PROCEEDINGS OF SPIE

XVI International Conference on Pulsed Lasers and Laser Applications

Maxim V. Trigub Anton V. Klimkin Victor F. Tarasenko Editors

10–15 September 2023 Tomsk, Russian Federation

Organized by Institute of Atmospheric Optics SB RAS (Russian Federation) Institute of High Current Electronics SB RAS (Russian Federation) Tomsk State University (Russian Federation)

Sponsored by TOPAZ Research and Inculcation Enterprise (Russian Federation) SP Equipment (Russian Federation) Azimut Photonics (Russian Federation) Special Systems. Photonics (Russian Federation) SC LLS (Russian Federation)

Published by SPIE

Volume 12920

Proceedings of SPIE 0277-786X, V. 12920

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 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 XVI International Conference on Pulsed Lasers and Laser Applications, edited by Maxim V. Trigub, Anton V. Klimkin, Victor F. Tarasenko, Proc. of SPIE 12920, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510671386 ISBN: 9781510671393 (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

PLENARY SESSION

12920 02 Distinctive features of Raman spectra of crude oils of the Absheron peninsula [12920-57]

YOUNG SCIENTISTS SESSION

12920 03	Luminescent properties of (Cs,Rb)PbBr3 perovskite nanocrystals in borate glass [12920-12]
12920 04	Filamentation of high-power femtosecond laser pulses with full and partial amplitude modulation by a mesh mask [12920-15]
12920 05	Generation of similariton-like pulse bunch in erbium-doped fiber laser with hybrid mode-locking [12920-20]
12920 06	Identifying a laser ablation damage threshold for all-inorganic mixed-halide perovskite microwires [12920-30]
12920 07	On the persistence of photoluminescence in all-inorganic mixed-halide nanowire lasers [12920-31]
12920 08	Modeling of the antireflection coating based on a periodic structure on a diamond [12920-51]

GAS MEDIA FOR LASERS AND OPTOELECTRONIC DEVICE

- 12920 09 Computer simulation of the helium line profiles under laser excitation in near-resonance regions [12920-18]
 12920 0A Long pulse UV and VUV gas discharge lasers [12920-45]
- 12920 0B High frequency capacitive discharge pumped Cu+Ne laser [12920-53]

GAS DISCHARGES FOR LASERS AND NON-COHERENT RADIATION SOURCES

12920 OC Photoluminescence of PMMA induced by a KrCl excilamp and a KrCl laser [12920-13]

12920 0D Nanosecond discharge in distilled water in an inhomogeneous electric field [12920-54]

ULTRASHORT LASER PULSES

12920 OE	Dependence of the luminescence of molecular nitrogen in the filamentation region on the energy and duration of femtosecond radiation [12920-14]
12920 OF	Model of the effective permittivity during intensity collapse stopping for propagation of high-power femtosecond laser pulses [12920-16]

12920 0G Estimation of the nonlinear-optical coefficient of GaSe:S crystals according to electro-optical measurements [12920-48]

LASER SYSTEMS, LASER APPLICATIONS, AND NEW LASER-OPTICAL TECHNOLOGIES

12920 OH	Optical superresonance and generation of extreme magnetic fields in mesoscale dielectric spheres [12920-4]
12920 01	Time domain photonic hook beam for manipulating nanoparticles along curved trajectories [12920-7]
12920 OJ	Tribological characteristics of the multicomponent iron-based alloys surface after laser modification [12920-8]
12920 OK	Lasers for polychromatic guide stars [12920-10]
12920 OL	Light scattering matrix for large irregularly shaped ice crystals averaged over an ensemble of particles [12920-11]
12920 OM	Wide-range pulsed parametric laser for drug identification [12920-19]
12920 ON	Development of an adaptive optical system for stabilizing laser radiation and correcting its turbulent distortions [12920-25]
12920 00	Efficiency of stabilization of laser radiation on the stand of an adaptive optical system [12920-26]
12920 OP	Design of pulse compression system based on real-time processing FPGA [12920-28]
12920 OQ	Research on online measurement method for luggage dimensions based on LiDAR point cloud [12920-32]
12920 OR	High power laser amplifier with cryogenic closed-loop cooling [12920-35]

NON-COHERENT RADIATION SOURCES

12920 0S About the service life of KrCl- and XeBr-excilamps in the radiation stabilization mode using optoelectronic feedback [12920-50]

PHOTONICS IN REMOTE ENVIRONMENTAL STUDIES

- 12920 0T Lidar observations of the tropospheric aerosol structures on the Baikal Lake coast [12920-21]
- 12920 0U Accounting for molecular absorption of laser radiation in the range from UV to mid-IR region on the paths of lidar sounding of gas-aerosol pollution in the atmosphere [12920-34]
- 12920 0V Calculation of the coordinates of the object of lidar sounding and its 3D cartographic display [12920-38]

BIOPHOTONICS

- 12920 0W Fluorescent indices of barley and tagetes plants treated with physiologically active compounds [12920-22]
 12920 0X VUV irradiation of microorganisms in the aquatic environment [12920-23]
- 12920 OY Hormesis in microorganisms under the action of VUV radiation [12920-29]
- 12920 0Z Mechanisms of temperature dependence of the ratiometric signal of fluorescein [12920-37]
- 12920 10 Dependence of the stability constant of the europium complex on the introduction of a halogen into the structure of 2,2'-bipyridyl-6,6-dicarboxamide [12920-39]
- 12920 11 Investigation of the complex formation reaction of europium nitrate with 1,10'-phenanthroline dicarboxamides [12920-40]
- 12920 12 Reduction of the Fabry-Pérot effect influence on the terahertz absorption spectra of liquid and gas samples by variation of the measurement cell parameters [12920-46]
- 12920 13 The possibility of increasing the efficiency of terahertz absorption spectra noise reduction using a sliding window variant of Savitzky-Golay filter [12920-47]

PHOTOPHYSICAL PROCESSES, CONVERSION OF LASER RADIATION, NONLINEAR OPTICS, AND LASER SYNTHESIS OF NANOSTRUCTURE

- 12920 14 Luminescent studies of flexible [DUT-8 (Zn)] metal-organic frameworks [12920-17]
- 12920 15 Size effects and improved optical limiting efficiency for carbon nanotube composites with a tetra(cyclotriphosphazene)-substituted phthalocyanine ligand [12920-24]

12920 16 Optical properties and 532nm to 266nm second harmonic generation in bulk β-BBO crystals grown from the BaB₂O₄-NaBaBO₃-V₂O₅ system [12920-41]

CARBON MATERIALS IN QUANTUM ELECTRONICS, PHOTONICS, OPTOELECTRONICS

- 12920 17 Energy-tunable diffraction filters made of pyrolytic graphite for x-ray spectra selection and measurements [12920-5]
- 12920 18 ODMR spectroscopy of NV⁻ color centers in synthetic diamonds [12920-27]
- 12920 19 Cathodoluminescence of synthetic diamonds containing nitrogen vacancy defects in the temperature range from 90 to 800 K [12920-49]
- 12920 1A Cherenkov radiation in low-impurity diamond samples under the action of an electron beam with an energy of tens-hundreds of keV [12920-52]