

PROCEEDINGS OF SPIE

Seventh Asia Pacific Conference on Optics Manufacture (APCOM 2021)

**Jiubin Tan
Xiangang Luo
Ming Huang
Lingbao Kong
Dawei Zhang**

Editors

**28-31 October 2021
Shanghai, China**

Organized by

Institute of Optics and Electronics, CAS (China) • Shanghai Institute of Optics and Fine Mechanics, CAS (China) • Xi'an Institute of Optics and Precision Mechanics, CAS (China) • Institute of Machinery Manufacturing Technology, China Academy of Engineering Physics (China) • Beijing Institute of Space Mechanics & Electricity (China) • State Key Laboratory of Ultra-precision Machining Technology, The Hong Kong Polytechnic University (China) • School of Mechanical Engineering, Shanghai Jiao Tong University (China) • Shanghai Engineering Research Center of Ultra-Precision Optical Manufacturing, Fudan University (China) • Shanghai Engineering Research Center of Extreme Optical Manufacturing and Measurement (China) • Shenzhen Key Laboratory of High Performance Nontraditional Manufacturing, Shenzhen University (China) • Advanced Optical Manufacturing Youth Expert Committee, CSOE (China)

Sponsored by

Chinese Society for Optical Engineering (China)

Published by

SPIE

Volume 12166

Part One of Three Parts

Proceedings of SPIE 0277-786X, V. 12166

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Seventh Asia Pacific Conference on Optics Manufacture (APCOM 2021), edited by Jiubin Tan, Xiangang Luo, Ming Huang, Lingbao Kong, Dawei Zhang, Proc. of SPIE Vol. 12166, 1216601 · © 2022 SPIE · 0277-786X · doi: 10.1117/12.2632266

Proc. of SPIE Vol. 12166 1216601-1

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 SPIDigitalLibrary.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 *Seventh Asia Pacific Conference on Optics Manufacture (APCOM 2021)*, edited by Jiubin Tan, Xiangang Luo, Ming Huang, Lingbao Kong, Dawei Zhang, Proc. of SPIE 12166, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510652088
ISBN: 9781510652095 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 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.

SPIE. DIGITAL LIBRARY
SPIDigitalLibrary.org

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

Part One

SEVENTH ASIA PACIFIC CONFERENCE ON OPTICS MANUFACTURE (APCOM 2021)

- 12166 02 **Research on the properties of Ta₂O₅ optical films prepared with APS plasma assisted deposition [12166-1]**
- 12166 03 **Study on the relationship between motion accuracy and optical surface accuracy of ion beam figuring equipment [12166-3]**
- 12166 04 **Study on optimization of a NiP layer polishing process on magnetorheological finishing for metal substrate [12166-4]**
- 12166 05 **Experimental study on image stitching of blade-shaped hole [12166-5]**
- 12166 06 **Optimal design of a 800mm vehicle mounted telescope's main mirror support scheme [12166-6]**
- 12166 07 **Research on ion beam figuring method based on new controllable ion source [12166-8]**
- 12166 08 **Elastic emission polishing based on shear thickening slurry [12166-9]**
- 12166 09 **Freeform construction method for illumination design by using two orthogonal tangent vectors based on ray mapping [12166-13]**
- 12166 0A **Speckle deflectometry based on digital image correlation [12166-15]**
- 12166 0B **In-situ testing of front and rear surfaces of transparent element [12166-16]**
- 12166 0C **Surface design for refractive multifocal optics [12166-17]**
- 12166 0D **A novel method based on polarization beam splitting and focusing for full Stokes detection of dielectric metasurfaces [12166-19]**
- 12166 0E **Manufacture of freeform surface on die steel by ultrasonic assisted diamond turning [12166-20]**
- 12166 0F **Flexible phase control of spatial light modulators in interferometric surface figure tests [12166-22]**
- 12166 0G **The fatigue analysis method of satellite transportation environment based on acceleration response [12166-23]**
- 12166 0H **Research on adaptive grinding of curved optical parts based on neural network control strategy [12166-24]**

