PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 7655

, "Front Matter: Volume 7655," Proc. SPIE 7655, 5th International Symposium on Advanced Optical Manufacturing and Testing Technologies: Advanced Optical Manufacturing Technologies, 765501 (20 October 2010); doi: 10.1117/12.873875

SPIE.

Event: 5th International Symposium on Advanced Optical Manufacturing and Testing Technologies, 2010, Dalian, China

PROCEEDINGS OF SPIE

*5th International Symposium on Advanced
Optical Manufacturing and Testing
Technologies*

Advanced Optical Manufacturing Technologies

Li Yang
Yoshiharu Namba
David D. Walker
Shengyi Li
Editors

26–29 April 2010
Dalian, China

Sponsored by
COS—The Chinese Optical Society (China) • IOE—The Institute of Optics and Electronics, CAS (China)

Cosponsored and Published by
SPIE

Supporting Organizations
Ministry of Science and Technology of China (China) • Chinese Academy of Sciences (China)
National Natural Science Foundation of China (China)

Cooperating Organizations
Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) • Singapore Institute of Optics and Photonics (Singapore) • Optical Society of Sichuan Province (China) • State Key Laboratory of Microfabrication (China) • Dalian Institute of Chemical Physics, CAS (China) • Dalian University of Technology (China) • Changchun Institute of Optics, Fine Mechanics and Physics, CAS (China) • Changchun University of Technology (China) • National University of Defense Technology (China) • University of Electronic Science and Technology of China (China) • Harbin Institute of Technology (China) • Beijing Institute of Technology (China) • Crystechcoating Inc. (China)

Part One of Two Parts

Volume 7655

Proceedings of SPIE, 0277-786X, v. 7655

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

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 *5th International Symposium on Advanced Optical Manufacturing and Testing Technologies: Advanced Optical Manufacturing Technologies*, edited by Li Yang, Yoshiharu Namba, David D. Walker, Shengyi Li, Proceedings of SPIE Vol. 7655 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X

ISBN 9780819480859

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 © 2010, 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/10/\$18.00.

Printed in the United States of America.

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

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent 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 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. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

Part One

xv	<i>Conference Committee</i>
xvii	<i>Symposium Committees</i>
xix	<i>Introduction</i>

SESSION 2-1

7655 02	Material removal mechanisms in abrasive vibration polishing of complex molds [7655-18] E. Brinksmeier, O. Riemer, H. Schulte, LFM, Univ. of Bremen (Germany)
7655 03	High precision optical finishing of lightweight silicon carbide aspheric mirror [7655-178] J. Kong, K. Young, Precision Asphere, Inc. (United States)
7655 04	Design and experiments of a 629nm He-Ne laser with an internal Fabry-Perot etalon [7655-88] J. Liang, X. Long, B. Zhang, S. Jin, National Univ. of Defense Technology (China)
7655 05	Microstructure evolution and FT-IR spectra of silicon induced by pulsed laser irradiation [7655-180] W. An, Northeast Forestry Univ. (China); X. Zhao, Harbin Institute of Technology (China); R. Su, J. Li, J. Xin, Northeast Forestry Univ. (China)
7655 06	A novel precision face grinder for advanced optic manufacture [7655-140] Y. Guo, Y. Peng, Z. Wang, W. Yang, G. Bi, X. Ke, X. Lin, Xiamen Univ. (China)
7655 07	Calculation and analysis for stiffness of the thrust aerostatic bearing of ultra-precision machine tools [7655-68] L. Lu, Z. Zhao, Y. Liang, L. Zhang, Harbin Institute of Technology (China)
7655 08	Kinematical characteristics of two-dimensional vertical ultrasonic vibration-assisted grinding technology [7655-156] Y. Peng, Xiamen Univ. (China); Y. Wu, Akita Prefectural Univ. (Japan); Z. Liang, Akita Prefectural Univ. (Japan) and Beijing Institute of Technology (China); Y. Guo, Xiamen Univ. (China)
7655 09	Research on controllable compliant tools (CCT) theory and technology [7655-132] S. Li, X. Xie, Y. Dai, National Univ. of Defense Technology (China)
7655 0A	Review on active optics methods: What can we do by elastic bending? [7655-80] G. R. Lemaitre, Lab. d'Astrophysique de Marseille (France)
7655 0B	Blaze wavelength of convex blazed grating in an Offner spectrometer [7655-08] B. Yang, C. Liu, X. Ding, X. Wang, Y. Liu, Shanghai Institute of Technical Physics (China)

- 7655 0C **Mechanism and techniques of mechanical lapping of nature diamond cutting tools nose arc** [7655-03]
Z. Q. Li, W. J. Zong, T. Sun, S. Dong, Harbin Institute of Technology (China)
- 7655 0D **Depth of focus extended intraocular lenses and their optical performances in a pseudophakic eye model** [7655-82]
Z.-Q. Wang, Nankai Univ. (China); F. Rao, Nankai Univ. (China) and Vehicle Lamp Testing Lab. of Jiangsu Entry-Exit Inspection & Quarantine Bureau (China); Y.-J. Liu, Nankai Univ. (China)
- 7655 0E **Acrylic-based Y-branch POF coupler for do-it-yourself next generation optical devices** [7655-11]
A. A. Ehsan, S. Shaari, Univ. Kebangsaan Malaysia (Malaysia); M. K. Abd Rahman, Univ. Teknologi MARA (Malaysia)

