PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 10553

, "Front Matter: Volume 10553," Proc. SPIE 10553, Novel In-Plane
Semiconductor Lasers XVII, 1055301 (23 March 2018); doi:
10.1117/12.2323053

SPIE.

Event: SPIE OPTO, 2018, San Francisco, California, United States

PROCEEDINGS OF SPIE

Novel In-Plane Semiconductor Lasers XVII

Alexey A. Belyanin

Peter M. Smowton

Editors

29 January – 1 February 2018

San Francisco, California, United States

Sponsored and Published by
SPIE

Volume 10553

Proceedings of SPIE 0277-786X, V. 10553

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Novel In-Plane Semiconductor Lasers XVII, edited by Alexey A. Belyanin, Peter M. Smowton, Proc. of SPIE Vol. 10553, 1055301 · © 2018 SPIE · CCC code: 0277-786X/18/\$18 · doi: 10.1117/12.2323053

Proc. of SPIE Vol. 10553 1055301-1

The papers 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. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers 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 these proceedings:

Author(s), "Title of Paper," in *Novel In-Plane Semiconductor Lasers XVII*, edited by Alexey A. Belyanin, Peter M. Smowton, Proceedings of SPIE Vol. 10553 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X
ISSN: 1996-756X (electronic)

ISBN: 9781510615915
ISBN: 9781510615922 (electronic)

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 © 2018, 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/18/\$18.00.

Printed in the United States of America.

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

**SPIE. DIGITAL
LIBRARY**
SPIEDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five 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.

Contents

vii	<i>Authors</i>
ix	<i>Conference Committee</i>

PLENARY SESSION

10553 02	III-nitride nanowire LEDs and diode lasers: monolithic light sources on (001) Si emitting in the 600-1300nm range (Plenary Paper) [10553-202]
----------	--

DEVELOPING LASER MATERIALS

10553 07	Laser diodes using InAlGaAs multiple quantum wells intermixed to varying extent [10553-56]
----------	---

NITRIDES/VISIBLE EMITTING LASERS

10553 08	Defect evolution during catastrophic optical damage in 450nm emitting InGaN/GaN diode lasers (Invited Paper) [10553-5]
10553 0A	10th order laterally coupled GaN-based DFB laser diodes with v-shaped surface gratings (Invited Paper) [10553-7]

ANTIMONIDE-BASED MID-IR LASERS

10553 0C	New GasB based single mode diode lasers in the NIR and MIR spectral regime for sensor applications [10553-9]
10553 0E	Magneto-optical properties of potassium terbium fluoride [10553-11]

QUANTUM DOT LASERS

10553 0G	Incorporating structural analysis in a quantum dot Monte-Carlo model [10553-13]
10553 0J	Temperature dependence of spectral linewidth of InAs/InP quantum dot distributed feedback lasers [10553-16]

TEMPORAL EFFECTS AND MODE LOCKED LASERS

10553 0K	Pico- and nanosecond investigations of the lateral nearfield of broad area lasers under pulsed high-current excitation [10553-17]
----------	--

- 10553 0L **Spontaneous generation of frequency combs in QD lasers** [10553-18]
- 10553 0M **Influence of different approaches for dynamical performance optimization of monolithic passive colliding-pulse mode-locked laser diodes emitting around 850 nm** [10553-19]
- 10553 0N **Passive, active, and hybrid mode-locking in a self-optimized ultrafast diode laser** [10553-20]
- 10553 0O **High pulse energy stabilized passively mode-locked external cavity inverse bow-tie 980nm laser diode for space applications** [10553-21]

MID-IR QCLS AND ICLS

- 10553 0P **Continuous wave power scaling in high power broad area quantum cascade lasers** [10553-22]
- 10553 0Q **3.35 μ m distributed feedback interband cascade lasers with top grating** [10553-23]

PHOTONIC BANDGAP AND CAVITY EFFECTS

- 10553 1O **Reflectors and tuning elements for widely-tunable GaAs-based sampled grating DBR lasers** [10553-33]

COMBS AND MODE LOCKING

- 10553 19 **Passive mode-locking of 3.25 μ m GaSb-based type-I quantum-well cascade diode lasers** [10553-42]

