

**Technical
Program**

AOMATT 2010

**The 5th SPIE International Symposium on
Advanced Optical Manufacturing and Testing Technologies**
*26-29 April 2010, Dalian World Expo Center
Dalian China*



Sponsored by



中国光学学会
The Chinese Optical Society



中国科学院光电技术研究所
THE INSTITUTE OF OPTICS AND ELECTRONICS
THE CHINESE ACADEMY OF SCIENCES

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Daily Event Schedule

<i>Date</i>	<i>Time</i>	<i>Contents</i>	<i>Place</i>
Sunday April 25, 2010	8:00-20:00	Registration for domestic authors	No. 10, F Area, first floor, Dalian World Expo Center
	8:00-22:00	Registration for overseas authors	Howard Johnson Parkland Hotel Dalian
	20:00-24:00	Registration for domestic authors	Air China Hotel - Dalian
Monday April 26, 2010	8:30-9:00	Opening Ceremony	Multi-functional Hall, second floor, Dalian World Expo Center
	9:00-12:30	Plenary Prenary 1-5	
	13:30-17:00	Academician Plenary 1-4	
	18:00-21:00	Welcome Dinner	Dalian sweetland hotel
Tuesday April 27, 2010	8:30-12:00	Session 1-1, Session 2-1 Session 3-1, Session 4-1 Session 5-1, Session 6-1	room1, room2 room3, room4 room5, room6
	13:30-17:00	Session 1-2, Session 2-2 Session 3-2, Session 4-2 Session 5-2, Session 6-2	room1, room2 room3, room4 room5, room6
Wednesday April 28, 2010	8:30-12:00	Session 2-3 Session 3-3, Session 4-3 Session 5-3, Session 6-3	room2 room3, room4 room5, room6
	13:30-17:00	Post Presentations	Exhibition hall, second floor, Dalian World Expo Center
		Workshop	No. 1 Lecture hall, second floor, Dalian World Expo Center
Thursday April 29, 2010	The whole day	Touring	
Friday April 30, 2010		The end.	

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Advanced Optical Manufacturing and Testing Technologies**

**26-29 April 2010
Dalian World Expo Center
Dalian China**

Sponsored by:

- COS** - The Chinese Optical Society
- IOE** - Institute of Optics and Electronics,
- Chinese Academy of Sciences
- SPIE** - The International Society for Optics and Photonics
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Supported by:

Ministry of Science and Technology of China
Chinese Academy of Sciences (CAS)
National Natural Science Foundation of China

Honorary Chair:

WANG Daheng, Academician, CAS & CAE (China)

Symposium General Chair:

ZHOU Bingkun, President of Chinese Optical Society (COS), Academician, CAS

Conferences:

- 1 Large Mirror and Telescopes
- 2 Advanced Optical Manufacturing Technologies
- 3 Optical Test and Measurement Technology and Equipments
- 4 Design, Manufacturing and Testing of Micro and Nano Optical Devices and Systems
- 5 Opto Electronics Material and Devices for Detector, Imager, Display and Energy Conversion Technology
- 6 Smart Structure and Materials in Manufacturing and Testing

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26-29 April 2010
Dalian China

INVITATION

Dear Authors and Friends!

Advanced optical manufacturing and testing technologies are closely associated with technology developments of information, bioscience, materials and NANO technologies. At the same time, optical manufacturing has been developed into a new global high tech. business. At the mean time, the International Symposium of AOMATT has become more and more popular in domestic and (abroad) foreign countries.

On behalf of the Organization Committee of the Symposium, I would like sincerely to invite you to participate in the AOMATT2010 to be held in Dalian, China on April 26-29, 2010. It will be appreciative that you submit your abstracts and manuscripts to the SPIE proceedings of the conference in time. We believe that the beautiful costal city-Dalian, China and also the successful symposium of AOMATT2010 will leave you a pleasant and impressive memory.

We are looking forward to meeting you at the symposium next year in Dalian.

Sincerely Yours,



Prof. ZHANG Yudong

Director of the Institute of Optics & Electronics, CAS
General Co-Chair of AOMATT2010
Chairman of the Organization Committee of AOMATT2010

Organizations & Committees**Sponsored by:**

COS - The Chinese Optical Society



中国光学学会
The Chinese Optical Society

IOE - Institute of Optics and Electronics, Chinese Academy of Sciences



中国科学院光电技术研究所
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THE CHINESE ACADEMY OF SCIENCES

SPIE - The International Society for Optics and Photonics (*Technical Co-Sponsor*)



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- Ministry of Science and Technology of China
- Chinese Academy of Sciences (CAS)
- National Natural Science Foundation of China

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- German Institute of Applied Optics
- Singapore Institute of Optics and Photonics
- Optical Society of Sichuan Province
- State Key Laboratory of Microfabrication
- Dalian Institute of Chemical Physics, Chinese Academy of Sciences
- Dalian University of Technology
- Changchun Institute of Optics, Fine Mechanics and Physics, CAS
- Changchun University of Technology

- National university of Defense Technology
- University of Electronic Science and Technology of China
- Harbin Institute of Technology
- Beijing Institute of Technology
- Qingdao Haitai coating technology Ltd.

Honorary Chair:

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ZHOU Bingkun, President of Chinese Optical Society (COS), Academician, Chinese Academy of Sciences

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Chu Junhao, Academician, Chinese Academy of Sciences, Shanghai Institute of Technical Physics, CAS (China)

Zhou Liwei, Academician, Chinese Academy of Engineering, Beijing Institute of Technology (China)

Roland GEYL, REOSC Optics, SAGEM (France)

Jose M. Sasian, University Arizona (USA)

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James R. Torley, University of Colorado (USA)

Yoshiharu Namba, Chubu University (Japan)

Jim Burge, University of Arizona (USA)

David D. Walker, University College London (U.K)

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Cao Jinghua, Deputy Secretary for International Cooperation, CAS (*Co-Chair*)

Xiang Libin, Director for Academy of Opto-electronics, CAS (*Co-Chair*)

Anand Asundi, Director of Singapore Institute of Optics and Photonics (*Co-Chair*)

Ni Guoqiang, Secretary-General of Chinese Optical Society (*Co-Chair*)

etc.

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Qing Yuwen, Natural Science Foundation of China, *Co-Chair*

YU Haodong, Changchun University of Science and Technology (China) *Co-Chair*

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Myung K. Cho, NOAO (USA), *Co-Chair*

etc.

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YANG Li, Committee of Optical Manufacturing Technology, COS

Jinxue Wang, SPIE Technical Advisor (USA)

Symposium General Chair:

Zhou Bingkun, President of Chinese Optical Society (COS), Academician, Chinese Academy of Sciences

Zhou Bingkun was born in Sichuan, China in 1936. He graduated from Tsinghua University, Beijing, China in 1956. Since 1956 he has been with the Electronic Engineering Department at the same University. From 1960 to 1962 he was a visiting scholar at Leningrad Electrotechnical Institute, Leningrad, former USSR. From 1983 to 1984 he was a visiting scholar and then professor of Applied Physics Department, Stanford University, U.S.A. From 1985, he has been a professor of Electronic Engineering Department at Tsinghua University, Beijing, China. He was elected as a member of Chinese Academy of Sciences in 1991 and was elected as a member of the Third world Academy of Sciences in 2001. At present he is president of the Chinese Optical Society and vice-chairman of the science and technology committee of Ministry of Education. He was the vice-president of the National Natural Science Foundation of China (1996-2003), director of Information Science Department of CAS (2003-2006), the Chairman of the Steering Committee of Optoelectronic Devices and System Integration Technology, High Technology Research & Development Program of China and the Director of National Research Center for Optoelectronic Technology, Beijing(1987-1996). He is fellow of the Optical Society of America and Chinese Institute of Electronics.

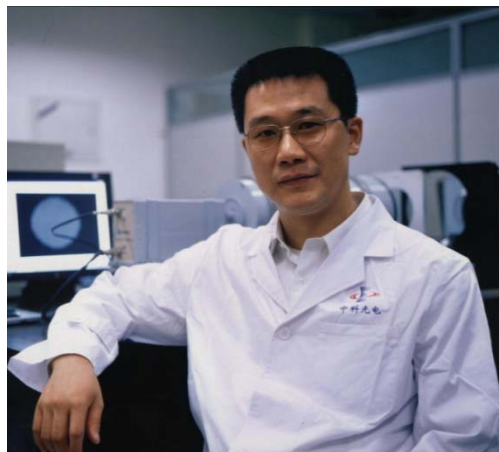


He has been engaged in laser and optoelectronics research and teaching for a long time. In 1984, He made key contributions to development of diode pumped, narrow linewidth and frequency stable Solid State Lasers. He with his research group has made scientific research achievements in the area of "Single Mode, Narrow Linewidth, Frequency-Stable and Tunable External Cavity Semiconductor Lasers"; "semiconductor laser pumped solid state laser"; "fiber ring cavity and their application"; "doped fiber amplifiers and lasers" and "DWDM optical fiber transmission technology". He has won 11 national and ministry-level prizes. He is the author or co-authors of about 100 papers, presentations, patents and one book : " Laser Principle" , which was awarded the state excellent prize.

Symposium General Co-Chair:

ZHANG Yudong, President of Institute of Optics and Electronics, CAS (China)

Mr. Zhang Yudong, PhD and Research Professor, President of IOE (Institute of Optics and Electronics), CAS (Chinese Academy of Sciences) is a member of the Appraisal Expert Team of Information Directorate of NSFC (National Natural Science Foundation of China), a vice-chair of Bio-optics and Laser Medicine Subcommittee of COS (Chinese Optical Society), a vice-Chair of Electro-Optical Specialty Committee of Chinese Society of Astronautics, and a committeeman of Quantum Electronics and Electro-Optical Subcommittee of CIE (Chinese Institute of Electronics), an adjunct professor of UESTC (University of Electronic Science and Technology of China) and Zhejiang University respectively.



Mr. Zhang received his BS from Zhejiang University in 1984, his MS from IOE in 1987, and his PhD from Shanghai Institute of Optics and Fine Mechanics, CAS, in 1991. From 1991 to 1997 he held the technical posts of Research Assistant, Research Associate Professor and Research Professor in Fujian Institute of Research on the Structure of Matter, CAS. He has been working in IOE since 1998 and serving as President since 2003.

For more than 10 years, he has carried out many frontier researches in the fields of adaptive optics, microlithography and new materials of non-linear optics and has obtained many innovative achievements which are leading in China or advanced in the world. He has won one first-grade award of CAS Prize for S&T Progress and CAS Prize for Invention respectively. Altogether, he has applied for and obtained 38 pieces of patents, and published more than 50 theses among which 30 are included in EI Database and 10 in SCI Database.

From 1985 to 1987, he participated in the development of Wavefront Correction System with Dither Technology for the ICF (Inertial Confinement Fusion) experiment in China and proposed an adaptive search method for multiple-extreme optimization. It is the first time to successfully apply the adaptive optical technology to laser atomic fusion system in the world.

From 1998 to 1991, he engaged in the development of Submicron Excimer Laser Lithography System, which worked out the first prototype system in China. He successfully developed the precision submicron objective lens which was the core component of the system and obtained two related patents.

From 1991 to 1997, he took part in the research into new nonlinear optical crystal materials and related devices, obtained five national invention patents and won one first-grade award of CAS Prize for Invention.

From 1998 to present, he has been taking charge of the development of the adaptive optical (AO) system for imaging live human eye retina with high resolution. The system is the first practical compact AO system for this application in the world.

He is also in charge of the development of Dynamic Wavefront Correction AO System for the new generation of ICF prototype system in China. It is the first AO system which can reduce the wavefront distortion of laser beam in ICF system from 9λ to about 1.5λ in China. This extends the application of adaptive optics in the ICF field and is at the advanced world level.

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Plenary Schedule**9:00-12:30 April 27 Plenary 1-5 Multi-functional Hall, 2 floor**

- 1. The Challenges From VLT to ELT project in astronomy and from DUV to EUV in lithography optics**

Dr. Roland Geyl (France)*REOSC Optics*

- 2. Laser Precision Engineering: A Versatile Micro- & Nano-manufacturing Means**

Dr. Hong Minghui (Singapore)*Department of Electrical & Computer Engineering, National University of Singapore and Data Storage Institute, ASTAR, Singapore*

- 3. Fabrication of Pt/C Multilayer-Coated Mirrors for Hard X-Ray Telescopes**

Dr. Yoshiharu Namba (Japan)*Department of Mechanical Engineering, Chubu University*

- 4. Developments in Optical Testing Technology during the Last Decade**

Dr. James C. Wyant (USA)*College of Optical Sciences, University of Arizona, Tucson, AZ*

- 5. IBF-Technology for Nano-Manufacturing Technology**

Dr. T. Franz (German)*NTG Neue Technologien GmbH, Germany***13:30-17:00 April 27 Academician 1-4 Multi-functional Hall, 2 floor**

- 1. Progress of Chemical Oxygen Iodine Laser**

Prof. Fengting Sang (China)*Dalian Institute of Chemical Physics, CAS*

- 2. The challenges to the advanced optical manufacturing technology from laser fusion engineering**

Prof. Dianyuan Fan (China)*Shanghai Institute of Optics and Fine Mechanics, CAS*

- 3. Advanced Spectroscopy for characterization of materials**

Prof. Junhao Chu (China)*Shanghai Institute of Technical Physics, CAS*

- 4. The advance optical technologies of LAMOST telescope**

Prof. Xiangqun Cui (China)*National Astronomical Observatories/Nanjing Institute of Astronomical Optics and Technology, CAS*

Session Schedule and Session Chair

Time	Session No.	Place	Session Chair
8:30-12:00 April 27	Session 1-1	room 1	Wu Fan
	Session 2-1	room 2	Xin Qiming
	Session 3-1	room 3	Wu Shibin
	Session 4-1	room 4	Peng Changsi
	Session 5-1	room 5	Wu Zhiming, Wen Wen
	Session 6-1	room 6	Luo Xiangang
13:30-17:00 April 27	Session 1-2	room 1	Fan Bin
	Session 2-2	room 2	Yu Jingchi
	Session 3-2	room 3	Li Shengyi
	Session 4-2	room 4	Ye Shuliang
	Session 5-2	room 5	Chen Zhijian, Xiao Lixin
	Session 6-2	room 6	Luo Xiangang
8:30-12:00 April 28			
	Session 2-3	room 2	Wan Yongjian
	Session 3-3	room 3	Jing Hongwei
	Session 4-3	room 4	Hu Song
	Session 5-3	room 5	Yu Junsheng, Zhang Lei
	Session 6-3	room 6	Hong Minghui

Workshop Schedule

13:30-17:00 April 28 **Workshop** **No.1 Lecture Hall, 2 floor**

1. Zeeko Ltd. (UK) <http://www.zeeko.co.uk> 13:30-14:30



2. ESDI, Inc. (USA) <http://www.engsynthesis.com> 14:45-15:45



3. NTG (German) <http://www.ntg.de> 16:00-17:00



9:00-12:30 April 27 Plenary Presentations 1-5
Multi-functional Hall, second floor

■ ***Plenary Presentation 1***

Title: The Challenges From VLT to ELT project in astronomy and from DUV to EUV in lithography optics

Dr. Roland Geyl (France)

REOSC Optics

Email: roland.geyl@sagem.com



Abstract: The science (or the art) of precision optical component manufacturing and testing and the design of the systems including these components is continuously progressing and is presently pushing hard and moving fast along two directions we want to briefly report in this talk.

On one side, astronomy is planning to build soon Extremely Large Telescopes of the 30 to 40-m class based on segmented primary mirror technology and intensive use of active and adaptive mirror technology. We will report our work done for the 11-m Gran Telescopio Canarias and show first results of latest developments aiming to produce these segments now really faster, cheaper and probably better too.

