# PROCEEDINGS OF SPIE

# Selected Papers from Conferences of the Photoelectronic Technology Committee of the Chinese Society of Astronautics 2014, Part II

Xiangwan Du Dianyuan Fan Jialing Le Yueguang Lv Jianquan Yao Weimin Bao Lijun Wang

19–24 October 2014 Suzhou, China

Organized by

Photoelectronic Technology Committee, China Society of Astronautics (China) China Aerodynamics Research and Development Center (China) State Key Laboratory of Laser Propulsion and Applications, Academy of Equipment (China)

Sponsored by Chinese Society of Astronautics (China)

Volume 9522

Proceedings of SPIE 0277-786X, V. 9522

Selected Papers from Conferences of the Photoelectronic Technology Committee of the Chinese Society of Astronautics 2014, Part II, edited by Xiangwan Du, Dianyuan Fan, Jialing Le, Yueguang Lv, Jianquan Yao, Weimin Bao, Lijun Wang, Proc. of SPIE Vol. 9522, 952201 · © 2015 SPIE · CCC code: 0277-786X/15/\$18 · doi: 10.1117/12.2191523

The papers included 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. The papers published in these proceedings 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 this book:

Author(s), "Title of Paper," in Selected Papers from Conferences of the Photoelectronic Technology Committee of the Chinese Society of Astronautics 2014, Part II, edited by Xiangwan Du, Dianyuan Fan, Jialing Le, Yueguang Lv, Jianquan Yao, Weimin Bao, Lijun Wang, Proceedings of SPIE Vol. 9522 (SPIE, Bellingham, WA, 2015) Article CID Number.

ISSN: 0277-786X ISBN: 9781628416534

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445 SPIE.org

Copyright © 2015, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 0277-786X/15/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.



**Paper Numbering:** Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print. Papers are published as they are submitted and meet publication criteria. A unique citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages.

# **Contents**

ix	Authors
xiii	Conference Committees
XV	Introduction
	SELECTED PAPERS FROM CONFERENCES OF THE PHOTOELECTRONIC TECHNOLOGY COMMITTEE OF THE CHINESE SOCIETY OF ASTRONAUTICS 2014, PART II
9522 02	An extraction method of the tank characteristic quantities in infrared thermal images [9522-1]
9522 03	Effect of residual gas on cathode photoelectric emission life in generation III L-L-L tube [9522-5]
9522 05	Design of an infrared four-mirror optical system with large relative aperture [9522-10]
9522 06	Simulation of surface deformation for the lithographic object lens by Zernike polynomials [9522-11]
9522 07	Geometric correction method of rotary scanning hyperspectral image in agriculture application [9522-16]
9522 08	High precision digital control LED spot light source used to calibrate camera [9522-17]
9522 09	Effect of random phase errors on coherent beam combining based on liquid crystal phased array [9522-18]
9522 0A	A fiber DBR laser based vector hydrophone for ultrasonic medical applications [9522-22]
9522 OB	Concept and realization of measuring spatial structure of atmospheric optical turbulence by the fiber optical turbulence sensor array [9522-23]
9522 0C	Integrated multi-channel receiver for a pulsed time-of-flight laser radar [9522-26]
9522 0D	Test and analysis of the infrared characteristic of the plume-smoke [9522-29]
9522 OE	Directional force measurement technology based on fiber optical laser heterodyning demodulation [9522-31]
9522 OF	The signal detection technology of photoconductive detector with lock-in amplifier [9522-33]
9522 OG	Research on mechanical vibration impacts of GaAs photocathode photoemission performance [9522-35]

