AOMATT CHINA 2007

The 3rd International Symposium On

Advanced Optical Manufacturing and Testing Technologies

Technical Program

Chengdu, China

8-12, July 2007

Technical Program

AOMATT2007

The 3rd SPIE International Symposium on

Advanced Optical Manufacturing and Testing Technologies

8-12 July 2007
GOLDEN BULL HOTEL
Chengdu
China

Sponsored by:

COS-The Chinese Optical Society
IOE-Institute of Optics and Electronics,
-Chinese Academy of Sciences
SPIE-The International Society for Optical Engineering

Managed by:
IOE - Institute of Optics and Electronics,
-Chinese Academy of Sciences
Cooperating:
Committee of Optical Manufacturing Technology, COS
CoSponsoring:
the State Key Laborory of Optical Technology for Microfabrication
SOS- Sichuan Optical Society
Supported by:
The Ministry of Science and Technology of China
Chinese Academy of Sciences (CAS)
National Natural Science Foundation of China (NSFC)

Honorary Chair:

WANG Daheng, Academician, CAS & CAE (China)

Symposium General Chair:

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

AOMATT2007

AOMATT 2007 Technical Program Contents

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Advanced Optical Manufacturing and Testing Technologies

8-12 July2007

Chengdu China

IVITATION

Welcome!

Dear Colleagues and Friends,

The 3rd International Symposium on Advanced Optical Manufacturing and Testing Technologies 2007 will be held in Chengdu in July8-11, 2007, in the well-know historical and cultural city in southwest China.

Technologies of advanced optical manufacturing and testing become an important branch of optical sciences as well as an indispensable part of manufacturing science. They are closely associated with technologies of information, bioscience, materials and manufacturing process, integrated w ith optics, mechanics, computer, measurement and other new technologies. The symposium will review the great progress in this field all over the world during the last decade, carrying out academic exchange on the approached achievements and discussing the development trend, planning on the key technology and business cooperation and so on in the conference.

On behalf of the organization committee of the symposium,I would like sincerely to invite you to participate in the 3rd International Symposium on Adva nced Optical Manufacturing and Testing Technologies in July8 -12, 2007. We believe that the ancient historical sceneries and multi -cultural components in Chengdu will leave you a pleasant and impressive memory .

We are looking forward to meeting you at the symposium in Chengdu .

Sincerely

Zhang Yudong
Chairman of the Organization Committee
Director, Institute of Optics & Electronics, CAS

AOMATT 2007 Symposium Organizations & Committees

Sponsored by:

COS - The Chinese Optical Society

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

SPIE - The International Society for Optical Engineering (Technical Co-Sponsor)

Cooperating Organizations:

Committee of Optical Manufacturing Technology, COS

CoSponsoring Organizations:

the State Key Laborory of Optical Technology for Microfabrication

SOS- Sichuan Optical Society

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The Ministry of Science and Technology of China
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Honorary Chair:

WANG Daheng, Academician, Chinese Academy of Sciences and Chinese Academy of Engineering (China)

Symposium General Chair:

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

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Roland Geyl, REOSC Optics, SAGEM (France)
Richard Freeman, Zeeco Co. Ltd (UK)
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Mike Conroy, Taylor Hobson Limited (England)

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Secretary General of the Symposium:

YANG Li, Committee of Optical Manufacturing Technology, COS
Jinxue Wang, SPIE Technical Advisor (USA)

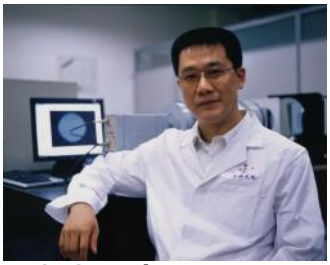
Symposium General Chair:

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 "S ingle 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 ofInstitute 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.

From1998 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.

AOMATT 2007 Daily Event Schedule General

Date	Time	Content	Place
Sunday,8 July	9:00-22:00	Registration	Lobby of the Hotel
Monday, 9 July	8:30-9:00	Opening Ceremony	auditorium of the Hotel
	9:00-12:00	Plenary 1-4	auditorium of the Hotel
	13:30-17:40	Plenary 5-10	auditorium of the Hotel
	18:30-20:30	Welcome Banquet	auditorium of the Hotel
Tuesday,10July	8:30-12:00	Session 1-1 Session 2-1,2-2 Session 3-1,3-2,3-3 Session4-1	(room1): Session 1-1 (room2): Session 2-1 (room3): Session 2-2 (room4): Session 3-1 (room5): Session 3-2 (room6): Session3-3 (room7): Session 4-1
	13:30-17:10	Poster 1,2,3,4	Room8
	13:30-17:10	Workshop by TOSHIBA , SATISLOH and FISBA OPTIK	Room9
Wednesday,11July	8:30-12:00	Session 1-2 Session 2-3,2-4 Session 3-4,3-5,3-6 Session4-2	(room1): Session 1-2 (room2): Session 2-3 (room3): Session 2-4 (room4): Session 3-4 (room5): Session 3-5 (room6): Session3-6 (room7): Session 4-2
	13:30-17:10	Session 2-5,2-6 Session 3-7,3-8,3-9 Session4-3	(room2): Session 2-5 (room3): Session 2-6 (room4): Session 3-7 (room5): Session 3-8 (room6): Session3-9 (room7): Session 4-3
	19:30-21:30	Closure Ceremony and an Evening Party	auditorium of the Hotel
Thursday,12July	The whole day	Touring around Chengdu	
Friday,13July		Touring to Jiuzhaigou Valley or the Potala Palace at Lhasa	Self Choice