Looking down to the surface of the silicon wafer patterned through lithography process, the semiconductor industry is making gigantic progress on DUV optics operating at 193 nm and providing few 10 nanometers resolution thanks to hyper NA lens design and immersion technology. The next generation of lithography optics is also well maturing presently thanks to the use of mirror systems operating at the soft X wavelength of 13,5 nm. Optical manufacturing and testing art is moving fast again for the production of ultra precise and ultra smooth optical components. Surprisingly, the active optics technology coming from large astronomical mirrors is finding new proof of effectiveness for these type of very challenging optical systems.

Principal Author's Biography: Roland GEYL graduated from the Ecole Supérieure d'Optique in Orsay-France in 1979.

He worked in the various domains of lens design for high performance space and defense optics, precision metrology including absolute calibration and precision manufacturing with computer controlled technology of large aspheric optics. His latest work is focused on DUV and EUV optics as well as large segmented optics manufacturing and testing.

He holds 10 patents and gave many talks at international symposia. Roland GEYL managed several key space optics and astronomy projects at REOSC, now SAGEM and is now VP Sales and Business Development of the Business Unit. In parallel, Roland GEYL ensured theoretical and practical lens design courses at the Ecole Supérieure d'Optique for nearly 20 years.

■ Plenary Presentation 2

Title: Laser Precision Engineering: A Versatile Micro- & Nanomanufacturing Means

Dr. Hong Minghui (Singapore)

Department of Electrical & Computer Engineering, National University of Singapore and Data Storage Institute, ASTAR, Singapore



Abstract: Laser precision engineering has unique advantages of being non-contact process, flexible setup and high speed processing in air. In the last decades, we have witnessed its extensive applications in various production lines. Combined with other advanced processing tools, laser nanofabrication will play a much more important role in the next generation manufacturing.

Principal Author's Biography: Dr. Hong Minghui received his B.S. & M.S. (solar cell fabrication) from Physics Dept., Xiamen Univ., China in 1985 and 1988. After teaching in the Univ. as a lecturer from 1988 to 1994, he continued his higher degree studies in Dept. of Electrical and Computer Engineering (ECE), National University of Singapore (NUS) and obtained his M.E. (laser surface processing & real-time monitoring) in 1996 and Ph.D. in 2000 (laser ablation & real-time monitoring). His research interest includes laser ablation, optical signal diagnostics/process real time monitoring and its industrial applications on laser microprocessing and nanoengineering. He has co-authored 8 book chapters, 23 patents granted, 200+ scientific papers and 25+ keynote/invited talks in the international conferences. He is a member of organizing committees for Laser Precision Micromachining International Conference (2001~2010), International Symposium of Functional Materials (2005 and 2007), Chair of International Workshop of Plasmonics and Applications in Nanotechnologies (2006) and Chair of Conference on Laser Ablation (2009). He was invited to be a peer reviewer of European Science Foundation (2002~2010) projects/workshops. He was invited to serve as an Associated Editor of International Journal of Optomechatronics, an Editor of Journal of Laser Micro/Nanoengineering and a Guest Editor of Applied Physics A. He is Simon Industrial and Professional Fellow in the University of Manchester, UK in the area of laser processing. He won IES Prestigious Engineering Achievement Award 2004, "Laser Microprocessing and Nanofabrication". Dr. Hong is currently an Associate Professor in ECE Dept, NUS and a Senior Scientist in Data Storage Institute, ASTAR, Singapore.

■ Plenary Presentation 3

TITLE: Fabrication of Pt/C Multilayer-Coated Mirrors for Hard X-Ray Telescopes

Dr. Yoshiharu Namba (Japan)

*Department of Mechanical Engineering, Chubu University
E-mail: namba@isc.chubu.ac.jp*



Abstract: In future satellite missions for X-ray astronomy, hard X-ray imaging will become one of the major observation techniques. It allows astronomers to observe the distribution of hard X-ray objects in the Universe with a high sensitivity. Since hard X-rays can penetrate thick absorbing materials, astronomers are able to discover many massive black holes embedded in thick gas. High-energy phenomena are well studied in hard X-rays, which are essentially produced by accelerated high-energy particles in the universe. The sixth Japanese X-ray astronomy

satellite ASTRO-H to be launched in 2014 is expected to provide the first opportunity to perform hard X-ray imaging observations with a supermirror hard X-ray telescope. This telescope will be constructed with multiple grazing incidence reflecting mirrors of conical shape. The mirrors are fabricated by replication technology from Pt/C multilayer-coated glass tubes of different diameters. The next-generation hard X-ray telescopes after ASTRO-H program require highly nested aspherical thin mirrors of 100 nm shape accuracy and less than 0.3 nm rms surface roughness. Thin mirror substrates or shells consisting of a paraboloid and hyperboloid of revolution are fabricated by replication from molding dies consisting of a paraboloid and hyperboloid of revolution. The ultra-precision molding dies of electroless nickel were single-point diamond turning and ultra-precision polishing.

KEYWORDS: Aspheric Surfaces, Ultra-Precision Molding Dies, Mirror Replication, Single-Point Diamond Turning, Ultra-Precision Polishing

Principal Author's Biography: Graduated from the department of precision engineering, Osaka University in 1964, Dr. of Engineering from Osaka University in 1970. Associate professor of Osaka University from 1972 to 1987. Professor of Chubu University from 1987. Winner of David Richardson Medal from the Optical Society of America in 1998. Fellow of JSME and JSPE.

■ Plenary Presentation 4

Title: Developments in Optical Testing Technology during the Last Decade

Dr. James C. Wyant (USA)

College of Optical Sciences, University of Arizona, Tucson, AZ

Email: jcwyant@optics.arizona.edu



Abstract: Modern electronics, computers, and software have made it possible to greatly improve the testing of optical components and optical systems and the resulting improvements in the new optical instruments and devices we use are evident. This talk discusses some of these new techniques and in particular the talk will discuss new metrology techniques for evaluating high quality lithographic optics essential for the manufacturing of modern electronics, techniques for the testing of aspheric optics used in most modern optical instruments, special techniques for the evaluation of large astronomical optics, and techniques for performing high quality measurements in less than ideal environments. The impact of these improvements on electronic chips, data storage devices, and various optical instruments will be discussed.

Principal Author's Biography: James C. Wyant received a B.S. in physics from Case Western Reserve University and M.S. and Ph.D. in optics from the University of Rochester and he is currently Dean and Professor at the College of Optical Sciences at the University of Arizona. Wyant is a member of the National Academy of Engineering and a Fellow of OSA, SPIE, and the Optical Society of India. Wyant was the 1986 president of SPIE and he is the 2010 president of OSA. Wyant has received several awards including the SPIE Gold Medal, the SPIE Technology Achievement Award, the OSA Joseph Fraunhofer Award, and the Optical Society of India Lifetime Achievement Award. In 2008 he received a Doctorado Honoris Causa from the Instituto Nacional de Astrofisica, Optica y Electronica in Puebla, Mexico. He was a founder of the WYKO Corporation and served as its president and board chairman from 1984 to 1997 and he was a founder of the 4D Technology Corporation and currently serves as its board chairman.

■ **Plenary Presentation 5**

**Title: IBF-Technology for Nano-Manufacturing Technology
Dr. T. Franz (German)**

NTG Neue Technologien GmbH & Co. KG,

Abstract: Over the last ten years IBF-Technology has been established as a very effective deterministic method to produce ultra-high-precision plane, spherical and aspherical surfaces. The present state of the art is the correction of polishing errors from the long spatial wavelength range from centimeters to meters up to the long spatial wavelength part of the so called mid spatial frequency roughness (MSFR).

Whereas in the past the main technology driver has been the semiconductor industry, within the last three years new applications came up due to the fact that specifications for optical equipment were tightened.

Very precisely figured surfaces are very important for advanced DUV, EUV and synchrotron optics and for telescope optics for earth and space observation. This led to the development of new types of Ion Beam Figuring plants.

The report reflects upon these most efficient systems able to produce high quality optics and mirrors and gives an overview about NTG' s nearly 20 years lasting experience & capabilities in IBF-Technology including an outlook to future projects and R&D-Tasks.



Principal Author's Biography: Thomas Franz studied mechanical engineering at the Technical University of Darmstadt and graduated in 1995.

For NTG he is working since 1995/06/01. He started as a project engineer in the Design office. During that time he was senior project manager of international projects in Europe, Japan, USA and U.A.E (Dubai). All the time in NTG Th. Franz was involved in IBF related projects. The last project in the Design Office was the realisation of the IBF-100 which was an idea of Dr. Haensel and him.

Since 2008/07/01 T. Franz is Chief Technical Officer and Chief Marketing Officer at NTG. His first challenge here was the decision to develop the IBF 1500 plant for mirrors used in astronomical applications.

Thomas Franz was born 1967/03/09 and lives in a small village near Gelnhausen, Germany. He is married since 1998 and has three children (Two boys, age 4 & 8; one girl, age 6).

13:30-17:00 April 27 Academician Plenary Presentations 1-4
Multi-functional Hall, second floor

■ **Academician Plenary Presentation 1**

Title: Progress of Chemical Oxygen Iodine Laser

Prof. Fengting Sang (China)

Dalian Institute of Chemical Physics, CAS

Academician of Chinese Academy of Engineering

Abstract: Since the initial demonstration of chemical oxygen iodine laser (COIL) in 1977. The COIL is well known as a reliable source to produce laser output power up the multi megawatt level. In addition, the high homogeneity of the gain medium provides the near diffraction limited generation of laser radiation. The COIL is a high power, continuous-wave, operating wavelength at 1315 nm which is in the minimum-loss band of the silica optical fiber. Therefore the COIL has a significant future as industrial and military applications. Especially, COIL is one of the most promising candidates for directed energy applications. In the COIL, Researchers have realized that heart of the COIL system is the singlet oxygen generator. Singlet oxygen molecule $O_2(^1\Delta)$ is the energy source of COIL. A efficient singlet oxygen generator (SOG) is based on the reaction of basic hydrogen peroxide solution (BHP) with gases chlorine: $Cl_2 + 2 HO_2^- \rightarrow 2 Cl^- + H_2O_2 + O_2(^1\Delta)$. For this reason the singlet oxygen generator has been the focus of intense research and development efforts over the last 30 years. The iodine is both dissociated and pumped by energy transfer from singlet oxygen $O_2(^1\Delta)$. The iodine then lases at 1315nm. Very important parameter of the COIL is the chemical efficiency, η_{chem} , defined as the number of emitted photons per number of chlorine molecules passed through the $O_2(^1\Delta)$ generator. Efficiency around 30% for the supersonic COIL seemed to be the state-the art in the last decade. Recently, Rosenwaks reported on the achievement of a record (40%) chemical efficiency of the supersonic COIL using a small-scale (5-cm gain length) device with supersonic mixing scheme in 2008. This paper reports on the chemical efficiency of COIL, singlet oxygen generators, optical resonator, and potential application examples.



Principal Author's Biography: Prof. *Fengting Sang*, born at *Dalian* in 1942, graduated from the department of engineering mechanics, *Harbin Polytechnic University* in 1964, now is an academician of *Chinese Academy of Engineering*, a senior professor and a supervisor for Ph.D. student in *Dalian Institute of Chemical Physics*.

In the period of more than 40 years from 1962, he has engaged in the research of CO_2 gas dynamic laser, HF/DF chemical laser, new species of chemical lasers with visible wavelength, and especially after 1987, chemical oxygen iodine laser (COIL).

He has many achievements approved by the *Chinese Academy of Sciences (CAS)* and the State, including a second-prize of the *National Award for Science & Technology Progress*, two first-prize and one second-prize of the *CAS Awards of Science & Technology Progress*, and many first-prize of *Provincial-level Awards for Science & Technology Progress*.

He has published about 70 papers in professional journals, and is the co-author of the following three books written in Chinese: "*Chemical Lasers*", "*Short-wavelength Chemical Lasers*" and "*Chemical Lasers & Applications*".

■ **Academician Plenary Presentation 2**

Title: The challenges to the advanced optical manufacturing technology from laser fusion engineering

Prof. Dianyuan Fan (China)

Shanghai Institute of Optics and Fine Mechanics CAS

Academician of Chinese Academy of Engineering

Abstract: Laser Fusion (ICF) facility is the largest laser system in the world. The facility will require more than 10,000 optics which comprise total surface area of more than 4000m². A rigorous and numerous challenges for ultra-precision optical fabrication are all than ever before and to do at unprecedented speeds as well. The ICF optics difference with conventional optics, has to work under high peak power laser. So that they not only have rigorous form error tolerance (PSD) with difference scale spatial frequency zone also require good subsurface finishing quality .

We must develop advanced optical fabrication technology to meet the challenges. In the report, we will briefly describe CNC milling and polishing technique, diamond turning technique for KDP cutting. An accurate metrology ensures successful fabrication, we will present the on-line and subaperture stitching measurements implement the error control effectively in production environment.



Principal Author's Biography: Fan Dianyuan, research professor of SIOFM,CAS. Postgraduated from the Chinese Academy of Sciences in 1966, and was elected member of the Chinese Academy of Engineering in 1995. During the passed 40 years, he was responsible for designing and completing a series of laser fusion facilities, and has published more than 250 scientific articles and reports.

■ **Academician Plenary Presentation 3**

Title: Advanced Spectroscopy for characterization of materials

Prof. Junhao Chu (China)

Shanghai Institute of Technical Physics, CAS

Academician of Chinese Academy of Science

Abstract: Some advanced spectroscopic techniques, such as spectroscopic ellipsometry (SE), infrared photo-reflectance (PR) and photo-luminescence (PL), cyclotron resonance (CR) and spin resonance (SR) spectroscopy, and their applications in the characterization of functional materials have been reported in the talk. Some new results on the optical transitions of narrow gap semiconductors and ferroelectric thin film materials were also reported in the talk.



Principal Author's Biography: He is born at YiXin city in JiangSu province in March 1945, graduated from Physics Department in Shanghai Normal University in 1966, and got Master degree and PhD degree from Shanghai Institute of Technical Physics, CAS in 1981 and 1984, respectively, elected as Member of Chinese Academy of Sciences in 2005. He is professor in Shanghai Institute of Technical Physics in CAS, and Director of Research center for Solar cells in CAS, he is also Dean of School of Information Science and

Technology in East China Normal University, and Chief Editor of Chinese Journal of Infrared and Millimeter Waves. He had been the director of National Laboratory for Infrared Physics from 1993 to 2003. He has made a systematically investigation on the infrared opto-electronic materials and devices such as narrow gap semiconductors and ferroelectric thin films. He presented widely used expressions for energy band gap, absorption coefficient etc. for HgCdTe, set up a theoretical model to describe the two-dimensional electron subband structures in the MIS structure of narrow gap semiconductors. He found the properties of fundamental opto-electronic transitions, determined opto-electric territorial for HgCdTe materials and devices. He developed researches on the physics of ferroelectric thin film materials and devices, fabricated PZT and BST uncooled infrared detectors to realize thermal imaging. He has published more than 300 papers, and 3 books. He is also an author for Landolt-Boernstein "Numerical Data and Functional Relationships in Science and Technology". He acquired the second class Awards of Natural Science in China (2005).

