## PROCEEDINGS OF SPIE

## AOPC 2017: Optical Spectroscopy and Imaging

Jin Yu Zhe Wang Wei Hang Bing Zhao Xiandeng Hou Mengxia Xie Tsutomu Shimura *Editors* 

4-6 June 2017 Beijing China

Sponsored by SPIE Chinese Society for Optical Engineering (China)

Organized by Chinese Society for Optical Engineering (China) Photoelectronic Technology Committee, Chinese Society of Astronautics (China) Department of Cooperation and Coordination for Industry, Academe and Research, CHIA (China) Science and Technology on Low-light-level Night Vision Laboratory (China) Science and Technology on Electro-Optical Information Security Control Laboratory (China)

Published by SPIE

Volume 10461

Proceedings of SPIE 0277-786X, V. 10461

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 AOPC 2017: Optical Spectroscopy and Imaging, edited by Jin Yu, Zhe Wang, Wei Hang, Bing Zhao, Xiandeng Hou, Mengxia Xie, Tsutomu Shimura, Proceedings of SPIE Vol. 10461 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

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

ISBN: 9781510614031 ISBN: 9781510614048 (electronic)

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 © 2017, 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/17/\$18.00.

Printed in the United States of America Vm7 i ffUb 5 ggc WUHY gr a Wzi bXYf WbgY Zfca GD-9.

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



**Paper Numbering:** *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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 Authors
- xi Conference Committee
- xiii Introduction

## **OPTICAL SPECTROSCOPY AND IMAGING**

- 10461 02 Spatial-spectral blood cell classification with microscopic hyperspectral imagery [10461-1]
- 10461 03 Photoacoustic experiments of glucose aqueous solution based on pulsed laser induced ultrasonic technique [10461-2]
- 10461 04 Variable selection based near infrared spectroscopy quantitative and qualitative analysis on wheat wet gluten [10461-4]
- 10461 05 **Dual pulse laser induced breakdown spectroscopy on Cu concentration in CuSO4 solution with liquid jet** [10461-5]
- 10461 06 Structural study of aggregated  $\beta$ -carotene by absorption spectroscopy [10461-6]
- 10461 07 A method derived from genetic algorithm, principal component analysis and artificial neural networks to enhance classification capability of laser-Induced breakdown spectroscopy [10461-7]
- 10461 08 Hyperspectral image target detection algorithm based on complex networks [10461-9]
- 10461 09 Application of digital quadrature lock-in amplifier in TDLAS humidity detection [10461-10]
- 10461 0A Analysis of terahertz dielectric properties of pork tissue [10461-12]
- 10461 0B Analysis on the optical aberration effect on spectral resolution of coded aperture spectroscopy [10461-13]
- 10461 0C A research on radiation calibration of high dynamic range based on the dual channel CMOS [10461-14]
- 10461 0D Using imaging brightness information to select feature bands for multi-spectral images of cabbage leaves [10461-15]
- 10461 OE Electric field Monte Carlo simulation of polarized light propagation in multi-layered media [10461-16]
- 10461 OF Measurement of trace gas concentration with pressure-calibration method based on wavelength modulation absorption spectrometry [10461-19]

10461 0G	Highly uniform silver coated hydrogen silsesquioxane nanopost arrays as excellent surface-enhanced Raman scattering substrate [10461-20]
10461 OH	Comparison of fluorescence rejection methods of baseline correction and shifted excitation Raman difference spectroscopy [10461-21]
10461 OI	A synthetic method of solar spectrum based on LED [10461-22]
10461 OJ	A coarse-to-fine approach for medical hyperspectral image classification with sparse representation [10461-24]
10461 OK	A calibration method of infrared LVF based spectroradiometer [10461-25]
10461 OL	Research on visible and near infrared spectral-polarimetric properties of soil polluted by crude oil [10461-27]
10461 OM	Study of improving signal-noise ratio for fluorescence channel [10461-29]
10461 ON	Effects of plume afterburning on infrared spectroscopy [10461-30]
10461 00	Numerical simulation study of two-dimensional tomography reconstruction using calibration-free modulation spectroscopy [10461-31]
10461 OP	A light field microscope imaging spectrometer based on the microlens array [10461-32]
10461 OQ	Integrated cavity output spectroscopy and its application in terms of trace gas detection [10461-33]
10461 OR	Design of remote laser-induced fluorescence system's acquisition circuit [10461-34]
10461 OS	Spontaneous Rayleigh-Brillouin scattering spectral analysis based on Wiener filter [10461-35]
10461 OT	Spectral identification of melon seeds variety based on k-nearest neighbor and Fisher discriminant analysis [10461-36]
10461 OU	A new approach of oil spill detection with time-resolved LIF polarization spectrum combined with principle component analysis [10461-39]
10461 OV	Accuracy improvement of interferometric Rayleigh scattering diagnostic [10461-40]
10461 OW	Spectral resolution enhancement of Fourier-transform spectrometer based on orthogonal shear interference using Wollaston prism [10461-41]
10461 OX	Calculation of color difference and measurement of the spectrum of aerosol based on human visual system [10461-42]
10461 OY	Analysis of characteristics of Si in blast furnace pig iron and calibration methods in the detection by laser-induced breakdown spectroscopy [10461-43]
10461 OZ	The integrated design and archive of space-borne signal processing and compression coding [10461-44]