Plenary Presentation

Monday, 9 July

8:30-9:00 Opening Ceremony / / *Chiar: Yangli (Secretary General)*

9:00-17:40 Plenary Presentation /

Chair for P.P. Session 0-1 : Zhang Yudong (Chair of Organizing Committee)
Chair for P.P. Session 0-2 : Dr. Myung K. Cho (Co-Chair of conference 1)
Chair for P.P. Session 0-3 : Xing Tingwen (Director of the State Key Laborory of Optical Technology for Microfabrication)
Chair for P.P. Session 0-4 : Li Yanqiu (Co-Chair of conference4)

	Order	Time	Presentation	Title of the lecture	Note
Session 0-1	1	9:00-9:40	Dr.H. Philip Stahl	James Webb Space Telescope The First Light Machine	NASA U.S.A
	2	9:40-10:20	Dr.Bernard Delabre	The 42 m E-ELT (European Extremely large telescope)	ESO Germany
10:20-10:40 Tea Break					
Session 0-2	3	10:40-11:20	Dr.Eric RUCH	Extremely Large Telescope The Challenge of the Optics	SAGEM Défense Sécurité REOSC Department France
	4	11:20-12:00	Dr. Jim Burge	Optics for the Giant Magellan Telescope	University of Arizona USA
12:00-12:10 Attendances Taking Photo					
12:10-13:30 Lunch Time					
Session 0-3	5	13:30-14:10	Dr.David Walker	The New UK National Facility for Ultra-Precision and Structured Surfaces	University CollegeLondonUK
	6	14:10-14:50	Dr.Yoshiharu Namba	Manufacturing of Replicated Optics for Extremely Short Wavelength Applications	Chubu University Japan
	7	14:50-15:30	Dr.Tadashi Hatano	High precision multilayers of imaging mirrors for diffraction-limited soft X-ray microscopes	Tohoku University Japan
15:30-15:40 Tea Break					
Session 0-4	8	15:40-16:20	Dr.Masaomi Kameyama	Immersion and 32nm Lithography -- Now and Future --	Nikon Corporation Japan
	9	16:20-17:00	Dr.Xiangang Luo	Sub-wavelength Plasmonic Optics and its Applications to Nano-Optical Functional Elements	IOE China
	10	17:00-17:40	Dr.SEN HAN	Overview of Characterizing MEMS/NEMS	veeco company U.S.A

Monday, 9 July,2007

The 3rd AOMATT 2007
Golden Bull Hotel Chengdu
Presided by: **ZHOUBingkun**

8:30 to 9:00
Opening Ceremony
Chair: YangLi

9:00 to 17:40
Plenary talk

AOMATT2007 Plenary Presentation
9:00 at to 17:40
Golden Bull Hotel Chengdu
Room auditorium of the Hotel

P.P. Session 0-1
Chair: Zhang Yudong
09:00-09:40 Dr.H. Philip Stahl
09:40-10:20 Dr.Bernard Delabre
10:20-10:40 Coffee/Tea break

P.P. Session 0-2
Chair: Dr. Myung K. Cho
10:40-11:20 Dr.Eric RUCH
11:20-12:00 Dr.David Walker

P.P. Session 0-3
Chair: Xing Tingwen
13:30-14:10 Dr.Yoshiharu Namba
14:10-14:50 Dr.Tadashi Hatano
14:50-15:30 Dr.Masaomi Kameyama
15:30-15:40 Coffee/Tea break

P.P. Session 0-4
Chair: Li Yanqiu
15:40-16:20 Dr.David Robertson
16:20-17:00 Dr.Xiangang Luo
17:00-17:40 Dr. SEN HAN

Plenary Talk 1

James Webb Space Telescope : The First Light Machine

9:00 to 9:40

Dr. H. Philip Stahl
NASA
USA

Abstract

Scheduled to begin its 10 year mission no sooner than 2013, the James Webb Space Telescope (JWST) will search for the first luminous objects of the Universe to help answer fundamental questions about how the Universe came to look like it does today. At 6.5 meters in diameter, JWST will be the world's largest space telescope. This talk reviews science objectives for JWST and how they drive the JWST architecture, e.g. aperture, wavelength range and operating temperature. Additionally, the talk provides an overview of the JWST primary mirror technology development and fabrication status.

Brief Biography

Dr. H. Philip Stahl is a Senior Optical Physicist at NASA MSFC where he is the James Webb Space Telescope (JWST) Optical Components Technical Lead. Previously, Dr. Stahl was a Senior Staff Optical Engineer at Raytheon Danbury (formerly Hughes Danbury Optical Systems, now Goodrich Aerospace) where he was the lead optical engineer for the 4 meter LAMP mirror. As President of Stahl Optical Systems Inc. he supported several NASA microgravity experiments. Also, he was an Assistant Professor of Physics and Applied Optics at Rose-Hulman Institute of Technology, the Optical Products Manager at Breault Research Organization (BRO), and a Senior Optical Systems Engineer at BRO. Prior to that, he worked at Perkin-Elmer, Hughes Aircraft, and Wright-Patterson AFB. Finally, he was a Faculty Fellow at NASA Lewis (now Glenn) Research Center.

Dr. Stahl is a leading authority in optical metrology, optical engineering, and phase-measuring interferometry. Many of the world's largest telescopes have been fabricated with the aid of high-speed and infrared phase-measuring Interferometers developed by him, including the Keck, VLT and Gemini telescopes. He is a Fellow of SPIE, an SPIE Director, an International Commission for Optics (ICO) Vice President and a member of OSA. He earned his PhD in Optical Science at the University of Arizona Optical Sciences Center in 1985.