■ **Academician Plenary Presentation 4**

Title: The advance optical technologies of LAMOST telescope
Prof. Xiangqun Cui (China)

*National Astronomical Observatories/Nanjing Institute of
 Astronomical Optics and Technology, CAS
 Academician of Chinese Academy of Science*

Abstract: Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST) is an innovative telescope with both large aperture and wide field of view to achieve the large scale spectroscopic survey observation. LAMOST has completed its engineering work in 2008, and is going to finish commissioning around the end of 2010. It consists of a 5.72m×4.40m active deformable reflecting Schmidt mirror, a 6.67m×6.05m primary mirror and a focal surface with 4000 optical fibers. There are 16 spectrographs to get 4000 spectra which recorded by 32 4KX4K CCD detectors. Both the active deformable reflecting Schmidt mirror and the primary mirror are segmented. This presentation introduces its innovation of optical system, the technique challenges in active optics, mirror fabrication, and the optical fiber positioning. The success show that LAMOST project has pushed the Chinese technologies for developing large telescope to the forefront of world, and let China got capability to build extremely large telescope itself or join international ELT projects.

Keywords: Wide field telescope, Reflecting Schmidt system, Active optics, Segmented mirror



Principal Author's Biography: Xiangqun Cui is an academician of Chinese Academy of Sciences, the general engineer of LAMOST project, the vice president of Chinese Astronomical Society, the associate director of National Astronomical Observatories of CAS, the associate director of Chinese Center of Antarctic Astronomy. She got her MSC and PhD in Purple Mountain Observatory, CAS in China. During the years of 1985 to 1994 she visited and worked in Jodrell Bank Observatory in England for radio telescopes and in European Southern Observatory (ESO) in Germany for VLT project. In 1994 to 2009, she worked for the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST).

Conference 1: Large Mirror and Telescopes

(SPIE Proceedings VOL. 7654)

Conference Chairs:

JIANG Wenhan, Academician, Chinese Academy of Engineering (China)

Myung K. Cho, National Optical Astronomy Observatory (USA)

WU Fan, Institute of Optics and Electronics, CAS (China)

**8:30-12:00 April 27 SESSION 1-1
room 1 (20 min/report)**

Session chair: Wu Fan

- ✓ Research on Technique of Wavefront Retrieval Based on Foucault Test, Wu Zhonghua(China).....[1-0001]
- ✓ ELT Primary Mirror Prototype Segment Manufacturing and Testing, Eric Ruch(France)[1-0031]
- ✓ Active Support Technology Research Based on 400mm Diameter Thin Mirror, Li Hong-zhuang(China)[1-0004]
- ✓ Study on Computer-aided Alignment Method , Wang bin(China)[1-0014]

Tea Time

- ✓ Blind Deconvolution in Phased Telescope Array with Phase Error, Zhou zhiwei(China)[1-0017]
- ✓ The accuracy problem of FEA in the deformation of larger-aperture optical components, Li Shimeng(China)[1-0020]
- ✓ Fabrication of large off-axis asymmetry aspherics using stressed lap with orbital tool motion, Luo xiao(China).....[1-0024]

**13:30-17:00 April 27 SESSION 1-2
room 1 (20 min/report)**

Session chair: Fan Bin

- ✓ grinding and polishing technology with computer controlled active-lap for Φ 1250mm f/1.5 asperical mirror, Fan Bin(China).....[1-0081]
- ✓ Nonlinear Analysis Method for Predicting Optical Surface Deformations Resulted from Assembly Process, WANG Dong(China)[1-0036]
- ✓ Development Plan of Korea for the GMT, Young-Soo KIM(Korea).....[1-0066]
- ✓ A method of tracking performance, Gaomin(China)[1-0047]

Tea Time

- ✓ A large aspherical surfaces diamond turning and measurement on line methods, Cheng-Shen Han(China)[1-0049]
- ✓ The Application of Wavefront Coding Technology to a Large Segmented Synthetic Aperture Telescope, Litong FENG(China)[1-0062]
- ✓ Studing on working tolerance of off-axis three mirrors anastigmatic telescope, Qinghua YU(China)[1-0076]

13:30-17:00 April 28**POSTER****Exhibition hall, 2 floor**

- ✓ Laser Scale Model Simulation of Microwave Landing System and Analysis of Electromagnetic Similitude, Qiang Miao(China).....[1-0000]
- ✓ Athermalization of Coaxial Reflective Space Telescope, Zhang Lei(China)[1-0002]
- ✓ Design Control System of Telescope Force Actuators Based on WLAN, Shuai Xiaoying(China).....[1-0003]
- ✓ Research on lateral support structure of large-aperture telescope primary mirror, wangyang(China).....[1-0005]
- ✓ Research on Axial Support Technology of , YAO Hui(China)[1-0006]
- ✓ Design and Control of the Telescope Direct Drive System Based on Complex Electromechanical Design Theory, Ren Changzhi(China)[1-0007]
- ✓ The Simulation of the Antarctic Robotic Telescope Model based on VC, Zhouwen(China)[1-0008]
- ✓ Analysis of the Primary Mirror Coating Uniformity and Support Means, Wang Chang-Jun(China)[1-0009]
- ✓ Coherent scanning of laser beams by controlling their phases, Ze Zhang(China)[1-0010]
- ✓ Application of research for Large- Aperture infrared solar telescope by metal primary mirror, Meng Xiao Hui(China)[1-0011]
- ✓ Research on Edge Control in the Process of Polishing Using Ultra Precise Bonnet on Optical Elements, Wang wei(China)[1-0012]
- ✓ Improved uniformity of target irradiation by combining an Orthogonal Cylindrical Lens Array and the polarization control, Zheng jianzhou(China)[1-0013]
- ✓ Wavefront Alignment Research of Segmented Mirror Synthetic Aperture Optical (SAO) System, Deng Jian(China).....[1-0015]
- ✓ Study on the Azimuth Bearing Scheme of the Large Alt-azimuth Telescope, Wang huai(China).....[1-0016]
- ✓ Study on the response function of the ultra thin circular mirror with very large aperture, Feng Youjun(China)[1-0019]
- ✓ Wavefront control for complicated pupil space telescopes, Wu Quanying(China)[1-0021]
- ✓ The Influence of Contaminated Mirror on the Flux Density Distributions of Stray Radiation of Infrared Telescope Systems, Pan He(China)[1-0022]
- ✓ Path Analysis and Suppression of Self-generated Thermal Emission in Infrared Optical Systems, Yao Xiuwen(China)[1-0023]
- ✓ The influence of thermal environment on the stray radiation performance of Infrared Telescope, Jing Xiao(China).....[1-0025]
- ✓ Ground-based measurement, Wang Guoqiang(China).....[1-0026]
- ✓ Terahertz Infrared Thermal Wave Technology and Application in NDE, Chunfei XING(China)[1-0027]
- ✓ Co-focus and Co-phase calibration experiment of segmented mirror active optics, Xudong Lin(China)[1-0028]
- ✓ 2m Aperture Telescopes Designed for Lidar Measurements , Zhaoai Yan(China)[1-0029]
- ✓ Co-phasing of Segmented Mirrors using Dispersed Rayleigh Interferometry in the presence of Background Star, Shanshan Wang(China).....[1-0030]
- ✓ Design of hybrid space optical telescope with super large aperture, Yan Shuhua(China)[1-0032]
- ✓ Sub-aperture stitching interferometry testing optical system wave-front based on scanning pentaprism , Wang Lihua(China)[1-0033]
- ✓ The Study of Remote Sensing Imaging System Based on Phase Diversity, Li Fei(China)[1-0034]

- ✓ Joining of Silicon Carbide Ceramic for Optical application by reaction bonded technology, Aifang Zhang(China) [1-0035]
- ✓ The Optical and electric properties of The electrochromic films V2O5-WO3-x, Zuying Li(China) [1-0037]
- ✓ Analysis of requirements for the actuator of primary mirror, Junbo Zhang(China) [1-0039]
- ✓ A novel computer control method for telescope mount drive, Wangping Zhou(China) [1-0040]
- ✓ Two-mirror adaptive optics system for correcting both amplitude and phase of a laser beam projection through the turbulent atmosphere, Yu hao(China) [1-0041]
- ✓ Time-delay Analysis for Dynamic Surveying of the laser total station measurement system for FAST, Zhaixuebing(China) [1-0042]
- ✓ Imaging characteristics of an optical butting system, Lei hua(China) [1-0043]
- ✓ The Application of Permanent-Magnet Synchronous Motor in Telescope Mount Driving, Song Xiaoli(China) [1-0044]
- ✓ Research of active panel technology for large aperture millimeter-wave\sub-millimeter-wave telescope, Xuhao Wu(China) [1-0045]
- ✓ Theoretical active optics performance of a 1.2m thin-mirror, Ping Yao(China) · [1-0046]
- ✓ Study on the shock wave effects to the laser transmission at the supersonic speed, Zhang Xiang-jin(China)..... [1-0048]
- ✓ Optical Design of Large Optical telescope for Large Aperture Static Imaging Spectrometer , WANG Mei-qin(China) [1-0050]
- ✓ Analysis on the Radiation damage for CCD 7899, Qian Song(China) [1-0051]
- ✓ Misalignment Wavefront Detection of Segmented-aperture Optical System on Orbit, LU Li-hong(China) [1-0052]
- ✓ Studing on working tolerance of off-axis three mirrors anastigmat telescope, yu qinghua(China)..... [1-0053]
- ✓ Analysis and simulation of the surface shape of membrane mirror applied by non-uniform load, Gengsheng Zhang(China)..... [1-0054]
- ✓ Fabricate of Φ 1.2m Reaction Bonded Silicon Carbide Mirror Blank, Zhang Ge(China) [1-0055]
- ✓ Fabrication of composite structures based on microwrinkles, Xiaoli Zhao(China) [1-0056]
- ✓ Application for Vibration Monitoring of Aspheric Surface Machining Based on Wireless Sensor Networks, Chun Guang Han(China) [1-0057]
- ✓ The manufacture of off-axis ellipsoidal aspheric mirror, Xiaoyin YAO(China) ··· [1-0058]
- ✓ panoramic periscope, Guo Yiwen(China)..... [1-0059]
- ✓ Study on High Precision Membrane Mirror Forming Method, Liu Chun-yu(China) [1-0060]
- ✓ Analysis of bonding stress between the reflector and the mounts in space camera, LI Yan(China) [1-0061]
- ✓ Off-Axis Three-Mirror System Optical and Opto-Mechanical Design for an imaging spectrometer, Ruiping Zhao(China) [1-0063]
- ✓ Wavefront error budget and optical manufacturing tolerance analysis for 1.8m telescope system, Kai Wei(China)..... [1-0064]
- ✓ Integrated SET Optimization Design of Phased Array Antennas, C. S. Wang(China) [1-0065]
- ✓ First light on the 127-element adaptive optical system for 1.8m telescope, Prof. Changhui Rao(China) [1-0067]
- ✓ Non-destructive assessment of pear fruit quality by portable near infrared spectroscopy, Zhang Hailiang(china)..... [1-0068]
- ✓ Exposure of space camera prediction with radiative transfer software PcModWin, Xie Ding-jie(China)..... [1-0069]

- ✓ Based on Temperature Control Strategy Large mirror Lightweight Method, Tan Fanjiao(China).....[1-0070]
- ✓ Design and Application Research of Exact Constrain Support Structure, Chen xiao-juan(China).....[1-0071]
- ✓ Compositing Images for an optical butting camera, Zhihua Xu(China).....[1-0072]
- ✓ A support method of large aperture light weighted primary mirror manufacturing and testing, Zhaoye(China)[1-0073]
- ✓ Design of Compensative and Testing System of Primary Mirror with a 500mm Diameter, Fu lianxiao(China).....[1-0074]
- ✓ Research on integrating sphere low-light level stress system, Yang Donglin(China)[1-0075]
- ✓ Some methods for the fabrication of large diameter off-axis paraboloids , Li-De pei(China)[1-0077]
- ✓ The compensation tests of ellipsoidal mirror with a scale of 1m and super large relative aperture, Ming-yong hu(China)[1-0078]
- ✓ Wavefront alignment research of segmented mirror synthetic aperture optical (SAO) system, Deng Jian(China)[1-0079]

Conference 2: Advanced Optical Manufacturing Technologies

(SPIE Proceedings VOL.7655)

Conference Chairs:

YANG Li, COMT, COS (China)

Yoshiharu Namba, Chubu University (Japan)

David D. Walker, University College Landon (UK)

LI Shengyi, National University of Defense Technology (China)

8:30-12:00 April 27 SESSION 2-1
room 2 (15 min/report)

Session chair: Xin Qiming

- ✓ Material removal mechanisms in abrasive vibration polishing of complex molds, Heiko Schulte(Germany).....[2-0084]
- ✓ Optical Finishing of Lightweight Silicon Carbide Asphere Using Sub-Aperture Polishing Technology , Dr. John Kong(USA).....[2-0036]
- ✓ Design and experiments of a 629nm He-Ne Laser with internal Fabry-Perot etalon, Liang Jing(China).....[2-0007]
- ✓ Microstructure evolution and FT-IR spectra of silicon induced by pulsed laser irradiation, Weiwei An(China)[2-0012]
- ✓ A Novel Ultraprecision Surface Grinding Machine for Advanced Optic Manufacture, Y. Guo(China)[2-0021]
- ✓ Research on Stiffness of Aerostatic Bearing of Ultra-precision Machine Tool for KDP Crystal, Lu Lihua(China)[2-0114]
- ✓ Characteristics of Two-Dimensional Vertical Ultrasonic Vibration-assisted Grinding Technology, Y. Peng(China).....[2-0140]

Tea Time

- ✓ Research on Controllable Compliant Tools(CCT) Theory and Technology, Shengyi Li(China)[2-0160]
- ✓ Review on active optics methods - What can we do by elastic bending ?, Gerard R. Lemaitre(France)[2-0096]
- ✓ Blaze Wavelength of Convex Blazed Grating in An Offner Spectrometer, Yang Bo(China)[2-0031]
- ✓ Mechanism and techniques of mechanical lapping of nature diamond cutting tools' nose arc, Li Zengqiang(China)[2-0032]
- ✓ Depth of focus extended intraocular lenses and their optical performances in a pseudophakic eye model, Zhao-Qi Wang(China)[2-0035]
- ✓ Acrylic-based Y-Branch POF Coupler for "Do-it-Yourself" Next Generation Optical Devices, Abang Annuar Ehsan(Malaysia)[2-0093]
- ✓ Workspace Analysis of a 3SPS+1PS Bionic Parallel Processing Platform Based on Unit Quaternion, Jing-li Yu(China)[2-0158]

**13:30-17:00 April 27 SESSION 2-2
room 2(15 min/report)***Session chair: Yu Jingchi*

- ✓ loop-polishing machining technology of large area lightweigt mirror, Chen Xianhe(China)[2-0074]
- ✓ Research on the critical cutting thickness in ductile mode cutting of CaF2 crystals, Haofeng Chen(China)[2-0058]
- ✓ Ultra Precision Machining of Nitrocarburized Steels, Jens Osmer(Germany).....[2-0089]
- ✓ Automatic Manufacturing Methods for the Precision Centering of Lenses, Stefan Krey(Germany)[2-0135]
- ✓ Effect of Growth Temperature on the Properties of Al-doped ZnO Thin Film Prepared by RF Magnetron Sputtering, Zhou Yang(China)[2-0086]
- ✓ Atomics Simulation of Single-crystal Copper Nanocutting Prcess: Removal Mechanism, Defects Evolvment and Characterization, Jiakuan Chen(China).....[2-0132]
- ✓ Development in Optical Design and Simulation Optimization Methods, Liu hua(China)[2-0091]

