

# **2021 International Conference of Optical Imaging and Measurement (ICOIM 2021)**

**Xi'an, China  
27-29 August 2021**



**IEEE Catalog Number: CFP21AA7-POD  
ISBN: 978-1-6654-4779-9**

**Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP21AA7-POD
ISBN (Print-On-Demand):	978-1-6654-4779-9
ISBN (Online):	978-1-6654-0354-2

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## Table of Contents

<b>Error analysis of a photoelastic-modulated Mueller matrix ellipsometer</b>	1
<i>Tao Huang, Hao Jiang, Song Zhang, Shiyuan Liu, Bowen Deng</i>	
<b>3D Super-resolution Optical Imaging Using Deep Image Prior</b>	5
<i>Ruoxin Wang, Chifai Cheung</i>	
<b>Convolutional Neural Networks' Applications in Automatic Target Recognition for Synthetic Aperture Images</b>	9
<i>Wenting Yu, Peng Zhang</i>	
<b>Creating Seed Coat Catalog Using Spectral Domain Optical Coherence Tomography</b>	14
<i>Xinhua Li, Xingyu Yang, Zijian Zhang, Dingming Kang, Yaochun Shen</i>	
<b>Investigation on the Influence of Macro-micro Grating Parameters on Diffraction Characteristics through FDTD Simulation</b>	20
<i>Yaowen Ban, Biao Lei, Guoyong Ye, Guobo Zhao, Zhenghui Zhang, Hongzhong Liu</i>	
<b>Nonlinearity suppression method for optical frequency scanning based on the Phenomenological model</b>	24
<i>Zhongwen Deng, Xiaoping Li, Haifeng Sun, Xingyu Jia, Qifan Wang, Xiawei Meng, Lirong Shen</i>	
<b>Design of high quantum efficiency photodetector based on graphene/silicon nanometer truncated cone array</b>	28
<i>Jijie Zhao, Weiguo Liu, Huan Liu, Minyu Bai</i>	
<b>Active Millimeter Wave Imaging based on CGC Lens</b>	32
<i>Jingduo Cui, Jinbang Wang, Kui Yang, Lu Zhao, Hanxue Mei, Tao Zhang, Zhiguo Liu</i>	
<b>Design of the Telecentric Lens for Dual Side Imaging of the Small Size Particles with Equal Optical Path</b>	36
<i>Xinsen Wang, Yafan Duan, Wenzhi Chen, Nuofei Lin, Jianling Ding, Tingdi Liao</i>	
<b>Design &amp; Optimization of F-Theta Focusing Lens Based on ZEMAX</b>	41
<i>Qinxiao Liu, Hong Zhu, Fang Wang, Chaoyuan Ding, Dongxia Hu</i>	
<b>Synthesis of HgTe Quantum Dots and Its Application in Broadband Photodetection</b>	45
<i>Shuai Wen, Weiguo Liu, Huan Liu, Fei Xie</i>	
<b>Research on OCT Imaging Law of Frozen Meat Applied with Electric Field During Storage</b>	49
<i>Lu Zhang, Xiaorong Shen, Yiyang Zhang, He Yang, Kejia Li, Hong Zhao</i>	
<b>An Accelerated Algorithm for 3D Reconstruction of Groove Structure Based on Parallel Light and White Light Interference</b>	53
<i>Kexin Zhang, Yiyong Liang, Guozhong Li</i>	
<b>Optical design of a backlight illumination system</b>	58
<i>Bo Zhang, Qin Liu, Kang Li, Nigel Copner</i>	