- 12166 OI **Microwave frequency measurement method with ultrawide frequency range and high resolution** [12166-26]
- 12166 OJ **Research on deformation field reconstruction of elastic thin plate based on fiber Bragg grating strain monitoring** [12166-27]
- 12166 OK **TSP solution for adaptive scanning paths in long-range SPM measurements** [12166-28]
- 12166 OL **Path planning and avoidance control for airbag polishing** [12166-29]
- 12166 OM **Tool path generation of ultra-precision machining an off-axial four-mirror anastigmat system based on accuracy active control** [12166-30]
- 12166 ON **Projecting uniformity subwavelength pattern by plasmonic lithography with unidirectional surface plasmon coupler** [12166-31]
- 12166 OO **Optimization on the general molds design method for precision glass molding** [12166-34]
- 12166 OP **Research on channelized receiver based on microwave photonic with large instantaneous bandwidth** [12166-35]
- 12166 OQ **Research on influence mechanism of thermal error of ultra-precision diamond fly-cutting machine tool** [12166-38]
- 12166 OR **Study on adhesive curing process and bonding property of XM-31 silicone rubber** [12166-39]
- 12166 OS **Research on spatial and temporal distribution and mechanism of large-scale subsidence funnel of North China Plain using InSAR time series** [12166-41]
- 12166 OT **DoA estimation based on accelerated structured alternating projection using coprime array** [12166-42]
- 12166 OU **A joint amplitude-phase inter-channel errors calibration method for 3D MIMO imaging radar based on the minimum entropy technology** [12166-43]
- 12166 OV **Static hand gesture recognition based on 2-D SAR imaging** [12166-45]
- 12166 OW **Radar gesture recognition based on lightweight convolutional neural network** [12166-46]
- 12166 OX **Research on real time image processing technology of airborne infrared camera** [12166-47]
- 12166 OY **A infrared image highlighting region suppression method based on histogram transform** [12166-49]
- 12166 OZ **Multi-level phase unwrapping method by combining the branch-cut and minimum cost flow** [12166-50]
- 12166 10 **Signal-level cooperative target location based on distributed networked radar** [12166-51]

- 12166 11 **Research on infrared image sub-pixel super-resolution reconstruction algorithm based on deep learning** [12166-53]
- 12166 12 **Comparison of multiple scatterer detection methods in differential SAR tomography** [12166-55]
- 12166 13 **Optical system design of 64×64 InGaAs/InP single photon avalanche diode (SPAD) focal plane arrays** [12166-56]
- 12166 14 **Study on surface defects of monocrystalline silicon caused by argon ion beam with different energies** [12166-57]
- 12166 15 **Parameter sensitivity of temperature response characteristics in the thermistor pasting technology** [12166-60]
- 12166 16 **Angular dependence of nanosecond laser-induced periodical surface structure periodicity on silicon** [12166-61]
- 12166 17 **Highly coherent points selection method in complex environment** [12166-62]
- 12166 18 **Phase information based track-before-detect of maneuvering weak multi-targets** [12166-63]
- 12166 19 **Laser scanning confocal microscopy observations of InAsSb thin and thick epilayers** [12166-64]
- 12166 1A **Research on airdrop track measurement technology based on UWB** [12166-66]
- 12166 1B **Research on vibration suppression control method of space large flexible solar wing** [12166-69]
- 12166 1C **Ultra-precision grinding and polishing of fused quartz material** [12166-71]
- 12166 1D **FusionGAN-Detection: vehicle detection based on 3D-LIDAR and color camera data** [12166-72]
- 12166 1E **Gesture recognition with feature fusion using FMCW radar** [12166-73]
- 12166 1F **Research on permanent scatterer extraction methods in differential SAR tomography** [12166-74]
- 12166 1G **A lightweight convolutional network for infrared object tracking** [12166-75]
- 12166 1H **Comparison of target utilization rate of two paths for disc-type laser ablation micro thruster** [12166-76]
- 12166 1I **Fastening torque simulation method of pressure-ring based on finite element simulation analysis and experimental verification** [12166-77]
- 12166 1J **Fusion method of infrared-polarization images based on common and unique salient feature** [12166-78]
- 12166 1K **Material removal of aluminate magnesium spinel based on nanoindentation and microscratch test** [12166-79]