SESSION 2-2

- 7655 0F **Loop-polishing machining technology of large area lightweight mirror** [7655-161]
X. Chen, C. Zhang, X. Tian, H. Liu, Henan PingYuan Optics Electronics Co., Ltd. (China)
- 7655 0G **The mechanism for material removal in ductile mode cutting of CaF_2 brittle crystals** [7655-83]
H. Chen, Y. Dai, X. Peng, Z. Zheng, C. Guan, National Univ. of Defense Technology (China)
- 7655 0H **Ultraprecision machining of nitrocarburized steels** [7655-38]
J. Osmer, R. Gläbe, O. Riemer, E. Brinksmeier, Bremen Univ. (Germany)
- 7655 0I **Effect of growth temperature on the properties of Al-doped ZnO thin film prepared by RF magnetron sputtering** [7655-173]
Z. Yang, Hebei Univ. (China); H. Zheng, Baoding Univ. (China); X. Li, Y. Peng, Q. Zhao, B. Liu, Hebei Univ. (China)
- 7655 0J **MD simulation of nanocutting process: removal mechanism, defects evolvement, and characterization** [7655-75]
J. X. Chen, Harbin Engineering Univ. (China) and Harbin Institute of Technology (China); Y. C. Liang, Harbin Institute of Technology (China); L. Q. Wang, Harbin Engineering Univ. (China); M. J. Chen, Z. Tong, W. Q. Chen, Harbin Institute of Technology (China)
- 7655 0K **Processing microgrooves and craters on the surface of wide band gap mold material using femtosecond laser** [7655-129]
Q. Zhao, T. Jiang, Z. Dong, R. Fan, X. Yu, Harbin Institute of Technology (China)
- 7655 0L **Finishing of display glass for mobile electronics using 3M Trizact diamond tile abrasive pads** [7655-39]
L. Zheng, 3M South China Technical Ctr. (China); T. Fletcher, 3M Company (United States); T. K. Na, 3M Innovation Ctr. (Singapore); B. Sventek, V. Romero, P. S. Lugg, 3M Company (United States); D. Kim, 3M Asia Pacific Pte Ltd. (Korea, Republic of)
- 7655 0M **Thermal research in fluid jet polishing process** [7655-101]
C. Y. Shi, J. H. Yuan, F. Wu, Y. J. Wan, The Institute of Optics and Electronics (China)

- 7655 ON **Pilot study for ion beam figuring process** [7655-22]
W. Guo, Y. Zheng, H. Wang, B. Liang, Nanjing Institute of Astronomical Optics & Technology (China)
- 7655 OO **Analysis about diamond tool wear in nano-metric cutting of single crystal silicon using molecular dynamics method** [7655-74]
Z. Wang, Y. Liang, M. Chen, Z. Tong, J. Chen, Harbin Institute of Technology (China)
- 7655 OP **Tool decentration effect in slow tool servo diamond turning off-axis conic aspheric surface** [7655-164]
Y. Dai, C. Guan, Z. Yin, G. Tie, H. Chen, J. Wang, National Univ. of Defense Technology (China)
- 7655 OQ **Temperature sensor using a long period fiber grating fabricated by 800 nm femtosecond laser pulses** [7655-29]
Y. Yu, S. Ruan, H. Yang, C. Du, J. Zheng, Shenzhen Univ. (China)

SESSION 2-3

- 7655 OR **Ultra-precision cutting of Fresnel lenses on single crystal germanium and the machining processing analysis** [7655-99]
Y. Fan, Y. Zhu, W. Pan, Zhejiang Univ. of Science and Technology (China)
- 7655 OS **ELID supported grinding of thin sapphire wafers** [7655-36]
I. Makarenko, C. Vogt, R. Rascher, P. Sperber, T. Stirner, Univ. of Applied Sciences Deggendorf (Germany)
- 7655 OT **Novel method of computer-aided alignment for large aperture space systems** [7655-163]
Y. Huang, L. Li, Beijing Institute of Technology (China)
- 7655 OU **Fabrication of microstructure array by means of ultra-precision micro-milling** [7655-70]
P. Zhang, B. Wang, Y. Liang, Harbin Institute of Technology (China)
- 7655 OV **Drilling of optical glass with electroplated diamond tools** [7655-31]
A. J. Wang, C. G. Luan, Yantai Vocational College (China); A. B. Yu, Ningbo Univ. (China)
- 7655 OW **Simulation analysis and structure optimization of the polishing disc with the tiny-grinding wheel cluster based on MR effect** [7655-154]
J. Lu, Q. Yan, Guangdong Univ. of Technology (China); A. Tang, Foxconn Super Precision Mechanical Business Group (China); W. Gao, L. Kong, Guangdong Univ. of Technology (China)
- 7655 OX **Theoretical analysis and experimental study of material removal characteristics in ion beam figuring process** [7655-130]
Y. Dai, W. Liao, S. Chen, L. Zhou, X. Xie, National Univ. of Defense Technology (China)
- 7655 OY **Relationship between influence function accuracy and polishing quality in magnetorheological finishing** [7655-33]
M. Schinhaerl, F. Schneider, R. Rascher, C. Vogt, P. Sperber, Univ. of Applied Sciences Deggendorf (Germany)

