Stabilized optical source

Fiber coupled laserdiode source

Introduction

In optical metrology, often a reliable and well stabilized lightsource is essential. In many research projects we use fiber coupled laserdiodes, some of them operated below the laser threshold. While working principle has been proven, in long time experiments it turned out to show temperature drift, mode hopping and spiking. Some of these effects are likely resulting from pcb-design and selected components, others have to bee further investigated.

In this project you will evaluate an existing setup, identify relevant effects, optimize circuit design and develop a prototype. Manual control has to be replaced by uC and wireless communication.

For this, you will:

- make yourself familiar with control of laser diodes
- evaluate given demonstrator and identify relevant effects
- develop an interface for digital control of basic functions like output power level
- provide display of relevant parameters like diode current and voltage on device
- implement features like "Soft-Start Current Ramp", "Over-Current Protection", "Reverse current protection"
- select appropriate uC
- design circuit and pcb
- implement wireless control and data logging of displayed properties, like bluetooth
- commission demonstrator lightsource
- evaluate it and discuss results

Competencies:

- Laser drivers
- uC programming
- analog electronics
- Peripheral interfacing
- PCB layout
- Repeatability and uncertainty
- Technical and scientific documentation

Further info:

The eboLED project page gives an insight in the environment of the project.