23rd International Workshop of Laser Ranging

Oct.20 ~ Oct.26, 2024

Kunming, China

Program at a Glance

Time zone: UTC +8:00, Beijing.

Date (UTC +8:00)	Sunday Oct.20	Monday Oct.21	Tuesday Oct.22	Wednesday Oct.23	Thursday Oct.24	Friday Oct.25
Location		Golden Ballroom	Multifunctional Conference Hall	Multifunctional Conference Hall	Tour of the observatories	Multifunctional Conference Hall
9:00~10:00		Opening Session	Session 3 (P2): Station Operations and Upgrades	Session 7: Development of SLR and Time Transfer		Session 9: New Device for SLR
10:00~10:30		Tea Break	Tea Break	Tea Break		Tea Break
10:30~12:00		Session 1: Recent Progress in ILRS	Session 4 (P1): Lunar Laser Ranging and Future Missions	Session 8: SLR Data Processing		(Reserve)
12:00~14:00		Lunch	Lunch	(12:15) Lunch		Lunch
Location	*"Lake Side"* (conference room)	Golden Ballroom	Multifunctional Conference Hall	*"Lake Side"* (conference room)		Multifunctional Conference Hall
14:00~15:00	ILRS GB (P1)	Session 2 (P1): SLR for Geodesy and Geophysics	Session 4 (P2): Lunar Laser Ranging and Future Missions	MSC Meeting		Space Debris Study meeting
15:00~15:30	Tea Break	Tea Break	Tea Break	Tea Break		Tea Break
15:30~18:00	(15:30~16:30) ILRS GB (P2)	Session 2 (P2): SLR for Geodesy and Geophysics	Session 5: Space Debris Laser Ranging	NESC		Closing Session (ILRS GB included)
	(16:30~18:30) ASC Meeting	Session 3 (P1): Station Operations and Upgrades（online）	Session 6: SLR for Gravitation and Relativity	LLR & T		
18:00	(18:30) Buffet Reception (1st Floor Dining Area)	Dinner (Multifunctional Conference Hall)			Dinner (Kunming station)	

***ASC: Analysis Standing Committee**
GB: Governing Board (Invited only)
MSC: Missions Standing Committee
NESC: Networks and Engineering Standing Committee
LLR&T: Lunar Laser Ranging and Time Transfer

Table of Contents

I. Greetings from Kunming

- **Welcome Message**

Dear participants,

As the golden autumn unfolds, we are gathered here in the picturesque and temperate city of Kunming in China to partake in the 23rd International Workshop on Laser Ranging. On behalf of the International Laser Ranging Service (ILRS) and the organizing committee of this conference, we extend a warm welcome and sincere gratitude to all our distinguished guests who have traveled from afar.

Since the establishment of the International Laser Ranging Service in 1998, it has been committed to organizing and coordinating global satellite laser ranging and lunar laser ranging activities, providing essential data support for geodesy, geophysics, lunar and planetary science programs. Today, we are honored to convene on the 60th anniversary of the first successful satellite laser ranging, bringing together experts and professionals from the global laser ranging community to discuss key technologies, significant breakthroughs, innovative ideas, the opportunities and challenges in the field.

This conference has meticulously planned a variety of topics, covering the scientific application of satellite laser ranging data, technological development, lunar and deep space exploration with lasers, software automation, space debris monitoring and removal, and new types of retroreflectors. We believe these topics will inspire in-depth discussions and exchanges, promoting further development of laser ranging. Here, we would like to express my special thanks to scholars from research institutions from all over the world, for gracing us with your presence and making this conference more diverse and intellectually stimulating.

We look forward to a fulfilling and enjoyable week together, where we can collaborate and contribute to the future development of the SLR technology. In closing, we wish this International Workshop on Laser Ranging great success, and we hope that every day you spend in Kunming will be filled with achievements and joy.

Thank you for your participation, and we look forward to engaging in deep conversations with you.

- **About the IWLR**

The International Laser Ranging Service (ILRS) is one of the surveying services of the International Association of Geodesy (IAG), dedicated to organizing and coordinating global satellite laser ranging and lunar laser ranging activities to support geodesy, geophysics, lunar and planetary science programs, and to provide data products that are important for the maintenance and improvement of ranging systems to the International Earth Reference Framework.

The International Workshop on Laser Ranging (IWLR) is an important academic conference in the field of laser ranging initiated by ILRS, aiming to promote the development of laser ranging technology and international exchanges. The workshop is held every two years and has been successfully held 22 times worldwide by now.

This year 2024 coincides with the 60th anniversary of the first successful satellite laser ranging, we invite experts, scholars and technicians in the field of laser ranging from all over the world to gather in China to discuss the key technologies, important breakthroughs, innovative concepts, and existing opportunities and challenges in the field of laser ranging.