- 7655 02 **Singularity analysis of a novel 3SPS+PS bionic parallel processing platform based on Grassmann line geometry** [7655-108]
W. Gu, G. Cheng, China Univ. of Mining and Technology (China); Y. Wan, The Institute of Optics and Electronics (China)
- 7655 10 **Planning and Implementation of tool path computer controlled polishing optical surfaces** [7655-177]
X. B. Yu, F. H. Zhang, Y. Zhang, Y. Y. Lin, P. Q. Fu, Harbin Institute of Technology (China)
- 7655 11 **Research on middle and high spatial-frequency errors by discrete particles abrasion** [7655-107]
Y. J. Wan, C. Y. Shi, J. H. Yuan, F. Wu, The Institute of Optics and Electronics (China)
- 7655 12 **Measurement of high-departure aspheres using subaperture stitching with the Variable Optical Null (VON)** [7655-23]
A. Kulawiec, P. Murphy, M. DeMarco, QED Technologies (United States)
- 7655 13 **IBF technology for nanomanufacturing technology** [7655-600]
T. Franz, NTG Neue Technologien GmbH & Co. KG (Germany); T. Hänsel, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany)

POSTER SESSION

- 7655 14 **Research on the planarizaion of the large optic wafer in the fast polishing process** [7655-02]
W. Yang, J. Lin, Y. Guo, Xiamen Univ. (China)
- 7655 15 **Stable output of fiber laser with complex ring cavities** [7655-05]
T. Liu, P. Han, X. Gao, Hebei Univ. of Science and Technology (China)
- 7655 16 **Thermal tuning on narrow linewidth fiber laser** [7655-43]
P. Han, T. Liu, X. Gao, S. Ren, Hebei Univ. of Science and Technology (China)
- 7655 17 **The main parameters relationship analysis of the Erbium-doped fiber ring laser** [7655-01]
L. Wang, Chongqing Univ. of Posts and Telecommunications (China)
- 7655 18 **Athermal research on high resolution imaging for visible optical system on airborne CCD camera** [7655-51]
Y. Qian, X. Cheng, Y. Li, B. Peng, Zhejiang Normal Univ. (China); X. Xiang, The Institute of Optics and Electronics (China)
- 7655 19 **Antireflective gradient index silica films for high power laser applications** [7655-159]
L. Yan, H. Lv, S. He, X. Yuan, W. Zheng, China Academy of Engineering Physics (China)
- 7655 1A **Three dimensional finite element simulation and analysis of residual stress in milling** [7655-14]
H. Liu, Y. Sun, Y. Liang, Z. Lu, Harbin Institute of Technology (China)
- 7655 1B **Study of multi-laser imaging scanning optical system based on integrated optical waveguide** [7655-112]
B. Xu, Zhejiang Univ. of Science and Technology (China)

- 7655 1C **Design of athermal collimator by hybrid refractive and diffractive method** [7655-12]
X. Zhai, H. Zhang, H. Xu, Changchun Institute of Engineering and Technology (China); W. Liu, Aviation Univ. of Airforce (China)
- 7655 1D **Optical thin film design with immune optimization algorithm** [7655-77]
W. Wang, Nanchang Univ. (China); X. Rong, Xuzhou Institute of Industry Technology (China)
- 7655 1E **Study on high-performance whole spectrum and multi-band antireflective films on ZnS optical windows** [7655-97]
T. Zhang, X. Chen, J. Chen, H. Liu, J. Chen, Henan Pingyuan Optics Electronics Co., Ltd. (China)
- 7655 1F **Finite element analysis for PZT actuated deformable polishing lap** [7655-19]
Z. Hu, Yantai Univ. (China)
- 7655 1G **Influence of ion beam bombardment on surface roughness of K9 glass substrate** [7655-62]
Y. Pan, G. Huang, L. Hang, Xi'an Technological Univ. (China)
- 7655 1H **Design and analysis on the kinematics of the lap-polisher for optical fiber end face based on tribological theory** [7655-65]
Y.-S. Lu, J. Wang, Q.-L. Shu, Shenyang Ligong Univ. (China); J. Sun, X.-J. Zheng, Shenyang Jianzhu Univ. (China)
- 7655 1I **Dispersion study on band gap of 1-D lateral restrictions photonic crystal** [7655-84]
H. Dai, Q. Liu, Chongqing Technology and Business Univ. (China)
- 7655 1J **The pressure control technology of the active stressed lap** [7655-109]
Y. Li, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); D. Wang, Nanjing Institute of Astronomical Optics & Technology (China)
- 7655 1K **Filter model based dwell time algorithm for ion beam figuring** [7655-64]
Y. Li, Institute of Optics and Electronics (China) and Graduate School of the Chinese Academy of Sciences (China); T. Xing, Institute of Optics and Electronics (China); X. Jia, H. Wei, Institute of Optics and Electronics (China) and Graduate School of the Chinese Academy of Sciences (China)
- 7655 1L **Grinding precision forecasting in optical aspheric grinding using artificial neural network and genetic algorithm** [7655-15]
C. Jiang, Y. Guo, Xiamen Univ. (China); Q. Yang, Ningbo Dahongying Univ. (China); C. Han, Xiamen Univ. (China) and Ningbo Dahongying Univ. (China)
- 7655 1M **A novel ultra-precision turning method of aspheric surface** [7655-06]
G. Li, Harbin Institute of Technology (China) and China Academy of Engineering Physics (China); T. Sun, Harbin Institute of Technology (China); Y. Li, Heilongjiang Univ. of Chinese Medicine (China) and Harbin Institute of Technology (China); Q. Wang, S. Dong, Harbin Institute of Technology (China)