- 12166 1L **Spatiotemporal correlated single photon imaging** [12166-80]
- 12166 1M **Compact and robust Bragg grating stabilized diode laser at 780 nm** [12166-84]
- 12166 1N **Athermalization design of compact dual-fields middle infrared optical zoom system with high-speed switching** [12166-85]
- 12166 1O **First-principles calculations of terahertz dielectric and thermal properties of 3C-SiC** [12166-89]
- 12166 1P **The design of on-chip digital Fourier transform spectrometer** [12166-90]
- 12166 1Q **Research on polarization error of integrated optical path device of fiber optic gyroscope based on Jones matrix theory** [12166-91]
- 12166 1R **Autofocusing imaging method based on alternating learning of wall parameters and sparse coefficients for through-the-wall radar** [12166-94]
- 12166 1S **A fast parameter estimation method for attributed scattering centers based on complex field separation** [12166-96]
- 12166 1T **Three-dimensional imaging of ground penetrating radar with total variation minimization** [12166-97]
- 12166 1U **Review of the development status of UAV countermeasures** [12166-98]
- 12166 1V **A novel stepped trapezoidal CMRC with ultra-wide suppressed frequency band** [12166-99]
- 12166 1W **Robust curve and surface reconstruction method based on clustering algorithm** [12166-100]
- 12166 1X **A CUDA based infrared image simulation method of rocket plumes observed by satellite** [12166-105]
- 12166 1Y **Research on visual image processing and edge detection method of micro flapping wing flying robot based on cluster analysis** [12166-109]
- 12166 1Z **Research on high-speed laser micro-machining and micro-hole arrays based on polygon mirror scanner** [12166-110]
- 12166 20 **Research on directional stability analysis and control method of spatial data transmission antenna** [12166-111]
- 12166 21 **Optical design of monocentric multiscale three-line array airborne mapping camera** [12166-112]
- 12166 22 **3D object reconstruction algorithm based on dynamic threshold dithering technique** [12166-113]
- 12166 23 **Remote sensing monitoring of land desertification in four counties of Bashang, Hebei based on Landsat-8** [12166-114]

- 12166 24 **An analogical gravitational lens model [12166-116]**
- 12166 25 **Package structure design of 64×64 InGaAs/InP SPAD assembly [12166-117]**
- 12166 26 **Performance evaluation and model quantization of object detection algorithm for infrared image [12166-118]**
- 12166 27 **Radiative transfer modeling of Hadamard coded infrared imaging spectrometer based on DMD [12166-119]**
- 12166 28 **Research on the performance of nonuniform circular array for direction finding ambiguity resolution [12166-121]**
- 12166 2A **Design of continuous zoom TV detection system in deep-sea [12166-124]**
- 12166 2B **Research on broadband microwave electromagnetic antireflection effect based on angle-insensitive electromagnetically induced transparent metamaterials [12166-127]**
- 12166 2C **Multi-model imaging detection using a learning feature fusion module [12166-128]**
- 12166 2D **An improved data separation approach for wide swath spaceborne SAR in multiple elevation beams operation mode [12166-129]**
- 12166 2E **Nonuniformity correction of infrared image based on motion estimation adaptive neural network [12166-131]**
- 12166 2F **Dielectric properties of water and NaCl solutions investigated by terahertz time-domain spectroscopy [12166-132]**
- 12166 2G **Thermal isolation and thermal sensing technologies of spacecraft under laser irradiation [12166-133]**
- 12166 2H **Infrared dim and small target detection of array camera based on probability estimation module [12166-134]**
- 12166 2I **Ultra-high phase transition amplitude of Fe-doped high-performance VO₂ films manufactured by DC-magnetron sputtering for modulation application [12166-139]**
- 12166 2K **Simulation and in-orbit verification of passive lunar calibration timing for Chinese ocean color satellite [12166-142]**

Part Two

- 12166 2L **FAREC: few accumulations range extraction and correction in high-flux single-photon Lidar [12166-143]**
- 12166 2M **Epipolar plane images based light-field angular super-resolution network [12166-146]**

