PROCEEDINGS OF SPIE

Semiconductor Lasers and Applications III

Lianghui Chen Hiroyuki Suzuki Paul T. Rudy Ninghua Zhu Editors

12–13 November 2007 Beijing, China

Sponsored by SPIE COS—Chinese Optical Society

Cooperating Organizations

OSJ—Optical Society of Japan • OSK—Optical Society of Korea • Australian Optical Society • Optical Society of Singapore • Beijing Institute of Technology (China) • Beijing University of Posts and Telecommunication (China) • Peking University (China) • Tsinghua University (China) • Zhejiang University (China) • Changchun University of Science and Technology (China) • University of Shanghai for Science and Technology (China) • Shanghai Jiao Tong University (China) • Tianjin University (China) Nankai University (China) • Shanghai Institute of Optics and Fine Mechanics (China) • Changchun Institute of Optics and Fine Mechanics (China) • Institute of Semiconductor (China) • Institute of Optics and Electronics (China) • Shanghai Institute of Technical Physics (China) • China Instrument and Control Society • China Solid State Lighting Research and Industry Alliance • Optoelectronics Technology Committee, COS (China)

Supporting Organizations

CAST—China Association for Science and Technology (China) • NNSF—National Nature Science Foundation (China) • The Ministry of Science and Technology (China)

Published by SPIE

Volume 6824

Proceedings of SPIE, 0277-786X, v. 6824

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Semiconductor Lasers and Applications III*, edited by Lianghui Chen, Hiroyuki Suzuki, Paul T. Rudy, Ninghua Zhu, Proceedings of SPIE Vol. 6824 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 0277-786X ISBN 9780819469991

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445 SPIE.org

Copyright © 2008, Society of Photo-Optical Instrumentation Engineers

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/08/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.



Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

ix xi	Conference Committee Symposium Committees		
CECCION 1	CIANULATION CHARACTERISTICS AND RACKACING I		
SESSION 1	SIMULATION, CHARACTERISTICS, AND PACKAGING I		
6824 02	Advances in high-power semiconductor diode lasers (Invited Paper) [6824-01] X. Ma, L. Zhong, Institute of Semiconductors (China)		
6824 03	Successful diode laser material processing using application specific micro-optical bean shaping [6824-09]		
	F. Kubacki, H. Weitze, P. Bruns, T. Lu, Lissotschenko Mikrooptik GmbH (Germany)		
6824 04	A new analytic expression for TM mode spontaneous emission in a microcavity laser [6824-36]		
	HD. Zhao, M. Sun, LY. Han, HL. Tian, P. He, TD. Guo, H. Liu, Hebei Univ. of Technology (China)		
6824 05	Nonlinear dynamic characteristics of pulse injected semiconductor lasers [6824-46] YS. Juan, HY. Tu, FY. Lin, National Tsing Hua Univ. (Taiwan, China)		
6824 06	Measurement and analysis of microwave frequency response of semiconductor optical amplifiers [6824-45] J. Liu, Institute of Semiconductors (China); SJ. Zhang, Univ. of Electronic Science and Technology of China (China); YH. Hu, L. Xie, YZ. Huang, NH. Zhu, Institute of Semiconductors (China)		
SESSION 2	SIMULATION, CHARACTERISTICS, AND PACKAGING II		
Fabrication and characterization of TO packaged high-speed laser modules Paper) [6824-81] J. M. Wen, Y. Liu, X. Wang, H. Q. Yuan, L. Xie, N. H. Zhu, Institute of Semicondu			
6824 09	A tolerant coupling scheme for pigtailing laser diode module in active alignment process		
	[6824-12] M. Fadhali, Ibb Univ. (Yemen); Saktioto, J. Zainal, Y. Munajat, J. Ali, R. Rahman, Univ. Technology Malaysia (Malaysia)		
Focusing of diode laser beams: a partially coherent Lorentz model [6824-6]. Yang, Huazhong Univ. of Science and Technology (China) and China A Research and Development Ctr. (China); T. Chen, G. Ding, Jiangsu Univ. (Huazhong Univ. of Science and Technology (China)			