Tea Time

- ✓ Processing Micro Grooves and Craters on the Surface of Wide Band Gap Mold Material Using Femtosecond Laser, Prof. Qingliang Zhao(China)[2-0024]
- ✓ Finishing of Display Glass for Mobile Electronics using 3M Trizact™ Diamond Tile Abrasive Pads, ZHENG Lianbin(China)[2-0136]
- ✓ Thermal research in fluid jet polishing process, Shi Chunyan(China)[2-0169]
- ✓ Production grinding capability for 1m Zerodur hexagonal mirror segment using the BoX® grinding machine, Xavier Tonnellier(UK).....[2-0153]
- ✓ Pilot Study for Ion Beam Figuring Process, weiyuan GUO(China)[2-0159]
- ✓ Analysis About Diamond Tool Wear in Nano-metric Cutting of Single Crystal Silicon Using Molecular Dynamics Method, Wang zhiguo(China)[2-0128]
- ✓ Tool decentration effect in slow too servo diamond turning sinusoidal surface, Guan Chaoliang(China)[2-0043]
- ✓ Temperature sensor using a Long Period Fiber Grating Fabricated by 800 nm Femtosecond Laser Pulses, Yu Yongqin(China)[2-0111]

**8:30-12:00 April 28 SESSION 2-3
room 2(15 min/report)***Session chair: Wan Yongjian*

- ✓ Ultra-precision Cutting of Fresnel lenses on Single Crystal Germanium and the machining processing analysis , Fan yufeng(China)[2-0122]
- ✓ ELID supported grinding of thin sapphire wafers, Christian Vogt(Germany)[2-0092]
- ✓ Alignment methods of large aperture reflecting system, Yifan Huang(China)···[2-0105]
- ✓ Fabrication of Optical Microstructure Component by Using Five-axis Ultra-precision Machine Tool, Peng Zhang(China)[2-0139]
- ✓ Drilling of optical glass with electroplated diamond tools, Wang aijun(China) ··[2-0148]
- ✓ Simulation Analysis and Structure Optimization of the Polishing Disc with the Tiny-grinding Wheel Cluster Based on MR Effect, Jiabin Lu(China)[2-0155]

Tea Time

- ✓ Theoretical Analysis and Experimental Study of Material Removal Characteristics in Ion Beam Figuring Process, DAI Yifan(China).....[2-0151]
- ✓ Relationship between influence function accuracy and polishing quality in magnetorheological finishing, Markus Schinhaerl(Germany)[2-0083]
- ✓ Singularity Analysis of a Novel 3SPS+PS Bionic Parallel Processing Platform based on Grassmann Line-geometry, Wei Gu(China)[2-0157]
- ✓ The tool path algorithm and Implementation of Ultrasonic- magnetorheological combined finishing optical surfaces, Xingbin Yu(China)[2-0145]
- ✓ Research on middle and high spatial-frequency errors by discrete particles abrasion, Wan Yongjian(China).....[2-0167]
- ✓ CAD of The unstable optical resonator, Zhou haiguang(China)[2-0054]

13:30-17:00 April 28**POSTER****Exhibition hall, 2 floor**

- ✓ Research on the planarizaion of the large optic wafer in the fast polishing process, Wei Y(China)[2-0000]
- ✓ Study on Stable Output of Fiber Laser with Complex Ring Cavities, Liu Tianshan(China)[2-0001]
- ✓ Thermal Tuning On Narrow Linewidth Fiber Laser, Han Peiqi(China)[2-0002]
- ✓ New magnetic constraint magnetron sputtering source, Mib Qian(China).....[2-0003]
- ✓ The optimal control of the surface residual stress by laser shock peening, Su-min Yin(China)[2-0004]
- ✓ The Main Parameters Relationship Analysis of the Erbium-doped Fiber Ring Laser , Lian Wang(CHINA)[2-0005]
- ✓ Athermal Research on High Resolution Imaging for Visible Optical System on Airborne CCD Camera, Yixian Qian(China).....[2-0006]
- ✓ Antireflective gradient index silica films for high power laser applications, lianghong yan(China).....[2-0008]
- ✓ Using new method of CCOS to the fast focal ratio off-axis aspherical segment, analyzing its movement feature & the technological parameter, Gao Bilie(China)[2-0009]
- ✓ Three Dimensional Finite Element Simulation and Analysis of Residual Stress in Milling, Liu Haitao(China).....[2-0010]
- ✓ Laser imaging scanning devices based on integrated , Xu xijun(China)[2-0013]
- ✓ Design of Athermal Collimator by Hybrid refractive and diffractive Method, Zhai Xuhua(China)[2-0014]
- ✓ Optical thin film design with immune optimization algorithm, Wang wenliang(China)[2-0015]
- ✓ Study on high-performance whole spectrum and multi-band antireflective films on ZnS optical windows, Zhang tao(China)[2-0016]
- ✓ Antireflection with multilayer structure used on solar cell , Wang wenliang(China)[2-0017]
- ✓ Finite Element Analysis for PZT Actuated Deformable Polishing Lap, huziqiang(China)[2-0018]
- ✓ Influence of Ion Beam Bombardment on Surface Roughness , Pan Yongqiang(China)[2-0019]
- ✓ Study on sub-wavelength nano-porous silica reflection reducing coating, Ye Xin(China)[2-0020]
- ✓ Design and Analysis on the Kinematics of the Lap-Polisher for Optical Fiber End face Based on Tribological Theory, Lu Yu-Shan(China)[2-0022]
- ✓ The cleaning of BK7 substrate, Xiao-Dong Wang(China).....[2-0023]

- ✓ Dispersion study on band gap of 1-D lateral restrictions photonic crystal, Dai Hongxia(China)[2-0025]
- ✓ Optimize optical thin film system using Ant Colony Algorithms, chendejun(China)[2-0026]
- ✓ The polishing pressure control technology of the active stressed lap, Li Ying(China)[2-0027]
- ✓ Optical design of the flatness interferometer, Liu mengxia(China)[2-0028]
- ✓ Filter model based dwell time algorithm for ion beam figuring, Li Yun(China) ..[2-0029]
- ✓ Research on GRIN Microlens Material Preparation, Yulin Li(China)[2-0030]
- ✓ Grinding Precision Forecasting in Optical Aspheric Grinding Using Artificial Neural Network and Genetic Algorithm, Chen Jiang(China).....[2-0033]
- ✓ The general analysis on laser lineup system of geometrical optics mathematical model, YangYu(han)[2-0034]
- ✓ Laser CAD/CAM, Han Min(China)[2-0037]
- ✓ The Films Thickness Uniformity Associated With Vacuum Chamber Configuration, ZhiLin Xia(China)[2-0038]
- ✓ Resolution model study of the KBA X-ray microscope , Lingling zhao(China) ...[2-0039]
- ✓ A New Ultra-Precision Turning Method of Aspheric Surface, LI Guo(China).....[2-0040]
- ✓ Study on abrasive jet polishing and its application in optical manufacture, Zhaoze Li(China)[2-0041]
- ✓ The Investigation of Laser Welding of Stainless Steel Railway Vehicles and the Fatigue Life of the Joit, Hongxiao Wang(China).....[2-0042]
- ✓ Fabrication and Characteristics of near elliptical core squeezed hexangular lattice photonic crystal fibers based on polyme, Zhang Yani(China)[2-0044]
- ✓ Design of Multilayer Dielectric Grating in VUV spectrum by Rigorous Coupled-Wave Method, He Sheng-nan(China).....[2-0045]
- ✓ The Key Technology Research molded glass lens, Sun wenpei(China)[2-0046]
- ✓ Theoretical and experimental investigation on the 2.7um laser pumped ZnGeP2 optical parametric oscillator generating 4.3um laser, Jiang Hailin(China).....[2-0047]
- ✓ DESIGNS OF MASKS IN THICKNESS UNIFORMITY, Cheng-Chung Jaing(China) [2-0048]
- ✓ The deterministic manufacturing of steep SIC sphere mirror, Shu Yong(China)[2-0049]
- ✓ Research on high power laser welding of Mg-Rare earth alloy NZ30K, Daijun(China)[2-0050]
- ✓ Tunable bandwidth and parametric bandwidth for periodically poled LiNbO3 based optical parametric amplification, Liu Tao(China)[2-0051]
- ✓ Research on the reactive ion modification of fused silica surface, Wang Feng(China)[2-0052]
- ✓ New Exploration of the Optical Aspherical Replication Technique, WANG Qin(China)[2-0053]
- ✓ A kind of optimizing design method of progressive addition lenses, Tang Yunhai(China)[2-0055]
- ✓ Design and fabrication of fused silica grating with shallow groove for energy measurement of high-energy pulse laser, LI Chao-ming(China)[2-0056]
- ✓ Dwell time algorithm based on optimization theory for magnetorheological finishing, Zhang Yunfei(China)[2-0057]
- ✓ Experimental Investigation of Cutting Mechanics of KDP Crystal, C.H. An(China)[2-0059]
- ✓ Optimization for LED Arrays to Achieve Uniform Near-field illumination, Zhang Hu(China).....[2-0060]
- ✓ Visible light and IR spectrum smoke vision simulation of the photoelectric imaging detector, Lu Bin(China).....[2-0061]
- ✓ Optimization of Removal Function in Computer Controlled Optical Surfacing, Chen Xi(China).....[2-0062]

- ✓ Research on a simulation system for diamond turning of optical components with micro-structured surfaces, Jingbo Zhou(China).....[2-0063]
- ✓ Benefits of Freeform Surfaces in Optical Design, Wang Lingjie(China)[2-0064]
- ✓ Features of the reference laser signal in the space-borne Fourier Transform Spectrometer, WEI Huan-dong(China) [2-0065]
- ✓ Cylindrical lens design with illuminance uniformity in the image plane of critical illumination system, Chong Huang(China) [2-0066]
- ✓ Wet-cleaning and analysis of contaminants on the surface of multilayer dielectric film pulse compressor gratings, Chen Shang-bi(China) [2-0067]
- ✓ Freeform lens design for a LED boat-carrying searching light, Shuang Zhao(China) [2-0068]
- ✓ Experimental Research on the Effects of Different Overlapping Rates in Laser Shock Processing, WANG CHENG(China)..... [2-0069]
- ✓ Novel Supramolecular Bisazopolymers for Four-Dimensional Optical Recording, Duan Shiyuan(China) [2-0070]
- ✓ Study on the Preparation of a High Diffraction Efficiency Dammann Grating with Subwavelength Structure, Leng Yanbing(China) [2-0071]
- ✓ Error Analysis of Diffractive Optical Element Manufactured by Diamond Turning Technology, Yun-Cui Zhang(China)..... [2-0072]
- ✓ Deterministic Manufacturing Technologies for Polycrystalline Magnesium Fluoride Conformal Domes , Hu Hao(China) [2-0073]
- ✓ Research on middle and high spatial-frequency errors by discrete particles abrasion, Chunyan Shi(China) [2-0075]
- ✓ Technique of error estimation and compensation in ion beam figuring process, ZHOU Lin(China)..... [2-0076]
- ✓ the Research of Stray Radiation in Cryogenic Space Remote Sensor, Baolin Du(China) [2-0077]
- ✓ Design and image restoration research of a cubic-phase-plate system, Xin Zhang(China)..... [2-0078]
- ✓ Optical Design and Multi-Objective Optimization for U-type 2X Zoom Projection Optics, Jung-Hung Sun(Taiwan,China)..... [2-0079]
- ✓ Fabricating a variety of micro-optics structures using anisotropic etching of silicon, LIBin(China) [2-0080]
- ✓ Workspace Analysis of 3-RPS Symmetrical Parallel Supporting Structure with Three Degree-of-Freedom, Dr. Gang(China) [2-0081]
- ✓ The removal function of edge effect and amending , Dr. DENG Wei-jie(China) [2-0082]
- ✓ Laser fast-fabrication of textured surface for good friction and wear properties, HaifengYang(China) [2-0085]
- ✓ Study on annular polishing for a rectangle optical flat with high aspect ratio, Ma zhicheng(China) [2-0087]
- ✓ Study on annular polishing for a rectangle optical flat with high aspect ratio, Ma zhicheng(China) [2-0088]
- ✓ Polarization Properties of photonic crystal fiber with elliptical holes square-lattice, Fei Liu(China)..... [2-0090]
- ✓ A surface data generation method of optical micro-structure and analysis system for Fast Tool servo fabricating, Yang Fan(China)..... [2-0094]
- ✓ Material removal function of the capacitive coupled hollow cathode plasma source for plasma polishing, Weiguo Liu(China)..... [2-0095]
- ✓ Optical and mechanical properties of nanocrystalline silicon dioxide films prepared by medium frequency magnetron sputtering , Cao yongzhi(China) [2-0097]
- ✓ Time-resolved dynamics of 355nm nanosecond laser induced front and rear surface damage on fused silica, Liu Hongjie(China) [2-0098]

- ✓ Research on the relationship between turning surface characters and material characters of CVD ZnSe, Li Weihao(China) [2-0099]
- ✓ Calculation and simulation of the uniformity of grinding removal in ring polishing, Wang L(China) [2-0100]
- ✓ Research on Chemical Cleaning Technology for Super-smooth Surface of Molten Quartz Fundus, Jiao Ling-yan(China) [2-0101]
- ✓ Research on Mirror Drum Manufacture , Wang Fang(China) [2-0102]
- ✓ Raman spectra of hydrogen-free amorphous carbon films by surface-wave-sustained plasma, Junqi Xu(China) [2-0103]
- ✓ Design and fabrication of tunable aspherical lens for spherical compound eye, Zhenxian Zhan(China) [2-0104]
- ✓ Design of wide-angle lens based on compound eyes, Zhaolou Cao(China) [2-0106]
- ✓ Demonstration of shaping an aspheric from an ultrathin spherical mirror using active supports, Chunmei Zeng(China) [2-0107]
- ✓ A Method of minimizing the frequency stabilization sensitivity for four frequency differential laser gyro, Yang Jianqiang(China) [2-0108]
- ✓ Study of focusing combination of large-caliber coherent laser beams, Jingquan Wang(China) [2-0109]
- ✓ Foundation Rules of Magnetorheological Finishing Process by Spiral Polishing Way, Wang Yajun(China) [2-0110]
- ✓ Research on a novel non-null metrology of convex asphere, Feng Yan(China) [2-0112]
- ✓ Research of combination polishing technology, Hang lingxia(China) [2-0113]
- ✓ Effect of Machining Parameter on Micro-burr Size During Micro-milling , Liu Lifei(China) [2-0115]
- ✓ Analysis on the material removal stability for the finishing of the optical surface using Atmospheric pressure plasma jet, Yanfu ZHANG(China) [2-0116]
- ✓ Design method for axisymmetric lens and reflector for uniform illumination, Wang Hong(China) [2-0117]
- ✓ Calculation of the optical force on metal nanoparticles by FDTD method, Hong Li(China) [2-0118]
- ✓ The Research on Anisotropy of Ultra-precision Machining, Zhang Wensheng(China) [2-0119]
- ✓ Research and Development of AOTF Based NIR Spectrometer, Zhang Hui(China) [2-0120]
- ✓ Implementation of the application of Bluetooth technology in processing aspheric mirrors, CHEN Dong-yun(China) [2-0121]
- ✓ Influence of surface roughness in atmospheric pressure plasma jet of zerodur material , Jinhuilang(China) [2-0123]
- ✓ Antibacterial and Tribological Behavior of Self-assembled Monolayer on Optical Lens, Jeng-Haur Horng(Taiwan,China) [2-0125]
- ✓ Optical system of high precise star sensor with large field and low distortion, Wu Yanxiong(China) [2-0126]
- ✓ 3D Reconstruction from Integral Images Based on Interpolation Algorithm, Hong-Xia Wang(China) [2-0127]
- ✓ Testing technology for off-axis parabolic mirror during fine grinding stage, Hanyu(China) [2-0129]
- ✓ Freeform reflector design for infrared light source, ZHANG Kun(China) [2-0130]
- ✓ Shaping Approach of High Precision Aspheric Lenses with CNC Turning, Shutong Xie(China) [2-0131]
- ✓ Study on Optimization of Process Parameters for Lithium Niobate Photoelectric Material in CMP, Wang shengli(China) [2-0133]
- ✓ Surface Damage Mitigation of Fused Silica with CO2 Laser, Li xibin(China) [2-0134]