- 12166 2N **An effective control strategy for PMLSM velocity smoothness control at low-velocity of ultra-precision air bearing linear feed stage** [12166-147]
- 12166 2O **Phase compensation of atmospheric disturbance based on GB-InSAR** [12166-148]
- 12166 2P **Study on assembly process of flexible support mirror based on adhesive technology** [12166-149]
- 12166 2Q **FPGA-based hardware acceleration of electromagnetic wave reverse time migration imaging** [12166-151]
- 12166 2R **Ascent trajectory planning of pre-cooled combined power vehicle** [12166-152]
- 12166 2T **Accurate segmentation of remote sensing cages based on U-Net and voting mechanism** [12166-154]
- 12166 2V **Design and modeling of automation, autonomy, and artificial intelligence mission system for multi-domain joint operation** [12166-156]
- 12166 2W **Relay location planning method based on online self-optimization** [12166-157]
- 12166 2X **Multi-target localization based on joint utilization of ToA and Doppler using monostatic radar in multipath environment** [12166-158]
- 12166 2Y **Compressive sensing-based infrared image super-resolution method for rapid NDT of CFRP components** [12166-159]
- 12166 30 **An efficient spatiotemporal weighted mining algorithm for flight delay analysis in single pilot operations mode** [12166-163]
- 12166 31 **GPR electromagnetic inversion method based on multi-scan multi-frequency data and deep learning** [12166-165]
- 12166 32 **Research on utilization of BHR multiple in coal mine** [12166-167]
- 12166 33 **A survey of the estimation and fusion methods for battlefield situation awareness** [12166-168]
- 12166 34 **Cooperative formation control of fixed-wing UAVs based on deep reinforcement learning** [12166-169]
- 12166 35 **Programmable multi-beam steering with optical phased array** [12166-170]
- 12166 36 **Thermodynamic equilibrium state analysis of silicon plasma induced by picosecond laser** [12166-172]
- 12166 37 **Recognition and separation of radar aliasing signals based on CNN and SVDD** [12166-173]
- 12166 39 **Modeling the modulation transfer function measurement system of large aperture space cameras** [12166-175]

- 12166 3A **Active quenching circuit with adjustable reverse bias voltage for single photon avalanche diodes arrays** [12166-176]
- 12166 3B **Design and analysis of radial supports for a large aperture prism** [12166-179]
- 12166 3C **Object detection based on SURF feature matching and Hough transform** [12166-180]
- 12166 3D **Intelligent monitoring of subsidence cracks in underground power utility tunnel** [12166-184]
- 12166 3E **Flight-mission allocation and self-health management method for the rocket-borne CRFT** [12166-187]
- 12166 3F **Design of integrated optical transceiver for miniaturized three-axis fiber optic gyroscope** [12166-188]
- 12166 3G **Airborne infrared high dynamic range signal compression display method based on CLAHE** [12166-190]
- 12166 3H **Analysis on underwater acoustic countermeasure equipment for submarine** [12166-191]
- 12166 3I **Method for detecting surface roughness of silicon carbide substrate based on parallel differential confocal microscope** [12166-192]
- 12166 3J **A co-packaged photoelectric converter module** [12166-195]
- 12166 3K **An LSTM-based aerodynamic parameter recognition method for skip gliding targets** [12166-196]
- 12166 3L **Investigation of H⁺ beam radiation on photoelectric performance of GaAs photocathodes** [12166-197]
- 12166 3M **Fabrication of large-vector height aspheric microlens via tool swing stitching processing** [12166-198]
- 12166 3N **Ship detection in infrared images based on YOLOV4 and salient regions** [12166-199]
- 12166 3O **Intensity decoupled beacon vector angle measurement method based on RGB combined beam light** [12166-201]
- 12166 3P **A method for fast three-dimensional topography reduction of thin-film laser etched surface** [12166-202]
- 12166 3Q **Propagation properties of flattened Gaussian beams passing through an off-axis expanding optical system** [12166-203]
- 12166 3R **Collision-free motion planning approach for multi-object spectrographs with equal-arm fiber positioners** [12166-204]
- 12166 3S **A 16-bit two-stage ADC for 320×256 infrared focal plane array** [12166-206]