Plenary Talk 2

The 42 m E-ELT (European Extremely large telescope)

9:40-10:20

Bernard Delabre
European Southern Observatory (ESO)
Germany

Abstract:
The present concept of the E-ELT is a five mirrors, 42 m diameter telescope which includes adaptive optic for correction of the ground layer turbulences. The primary mirror is aspheric, it is composed of 906 hexagonal segments, 1.45 m each. The secondary mirror has a diameter of 5.7 m. The three additional mirrors, one concave and 2 flat are used for adaptive optic and image stabilization, they also provide access to two Nasmyth focal planes.The implementation of a Coude focus is also foreseen for instruments which require very high stability. The five mirror approach provides a fully diffraction limited 10 arc min field of view, even down to 450 nm and is compatible with the use of laser guide stars.
This paper will describe in details the optical design and the performances of the telescope. Some preliminary information of the mechanical concept will also be given.

Brief Biography
Several papers on astronomical instrumentation, mainly imagers and spectrographs for the ESO Very large Telescope.

Plenary Talk3

Extremely Large Telescope The Challenge of the Optics.

10:40-11:20

Eric RUCH
SAGEM Défense Sécurité REOSC Department
France

Abstract:
The next generation of Extremely Large Telescope wi ll be a major challenge for the optical manufacturing companies worldwide. Several projects, such as the European Extremely large Telescope, the Thirty Meter Telescope, the Giant Magellan Telescope are planned to be manufactured during the next decade. The se projects will require the production of large monolithic segments or several hundreds of 2 meter class segments much faster and much more accurate than the optics produced in the 90s. Most of these new generation telescope will also require large adaptive mirror with thin shell of several meter in diameter and a few millimeters thick. And the focal planes will see new generation of instruments requiring very large lenses and filters. This paper will address these new challenges that the optical manufacturing will face during the next decade.

Brief Biography
Eric Ruch is graduate in optical engineering from the Institute of Optics in Paris . Hs has joined REOSC in 1985, has work in lens design and has been project manager for several space and astronomy projects. Since 2006, he is responsible for the business development for
the space and the astronomy activities of the REOSC department in SAGEM.

Plenary Talk4

Optics for the Giant Magellan Telescope

11:20-12:00

Dr. Jim Burge

University of Arizona USA

Abstract:

The University of Arizona has started making the optics for the Giant Magellan Telescope -- an astronomical telescope with 25 meter aperture. The giant primary mirror for GMT will be made of seven smaller pieces, each 8.4 meters across. The effects of the atmosphere will be measured using laser guide stars and will be corrected in real time by deforming the 4 meter secondary mirror. The challenges of making the telescope optics are being directly addressed at the University of Arizona. This talk will summarize the design and performance of GMT and will give discuss the technology for the mirrors.

Biography:

Dr. Jim Burge is Associate Professor at the University of Arizona with joint appointments at the College of Optical sciences and Steward Observatory. He has led the development of optical testing and mirror fabrication technologies that enable the production of large, highly aspheric telescope mirrors. He also leads a group of graduate researchers and teaches courses in applied optics and optomechanics.

Plenary Talk5

The New UK National Facility for Ultra-Precision and Structured Surfaces

13:30-14:10

Dr.David Walker

University College London UK

Abstract:

This paper describes the UK programme to develop a National Facility for producing ultra-precision surfaces up to the 1m size-range and beyond. This is partly funded by the UK research councils through the university sector, and partly by industrial collaborators. The Facility is located within the technology centre of the new OpTIC Technium building in North Wales, which also houses company incubators and business support. The driver for theprogramme is the increasing demand for medium-scale optics for a number of sectors including astronomy and high-power lasers, and the increasing demands on surface-quality and surface-complexity.

State-of-the-art equipment is currently being installed and operated in the new National Facility. Processes under development comprise ultra-precision grinding, reactive atomic plasma technology, fluid-jet polishing, Precessions TM polishing and various hybrid grolishing techniques. Metrology of surfaces is key to their manufacture, and so the UK approach to this is also described, based around interferometry and contact profilometry. Overall, the Facility is developing a holistic approach considering all aspects of the optimum end-to-end manufacturing cycle.

Plenary Talk6

Manufacturing of Replicated Optics for Extremely Short Wavelength Applications

14:10-14:50

Dr.Yoshiharu Namba

Chubu University Japan

Abstract:

The replication process is the key optical manufacturing technology for consumer's products such as lenses of CD, DVD, digital cameras and laser printers as well as collimation optics in order to reduce the cost remarkably, particularly for making non-flat and non-spherical surfaces. Making precision dies, molding, separation and inspection are the basic processes for such optics. X-ray optics requires special demands such as aspheric mirrors of higher dimensional accuracy and very smooth surface due to shorter wavelength. X-ray microscopes need inner mirrors of small diameter. X-ray telescopes need very light weigh and large mirrors of various shapes. All such mirrors are coated with very smooth thin reflecting films. For making such X-ray optics, replication technology has been adopted. This paper deals with ultra-precision machining of electroless nickel dies, single and multi-layer coating, molding and separation for making aspheric mirrors of X-ray microscopes and telescopes. The latter case, we need the mass production of large aspheric dies in high precision, so that the electroless nickel has been adopted as the material for dies due to machinability. The dies were single-point diamond turned by ultra-precision lathes of 1nm resolution and polished into smooth surfaces less than 0.3nm rms. Such manufacturing process will help industrial needs in visible and infrared regions as the leading edge technology.

Brief Biography: Graduated from the department of precision engineering, Osaka University in 1964, Dr. of Engineering from Osaka University in 1970. Associate professor of Osaka Unive rsity from 1972 to 1987. Professor of Chubu University from 1987. Winner of David Richardson Medal from the Optical Soc iety of America in 1998. Fellow of JSME and JSPE.