- ✓ A Kind of Composite Shack-Hartmann Wavefront Sensor with Switchable CCD and ICCD Detectors, Xuejun Zhang(China) [2-0138]
- ✓ Analysis of the control of surface roughness in Single Point Diamond Turning, Bell Xu(China) [2-0141]
- ✓ A sparse matrix based fast algorithm for dwell time in magnetorheological finishing (MRF) of large aperture optics, Shi Feng(China) [2-0142]
- ✓ Research on the wheel wear characteristic of the elliptic ultrasonic vibration grinding monocrystal silicon, Zhiqiang Liang(China) [2-0143]
- ✓ Study on Optical Design Methods for LED Extended Sources, Wang Hong(China) [2-0144]
- ✓ Design and Simulation of the LGP Structure for LED backlight, Zhang Wei(China) [2-0146]
- ✓ Research on machining error compensation in high-precision surface grinding machine for optical aspheric elements, Ke Xiaolong(China) [2-0147]
- ✓ Correction method for the error of diamond tool's radius in Ultra-precision cutting, Wang Yi(China) [2-0149]
- ✓ Sputtering gas pressure on the deposition of titanium nitride thin films and their properties, FU Shu-ying(China) [2-0150]
- ✓ Removing function model and experiments on ultrasonic polishing molding die, Huang qitai(China) [2-0152]
- ✓ The study of the region where Si nanoparticles form during pulsed laser ablation, Chu Lizhi(China) [2-0154]
- ✓ Thermal Shock Resistance Ability of IAD-Si coated SSiC mirrors, Xu Lingdi(China) [2-0156]
- ✓ Research on Processing Parameters of Laser Re-manufacturing, Wang zhi-jian(China) [2-0161]
- ✓ Cladding Process Design of Laser Re-manufacturing technology, Wang zhi-jian(China) [2-0162]
- ✓ Laser Re-manufacturing Technology of Slab Crystallizer, Wang zhi-jian(China) [2-0163]
- ✓ properties of AlF₃ and LaF₃ films at 193nm, XUE Chunrong(China) [2-0164]
- ✓ Misalignment model used in three-position absolute measurement, Yang Peng(China) [2-0165]
- ✓ Experimental method for determination of a suitable temperature range for glasses used in precision molding, Ma Tao(China) [2-0168]
- ✓ Study of parameters in precision optical glass molding, Ni Ying(China) [2-0170]

Conference 3: Optical Test, and Measurement Technology, and Equipments

(SPIE Proceedings VOL.7656)

Conference Chairs:

ZHANG Yudong, Director of Institute of Optics and Electronics, CAS (China)

Jose M. Sasian, Prof. of University of Arizona (USA)

XIANG Libin, Director of Opto-electronic Research Academy of Chinese Academy of Science (China)

Sandy To, Hong Kong Polytechnic University (China)

8:30-12:00 April 27 SESSION 3-1
room 3 (10 min/report)

Session chair: Wu Shibin

- ✓ Phase retrieval in-situ measurement for large aperture parabolic mirror, Ding Lingyan(China) [3-0114]
- ✓ Subaperture Stitching Based on Hartmann Wavefront Sensor, He Yu-mei(China) [3-0141]
- ✓ Characterization of Micro-optics using Physically Spherical Phase Compensated Digital Holographic Microscope, Qu Weijuan fin(Singapore) [3-0371]
- ✓ Fully automatic wavefront measurement of miniature aspheric lenses - a fast and accurate inspection technology, Iris Erichsen(Germany) [3-0324]
- ✓ Precision Measurement of Centering Error and Aspherical Axis Orientation, Josef Heinisch(Germany) [3-0329]
- ✓ Optimizing the Operating Parameters of Spectrophotometer for Testing Transmission Spectrum of Optical Substrate, Liu Huasong(China) [3-0232]
- ✓ Fiber Bragg Grating Demodulation System Based on ARM and LABVIEW, Zhang Ying(China)..... [3-0168]
- ✓ Modeling of LED Far-Field Radiation Pattern by using LabVIEW, Rakesh Chandra Prajapati(Canada) [3-0330]

Tea Time

- ✓ Design of null lenses for testing of an F/0.8 concave oblate elliptical surface, Ding xuezhuan(China) [3-0095]
- ✓ Phase Modulating Two Fabry-Perot Interferometry and Its Application to Nanometrology, Zhu Ruogu(China)..... [3-0011]
- ✓ Study of ocean red tide multi-parameter monitoring technology based on double-wavelength airborne lidar system, Lin Hong(China) [3-0036]
- ✓ Optical balanced detection with single photoreceiver, Prof Hui-Kang Teng(Taiwan,China) [3-0078]
- ✓ Water environmental pollutant detecting and implement system based on of fluorescence mechanism, Shutao Wang(China) [3-0102]
- ✓ Application of Wavelet Analysis in Laser Doppler Vibratory Signal Denoising, Lan Yu-fei(China)..... [3-0180]

- ✓ Super-smooth Surface Defects Measurement and Evaluation System, GAO Xin(China) [3-0218]
- ✓ Space composite colloidal crystal growth research, Yang Hao(China) [3-0224]

13:30-17:00 April 27 SESSION 3-2
room 3(10 min/report)

Session chair: Li Shengyi

- ✓ Study and Preliminary Measurement of Nanometer and Nanoradian Surface Profiler , Shinan Qian(USA) [3-0126]
- ✓ lecturer, Yanguang(australia) [3-0106]
- ✓ Polarization point-diffraction interferometer for high-precision testing of spherical surface, Daodang Wang(China) [3-0096]
- ✓ A Novel Tuning Fork Atomic Force Microscope for Optical Surfaces Characterization, Jian Zhao(China) [3-0118]
- ✓ Identification and quantification of Non-commonpath error in lateral shearing interferometry, Liu Bingcai(China) [3-0132]
- ✓ study of the transverse chromatic aberration after LASIK refractive surgery applying the individual eye model, Zhang(China) [3-0136]
- ✓ Test of Visible Spectral Transmittance of Large Aperture Optical Lens, Wang Jianmin(China) [3-0143]
- ✓ Nondestructive detecting soluble solid contents and weight of intact pears base on online near-infrared spectroscopy, Yan-De Liu(China) [3-0153]

Tea Time

- ✓ Overview on the profile measurement of turbine blade and its development, Huang junhui(China) [3-0163]
- ✓ Measurement Method for the Transition Width of Precision Approach Path Indicator based on Spectral Means, Haiping Shen(China) [3-0239]
- ✓ Performance of Modal-biased Wavefront Sensor to Detect Multiple Modes Aberration, Liu Changhai(China) [3-0241]
- ✓ Error analysis and system optimization of nonnull aspheric testing system, Yongjie Luo(China) [3-0249]
- ✓ Error Analysis of Spherical Surfaces Ultra-Precision Measurement, Dongsheng Wang (China) [3-0251]
- ✓ A hybrid phase retrieval method for solving the twin image problem in digital holography, Zhao Jie(China) [3-0270]
- ✓ An Efficient Compound de-noise Approach to Eliminate the Speckle Noise, YANG Xu(China) [3-0278]
- ✓ Automatic procedure for non-coplanar aberration compensation in lensless Fourier transform digital holography, Huakun Cui(China) [3-0285]

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Session chair: Jing Hongwei

- ✓ Certification, self-calibration and uncertainty in testing optical flats, Chris J. Evans(USA) [3-0237]

- ✓ Measurement of high-departure aspheres using subaperture stitching with the Variable Optical Null(VON™), Mike DeMarco(USA) [2-0137]
- ✓ Research on measurement of terahertz spectroscopy, Dr. Yuqiang Deng(China) [3-0039]
- ✓ Spectrum deductive method to determine depth and duty cycle of photo-resist grating with multilayer dielectric stack, CHEN Xin-rong(China) [3-0119]
- ✓ Performance Comparison of Optical Path Difference Calculation Algorithms for Wavelength Scanning Interferometry, Kaiwei Wang(China) [3-0293]
- ✓ Study of optimum pumping intensity at Cs vapor magnetometer, Zhang Junhai(China) [3-0296]
- ✓ Surface roughness measurement by the digital holography, Yan Li(China)..... [3-0300]
- ✓ The Application of the Laser Scanning Confocal Microscope in Fluorescent Film Sensor Research , Zhang Hongyan(China)..... [3-0306]

Tea Time

- ✓ Dynamic Closed-loop Test for Real-time Drift Angle Adjustment of Space Camera on Earth, Jun Hu(China) [3-0385]
- ✓ Investigation of a Laser frequency stabilization method based on linear magneto-optics effect, Zeng Xianjin(China)..... [3-0309]
- ✓ Effects of mechanical inaccuracies on the measurement result in metrology systems, Florian Schneider(Germany) [3-0317]
- ✓ Study on phase demodulation of a single closed fringe interferogram in radial shearing interferometer for aspheric testing, Tian chao(China) [3-0320]
- ✓ Development and Innovation on Integrated Engineering Optics System Design, Ding quanxin(China)..... [3-0339]
- ✓ Uniform Illumination Research For Large Area Digital Speckle Pattern Interferometry, Huang zhanhua(China) [3-0346]
- ✓ Zernike Polynomials for rectangular area and applications in off-axis asphere testing, He pinjiang(China)..... [3-0372]
- ✓ Apparatus for femtosecond laser measurement, Sun Qing(China) [3-0304]

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- ✓ Research on Doppler Frequency in Incoherent FM/CW Laser Detection, LIU Kai (China) [3-0001]
- ✓ Measurement of the Muller matrix for painted surfaces with a kind of scatterometer, FENG Weiwei(China) [3-0002]
- ✓ Study on 'vertical bright line' image of CCD camera irradiated by Laser, Jiang Tian(China)..... [3-0003]
- ✓ A novel algorithm for a rotation invariant template matching, MING LEI(China) [3-0004]
- ✓ Theodolite Self-stabilization Tracking Servo System Based on Mobile Platform, Wangchen(China) [3-0005]
- ✓ Wall-Drag Effect of Dense Brownian Particles Close to Solid-Liquid Interface in Low-Coherence Dynamic Light Scattering, Hui Xia(China) [3-0006]
- ✓ Noise Filtering for Moiré Fringe Signal Based on Variable Step Size Adaptive Neural network Algorithm, Lv Mengjun(China) [3-0007]

- ✓ A spectrum absorption methane gas sensor with optical fiber based on frequency harmonic detection mechanism, Wang Jiulong(China) [3-0008]
- ✓ Study on a methane and acetylene spectrum absorption mode gas sensor with optical fiber, Wang Jiulong(China) [3-0009]
- ✓ A novel optical fiber sensor for deformation measurement, Haiting Di(China)·· [3-0010]
- ✓ The multiple location analysis method for the detection of point targets, wenxuan(China) [3-0012]
- ✓ The Image Detection of Pantograph Slide Based On Yang-shot Mode, Shi Pengyan(China)..... [3-0013]
- ✓ Simultaneous determination of benzo[k]fluoranthene and perylene using excitation-emission matrix fluorescence, Wang Huanbo(China) [3-0014]
- ✓ Design of a new-type high spectral resolution UV-VIS Spectrophotometer, ZHAO Facai(China) [3-0015]
- ✓ Intensity-modulated and temperature-insensitive fiber Bragg grating vibration sensor, Lan li(China) [3-0016]
- ✓ Multi-camera Calibration Based on OpenCV and Multi-view Registration, Xiaoming Deng(China) [3-0017]
- ✓ Image Reconstruction Algorithm Realize with FPGA based on the emission spectral tomography, Biyan Leng(China)..... [3-0018]
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- ✓ Evaluation of Kinetic Constants of Biomolecular Interaction on Optical Surface Plasmon Resonance Sensor with Newton Iteration , Hu jiandong(China) [3-0020]
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- ✓ Monitoring System of Multiple Fire Fighting Based on Computer Vision, Li Jinlong(China) [3-0022]
- ✓ Quantitative Analyses of Tartaric Acid based on Terahertz Time Domain Spectroscopy, Cao binhua(China) [3-0023]
- ✓ Research on the detection system of liquid concentration base on birefringence light transmission method , Li Tianze(China)..... [3-0024]
- ✓ Moire CT technique and its application on laser flexible manufacture, Li Tianze(China) [3-0025]
- ✓ A new method to improve the measure accuracy of MTF, zongxi song(China) · [3-0026]
- ✓ Research on fiber-optic gyroscope signal detection with Lock-in amplifier, ZhangXia(China)..... [3-0027]
- ✓ Measurement of refractive indices and optical axis of an uniaxial crystal assisted by Brewster angle and reflectivity fitting techniques, J H Xing(China)..... [3-0028]
- ✓ A New Method of Gas Concentration Measurement based on Continuous Wave Cavity Ring-Down, Yang qiuxia(China)..... [3-0029]
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- ✓ New method for of adjustment single star simulator using penta prism, De-Zhi SU(China).....[3-0038]
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- ✓ The potential applications of photothermal interferometric detection technique in the single-layer optical thin film system, Honggang Hao(China)[3-0042]
- ✓ Design of Large-size Aspheric Measurement System and Motion Accuracy Analysis, Yonglu Zhu(China).....[3-0043]
- ✓ Fabrication 3D buried channel optical waveguides on field-driven ion exchange process, Z. G. Zhou(China).....[3-0044]
- ✓ Study Of Measuring The Intensity Distribution Of LED With Lock-In Amplifier , Kai Zhang(China).....[3-0045]
- ✓ System of Large-Dimension Diameters, Zhang Hongtao(China)[3-0046]
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- ✓ Multi-camera Calibration Based on OpenCV and Multi-view Registration , Xiaoming Deng(China)[3-0048]
- ✓ Transmission Characters Study of Soliton Based on Dispersion-managed, Xun Lu (China).....[3-0049]
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- ✓ Design and Characterization of a Large-Area Integrating Sphere Uniform Radiation Source for Calibration of Satellite Remote Sensors, He Ying-wei(China)[3-0059]
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- ✓ Fiber bragg grating sensor system based on erbium-doped fiber ring laser, Pang Huawei(China) [3-0075]
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- ✓ Self-mixing interference based on quadrature demodulation technique for displacement measurement, Dr. Dongmei Guo(China)..... [3-0077]
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- ✓ Polarimetric System Based on Rotating Wave-plates and Virtual Instruments, Zhi-Dong Shi(China) [3-0080]
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- ✓ nvestigation of phase retrieval with point source defocus image, Chen Tuquan(China) [3-0082]
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- ✓ New Method for Testing Diffraction Efficiency of AOTF, Yuanting Shen(China) · [3-0084]
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Conference 4: Design, Manufacturing and Testing of Micro and Nano Optical Devices and Systems

(SPIE Proceedings Vol. 7657)

Conference Chairs:

YE Tianchun, Director of Institute of Microelectronics, Chinese Academy of Science (China)

Sen Han, Veeco, Inc. (USA)

Masaomi Kameyama, Nikon Corporation (Japan)

HU Song, Institute of Optics and Electronics (IOE), CAS (China)

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- ✓ Manufacturing and quality analysis of high precision thermoplastic optical lenses, Sebastian Hessner(Germany)[4-0082]
- ✓ miniature Fabry-Perot Optic Fiber pressure sensor, Chen shuang(China)[4-0041]

