
INTERNATIONAL
SPACE SCIENCE
INSTITUTE
BEIJING
国际空间科学研究所-北京
SPACE-BASED STELLAR ASTROPHYSICS IN THE ULTRAVIOLET
WORKSHOP HANDBOOK
APRIL 14-18, 2025

INTERNATIONAL SPACE SCIENCE INSTITUTE - BEIJING

CONTENTS

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ABOUT ISSI-BJ

The International Space Science Institute in Beijing (ISSI–BJ) was jointly established by the National Space Science Center (NSSC) and the International Space Science Institute (ISSI) with the support of the International Cooperation Bureau and the Space Science Strategic Project of the Chinese Academy of Sciences (CAS). ISSI–BJ is a close cooperation partner of ISSI in Bern. The two institutes share the same Scientific Program Committee, the same study tools, and other information of mutual relevance and interest. However, both use independent operational methods and different funding sources.

ISSI–BJ is a non-profit research institute. Our main mission is to contribute to the achievement of a deeper scientific and technological understanding of future space missions as well as of the scientific results from current and past missions through multidisciplinary research, possibly involving, whenever felt appropriate, ground based observations, modelling, numerical simulation and laboratory experiments, using the same tools as ISSI, i.e. Forums, International Teams, Workshops, Working Groups or individual Visiting Scientists.

The Program of ISSI-BJ covers a widespread spectrum of space science disciplines, including astrophysics, solar and space physics, planetary science, astrobiology, microgravity science and Earth observation from space.

ISSI-BJ is an indipendent and politically neutral institute. We offer generous financial support to the scientists that come to Beijing: we offer coffe break, snacks, launch and dinner at our institute, as well as covering travelling and hotel expenses for the conveners of Workshops and Forums, and the leaders of the International Teams. After each meeting, we also offer support in publishing and promoting articles, essays and peer-reviewed papers.

INTERNATIONAL SPACE SCIENCE INSTITUTE - BEIJING

ISSI–BJ CALL FOR PROPOSAL

ISSI-BJ Activities

ISSI–BJ organizes a wide range of activities, such as Forums, Workshops, Working Groups, and International Teams. Applications to join our programs are always welcome. More info available at www.issibj.ac.cn.

International Teams — Annual call in January

Goal: Research focus, 10-15 scientists
Duration: 5 days each time
Result: Publications
Support: Living costs while in Beijing, travel support to team leader

Workshops

Goal: Research focus, 30-40 scientists
Duration: 5 days
Result: Book
Support: Living costs while in Beijing

Forums

Goal: Open discussion among 20-30 scientists
Duration: 2 days
Result: Taikong Magazine
Support: Living costs while in Beijing

Working Groups

Goal: Specific tasks, 8-12 scientists
Duration: As long as needed
Result: Springer ISSI Scientific Report Series (SR)
Support: Living costs while in Beijing, travel support if needed

ORGANIZER

The Workshop “Space-based Stellar Astrophysics in the Ultraviolet” is organized by the International Space Science Institute-Beijing (ISSI-BJ).

Conveners

- Martin Barstow, Leichester University, UK
- Pengfei Chen, Nanjing University, China
- Richard de Grijs, Macquaire University, Australia; International Space Science Institute-Beijing
- Ana I. Gomez de Castro, Complutense University of Madrid, Spain
- Li Ji, Purple Mountain Observatory, Chinese Academy of Sciences, China
- Chao Liu, National Astronomical Observatories, Chinese Academy of Sciences, China
- Annapurni Subramaniam, Indian Institute of Astrophysics Bangalore, India

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WORKSHOP OUTLINE & PROGRAM

Context

Astronomical 'fashions' tend to go through cycles. For quite some time now, much of the focus of the international astronomical community has been on questions related to the origin and evolution of the universe at large, and of the galaxies within it. Stellar astrophysics has, to some extent, been relegated to the back seat. However, armed with new insights about the intricacies of the processes of star formation and stellar evolution, for a large range of stellar masses and specifically beyond the nominal main-sequence stage, stellar astrophysics is slowly making its way back to the forefront of modern astrophysics. New insights into solar physics at ultraviolet wavelengths similarly continue apace. Recent effort in astronomical instrumentation has been focused on red and infrared capabilities, with research at the blue and ultraviolet end of the spectrum somewhat underdeveloped. However, there is now significant activity within the remits of various space agencies aimed at redressing this imbalance.

In the local Universe, where we can resolve both the Sun and individual stars, and explore the physics of star formation in exquisite spatial detail, the blue and (ultra)violet wavelength range is where most of the action occurs. Therefore, we propose to bring together experts from a wide range of stellar astrophysics backgrounds to discuss the state of the art in the field of "space-based stellar astrophysics in the ultraviolet". The ultraviolet wavelength range, best or only accessible from space (depending on one's precise wavelength range), holds the key to understanding the details of the star-formation process—of course in combination with infrared observations allowing us to peer through the ubiquitous circumstellar dust.