II. IWLR Location and Information

- **Workshop location**

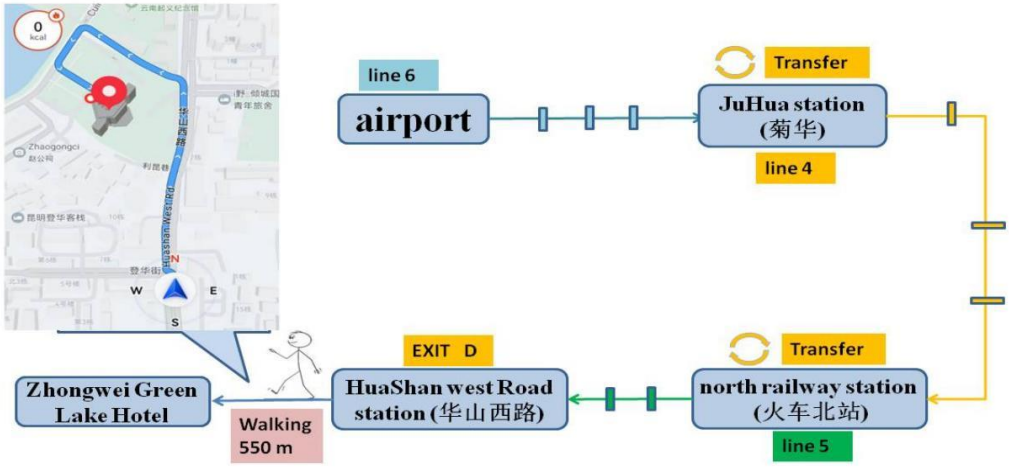
Zhongwei Green Lake Hotel Kunming (昆明中维翠湖宾馆)

Locals call Cuihu Hotel ("*tsui hu bing guan*"), near one of the most popular attractions in Kunming, the Green Lake Park.
Address: No. 6, Cuihu Hunan Road (near West Huashan Road).
Website: http://www.zhongweigreenlake.cn/en

- **Transportation**

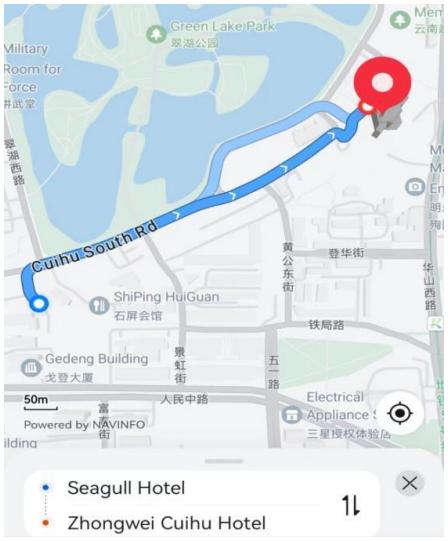
From **ChangShui International Airport** to Workshop Venue

Taxi: about 40 min, 70~100 CNY (**most recommended**).
Subway: about 1 hour, 6 CNY
Simplified Subway Map:



From **Seagull Hotel** to Workshop Venue

Walk about 600m, 8min.
Map:



Registration Desk

The registration desk, located in the foyer of Zhongwei Green Lake Hotel, will be open for the duration of the workshop and will serve as your main point of contact.
The registration desk can be contacted throughout the workshop on +86 15987119624.
Venue staff will be available at the following times:

- Oct.20 Sunday: 09:00 – 20:00
- Oct.21 Monday: 08:00 – 18:00
- Oct.22 Tuesday: 08:00 – 18:00
- Oct.23 Wednesday: 09:00 – 12:00
- Oct.25 Friday: 09:00 – 12:00

WI-FI

Free internet access has been made available to workshop delegates.
Choose "VIP Login";
Guest Username: 0001
Guest Password: 65158888

Lunch

Lunch for Oct.21, 22, 23, and 25 (buffet)
Time: 12:00-14:00 (12:15 for Oct.23)
Location: Zhongwei Green Lake Hotel
(The restaurant is on the right-hand side when entering the first floor of the hotel).

Lunch for Oct.24;
Time: 12:30 - 14:00
Location: Restaurant near Fuxian-Lake Site

Dinner

Dinner for Oct.20, Welcome Reception (Buffet);
Time: 18:30 – 20:30;
Location: Zhongwei Green Lake Hotel
(The restaurant is on the right-hand side when entering the first floor of the hotel).

Dinner for Oct.21, Banquet (Chinese banquet style);
Time: 18:00 – 20:30;
Location: Zhongwei Green Lake Hotel, second floor. (Multifunctional conference Hall)

Dinner for Oct.24, Visit Kunming Station (Buffet)
Time: 18:00 – 20:30;
Location: Kunming Station.

Note: The actual dining time may be adjusted according to the on-site plan, and we will provide timely notification.