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- ✓ Application of holographic technique to the photonic crystal quantum cascade lasers, Quan-Yong Lu(China)[4-0015]
- ✓ Nano-Devices Fabricated by Soft Press and Temperature-Pressure Variation Imprint, Lei Wang(China)[4-0035]
- ✓ Simulation of Modal Wavefront Sensor Employed Multiple Holographic Optical Elements, Liu Changhai(China)[4-0053]

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- ✓ Metal nanostrip arrays for transmission enhancement in subwavelength-slit, Xu-Feng Li(China)[4-0071]
- ✓ Optical Response of Bowtie Antennas, Guo Ying-Nan(China).....[4-0073]
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- ✓ Design, manufacture and Focus Properties of micro-lens array , Wei Mingyue(China)[4-0118]

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- ✓ Thinned-Cladding Zeolite Long Period Fiber Grating Chemical Sensors, Shengao(China)[4-0105]
- ✓ Characterization of a 61 channel bulk-PZT thick film deformable mirror and generation of Zernike polynomials, Jianqiang Ma(China).....[4-0046]
- ✓ The mode characteristics of Photonic crystal vertical cavity surface emitting laser , Yiyang Xie(China)[4-0083]

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- ✓ Periodic microstructures induced by interfered femtosecond laser pulses, Zhongyi Guo(Korea).....[4-0113]
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- ✓ Research on the novel 3D micro/nano touch probe of CMM, Fangfang Liu(China) [4-0014]
- ✓ DMFC Bipolar Material and New Processing for μ DMFC Microchannel, Bifeng Yin(China) [4-0016]
- ✓ Analysis of measuring errors for the visible light phase-shifting point diffraction interferometer, Zhang yu(China)..... [4-0017]
- ✓ Analysis on the electromagnetic polarity of asymmetrical metal nanoshells, Guang SHI(China) [4-0018]
- ✓ Study on the Stress Distribution and Temperature Distribution of Ultrasonically Assisted Micro-milling, HU haijun(China) [4-0019]
- ✓ Design and fabrication of microlens using digital lithography, Shwan Ho(China) [4-0020]
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- ✓ Design and Simulation of Micro Spectrometer Based on Torsional MEMS Grating, YAN BIN(China) [4-0022]
- ✓ The impact of manufacturing errors of domain structure on frequency doubling efficiency in PPLN waveguides, Liu Zhengying(China) [4-0023]
- ✓ Design and test of focusing mechanism of space camera, Guo Quanfeng(China) [4-0024]
- ✓ Processing and analyzing transmission electron microscope images of nanocrystals, LIU Shu-hua(China) [4-0025]
- ✓ Radiation forces analysis for gold nanoparticles in optical tweezers, Liu xiaoyu(China) [4-0026]
- ✓ An effective edge detection method for image measurement technology, Yang yuxiao (China)..... [4-0027]
- ✓ Soft substrate as a sacrificial layer for fabrication free-standing SU-8-based nanofluidic system, Li Xiao-jun(China) [4-0028]
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- ✓ A New Non-contact Method to Measure Surface Roughness by Chromatic Focal Shift of Optical Imaging System, WU Yu-Hao(China) [4-0039]
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- ✓ Compact grating couplers between a single-mode fiber and nanophotonic silicon-on-insulator waveguide, Xiaogang Tong(China) [4-0042]
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- ✓ Design and Analysis of Deep-ultraviolet Micro-lithography Illumination System, Han Xing(China) [4-0044]
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- ✓ Methods of Eliminating the Grid Effect Based on DMD Technique of Maskless Lithography, Yanli Li(China) [4-0047]
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- ✓ Optimization Study on the Deformable Mirror Support Structure of the Hyperspectral Imaging System for Food Detection, zhaofu(China) [4-0051]
- ✓ Study on controlling the profile of holographic ion beam etching gratings, LIU Quan(China) [4-0052]
- ✓ Experimental Verification of the Inverse Doppler Effect in Negative-index Material, Lie Feng(China) [4-0054]
- ✓ Phase demodulation method for fringe pattern , Feng Xu(China) [4-0055]
- ✓ Nanolithography in the evanescent near-field by using gain-assisted meta-materials system, Yong Yang(China) [4-0056]
- ✓ The performance analysis of Optical readout in micro-cantilever array IR imaging system , Wei Yan(China) [4-0057]
- ✓ optic fiber probe of AFM, Liu yanqiu(China) [4-0058]
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- ✓ DIRECTIONAL LIGHT PROPAGATION IN STACKED METAL-DIELECTRIC FILMS, LuLing(China) [4-0063]
- ✓ Research on Focal depth detection technique based on Lock-in amplifier in 193nm Lithography system, Fei Xie(China) [4-0066]
- ✓ A High Time-resolution Imaging Technology based on echelon optics, Zhangxin(China) [4-0067]
- ✓ A new System for Measuring the Diffractive Efficiency of Large Aperture Gratings, Xiaowei Zhou(China) [4-0068]
- ✓ Fabrication of near-zero refractive index metamaterial at optical range using nanoimprint lithography, Qu Yue(China) [4-0070]
- ✓ Monopole probe fed by coupling gold rods, Li Xiong(China) [4-0072]
- ✓ Study on residual stresses in Ultrasonically Assisted Micro-milling, Lu ze-sheng(China) [4-0074]
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- ✓ Focusing and Leveling in dual-stage system, Jinlong Li(China) [4-0078]
- ✓ Effects of scratching parameters of AFM-based dynamics plowing on nanomachining PMMA surface, Chen jing(China) [4-0080]
- ✓ Application of Chaos optimization algorithm in the Micro Spectrometer, XIONG yu hong(China) [4-0081]
- ✓ A Research on the Dynamic Measurement of the FAST Adaptive Cable-mesh Reflector Control-Nodes, Luo yabo(China) [4-0084]

- ✓ An optical modulation based focus method for optical projection lithography, Wangfu Chen(China).....[4-0086]
- ✓ Optical Transmission Enhanced effect of Short-ordered nano holes , He Jia-yu(China)[4-0088]
- ✓ Phase-shifting moire method for electronic components warping three-dimensional deformation detection method , Huang Yanping(China)[4-0092]
- ✓ Study on mechanical properties of single glass fiber by digital image correlation technique under optical microscope, Xiang Gao(China)[4-0093]
- ✓ Preparation and testing analysis of tapered fibers-optic evanescent wave absorbing sensor, Xu Ben(China).....[4-0095]
- ✓ System-level Modeling and Verification of a Micro Pitch-tunable Grating, Lu Xianglian(China)[4-0096]
- ✓ An AFM system with multi-mode scanning for large-area measurement, Cui Yuguo(China)[4-0097]
- ✓ Interferogram processing of cross grating lateral shearing interferometer, Wang Dan(China)[4-0098]
- ✓ Design of a ultra-precision rapid turning mechanism for the complex-surface optical elements, huang hai bin(China)[4-0099]
- ✓ Long Period Fiber Grating Chemical Sensor with thinned cladding and zeolite coating, Shengao(China).....[4-0100]
- ✓ Single-Crystal-Silicon MEMS Deformable Mirror Array Based on SOI Wafer Bonding, Kefan Chen(China).....[4-0101]
- ✓ Measurement errors analysis and calibration of phase-shifting point diffraction interferometer, Liu Ke(China)[4-0102]
- ✓ The study of shearing ratio choice ofcross grating lateral shearing interferometer , Wang Hai(China)[4-0103]
- ✓ Characteristics of sensors based on MEMS grating with interdigitated comb structure, Wei naike(China)[4-0104]
- ✓ The Study of Waveguide Ring Coupling Design of MOG, Jixiang(China)[4-0107]
- ✓ Fabrication and optical design of pyramid microstructure on the base of light guide used for the backlight module, Jee-Gong Chang(Taiwan,China)[4-0110]
- ✓ Analysis on the optical absorption of nanoparticles and photo-thermal polarity, Wei HAN(China).....[4-0112]
- ✓ IMAGING IN PHOTON SCANNING TUNNELING MICROSCOPY USING PIEZOELECTRIC CANTILEVER/ FIBER TIP AS ACUATOR, Zhao Wang(China).....[4-0114]
- ✓ Alignment system for double-faced and deep-exposure aligner, Ma Ping(China)[4-0115]
- ✓ Impact of manufacturing errors of domain structure on QPM frequency doubling efficiency in PPLN waveguides, Liu Zhengying(China)[4-0116]
- ✓ Design and Simulation for the bifocal microlens in thick film lithography , Tang Xionggui(China).....[4-0117]

Conference 5: Opto Electronics Material and Devices for Detector, Imager, Display and Energy Conversion Technology

(SPIE Proceedings Vol. 7658)

Conference Chairs:

JIANG Yadong, Dean of School of Optoelectronic Information, University of Electronic Science and Technology of China

Bernard Kippelen, Vice Director, Center of Organic Photonics and Electronics, Georgia Institute of Technology (USA)

YU Junsheng, State Key Laboratory of Electronic Thin Films and Integrated devices (China)

**8:30-12:00 April 27 SESSION 5-1
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Session chair: Wu Zhiming, Wen Wen

- ✓ Dependence of silicon thin-film growth characteristics on substrate temperature, Longzhi Lin, Haojie Zhang, Shaoji Jiang (China) [5-0014]
- ✓ Assess Image Blur in Photoelectric Imaging System, Xiaofu Xie, Jin Zhou, Qinzhang Wu (China) [5-0100]
- ✓ Photoluminescence and photovoltaic performance of poly3-octylthiophene and poly3-alkylthiophene, Lengliang Li, Fujun Zhang, Changrong Guan, Zuliang Zhuo, Bangzhi Cao, Yitao Li (China)..... [5-0044]
- ✓ Research Progress on Optical Wireless Communication in Xi'an University of Technology, Ke Xizheng (China)..... [5-0041]
- ✓ Energy transfer from both triplet and singlet energy levels of PVK to DCM2 induced by heavy-ion, Jiaxiu Luo, Lixin Xiao, Zhijian Chen, Bo Qu, Qihuang Gong (China) [5-0114]
- ✓ SAW ethanol gas sensors based on cryptophane-A sensitive film, Sun Ping, Jiang Yadong, Xie Guangzhong, Du Xiaosong, Li Xian, Hu Hengbo (China)..... [5-0071]
- Tea Time
- ✓ Realization of p-type conductivity in ZnO by (N, Ag) dual acceptor codoping: A first-principles study, Zhihua Xiong, Lanli Chen, Qixin Wan, Dongmei Li (China) [5-0031]
- ✓ Electrical and Optical Properties of Amorphous Vanadium Oxide Thin Films Deposited by DC Magnetron Sputtering, Zhenfei Luo, Zhiming Wu, Mingjun Du, Xiangdong Xu, Junsheng Yu, Tao Wang, Yadong Jiang(China)..... [5-0039]
- ✓ Optimizing the growth condition of optoelectronic material (ZnO film) by imaging technology, Jun Wang, Shi Pan, Yi Zhang (China) [5-0205]
- ✓ Effect of variable substrate temperature for SrTiO₃ thin films using pulsed laser deposition, Xiaojing Wan, Li Wang*, Xueqiong Su, Jiangbo Chen (China) [5-0067]
- ✓ Numerical Simulation of Multilayer Organic Light-Emitting Devices, Hansong Gao, Haibo Rao, Yue Hu, Jianjun Ju, Yuan He, Yuantao Wan (China) [5-0022]

- ✓ The Low-cost Preparation of Pyramid-like Texture ZnO Thin Films and the Application As a Front Electrode in Hydrogen Amorphous Silicon Solar Cells, Y. H. Hu, L. F. Wang, H. J. Xu, Y. C. Chen, W. H. Jiang (China)..... [5-0036]

13:30-17:00 April 27 SESSION 5-2
room 5 (16 min/report)

Session chair: Chen Zhijian, Xiao Lixin

- ✓ Substrate temperature influence on the properties of InGaZnO thin films grown by PLD technique, Jiangbo Chen, Li Wang, Xiaojing Wan, Xueqiong Su, Le Kong (China) [5-0068]
- ✓ Feature Point Tracking for Incomplete Trajectories with Multi-View Constraint, Wang Kun-peng, Zhang Xiao-hu, Yu Qi-feng (China)..... [5-0113]
- ✓ Polymer PSQ-L Notch Filter Fabricated by Simple Nanoimprint Process, Jie Teng, Xiuyou Han, Hongbo Zhang, Jinyan Wang, Xigao Jian, Stijn Scheerlinck, Geert Morthier, Roel Baets, Mingshan Zhao (China) [5-0132]
- ✓ Fast Near Natural Color Polarimetric Imagery Fusion Approach, Pucheng Zhou, Yusheng Han, Feng Wang, Hongkun Zhang (China)..... [5-0121]
- ✓ Effect of triplet energy and transporting property of electron transporting material on iridium complex yellow phosphorescent organic light-emitting devices , Wen Wen, Junsheng Yu, Sujie Chen, Chunhua Huang, Yadong Jiang (China) [5-0136]
- ✓ Solvothermal Synthesis of Platinum Nanoparticles and Their SERS Properties, Yong Yang, Zhengren Huang, Masayuki Nogami (China)..... [5-0140]

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- ✓ Theoretical and experimental demonstration of phase locking technology by utilizing cubic susceptibility medium, Zhao Liang, Sun Junqiang (China) [5-0195]
- ✓ Steady enhancement of organic solar cell performance by doping phosphorescent iridium complex, Jiang Huang, Junsheng Yu, Hong Wang, Yadong Jiang (China) [5-0147]
- ✓ The Application of ALD Process on Special Fiber , Guangyuan Wei, Ru Zhang, Peilin Lang (China) [5-0176]
- ✓ Research on High-speed Single Photon Detector, Wang Chao, Yang Hao, Wang Di, Ma Haiqiang, Luo Kaihong, Sun Zhibin, Zhai Guangjie (China)..... [5-0213]
- ✓ A Simple Defogging Method for Outdoor Images Based on Physical Model, Guo Jia, Wang Xiaotong, Hu Chengpeng, Yang Changqing (China) [5-0221]
- ✓ Quantitative analysis on flyback region problem of 1D transmissive liquid crystal optical phased array device, Xu Lin, Huang Ziqiang (China)..... [5-0208]

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Session chair: YU Junsheng, Zhang Lei

- ✓ Nano-Optical Microscopy: Now and Its Industrialization, Wu Shifa, Wang Zhao, Zhang jian, Xu Chenbiao, LI Hong, Pan Shi (China) [5-0235]
- ✓ Study of the transfer function of atmosphere to operation range of IRFPA, Dong Wei, An Ying Chen Wenjian (China) [5-0236]
- ✓ Waveguide Design Consideration of A High Power and Fast Speed Directional Coupling Photo Diode, Xuecai Yu (China)..... [5-0288]

- ✓ Thickness Effect and Etching Implement of Silicon Substrate of LiTaO₃ Thin Film Infrared Detector, De-Yin ZHANG, Wen-Tian LUO, Yong BAO, Feng GAO, Wei QIAN (China).....[5-0243]
- ✓ Realization of large open circuit voltage in organic photovoltaic cells by introducing a fluorescent dye layer, Nana Wang, Junsheng Yu, Yue Zang, Yadong Jiang (China).....[5-0145]
- ✓ Electroluminescence performance of organic light-emitting diode with molybdenum trioxide inside hole transport layer, Ye Zou, Zhenbo Deng, Zhaoyue Lü, Zheng Chen, Yuehong Yin, Hailiang Du, Yongsheng Wang (China)[5-0086]