6824 OB	Kinetic Monte Carlo simulation of the temperature dependence of semiconductor quantum dot growth [6824-79] C. Zhao, M. Zhao, Y. Wang, G. M. Wu, Beijing Institute of Petrochemical and Technolo (China)				
SESSION 3	NOVEL SEMICONDUCTOR LASERS				
32331014 3					
6824 OD	High-efficiency active opto-electronic devices (Invited Paper) [6824-82] G. D. Shen, Y. X. Chen, B. F. Cui, J. J. Li, J. Han, B. L. Guan, X. Guo, W. J. Jiang, W. Gao, J. Deng, C. Xu, Beijing Univ. of Technology (China)				
SESSION 4	SEMICONDUCTOR LASER APPLICATIONS I				
6824 OJ	Study on the time delay error for 160Gbit/s multiplexer [6824-02] X. Liu, T. Li, Beijing Jiaotong Univ. (China); L. Cai, Beijing Univ. of Posts and Telecommunications (China); H. Bi, S. Jian, Beijing Jiaotong Univ. (China)				
6824 OK	Experimental study of target detection based on vibration and polarization characteri [6824-04] C. Cao, X. Zeng, Q. Xu, Z. Feng, L. Su, Xidian Univ. (China)				
6824 OL	Inclination angle measurement of inertial platform based on LD-PSD [6824-19] Y. Huang, Y. Lin, L. Song, X. Zhou, Tianjin Univ. (China)				
6824 OM	Design of laser diode stable output system [6824-30] B. Liu, R. Cao, Harbin Univ. of Science and Technology (China)				
SESSION 5	SEMICONDUCTOR LASER APPLICATIONS II				
6824 ON	Wavelength tunable distributed Bragg reflector laser integrated with electro-absorption modulator by a combined method of selective area growth and quantum well intermixing (Invited Paper) [6824-85] LJ. Zhao, J. Zhang, L. Wang, YB. Cheng, JQ. Pan, HB. Liu, HL. Zhu, F. Zhou, J. Bian, BJ. Wang, NH. Zhu, W. Wang, Institute of Semiconductors (China)				
6824 OP	Investigate seawater and seawater anions' aqueous mixed solution by laser Raman spectroscopy [6824-61] D. Teng, J. Ma, Y. Huang, X. Zhang, R. Zheng, Ocean Univ. of China (China)				
6824 0Q	Selection of parameters in laser-amplifier injection locking [6824-66] J. Liu, Y. Xu, Z. Zhang, S. Han, X. Wang, Q. Lin, Zhejiang Univ. (China)				
SESSION 6	SEMICONDUCTOR LASERS AND RELATED MATERIALS				
6824 OS	Next-generation high-power high-efficiency diode lasers at Spectra-Physics [6824-14] H. Li, I. Chyr, D. Brown, F. Reinhardt, O. Romero, CH. Chen, R. Miller, K. Kuppuswamy, X. Jin, T. Nguyen, T. Towe, T. Crum, C. Mitchell, T. Truchan, R. Bullock, E. Wolak, J. Mott, J. Harrison, Spectra-Physics Lasers (USA)				

Demonstration and control of the fast-absorption recovery times of the InGaN/GaN quantum well saturable absorbers [6824-31]

F. Lin, N. Xiang, National Univ. of Singapore (Singapore); P. Chen, Institute of Materials Research and Engineering (Singapore); S. J. Chua, National Univ. of Singapore (Singapore) and Institute of Materials Research and Engineering (Singapore); A. Irshad, S. Roither, A. Pugzlys, A. Baltuska, Vienna Univ. of Technology (Austria)

- 6824 0V Strain analysis in pseudomorphically grown GaN-based multiple epitaxial layers [6824-48] D. Jang, J. Shim, Hanyang Univ. (South Korea)
- 6824 0W **1080nm optically pumped vertical-external-cavity surface-emitting laser** [6824-18] P. Zhang, Y. Song, X. Zhang, Beijing Univ. of Technology (China); Z. Zhang, Peking Univ. (China)

POSTER SESSION

6824 0X An atmospheric aerosol lidar and its experiment in Beijing [6824-05]