This is also the range, particularly at near-ultraviolet wavelengths also accessible from the ground, where we can best understand and study the nucleosynthetic origin of the iron-peak elements, molecules and neutron-capture elements. The ultraviolet offers a wealth of unique information and direct access to activity indicators in stellar atmospheres (e.g., in the form of chromospheric variability in solar-mass

or more massive stars) and the stellar environment. That latter aspect, in relation to the high energies represented by ultraviolet emission, links directly to the conditions for habitability on exoplanets in those immediate stellar environments, both in the general galactic field and in star clusters.

We aim to focus on recent and current highlights from a diversity of ongoing ultraviolet missions, including the Hubble Space Telescope/HST, India's ASTROSAT/UVIT and Aditya-L1, the Optical Monitor on XMM-Newton, Japan's Solar-C and UVOT on Swift, while providing recommendations for future synergies between ultraviolet capabilities and longer-wavelength missions. This is an opportune time to organize such a workshop, given the increasing focus on ultraviolet science worldwide. In Europe, the NUVA network has built a community to promote future missions. The International Astronomical Union (IAU) hosts an ultraviolet astronomy Working Group within Division B, which has promoted the IAU resolution to set standards in ultraviolet photometry in preparation for future missions. A range of future ultraviolet missions are now in the planning or development phases, including China's Space Station Telescope (a wider-field, Hubble Space Telescope-like observatory which will include UV capabilities), CASTOR (Canada, UK), UVEX (USA), ULTRASAT (Israel, USA), SIRIUS[1] (UK) and ESCAPE (USA). On a longer timescale, NASA has adopted the UV/Optical/IR Habitable Worlds Observatory/HWO as its next flagship, to be developed with international partners. Our aim is to not only gain a comprehensive understanding of a wide range of aspects pertaining to stellar physics that are only accessible at the shortest wavelengths, but to also and ultimately define a roadmap that should stand the test of time in the near term and form the basis for near-future developments in this newly re-emerging field.

To aid with the delivery of our main aims, this ISSI-BJ workshop will cover the six key topics highlighted in Section 3 in sessions of at least 3 hours each, led by some of the key scientists driving these fields (many of whom are among our proposed conveners). Where possible and appropriate, we will give the junior scientists responsible for most of the ground work a prominent role in the meeting's program, in essence

to set them up as future leaders with links to the 'movers and shakers' in this area internationally. In addition to their integral role in the main meeting program, we will also set aside a specific session focusing entirely on the science driven by the young scientists.

Objectives

- The Sun at ultraviolet wavelengths
- Stellar atmospheres
- Stellar environments (including the impact on exoplanets in the habitable zone)
- Stellar activity (transients, flares, coronal mass ejections and winds)
- Star clusters
- Synergies with modern ground-based and space-borne observatories

Program

Monday April 14, 2025

1. Morning session (Chair: Richard de Grijs)		
09:00–09:10	Welcome & Introduction	Richard de Grijs
09:10–09:30	The Solar Upper Transition Region Imager (SUTRI) Onboard the *SATech-01* Satellite	Xianyong Bai
09:30–10:00	(E)UV Observations of Various Activities in Sunspot Light Bridges	Yijun Hou
10:00–10:30	Coffee Break	
10:30–10:50	Understanding Solar Eruptions with Observations in the UV Lyman-α Window	Li Feng
10:50–11:20	UV Spectral Signatures of Solar/Stellar Filament Eruptions	Pengfei Chen
11:20–11:50	EUV Observations of Stellar Coronal Activity	Hui Tian
11:50–13:00	Lunch Break	
2. Afternoon session (Chair: Ana Ines Gomez de Castro)		
13:00–13:30	Stellar Modelling With the Help of the UV High-resolution Stellar Spectral Library	Xiaoting Fu
13:30–14:00	High-resolution Spectroscopy of Hot Stars in UV	Gajendra Pandey (*online*)
14:00–14:30	The Sun in the Near Ultraviolet	Durgesh Tripathi (*online*)
14:30–15:00	Coffee Break	
15:00–15:30	Solar & Stellar CMEs in EUV Spectroscopy: Observations & Simulations	Yu Xu

15:30–16:00	Review of the Sun at UV/EUV Wavelengths	Louise Harra (*online*)
16:00–16:30	Extreme Ultraviolet Observations of the Sun from Space: a Review & Future Prospects	Frédéric Auchère (*online*)
16:30–17:00	Modelling the Chromosphere/Transition Regions of the Sun & Stars & Review of Spectral Diagnostics	Giulio Del Zanna (*online*)