No Smoking Policy

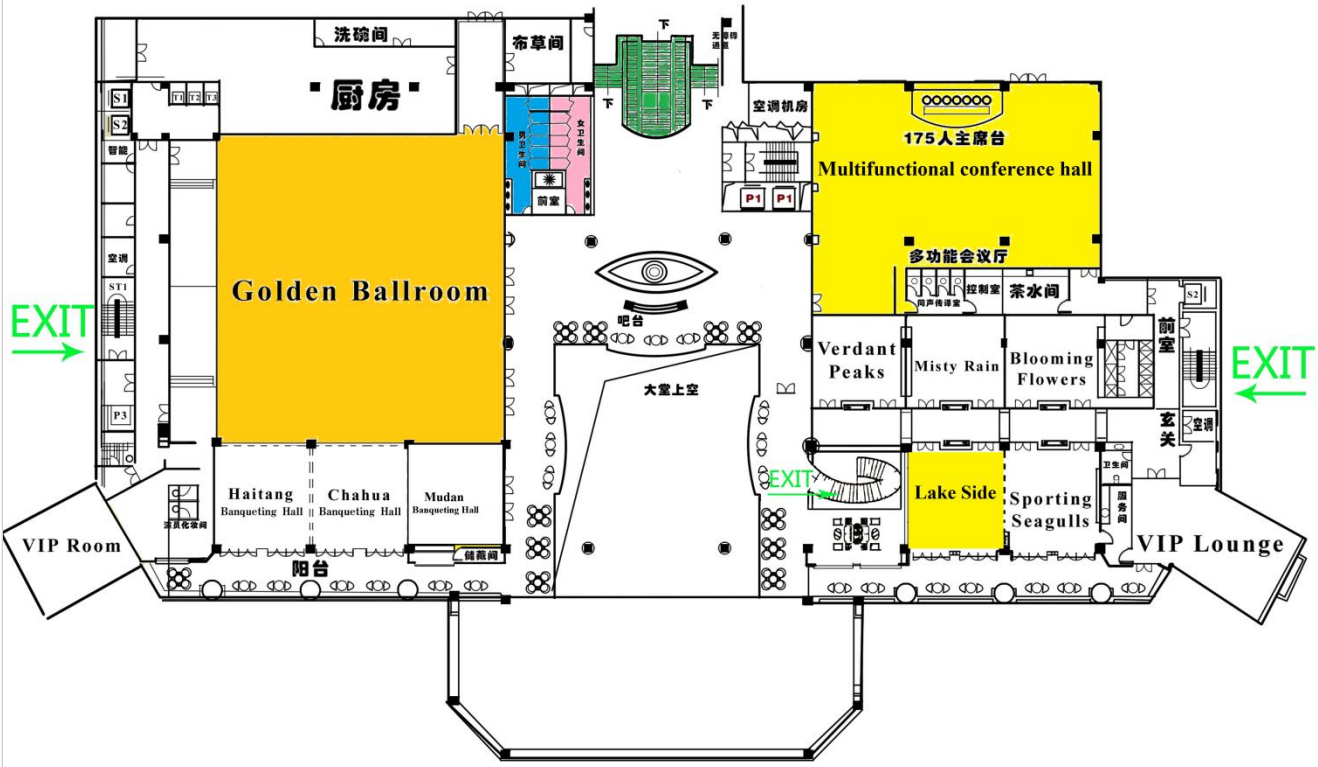
All the conference rooms and event spaces for IWLR are non-smoking.

Emergency Assistance

For emergencies please dial:
110 (Police);
120 (Medical Emergency);
119 (Fire Alarm).

- **Venue layout**

Location: 2nd Floor of the Main Hall, Green Lake Hotel



Golden Ballroom (main venue, Oct 21 all Day)

Multifunctional conference hall (main-venue, Oct 22 all Day, Oct 23 Morning, Oct 25 all Day)

***"Lake Side"* (conference room, sub-venue, Oct 20 Afternoon, Oct 23 Afternoon)**

Men's restroom | **Women's restroom** | **Stair**

Dining Area: in 1st Floor, Right side when entering the Hall

- **Online participation**

Online participation is free of charge.

For online participation you need to register, the webmaster will send the meeting link **per email**.

The virtual conference is based on the software of ZOOM.

The Time zone of Kunming is [UTC +8:00 Beijing]. We'll keep the host active during 8:30~18:30.(UTC +8:00)

For on-line speakers:

You can either upload your slides to our website, or share it at the time of your presentation. The online conference are all in the afternoon, the link can be tested during the lunch gap or tea break to ensure a successful connection.

Any urgent updates will be posted on our website, just stay tuned.

III. Oral Program

- **Monday (Oct.21):**

Opening Session	
Location	**Golden Ballroom**
Host	Pi Xiaoyu
09:00 – 9:40	Opening Ceremony - Speech: Chen Xuefei - Speech: Stephen Merkowitz - Speech: Zhao Changyin - Speech: Toshimichi Otsubo - Speech: Michael Pearlman

Tea Break	
9:40 – 10:15	Tea Break and Photo taken (Courtyard in front of the Hall)

Session 1: Recent Progress in ILRS (Keynote Reports)	
Location	**Golden Ballroom**
Chairperson	Toshimichi Otsubo, Zhao You
10:15-10:30	**Recent progress in the International Laser Ranging Service** Speaker: Claudia Carabajal Affiliation: Science Systems and Applications, Inc. @ NASA/GSFC
10:30-10:45	**Developments of Chinese SLR network and future plans** Speaker: Zhang Zhongping Affiliation: Shanghai Astronomical Observatory, Chinese Academy of Sciences
10:45-11:15	**ESA's Genesis mission - from an ILRS perspective** Speaker: Mathis Bloßfeld Affiliation: Technical University of Munich
11:15-11:30	**Geodetic Reference Instrument Transponder for Small Satellites** Speaker: Stephen Merkowitz Affiliation: National Aeronautics and Space Administration
11:30-11:45	**ACES Mission Update: Scientific Objectives and Ground Station Requirements** Speaker: Jan Kodet Affiliation: Technical University of Munich FESG

Lunch	
12:00 – 14:00	Location: Zhongwei Green Lake Hotel – Dining area

Session 2 (part 1): SLR for Geodesy and Geophysics	
Location	**Golden Ballroom**
Chairperson	Claudia Carabajal, Liang Zhipeng
14:00-14:15	**Reassessment of the Legacy Geodetic Satellite WESTPAC for ILRS Tracking** Speaker: Matthew Wilkinson Affiliation: NERC Space Geodesy Facility
14:15-14:30	**Contribution of LARES-2 to Space Geodesy** Speaker: Krzysztof Sośnica Affiliation: Wrocław University of Environmental and Life Sciences, Institute of Geodesy and Geoinformatics
14:30-14:45	**The influence of considering atmospheric wind field for atmospheric drag on SLR orbit determination** Speaker: Wang Xiaoya Affiliation: Shanghai Astronomical Observatory, Chinese Academy of Sciences
14:45-15:00	**Where to place the future SLR satellite for the best GM, geocenter, C20, and other gravity field parameters recovery?** Speaker: Krzysztof Sośnica Affiliation: Wrocław University of Environmental and Life Sciences, Institute of Geodesy and Geoinformatics