- 12166 3T **Ship-carried short-wave-infrared imager with intelligent identification of marine vessels** [12166-208]
- 12166 3U **High-speed arbitrary waveform generation in photonic temporal synthetic dimension using low-speed electronics** [12166-209]
- 12166 3V **Research on signal processing method of linear array scanning infrared detection system** [12166-210]
- 12166 3W **Research on low SNR laser detecting signal extraction algorithm** [12166-211]
- 12166 3X **Harmonic frequency estimation method in multi-surface interferometry** [12166-212]
- 12166 3Y **The clutter modeling and characteristics in airborne radar system based on navigation satellite signal** [12166-213]
- 12166 3Z **A three-dimensional isotropic microprobe for the measurement of microstructures** [12166-215]
- 12166 40 **A two-dimensional system design for the coarse pointing assembly used for spaceborne laser communication** [12166-216]
- 12166 41 **Image super-resolution using CNNs for dual-focal camera system** [12166-217]
- 12166 42 **Temperature rise control of electromagnetic lock based on power switch circuit** [12166-218]
- 12166 43 **Photonic generation of phase-coded microwave signal with tunable frequency multiplication factor** [12166-219]
- 12166 44 **Closed-loop control system based on visual measurement for LAMOST optical fiber positioning** [12166-221]
- 12166 45 **Resource scheduling algorithm for multi-target imaging in netted radar based on SIMO technology** [12166-222]
- 12166 46 **High precision inversion of sea surface wind speed based on the data of BF-1 satellite** [12166-224]
- 12166 47 **Optimization design of segmented interference array integrated optical imaging system** [12166-227]
- 12166 48 **Analysis of impact mechanism of axial errors on circular grating corner sensor** [12166-229]
- 12166 49 **Phase retrieval using least absolute deviations for Fourier ptychographic microscopy** [12166-230]
- 12166 4A **Ultra-broadband, compact, CMOS compatible arbitrary ratio power splitter with very low excess loss** [12166-231]
- 12166 4B **Micro motion parameter inversion of spatial cone target based on convolutional neural networks** [12166-232]

- 12166 4C **The influence of optical fiber structure defects on the surface quality of optical fiber imaging elements** [12166-235]
- 12166 4D **Model of grinding-induced line/area roughness and subsurface damage in brittle material based on genetic algorithm and deep neural network** [12166-236]
- 12166 4E **The properties of SiO₂ thin films fabricated by dual ion assisted deposition in large coating chamber** [12166-237]
- 12166 4F **A GAN based method for SAR and optical images fusion** [12166-238]
- 12166 4G **Application and challenges of additive manufacturing in the liquid rocket engines** [12166-240]
- 12166 4H **Self-adaptive algorithm used for spectrum optimization in trichromatic white light-emitting diodes** [12166-241]
- 12166 4I **Research on radar multi batch target simulation timing control technology** [12166-243]
- 12166 4J **Pulse radar signal generation technology based on a Fourier domain mode-locked optoelectronic oscillator** [12166-244]
- 12166 4K **A composite processing method for eliminating the co-frequency noise in MTF test** [12166-245]
- 12166 4L **Velocity-region dual adaptive path planning for ICP jet processing of ultra-thin optical elements** [12166-246]
- 12166 4N **Spatio-temporal super-resolution for multi-scale coded aperture compressive sensing using DMD** [12166-249]
- 12166 4O **A study of ultra-precision raster milling of optical freeform surfaces** [12166-250]
- 12166 4P **Design of wide-band dual-field infrared optical system** [12166-251]
- 12166 4Q **A multi-images variational Bayesian super-resolution reconstruction method based dual sparse priors** [12166-252]
- 12166 4R **A novel method for localization of non-line-of-sight target in complicated scene based on ray tracing** [12166-254]
- 12166 4S **A superpixel structure based visual attention target detection algorithm for SAR image** [12166-256]
- 12166 4T **Study on fast calibration method of photoelectric sighting** [12166-257]
- 12166 4U **Research on key technologies of networking in 5G-based LEO satellite constellation system** [12166-258]
- 12166 4V **Computer-aided alignment method for AIMS solar telescope** [12166-259]