- 7655 1N **Fabrication and characteristics of near elliptical core squeezed hexangular lattice photonic crystal fibers based on polymer** [7655-500]
Y. Zhang, Baoji College of Arts & Sciences (China) and Xi'an Institute of Optics and Precision Mechanics (China)
- 7655 1O **Design of multilayer grating in VUV spectrum by rigorous coupled-wave method** [7655-63]
S. He, Y. Liu, H. Chen, K. Qiu, S. Fu, Univ. of Science and Technology of China (China)
- 7655 1P **Theoretical and experimental investigation on the 2.7 μ m laser pumped ZnGeP₂ optical parametric oscillator generating 4.3 μ m laser** [7655-55]
H. Jiang, J. Bian, J. Nie, X. Sun, Electronic Engineering Institute (China)
- 7655 1Q **Designs of masks in thickness uniformity** [7655-54]
C.-C. Jaing, Minghsin Univ. of Science and Technology (Taiwan)
- 7655 1R **Tunable bandwidth and parametric bandwidth for periodically poled LiNbO₃ based optical parametric amplification** [7655-56]
T. Liu, North China Electric Power Univ. (China); B. Li, North China Electric Power Univ. (China) and Beijing Univ. of Posts and Telecommunications (China)
- 7655 1S **New exploration of the optical aspherical replication technique** [7655-72]
Q. Wang, Y. Zhao, L. Zhang, Henan Polytechnic Univ. (China); J. Yu, Soochow Univ. (China)
- 7655 1T **A kind of optimizing design method of progressive addition lenses** [7655-13]
Y. Tang, L. Qian, Soochow Univ. (China); Q. Wu, Suzhou Univ. of Science and Technology (China) and Wenzhou Medical College (China); J. Yu, Soochow Univ. (China), Wenzhou Medical College (China), and Ministry of Health (China); H. Chen, Y. Wang, Wenzhou Medical College (China) and Ministry of Health (China)

Part Two

- 7655 1U **Design and fabrication of fused silica grating with shallow groove for energy measurement of high-energy pulse laser** [7655-146]
C. Li, X. Chen, J. Wu, Q. Liu, Z. Hu, Soochow Univ. (China)
- 7655 1V **Dwell time algorithm based on the optimization theory for magnetorheological finishing** [7655-81]
Y. Zhang, Y. Wang, Y. Wang, J. He, F. Ji, W. Huang, China Academy of Engineering Physics (China)
- 7655 1W **Experimental investigation of cutting mechanism of KDP crystal** [7655-144]
C. H. An, Harbin Institute of Technology (China) and Chinese Academy of Engineering Physics (China); P. Q. Fu, F. H. Zhang, Harbin Institute of Technology (China); Q. Xu, J. F. Zhang, Chinese Academy of Engineering Physics (China)

- 7655 1X **Optimization for LED arrays to achieve uniform near-field illumination** [7655-53]
H. Zhang, Univ. of Shanghai for Science and Technology (China); Y. Li, Univ. of Shanghai for Science and Technology (China) and Shanghai Key Lab. of Modern Optical System (China); W. Zhang, Y. Huang, H. Wang, X. Yu, Univ. of Shanghai for Science and Technology (China); H. Zhu, Univ. of Shanghai for Science and Technology (China) and Wuyi Univ. (China); S. Zhou, R. Sun, Y. Zhang, Univ. of Shanghai for Science and Technology (China)
- 7655 1Y **Optimization of removal function in computer controlled optical surfacing** [7655-41]
X. Chen, P. Guo, J. Ren, Soochow Univ. (China)
- 7655 1Z **Research on a simulation system for diamond turning of optical components with micro-structured surfaces** [7655-21]
J. Zhou, T. Sun, X. Wang, Harbin Institute of Technology (China)
- 7655 20 **Features of the reference laser signal in the space-borne Fourier Transform Spectrometer** [7655-48]
H. Wei, Shanghai Institute of Technical Physics (China) and Graduate Univ. of Chinese Academy of Sciences (China); J. Hua, Z. Dai, Shanghai Institute of Technical Physics (China); R. Chen, X. Sun, Shanghai Institute of Technical Physics (China) and Graduate Univ. of Chinese Academy of Sciences (China)
- 7655 21 **Cylindrical lens design with illuminance uniformity in the image plane of critical illumination system** [7655-501]
C. Huang, H. Chen, K. Zhang, Huazhong Univ. of Science and Technology (China); S. Zhao, Huazhong Univ. of Science and Technology (China) and Wuhan National Lab. for Optoelectronics (China)
- 7655 22 **Wet-cleaning of contaminants on the surface of multilayer dielectric pulse compressor gratings by the Piranha solution** [7655-66]
S. Chen, B. Sheng, X. Xu, S. Fu, Univ. of Science and Technology of China (China)
- 7655 23 **Experimental research on the effects of different overlapping rate in laser shock processing** [7655-127]
C. Wang, L. C. Zhou, X. Zhou, Q. He, W. Li, Air Force Engineering Univ. (China)
- 7655 24 **Study on the preparation of a high diffraction efficiency Dammann grating with subwavelength structure** [7655-139]
Y. Leng, L. Dong, Y. Sun, Changchun Univ. of Science and Technology (China)
- 7655 25 **Error analysis of diffractive optical element manufactured by diamond turning technology** [7655-181]
Y.-C. Zhang, Dalian Polytechnic Univ. (China); L. Liu, Dalian Neusoft Institute of Information (China); N.-Y. Zou, Q. Liu, Dalian Polytechnic Univ. (China)
- 7655 26 **Deterministic manufacturing technologies for polycrystalline magnesium fluoride conformal domes** [7655-123]
H. Hu, Y. Dai, C. Guan, Z. Yin, Z. Li, National Univ. of Defense Technology (China)