Plenary Talk7

High precision multilayers of imaging mirrors for diffraction-limited soft X-ray microscopes

14:50-15:30

Dr.Tadashi Hatano
Tohoku University Japan

Abstract:
We are developing soft X-ray microscopes using multilayer optics (M. Yamamoto et al.: Opt. Prec. Eng. 9, 405 (2001)). Our goal is an element specific imaging of organic and inorganic hybrids with a spatial resolution of 50 nm in laboratory scale. Normal incidence multilayer mirrors could reduce an aberration to nm level, as well as dilate an NA over 0.2. Though a laser produced plasma (LPP) laboratory source (S. Nakayama et al.: Physica Scripta 41, 754 (1990)) is less brilliant than synchrotron radiation, it is suitable for imaging type microscope in combination with a multilayer objective. We have developed a multilayer fabrication system stabilized for absolute thickness control to ±0.4% and a speed programmed shutter for thickness distribution control over a curved mirror substrate to ±0.1%. Precise period thickness measurements were achieved at a synchrotron radiation facility (T. Hatano et al.: AIP Proc. 705, 839 (2004)). To finalize high quality imaging mirrors with a sub-nm level error, we are developing a spectro-reflectometer, an at-wavelength interferometer and a wavefront error correction system. The spectro-reflectometer is composed of an LPP source, a Monk-Gillieson type monochromator and a variable length goniometer adjustable to radius of curvatures of mirror samples. Another LPP source with a high NA debris shutter (M. Yamamoto et al.: Proc. Soc. Photo-Opt. Instrum. Eng. 4146, 128 (2000)) is used at the interferometer, which is of a common path type. We have proposed a wavefront correction method using a 6°
reflection phase change at a wavelength of 13 nm under a single layer pair removal (M. Yamamoto: Nucl. Instrum. Methods Phys. Sec. A 467-8, 1282 (2001)). A milling equipment for this purpose is under construction.

Brief Biography:
Tadashi Hatano was born in Mie, Japan in 1964. He got a PhD (sc) at the University of Tokyo in 1993. He was a research fellow from 1994 till 1996 in the Photon Factory, where he studied core MCD and soft X-ray Young's interferometer. He moved to Tohoku University in 1996. His current interests are in phase control of soft X-rays using multilayers including interferometry, diffraction- limited imaging and polarization analysis.

Plenary Talk8

Immersion and 32nm Lithography -- Now and Future –

15:40-16:20

Dr.Masaomi Kameyama

Nikon Corporation Japan

Abstract:

The amazing growth of the semiconductor industry over the past decades has been supported, and in many cases driven, by miniaturization of devices. Behind this has been one strong backbone - lithography. In the 1970's, devices had geometries of several micrometers, but now we are about to enter 45nm device pre-production and shortly after move it into volume-production. Immersion lithography, although having a short development time, is already in production and will become the primary technology driver. What we need to do now is identify the solutions for 32nm lithography. There are several candidates for 32 nm lithography, such as EUVL, High Index Immersion and Double Patterning / Double Exposure. Other more esoteric technologies such as nanoimprint and maskless lithography have also been mentioned. In this paper, the present status of Immersion lithography will be reviewed and each of the 32nm candidates are reviewed.

Brief Biography:

He received MS degree in Industrial Chemistry at Seikei University at 1975. He joined Nikon R & D Center in 1975, and then moved to Exposure Tool Designing Department in 1984. Since 1984, he has been in the center of Exposure Tool developments. He is the active member of ITRS Lithography ITWG and the ex-representative of Japan Lithography TWG in 2002 - 2005.

Plenary Talk9

Sub-wavelength Plasmonic Optics and its Applications to Nano-Optical Functional Elements

16:20-17:00

Dr.Xiangang Luo

IOE China

Abstract:

Current developments in optical technologies are being directed toward nanoscale devices with subwavelength dimensions. For most materials, light–matter interactions decrease as the structure size is below the wavelength of light. However, metals which support surface plasmon modes can concentrate electromagnetic fields to a small fraction of a wavelength while enhancing local field strengths by several orders of magnitude. For this reason, plasmonic nanostructures can overcome the diffraction of light. Thus, sub-wavelength plasmonic optics have many important applications in nanooptics. Here we review the current work in our laboratory and future prospects of sub-wavelength plasmonic optics and its applications in various fields including nano-optical sensors, nano-optical functional elements, and nanolithography.

Biography:

Xiangang Luo is a Professor and the vice Director of the State Key Lab of Optical Technology for Microfabrication. He also serves as the chief scientist of National Key Basic Research and Development Program on plasmonic-materials and devices. His current research focused on plasmonics, nano-scale engineering, meta-materials, and nano-photonics and nanofabrication. He has published over 60 technical papers. He received Ph.D from Chinese Academy of Sciences.

Plenary Talk10

Overview of Characterizing MEMS/NEMS

17:00-17:40

Dr.SEN HAN

veeco company U.S.A

Abstract:

With the development of MEMS and NEMS industries, the marketing demands on testing MEMS/NEMS devices are presented. Because MEMS/NEMS devices are manufactured using microfabrication technology similar to the batch fabrication techniques used for integrated circuits, unprecedented levels of functionality can be placed on a small silicon chip. With such complexity, and the demand for absolute repeatability, it is no surprise that quality control is one of the most crucial factors in making a successful and afford able MEMS/NEMS product. This presentation introduces overview of MEMS/NEMS testing. Then the presentation reviews the techniques of MEMS/NEMS testing, including static, dynamic and through transmissive media measurements. Finally, the presentation describes software features and MEMS applications.

Brief Biography:

Dr. Sen Han, as Senior Staff Scientist, has been working at Wyko/Veeco Instrument Inc since 1997. Dr. Han is an Adjunct Professor of College of Optical Sciences, University of Arizona, USA and an Adjunct Professor of Optical Engineering, Changchun University of Science and Technology, China. From 1991 to 1997, Dr. Han was a guest researcher of Institute of Applied Optics at the University of Stuttgart, Germany.

Dr. Han was involved in the design and manufacturing of the largest 24" phase shifting interferometer, LIGO interferometer and Wyko RTI series laser interferometers. Recently, Dr. led TTM project. Dr. Han won R&D100 Awards twice in 2000 and 2005, respectively.