<b>Calibration method for measuring angle device with CCD</b>	64
<i>Zelin Sun</i>	
<b>Research on Inversion Law of Label-free Two-dimensional Light Scattering Cell Size Based on Gray-Level Co-occurrence Matrix</b>	68
<i>Huijun Wang, Lu Zhang, He Yang, Nan Yang, Hong Zhao, Li Yuan</i>	
<b>A Simulation Algorithm of The Space-based Optical Star Map with Any Length of Exposure Time</b>	72
<i>Yupeng Wang, Zhaodong Niu, Lina Song</i>	
<b>Analysis of the Anti-magnetic Interference Characteristics of the Stacked Magneto-optical Current Sensor and Error Compensation Method</b>	77
<i>Yansong Li, Xiaojun Zhao, Jun Liu</i>	
<b>Fabrication of large-sized stitching computer generated hologram (CGH)</b>	84
<i>Yingying Bai, Zhiyu Zhang, Ruoqiu Wang, Hongda Wei</i>	
<b>Test system of laser ultrasonic directional transmission channel characteristics</b>	88
<i>Peipei Zhang, Yunjing Guan</i>	
<b>A Structure Based Speckle Filtering Method for Ocean SAR Images</b>	92
<i>Pu Cheng, Zhentao Yu, Jie Chen</i>	
<b>Characterizing static aberration in reflective liquid crystal spatial light modulators (LC-SLM) using random phase shifting interferometry</b>	96
<i>Junxiang Li, Zixin Zhao, Chen Fan, Yijun Du, Menghang Zhou, Xuchao Zhang, Hong Zhao</i>	
<b>Fast Stereo Matching Method Based on Two-step AD-Census Fusion</b>	100
<i>Tong Wang, Yangfan Sun</i>	
<b>Image Reconstruction of Photonics Integrated Interference Imaging System: stablized CLEAN methods</b>	104
<i>Tianbao Chen, Mingsen Tian, Xuefeng Zeng, Zhiyu Zhang</i>	
<b>Blast furnace chute visual detection based on mechanism model</b>	
<b>Part 3: Visual Detection Based on Infrared Images</b>	109
<i>Xiaoman Cheng, Shuseng Cheng, Wenxuan Xu, Pengbo Liu</i>	
<b>Fast Positioning of Zero Path Difference of White Light Interference Based on Image Processing</b>	113
<i>Guozhong Li, Yiyong Liang, Kexin Zhang, Zengqiang Li</i>	
<b>Phase extraction of a set of Phase-shifting patterns reduced basis decomposition</b>	118
<i>Jinlu Han, Pu Ma, Chang Liu, Hubing Du</i>	
<b>High-Speed and Accurate Method for the Gear Surface Integrity Detection Based on Visual Imaging</b>	122
<i>Wei Shao, Yunqiu Shao, Qian Liu, Rong Quan</i>	

<b>Characterization of tissue texture with Mueller matrix parameters</b>	127
<i>Yongtai Chen, Benda Xin, Mingyu Zhao, Jinkui Chu</i>	
<b>Two-frame phase extraction technology based on vector normalization with single filter</b>	131
<i>Hangying Zhang, Liangcai Cao, Hong Zhao, Feng Yang</i>	
<b>A Novel Lightweight Infrared and Visible Image Fusion Algorithm</b>	135
<i>Chuanyun Wang, Guowei Yang, Dongdong Sun, Jiankai Zuo, Ziwei Li, Xiaoning Ma</i>	
<b>Scintillator study for improving material separation ability in x-rays computed tomography imaging</b>	140
<i>Xiaoqin Xia, Jing Zou</i>	
<b>Autostereoscopic Measurement System for Rapid 3D Inspection of Wire Bonding</b>	145
<i>Sanshan Gao, Chifai Cheung, Da Li</i>	
<b>A fast point cloud precision registration method based on spatial grid division</b>	149
<i>Faheng Liu, Chunwei Zhang, Hong Zhao, Qingkang Bao, Min Hu, Tianyu Zhang</i>	
<b>The measurement of the center of mass and the optical center in a freely falling body of absolute gravimetry</b>	153
<i>Kang Lv, Ye Yu, Xiang Hu, Yu Tian, Fu Bao</i>	
<b>Towards a Novel Phase Unwrapping Model for Three Dimensional Measurement</b>	157
<i>Hailong Tan, Yuanping Xu, Yanlong Cao, Benjun Guo, Tukun Li, Jian Huang, Jun Lu, Han Jiang</i>	
<b>Research on Microbial Detection Technology Based on Femtosecond Laser Technology Raman Spectroscopy</b>	162
<i>Xinxin Chen, Huqiang Tian, Bo Cheng</i>	
<b>An Optical Periscope Technique for Measuring Cryogenic Liquid Level Height in Adverse Environment</b>	166
<i>Ping Fang, Jianguo Xin, Xie Li</i>	
<b>Analysis of Lidar Technology Development Based on Autonomous Driving Competition</b>	170
<i>Fenghua Yang</i>	
<b>Design of Intelligent Robot for Bank Early Warning and Security Based on Robot Vision</b>	174
<i>Yan Ren, Bin Liu</i>	
<b>FPGA-based Detection Module for the Chromatic Confocal Measurement Sensor</b>	178
<i>Ye Yuan, Tao Liu, Li Zhang, Jiaqi Hu, Jiayi Wang, Shuming Yang</i>	
<b>Reciprocal optical voltage sensor with rotating double-crystal structure based on Pockels effect</b>	182
<i>Zhi Li, Yansong Li, Jun Liu</i>	
<b>Blast furnace chute visual detection based on mechanism model Part 2: Numerical simulation of heat transfer in blast furnace chute</b>	188
<i>Xiaoman Cheng, Shuseng Cheng, Wenxuan Xu, Pengbo Liu</i>	

