# PROCEEDINGS OF SPIE

# Eighteenth National Conference on Laser Technology and Optoelectronics

Weibiao Chen Minghui Hong Jianrong Qiu Pu Wang Jianqiang Zhu Tiancai Zhang Editors

10–13 June 2023 Shanghai, China

Organized by Chinese Laser Press (China) Shanghai Society of Laser (China)

Technical Co-Sponsor and Publisher SPIE

**Volume 12792** 

Proceedings of SPIE 0277-786X, V. 12792

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

Eighteenth National Conference on Laser Technology and Optoelectronics, edited by Weibiao Chen, Minghui Hong, Jianrong Qiu, Pu Wang, Jianqiang Zhu, Tiancai Zhang, Proc. of SPIE Vol. 12792, 1279201 © 2023 SPIE · 0277-786X · doi: 10.1117/12.3010450

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 Eighteenth National Conference on Laser Technology and Optoelectronics, edited by Weibiao Chen, Minghui Hong, Jianrong Qiu, Pu Wang, Jianqiang Zhu, Tiancai Zhang, Proc. of SPIE 12792, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510668379

ISBN: 9781510668386 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2023 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

#### EIGHTEENTH NATIONAL CONFERENCE ON LASER TECHNOLOGY AND OPTOELECTRONICS

12792 02	Time evolution of high-energy electron radiation in different domains [12792-2]
12792 03	Study on the treatment of titanium alloy template by high-speed laser polygon mirror scanning system [12792-4]
12792 04	Research on laser high-speed slotting the PERC solar cell [12792-5]
12792 05	Laser intensity affects the electron's optimal position and the spatial radiation characteristics in linearly polarized tightly focused laser field [12792-6]
12792 06	Comparison of perforation effect between long pulse and continuous laser irradiation on aluminum alloy plates [12792-7]
12792 07	Effect of laser intensity on asymmetric radiation of electron [12792-8]
12792 08	Miniature optical fiber Fabry-Pérot ultrasonic transducer for ultrasound detection [12792-9]
12792 09	Symmetry of nonlinear inverse Thomson scattering with initial phase modulation of ultrashort circularly polarized laser [12792-10]
12792 0A	Full space spectra generated by collision of electrons with different initial energy and positions with tightly focused laser pulses [12792-13]
12792 OB	Influence of initial phase on radiation characteristics of electrons driven by non-tightly focused laser [12792-15]
12792 OC	Study on radiation characteristics of energetic electrons driven by circularly polarized intense laser pulse $[12792-16]$
12792 0D	Triple-wavelength Erbium-doped fiber laser based on interference in a seven-core fiber [12792-17]
12792 OE	Non-line-of-sight reconstruction based on filtered back projection [12792-18]
12792 OF	Study on the inactivation effect of ultraviolet light from multi-irradiance UV-LEDs on bacteria and the underlying damage [12792-19]

12792 0G	Zeptosecond x-ray pulse generation from scattering of few-cycle laser pulses with relativistic electron [12792-20]
12792 OH	The effective characteristics of pulse duration on the electron emission impelled by linear polarized strong laser pulse [12792-21]
12792 OI	Equivalent structure constant in oceanic turbulence based on the quadratic approximation [12792-22]
12792 OJ	Full spatial characteristics of emission from electron oscillation driven by linearly polarized laser pulses [12792-24]
12792 OK	Ultra-fine cable fiber optic hydrophone array for acoustic detection [12792-26]
12792 OL	Theoretical analysis of high refractive index contrast grating-based vertical external cavity surface emitting lasers [12792-27]
12792 OM	Propagation properties of helical Ince–Gaussian beam in oceanic turbulence [12792-28]
12792 ON	High performance waveguide integrated vertical silicon-based germanium avalanche photodetectors [12792-29]
12792 00	Broadband efficient color holographic imaging based on metasurfaces [12792-33]
12792 OP	Effect of pulse width variation on the radiation characteristics of electrons driven by circularly polarized lasers [12792-34]
12792 0Q	Extended target-dependent Hartmann wavefront detection with partial missing subaperture images [12792-38]
12792 OR	Study on the single pulse ablation characteristics of SiC ceramics by infrared femtosecond laser [12792-40]
12792 OS	Amorphous mesoporous carbon nanomaterials converted from waste paper via nanosecond laser photochemical synthesis [12792-41]
12792 OT	Performance and reliability study on high-power single-mode 980nm semiconductor laser pump [12792-42]
12792 OU	Deep learning-based ultrafast structured illumination microscopy imaging reconstruction [12792-46]
12792 OV	Accumulative effect in femtosecond laser ablation of SiC <sub>f</sub> /SiC ceramic matrix composites $[12792-47]$
12792 OW	Anisotropic turbulence-induced spectral intensity evolution of a partially coherent vortex beam [12792-49]
12792 OX	Effect of electrically assisted laser shock on friction and wear properties of 316L stainless steel [12792-50]