9522 OH	Activation processes on GaAs photocathode by different currents of oxygen source [9522-42]
9522 OI	The influences of vacuum pressure and gas components on the stability of GaAs photocathode [9522-43]
9522 OJ	Investigation on choosing technical parameters for pulse thermography [9522-45]
9522 OK	A novel approach to improve digital signal performance by placement and routing with manual intervention [9522-46]
9522 OL	Investigation on the interface of polysilicon/oxide in CCD image sensors [9522-48]
9522 OM	Study on the repetition rate locking system of the femtosecond laser [9522-50]
9522 ON	High speed global shutter image sensors for professional applications [9522-51]
9522 00	A vehicle photoelectric detection system based on guidance of machine vision [9522-53]
9522 OP	Study of a sensor based on the series of micro-rings with dual coupling points [9522-54]
9522 0Q	Dual-band infrared optical imaging system design by wavefront coding [9522-56]
9522 OR	Evaluation of thermo-radiation characteristics of IR windows in hypersonic vehicles [9522-57]
9522 OS	Rotational analysis of birefringent crystal particles based on modified theory in optical tweezers [9522-58]
9522 OT	Automatic bias control system of high speed electro-optic modulator in DPSK Systems [9522-59]
9522 OU	Enhanced memory architecture for massively parallel vision chip [9522-61]
9522 OV	Noise analysis for high speed CMOS image sensor [9522-62]
9522 OW	A detection method of infrared dim small target under complex cloud background [9522-65]
9522 0X	Recent development of infrared tunable filter [9522-67]
9522 OY	The quantitative detection analysis to infrared polarization characteristics of targets [9522-68]
9522 OZ	Study on the premixed laminar flames of iso-octane [9522-69]
9522 10	A new 9T global shutter pixel with CDS technique [9522-70]
9522 11	Modeling and characteristic of the SMT Board Plug connector in high speed optical communication system [9522-71]

9522 12	Quenching and temperature dependence of perpendicular magnetic anisotropy of Pt/Co multilayers $[9522\text{-}72]$
9522 13	Study on application of adaptive fuzzy control and neural network in the automatic leveling system [9522-73]
9522 14	An enhanced moment matching method to destriping EO-1/Hyperion data [9522-74]
9522 15	GaN ultraviolet detector based demonstrator board for UV-index monitoring [9522-75]
9522 16	Two methods for characterizing the electrical properties of InAsSb film grown by liquid phase epitaxy [9522-76]
9522 17	Enhancement dark channel algorithm of color fog image based on the local segmentation [9522-79]
9522 18	New bionic navigation algorithm based on the visual navigation mechanism of bees [9522-80]
9522 19	System design of Fourier transform imaging spectrometer using tunable lateral shearing splitter [9522-82]
9522 1A	Analysis of system parameters for interferometric imaging spectrometer [9522-86]
9522 1B	Observation and analysis of flow field in laser ablation plume of POM [9522-87]
9522 1C	Research progress and perspective of hyperspectral image projectors [9522-88]
9522 1D	A high performance constant fraction discriminator for pulsed laser proximity fuze [9522-89]
9522 1F	The modification of ultraviolet Total Ozone Unit (TOU) for absorbing aerosol index [9522-92]
9522 1G	A novel data transmission circuit for digital image sensors [9522-93]
9522 1H	Test of reflective MTN liquid crystal cell for the LCOS microdisplay by guided wave method [9522-94]
9522 11	Terahertz digital holography image processing based on MAP algorithm [9522-95]
9522 1J	Temperature sensor and display researched based on micro-deformation of beam splitting mirror in holographic system [9522-96]
9522 1K	A background suppression algorithm for infrared image based on shearlet [9522-101]
9522 1L	Development of optically immersed, near-room-temperature HgCdTe photovoltaic detectors [9522-104]
9522 1M	Modeling for infrared readout integrated circuit based on Verilog-A [9522-105]
9522 1N	Simulation for spectral response of solar-blind AlGaN based p-i-n photodiodes [9522-107]

