal of this work is the software development and application of a high-speed modular FPGA (Field Programmable Gate Array) based Laser Diode and Temperature control system in LabVIEW.

Tasks:

- Get familiar with the topic
- Define requirements for the control system
- Implementation and testing of the system
- Characterization of the implemented system in the laboratory
- Intermediate and final presentations, writing your thesis

Requirements:

- Knowledge in LabVIEW (preferred)
- Basic knowledge FPGA (optional)
- Independent working

Are you interested? Feel free to contact us!

Start: immediately

Reaktive Strömungen und
Messtechnik (RSM)

Reactive Flows and
Diagnostics



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