Dr. Han is a member of SPIE, OSA and ASPE, and a board member of China society of Micro/Nano-Technology.

Workshop 1 *(Room9: 13:30-14:30 Tuesday,10July)*

Glass Molding and Mold Machining for Optical Elements

Masahide. KATSUKI
TOSHIBA MACHINE CO., LTD.

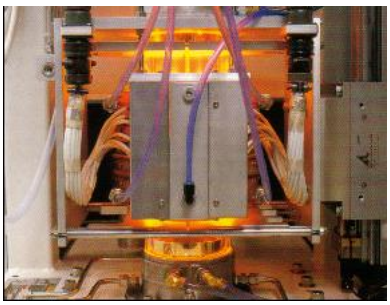
1. Introduction

a. Back ground of glass molding

b. Definition of glass molding

2. Overview of glass molding process

a. Molding process and machine structure



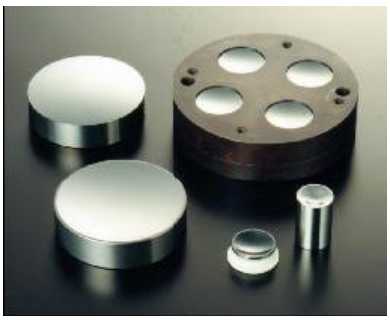
b. Transferability of molding

c. Repeatability of molding

d. Glass molding machine

3. Mold machining

a. Mold structure and material



b. Aspheric generator

c. Machining

4. Machining and molding examples

5. Conclusions

Workshop 2 (Room9: 14:30-16:30 Tuesday,10July)

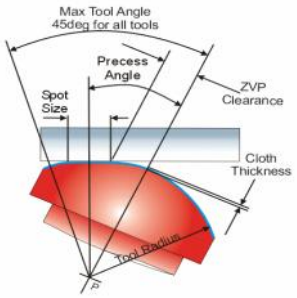
Satisloh

Free Form Optics in Precision Applications – State of the Art and Future Trends

Michael Wagner

Technical challenges of Asphere and freeform production

1. **Grinding of aspheres and free-forms**
2. **Computer-controlled polishing**
3. **A-I / A-II; the precessions polishing technology**
4. **Precession polishing**
5. **The polishing spot function**
6. **Precessions software**
7. **Results achieved**
8. **Conclusion**



New Axes Configuration On Grinder For A Flexible Optical Manufacturing

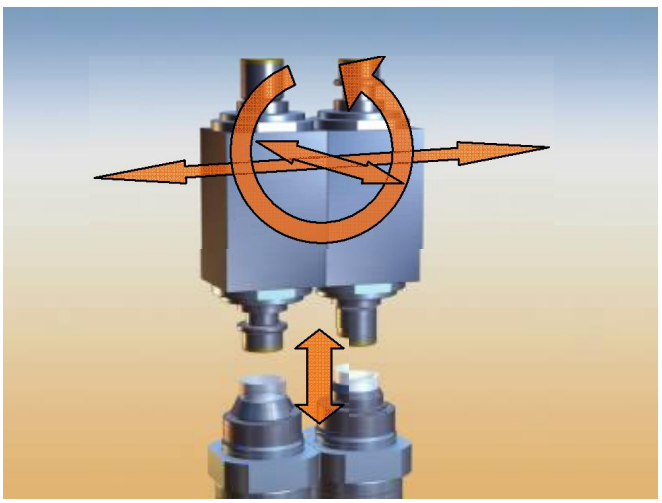
Jörg Haas

In June 2006 Satisloh GmbH shows exhibiters of the Optatec in Frankfurt the new developed SPM 60 grinder for the first time.

SPM 60:

Fig.1:
Swivel Head with 2 direct driven tool spindles and 4 diamond tools.

The 2 Lower spindles, work piece spindles.



Workshop 3 (Room9: 16:40-17:10 Tuesday,10July)

The Phase Productline and its Applications in Optics

FISBA OPTIK – Facts and Figures

– Business Areas

– Focus of Business Areas

– In-House Service Providers

– Our Mission

Introduction of Product Line Metrology

–mPhase (Standard Systems)

–mPhase martgage

- **Analysis Software**
- **Standard Metrology Products**
- **mPhase Philosophy & Strategy**

–Custom Made Applications

Market

–Segments

–Specific Applications

–Specific Systems

–List of our Customers

Contact

Conference 1 • SPIE Proceedings Vol.6721

Tuesday- Wednesday, 10-11July

Large Mirror and Telescopes

Conference Chairs: **JIANG Wenhan**, Academician, Chinese Academy of Engineering (China)
Dr. Myung K. Cho, National Optical Astronomy Observatory (USA)

Program Committee:

Matt Johns, Carnegie Observatories (USA)
Hans J. Kaercher, MAN Technologie AG (Germany)
WU Fan, Institute of Optics and Electronics, Chinese Academy of Sciences (China)
Kathleen A. Richardson, Univ. of Central Florida/CREOL (USA)
YU Jingchi, Suzhou Univ. (China)
Sung-Kie Youn, Korea Advanced Institute of Science and Technology (KAIST) (Korea)
ZHANG Xuejun, Changchun Institute of Fine Mechanics and Physics, CAS
YUAN Lvjun, Nanjing Institute of Astronomical Optics & Sciences (China)
Seung-Woo Kim, Korea Advanced Institute of Science and Technology (Korea)
FANG Jingzhong, Institute of Optics and Electronics, Chinese Academy of Sciences (China)
Yuri Storyalove, State Optics Institute (Russia)

Mirrors for large astronomical and space telescopes
Light-weighted mirror technology
Large deployable mirror and telescopes
New and innovative mirror and telescope designs
Advanced testing methods for large mirror
Support systems and structures
New material for large mirrors