Tea Break	
15:00– 15:30	Tea Break

Session 2 (part 2): SLR for Geodesy and Geophysics	
Location	**Golden Ballroom**
Chairperson	Mathis Bloßfeld, Yang Yongzhang
15:30-15:45	**Updates of BJFS station and SLR station Classification for GNSS Satellite Orbit Accuracy Validation** Speaker: Zhao Chunmei Affiliation: Chinese Academy of Surveying and Mapping
15:45-16:00	**Improving multiple LEO combination for SLR-based geodetic parameters determination using variance component estimation** Speaker: Fu Yuanchen Affiliation: Wuhan University
16:00-16:15	**Estimation of geocenter motion and the second-degree gravitational harmonics from LAGEOS data** Speaker: Zhong Luping Affiliation: Institute of Seismology, Wuhan, China Earthquake Administration
16:15-16:30	**Pre-GRACE Gravity Field Estimation Using SLR and GRACE Data** Speaker: Filip Gałdyn Affiliation: Wroclaw University of Environmental and Life Sciences, Institute of Geodesy and Geoinformatics
16:30-16:45	**Modeling range corrections from SLR residuals to active Low Earth Orbiters – insights from study based on over 10 satellites and 20 years of data** Speaker: Dariusz Strugarek

	Affiliation: Wrocław University of Environmental and Life Sciences
16:45-17:00	**Ocean and Atmospheric Tide Models in SLR Precise Orbit Determination** Speaker: Alexander Kehm Affiliation: Deutsches Geodätisches Forschungsinstitut (DGFI-TUM) Technische Universität München
17:00-17:15	**Alternative normal point formation strategies for Galileo satellites - 11 normal points instead of 1 (online)** Speaker: Michael Steindorfer Affiliation: Space Research Institute, Austrian Academy of Sciences
17:15-17:30	**A joint SLR processing between Sentinel-6 and spherical geodetic satellites (online)** Speaker: Adrián Baños García Affiliation: Space Geodesy and Orbit Determination CLS Group (Collecte Localisation Satellites)

Session 3 (online part): Station Operations and Upgrades	
Location	**Golden Ballroom**
Chairperson	Zhang Haitao, Pi Xiaoyu
17:30-17:45	**Advances, updates and new techniques at Graz station (online)** Speaker: Wang Peiyuan Affiliation: Space Research Institute, Austrian Academy of Sciences
17:45-18:00	**Validation of the Yebes Laser Ranging Station (YLARA), current status and future upgrades (online)** Speaker: Beatriz Vaquero Affiliation: Yebes Observatory (IGN Spain)

Dinner	
18:00 – 20:30	Location: Multifunctional Conference Hall

- **Tuesday (Oct.22):**

Session 3: Station Operations and Upgrades	
Location	**Multifunctional Conference Hall**
Chairperson	Matthew Wilkinson, Tang Kai
09:00-09:15	**MLRO Upgrade** Speaker: Vincenza Luceri Affiliation: e-GEOS company, Italian Space Agency
09:15-09:30	**Signal Transmission and Networking Improvements of the SLR Telescope Systems in Kunming Station** Speaker: Pi Xiaoyu Affiliation: Yunnan Observatories, Chinese Academy of Sciences
09:30-09:45	**The Newly Refurbished San Fernando Laser Station** Speaker: Manuel Sánchez Piedra Affiliation: The Royal Institute and Observatory of the Spanish Navy
09:45-10:00	**Window Incremental Forest for System Delay Prediction in Satellite Laser Ranging** Speaker: Yang Chun Affiliation: Yunnan Observatories, Chinese Academy of Sciences

Tea Break	
10:00 – 10:30	Tea Break

Session 4 (Part 1): Lunar Laser Ranging and Future Missions	
Location	**Multifunctional Conference Hall**
Chairperson	Clément Courde, Dong Xue
10:30-10:45	**Promoting CCRs on lunar polar area via ILRS like CE7&8 missions** Speaker: Ping Jinsong Affiliation: National Astronomical Observatories, Chinese Academy of Sciences
10:45-11:00	**hHz monostatic Lunar Laser Ranging at the WLRS** Speaker: Johann Eckl Affiliation: Federal Agency for Cartography and Geodesy
11:00-11:15	**The first Laser Retroreflector deployed on the lunar far side onboard China's Chang'e 6 mission** Speaker: Di Kaichang Affiliation: Aerospace Information Research Institute, Chinese Academy of Sciences
11:15-11:30	**ESA's Nextgen Lunar Laser Retroreflector with Pointing Actuators for NASA's CP11 Mission** Speaker: Simone Dell'Agnello Affiliation: National Institute for Nuclear Physics (INFN)
11:30-11:45	**Lunar laser ranging progress at Kunming station** Speaker: Li Zhulian Affiliation: Yunnan Observatories, Chinese Academy of Sciences

11:45-12:00	**Application of radio range and range-rate on solving dUT1 and monitoring lunar physical librations** Speaker: Li Wenxiao Affiliation: National Astronomical Observatories, Chinese Academy of Sciences

Lunch	
12:00– 14:00	Location: Zhongwei Green Lake Hotel – Dining area

Session 4 (Part 2): Lunar Laser Ranging and Future Missions	
Location	**Multifunctional Conference Hall**
Chairperson	Stephen Merkowitz, Zhang Zhongping
14:00-14:15	**Research progress on lunar laser ranging at Tianqin station** Speaker: Lin Xudong Affiliation: Sun Yat-SEN University
14:15-14:30	**CPF calculation in circumlunar satellite laser ranging observations** Speaker: Huang Kai Affiliation: Yunnan Observatories, Chinese Academy of Sciences
14:30-14:45	**Computer Vision Based Lunar Laser Ranging Signal Detection** Speaker: Zhou Chengkai Affiliation: Sun Yat-SEN University
14:45-15:00	**High-precision modern ephemeris of the Moon EPM2023 at the IAA RAS (online)** Speaker: Eleonora Yagudina Affiliation: Institute of Applied Astronomy RAS
15:00-15:15	**Lunar Laser Ranging for Testing Relativity and Studying the Earth-Moon System (online)** Speaker: Zhang Mingyue Affiliation: Institut für Erdmessung, Leibniz Universität Hannover