9522 10	On simulation and verification of the atmospheric turbulent phase screen with Zernike polynomials [9522-111]
9522 1P	Simulation of hyperspectral imaging based on tunable Fabry-Pérot interferometer [9522-112]
9522 1Q	Fabrication and surface profile simulation of sapphire microlens array [9522-113]
9522 1R	The integrated platform of controlling and digital video processing for underwater range-gated laser imaging system [9522-114]
9522 1S	Research on dual spectrum solar-blind ultraviolet corona detection system [9522-115]
9522 1T	Research and experiment of InGaAs shortwave infrared imaging system based on FPGA [9522-116]
9522 1U	Study on damage of K9 glass under 248nm ultraviolet pulsed laser irradiation [9522-117]
9522 1V	Dual cameras acquisition and display system of retina-like sensor camera and rectangular sensor camera [9522-119]
9522 1W	Discussion of beam quality of semiconductor lasers [9522-120]
9522 1X	Study on the relationship of dark current characteristics and materials surface defects of extended wavelength InGaAs photodiodes [9522-122]
9522 1Y	Performance of four-stage thermoelectric cooler for extended wavelength InGaAs detectors [9522-123]
9522 1Z	Spectroscopic properties of Nd³+/Yb³+ co-doped in lithium aluminum silicate glass for 1.0 $\mu$ m fiber laser [9522-125]
9522 20	Photo-and-dark-current-voltage characteristics of normal-incidence GaAs photodetectors with two types of electrode configurations [9522-126]
9522 21	Electroluminescence of cubic boron nitride single crystal flakes with color-zoning [9522-127]
9522 22	Measurement and analysis of aircraft and vehicle LRCS in outfield test [9522-128]
9522 23	High performance InAs/GaSb superlattice long wavelength photodetectors based on barrier enhanced structures [9522-131]
9522 25	Noise characteristic of AlGaN-based solar-blind UV avalanche photodiodes [9522-133]
9522 26	Analysis of pixel circuits in CMOS image sensors [9522-136]
9522 27	The field distribution in a finite number of nanostructured metal waveguide arrays [9522-139]
9522 28	Research on micro-deformation of beam splitting mirror in holographic system by laser speckle method [9522-145]

9522 29	Dark-current characteristics of GaN-based UV avalanche photodiodes [9522-147]
9522 2A	A 15-bit incremental sigma-delta ADC for CMOS image sensor [9522-148]
9522 2B	Blind image deblurring with edge enhancing total variation regularization [9522-151]
9522 2C	A limb atmospheric radiance inversion method based on a sun-synchronous orbit satellite [9522-153]
9522 2D	The application of IR detector with windowing technique in the small and dim target detection [9522-155]
9522 2F	New design of a hybrid plasmonic waveguide [9522-161]
9522 2G	Blind image deblurring based on trained dictionary and curvelet using sparse representation [9522-162]
9522 2H	Defect structure and optical damage resistance of Zr:Ce:Fe:LiNbO <sub>3</sub> crystals [9522-166]
9522 21	Growth and photorefractive properties of Zr:Cu:Fe:LiNbO <sub>3</sub> crystals with various Li/Nb ratios [9522-167]
9522 2J	A fast and practical calibration method for the phase measuring profilometry [9522-168]
9522 2K	Discuss on the two algorithms of line-segments and dot-array for region judgement of the sub-satellite purview [9522-169]
9522 2L	Polarization of focal spot for high numerical aperture radially polarized beam [9522-171]
9522 2N	Visual saliency detection based on modeling the spatial Gaussianity [9522-175]
9522 20	Interaction of pulsed laser energy with bow shock in Mach 5 flow [9522-179]
9522 2P	A non-destructive readout circuit of the linear array image sensor with over 90dB dynamic range and 190k fps for radar system $[9522-182]$
9522 2Q	Modeling and simulation of time-gated FLIM SPAD image sensors [9522-186]
9522 2R	Probability-based saliency detection approach for multi-features integration [9522-187]
9522 2S	Automatic target locating system through cooperative dual-field imaging [9522-188]
9522 2T	Backscattering metal gratings in QWIPs to increase the long wavelength infrared light absorption [9522-189]
9522 2V	An infrared image non-uniformity correction algorithm based on pixels' equivalent integral capacitance [9522-193]
9522 2X	Surface morphology of LPE-growth GaSb quantum dots [9522-196]
9522 2Y	A hyperspectral image optimizing method based on sub-pixel MTF analysis [9522-197]