D. Han, W. Liu, Y. Zhang, Y. Lu, J. Liu, Anhui Institute of Optics and Fine Mechanics (China); T. Yu, Beijing Municipal Environmental Monitoring Ctr. (China)

6824 0Y Retrieval method for aerosol mass concentration vertical distribution based on extinction [6824-06]

D. Han, W.-Q. Liu, Y.-J. Zhang, J.-G. Liu, Y.-H. Lu, N.-J. Zhao, Anhui Institute of Optics and Fine Mechanics (China)

Influence of the light injection on the chaotic carrier fundamental frequency of the VCSELs with optical feedback [6824-10]

S. Liu, G. Xia, X. Tang, Y. Fan, Z. Li, Z. Wu, Southwest Univ. (China)

- Numerical investigations on the message encoding and decoding techniques of the incoherent optical feedback chaotic system [6824-11]
- L. Xu, G. Xia, L. Fan, X. Yan, X. Wang, Z. Wu, Southwest Univ. (China)
- Polarization dependence of the effect of external optical feedback on semiconductor lasers [6824-21]

Q. Zou, Institut National des Télécommunications (France); S. Azouigui, Lab. de Photonique et de Nanostructures, CNRS (France) and Institut National des Télécommunications (France); A. Ramdane, Lab. de Photonique et de Nanostructures, CNRS (France); B.-E. Benkelfat, Institut National des Télécommunications (France)

6824 13 Beam shaping of stack pulse laser diodes [6824-22]

D. Xin, J. Zhang, L. Wang, M. Zhang, X. Ma, Changchun Univ. of Science and Technology (China)

6824 14 Compact circuit modeling of semiconductor lasers for analog optical link simulations [6824-25]

S. J. Zhang, Univ. of Electronic Science and Technology of China (China) and Institute of Semiconductors (China); N. H. Zhu, Institute of Semiconductors (China); Y. Liu, Univ. of Electronic Science and Technology of China (China)

0024 13	Z. Qiao, J. Zhang, C. Liu, Y. Yao, H. Bo, J. Ma, X. Gao, B. Bo, Changchun Univ. of Science and Technology (China)				
6824 16	Applied research of semiconductor laser on laser encoding and emitting system [6824-27] Y. Qian, Institute of Optics and Electronics (China) and Graduate School of the Chinese Academy of Sciences (China); X. Cheng, J. Zhang, Changchun Univ. of Science and Technology (China)				
6824 18	Study on detection techniques for laser fuze using pseudorandom code [6824-29] X. Yan, P. Li, R. Jia, H. Chen, Beijing Institute of Technology (China)				
6824 19	Investigation of semi-insulating GaAs photoconductive switches triggered by semiconductor lasers [6824-32] W. Shi, X. Liao, Z. Liu, D. Ma, Xi'an Univ. of Technology (China)				
6824 1A	Calculation and comparison of thermal effect in laser diode pumped slab lasers with different pumping structures [6824-34] F. Huang, N. Jiang, Y. Wang, W. Dong, Y. Niu, Ordnance Engineering College (China)				
6824 1B	Temperature characteristics of high power vertical cavity surface emitting lasers [6824-35] C. Yan, Changchun Univ. of Science and Technology (China); C. He, G. Lu, L. Qin, Changchun Institute of Optics, Fine Mechanics and Physics (China)				
6824 1C	The design of a new concavity heat sink for the high power semiconductor laser array [6824-37] HD. Zhao, M. Sun, HL. Tian, JQ. Wang, Hebei Univ. of Technology (China)				
6824 1E	Preparation and property study of gold-tin alloys for packaging of high-power semiconductor lasers [6824-39] B. Huang, J. Chen, Z. Qiao, C. Liu, Y. Yao, X. Gao, B. Bo, Changchun Univ. of Science and Technology (China)				
6824 1F	Analysis of spectrum narrowing of diode laser bar [6824-41] X. Deng, Changchun Institute of Optics, Fine Mechanics and Physics (China) and Graduate School of the Chinese Academy of Sciences (China); Y. Liu, H. Yin, Changchun Institute of Optics, Fine Mechanics and Physics (China); G. Feng, Y. Gu, Changchun Institute of Optics, Fine Mechanics and Physics (China) and Graduate School of the Chinese Academy of Sciences (China); L. Wang, Changchun Institute of Optics, Fine Mechanics and Physics (China)				
6824 1G	High-efficiency AlGaAs/GaAs quantum well semiconductor laser [6824-44] L. Li, C. Wan, Z. Li, M. Li, G. Liu, Changchun Univ. of Science and Technology (China)				
6824 1H	Study of the model of laser diode emitted beam based on multimode Gaussian distribution [6824-47] P. Li, J. Sun, H. Chen, W. Guo, K. Li, Beijing Institute of Technology (China)				
6824 11	A novel high-resolution chaotic lidar with optical injection to chaotic laser diode [6824-50]				

