PROCEEDINGS OF SPIE

Twentieth National Conference on Laser Technology and Optoelectronics

Qiang Liu *Editor*

20–23 June 2025 Shanghai, China

Organized by China Laser Press (China)

Technical Cosponsor and Publisher SPIE

Volume 13788

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 Twentieth National Conference on Laser Technology and Optoelectronics, edited by Qiang Liu, Proc. of SPIE 13788, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510694552

ISBN: 9781510694569 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2025 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.



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

vii Conference Committee

TWENTIETH NATIONAL CONFERENCE ON LASER TECHNOLOGY AND OPTOELECTRONICS

13788 02	Research on active and passive dual-loss Q-switched laser based on the WTe_2/MoS_2 heterojunction [13788-2]
13788 03	Arrayed VCSEL pulsed driver design and experiments [13788-3]
13788 04	Research on the model of reinforcement learning in fiber optic sensor signal processing [13788-5]
13788 05	Silicon nitride grating coupler based on DBR and thermo-optic tuning technology [13788-7]
13788 06	Three-dimensional super-resolution light-induced magnetization spot arrays [13788-8]
13788 07	Negative-curvature hollow-core fiber for single-mode transmission in the near-infrared spectral region [13788-9]
13788 08	Production of triangular helix beams with the hexagonal array [13788-10]
13788 09	Single-frequency Q-switched Er:YAG laser with Herriott-type multi-pass cavity [13788-11]
13788 0A	Bend-resistant temperature sensor realized by optical fiber microsphere and photonic crystal fiber mode controller [13788-12]
13788 OB	Design of high-performance silicon nitride edge coupler based on subwavelength grating [13788-15]
13788 OC	Dynamic effects of aluminum target ablated by combined pulsed/continuous laser [13788-16]
13788 0D	Single-photon LiDAR data generation model for data augmentation [13788-18]
13788 OE	A tower localization method for power transmission lines based on phase analysis in DAS [13788-19]
13788 OF	Research on integrated high-precision laser time synchronization and communication in space $\left[13788\text{-}20\right]$
13788 0G	Image-based Dross attachment estimation of laser cut edges with a convolutional neural network [13788-21]

13788 0H	Large-gradient wavefront detection based on knife-edge scanning filtering method [13788-23]
13788 OI	A novel method for generating grafted perfect vector vortex beams [13788-25]
13788 OJ	Manipulating flying and stored light quanta with laser cooled atomic ensembles [13788-26]
13788 OK	Research on pumping dye laser with 100-watt red solid-state laser [13788-27]
13788 OL	High-order fiber Bragg gratings in the visible range inscribed with femtosecond laser and a phase mask [13788-28]
13788 OM	Analysis of pulse width on the spatial properties of electron motion and radiation driven by linearly polarized tightly focused chirped laser pulses [13788-31]
13788 ON	Laser properties of mixtures of Rhodamine 101 and Cresyl Violet 670 [13788-37]
13788 00	2.8µm high-repetition-rate fiber laser based on hybrid mode-locking [13788-39]
13788 OP	Physical-driven fault prediction of high-power fiber lasers [13788-40]
13788 0Q	Over 10kW laser output achieved based on ultra-lightweight all-fiber laser system [13788-42]
13788 OR	Plasma evolution of carbon nanotube paper induced by double-pulse of nanosecond laser irradiation [13788-44]
13788 OS	Diode-pumped Yb:YAG slab multi-wavelength laser [13788-45]
13788 OT	Development of a 105µm fiber output 60W nanosecond green solid-state laser [13788-46]
13788 OU	Research on rotational speed measurement technology for rough-surfaced targets based on rotational Doppler effect [13788-47]
13788 0V	Narrow-linewidth single-frequency fiber laser based on whispering gallery mode resonator self-injection locking [13788-48]
13788 OW	Research on light focusing through scattering media based on super-pixel modulation [13788-49]
13788 OX	Research status and development overview of ultra-high-power semiconductor laser source [13788-50]
13788 OY	Spatial-temporal feature fusion-based Brillouin frequency shift extraction method [13788-51]

13788 OZ	Generation of flat-top focal fields using spatially uniform linear source antenna arrays [13788-54]
13788 10	Cross scale simulation study on ionic-surfactant-mediated electro-dewetting process based on first principles [13788-55]
13788 11	Experimental study on the intensity distribution of laser diffuse reflection for oblique incidence [13788-56]
13788 12	Suppression of Q-switched spikes in an all-fiber acousto-optic oscillator [13788-57]
13788 13	Highly sensitive molecular detection using FRET-based semiconductor nanowire lasers [13788-59]