9522 2Z	Quality evaluation of adaptive optical image based on DCT and Rényi entropy [9522-200]
9522 30	Terahertz digital holography image denoising using stationary wavelet transform [9522-202]
9522 31	Strategies to improve system resolution in multiple configuration sensors [9522-203]
9522 32	Integrated optics to improve resolution on multiple configuration [9522-205]
9522 33	Fabrication of super-hydrophobic duo-structures [9522-208]

# **Authors**

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Bai, Caixun, 19, 1A Bai, Tingzhu, 1V Bai, Xiao-feng, 0G Bai, Zhizhong, 23 Bao, Bin, OK Bao, Yunfei, 14 Bian, Tianliang, 20, 21 Cao, Chang-Qing, 1W, 22 Cao, Fengmei, 1V Cao, Nan, 1V Chang, Chao, 25, 29 Chang, Jian, 2L Chen, Chang, 03, 0H Chen, Dapeng, 0D Chen, Fansheng, 2C, 2D, 2V Chen, Gang, 1X Chen, Guang-Hao, 11, 30 Chen, Jian, 09 Chen, Jianxin, 23 Chen, Jina, 00 Chen, Nan, 26, 2A Chen, Ruo-wang, 0W Chen, Wei, 0O Chen, Xiaoshuana, 27 Chen, Xiuyan, 1J, 28 Chen, Yonghe, 02 Chen, Zhanguo, 20, 21 Chen, Zhe, 0U Cheng, Guimei, 0K Cheng, Hong-chang, OG, OH, OI

Cheng, Qi-sheng, 0Z

Cheng, Xing, 01 Chu, Junhao, 12 Cong, Bin, 05, 06 Cui, Kun, 2D Cui, Naidi, 11 Cui, Shan-Shan, 30 Dai, Liming, 10 Dai, Ning, 12, 16, 2X Deng, Rong, 2Z Deng, Shuangyan, 1X Ding, Quanxin, 31, 32 Ding, Xiao-yu, 0Z Dong, Yanbing, 0D, 2Z Dong, Yucui, 2C, 2D Dong, Zhenzhen, 11 Du, Boyu, 08 Duan, Jing, 0K Fan, Zhao-jin, 22

Fang, Guangyu, 0F Fang, Xiaodong, 1U Feng, Haikuan, 07 Feng, Junbo, 11 Feng, Liang, 2G Feng, Zhe-jun, 22 Fu, Jianguo, 1F Fu, Liping, 1F Fu, Qiang, 0Q Gao, Jie, 2H, 2I Gao, Jing, 2P Gao, Jingyi, 0A, 0E Gao, Peng, 1J Gao, Yin, 17 Gao, Zhi-yuan, 2P Gong, Haimei, OF, 1X Gong, Wei, 1L Gu, Yan, 1S, 1T Guo, Chunjie, 31, 32 Guo, Jia, 00 Guo, Jin, 11, 15 Guo, Shiliang, OP Guo, Xi, 0A, 0E Guo, Yanyan, 1Z Guo, Yiliang, 1T Guo, Zhi-qiang, 0V Han, Kexuan, 1Z Han, Longfei, 2J He, Hongyan, 14 He, Li, 23 He, Xiangrong, OF

He, Yuging, 2R, 2S Hong, Hanyu, 2B Hong, Yan-ji, 0Z Hou, Boyan, 2S Hou, Lixin, 21 Hu, Chun-sheng, 0W Hu, Shuhong, 16, 2X Hua, Xia, 2B Huang, Kun, 2R, 2S Huang, Qian, 2G Huang, Sijie, 2D Huang, Yong-sheng, 1C Huang, Yufeng, 18 Jia, Gang, 20, 21 Jiang, Y. J., 33 Jiang, Yan, 0C Jiao, Cuiling, 1L Jin, Chuan, 23