- 7655 27 **Stray radiation research in CSRS** [7655-28]
B. Du, Beijing Institute of Technology (China) and Luoyang Research Institute of Electro-optical Equipment of AVIC (China); L. Li, Y. Huang, X. Han, B. Ma, Beijing Institute of Technology (China)
- 7655 28 **Design and image restoration research of a cubic-phase-plate system** [7655-182]
X. Zhang, Changchun Institute of Optics, Fine Mechanics and Physics (China) and Graduate Univ. of Chinese Academy of Sciences (China); X. Zhang, Changchun Institute of Optics, Fine Mechanics and Physics (China); G. Shi, Changchun Institute of Optics, Fine Mechanics and Physics (China) and Graduate Univ. of Chinese Academy of Sciences (China); J. Zhang, F. He, Changchun Institute of Optics, Fine Mechanics and Physics (China)
- 7655 29 **Optical design and multi-objective optimization for u-type 2X zoom projection optics** [7655-25]
J.-H. Sun, Y.-C. Fang, B.-R. Hsueh, National Kaohsiung First Univ. of Science and Technology (Taiwan)
- 7655 2A **Fabricating a variety of micro-optics structures using anisotropic etching of silicon** [7655-169]
B. Li, M. Wei, M. Wang, X. Zhang, Institute for Pattern Recognition and Artificial Intelligence (China), Wuhan National Lab. for Optoelectronics (China), and Huazhong Univ. of Science & Technology (China); C. Xie, Wuhan National Lab. for Optoelectronics (China); T. Zhang, Institute for Pattern Recognition and Artificial Intelligence (China) and Huazhong Univ. of Science & Technology (China)
- 7655 2B **Workspace analysis of 3-RPS symmetrical parallel supporting structure with three degree-of-freedom** [7655-98]
G. Cheng, China Univ. of Mining and Technology (China); Y.-J. Wan, Institute of Optics and Electronics (China); S.-R. Ge, China Univ. of Mining and Technology (China)
- 7655 2C **The removal function of edge effect and amending with dwell time function** [7655-143]
W. Deng, L. Zheng, X. Wang, Changchun Institute of Optics, Fine Mechanics and Physics (China); X. Luo, Changchun Institute of Optics, Fine Mechanics and Physics (China) and Graduate School of the Chinese Academy of Sciences (China); F. Zhang, Changchun Institute of Optics, Fine Mechanics and Physics (China)
- 7655 2D **Study on annular polishing for a rectangle optical flat with high aspect ratio** [7655-148]
Z. Ma, J. Li, Changchun Institute of Optics, Fine Mechanics and Physics (China) and Graduate School of Chinese Academy of Sciences (China); S. Song, Changchun Institute of Optics, Fine Mechanics and Physics (China)
- 7655 2E **Polarization properties of elliptical-hole square lattice photonic crystal fibers** [7655-157]
F. Liu, H. Gao, Y. Zhang, Baoji Univ. of Arts & Sciences (China)
- 7655 2F **A surface data generation method of optical micro-structure and analysis system for Fast Tool Servo fabricating** [7655-115]
F. Yang, Y. Dai, F. Wan, G. Wang, National Univ. of Defense Technology (China)
- 7655 2G **Optical and mechanical properties of nanocrystalline silicon dioxide films prepared by medium frequency magnetron sputtering** [7655-69]
Y. Z. Cao, Z. J. Hu, F. L. Yu, T. Sun, S. Dong, Harbin Institute of Technology (China)

- 7655 2H **Research on the relationship between the CVD ZnSe turning surface defects and the material micro-characteristic** [7655-89]
W. Li, H. Zhang, Y. Tong, Y. Ji, Tianjin Jinhang Institute of Technical Physics (China); Z. Shen, Tongji Univ. (China); L. Wang, F. Wang, Q. Bai, Tianjin Jinhang Institute of Technical Physics (China)
- 7655 2I **Calculation and simulation of the uniformity of grinding removal in ring polishing** [7655-106]
L. Wang, Tianjin Jinhang Institute of Technical Physics (China); Z. Shen, Tongji Univ. (China); Y. Tong, Y. Ji, W. Li, L. Jiao, D. Wu, Tianjin Jinhang Institute of Technical Physics (China)
- 7655 2J **Research on chemical cleaning technology for super-smooth surface of fused silica substrate** [7655-152]
L. Jiao, Y. Jin, Y. Ji, Y. Tong, F. Wang, T. Liu, L. Wang, Tianjin Jinhang Institute of Technical Physics (China)
- 7655 2K **Processing four-surface mirror drum with single point diamond fly-cutting** [7655-121]
F. Wang, Y. Jin, Y. Tong, H. Zhang, L. Jiao, Y. Ji, T. Liu, W. Li, Tianjin Jinhang Institute of Technical Physics (China)
- 7655 2L **Raman spectra of amorphous carbon films deposited by SWP** [7655-34]
J. Xu, Xi'an Technological Univ. (China) and Northwestern Polytechnical Univ. (China); W. Liu, L. Hang, J. Su, Xi'an Technological Univ. (China); H. Fan, Northwestern Polytechnical Univ. (China)
- 7655 2M **Design and fabrication of tunable aspherical lens for spherical compound eye** [7655-24]
Z. Zhan, Z. Cao, K. Wang, F. Guo, Univ. of Science and Technology of China (China)
- 7655 2N **Demonstration of shaping an aspheric from an ultra-thin spherical mirror using active supports** [7655-168]
C. Zeng, J. Yu, P. Guo, Soochow Univ. (China)
- 7655 2O **A method of minimizing the frequency stabilization sensitivity for four frequency differential laser gyro** [7655-76]
J. Yang, National Univ. of Defense Technology (China); Y. Zhu, Academy of Air Force Radar (China); Y. Luo, Naval Univ. of Engineering (China); T. Jiang, National Univ. of Defense Technology (China)
- 7655 2P **Study of focusing combination of large-caliber coherent laser beams** [7655-78]
J. Wang, Sichuan Univ. (China); H. Liang, Hebei Univ. of Engineering (China); J. Du, Y. Zhang, X. Niu, Sichuan Univ. (China)
- 7655 2Q **Center removal amount control of magnetorheological finishing process by spiral polishing way** [7655-103]
Y. Wang, J. He, F. Ji, W. Huang, H. Xiao, Q. Luo, Y. Zheng, China Academy of Engineering Physics (China)
- 7655 2R **Research of combination polishing technology** [7655-96]
L. Hang, X. Zhu, W. Liu, Z. Guo, Z. Chen, H. Wang, Xi'an Technological Univ. (China)