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- ✓ Fraunhofer Diffraction of the Object with Inclined Plane, Anqing Zhao (China)·[5-0295]
- ✓ Thin Film AlGaInP Power LEDs with Roughened Surface, Guo Jing, Zou Deshu, Gao Wei, Qin Yuan, Liu Zike, and Shen Guangdi (China)[5-0258]
- ✓ The Research and Analysis of TDICCD Dynamic Driving Design, Yun Cheng, Tao LI (China).....[5-0302]
- ✓ Research On Accelerometer Based On Multi-mode Interference, Qiaofen Zhou, Changlun Hou, Guoguang Yang, Jian Bai, Shuangshuang Zhao (China)[5-0311]
- ✓ Novel Chemically Selective Siloxane Polymer for Chemical Vapor Sensing, Jia Huang , Yadong Jiang, Xiaosong Du, and Juan Bi (China)[5-0095]
- ✓ Investigation of bright spatial solitons in SBN: 75 photorefractive crystal, Qinlin Guo, Guiying Deng, Baolai Liang, Panlai Li, Yan Li, Xu Li (China)[5-0111]

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- ✓ Study of Quantitative Identification of Infrared Thermal Wave Testing Based on BP Neural Networks, Zhang Wei(China)[5-0001]
- ✓ Quantum Teleportation and Survey Technology, Wang Zhiguo(China).....[5-0002]
- ✓ Effect of carrier gas on crystal quality of thick HVPE-GaN films, Wangru(China)[5-0003]
- ✓ Experimental research on liquid level measurement with linear CCD, Qiang Wen who(China)[5-0004]
- ✓ DATA PROCESSING BASED ON 3D MEASUREMENT SYSTEM USING DISPARITY METHOD, Yang Shuping(China).....[5-0005]
- ✓ Traceable dynamic calibration for CHAL-010 thermocouple, Hao Xiaojian(China)[5-0006]
- ✓ Time constant measurement of thermocouple by use of modulated laser, Hao Lina(China)[5-0007]
- ✓ The design of mirror's temperature control system of three Antarctic Schmidt Telescopes, Zhao jianlin(China).....[5-0008]
- ✓ Viewing angle changeable display, JinBi Leng(China).....[5-0009]
- ✓ Principle and Design of Small-Sized and High Definition X-Ray Machine, Anqing Zhao(China).....[5-0010]
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- ✓ Dynamic MTF Analysis and Calculation of Aerial Camera, LIAO Jing-yu(China) [5-0015]
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- ✓ Research of Pulse Detection on Two-Dimensional Position Sensitive Detector, Xi Feng(China)..... [5-0020]
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Conference 6: Smart Structure and Materials in Manufacturing and Testing

(SPIE Proceedings Vol.7659)

Conference Chairs:

LUO Xiangang, Institute of Optics and Electronics, CAS (China)
George Von Freymann, University of Karlsruhe (Germany)

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- ✓ Numerical study of slow-light induced by SBS in an optical fiber, Zhou hongyan(China) [6-0034]
- ✓ A Study on Ultrasonic On-Line Testing System of Oil Coiled Tubing, Qiu wenbin(China) [6-0035]

Tea Time

- ✓ Analysis of High Contrast Nano-lithography Using Array of Subwavelength Metallic Apertures, Yanxia Cui(US) [6-0036]
- ✓ The research of diagnose for structural damage based on piezoelectric phased array, Li xingang(China) [6-0040]
- ✓ Carbon nanocoils manipulated by optical tweezers, Jiangtao Lv(China) [6-0048]

13:30-17:00 April 27 SESSION 6-2 room 6 (20 min/report)

Session chair: Luo Xiangang

- ✓ Surface plasmon imaging and lithography beyond the diffraction limit, Yao Hanmin(China) [6-0068]
- ✓ Fiber Optic Surface Plasmon Resonance Technology based on Gold Nanoparticle embedded Polymerization Technology for Chemical Gas Detection, Dr. Wei Peng(China) [6-0055]
- ✓ Automatic Impedance Matching in Passive Far-Field RFID, Rakesh Chandra Prajapati(Switzerland) [6-0060]

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- ✓ Exploration on propagation properties of, Qing Zhao(China) [6-0025]
- ✓ Infrared turbidity sensor validation based on ARMA model, chen jian(China) [6-0030]
- ✓ Application Research of the Synthetic Image Segmentation Algorithm on the Multi-Lens Video Logging , Jia huiqin(China) [6-0069]

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- ✓ Femtosecond Laser Fabrication of Long Period Fiber Gratings and Index Sensitivity Analysis, Li Benye(China)..... [6-0074]
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- ✓ Analysis on optical absorption, Electromagnetic & thermal polarity of metal nanoshells, Wang Hao(China) [6-0082]
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- ✓ Interfacial polycondensation synthesis of UV irradiation responding microcapsule with sub-micrometre size, Weidong Lai(China) [6-0061]
- ✓ The evaluate system of the 2-D scanning mirror based on CMOS sensor, ZENG gui-ying(China) [6-0062]
- ✓ Research of Electromagnetism Drive Micromechanical Gyroscope Based on Tunneling Effect of Multi-Barrier Nano Thin Films, Kang Du(China) [6-0063]
- ✓ Damage detection in I-type steel beam based on PZT admittance signals, Wang Dansheng(China) [6-0064]
- ✓ Packaging of the fiber Bragg grating in metal and the temperature sensing character, Dr. Yulong Li(China) [6-0065]
- ✓ Numerical investigation of optical lithography beyond diffraction limit with off-axis illumination, Tong-Kai Zhao(China) [6-0066]
- ✓ Real-time storage research of Cameralink Camera, Zhou Guohui(China) [6-0067]
- ✓ Visual Statistical Models Applied to Image Compression Coding, PING ZHENG(China) [6-0070]
- ✓ The Design of a Broad-band Metamaterial Patch Antenna, Zhao bo(China) [6-0071]
- ✓ Theoretical analysis of metal-dielectric multilayer structures with application to super-resolution, Mingbo Pu(China) [6-0072]
- ✓ An external cloak with near perfect performance , Na Yao(China) [6-0073]
- ✓ Study on Surface Acoustic Wave CO Gas Sensor based on Electroactive Polymers, CAO Wei(China) [6-0075]
- ✓ Design of magnifying far-field imaging device by coordinate transformation, Hengyi Li(China) [6-0076]
- ✓ Utilize a digital method to determine the rotation direction in incremental photoelectric encoder, Li You-sheng(China) [6-0077]
- ✓ The Research of Video Segmentation Algorithm Based on Image Fusion in the Wavelet Domain, Yang Fan(China) [6-0078]
- ✓ Development and Application of Low-frequency FBG Vibration Sensor, NAN Qiu-ming(China) [6-0079]
- ✓ Remote monitoring system of oil wells based on ARM and GPRS, Wang Yinwen(China) [6-0080]
- ✓ Study on the Detection of Locomotive Driver Fatigue Based on Image, Gao Fadeng(China) [6-0081]
- ✓ Performance evaluation of 3D Biograph PET/CT based on Monte Carlo simulation, Wang Bing(China) [6-0082]

13:30-14:30 April 28..... Workshop 1, No.1 Lecture hall



UK Head Quarters Address: 4 Vulcan Court, Vulcan Way, Hermitage Industrial Estate, Coalville,

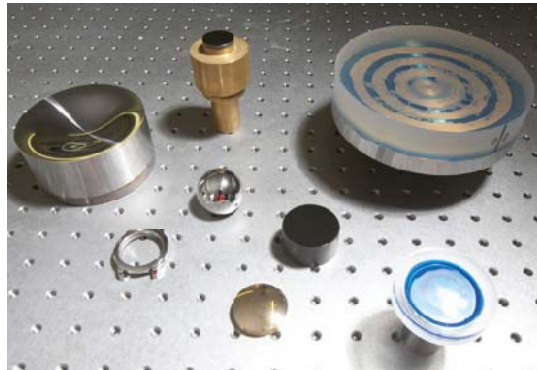
Leicestershire LE67 3FW, United Kingdom. **Tel:** +44 1530 815 832 **Fax:** +44 1530 839 631

Email: info@zeeko.co.uk **Website:** www.zeeko.co.uk

中国总代理: 資华贸易有限公司, 曾瀚威, Mobile Phone(内地): 13923829816

香港九龙弥敦道789号健峰保险大厦1104室. **Tel:** +852 (0) 2380 6080 **Fax:** +852 (0) 2789 8656 **Email:** zhiwa@hkstar.com

Zeeko is an innovative, young and dynamic technology based business with globally protected Intellectual Property extending to over 52 worldwide patents. Zeeko specialise in the manufacturing and commercialisation of Ultra-Precision Polishing Machines famously known as the Intelligent Robotic Polishers (IRP). Zeeko Ltd manufactures corrective polishing machines for fabricating high precision optics, orthopaedic joints, semiconductor applications and precision moulds in a number of different materials.



The machines are supplied with software and processes suitable for the production of the most complex freeform artefacts. Covering a range of sizes from 1.5mm to 6m they utilise patented processes including the mechanical "ZeekoClassic" technology and the "ZeekoJet" solution. These cost effective solutions are deterministic and scalable from the smallest cell-phone requirements to the largest astronomy applications and are suitable for polishing most materials from traditional optics materials, stainless steel etc to both tungsten carbide and silicone carbide.

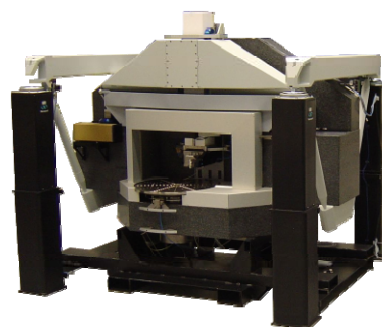
Along with Dr David Walker, Richard founded Zeeko Ltd, the innovative manufacturer of polishing solutions for ultra-precision surfaces. As Managing Director he has lead the

company throughout the development of its current range of equipment. As a part of its business, Zeeko includes the supply of such technologies to the manufacturers of optics for the astronomy community. His Company has, in just nine years, progressed from start-up status to become one of the recipients of a contract to develop manufacturing technologies for the fabrication of the primary mirror segments for the European Extremely Large Telescope.

Both in its polishing technology and in its measurement techniques, Zeeko has been a key innovator in the development of processes that in the coming years will be relied upon by at least a part of the astronomical community. Richard will describe these innovations and discuss some of the challenges faced by Zeeko in meeting the aspirations of the scientific community.

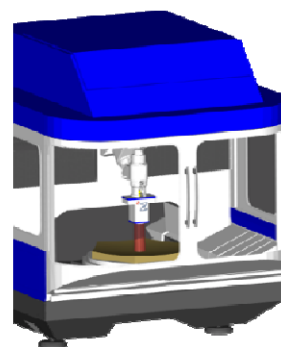
NANOMEFOS Specifications

- Measures flat, spherical, free-form and off-axis parts, size up to 500 mm \varnothing by 100 mm thick
- Granite base with active vibration isolation
- 5-axis servo driven system positions custom probe over surface under test
- Air bearings for 4 main motion axes
- Uncertainty 30 – 90 nm (2σ), dependent upon part to be measured
- Non-contact optical probe:
 - o 5 mm axial range
 - o $\pm 5^\circ$ angular range
 - o 1 nm resolution
 - o Sample rate $> 3\text{kHz}$
- Interferometric and capacitive monitoring on motion axes
- High speed measurement (estimated 15 min for 500 mm \varnothing part)
- State of the art CNC control of all axes and measurements
- Control and analysis software based around the Zeeko Metrology Toolkit
- Dimensions (W x D x H): 2100 mm x 1800 mm x 1800 mm



Stitching Interferometer Specifications

- Measure fast convex or slow concave surfaces and flats by Stitching Interferometry (SI)
- Customized Twyman-Green type interferometer at 633 nm utilizing custom auxiliary optics for surface measurement with 1000 x 1000 pixel CCD camera
- Stitching Interferometry module fits into Zeeko tool chuck and uses the same CNC axes as the machine system
- SI module fits into Zeeko tool chuck and uses the same CNC axes as the machine system
- Auxiliary optics depend upon application, but nominally based on 4" and 6" apertures for spherical parts
- Supports the production of spherical surfaces to $\lambda/10$ P-V
- Accuracy dependent upon application, but for spheres and flats is generally better than $\lambda/50$ RMS1
- $\lambda/20$ P-V reference optics for spherical systems 1 Results obtained with a development version of the stitching system



Optical Test Tower

- Free-standing optical test towers designed to serve the Zeeko IRP 800-IRP 2400 machines
- Custom designed for your application using CAD /finite element analysis and optical design software
- Interferometers, wavefront sensors OR optical components can be placed at the top of the towers for flexibility in the optical test design.
 - o Test longer radius concave spheres in situ
 - o Fold and shorten the beam path using custom optical test configurations
- Isolated gantry allows personnel access for adjustment and upper tower configuration, without disturbing measurement frame.



14:45-15:45 April 28..... Workshop 2, No.1 Lecture hall

**Engineering Synthesis Design, Inc.**

310 South Williams Boulevard Suite 210 Tucson, AZ 85711-4483 USA
 Phone: +1 (520) 296-3068 Fax: +1 (520) 296-2897 www.engsynthesis.com

Advances in Fizeau Interferometry**Donald A. Pearson II****ESDI – Tucson, Arizona, USA**

The last several years have seen major technical advances with the design and application of Fizeau interferometers. ESDI in Tucson, Arizona has consistently been a leader in these advances by designing and manufacturing state of the art Fizeau interferometers for vibration insensitivity and for measuring aspheric elements. ESDI's Intellium H2000 is a polarization based vibration insensitive Fizeau interferometer that incorporates simultaneous phase-shifting with its patented *HyperPhase* module. The patented *HyperPhase* module allows for three ultra precise, phase-shifted interferograms to be acquired simultaneously. ESDI has successfully demonstrated less than $\lambda/100$ measurement errors in the H2000. ESDI has also developed a nulling Fizeau interferometer, the Intellium Asphere, for measuring aspheric surfaces. The Intellium Asphere incorporates traditional phase-shifting interferometry, sub-Nyquist sampling and ESDI's patent pending CGR technology to measure aspheres in the same manner which flats and spherical surfaces are measured.

Intellium H2000: Like all vibration insensitive interferometers that capture multiple phase-shifted interferograms simultaneously, the H2000 is polarization based. Like all polarization based, vibration insensitive interferometers, the H2000 is also a dual beam interferometer in that the measurement beam and the reference beam are orthogonally polarized with respect to one another. Because the dual beams are orthogonally polarized, they may be affected differently as they travel through the optical path of the interferometer. These affects are due to birefringence that may exist in the internal optics

of the interferometer or the reference optics being used. In the H2000, the illuminating test and reference beams travel through the collimator at a slight angle with respect to one another. However, the reflected reference and test beams travel on-axis back through the optical system. This unique design, coupled with ESDI's SPARC (S-P Advanced Relative Calibration technology) allow for measurement errors of less than $\lambda/100$. This may be accomplished by simply by making a measurement with the S and P beams configured as test and reference, saving the result, he reversing the S and P beams to measurement and test. In our presentation, we will demonstrate these measurement results.

Intellium Asphere: The Intellium Asphere is a modified Fizeau interferometer used for measuring aspheric surfaces. The Asphere incorporates traditional phase-shifting, sub-Nyquist sampling and ESDI's patent pending CGR technology. Traditional Fizeau interferometers must be used with computer generated holograms to measure aspheres. This is so because using a standard transmission sphere to measure an aspheric surface generates fringe densities to high to overcome and the fact the test and reference beams travel different paths throughout the system create retrace errors. ESDI has solved this by implementing a sub-Nyquist camera where it is possible to capture and process interferograms with fringe densities of four fringes per pixel, i.e., greater than 2000 fringes and by implementing CGR (computer generated reference) technology to overcome the retrace errors. The CGR is a set of computer generated, synthetic fringes that are easily generated because the optical prescription of the aspheric surface is known, the optical prescription of the transmission sphere is known and the optical prescription of the interferometer is known. Therefore, we generate the CGR and overlay it with the actual fringes being measured. The overlaying of the two interference patterns, the actual fringes from the surface and the CGR, creates the Moire' affect. With the Moire' fringes as the guide, it is now straightforward to align and measure the aspheric surface in a "nulled" condition. In our presentation, ESDI will demonstrate this capability.