Tea Break	
15:15 – 15:45	Tea Break

Session 5: Space Debris Laser Ranging	
Location	**Multifunctional Conference Hall**
Chairperson	Hyung-Chul Lim, Li Yuqiang
15:45-16:00	**First Experiments in Bistatic Laser Ranging to Space Debris in Riga (online)** Speaker: Kalvis Salmins Affiliation: Institute of Astronomy University of Latvia
16:00-16:15	**Attitude Estimation of (defunct) Satellites using Bi-static Satellite Laser Ranging Simulations (online)** Speaker: Sebastian Schneider Affiliation: Austrian Academy of Sciences, Space Research Institute
16:15-16:30	**Space Debris Laser Ranging with range-gate-free SNSPD** Speaker: Zhang Haitao Affiliation: Yunnan Observatories, Chinese Academy of Sciences

16:30-16:45	**Advances in Daytime Debris Laser Ranging (DLR) Technology on the Changchun Station** Speaker: Liang Zhipeng Affiliation: Changchun Observatory of National Astronomical Observatories, Chinese Academy of Sciences
16:45-17:00	**Attitude Estimation of Falcon 9 Rocket Body Based on Automatic Differentiation** Speaker: Li Hui Affiliation: Yunnan Observatories, Chinese Academy of Sciences

Session6: SLR for Gravitation and Relativity	
Location	**Multifunctional Conference Hall**
Chairperson	Simone Dell'Agnello, Zhang Haifeng
17:00-17:15	**Testing Local Lorentz Invariance with SLR** Speaker: Roberto Peron Affiliation: National Institute for Astrophysics (INAF)
17:15-17:30	**The Galileo for Science 2.0 Project: SLR Campaign and Project Status** Speaker: Alessandro Di Marco Affiliation: National Institute for Astrophysics (INAF)
17:30-17:45	**Detecting gravitational waves with SLR (online)** Speaker: Diego Blas Affiliation: Institut de Física d'Altes Energies / Catalan Institution for Research and Advanced Studies
17:45-18:00	**Testing Gravitational Redshift through Simulation of the China Space Station Laser Timing Experiment** Speaker: Abdelrahim Ruby Affiliation: Wuhan University

- **Wednesday (Oct.23):**

Session 7: Development of SLR and Time Transfer	
Location	**Multifunctional Conference Hall**
Chairperson	Cinzia Luceri, Dong Xue
09:00-09:15	**Development of the Omni-SLR system: concepts and project status** Speaker: Toshimichi Otsubo Affiliation: Hitotsubashi University
09:15-09:30	**Advancements in Satellite-Ground Laser Time Transfer at the Shanghai Astronomical Observatory** Speaker: Wu Zhibo Affiliation: Shanghai Astronomical Observatory, Chinese Academy of Sciences
09:30-09:45	**Wuhan SLR station progress and time synchronization for multi-station ranging** Speaker: Zhang Jie Affiliation: Academy for Precision Measurement Science and Technology, Chinese Academy of Sciences
09:45-10:00	**Pulse repetition frequency of 1Hz~1MHz industrial picosecond laser for satellite and space debris laser ranging** Speaker: Long Mingliang Affiliation: Shanghai Astronomical Observatory, Chinese Academy of Sciences
10:00-10:15	**Time/Distance Metrology based on Free-Space Optical Communication Links** Speaker: Phung Duy-Hà Affiliation: Observatoire de la Côte d'Azur, Université Côte d'Azur
10:15-10:30	**Overview of Lishan SLR station of National Time Service Center** Speaker: Wang Xiao Affiliation: National Time Service Center, Chinese Academy of Sciences

Tea Break	
10:30-11:00	Tea Break

Session 8: SLR Data Processing	
Location	**Multifunctional Conference Hall**
Chairperson	Johann Eckl, Zhang Jie
11:00-11:15	**Advancing Fully Automated SLR Data Reduction** Speaker: Matthew Wilkinson Affiliation: NERC Space Geodesy Facility
11:15-11:30	**Satellite Tracking Data Analysis and Comparison from Laser Ranging and Other Detection Methods** Speaker: Lalida Tantiparimongkol Affiliation: National Astronomical Observatories, Chinese Academy of Sciences
11:30-11:45	**Inclusion of LARES-2 in the ILRS products** Speaker: David Sarrocco Affiliation: E-Geos: An ASI/Telespazio company
11:45-12:00	**Simulation Study of SLR Data Compression Algorithms** Speaker: Linda Geisser Affiliation: Astronomical Institute of the University of Bern

12:00-12:15	**A new model to predict Ajisai satellite reflected sunlight flashes and application to the determination of its rotation parameters (video)** Speaker: Carlo Calatroni Affiliation: Observatoire de la Côte d'Azur, Université Côte d'Azur