- 7655 2S **Analysis on the material removal stability for the finishing of the optical surface using atmospheric pressure plasma jet** [7655-172]
Y. Zhang, Harbin Institute of Technology (China) and Shenyang Institute of Aeronautical Engineering (China); B. Wang, S. Dong, Y. Yuan, Harbin Institute of Technology (China)
- 7655 2T **Calculation of the optical force on dielectric nanoparticles by FDTD method** [7655-162]
H. Li, S. Pan, Y. Zhang, Dalian Univ. of Technology (China)
- 7655 2U **Anisotropy research of ultra-precision machining on KDP crystal** [7655-59]
W. Zhang, Heilongjiang Institute of Science and Technology (China); Y. Cao, J. Wang, Y. Gao, M. Zhou, Harbin Institute of Technology (China)
- 7655 2V **Research and development of AOTF based NIR spectrometer** [7655-502]
H. Zhang, S. Li, M. Bao, Q. Wen, W. Wang, H. Yan, X. Zhang, Z. Wang, R. Wang, Chinese Academy of Agricultural Mechanization Sciences (China)
- 7655 2W **Implementation of Bluetooth technology in processing aspheric mirrors** [7655-183]
D. Chen, Institute of Optics and Electronics (China) and Graduate School of Chinese Academy of Sciences (China); X. Li, Institute of Optics and Electronics (China)
- 7655 2X **Effect on surface roughness of zerodur material in atmospheric pressure plasma jet processing** [7655-92]
H. L. Jin, B. Wang, F. H. Zhang, Harbin Institute of Technology (China)
- 7655 2Y **Antibacterial and tribological behavior of self-assembled monolayer on optical lens** [7655-44]
J. H. Horng, National Formosa Univ. (Taiwan); Y. R. Jeng, National Chung Cheng Univ. (Taiwan); C. C. Wei, National Formosa Univ. (Taiwan); Y. T. Tasi, National Chung Cheng Univ. (Taiwan)
- 7655 2Z **3D reconstruction from integral images based on interpolation algorithm** [7655-170]
H. Wang, Z. Xu, Z. Li, Beijing Youth Politics College (China); C. Wu, Univ. of Science and Technology Beijing (China)
- 7655 30 **Testing technology for off-axis parabolic mirror during fine grinding stage** [7655-167]
H. Yu, The Institute of Optics and Electronics (China) and Graduate School of the Chinese Academy of Sciences (China); W. Fan, Y. Wan, The Institute of Optics and Electronics (China)
- 7655 31 **Freeform reflector design for infrared light source** [7655-58]
K. Zhang, H. Chen, Q. Liang, Z. Liao, Huazhong Univ. of Science and Technology (China); J. Li, Huazhong Univ. of Science and Technology (China) and Guilin Univ. of Electronic Technology (China)
- 7655 32 **Study on optimization of process parameters for lithium niobate photoelectric material in CMP** [7655-176]
S. Wang, Z. Li, Y. Liu, H. Mu, Hebei Univ. of Technology (China)
- 7655 33 **Surface damage mitigation of fused silica with CO₂ laser** [7655-134]
X.-B. Li, H.-B. Lv, X. Xiang, H.-J. Wang, M. Chen, X.-D. Yuan, W.-G. Zheng, China Academy of Engineering Physics (China)

