

## Preface

The year 2009 was another successful one for the Institute of Optoelectronics. Research concentrated 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 focused its efforts on the fabrication and analysis of GaAs-based specialty VCSELs emitting higher-order transverse modes, the design of bidirectional transceiver chips integrating a VCSEL and a PIN-type photodiode, the optimization of polarization-stable surface grating VCSELs for atomic clock applications, and the demonstration of VCSEL-based sensing and particle manipulation in microfluidic chips.

Besides other ongoing activities, the GaN Group continued to concentrate on studies of non- and semipolar structures for highly efficient longer wavelength light emitters. The cooperation in our respective transregional research group “PolarCoN” could be further enhanced. In the frame of these activities, we have organized a summer school in September where more than 50 scientists from the research group and from other renowned institutions world-wide enjoyed the great hospitality of the scientific center “Schloss Reisingen” for fruitful scientific discussions. With the participation in the DFG project SALVE (“Sub Angstrom Low Voltage Electron Microscopy”) led by the TEM group of Ulm University, we have set a first step in the field of graphene research.

In the High-Power Semiconductor Laser Group, an optically-pumped semiconductor disk laser with intracavity second-harmonic generation in a novel folded-cavity resonator configuration has been realized, emitting 1.6 W of continuous output power at a wavelength of 460 nm. The incident pump power was 11 W at a wavelength of 808 nm, which results in a record overall power conversion efficiency of 14.5 %.

In Feb. 2009, Anna Bergmann’s Diploma Thesis on VCSEL-integrated optical trapping modules was awarded by the VDE. Johannes Michael Ostermann received the Dulger Prize 2009 of the Heidelberger Akademie der Wissenschaften for his work on polarization-stable VCSELs.

On November 14, the Institute of Optoelectronics celebrated its 20-year anniversary. All 120 alumni of the Institute were invited to an anniversary celebration party and 67 of them came to Ulm, some with spouses and children. Another highlight of last year’s activities was the 14th European Workshop on MOVPE organized by our Institute in June, where more than 200 scientists presented and discussed their brand-new results, excellently hosted by the Edwin-Scharff Congress Center Neu-Ulm.

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