Preface

During 2006, the research activities of the Institute of Optoelectronics have been continuing in the areas of optical interconnect systems, vertical-cavity surface-emitting lasers, GaN-based electronic and optoelectronic devices, optically pumped semiconductor disk lasers, and high-power semiconductor amplifiers. The VCSELs and Optical Interconnects Group headed by Rainer Michalzik has demonstrated, amongst others, AlGaAs-based VCSELs with emission wavelengths as low as 720 nm, high-performance 850 nm single-mode VCSELs, miniaturized transceiver chips for bidirectional optical data transmission over graded-index multimode fiber, as well as novel schemes for multilevel digital signal generation and optical trap-based particle sorting, both using densely spaced VCSEL configurations. In the GaN Group headed by Ferdinand Scholz, the work on semipolar LEDs has attracted much attention, as bright light generation from facet quantum well LEDs could be demonstrated. Moreover, a new project pushed the research activities on free-standing GaN wafers: Nearly full 2-inch GaN wafers with thicknesses of about 1 mm could be grown by hydride vapor phase epitaxy. In the High-Power Semiconductor Laser Group headed by Peter Unger, a continuous output power of 13.2 W has been achieved with a semiconductor disk laser having an optical-to-optical conversion efficiency of more than 50 %.

A major event of the last year was the DGKK workshop on III-V epitaxy where about 130 scientists shared their latest results, presented in more than 40 talks. The participation of 24 companies in the accompanying industrial exhibition underlined once more the strong importance of research of the Institute for the development of future daily life optoelectronic devices. Thanks to the cooperation of our faculty, the scientific parts of the workshop could make use of the convenient lecture halls of the Universität West, complemented by a workshop dinner in the Stadthaus near the Ulmer Münster cathedral, generously sponsored by the participating companies.

Four members of the Institute, namely Martin Peschke, Brem Kumar Saravanan, Frank Habel, and Steffen Lorch received their Ph.D. degrees. Furthermore, 4 Diploma or Master Theses and 3 Semester Projects have been carried out in 2006. The Institute further intensified the close collaboration with industrial partners. We also appreciate the financial support of national and European research organizations, which contribute the major part of our funding. Numerous publications at international conferences and a large number of articles in respected journals document the strong research activities of the Institute. A detailed list can be found at the end of this report.

Peter Unger Ulm, March 2007