ESDI Product Introduction

Intellium H2000 - Simultaneous Phase-Shifting Fizeau Interferometer for Dynamic Measurements in Harsh Environments

Features ESDI's patented *HyperPhase* module for Vibration & Turbulent Environments; *SPARC®* Technology demonstrates measurement errors of less than $\lambda/100$ PV; Uses industry standard, 100 mm (4") bayonet reference optics; Measure flat, concave and convex surfaces, small to astronomical size; Ideal for long optical path length and remote Fizeau cavity applications; 10 μ s exposure times; True 1k x 1k resolution; Dimensions 337 x 190 x 254 mm

Intellium Asphere - Nulling Fizeau Interferometer for Aspheric Surface Measurements

Utilizes traditional phase-shifting technology with sub-Nyquist sampling & *CGR* Technology; Data acquisition, processing and retrace compensation in seconds, **NOT** minutes; No CGHs, null lenses or long stitching/scanning processes required; Measures aspheric, flat, and spherical surfaces; Operates on the world-renowned IntelliWave™ 6.5 software platform; Output Aperture 100mm; Fringe Resolution 2,000 fringes; Dimensions 338 mm x 190 mm x 254 mm

Intellium Z100u – Full Featured 100mm Fizeau Interferometer

Single cable, total USB connectivity to laptop or desktop computer; Supports PZT

phase-shifting, spatial carrier and fringe tracing interferometry; Compatible with all industry standard 4" (100mm) reference optics and accessories; 6x zoom, focus and attenuation controls; 1k x 1k true spatial resolution; 35 μ s exposure time; *IntelliPhase* static spatial carrier function for vibration insensitivity; With the single cable USB connectivity option, the Z100u and laptop computer increase portability and flexibility. Also available is the 40mm aperture **Z40u** Fizeau interferometer for small part testing

***Intellium PDI* – Self Referencing Point-Diffraction Interferometer**

The PDI measures real-time wavefront data from external sources in vibration and turbulent atmospheric environments. The *Intellium™ PDI* with ESDI's patented *HyperPhase™* module is a state-of-the-art point-diffraction interferometer that provides real-time wavefront measurements using an internally generated spherical reference and ESDI's simultaneous phase-shifting technology.

Also available is the **SBSI** for very small diameter wavefront measurements

***IntelliWave* - The De-facto Standard for Interferometry Software**

Also available is *IntelliStitch* for stitching large flat and spherical surface measurements

16:00-17:00 April 28..... Workshop 3, No.1 Lecture hall



Partner of NTG in China:

Mr. Shi Zhenxia / 师 振 峡

OEC desino zhenxia Tech.Co.,Ltd.

北京德华振峡科技有限公司

Tel.: 021 6148 2080

NTG Neue Technologien GmbH & Co. KG

Im Steinigen Graben 12-14

D-63571 Gelnhausen

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Fax: +49-6051-6003-55

e-mail: info@ntg.de

IBF-Technology for Nano Manufacturing Technology

T.Franz

NTG, Neue Technologien GmbH & Co.KG, Im Steinigen Graben 12-14, 63571 Gelnhausen-Hailer, Germany; t.franz@ntg.de

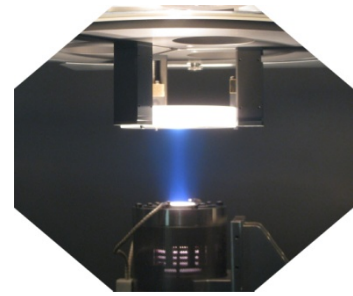
The report in the Forum will reflect upon the informations given in the report of the plenary talk but additionally give a very detailed view of the history and presence of NTG with an sideview on other branches and projects in which NTG is involved. The main focus also lies on the IBF-Technology. The report will explain the different stages of development of these unique technology at NTG within the last twenty years. All different types of NTG IBF-plants will be explained in details including some intentions which applications are suitable for IBF. The report reflects upon the widespreaded IBF-300, IBF-450 and IBF-700 and places a particular emphasis to the latest developments of NTG: IBF-100 and IBF-1500.

The following informations can be seen as fundamental for all our systems.

NTG Product Introduction

NTG is a worldwide operating mechanical engineering company located in the heart of the european Union. Made in Germany is not just an empty phrase for us. No difference if simple job order parts or complex procedural plants, everything is manufactured inhouse.

Since 1968 NTG Neue Technologien GmbH & Co. KG is an innovative designer and manufacturer of products for mechanical engineering, special machines and appliances. Located in the Frankfurt/Main area, actually approx. 85 employees are working at NTG. NTG co-operates successfully with customers in Industry and Research. Our activities concentrate on Design, Manufacturing, Assembly and Commissioning of parts or complete plants mainly in the fields of vacuum technology, nanotechnology and components for nuclear power plants, as well as special custom-made plants for industrial clients. In our characteristic as designer of custom made solution we are always looking for new challenges. Do not hesitate to describe us your problem, even if it does not fit into the categories listed above. NTG's production equipment is according to the high requested standard and is added by our production independent and TÜV-authorized Quality Control Department. It is equipped with 3D gauging machines. All processes are controlled by an ERP-System. We dispose of valid approvals according to HP0 and DIN/ISO 9001, DIN ISO 13485 as well as KTA 1401 and SVTI. Our Technical Engineering and project planning team is provided with wit the following 3D-CAD and CAM System: Mechanical Engineering: Solid Works 2010, ProE, CAM Works Electrical Engineering: VisiWinNET(.net-Interface), TwinCAT or Siemens S7, TreeCAD. NTG is specialized on stainless steel. With our experience and our large feedstock we are able to serve our customer immediately if required.



Since 1991 NTG is engaged in IBF-technology. IBF-Technology is needed when the required quality of optical surfaces can not be achieved by using conventional polishing techniques. Our Customers are the world leader in fabrication of high performance optics. Whereas in the past the use of technology was limited in producing stepper objectives for the semiconductor industry recently a growing demand of this technology even in the traditional optic industry can be recognized. Actually five different standard types of IBF-plants are available at NTG for different sizes and applications.

NTG uses inhouse developed control systems for the IBF-plants. Control is done via touchscreen. The process flow is nearly completely automated. This means for the user: insert work piece, load the program, start the process.

IBF-100:

The IBF-100 is beside the IBF-1500 the latest development of NTG. The IBF-100 is a consistent advancement of our bigger plants IBF-300, IBF-450 and IBF-700. Parts with a diameter of 5-70mm, a max. part thickness of 45mm and max. contact angle of 60° can be treated.

IBF-300 & IBF-450:

The IBF-300 and 450 were the first types of IBF plants from NTG. Designed for diameters up to 300 resp. 450mm a height up to 120mm and weights up to 50kg these



plants are perfect tools for the fabrication of high end lenses. For more than 15 years some plants of this type are running in an industrial process partly in 24/7. The system is almost free of wear parts.

IBF-700:

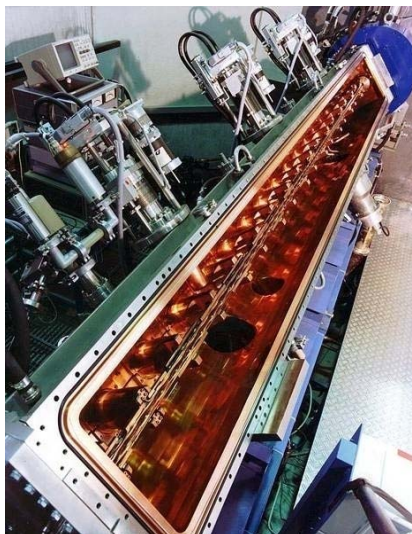
The IBF-700 is for workpieces up to 700mm in diameter approx. 200mm height and a weight up to 100kg. Its main use is in the semiconductor industry.

IBF-1500:

The IBF-1500 is for workpieces up to 1500mm in diameter and a total weight up to 1000kg ! It is actually the biggest NTG-IBF plant and is mainly used for polishing error correction of large mirrors used for astronomical applications.

Advantages of NTG-IBF Process

- Contactless process - no signs on the surface
- no induced stress on the surface
- almost any geometry can be treated
- large spectrum of processable materials
- acquisition costs comparable with MRF plants
- low operating costs
- no abrasives are necessary
- nearly no wearing parts
- less cleaning expenses (for parts and machine)
- low maintenance
- surface quality $PV < \lambda / 10$ to $\lambda / 20$ reachable (depending on the requirements of quality & process speed)
- surface quality $PV < \lambda / 100$, rms $< 1\text{nm}$ reachable without additional investments
- Know-How resulting of nearly 20 years IBF-treatment



Beam Accelerator

Dalian World Expo Center

<http://www.dl-expo.com/>

The Dalian World Expo center CO.,LTD was founded in June 2004, and is governed by the Dalian XingHai Bay Development & Construction Administration Center. It is equipped to host international and domestic trade fairs, conventions and exhibitions and is a member of The Federation of Consumer Products Trade Center for All China Cities as well as The China Convention and Exhibition society. The governing units of Convention Exhibition Fortune have bestowed the service award of Annual Selection of China Convention and Exhibition industry for 2005-2006, and rated the Expo Center in the Top 20 Profitable Exposition of the Exhibition Industry. It is also won the highest honor award of China Newly Rising Star in the China Convention Exhibition Summit Forum for 2007.

Howard Johnson Parkland Hotel Dalian**ACCOMODATION**

Our 262 luxurious guest rooms and suites provide ideal city and sea view rooms. The Interior Decor and elegant furnishings are designed by Top German Design Company GMP with modern amenities to offer the guests the ultimate experience.

The Howard Johnson Club Floors allow for that exclusive private check-in and check-out providing superior comfort and benefits for the discerning business travelers. Each room and suite is stylishly decorated with great attention to detail, featuring state-of-the-art amenities.

RESTAURANTS & LOUNGES:

Loading Restaurant

This restaurant provides a unique open kitchen design which offers an international buffet. Featuring the best of Japanese, Asia, local seafood dishes and genuine pizza. Definitely the place to dine in Dalian Xinghai Square.

Helloker Lobby Lounge

The lobby lounge becomes the ideal meeting place. By day it is the ideal place to meet for a coffee and try our pastries and snacks. At night, the lounge transforms, offering live music and a great selection of evening cocktails.

LOCATION:

"Location is everything", Howard Johnson Parkland Hotel Dalian is located in the Xinghai Square – known as the largest and most scenic restaurant and entertainment square in Asia. This Hotel becomes first choice for exhibition patrons as it is directly adjacent the Dalian World Expo Centre. The hotel also compliments the fast developing Commercial and Finance area where an array of International Brand companies can be found, Your evening can be perfect as this hotel is only a five minutes walk to the beach.

TRANSPORTATION / NEARBY ATTRACTIONS:

Zhou shuizi International Airport	15 minutes by car
Dalian Railway Station	18 minutes by car
Dalian Xinghai Square	3 minutes by walk

FACILITIES & GUEST SERVICES

- Hi-speed Internet access
- Voice mail system
- Luxurious bath amenities
- Full size writing desk with writing lamp
- Hair drier
- In-room safe
- Limousine services
- Individually controlled air-conditioning
- Wheelchair accessible room
- Satellite TV programs
- Tea/coffee facility
- Full-stocked mini-bar/mini shop
- Car parking
- Howard Johnson Club Floors

MEETING FACILITIES

The ideal meeting solution can be found for that intimate event or meeting. Our facilities are designed for flexibility to meet your needs. Each of the meeting and function spaces feature modern audio-visual equipment, and offer a wide selection of catering and banquet themes. Our meeting organizers will ensure that service is delivered in the most professional manner to meet the needs of your company and client.

RECREATION & LEISURE

- Fitness Centre & Gym
- Sauna



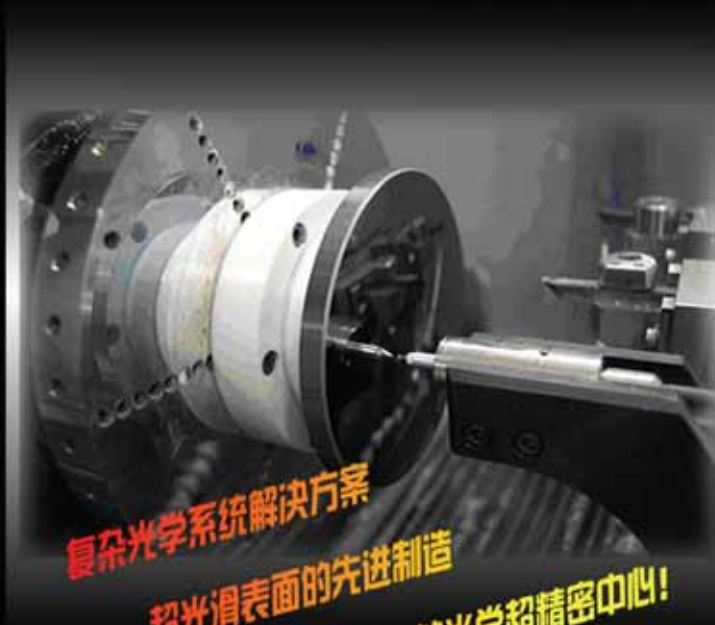
maupmc

上海现代先进超精密制造中心有限公司

Shanghai Modern Advanced Ultra Precision Manufacturing Center .LTD

主要产品:

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微结构表面 (Micro Structure Surface)
微阵列和模具 (Micro Structure Array and Mold)
各种扫描器件 (F- θ Lens, Scanner)
离轴三反光学系统 (Off-axis Reflective Imaging System)
立体目镜显示系统/头盔显示器 (Helmet-Mounted Displays)
超短焦投影镜头 (Ultra Short Focus Project Lens)
热成像镜头 (Thermal Imaging Lens)



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建设世界领先的先进紫外/可见/红外光电元件和装配的研发设计中心
专注所有光学材料的非球面、自由面、微结构阵列制造
由国内外多学科专家和学者组成的专业团队为高难度项目客户提供技术支持

Find out more: www.maupmc.com Tel: (86-21) 55063801 Fax: (86-21) 55063804
Email: maupmc@maupmc.com 地址: 上海市黄兴路2005号2号楼20层 邮编: 200433



Institute of Optics and Electronics

Chinese Academy of Sciences



URE-2000/35



URE-2000S/25



URE-2000B



URE-2000D

URE2000 aligner's series were successfully developed in 1998. Eight types of them had been delivered to the customers over more than 20 provinces. Some of them had been exported to US, Singapore, Vietnam, P. R. Korea, etc..

URE2000 aligner's series, by the means of proximity or contact method, were used for the fabrication of small scale IC, semi-conductive devices, infrared devices and MEMS etc.. They are also suitable for the small production in factory.

Technical Parameters

Exposure area:

100mm×100mm~430mm×430mm

Overlay:

±0.45μm--±1μm

Resolution:

0.8-1μm (positive resist with thickness of 0.6mm)

Illumination Uniformity:

±3.5% (within Φ100mm)

±5.0% (within Φ150mm)

Power of mercury lamp:

100W~4500W

Mask Aligner

Contacts:

Post Code: 610209

Address: Chengdu Shuangliu 350 Post Box,
Sichuan, P.R.China

Deputation: Song Hu

Telephone: +0086-28-85100564

Fax: +0086-28-85100564

Http://www.guangkeji.com