Y. Wang, A. Wang, Taiyuan Univ. of Technology (China)

6824 1J	Analysis of circuit model for vertical-cavity surface-emitting lasers [6824-52] W. Wu, China Jiliang Univ. (China)				
6824 1K	Multi-target ranging using chaotic laser generated by semiconductor laser with optical feedback [6824-54] YC. Wang, BJ. Wang, AB. Wang, TA. Gong, Taiyuan Univ. of Technology (China)				
6824 1L	The effects of dispersion on optical fiber chaotic secure communication [6824-55] Y. Wang, J. Zhang, A. Wang, Y. Li, G. Zhang, Taiyuan Univ. of Technology (China)				
6824 1M	Mode matching of all optical wavelength conversion using an injection-locked Fabry-Perot laser diode [6824-58] Y. An, YC. Wang, MJ. Zhang, HC. He, SX. Niu, Taiyuan Univ. of Technology (China)				
6824 1N	Comparison of message filtering characteristics between closed-loop and open-loop feedback schemes [6824-60] YC. Wang, YL. Li, AB. Wang, Taiyuan Univ. of Technology (China)				
6824 10	Evolution from low-frequency fluctuations to high-dimension chaos in semiconductor laser with optical feedback [6824-62] YC. Wang, LQ. Kong, AB. Wang, HH. Wang, Taiyuan Univ. of Technology (China)				
6824 1Q	Application of DDS in laser modulation [6824-65] Z. Zhang, J. Lu, Y. Xu, Z. Wang, Q. Lin, Zhejiang Univ. (China)				
6824 1S	Simultaneous all-optical clock division and wavelength conversion using a Fabry-Pérot laser diode [6824-71] MJ. Zhang, Y. Wang, Y. An, SX. Niu, HC. He, Taiyuan Univ. of Technology (China)				
6824 1V	The optimization of the beam of laser [6824-77] X. Sun, X. Xu, W. Fan, Nankai Univ. (China)				
6824 1X	Near infrared Raman spectra of <i>Rhizoma dioscoreae</i> (Invited Paper) [6824-80] W. Lin, R. Chen, Fujian Normal Univ. (China); G. Chen, Fujian Normal Univ. (China) and Huazhong Univ. of Science and Technology (China); S. Feng, Y. Li, Z. Huang, Y. Li, Fujian Normal Univ. (China)				
	Author Index				

Conference Committee

Conference Chairs

Lianghui Chen, Institute of Semiconductors (China)Hiroyuki Suzuki, Advanced Telecommunications Research Institute International (Japan)Paul T. Rudy, QPC Lasers, Inc. (USA)

Ninghua Zhu, Institute of Semiconductors (China)

Program Committee

Yi Luo, Tsinghua University (China)
Hongliang Zhu, Institute of Semiconductors (China)
Yongzhen Huang, Institute of Semiconductors (China)
Guang-Di Shen, Beijing University of Technology (China)
Guoyi Zhang, Peking University (China)
Park Liu, Shagrow Telecom Company, Ltd. (China)
Jeffrey E. Ungar, QPC Lasers, Inc. (USA)
Takaaki Kakitsuka, NTT Photonics Laboratories (Japan)
Fouad Karouta, Technische Universiteit Eindhoven (Netherlands)