HIGH POWER/BRIGHTNESS

- 10553 1C **Diffraction limited 1064nm monolithic DBR-master oscillator power amplifier with more than 7W output power** [10553-45]
- 10553 1D **Comparison of distributed Bragg reflector ridge waveguide diode lasers and monolithic master oscillator power amplifiers** [10553-46]
- 10553 1F **5.5nm wavelength tunable high power MOPA diode laser system at 971nm** [10553-48]
- 10553 1G **Comparison for 1030nm DBR tapered diode lasers with 10W central lobe output power and different grating layouts for wavelength stabilization and lateral spatial mode filtering** [10553-49]

POSTER SESSION

- 10553 1L **Angled facet waveguide quantum cascade laser for external cavity system** [10553-54]
- 10553 1M **Stability of the mode-locking regime in tapered quantum-dot lasers** [10553-55]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Alahmadi, Yousef, 07	Kundermann, S., 0O
Alloush, M. Ali, 0N	Lascola, Kevin, 0Q
Babazadeh, N., 0G	Lecomte, M., 0O
Bardella, Paolo, 0L, 1M	Lell, Alfred, 08
Belenky, Gregory, 19	Leshin, J., 0P
Bhattacharya, P., 02	Li, Wei, 0G
Boiko, D. L., 0O	Liero, A., 0K
Brenner, Carsten, 0N	LiKamWa, Patrick, 07
Breuer, S., 1M	Löffler, Andreas, 08
Brox, O., 10	Lyakh, A., 0P
Bugge, Frank, 0M, 1D, 1G	Maaßdorf, André, 1C
Butler, I. M. E., 0G	Maiwald, Martin, 1C
Childs, D. T. D., 0G	Masselink, W. Ted, 1L
Columbo, Lorenzo Luigi, 0L	Mathonnière, Sylvain, 1L
Della Casa, Pietro, 10, 1F	Matsuoka, Yohei, 1L
Drzewietzki, L., 1M	Milde, Tobias, 0C
Duan, J., 0J	Mordmüller, Mario, 0C
Einfeldt, S., 0A	Müller, André, 1F, 1G
Erbert, Götz, 1C, 1G	Nishi, K., 0G
Feise, David, 1D, 1F	O'Gorman, James, 0C
Feng, Tao, 19	Parillaud, O., 0O
Figueiredo, P., 0P	Paschke, Katrin, 1D
Foundos, Greg, 0E	Peyvast, Negin, 0G
Freier, E., 0A	Pham, John, 0Q
Fricke, Jörg, 0K, 0M, 1C, 1F, 1G	Pilny, Rouven H., 0N
Garcia, M., 0O	Poole, P. J., 0J
Gerard, B., 0O	Prziwarka, T., 0M
Gerke, Sebastian, 1D	Resneau, P., 0O
Ginolas, Anim, 1F	Ressel, Peter, 1C, 1F
Gioannini, Mariangela, 0L	Robert, Y., 0O
Go, R., 0P	Ross, I. M., 0G
Grillot, F., 0J	Rossetti, M., 1M
Hazari, A., 02	Sacher, Joachim, 0C
Hoffmann, V., 0A	Schade, Wolfgang, 0C
Hofmann, Martin R., 0N	Schires, K., 0J
Hogg, R. A., 0G	Semtsiv, Mykhaylo P., 1L
Honsberg, Martin, 0C	Shen, Kun, 0Q
Hoppe, Morten, 0C	Shterengas, Leon, 19
Hosoda, Takashi, 19	Shu, H., 0P
Huang, H., 0J	Sobhani, S. A., 0G
Jahangir, S., 02	Staske, R., 0K
Kang, J. H., 0A	Stevens, Kevin T., 0E
Kemke, Robert, 08	Stocker, Michael, 0Q
Kipshidze, Gela, 19	Stojetz, Bernhard, 08
Klehr, Andreas, 0K, 0M, 0N	Sugawara, M., 0G
Kneissl, M., 0A	Sulmoni, L., 0A
Knigge, Andrea, 0K, 0M, 0N, 10	Sumpf, Bernd, 10, 1C, 1F, 1G
König, Harald, 08	Suttlinger, M., 0P
Krakowski, M., 0O	Takemasa, K., 0G