- 12166 4W **Research on collaborative measurement methods for aircraft digital assembly** [12166-260]
- 12166 4X **Computing effective Hamiltonians of coupled electromagnetic systems** [12166-262]
- 12166 4Y **Equivalent evaluation method of detection performance of night vision system** [12166-263]
- 12166 4Z **First-order ghost analysis of diffractive/refractive imaging optical system based on ASAP**
[12166-264]
- 12166 50 **Infrared image target detection system based on RV1126** [12166-265]
- 12166 51 **Research on molding of chalcogenide glass diffractive optical element** [12166-267]
- 12166 52 **Design and analysis of bonding process of the space-based rectangular curved prisms**
[12166-268]
- 12166 53 **A 32 × 32 avalanche photodiode array read-out circuit with rapid active-quenching and high-voltage protection** [12166-269]
- 12166 54 **Allan variance analysis of a nuclear magnetic resonance oscillator** [12166-270]
- 12166 55 **On resource pooling technology of highly integrated onboard equipment** [12166-271]
- 12166 56 **Focusing polychromatic light with different spectrum bandwidth through turbid medium**
[12166-272]
- 12166 57 **High-resolution dual-view computer-generated holographic display based on holographic optical element** [12166-274]
- 12166 58 **Design of PWM-based spectrum tunable light source** [12166-277]
- 12166 59 **Integrated optical electric field sensor with array conical dipole antenna electrodes based on lithium niobate** [12166-280]
- 12166 5A **Pose estimation using polarimetric imaging in low-light environment** [12166-282]
- 12166 5B **Automatic characterization method for the quasi-planar freeform surface by atmospheric pressure plasma processing** [12166-283]
- 12166 5C **Analysis of sneak path of liquid launch rocket engine system** [12166-285]
- 12166 5D **A study on adaptive DBF method for spaceborne Ka-SAR based on DOA estimation** [12166-287]

Part Three

- 12166 5E **Infrared dim target detection technology based on IRI-CNN** [12166-288]

- 12166 5F **Thermal-structural-optical integrated analysis of an airborne camera** [12166-290]
- 12166 5G **Self-calibrated characterization of high-speed photodetectors based on slowly-varying-envelope photonic sampling** [12166-292]
- 12166 5H **Improved SORT for vehicles tracking in satellite videos** [12166-293]
- 12166 5I **Radar measurement accuracy range acceptance method based on coordinate transformation** [12166-294]
- 12166 5J **Band optimization method for airborne point target detection** [12166-295]
- 12166 5K **Shape measurement simulation of grazing incidence mirror based on fringe reflection method in polar coordinates** [12166-298]
- 12166 5L **A 1×1 region of interest readout scheme at arbitrary position for infrared focal plane array** [12166-300]
- 12166 5M **Reliability enhancement of the launch vehicle utilization system with the estimation of propellant residual mass** [12166-303]
- 12166 5N **Modeling and simulation of aero-thermal radiation of dome based on inverse ray tracing** [12166-304]
- 12166 5O **Joint time-frequency analysis and multipath exploitation for monostatic radar multi-object localization** [12166-306]
- 12166 5P **Research on collaborative search task planning of UAV swarm in dynamic environment** [12166-307]
- 12166 5Q **Three-dimensional positioning and imaging through scattering media based on the double-helix point spread function** [12166-308]
- 12166 5R **Single ISAR image enhancement based on convolutional neural network** [12166-309]
- 12166 5S **Confidence probability cooperation for multi-agent fiber Bragg grating intelligent health monitoring self-healing system** [12166-310]
- 12166 5T **Preset parameters calibration of focal stack computational imaging system** [12166-311]
- 12166 5U **An iterative phase imaging method based on nonlinear hot image** [12166-312]
- 12166 5V **Underground target detection and location estimation based on scattering curve feature recognition network** [12166-313]
- 12166 5W **Microwave photonic sparse radar with a high range resolution** [12166-314]
- 12166 5X **Imaging through scattering medium based on lensless Fourier transform digital holography** [12166-315]

