PROCEEDINGS OF SPIE

International Conference on Laser, Optics and Optoelectronic Technology (LOPET 2021)

Changsi Peng Fengjie Cen Editors

28–30 May 2021 Xi'an, China

Organized by AEIC Academic Exchange Information Centre (China)

Sponsored by China Optoelectronics Industry Platform (China)

Published by SPIE

Volume 11885

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 *International Conference on Laser, Optics and Optoelectronic Technology (LOPET 2021)*, edited by Changsi Peng, Fengjie Cen, Proc. of SPIE 11885, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510646162

ISBN: 9781510646179 (electronic)

Published by

SPIE

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

SPIE.org

Copyright © 2021 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

RESEARCH ON LASER COMMUNICATION AND INDUCTION LIGHTING SYSTEM

11885 02	Analysis of factors influencing homogenization effect of microlens array in laser lighting system [11885-2]
11885 03	Microstructure and mechanical properties of laser-induction hybrid welding 2205 duplex stainless steel [11885-5]
11885 04	Research on inter-satellite laser communication based on relay system [11885-7]
11885 05	Effect of laser rust removal on surface roughness of 3Cr2Mo die steel [11885-8]
11885 06	High-efficient ablation of nickel through multiple scanning of femtosecond laser single pulse [11885-29]
11885 07	Hot cracking sensitivity of 2A14 high strength aluminum alloy in fiber laser welding [11885-34]
11885 08	Software realization of laser pulse code [11885-35]
11885 09	Laser vibration measurement technology and its application in aerospace field [11885-41]
11885 0A	Research on satellite-to-ground laser communication system and business process [11885-42]
11885 OB	Fabrication of periodically-curved micro/nano grating structures on sapphire surface using femtosecond laser pulses [11885-44]
11885 0C	Numerical study of the time-delay signature concealment and bandwidth enhancement in semiconductor ring laser [11885-45]
11885 0D	The dynamics and deposition results of femtosecond laser-induced liquid film forward transfer [11885-46]
11885 OE	Femtosecond laser fabrication of porous ceramics for electrospray thruster emitter [11885-47]
11885 OF	Ablation enhancement of polymer-fullerene blend films under temporally-shaped femtosecond laser processing [11885-48]
11885 0G	Study on the ablation of layered semiconductor material by femtosecond laser [11885-49]
11885 OH	Shockwave observation of femtosecond laser ablation on Si ₃ N ₄ ceramic [11885-50]

11885 OI	In-situ p53 protein detection based on a micro Bragg fiber grating and the optical wavelength meter measurement [11885-53]
11885 OJ	Experimental research on continuous variable quantum key distribution in fiber channel [11885-59]
	OPTICAL COMMUNICATION AND IMAGING INFORMATION RECOGNITION TECHNOLOGY
11885 OK	Identification and measurement method of atmospheric pollution sources [11885-9]
11885 OL	Influence of temperature and atmospheric transmission on the mid-wave and long-wave infrared radiation spectrum of materials [11885-11]
11885 0M	A real-time matching system for large-small field of view images based on Zynq [11885-12]
11885 ON	A synchronous control system designed for underwater single-photon range-gated imaging based on FPGA [11885-16]
11885 0O	Propagation properties of Bessel Gaussian vortex beams propagation in turbulent atmosphere [11885-17]
11885 OP	Fabrication of computer-generated holograms on silicon by femtosecond laser-assisted with chemical etching [11885-21]
11885 OQ	Study on natural lighting design of the reading room in a university library [11885-22]
11885 OR	VO ₂ -based thermochromic films with passive radiative properties for spacecraft thermal control [11885-23]
11885 OS	Application of laser ranging technology in tunnel visualization [11885-24]
11885 OT	Experimental study on the burning images of oil pool fire in confined space [11885-27]
11885 OU	Reconstructing temperature field images by MWIR and LWIR based on uncooled IRFPA [11885-33]
11885 OV	Development of a 3x3-channel bionic compound eyes imaging system for target positioning [11885-38]
11885 OW	Study on preparation mechanism and luminescence property of CaAlSiN ₃ : Eu phosphor $[11885-43]$
11885 0X	Infrared absorption properties of SF6 gas-decomposition product SO2F2 in GIS gas chamber [11885-55]

OPTOELECTRONIC TECHNOLOGY AND INTELLIGENT MANUFACTURING APPLICATION

11885 OY	One-step formation of holey carbon electrode via double-pulse femtosecond laser irradiation of flexible polyimide for micro-supercapacitor [11885-4]
11885 OZ	Study on MoS ₂ -SiO ₂ nanofilms prepared by sol-gel method [11885-6]
11885 10	Research on MEMS biaxial electromagnetic micromirror based on radial magnetic field distribution [11885-10]
11885 11	Analysis and design of a square-law detector based on multiplier for high linearity radiometer [11885-13]
11885 12	Design of secondary lens focusing mechanism for multispectral camera [11885-14]
11885 13	Anisotropic elliptical microbumps on gold films induced by slit-shaped femtosecond laser [11885-19]
11885 14	Performance analysis of digital pulse interval modulation for underwater optical communication link in anisotropy oceanic turbulence [11885-25]
11885 15	Polarization properties of haze particles on ultraviolet light scattering [11885-26]
11885 16	All-optical clock extraction and wavelength conversion based on F-P filter and cross gain modulation for WDM-PON [11885-28]
11885 17	GaN micro-LED/GFET monolithic integrated display pixels fabricated with new processing technology [11885-31]
11885 18	Fabrication of morphology controllable silicon nanostructure array by chemical etching assisted femtosecond laser near-field modification [11885-39]
11885 19	A novel on-line textile color measurement system [11885-51]
11885 1A	Analysis of factors affecting transverse mode instability in high-power thulium-doped fiber lasers [11885-52]
11885 1B	Long-wave infrared metasurface absorber of silicon in microhole array structure [11885-54]
11885 1C	LED plant lighting system design based on improved pigeon-inspired optimization algorithm [11885-57]
11885 1D	Application of opto-mechatronics technology in intelligent manufacturing [11885-58]