Session Chairs

- Simulation, Characteristics, and Packaging I
 Ninghua Zhu, Institute of Semiconductors (China)
 Fouad Karouta, Technische Universiteit Eindhoven (Netherlands)
- Simulation, Characteristics, and Packaging II Luo Yi, Tsinghua University (China) Lijun Wang, Changchun Institute of Optics, Fine Mechanics and Physics (China)
- Novel Semiconductor Lasers
 Guoyi Zhang, Peking University (China)
 Takaaki Kakitsuka, NTT Photonics Laboratories (Japan)
- Semiconductor Laser Applications I
 Paul T. Rudy, QPC Lasers, Inc. (USA)
 Guang-Di Shen, Beijing University of Technology (China)
- 5 Semiconductor Laser Applications II Yongzhen Huang, Institute of Semiconductors (China) Jeffrey E. Ungar, QPC Lasers, Inc. (USA)

6 Semiconductor Lasers and Related Materials
Wanhua Zheng, Institute of Semiconductors (China)
Park Liu, Shagrow Telecom Tech Company, Ltd. (China)

Symposium Committees

General Chairs

Brian Culshaw, University of Strathclyde (United Kingdom) **Bingkun Zhou**, Tsinghua University (China) and COS—Chinese Optical Society (China)

General Cochairs

Arthur Chiou, National Yang-Ming University (Taiwan, China)
Mitsuo Takeda, University of Electro-Communications (Japan)
Chungli Bai, Chinese Academy of Sciences (China)
Seung-Han Park, Yonsei University (South Korea)
Zhizhan Xu, Shanghai Institute of Optics and Fine Mechanics (China)

Jianlin Cao, China Ministry of Science and Technology (China)
Junhao Chu, Shanghai Institute of Technical Physics (China)
Jingming Kuang, Beijing Institute of Technology (China)
Xiaomin Ren, Beijing University of Posts and Telecommunications (China)
Dingbo Kuang, Shanghai Institute of Technical Physics (China)
Guozheng Yang, Institute of Physics (China)

Honorary Chairs

Daheng Wang, Chinese Academy of Sciences (China) **Guoguang Mu**, Nankai University (China)

Technical Program Chair

Songlin Zhuang, Shanghai University of Science and Technology (China)

Technical Program Cochairs

Xun Hou, Xian Institute of Optics and Precision Mechanics (China) **Qian Mao**, Wuhan Research Institute of Posts and Telecommunications (China)

Xu Liu, Zhejiang University (China)

Local Organizing Committee Chair

Shusen Xie, Fujian Normal University (China)

Local Organizing Committee Cochairs

Guoqiang Ni, Beijing Institute of Technology (China)
Qihuang Gong, Peking University (China)
Ying Gu, PLA General Hospital (China)
Huilin Jiang, Changchun University of Science and Technology (China)

General Secretary

Guoqiang Ni, Beijing Institute of Technology (China)

Administrative Vice General Secretary

Boyu Ding, Beijing Institute of Technology (China)

Vice General Secretaries

Hanyi Zhang, Tsinghua University (China)
Ya Cheng, Shanghai Institute of Optics and Fine Mechanics (China)
Zhongwei Fan, Academy of Opto-electronics (China)
Jianxin Chen, Fujian Normal University (China)
Lan Wu, Zhejiang University (China)
Shaowen Wang, COS—Chinese Optical Society (China)
Yuejin Zhao, Beijing Institute of Technology (China)
Chongxiu Yu, Beijing University of Posts and Telecommunication (China)
Jun Ruan, China Solid State Lighting Research and Industry Alliance (China)

Local Organizing Committee Members

Kangnan Qi, Beijing Optical Society (China)
Chunqing Gao, Beijing Institute of Technology (China)
Tiegen Liu, Tianjin University (China)
Lanxing Shao, Shanghai Optical Society (China)
Zaixuan Zhang, Chinese Jiliang University (China)
Hongda Chen, Institute of Semiconductors (China)
Baosheng Liu, Beijing Optical Society (China)
Xin Wang, Hubei Optical Society (China)
Lin Zhai, COS—Chinese Optical Society (China)
Zhiqiang Zhu, East China Normal University (China)
Lei Xu, Fudan University (China)
Hezhou Wang, Zhongshan University (China)
Zhiming Yi, Ofstar Tech Company, Ltd., Shenzhen (China)