- 12166 5Y **Unwrapping-free Fourier panoramic single-pixel imaging** [12166-316]
- 12166 5Z **Dual-CNN fusion panoptic segmentation based on edge optimization** [12166-317]
- 12166 60 **A semantic-driven image scene fine-grained enhancement recognition** [12166-318]
- 12166 61 **High resolution liquid refractive index sensing with tunable sensitivity based on a two-tap microwave photonic filter** [12166-320]
- 12166 62 **Design and fabrication of circularly polarized light metalens** [12166-321]
- 12166 63 **Large-size and high-resolution image plane hologram printing method based on spatial light modulator** [12166-322]
- 12166 64 **Ultra-narrow linewidth laser based on stimulated Brillouin scattering** [12166-323]
- 12166 65 **Theoretical analysis and improving methods for the viewing angle of liquid crystal display in manned spaceship** [12166-324]
- 12166 66 **Lateral shearing interferometry with continuously variable shear ratio** [12166-326]
- 12166 67 **Spatial resolution analysis of airplane-missile borne bistatic SAR** [12166-327]
- 12166 68 **Microwave photonic interrogation of a real-time gas vacuum sensor** [12166-328]
- 12166 6A **A method for dynamic target simulation of non-coplanar multimode radar** [12166-330]
- 12166 6B **Air flow turbulence orthogonality and surface error estimation in large aperture optical testing** [12166-331]
- 12166 6C **Infrared medium and short wave fusion algorithm based on helix mapping of differential feature** [12166-334]
- 12166 6D **Dynamic scattering media imaging based on combined modulation** [12166-335]
- 12166 6E **Analysis of the upper limit accuracy of an imaging radar altimeter from satellite formation** [12166-339]
- 12166 6F **Large-format, full-color moiré imaging device by high resolution inkjet printing** [12166-340]
- 12166 6G **Design and analysis of adaptive flexible support for cold optical lens** [12166-343]
- 12166 6H **Research on the influence of forward scattering on the resolution of underwater imaging** [12166-344]
- 12166 6I **Research on radiation characteristics outside turntable center of radio frequency simulation system** [12166-345]

- 12166 6J **Research on infrared target recognition algorithm based on SSD-MobileNetv1 network** [12166-349]
- 12166 6K **Optothermal dynamics in terahertz whispering-gallery resonators** [12166-352]
- 12166 6L **Miniaturized lens design based on free-form surface for micro intelligent instrument** [12166-354]
- 12166 6M **Internal stray radiation analysis of uncooled thermal infrared imaging spectrometer** [12166-355]
- 12166 6N **Multiscale image fusion based on local standard deviation** [12166-356]
- 12166 6O **Semi-analytical calculation model for multi-wavelength laser gas detection** [12166-358]
- 12166 6P **Study on the temperature field of nanosecond pulse laser processing carbon fiber reinforced plastics** [12166-360]
- 12166 6R **Technical research on high-speed real-time VLC based on analog pre-emphasis** [12166-364]
- 12166 6S **Detection device for transmittance and light-transmitting uniformity of fiber-optic imaging element** [12166-365]
- 12166 6T **Dynamic metamaterial perfect absorber based on VO₂ phase transition** [12166-368]
- 12166 6U **Cooled mid-infrared unobscured three-mirror system with an intermediate image plane using freeform surfaces** [12166-369]
- 12166 6V **Research progress on preparation technology and application of near-infrared silicon-based materials** [12166-370]
- 12166 6W **Infrared dim target detecting algorithm based on multi-feature and spatio-temporal fusion** [12166-371]
- 12166 6X **Development of a fast binocular structured light measuring system using composite fringe projection** [12166-372]
- 12166 6Y **Wavefront coded image restoration algorithm based on compressed sensing for off-axis mirror system** [12166-373]
- 12166 6Z **Precision image recognition system based on laser microscopic anti-counterfeiting features** [12166-374]
- 12166 70 **Adaptive color extraction method for structured laser stripes** [12166-375]
- 12166 71 **Design of an array collimating system based on VCSEL light source** [12166-376]
- 12166 72 **Multiple-beam lidar detection technology** [12166-377]
- 12166 73 **Interpolation-free 3-D millimeter-wave imaging for security inspection** [12166-378]

