

PROCEEDINGS OF SPIE

Novel In-Plane Semiconductor Lasers XX

Alexey A. Belyanin
Peter M. Smowton
Editors

6–11 March 2021
Online Only, United States

Sponsored and Published by
SPIE

Volume 11705

Proceedings of SPIE 0277-786X, V. 11705

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

Novel In-Plane Semiconductor Lasers XX, edited by Alexey A. Belyanin,
Peter M. Smowton, Proc. of SPIE Vol. 11705, 1170501 · © 2021 SPIE
CCC code: 0277-786X/21/\$21 · doi: 10.1117/12.2596668

Proc. of SPIE Vol. 11705 1170501-1

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 SPIDigitalLibrary.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 XX*, edited by Alexey A. Belyanin, Peter M. Smowton, Proceedings of SPIE Vol. 11705 (SPIE, Bellingham, WA, 2021) Seven-digit Article CID Number.

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

ISBN: 9781510642454
ISBN: 9781510642461 (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 © 2021, 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 \$21.00 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/21/\$21.00.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.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

MODE-LOCKING: COMBS

- 11705 03 **InAs/InP quantum dot coherent comb lasers and their applications in data centre and coherent communication systems (Invited Paper)** [11705-1]
- 11705 08 **First demonstration of a hybrid integrated InP-Si₃N₄ diode laser for broadband optical frequency comb generation** [11705-48]

MATERIAL AND DEVICE DEVELOPMENT

- 11705 0E **On the carrier kinetics in Al(In)GaN quantum wells stressed by high current densities** [11705-11]

III-V ON SILICON LASERS

- 11705 0K **Impact of dislocation density on performance and reliability of 1.3 μ m InAs quantum dot lasers epitaxially grown on silicon** [11705-17]

HIGH BRIGHTNESS / NARROW LINEWIDTH

- 11705 0M **Single-pass tapered semiconductor optical amplifiers and modules for efficient coherent beam combining (Invited Paper)** [11705-19]
- 11705 0N **Enhanced self-aligned structure for improved lateral brightness in 940 nm high-power broad-area diode lasers** [11705-20]
- 11705 0O **Narrow spectral line-width 785 nm DBR tapered lasers with 7 W output power** [11705-21]

MODELING OF QCLS AND THEIR FREQUENCY COMBS

- 11705 10 **Frequency modulated combs as extended nondispersive waves** [11705-33]

MID-INFRARED QCLS: NEW MATERIALS, HIGH PERFORMANCE

- 11705 15 **Highly efficient long-wavelength infrared, step-tapered quantum cascade lasers** [11705-38]

11705 16 **Beam stability of buried-heterostructure quantum cascade lasers formed by ICP-etching and HVPE regrowth** [11705-39]

MID-INFRARED AND THZ LASERS: NEW DESIGNS I

11705 19 **Waveguiding and dispersion properties of interband cascade laser frequency combs**
[11705-42]

POSTER SESSION

11705 1D **Can photonic-CMOS quantum cascade lasers with built-in nonlinear optics replace multiple quantum well diode-based QCLs? Analysis of performance advantages and future outlook**
[11705-46]

11705 1E **AlGaInAs / InP laser heterostructure improvement** [11705-47]