SESSION 1-1 & 1-2

SESSION 1-1 (25min / report)

Room 1: ……Tuesday,10 July 8:30-12:00

Chair:Wu Fan

A 2,5 meter Robotic Telescope Project*(Invited), Eric* RUCH SAGEM Défense Sécurité REOSC Department France ……[1-010]

Thermal Performance of the ATST Secondary Mirror (Invited), Myung K. Cho, Joe DeVries, and Eric *Hansen* U.S.A ……[1-018]

High-resolution imaging techniques based on Optical Synthetic Aperture Shengqian Wang, Changhui Rao, Wenhan Jiang, Helu Song China……[1-002]

Tea Break

Absolute calibration of null lenses using dual computer-generated holograms (Invited), Proteep Mallik James Burge Rene Zehnder U.S.A ……[1-021]

Experimental Study on Imaging of Optical Sparse Aperture Systems and Its Evaluation, Dayong Wang, Ji Han, Xiyang Fu,HongfengGuo,ShiquanTao China ……[1-020]…

Control System of Position actuators For Segmented mirror active optics in LAMOST *Xixia* Du,Zhenchao Zhanga, Yongjun Qia, Aihua Li China……[1-039]

SESSION 1-2 (25min / report)

Room 1:……Wednesday,11 July 8:30-12:00

Chair: Gao Bilie

Gran Telescopio Canarias optics manufacture :A step towards the Extremely Large Telescope(Invited), Eric RUCH SAGEM Défense Sécurité REOSC Department France……[1-011]

Study on beryllium-mirror of space astronomical instruments, Liqiang Song, Shimo Yang, Zhiyuan Chen, Xinyu Zhang China……[1-022]……

The figuration of membrane mirrors by means of pre_shaped and electrostatic control Ping Gao, Minxue Tang, Xinhua Che, Lijuan Lu and Jianjun Yu China ……[1-026]

Tea Break

Holographic Correction of aberrated telescope with a membrane primary *Minxue Tang, Aimin Zhu, and* Weimin Shen China……[1-027]

Manufacturing and Testing 1-m Class SiC Aspherical Mirror (Invited), Zhang Xuejun Zhang Zhongyu Li zhilai China……[1-041]

POSTER 1

We will provide a broad with the dimentions of length of 3 me tres and breadth of 1 metres for each post papers. Pleasa prepare your post materials yourself.

Poster –Tuesday,10July, 2007 13:30-17:10 room8

Measurement of telescope aberrations using phase-diversity method
Qiang Li, Sheng Liao, Mangzuo Shen
China ……[1-001]…

Fabricate technique of large-scale lightweight SiC space mirror
ZHANG Ge,ZHAO Rucheng,ZHAO Wenxing
China ……[1-003]…

The mathematical analysis about deformation andmovement feature, when using stressed lap to off-axis segment, Gao Bilie
China ……[1-004]…

Design of a white-light interferometric measuring system for Co-phasing the primary mirror segments of the next generation of ground-based telescope
Helun song, xian hao, wenhan jiang ,changhui rao
China ……[1-006]…

Research on Shaftless Fast-steering Mirror Used in Precision Tracking-Aiming System
Jianmin Zhou Hongyan Yin Yonghui Wang Jin Guo China ……[1-007]…

Research on the Sparse aperture Configuration of Pseudo-Golay6
Wu Quanying Qian Lin Wu Feng
China……[1-008]

The multi-mode combine manufacturing technology for large aperture aspheric mirrors
Li Junfeng, Song Shumei
China ……[1-009]…

An optimized method for manufacturing large aspheric surfaces ZHOU Xusheng, LI Shengyi, DAI Yifan and XIE Xuhui China ……[1-012]

Thermal Analysis of the Main Mirror in Space Solar Telescope
Li Rong Shi Hu-li Chen Zhi-yuan
China ……[1-017]..

Analysis of actuator's array for ultra-thin mirrors by finite element method
Zeng Chunmei, Yu Jingchi
China……[1-019]…

Study on the 4-m class Alt-azimuth telescope driving scheme
Wang Huai, Zhang Jingxu, Zhao Yongzhi, Dai Shuang
China ……[1-023]…

Study on the active support technology of the ultra thin mirror with very large aperture
Feng Youjun, Zhang Rongzhu
China)……[1-024]

Study on the Electrostatic Deformation of Membr aneMirror
CHEN Xinhua, TANG Minxue, SHEN Weimin
China ……[1-025]…

Study on support structure of large-aperture telescope primary mirror
WANG Yang, ZHANG Jing-xu
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Studies on 400-1500nm Reflecting Coatings on large **aperture Lightweight Mirror**
Zhang yao ping, Xu hong
China ……[1-029]

Support technique of large deployable unit mirror
GAO Ming-hui REN Jian-yue
China ……[1-030]…

Control and network system of force actuators for deformable mirror active optics in LAMOST
Shengtao Zhang, Zhenchao Zhang, You Wang
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Development of C_f/Al lens barrel for space infrared telescope
Guo Shao-wen, Zhang Guang-yu, Wang Wu-yi, Zhao Xue-zeng
China……[1-032]…

Exact differentiator Based Sliding Mode Control for Large Optical Astronomical Telescopes
Wangping Zhou, Xinqi Xu
China……[1-033]..