- 12166 74 **Fabrication of bent crystal analyzer for high energy-resolution x-ray spectroscopy [12166-380]**
- 12166 75 **Road perception and road line detection based on fusion of LiDAR and camera [12166-381]**
- 12166 76 **A new off-axis Gregorian mechanical structure and its alignment method [12166-382]**
- 12166 77 **Deep-learning for position error detection of the secondary mirror in space optical remote sensing system [12166-385]**
- 12166 78 **Overview on infrared dim target tracking [12166-386]**
- 12166 79 **A novel 3D clutter removal for GPR pipe detection via tensor RPCA [12166-387]**
- 12166 7A **A separate routing policy for broadband satellite communication system supporting large-scale IP network deployment [12166-388]**
- 12166 7C **Simulation investigation of coupled optoelectronic oscillator with high supermode suppression ratio [12166-391]**
- 12166 7D **The topology snapshot-based uploading routing technique for the LEO satellite constellation [12166-394]**
- 12166 7E **Photonic generation of wideband radar waveforms with frequency multiplication [12166-396]**
- 12166 7F **Optimization design and experiment of parameters for non-isothermal glass molding process [12166-398]**
- 12166 7G **Accurate, fast, and reliable integrated alignment method of X-ray optics for laser-plasma diagnostics [12166-399]**
- 12166 7H **Miniaturized optoelectronic oscillator in microwave photonics [12166-400]**
- 12166 7I **Fabrication of none-opposite-deposited micro-structure on diamond with the SiO₂/Cr bilayer mask [12166-402]**
- 12166 7J **UGV obstacle detection of sensor fusion based on point cloud data segmentation [12166-403]**
- 12166 7K **Research on high-precision infrared spectral modulation and calibration technology based on reflective encoding mask [12166-404]**
- 12166 7L **A fast mapping for small mobile robot scanned by single line Lidar [12166-405]**
- 12166 7M **Revisit dictionary learning for video compressive sensing under the plug-and-play framework [12166-407]**
- 12166 7N **Tunable photonic nanojet formed by a two-layer dielectric microcylinder [12166-408]**

- 12166 7O **A new curvature sensor based on SMS fiber structure using ring-core fiber and its demodulation by microwave photonic filter** [12166-409]
- 12166 7P **Analysis and research on the change of characteristic parameters with age based on PPG signal** [12166-410]
- 12166 7Q **Reconfigurable analog computing architecture based on planar optical waveguides** [12166-411]
- 12166 7R **Tunable photonic nanojet formed by a two-layer dielectric microcylinder** [12166-413]
- 12166 7S **Design of real-time displacement measurement system based on FPGA image processing hardware** [12166-415]
- 12166 7T **Radar broadband beamforming technique based on sub-wavelength stepped optical delay line** [12166-418]
- 12166 7U **Few-pattern defocusing fringe projection profilometry for high-speed 3-D imaging** [12166-419]
- 12166 7V **Research on the posture error of Cassegrain optical system** [12166-421]
- 12166 7W **DoFP polarimetric imagery in infrared detection blindness rejection** [12166-423]
- 12166 7X **Injection-locked parity-time-symmetric optoelectronic oscillator with ultra-high sidemode suppression** [12166-424]
- 12166 7Y **A new method for step height characterization based on K-means algorithm** [12166-426]
- 12166 7Z **Multi-surface measurement at arbitrary positions based on four-surface interferometry** [12166-427]
- 12166 80 **Application of the third-generation power devices in aerospace power supply** [12166-430]
- 12166 81 **Research on semantic segmentation method of urban streetscape image based on deep learning** [12166-432]
- 12166 82 **Revisit dictionary learning for video compressive sensing under the Plug-and-Play framework** [12166-433]
- 12166 83 **Research on conversion method of high frame rate image stream to analog video frame rate** [12166-438]

