

## Preface

The year 2007 was again very fruitful for the Institute of Optoelectronics. Research concentrated on optical interconnect systems, vertical-cavity surface-emitting lasers (VCSELs), GaN-based electronic and optoelectronic devices, and semiconductor disk lasers.

The VCSELs and Optical Interconnects Group has continued to work on novel GaAs-based VCSELs and two-dimensional arrays, new-generation transceiver chips for full-duplex bidirectional optical interconnects, polarization-stable surface grating VCSELs, and VCSEL-based sensing and particle manipulation in microfluidic chips. For the first time, blue light could be generated by intracavity frequency doubling with an efficient electrically pumped VCSEL.

In the GaN Group, much effort has been put into optimization of the electrical properties of nitride-based heterostructures. Besides doping studies of HVPE-grown thick GaN layers, we investigated doping superlattices for improved high-power LEDs and Si doping of AlN for ultra-high band gap electronics. Heteroepitaxial growth studies of GaN on ZnO may eventually lead to novel hetero-nanorod applications. The emission wavelength of our semipolar facet LEDs could be shifted towards the green spectral range.

In the High-Power Semiconductor Laser Group, an optically-pumped semiconductor disk laser with intracavity second-harmonic generation has been realized, emitting 407 mW of continuous output power at a wavelength of 485 nm.

Together with our friends and cooperation partners from the Universities of Regensburg, Stuttgart and Ulm, many members of the Institute joined our hiking workshop in the Söllerhaus (Kleines Walsertal) in October, where the scientific topics presented in short seminar talks were further discussed while climbing some of the local mountains.

Two members of the Institute, namely Philipp Gerlach and Johannes Michael Ostermann, and two external students, namely Tony Albrecht and Michael Furitsch, received their Ph.D. degrees. Furthermore, 10 Diploma or Master Theses and 8 Semester Projects have been carried out in 2007. Thomas Wunderer's Diploma Thesis about electroluminescence of facet quantum wells finished in 2006 was awarded by the VDI Donau-Iller as an outstandingly good Diploma Thesis.

In Oct. 2007, Rainer Michalzik was awarded the Cooperation Prize between Science and Industry of Ulm University together with Johannes Michael Ostermann, Pierluigi Debernardi from the IEIIT National Research Center in Torino, Italy, and U-L-M photonics for the development and commercialization of polarization-stable VCSELs. Many million lasers of this kind are already used in highest performance optical computer mice.

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