- 7655 34 **A kind of composite Shack-Hartmann wavefront sensor with switchable CCD and ICCD detectors** [7655-57]
X. Zhang, K. Wei, Institute of Optics and Electronics (China), The Key Lab. on Adaptive Optics (China), and Graduate School of Chinese Academy of Sciences (China); C. Rao, Y. Zhang, Institute of Optics and Electronics (China) and The Key Lab. on Adaptive Optics (China)
- 7655 35 **Wear characteristics of diamond wheel in elliptical ultrasonic assisted grinding (EUAG) of monocrystal silicon** [7655-142]
Z. Q. Liang, Beijing Institute of Technology (China) and Akita Prefectural Univ. (Japan); X. B. Wang, Beijing Institute of Technology (China); Y. B. Wu, Akita Prefectural Univ. (Japan); W. X. Zhao, Beijing Institute of Technology (China); Y. F. Peng, Xiamen Univ. (China); T. Sato, Akita Prefectural Univ. (Japan)
- 7655 36 **Study on optical design method for LED extended sources** [7655-119]
H. Wang, Guangdong Univ. Research Ctr. for Semiconductor Lighting Engineering (China), South China Univ. of Technology (China), and Georgia Institute of Technology (United States); H. Wang, N. Du, X. Zhang, Guangdong Univ. Research Ctr. for Semiconductor Lighting Engineering (China) and South China Univ. of Technology (China)
- 7655 37 **Design and simulation of the LGP structure for LED backlight** [7655-104]
W. Zhang, H. Wang, L. Ji, C. Liu, Guangdong Univ. Engineering Research Ctr. for Semiconductor Lighting (China) and South China Univ. of Technology (China)
- 7655 38 **Research on machining error compensation in high-precision surface grinding machine for optical aspheric elements** [7655-17]
X. Ke, Y. Guo, S. Zhang, Xiamen Univ. (China); H. Huang, Chengdu Fine Optical Engineering Research Ctr. (China)
- 7655 39 **Correction method for the error of diamond tool's radius in ultra-precision cutting** [7655-105]
Y. Wang, J. Yu, Soochow Univ. (China)
- 7655 3A **Sputtering gas pressure on the deposition of titanium nitride thin films and their properties** [7655-149]
S. Fu, Hanshan Normal Univ. (China)
- 7655 3B **Removing function model and experiments on ultrasonic polishing molding die** [7655-49]
Q. Huang, Y. Ni, J. Yu, Soochow Univ. (China)
- 7655 3C **The improved method to determine the nucleation region of Si nanoparticles formed during pulsed laser ablation** [7655-136]
L. Chu, C. Chen, X. Ding, Z. Deng, H. Zhang, W. Liang, J. Chen, G. Fu, Y. Wang, Hebei Univ. (China)
- 7655 3D **Thermal shock resistance ability of IAD-Si coated SSiC mirrors** [7655-133]
L. Xu, X. Fu, W. Jiao, R. Fu, Beijing Institute of Space Mechanics and Electricity (China); P. Sun, China North Vehicle Research Institute (China); J. Wang, Beijing Zhengxing Institute of Metrology and Measurement (China)

- 7655 3E **Research on processing parameters of laser re-manufacturing** [7655-46]
Z. Wang, Hunan Institute of Technology (China); H. Zhai, Y. Liu, Shenyang SANY Heavy Equipment Co. Ltd. (China); S. Sun, Northeastern Univ. (China)
- 7655 3F **Technical design of laser re-manufacturing technology** [7655-40]
Z. Wang, Hunan Institute of Technology (China); F. Xing, SIASUN Robot & Automation Co. Ltd. (China); Y. Liu, H. Zhai, Shenyang SANY Heavy Equipment Co. Ltd. (China)
- 7655 3G **Properties of AlF_3 and LaF_3 films at 193nm** [7655-503]
C. Xue, Shanghai Institute of Optics and Fine Mechanics (China) and Changshu Institute of Technology (China); J. Shao, Shanghai Institute of Optics and Fine Mechanics (China)
- 7655 3H **Experimental method for determination of a suitable temperature range for glasses used in precision molding** [7655-90]
T. Ma, Suzhou Univ. (China); F. Chen, Suzhou Univ. (China) and Schott Glass Technologies Co., Ltd. (China); J. Yu, Suzhou Univ. (China)
- 7655 3I **Study of parameters in precision optical glass molding** [7655-147]
Y. Ni, Q. Wang, J. Yu, Soochow Univ. (China)
- 7655 3J **Theoretical and experimental study on the active support** [7655-184]
Y. Wu, F. Wu, G. Wu, The Institute of Optics and Electronics (China)

Author Index

Conference Committee

Conference Chairs

Li Yang, Institute of Optics and Electronics (China)

Yoshiharu Namba, Chubu University (Japan)

David D. Walker, University College London (United Kingdom)

Shengyi Li, National University of Defense Technology (China)

Session Chairs

Session 2-1

Qi Mingxin, Chinese Optical Society (China)

Session 2-2

Jinghi Yu, Soochow University (China)

Session 2-3

Yongjian Wan, Institute of Optics and Electronics, CAS (China)

Symposium Committees

Honorary Chair

Daheng Wang, Chinese Academy of Sciences (China) and Chinese Academy of Engineering (China)

Symposium General Chair

Bingkun Zhou, Chinese Optical Society (China) and Chinese Academy of Sciences (China)

Symposium General Cochairs

Jianlin Cao, Ministry of Science and Technology of China (China)

James C. Wyant, College of Optical Sciences, The University of Arizona (United States)

Yudong Zhang, Institute of Optics and Electronics, CAS (China)

Michael Pfeffer, German Institute of Applied Optics (Germany)

Peigeng Li, Huazhong University of Science & Technology (China) and Chinese Academy of Engineering (China)

Guofan Jing, Tsinghua University (China) and Chinese Academy of Engineering (China)

Chunhao Zhang, China Association for Science (China), Chinese Academy of Sciences (China), and Dalian Institute of Chemical Physics (China)

International Academic Committee

Wenhan Jiang, Chair, Chinese Academy of Engineering (China) and Institute of Optics and Electronics, CAS (China)

Fengting Sang, Chinese Academy of Engineering (China) and Dalian Institute of Chemical Physics, CAS (China)

Lishi Wen, Chinese Academy of Engineering (China) and Dalian University of Technology (China)

Guoguang Mu, Chinese Academy of Sciences (China) and Nankai University (China)

Yijun Zhao, Chinese Academy of Engineering (China) and National University of Defense Technology (China)

Xingdan Chen, Chinese Academy of Engineering (China) and Changchun Institute of Optics, Fine Mechanics and Physics, CAS (China)

Dianyuan Fan, Chinese Academy of Engineering (China) and Shanghai Institute of Optics and Fine Mechanics, CAS (China)

Liding Wang, Chinese Academy of Sciences (China) and Dalian University of Technology (China)