Lunch	
12:15– 14:00	Location: Zhongwei Green Lake Hotel – Dining area

- **Friday (Oct.25):**

Session 9: New Device for Laser Ranging	
Location	**Multifunctional Conference Hall**
Chairperson	Li Zhulian , Tang Rufeng
09:00-09:20	**Large-area High-speed SNSPDs for Laser Ranging** Speaker: Wang Hao Affiliation: Nanjing University
09:20-09:40	**Chip-scale optical timing and ranging systems** Speaker: Hu Liang Affiliation: Shanghai Jiao Tong University
09:40-09:55	**New RGG development for bistatic LLR system based on cRIO controller** Speaker: Gao Jian Affiliation: Changchun Observatory of National Astronomical Observatories of Chinese Academy of Sciences

Tea Break	
09:55-10:25	Tea Break

Session 9: New Device for Laser Ranging	
Location	**Multifunctional Conference Hall**
Chairperson	Li Zhulian , Tang Rufeng
10:25-10:40	**Eventech Stream Time-Tagger ESTT (New Updates)** Speaker: Pavels Razmajevs Affiliation: Eventech
10:40-10:55	**Hollow Retroreflectors and Applications** Speaker: Jing Hongwei Affiliation: Sichuan Lamda Technologies Co.,Ltd

*Extra submitted reports may be added here.

Lunch	
12:00– 14:00	Location: Zhongwei Green Lake Hotel – Dining area

Tea Break	
15:00 – 15:30	Tea Break

Closing Ceremony (GB included)	
15:30 – 18:00	Location: Multifunctional Conference Hall

IV. Poster Program

Session A: Scientific applications of satellite laser ranging
Improving software tools for determining global tools for determining global geodynamic parameters using satellite laser ranging at the Federal State Unitary the Federal State Unitary Enterprise "VNIIFTRI" Author: Natalia Parkhomenko Affiliation: Federal State Unitary Enterprise: Federal State Unitary Enterprise (FSUE) "National Research Institute for Physical-Technical Institute for Physical-Technical
A Review of the ILRS Station Validation Procedures and Recent Performance Author: Frank Lemoine Affiliation: National Aeronautics and Space Administration (NASA)
Performance of laser time-frequency transfer system in China Space Station Author: Geng Renfang Affiliation: Shanghai Astronomical Observatory, Chinese Academy of Sciences
The Crustal Dynamics Data Information System (CDDIS) – SLR Updates Author: Justine Woo Affiliation: NASA CDDIS
Precise Orbit Determination of BDS satellites based on China Laser Ranging Network Author: Qu Weijing Affiliation: Shanghai Astronomical Observatory, Chinese Academy of Sciences
Estimation of the laser retro-reflector array center location for BEIDOU-3M Author: Andrei Pafnutev Affiliation: JSC «TsNIIMash»

Session B: Development of satellite laser ranging
Development of SLR facilities of VNIIFTRI and its East-Siberian Branch Author: Natalia Parkhomenko Affiliation: Federal State Unitary Enterprise (FSUE) "National Research Institute for Physical-Technical and Radio Engineering Measurements" (VNIIFTRI)
A new method of automated processing of rough measurements in laser satellite ranger Author: Natalia Parkhomenko Affiliation: Federal State Unitary Enterprise (FSUE) "National Research Institute for Physical-Technical and Radio Engineering Measurements" (VNIIFTRI)
Research on the Influence of SNSPDs Using Multimode Fiber in Space Target Laser Ranging Receiving system Author: Yuan Chunyu Affiliation: Sun Yat-SEN University
Research on the Key Technologies of the Integrated System of Satellite-to-ground Laser Ranging Communication and Polarization Imaging Based on the 700mm Laser Ranging Telescope at Changchun Observation Station Author: Wen Guanyu

Affiliation: Changchun Observatory of National Astronomical Observatories, Chinese Academy of Sciences
A miniaturized laser system with short pulse width and high pulse energy for interplanetary laser ranging Author: Ren Xiaojing Affiliation: Chinese academy of sciences
Recent Progress in Changchun Laser Ranging Station (CHAL/7237) Author: Guan Bowen Affiliation: Changchun Observatory of National Astronomical Observatories of Chinese Academy of Sciences
Using ground target calculate the coordinates of the ranging station Author: Zhou Chengkai Affiliation: Sun Yat-SEN University
Satellite Laser Ranging Sky Background Noise Simulation Author: Liu Zhenxing Affiliation: Changchun Observatory of National Astronomical Observatories of Chinese Academy of Sciences
Corner cube retroreflector with a spiral phase structure generating annular far-field diffraction pattern Author: Tang Kai Affiliation: Shanghai Astronomical Observatory, Chinese Academy of Sciences
Developments of Shanghai SLR station and future plan Author: Zhang Haifeng Affiliation: Shanghai Astronomical Observatory, Chinese Academy of Sciences

Session C: Lunar laser ranging and deep space missions
Stability study of laser time transfer in Cis-lunar space Author: Liu Tong Affiliation: Technology and Engineering Center for Space Utilization， Chinese Academy of Sciences
Rapid Solution of Earth Rotation Parameters by LLR Common View: A Numerical Simulation Author: Liang Zhipeng Affiliation: Changchun Observatory of National Astronomical Observatories of Chinese Academy of Sciences
The performance and analysis of the TianQin station during its first full moon Author: Han Xida Affiliation: Sun Yat-SEN University

Session D: Space debris laser ranging
Orbit Error Compensation Based on BiLSTM for Satellite Laser Ranging Author: Chen Junyu Affiliation: Kunming Univ Sci & Technol,
New Mount for San Fernando Station Author: Sergio Salata Affiliation: AVS, Added Value Solutions

*Extra submitted posters may be added.

