

PROCEEDINGS OF SPIE

Solid State Lasers XXXIII: Technology and Devices

**W. Andrew Clarkson
Ramesh K. Shori**
Editors

**28–29 January 2024
San Francisco, California, United States**

Sponsored and Published by
SPIE

Volume 12864

Proceedings of SPIE 0277-786X, V. 12864

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

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 *Solid State Lasers XXXIII: Technology and Devices*, edited by W. Andrew Clarkson, Ramesh K. Shori, Proc. of SPIE 12864, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510669871
ISBN: 9781510669888 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)
SPIE.org
Copyright © 2024 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

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: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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

vi *Conference Committee*

SESSION 1 EYE SAFE AND MID-IR LASERS

- 12864 02 **Development of high peak and average power Tm:YLF lasers** [12864-1]
- 12864 03 **Efficient resonant diode pumping of 2 μm thulium lasers at 1.7 μm** [12864-2]
- 12864 04 **Simulated power scalability for ytterbium, holmium, and thulium-doped crystalline fiber amplifiers** [12864-3]
- 12864 05 **Modeling of sub-nanosecond Fe:ZnSe mid-IR gain-switched laser operating at room temperature** [12864-4]

SESSION 2 CHALLENGES AND ISSUES IN FIELD, FLIGHT, AND SPACE QUALIFIED LASER COMPONENTS AND SYSTEMS

- 12864 06 **Development of a frequency-locked Er:YAG laser for methane and water vapor DIAL** [12864-7]
- 12864 07 **Mission status, on-orbit performance, and lessons learned of the global ecosystem dynamics investigation (GEDI) lidar laser transmitters** [12864-8]
- 12864 08 **Space qualification studies of AOTF devices under the MISSE-11 mission** [12864-9]
- 12864 09 **Performance of the dragonfly mass spectrometer (DraMS) programmable UV laser source engineering test unit (ETU)** [12864-10]
- 12864 0A **Solid state multiwavelength laser development for planetary science laser mass spectrometer** [12864-11]

SESSION 3 NOVEL LASER CONCEPTS

- 12864 0B **Fast switchable CW to ultrashort pulsed high-power laser beam from a single thin-disk multipass amplifier** [12864-12]
- 12864 0C **Power scaling of optical vortices by the filled aperture coherent beam combining technique** [12864-16]

SESSION 4 ULTRAFAST LASERS

12864 0D **146 W, 7 fs, 11 μ J thin-disk oscillator compressed with multiple cells** [12864-60]

SESSION 5 PULSED LASERS I

12864 0E **Output parameters optimization of Q-switched Nd:YAG/V:YAG microchip laser generating at 1.34 μ m** [12864-23]

12864 0F **Novel output pulse control of CW pumped Nd:YVO₄/Cr:YAG microchip laser** [12864-24]

12864 0G **High-gain diode pumped Yb:YAG amplifier with advanced thermal management for pumping high repetition rate OPCPA** [12864-25]

12864 0H **Advanced numerical simulation model for end-pumped Ho³⁺:YAG laser resonators** [12864-26]

SESSION 6 PULSED LASERS II

12864 0I **High pulse energy 460-nm blue laser for Rb-Sr isochron dating on the moon surface** [12864-28]

12864 0J **375-400nm SHG Alexandrite laser using Zn-indiffused MgO:PPLN ridge waveguides** [12864-29]

SESSION 7 LASER MATERIAL CHARACTERIZATION

12864 0K **Monoclinic Yb³⁺,Li⁺:ZnWO₄ - efficient broadly emitting laser material** [12864-33]

12864 0L **Solution processed bulk colloidal nanocrystals as gain material in photonic crystal surface emitting lasers across the green-red spectrum** [12864-34]

12864 0M **Thermal aberration analysis in Nd:YVO₄** [12864-35]

12864 0N **Cr:LiSAF DFC chip for high power and broadband tiny integrated laser** [12864-36]

POSTERS SESSION

12864 0O **Conceptual design of an efficient, high-energy, broadband, high repetition rate laser system for ultrafast laser matter interaction applications at 1.45 μ m** [12864-17]

12864 0P **Directly diode pumped cryogenically-cooled Ho:GGAG laser** [12864-37]

- 12864 0Q **Gain switched Ho:YAG lasers with 2-4ns pulse duration, and high energy per pulse** [12864-38]
- 12864 0R **Direct modulated VCSEL illumination-based compact LIDAR sensor** [12864-40]
- 12864 0S **Efficient Nd:YVO₄-KGW intracavity Raman lasers with linear and folded fundamental laser cavities** [12864-41]
- 12864 0T **Thousand hours operations of CW DUV laser light source at 213 nm for high reliability** [12864-42]
- 12864 0U **Optimization of cooling system for a compact high peak power Yb:Er:Glass laser** [12864-44]
- 12864 0V **Polarized spectroscopy of Ho:YAlO₃ crystals for 2 μ m and 3 μ m lasers** [12864-45]
- 12864 0W **Determining the relative impact of quantum efficiency and core propagation loss on efficient power scaling of thulium-doped silica fibre lasers** [12864-47]
- 12864 0X **Power scaling of a diode-pumped Yb:YLF laser** [12864-50]
- 12864 0Y **Dual-wavelength Nd:YVO laser with c-cut crystal geometry** [12864-51]
- 12864 0Z **Femtosecond Yb:KGW laser pumped by a compact 946 nm Nd:YAG laser** [12864-52]
- 12864 10 **Reconfigurable crystal Brillouin laser for linewidth narrowing and microwave spaced frequency combs** [12864-54]
- 12864 11 **High-energy Alexandrite picosecond laser using the self-injection technique** [12864-56]
- 12864 12 **Implementation of uniform beam shape of medical picosecond laser for effective treatment** [12864-57]