## Preface

In the year 2012, research in the Institute of Optoelectronics progressed a lot. It focused on vertical-cavity surface-emitting lasers (VCSELs), optical interconnect systems, GaN-based electronic and optoelectronic devices, and semiconductor disk lasers.

The VCSELs and Optical Interconnects Group has successfully completed its projects on atomic clock VCSELs and monolithic VCSEL–PIN photodiode chips. Work on optical datacom links and microfluidic-integrated systems is continuing.

The GaN group further concentrated their studies on semipolar GaN epitaxial structures after the approval of the second 3-years phase of our transregional research group PolarCoN at the beginning of last year. Hence, we could arrange another summer school at Kloster Kostenz with more than 40 participants. Moreover, new projects about semipolar yellow LEDs and semi-insulating GaN bulk wafers were launched, while other topics like in-situ electrical measurements on graphene flakes in a transmission electron microscope were successfully continued. We could achieve excellent performance of LEDs grown on quasi-bulk GaN wafers demonstrating the successful synergetic combination of our HVPE and MOVPE studies.

In the High-Power Semiconductor Laser Group, an optically-pumped semiconductor disk laser with an output power of more than 21 W at an emission wavelength of 1040 nm has been realized. Even at a heat-sink temperature of the semiconductor disk of 90 °C, more than 3.5 W of output power has been achieved. In a folded cavity setup including a nonlinear LBO crystal for second-harmonic generation, 9.5 W of green light at an emission wavelength of 520 nm has been obtained. The system shows a conversion efficiency of 20 % with respect to the incident optical pump power and exhibits a tuning range of 22 nm.

The new VCSEL book edited by Rainer Michalzik which was announced in the last Annual Report was eventually published by Springer in early Oct. 2012. Moreover Rainer served as the co-editor of the Special Issue "Recent Advances in Semiconductor Surface-Emitting Lasers" published in *Advances in Optical Technologies*.

Anna Bergmann was selected as a participant of the "Get Ahead With Optics" Summer School for female graduate students of optical technologies from Tunisia and Germany, which was held in Hammamet-Yasmine, Tunisia, in Sept. 2012.

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