Auto-focusing Schemes for LAMOST Multipurpose Fiber-fed Spectrographs
Long Li, Zhongwen Hu, Jianing Wang , Yongtian Zhu, Lei Wang
China ……[1-034]…

LARGE APERTURE NANOCOMPOSITE DEFORMABLE MIRROR TECHNOLOGY
Peter C. Chen, Richard D. Hale
(USA)……[1-035]…

A Method To Fabricate Large Telescope Mirrors
Peter C. Chen, Richard D. Hale
USA……[1-037]…

Design and Fabrication of large-scale RB-SiC mirror
Yu-Feng Zhou, Yu-min Zhang, Jie-cai Han, Yuan-yuan Han, Wang Yao
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Active X-ray Mirror development at UCL: preliminary results
Carolyn Atkins, Peter Doel, Jun Yao, David Brooks, Samantha Thompson, Richard Willingale, Charlotte Feldman, Tim Button, Dou Zhang, Ady James
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Holographic correction of an aberrated optical imaging system
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China ……[1-044]…

Conference 2 • Proceedings of SPIE V.6722
Tuesday- Wednesday, 10- 11July 2007

Advanced Optical Manufacturing Technologies

Conference Chairs*:*

YANG Li, COMT, COS (China)

Yaolong Chen, (Germany)
Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena. (Germany)
Rongbin Li, Hong Kong Polytechnic University (China)

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ZHANG Jinliang, Xi'an Institute of Applied Optics (China)
Matthias Pfaff, OptoTech Optikmaschinen GmbH (Germany)
LI Wei, Chengdu Fine Precision Optical Engineering Research Centre (China)

Optical manufacturing technology reviews and roadmaps
Aspherical optics design and fabrication
ICF optical technology and engineering
Super-precision optical manufacturing
Optical thin film coatings
Diamond turning technology
Optical design and simulation software and tool
Optoelectronics components and modules integration and manufacturing
Opto-mechanical components and devices

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and Luis Alberto Martinez-Medina
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Φ300 Hartmann Field Flattening Laser Beam Expander
Peiming Hao, Liyin Yuan, Kexin Li, Senlin Zhou
China ……[2-016]

Diamond Turning Aspheric Projector Mirrors
Wenda JiangHong Kong, China……[2-020]

Fabrication of X-ray Diffractive Optical Elements for ICF target diagnosis
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China……[2-025]

Experimental Study on KDP Crystal Polishing

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Chair: Wang Zhanshan

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Design for Progressive Addition Lenses
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Research on the Al-AlN granular films prepared by D.C. magnetism filter arc deposition
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3D Reconstruction from Unidirectional Integral Images
ChunHong Wu, Guoliang Fu, HongXia Wang, Yang Yang
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Research on key techniques of nanometer scale macro-micro dual-drive precision positioning
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Ferroelectric properties of multi-layer $LiTaO_3$ thin films with Ta_2O_5 buffer
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Q-switched Yb-doped Rod—type photonic crystal fiber laser
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Preparation and Properties of GaP Films on ZnS Substrate
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Optical Glasses for Precision Molding
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Fabrication of Multilayer Laminar Grating with High Efficiency for Extreme Ultraviolet
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Time-resolved dynamics of 355-nm laser-irradiated surface damage on fused silica
Shizhen Xu, Xiaodong Yuan, Wanguo Zheng, Xiaotao Zu, Haibin Lv, Xiaodong Jiang, Haijun Wang, Jin Huang
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Process Monitoring and Analysis in the Atmospheric Pressure Plasma Polishing (APPP) Method
Zhang Jufan, Wang Bo, Dong Shen
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Replication fidelity improvement of PMMA microlens array based on weight evaluation and optimization
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The determination of optical constants of zirconia and silica thin films in the UV to visible range
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Research on the Technology of Fluorescence Separation from Exciting Light in LIF Detection
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A new model for laser micro-nano fabrication of precise integrated circuit lead dies
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POSTER 2

We will provide a broad with the dimentions of length of 3 metres and breadth of 1 metres for each post papers. Pleasa prepare your post materials yourself.

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Adaptive optics image deconvolution using a modified Richardson-Lucy algorithm
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Manufacturing and photoelectrical properties of P-doped a-Si:H thin films deposited by PECVD
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China ……[2-007]
High power high brightness laser source for material processing through incoherent beam combination
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Comparison of ion posttreatment and laser conditioning of thin films
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Effect of technics parameter on optical constants of amorphous silicon thin film
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Effect of the annealing temperature on the AlN thin films prepared by D.C. magnetism filter arc deposition
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Fabrication of ZnO Thin Film Schottky Ultraviolet Photodetector
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The optical and electrical properties of indium-tin-oxide films prepared with different deposition rates
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Study on CCOS fabrication technology for super-smooth parabolic surface of light-weight SiC mirror
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Indirect optical thickness monitoring with stationary testslides for precision optical coatings
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Conference Chairs: **PAN Junhua**, Academician, Chinese Academy of Engineering (China)
James C. Wyant, Director of Optical Sciences Center, Univ. of Arizona (USA)
Hexin Wang, Carl Zeiss AG (Germany)

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Yun-Woo Lee, KRISS (Korean)
SU Chaolian, Xi'an Institute of Technology (China)

Modern interferometric technologies
Test for aspherical optical surface
Test for super- precision optical surface
Measurement for super smooth surface
Measurement of optical thin film
Test with infrared technologies
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New and innovative metrology and equipment
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Chairs:

Sen Han, Veeco, Inc. (USA)
Zheng Cui, Rutherford Appleton Laboratory (UK)
LI Yanqiu, Institute of Electrical Engineering, CAS (China)

Committee:

Li-Anne Liew, National Institute of Science and Technology (USA)
LUO Xiangang, Institute of Optics and Electronics, CAS (China)
CHEN Baoqing, Institute of Microelectronics, CAS (China)
Hans Lauth, Jenoptik Laser, Optik System, GmbH (Germany)
Zhichun Ma, Michigan Aerospace Corp. (USA) WANG Xiangchao, Shanghai Institute of Optics and Fine Mechanics, CAS (China)
Sung Moon, Korean Institute of Science and Technology (Korea)
ZHAO Qingliang, Harbin institute of technology (China)
Jun Yao, University College London (UK)
FANG Fengzhou, Tianjing University (China)
HU Song, Institute of Optics and Electronics, CAS (China)