Jin, Lijie, 2H, 2I Min, Chaobo, 1T Jin, Wei-qi, 1R Mo, De-feng, 0X, 1Y Ju. Honabin, 2N Nie, Hao, 2K Kang, Li, 1C Nie, Kai-ming, 2Q Kong, Lingjiang, 09 Niu, Ji-yong, 0Y L., Chunlin, 0L Niu, Sen, Ol L., Naiman, OL Pan, Jing, 2R L., Renhao, OL Pan, Jingsheng, 1S, 1T Lai, Zhi, 1W, 22 Pei, Huan, OS Lan, Weiyong, 13 Peng, C. S., 33 Li, Fan-ming, 0Y Piao, Ruigi, OP Li, Huijuan, 0J Qian, Cheng, 13 Li, Jianxin, 19, 1A, 1P Qiao, Hui, 1L, 1Q Li, Junwei, 2Z Qiao, Jun, 2Q Li, Kai, 2Y Qin, Xiao, 1K Li, Li, 1R Qiu, Su, 1R Li. Min. 03 Rao, Ruizhong, OB Li, Mingli, 20 Ren, Ling, 1T Li, Q., 20 Sha, Lei, 13 Li, Qi, 11, 30 Shao, Xiumei, 1X Li, Shao, 2G Shen, Yan, 1A Li, Tao, 1X, 1Y Shi, Caicheng, 1K Li, Xiangyang, 1L, 1N, 1Q, 25, 29 Shi, Feng, OG, OH, Ol Li, Xin, OP Shi, Hongli, 03, 01 Li, Xue, 1X, 1Y Shi, Jian-kang, 0W Li, Yi, 20 Shi, Jun-sheng, 17 Li, Zhengfen, 1G, 2A Shi, Xiaoyan, 27 Liang, Bo, OR Shi, Yan, 1R Shi, Yu, 2B Liao, Yinxin, 2T Lin, Yabin, 1V Shi, Z. W., 33 Liu, Beibei, 03 Shi, Zelin, 1M Liu, Chengmiao, 1P Si, Libin, 1H Liu, Da-fu, 0X, 1Y Song, Guofeng, 2T Liu, Hua, 31, 32 Song, Jie, 2B Liu, Jian, 0V Song, Man, 15 Liu, Jianguo, 18 Song, Shengyu, 1V Liu, Kefei, 1B Su, Xiaofeng, 2C, 2D Liu, Li-yuan, 0U, 0V Sun, Jianning, 1S, 1T Liu, Nian, 21 Sun, Xue, 1J Liu, Ruging, 0C Sun, Yusheng, 1P Liu, Shijia, 1Q Tang, Hengjing, 1X Liu, Wei-feng, 0W Tang, Xiu-zhang, 1C Liu, Xiangyang, 1Q Teng, Jie, 11 Liu, Xiuhuan, 20, 21 Tian, Dong-kang, 1R Tong, Jianqiang, 2H, 2I Liu, Yang, 08 Liu, Yang, 10 Tong, Shoufeng, OT, 1O Liu, Yi, OZ Tu, Bi-hai, 1D Liu, Yi, 18 Wan, Min, 0K Wan, Peng, 07 Liu, Yu, 0O Liu, Zi, 2J Wang, D. K., 20 Lu, Xiaoqing, 1S Wang, Dashuai, 0T Luo, Long, 1W Wang, Fangfang, 23 Lv, Meng, 12 Wang, Han, OA, OE Lv, Yingfei, 16, 2X Wang, Houmao, 1F Lyu, Chengang, 0A, 0E Wang, Jing, 2Z Ma, Cheng, 10 Wang, Jingiang, 2Y Mei, Haiping, OB Wang, Jun, 15 Meng, Xin, 19, 1A Wang, Long, Ol Meynants, Guy, 0N Wang, Qi, 1S Miao, Zhuang, 0H