V. Splinter Meetings

- **Sunday (Oct.20):**

ILRS GB Meeting	
Location	**"Lake Side" (conference room)**
14:00– 15:00	ILRS Governing Board Meeting (Part 1)
15:00 – 15:30	Tea break
15:30 – 16:30	ILRS Governing Board Meeting (Part 2)

ASC Meeting	
Location	**"Lake Side" (conference room)**
16:30– 18:30	Analysis Standing Committee Meeting

- **Wednesday (Oct.23):**

MSC Meeting	
Location	**"Lake Side" (conference room)**
14:00– 15:00	Missions Standing Committee Meeting
15:00-15:30	Tea Break

NESC, LLR&T Meetings	
Location	**"Lake Side" (conference room)**
15:30– 18:00	NESC, LLR&T Meetings

- **Friday (Oct.25):**

Space Debris Study Meeting	
Location	**Multifunctional Conference Hall**
14:00 – 15:00	Space Debris Study Meeting

VI. Tour of the Observatories (Oct.24 Thursday)

The registration for the tour of the observatories is on-site registration at the same time of the on-site workshop registration, and no additional fees are required.

- **Schedule**

Gathering Time: 8:45 AM to 9:00 AM

Gathering Place: At the 1st Floor, Entrance Hall of Zhongwei Green Lake Hotel

Departure Time: 9:00 AM, Oct.24

Time	Activity	Note
8:45 – 9:00	Gathering and Departure	**Entrance Hall, 1st Floor**
9:00 – 10:30	Bus travelling	
10:30 – 12:00	Visit Fuxian Lake Observatory	
12:00 – 14:00	Take bus to the restaurant Lunch and rest	
14:00	Gather at the restaurant	
14:00 – 15:30	Bus travelling to the Kunming Station	
15:30 – 17:30	Visit the Kunming Station	
17:45 – 19:00	Dinner at the Station	
19:00	Bus travelling back to the Hotel	Approx. 30 mins back

Note: The actual time may be slightly adjusted, and we will provide timely notification.

- **About The Fuxian Lake Solar Observatory**

The Fuxian Lake Solar Observatory, located in Yunnan Province, China, is a key research site for solar physics. With over 2200 hours of annual sunlight, it's equipped with the advanced New Vacuum Solar Telescope (NVST), which captures high-resolution solar images and spectra. The 1-meter telescope aids in studying solar magnetic fields, contributing to our understanding of solar activity.

Researchers have made strides in solar physics, particularly in understanding the Sun's magnetic fields' role in atmospheric heating. The observatory is accessible by bus from Kunming and offers a supportive environment for visiting researchers.

Fuxian Lake, home to the observatory, is China's largest deep-water lake, renowned for its clear waters and rich biodiversity. It's a popular spot for recreation and offers a glimpse into the region's cultural and historical heritage, making the area a unique blend of scientific inquiry and natural splendor.

- **About the Kunming Station**

It is the main observational site of the Yunnan Observatories, is also called the "Phoenix Mountain Science Popularization Park", which is a hub for both scientific education and natural beauty. In SLR research area, Kunming Station is renowned for its 1.2m telescope, which is a significant tool for astronomers, offering excellent observational platform for SLR, DLR and LLR researches.

Kunming Station is not only an observatory but also a place where science and nature intersect. It provides educational exhibits that make complex astronomical concepts accessible to the public. Visitors can learn about the history of astronomy, the structure of the universe, and the latest discoveries in space science.

In addition to its scientific attractions, the station is a tranquil oasis within the city. It boasts lush greenery, walking trails, and a serene atmosphere that makes it an ideal spot for relaxation and leisure. Its natural setting complements its scientific mission, providing a space where urban dwellers can connect with nature and the cosmos.

For those interested in a more in-depth astronomical experience, the station offers night sky observation sessions in publication days. Under the clear skies of Yunnan, visitors can witness the majesty of the Milky Way and learn about the constellations visible in the Southern Hemisphere.

VII. Organizing Committee

- **The International Program Committee (IPC)**

Name	Affiliation
[Chair] Changyin Zhao	PMO, China
[Chair] Toshimichi Otsubo	Hitotsubashi University, Japan
Claudia C. Carabajal	ILRS Central Bureau, USA
Ben Greene	EOS, Australia
Cinzia Luceri	ASI/CGS Matera, Italy
Chengzhi Liu	CHO, China
Clément Courde	INSU, France
Evan Hoffmann	NASA, USA
Hyung-Chul Lim	KASS, Korea
Johann Eckl	BKG, Germany
José Rodríguez	IGN, Spain
Michael Pearlman	CfA, USA
Michael Steindorfer	OEAW, Austria
Mathis Blossfeld	DGFI-TUM, Germany
Matthew Wilkinson	NERC Space Geodesy Facility, UK
Peiyuan Wang	OEAW, Austria
Stephen Merkowitz	NASA, USA
Tomasz Suchodolski	Space Research Centre of PAS, Poland
Yue Gao	EOS, Australia
Yuqiang Li	YNAO, China
You Zhao	NAO, China
Zhongping Zhang	SHAO, China

- **The Local Organizing Committee (LOC)**

Name	Affiliation
[Chair] LI, Yuqiang	Yunnan Observatories, Chinese Academy of Sciences (CAS)
FU, Honglin	Yunnan Observatories, CAS
LI, Rongwang	Yunnan Observatories, CAS
LI, Zhulian	Yunnan Observatories, CAS
LIANG, Zhipeng	Changchun Observatory, CAS
PI, Xiaoyu	Yunnan Observatories, CAS
SU, Xiaoli	Yunnan Observatories, CAS
TANG, Kai	Shanghai Astronomical Observatory, CAS
TANG, Rufeng	Yunnan Observatories, CAS
YANG, Yongzhang	Yunnan Observatories, CAS
ZHAI, Dongsheng	Yunnan Observatories, CAS
ZHANG, Haitao	Yunnan Observatories, CAS

VIII. Sponsors and Exhibitors

- Daheng Atlas Laser Technology Co., Ltd.
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Lamda 四川拉姆达科技有限公司
Sichuan Lamda Technologies Co.,Ltd.