12792 OY	Mode purity evolution of multimode perfect vortex beams in atmospheric turbulence [12792-52]
12792 OZ	Dynamic pressure sensing system based on fiber ring laser [12792-53]
12792 10	Demonstration of a bidirectional oscillating-amplifying integrated fiber laser with two ports times 2.5kW [12792-55]
12792 11	Laser metal deposition height prediction method based on multimodal neural network [12792-57]
12792 12	Ultra-short pulse laser-based additive manufacturing of high hardness tungsten [12792-58]
12792 13	Three-dimensional numerical simulation of temperature field evolution in laser cladding CoCrFeNi high-entropy alloy process [12792-59]
12792 14	Tunable multi-wavelength Brillouin–erbium random distributed feedback fiber laser [12792-60]
12792 15	A 10GHz regeneratively mode-locked polarization-maintaining fiber laser operating at 1560nn [12792-64]
12792 16	Numerical simulation of the radiation properties of a high-energy electron influenced by linear polarized laser pulse [12792-68]
12792 17	High power short wavelength infrared supercontinuum pumped by 2µm noise-like pulse [12792-69]
12792 18	Femtosecond chirped-pulse amplification system based on gain-managed nonlinearity regime [12792-71]
12792 19	2.5W diode-pumped femtosecond Yb:KGW laser [12792-72]
12792 1A	D-shape optical fiber SPR sensor with reference channel compensation [12792-75]
12792 1B	Au decorated direct laser processed black Si for enhanced infrared absorption [12792-76]
12792 1C	Rice leaf inspired anisotropic wettability surface based on femtosecond laser direct writing [12792-77]
12792 1D	An optical-transparent flexible metamaterial for ultra-broadband microwave absorption [12792-78]
12792 1E	A 1550nm passively mode-locked fiber laser with the repetition rate of 800MHz [12792-79]
12792 1F	Micromoles drilling in Ti-6Al-4V titanium alloy by laser and electrochemical machining [12792-80]
12792 1G	Impact of laser pulse-width on the nonlinear refractive index of black phosphorus quantum dots [12792-81]

2792 1H	Effects of laser intensity on the backscattering spectrum in tightly focused lasers [12792-83]
2792 11	Ultra-small-size microcavity with high quality factor utilizing bound state in the continuum [12792-84]
2792 1J	2.2kW linearly polarized narrow linewidth all-fiber laser [12792-86]
2792 1K	Research on array laser tilt correction technology based on composite sensing [12792-87]
2792 1L	Experimental study on waterjet guided laser efficient cutting of TA1 titanium [12792-88]
2792 1M	Grid search algorithm applied to auto-lock of ultra-stable laser [12792-95]
2792 1N	Tunable narrow-linewidth monolithic master oscillator tapered power amplifier diode laser based on surface bragg gratings [12792-97]
2792 10	Passively mode-locked ytterbium-doped fiber laser based on MnPS $_x$ Se $_y$ saturable absorber [12792-98]
2792 1P	Thermal effect of LD end-pumped Nd:YAG laser at 1319nm [12792-101]
2792 1Q	High-charge perfect vortex beam generation [12792-102]
2792 1R	Axial section multi-reflection cavity-like enhanced oxygen detection in pharmaceutical vial [12792-103]
2792 1S	Active control technology of petawatt laser signal-to-noise ratio based on isolated pre-pulse [12792-104]

### **Conference Committee**

#### Conference Chairs

**Weibiao Chen**, Shanghai Institute of Optics and Fine Mechanics (China)

Minghui Hong, Xiamen University (China)

Jianrong Qiu, Zhejiang University (China)

Pu Wang, Beijing University of Technology (China)

**Jianqiang Zhu**, Shanghai Institute of Optics and Fine Mechanics (China)

Tiancai Zhang, Shanxi University (China)

#### Session Chairs

- Laser Physics and Technology
   Ye Tian, Shanghai Institute of Optics and Fine Mechanics (China)
- 2 Advanced Solid-State Lasers and New Lasers Pu Zhou, National University of Defense Technology (China)
- 3 Laser Materials and Advanced Optoelectronic Materials **Shifeng Zhou**, South China University of Technology (China)
- 4 Laser Light Field Regulation, Transmission, and Application **Shuqi Chen**, Nankai University (China)
- 5 Advanced Laser Processing and Manufacturing Technology **Dongdong Gu**, Nanjing University of Aeronautics and Astronautics

  (China)
- 6 Semiconductor Lasers and Advanced Optoelectronic Devices **Yongzhen Huang**, Institute of Semiconductors (China)
- 7 Terahertz Technology and Application Jiaguang Han, Tianjin University (China) and Guilin University of Electronic Technology (China)
- 8 Nonlinear Optics and Quantum Optics **Xiaojun Jia**, Shanxi University (China)
- 9 Al and Laser Lilin Yi, Shanghai Jiaotong University (China) Pu Zhou, National University of Defense Technology (China) Xiaoming Wei, South China University of Technology (China)