Wang, Qi, 21

Wang, Qian, 0B Xu, Zhicheng, 23 Wang, Qiang, 0R Xue, Shiwei, 1N Wana, Rena, 1L Yan, Honazhou, 1X Wang, Shuang, 21 Yan, Lei, OG, Ol Wang, Shufei, OH Yang, Bo, OZ Wang, Siyuan, 2S Yang, Cong-jie, 2P Wang, Tanglin, 11, 15 Yang, Delong, 1J, 28 Wang, Tao, 2V Yang, Feng, 1S, 1T Wang, Wei, 2C Yang, Guijun, 07 Wang, Weihe, 1F Yang, Jie, 0U Wang, Xi, 1U Yang, Li-yi, 1Y Wang, Xiang, 1W Yang, Ming, OP Wang, Xiang-jing, 1D Yang, Mingming, 2K Wang, Xiao, 1M Yang, Wu, 27 Wang, Xiaojun, 2H Yang, Xiaojun, 03 Wang, Xin, 1J Yang, Zhenming, 09 Wana, Xin-lei, 2Q Yao, Libin, 1G, 26, 2A Wang, Xinyang, 10 Yao, Ping-ping, 1D Wang, Y. Y., 33 Yao, Su-ying, 2P Wang, Yahui, OR Yao, Wenying, 0S Wang, Yang, 0F, 16, 2X Ye, Jifei, 1B Wang, Yawei, 00 Ye, Wenjiang, 1H Wang, Yinhuan, 10 Yi, Miao, 2F Wang, Yongmei, 1F Yi, Tong Sheng, 06 Wang, Yun, 2C Yu, Bing, 1R Wang, Yun, 2Y Yu, Fengxia, 1Z Wei, Shan, 2S Yu, Guolin, 12, 16 Wei, Tongda, 2L Yu, Haiyang, 07 Wei, Yong, 0S Yu, Ji, 1J Wei, Zhenbiao, 02 Yuan, Yuan, 0H, 0I Wu, Haoran, 11 Yue, Chunyu, 14 Wu, Lei, 2J Yun, Hongquan, OR Wu, Nan-jian, 0U, 0V Yun, Li-jun, 17 Wu, Songbo, OK Zeng, Xiao-Dong, 1W, 22 Wu, Tengfei, 0M Zeng, Xin-ji, 2P Wu, Xu, 0N Zhang, Bochuan, OR Wu, Zheng, 05 Zhang, F., 33 Xiang, Yi-huai, 1C Zhang, Guang, 0D Xiao, Feng, 09 Zhang, Hui, 1H Xiao, Yanshan, 2J Zhang, J. L., 20 Xiao, Yun, 2L Zhang, Jiqing, 1G Xie, Feng, 15 Zhang, Lei, 10 Xing, Huaizhong, 27 Zhang, Li, 0M Xu. Bo. 07 Zhang, Peng, 2K Xu, Chun, 2V Zhang, Qishen, 2R Xu, Jiangtao, 03 Zhang, Shuanglei, 2V Xu, Jiang-tao, 2Q Zhang, X. Y., 33 Xu, Jintong, 1N, 25, 29 Zhang, Xiaohui, 0H Zhang, Xiaoling, 21 Xu, Ke, 03 Xu, Li, OR Zhang, Xiaolong, 0D Xu, Ling-zhang, 17 Zhang, Xin, 2H, 2I Xu, Migo, 0T Zhang, Xuantao, 00 Xu, Qin-fei, 0X, 1Y Zhang, Yani, OF Xu, Qing-yao, 0Z Zhana, Yi, 1D Xu, Tingfa, 2G Zhang, Yunhai, 2L Xu, Xiping, 08, 13 Zhang, Zhidong, 1H Xu, Yonggang, 12, 16 Zhao, Chunbo, 0M Xu, Yuannan, 2Z Zhao, Heng, 11 Xu, Yun, 2T Zhao, Pina-jian, 1D Xu, Zhaopeng, 2H, 2I

Zhao, Xiaolin, 12

Zhao, Zizhao, 13
Zheng, Guili, 1H
Zheng, Haotian, 0O
Zheng, Kunpeng, 02
Zhong, Shengyou, 1G, 2A
Zhou, Lijun, 0O
Zhou, Liwei, 31, 32
Zhou, Quan, 10
Zhou, Yi, 23
Zhu, Bo, 1S, 1T
Zhu, Jingguo, 0C
Zhu, Longyuan, 1Q
Zhu, Rihong, 19, 1A, 1P
Zhu, Yajie, 2K, 2Y
Zhu, Yanying, 0S
Zhu, Zhenyu, 0M
Zou, Mei, 26, 2A
Zou, Ruibin, 1K