Micro-nano optical system design
Micro-nano Optical manufacturing and testing
Nano metrology technology and tools
Nanoscale imaging and sensing technologies
Nanofluidics device design, fabrication and testing
Fabrication of MEMS/MOEMS devi ces
Testing and Characterization of MEMS/MOEMS
MEMS/MOEMS reliability
Packaging of MEMS/MOEMS devices
Next generation lithography
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General Information

Symposium Location

Conference Location: GOLDEN BULL HOTEL
The venue of the meeting is Golden Bull Hotel Chengdu Sichuan province. Golden bull hotel was established in 1957,and it's name was re-wrote by the late head of C.P.C Mr.Deng-Xiao ping. The hotel is located 5Km away from western-down of Chengdu. It's the conference center of Sichuan province ,and the largest villa-garden-style hotel within the province. It's regarded as the State- house of Sichuan province. The hospitable host is looking forward to your coming.

Transportation:

To airport:	40km
To railway station:	5 km
To city centre:	5km

Add: 2 Road Jin Quan, Jin Niu Ba, the West Outside of Chengdu .China. 610036
Hotel telephone: 86 28-87306666
Fax: 86 28-87305555

Registration Information

SPIE Members, Conference Committee Members, and Authors	$400
Others	$450
Full registration include:	one banquet ticket, admission to all conference sessions, and one conference proceeding

Tea/Coffee and Lunch Breaks

See the individual conference programme for times.

Passports/Visas

For visa application letter and information, please send e-mail to: **aomatt07@ioe.ac.cn**
Please consult your travel agent or oversea Chinese Consulate web site for visa requirements. If you plan to tour before or after the conference, you may apply for a tourist visa that does not need visa invitation letter.

Audio Visual Equipment

Meeting rooms will contain overhead and data projectors. Additional equipment will be made available only by special arrangement and may involve a rental fee.

Oral and Poster Presentation

For Oral Presentation, we will provide a computer to release the paper with the format of PPT (Microsoft PowerPoint).

For Poster presentation, we will provide a bulletin board in an individual room to release the paper.

Overseas Visitors Airport Picking up

Authors from outside of the mainland will be picked up at Airport (Chengdu) byConference Organization.

Please take me to the GOLDEN BULL HOTEL ，
Cheng du
Thank you!
请送我到成都金牛宾馆，谢谢!

Currency Exchange

In China, only RMB is used. However, exchange centers can be found at airports, most hotels and large shopping centers. When exchanging money, please keep your receipt by which you can change any remaining RMB back to foreign currency when leaving China. Visa, Master, American Express, Diners Club, JCB, and other credit cards are accepted in many department stores and hotels. But it might be difficult to draw cash with credit cards. The Bank of China and most hotels can cash travelers cheques issued by and foreign bank or financial institution. Traveler's cheque signed over to a third party cannot be cashed in China, but can be presented for collection through for the Bank of China.

Travel Information

Chengdu is one of the three best citys(Chengdu, Hangzhou, Dalian) for traveling in China, capital of Sichuan province, is not only China's important industrial base, but also a well-known historical and cultural city in southwest China, with a history of 2,500 years. In the vicinity of the city, there are a 2000 - year -old water conservancy project, **Dujiangyan** Irrigation System, a Taoist mountain called **Qingcheng Shan** (Green-city mountain). In addition, about 160 kilometers away from Chengdu lies the largest Buddha statue **Leshan Grand Buddha** and a Buddhist sacred mountain, **Mt. Emei**. All the historical sites and scenic spots are well worth a visit, not to say, the tea houses, the local cuisine and the traditional arts and crafts.

Chengdu is the main gateway to Tibet; there are daily flights to **the Potala Palace** at Lhasa, When the word Tibet is mentioned something icy chils the readers' nerves. In fact it snows only once or twice in a year and owing to the perpetuity of bright sunshine. **Tristar piles** the ruins is a distance 5000 to 3000 about ancient SiChuan cultural remains site, the area amounts to 12 square kilometers now, is Chinese one of 20th century significant archaeology discoveries. The world famous **Base of Panda** is home to panda. The historical sites of **Temple of San Su** is well worth a visit.

Located south of Chengdu, **Jiuzhaigou Valley** which is fantastic fairyland belongs to carbonate barrier lake landform with high mountains and deep valleys. There are nine old Tibetan villages in the gorge, hence the name Jiuzhaigou Valley.

Dujiangyan

Leshan Giant Buddha

the Base of Panda

Cultural Relic of Tristar Piles

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11July 8:30-12:00	**Session 1-2** (25min / report) **Gao Bilie**	**Session 2-3** (20min / report) **Xin Qiming**	**Session 2-4** (20min / report) **Hao Peiming**	**Session 3-4** (25min / report) **Wang Yunshan**	**Session 3-5** (25min / report) **Wang Li**	**Session3-6** (25min / report) **Yang Jiandong**	**Session 4-2** (15min / report) **Luo Xiangang**
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AOMATT 2007 Daily Event Schedule General

Date	Time	Content	Place
Sunday,8 July	9:00-22:00	Registration	Lobby of the Hotel
Monday, 9 July	8:30-9:00	Opening Ceremony	*auditorium of the Hotel*
	9:00-12:00	Plenary 1-4	*auditorium of the Hotel*
	13:30-17:40	Plenary 5-10	*auditorium of the Hotel*
	18:30-20:30	Welcome Banquet	*auditorium of the Hotel*
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	19:30-21:30	Closure Ceremony and an Evening Party	*auditorium of the Hotel*
Thursday,12July	The whole day	Touring around Chengdu	
Friday,13July		Touring to Jiuzhaigou Valley or the Potala Palace at Lhasa	Self-Choice