<b>A Phased Landmark Navigation Method for Lunar Exploration</b>	192
<i>Anran Wang, Li Wang, Baocheng Hua, Tao Li, Qihang Tian</i>	
<b>Quantitative relationship study between spatial heterogeneity and uncertainty of high-resolution pixel scale based on spectral measurement simulation</b>	197
<i>Peng Jiang, Jun Pan, Hailiang Gao, Han Sun, Kaisi Wang, Xinge Dou</i>	
<b>Design of readout circuit chip for medium wave 640 × 512-25um IRFPA</b>	203
<i>Qi Liu, Xiaojuan Xia, Weifeng Sun, Siyang Liu</i>	
<b>Binary fringe pattern in infrared phase measuring deflectometry</b>	207
<i>Caixia Chang, Yanqing Shi, Xiaohong Liu, Zonghua Zhang</i>	
<b>Ultrasonic inspection of aircraft secondary co-curing skin Recognition method of defect signal</b>	211
<i>Xiao He</i>	
<b>Design of test system for gun stabilization accuracy</b>	217
<i>Zelin Sun</i>	
<b>High Spatial Resolution Reconstruction of Underwater Acoustic Signal from Drawing Tower Grating with Long Cavity Based on GA-BP</b>	222
<i>Hanjie Liu, Ciming Zhou, Yandong Pang, Dian Fan, Xi Chen</i>	
<b>A Simple Optical Fiber-coupled Chromatic Confocal 3D Measurement System</b>	226
<i>Tao Liu, Xiaofeng Tang, Jiayi Wang, Zhibin Wang, Jiaqi Hu, Ye Yuan, Shuming Yang</i>	
<b>Measuring the Light Environment of Ship Bridge based on CCD Camera</b>	230
<i>Xingfen Qin</i>	
<b>Discussion of cross-axis isolation in vector atomic magnetometry via longitudinal field modulation</b>	234
<i>Yingying Li, Mingxiang Ma, Yukun Luo, Yubo Xie, Jie Wang, and Fufang Xu</i>	
<b>Blast furnace chute visual detection based on mechanism model Part 1: Analysis of chute wear based on discrete element method</b>	239
<i>Xiaoman Cheng, Shuseng Cheng, Wenxuan Xu, Pengbo Liu</i>	
<b>Form Recognition Based on Lightweight U-Net and Tesseract after Multi-level Retraining</b>	243
<i>Gang Li, Junhui Huang, Zhao Wang, Jianmin Gao, Kun Chen</i>	
<b>A Neural Network-based Method for Fast Angle Calibration of MEMS LiDAR</b>	249
<i>Dayong Lin, Chunhui Zhao, Yingying Gu, Yunfei Xu, Baocheng Hua, Zonghua Qu</i>	
<b>An object recognition method based on deep learning</b>	257
<i>Yingni Duan</i>	
<b>Research and Application of Aero-engine Interface Measurement Technology</b>	262
<i>Yingdong Shen, Yusong Liu, Fan Zhou, Zhengda Zhao</i>	
<b>Distributed design of wind tunnel temperature test system based on CAN bus</b>	267
<i>Zhaoxin Yang, Zhenghua Gu, Wenqing Zhang</i>	

<b>Impact Analysis of spectral response on the measurement of infrared radiation characteristics</b>	271
<i>Lijun Ma, Xinghao Feng, Zijian Zhang</i>	
<b>Volumetric measurement of flame using CTC at sparse-projection condition and fast 3-D contour rebuilding</b>	276
<i>Yanting Cheng, Wang Tian, Feng Chi, Chao Ma, Fanghua Liao, Jianjun Wang</i>	
<b>A Dynamic Following-based Binocular Vision Method for the Deformation Measurement of Motion Structures</b>	282
<i>Xiaojun Tang, Jingzhen Han</i>	
<b>Research on the measurement of micro display luminance</b>	286
<i>Shaoshui Wang, Facai Zhao, Xingbang Zhu, Yujiao Ruan</i>	
<b>Study on Station Planning of Dual Lugs Hole Measurement by Laser Tracker</b>	290
<i>Fan Zhou, Yusong Liu, Yingdong Shen, Zhengda Zhao, Qingzhong Tan</i>	
<b>EfficientPillarNet: A Fast Deep Network for Semantic Segmentation of Large-scale Point Clouds from Lidar</b>	295
<i>Shusheng Li, Teng Wang, Shuming Yang, Ye Yuan</i>	
<b>Building Damage Detection Method Based on Normal Vector Computation of Airborne Point Cloud Data</b>	301
<i>Shusong Huang, Yong Zeng, Wei Yi, Weirong Chen, Wenbo Su, Tian Xia</i>	
<b>Experimental Study on the Influence of Thickener Type on the Reflux Characteristics of Grease under Starved Lubrication</b>	305
<i>Zhijie Lin, Yazhen Wang, Yipeng Chen, Zhaoxiang Xu</i>	
<b>Author Index</b>	309