# **Conference Committees**

### Conference Chairs

**Xiangwan Du**, Chinese Academy of Engineering Physics (China) **Dianyuan Fan**, Shanghai Institute of Optics and Fine Mechanics (China)

**Jialing Le**, China Aerodynamics Research and Development Center (China)

**Yueguang Lv**, China Northern Institute of Electronic Equipment (China)

Jianquan Yao, Tianjin University (China)

**Weimin Bao**, China Aerospace Science and Technology Corporation (China)

**Lijun Wang**, Changchun Institute of Optics, Fine Mechanics and Physics (China)

### Conference Committee

Chun Tang, Institute of Applied Electronics, CAPE (China)
 Yongke Zhang, Southwest Institute of Technical Physics (China)
 Guangyong Jin, Changchun University of Science and Technology (China)

**Yanji Hong**, State Key Laboratory of Laser Propulsion and Application, Academy of Equipment (China)

**Xiaoyong Liu**, The 31st Research Institute of China Aerospace Science and Industry Corporation (China)

Zizheng Gong, China Academy of Space Technology (China)

**Yanji Hong**, State Key Laboratory of Laser Propulsion and Application, Academy of Equipment (China)

**Huilin Jiang**, Changchun University of Science and Technology (China)

Jing Ma, Harbin Institute of Technology (China)

### Program Committee

Michalis N. Zervas, University of Southampton (United Kingdom)

Björn Manuel Hegelich, The University of Texas at Austin (United States)

Akira Shirakawa, University of Electro-Communications (Japan)

Michael W. Renfro, University of Connecticut (United States)

Jizhang Sang, Wuhan University (China)

Bin Xiangli, Shanghai Engineering Center for Microsatellites (China)

Yudong Zhang, Institute of Optics and Electronics, Chinese Academy of Sciences (China)

Proc. of SPIE Vol. 9522 952201-14

# Introduction

We had the great honor of organizing The Second International Seminar on Highpower Laser Interaction with Matter and Application, The International Seminar on Space Surveillance Technology, and The Second Symposium on Combustion Diagnostics in Suzhou. It was truly a great pleasure for us to greet more than 600 participants from many different countries attending the three conferences. We firmly believe these conferences will become important international events in the field of optical technology.

The Second International Seminar on High-power Laser Interaction with Matter and Application was sponsored by the Chinese Society of Astronautics, and organized by the Photoelectronic Technology Committee, Chinese Society of Astronautics. The International Seminar on Space Surveillance Technology was sponsored by the Chinese Society of Astronautics, and organized by the Photoelectronic Technology Committee, Chinese Society of Astronautics. The Second Symposium on Combustion Diagnostics was sponsored by the Chinese Society of Astronautics, and organized by the the China Aerodynamics Research and Development Center and State Key Laboratory of Laser Propulsion and Applications.

The purpose of the three conferences was to provide a forum for the participants to report and review innovative ideas, up-to-date progress and developments, and to discuss novel approaches to application in the optical field. We sincerely hope that research and development in the optical field will be promoted and because of international cooperation and sharing, so common interest will be enhanced.

On behalf of other co-chairmen, and the Organization Committee of the three conferences, we would like to genuinely thank our sponsors and cooperation organizers for all they have done for the conferences. Thanks also to all the authors for their contributions to the Proceedings, to all of the participants and friends for their interest and efforts in helping us to make the conferences possible, to the Program Committee for their effective work and valuable advice, and especially the Secretariat and the editors in SPIE for their tireless effort and outstanding services in preparing the conferences and publishing the Proceedings.

Xiangwan Du Dianyuan Fan Jialing Le Yueguang Lv Jianquan Yao Weimin Bao Lijun Wang

Proc. of SPIE Vol. 9522 952201-16