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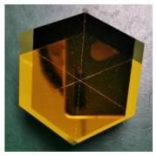
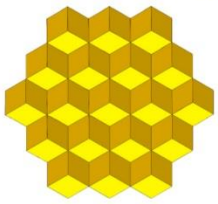
Hollow Reflectors

Glass Hollow Reflector

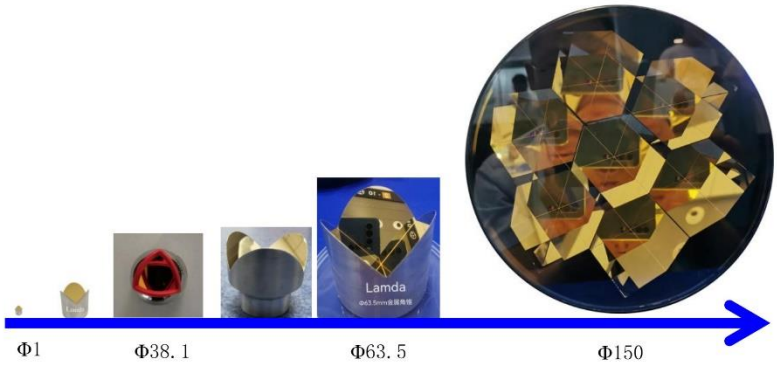
Metal Hollow Reflector



Hexagonal Hollow Reflector



Hollow Reflector Arrays



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SIMINICS

MT16 --Multichannel TCSPC System

MT16 is a new generation of high-precision Time-Correlated Single Photons Counting (TCSPC) system by SIMINCS. MT16 features a time resolution of 1ps, a dead time of 2ns, and a peak count rate of 500Mcps. In addition, MT16 provides a 10 Gigabit Ethernet interface (SFP) with a bandwidth of up to 10Gbps. The high data transfer rate of 280M/s to PC enable user to process huge amounts of photon counting. With high performance, MT16 can be used for various applications such as Time-Resolved Fluorescence, LIDAR and Quantum Optics.

Channel Features	
Number of input	4/8/16
Input voltage	-2V ~ +3V (adjustable)
Trigger edge	Falling or rising edge (adjustable)
Minimum pulse width of input	0.1 ns
Marker input type	LVTTL
Ref. in & Ref.out type	LVTTL
RMS jitter	＜10 ps
Input impedance	50 Ohm
TDC	
Peak counting rate	500 Mcps
Dead time	2 ns
Maximum event transfer rate	40M/s via USB3.0 interface & 280M/s via SFP interface
Adjustable range of delay	-1000 ~ 1000 ns
Pulse width measurement	Optional
GPS time tag	Optional
Histogram	
Time resolution	1/2/4.../33554432 ps
Count depth	2^32
Maximum number of time bins	1048576
Time range	1.04 us @1 ps/1.07 ms @1024 ps/35 s @33554432 ps
TTTR and ITTR	
Mode	T2/T3/ITTR
T2 resolution	1 ps
T3 resolution	1/2/4.../33554432 ps
Minimum counting range of ITTR	1 us
Count depth of TTTR	32G bit
Time range	Unlimited @T2/1.09 s @T3Unlimited @ITTR
Others	
Data interface	USB3.0/SFP
Size	186×325×64mm³
Power input	DC 12V/5A
Power consumption	24W

Mobile: 13023999960 (Mr.Liu) Email:liubinxian@siminics.com

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Xi'an Leading Optoelectronic Technology Co.,Ltd

Xi'an Leading Optoelectronic Technology Co.,Ltd is a national high-tech enterprise specializing in the R&D, production, system integration, and sales services of SWIR imaging systems and optoelectronic testing equipment. We focuses on providing clients with complete solutions from components, assemblies, parts to a full set of optoelectronic system products.

In recent years, the SWIR imaging systems developed by us have been widely used in laser spot detection, semiconductor inspection, laser communication, spectral imaging, laser cutting, bio-medical, astronomical observation, security, star sensors, laser guidance, anti-eavesdropping, laser vibration measurement and other fields. Except for SWIR imaging systems, we also provide customers with solution for scientific cameras and superconducting nanowire systems, which is highly recognized by customers.

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LASER RANGING

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Laser ranging uses a laser as a light source for distance measurement. CAS Nanjing Astronomical Instruments Co., LTD designs and produces ground-based and space-based equipment for laser ranging.

APPLICATION AREA

The measurement payload equipment is arranged in the LEO payload star A (space station), which carries out open-loop tracking of the target star B according to the orbital forecast data and makes closed-loop corrections to the two-dimensional servo rotary table by the astronomical real-time localization data, and the optical system transmits a laser (with a wavelength of 532 nm) to the target star B, which is used to complete the interstellar laser ranging, time-difference measurements and other scientific tasks through the relevant data processing and solving.

Principles of Operation


Concrete Figure

The large-aperture vehicle-mounted laser ranging telescope can be used to observe satellites at different geographical locations according to observation needs. The telescope can point and track the satellite to be surveyed, and the transmitting telescope transmits the laser light to the satellite. The surface of the satellite reflects the laser light to the telescope receiver, the photodetector receives the returned laser photons, and the received optical signal is converted into an electrical signal and transmitted to the control bin, thus completing the laser ranging.


40cm Car Laser Distance Measuring Telescope


1m Car Laser Distance Measuring Telescope

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