- 10461 10 Research of the absorbance detection and fluorescence detection for multifunctional nutrition analyzer [10461-45]
- 10461 11Bandwidth correction for LED chromaticity based on Levenberg-Marquardt algorithm<br/>[10461-46]
- 10461 12 Theoretical simulation on the electron spectra detached from F-ions in a short laser pulse [10461-48]
- 10461 13 Origin of interference patterns in the photoelectron momentum distributions for photodetachment of H-ions in short laser pulses [10461-49]
- 10461 14 Development and creation of a remote-controlled underwater laser induced breakdown spectrometer for analysis of the chemical composition of sea water and bottom sediments [10461-50]
- 10461 15 Phase retrieval via incremental truncated amplitude flow algorithm [10461-51]
- 10461 16 Stand-off laser Raman spectroscopy and its advancement in explosives detection [10461-52]
- 10461 17 Towards field detection of polycyclic aromatic hydrocarbons (PAHs) in environment water using a self-assembled SERS sensor [10461-53]
- 10461 18 Fast data reconstructed method of Fourier transform imaging spectrometer based on multicore CPU [10461-54]
- 10461 19 **Research on the shooting accuracy of ICF laser device based on radiation fluid** [10461-56]
- 10461 1A On-line dynamic monitoring automotive exhausts: using BP-ANN for distinguishing multicomponents [10461-58]
- 10461 1B Design and resolution analysis of parabolic mirror spectrometer [10461-60]
- 10461 1C Ammonia detection using hollow waveguide enhanced laser absorption spectroscopy based on a 9.56 µm quantum cascade laser [10461-61]
- 10461 1D Development of a prototype for dissolved CO<sub>2</sub> rapid measurement and preliminary tests [10461-62]
- 10461 1E Research of the fast data processing method for the Infrared fourier transform imaging spectrometer based on CUDA architecture [10461-63]
- 10461 1F Study on pattern recognition of Raman spectrum based on fuzzy neural network [10461-64]
- 10461 1G Analysis of the physical simulation on Fourier transform infrared spectrometer [10461-68]
- 10461 1H A fast point-cloud computing method based on spatial symmetry of Fresnel field [10461-69]
- 10461 11 Design and research of built-in sample cell with multiple optical reflections [10461-70]
- 10461 1J **Propagation characteristic of THz wave in camouflage net material** [10461-71]

10461 1K	Miniaturized spectral imaging for environment surveillance based on UAV platform
	[10461-72]

- 10461 1L Numerical calculation on infrared characteristics of the special vehicle exhaust system [10461-73]
- 10461 1M System optimization on coded aperture spectrometer [10461-76]
- 10461 1N Effect of LFTSD on underwater laser induced breakdown spectroscopy with different laser energies [10461-78]
- 10461 10 Comparison of phase unwrapping algorithms for topography reconstruction based on digital speckle pattern interferometry [10461-82]
- 10461 1P Hyperspectral image compressing using wavelet-based method [10461-83]
- 10461 1Q **Optimization of the infrared Stokes imaging polarimeter** [10461-85]
- 10461 1R Analysis and design of the ultraviolet warning optical system based on interference imaging [10461-86]
- 10461 1S Gas identification field test based on FTIR imaging spectrometer [10461-87]
- 10461 10 Study on hyperspectral imager in geostationary orbit based on ultra-large aperture [10461-89]