Junhua Pan, Chinese Academy of Engineering (China) and Soochow University (China)
Junhao Chu, Chinese Academy of Sciences (China) and Shanghai Institute of Technical Physics, CAS (China)
Liwei Zhou, Chinese Academy of Engineering (China) and Beijing Institute of Technology (China)
Roland Geyl, Sagem SA (France)
Jose M. Sasian, College of Optical Sciences, The University of Arizona (United States)
Fritz Klocke, Fraunhofer Institute for Production Technology IPT (Germany)
James R. Torley, University of Colorado at Colorado Springs (United States)
Yoshiharu Namba, Chubu University (Japan)
James H. Burge, College of Optical Sciences, The University of Arizona (United States)
David D. Walker, University College London (United Kingdom)

Organizing Committee

Yudong Zhang, *Chair*, Institute of Optics and Electronics, CAS (China)
Jinghua Cao, *Cochair*, Chinese Academy of Sciences (China)
Libin Xiang, *Cochair*, Academy of Optoelectronics, CAS (China)
Anand Asundi, *Cochair*, Nanyang Technological University (Singapore)
Guoqiang Ni, *Cochair*, Chinese Optical Society (China)

Program Committee

Xiangdi Lin, *Chair*, Chinese Academy of Engineering (China)
Hu Yang, *Cochair*, Institute of Optics and Electronics, CAS (China)
Yuwen Qing, *Cochair*, Natural Science Foundation of China (China)
Haodong Yu, *Cochair*, Changchun University of Science and Technology (China)
Sen Han, *Cochair*, Veeco Instruments Inc. (United States)
Myung K. Cho, *Cochair*, National Optical Astronomy Observatory (United States)

Secretary General of the Symposium

Li Yang, Committee of Optical Manufacturing Technology, COS (China)
Jinxue Wang, SPIE

Introduction

The 5th International Symposium on Advanced Optical Manufacturing and Testing technologies (AOMATT) was held 26–29 April 2010 at Dalian World Expo Center in the beautiful city of Dalian, China. This is the same venue where the 2007 World Economy Forum of DAVOS was held. AOMATT was initiated in 2000 to provide a forum for international researchers, designers, managers, and manufacturers to discuss related technologies in this area. The first meeting, AOMATT 2000, was held in Chengdu, China. Since then, AOMATT has increasingly become a must-attend conference for the international optical design, manufacturing, and testing communities. AOMATT has developed a reputation for excellent plenary sessions, quality oral and poster papers, and fun social events.

AOMATT 2010 was opened with a grand opening ceremony and outstanding plenary sessions. About 1,000 delegates attended the opening ceremony and plenary sessions in the multi-functional hall of the Dalian World Expo Center. Honored guests and sponsoring and cooperating organization representatives, including Professor Qing Yu Weng representing the National Science Foundation of China (NSFC), Dr. Jinxue Wang representing SPIE, technical cosponsor of AOMATT, and Dr. James C. Wyant, Dean of Optical Sciences at the University of Arizona and 2010 president of OSA, gave welcome and congratulation speeches at the opening ceremony. Professor Guofan Jin, an academicien of the Chinese Academy of Engineering and cochair of the symposium, gave an opening speech in written form on behalf of the Chinese Optical Society (COS). Plenary speakers included Dr. Roland Geyl from REOSC of France, Dr. Hong Minghui from the National University of Singapore, Dr. Yoshiharu Namba from Chubu University of Japan, Dr. James Wyant from the University of Arizona in the USA, Dr. Thomas Franz from the NTG Company in Germany, Professor Fengting Sang, an academicien from the Dalian Institute of Chemical Physics, Chinese Academy of Sciences (CAS), and Professor Xiangqun Cui, an academicien from the Nanjing Institute of Astronomical Optics and Technology, National Astronomical Observatory, CAS. Other academiciens attending AOMATT 2010 included: Wenhan Jiang from IOE of CAS, Can Li from DICP of CAS, Junhua Pan from Suzhou University, Liwei Zhou from Beijing Institute of Technology, and Yijun Zhao from the National University of Defense Technology.

AOMATT 2010 received more than 1,300 abstracts. After careful reviews by the conference chairs and committee members and an invited reviewer, more than 700 papers were accepted for presentation at the conference and publication in the Proceedings of SPIE. The AOMATT 2010 proceedings are divided into six volumes - 7654–7659 - and correspond to the six conferences of the symposium, namely, Large Mirrors and Telescopes; Advanced Optical Manufacturing Technologies; Optical Test and Measurement Technology and Equipment;

Design, Manufacturing, and Testing of Micro- and Nano-Optical Devices and Systems; Optical Materials, Detectors, Imagers, and Energy Conversion Technology; and Smart Structures and Materials in Manufacturing and Testing.

There is continued improvement in paper quality compared to previous AOMATT symposiums. Many papers report cutting-edge research and development. More authors are from well-known universities, research institutions, and corporations around the world. We believe AOMATT 2010 made another important step in establishing itself as an essential international symposium for the international optical design, manufacturing, and testing communities.

We would like to express our sincere appreciation to COS—The Chinese Optical Society, IOE—Institute of Optics and Electronics, the Chinese Academy of Sciences, and to SPIE for supporting AOMATT. We want to thank all the authors and participants for attending the symposium and sharing their research with colleagues around the world. We especially thank IOE and Dr. Yudong Zhang, President of IOE, for their steadfast support of AOMATT since its inception in 2000.

We look forward to your participation and support of the 6th AOMATT in 2012. Location, time, and the call for papers will be posted on SPIE and IOE websites soon.

Li Yang
Secretary General, AOMATT 2010
Chairman, Committee on Optical Manufacturing Technology, COS