Tatenguem, Herve, 0C
Tawfieq, Mahmoud, 10, 1F
Tomm, Jens W., 08
Torcheboeuf, N., 0O
Towner, Frederick, 0Q
Tränkle, Günther, 0M, 0N, 1C, 1D, 1F, 1G
Unger, R.-S., 0A
Vinet, E., 0O
Wang, C., 0J
Wang, Jie, 0Q
Wang, Meng, 19
Weber, C., 1M
Wegemund, Jan, 1D
Wenzel, H., 0A, 0K, 0M, 10
Werner, Nils, 1D
Wernicke, T., 0A
Weyers, M., 0M, 10
Xie, Feng, 0Q
Zeghuzi, A., 0K
Zelmon, David E., 0E
Zink, Christof, 1C, 1G

Conference Committee

Symposium Chairs

Connie J. Chang-Hasnain, University of California, Berkeley
(United States)

Graham T. Reed, Optoelectronics Research Centre, University of
Southampton (United Kingdom)

Symposium Co-Chairs

Jean-Emmanuel Broquin, IMEP-LAHC (France)

Shibin Jiang, AdValue Photonics, Inc. (United States)

Program Track Chair

Klaus P. Streubel, OSRAM AG (Germany)

Conference Chairs

Alexey A. Belyanin, Texas A&M University (United States)

Peter M. Smowton, Cardiff University (United Kingdom)

Conference Program Committee

Yasuhiko Arakawa, The University of Tokyo (Japan)

Mikhail A. Belkin, The University of Texas at Austin (United States)

Dan Botez, University of Wisconsin-Madison (United States)

Federico Capasso, Harvard School of Engineering and Applied
Sciences (United States)

Gary A. Evans, Southern Methodist University (United States)

Michael Kneissl, Technische Universität Berlin (Germany)

Luke F. Lester, Virginia Polytechnic Institute and State University
(United States)

Shinji Matsuo, NTT Photonics Laboratories (Japan)

Luke J. Mawst, University of Wisconsin-Madison (United States)

Jerry R. Meyer, U.S. Naval Research Laboratory (United States)

Roberto Paiella, Boston University (United States)

Richard V. Penty, University of Cambridge (United Kingdom)

Johann Peter Reithmaier, Universität Kassel (Germany)

Haisheng Rong, Intel Corporation (United States)

Gary M. Smith, MIT Lincoln Laboratory (United States)

Nelson Tansu, Lehigh University (United States)

Miriam Serena Vitiello, Consiglio Nazionale delle Ricerche (Italy)

Qi Jie Wang, Nanyang Technological University (Singapore)

Session Chairs

- 1 Developing Laser Materials
Luke J. Mawst, University of Wisconsin-Madison (United States)
- 2 Nitrides/Visible Emitting Lasers
Michael Kneissl, Technische Universität Berlin (Germany)
- 3 Antimonide-based Mid-IR Lasers
Leon Shterengas, Stony Brook University (United States)
- 4 Quantum Dot Lasers
Peter M. Smowton, Cardiff University (United Kingdom)
- 5 Temporal Effects and Mode Locked Lasers
Johann Peter Reithmaier, Universität Kassel (Germany)
- 6 Mid-IR QCLs and ICLs
Gerard Wysocki, Princeton University (United States)
- 7 QCLs for Spectroscopy
Feng Xie, Thorlabs Quantum Electronics (United States)
- 8 Photonic Bandgap and Cavity Effects
Alexey A. Belyanin, Texas A&M University (United States)
- 9 QCL Frequency Combs
Sukhdeep Dhillon, Laboratoire Pierre Aigrain (France)
- 10 Combs and Ultrafast Modulation
Marco Piccardi, Harvard John A. Paulson School of Engineering and Applied Sciences (United States)
- 11 Combs and Mode Locking
Karl Unterrainer, Technische Universität Wien (Austria)
- 12 High Power/Brightness
Gary M. Smith, MIT Lincoln Laboratory (United States)
- 13 THz QCLs
Maria Catrina Giordano, CNR-NANO (Italy)