Tuesday April 15, 2025

3. Morning session (Chair: Xiaoting Fu)

09:00–09:20	UV Imaging Study of the Cygnus Loop	Firoza Sutaria
09:20–09:40	Far-UV Spectroscopy of Hot Subdwarf Stars: Nucleosynthesis & Binary Stellar Evolution	Matti Dorsch
09:40–10:10	Multi-band Surveys of Hot Evolved Stars	Stephan Geier
10:10–10:30	Coffee Break	
10:30–11:00	On the Importance of UV Spectroscopy for the Study of Hot (Pre-)white Dwarfs	Nicole Reindl
11:00–11:30	Investigations of Gravitational Radiation & Triplicity of sdOB-type Binaries Based on Space-based Data	Shengbang Qian
11:30–12:00	UV & X-ray Observations of Rocky Planet Host Stars: Inputs for Atmospheric Photochemistry & Escape Calculations	Kevin France
12:00–12:10	Group Photo	
12:10–13:20	Lunch Break	

4. Afternoon session (Chair: Martin Barstow)

13:20–13:50	Stellar Archaeology in the UV	Thirupathi Sivarani (*online*)

13:50–14:10	Star–planet Interactions at Ultraviolet Wavelengths: Prospects of Detection	Ada Canet
14:10–14:40	Does the Electron Energy in Planetary Nebulae Follow κ (kappa) or Maxwellian Distributions?	Yong Zhang
14:40–15:10	Coffee Break	
15:10–15:35	Photometric Activity Cycles in Fast-rotating Stars: Revisiting the Reality of Stellar Activity Cycle Branches	Deepak Chahal
15:35–16:00	*Hubble Space Telescope*/STIS UV Spectroscopy of Galactic Planetary Nebulae	Xuan Fang
16:00–16:30	Monitoring & Understanding Stellar Flares & Activity	Giovanna Tinetti
16:30–17:00	UV Spectropolarimetry to Study Stellar Magnetospheres	Coralie Neiner (*online*)
18:00–	Social Dinner at Second Floor Park Plaza Hotel	

Wednesday April 16, 2025

5.	**Morning session (Chair: Samyaday Choudhury)**	
09:00–09:30	Stellar Populations in Star Clusters	Chengyuan L
09:30–10:00	Modelling the Integrated Light of the Stellar Populations in the NUV and FUV Spectral Ranges	Alexandre Vazdekis
10:00–10:30	High-energy Spectroscopy for Stellar Activities	Li Ji
10:30–11:00	Coffee Break	
11:00–11:30	Future Missions in the EUV and UV	Martin Barstow
11:30–12:00	The Life Cycle of Planetary Systems – New Insights from Present and Future UV Instrumentation	Ana Ines Gomez de Castro
12:00–13:00	Lunch Break	
	Free Afternoon	

Thursday April 17, 2025

	6. Morning session (Chair: Nicole Reindl)	
09:00–09:30	Unveiling Bifurcated Blue Straggler Sequences in NGC	Li Wang
09:30–09:55	GlobULeS: Globular Cluster UVIT Legacy Survey with *Astrosat*	Snehalata Sahu
09:55–10:20	Kinematics & Morphology of the Young Population in the Small Magellanic Cloud: Insights from UVIT	Sipra Hota
10:20–10:50	Coffee Break	
10:50–11:20	A UV-guided Study of Blue Straggler Stars of Open Clusters & Galactic Fields	Kaushar Vaidya
11:20–11:50	*QUVIK* – Quick Ultra-Violet Kilonova Surveyor	Norbert Werner (*online*)
11:50–13:00	Lunch Break	
	7. Afternoon session (Chair: Hui Tian)	
13:00–13:30	Impact of UV Imaging on Accurate Characterization of Binary Systems	Vikrant Vinayak Jadhav
13:30–14:00	*LAPYUTA* Mission – a 60 cm FUV Space Telescope	Shingo Kameda
14:00–14:30	Science from the Concept for a New UV Space Astronomy Project Initiative Between HKU & Relevant CAS Institutes	Quentin Parker
14:30–15:00	Coffee Break	
15:00–15:30	*Mauve*, a Small Ultraviolet & Visible Spectrophotometry Satellite & its Applications in Time-domain Stellar Spectroscopy	Benjamin Wilcock
15:30–16:00	Ultraviolet Extinction Sky Survey (*UVESS*): A Mission Concept for Probing the Interstellar Medium in the Milky Way & Local Group Galaxies	Andrew Battisti

16:00–16:30	A Summary of Star Cluster Studies Using *UVIT* on *AstroSat* 2173: Insights from Binary Evolution	Annapurni Subramaniam (*online*)
16:30–17:00	Studying Extragalactic Star Clusters & Star Formation Using UVIT/*AstroSat*	Samyaday Choudhury

Friday April 18, 2025

	8. Morning session (Chair: Li Ji)	
09:00–09:30	The *SPECTR-UF* Mission	Mikhail Sachkov
09:30–10:00	Soft X-ray Spectroscopy of Thermonuclear Bursts	Zhaosheng Li
10:00–10:30	What Can the Chinese Space Station Telescope Achieve by Combining UV with Optical Bands?	Chao Liu
10:30–11:00	Coffee Break	
11:00–11:30	Investigating the Factors Leading to Delay in the Dynamical Segregation of Dense Stellar Systems Using Blue Straggler Stars	Gaurav Singh
11:30–12:00	The GOTTA Project: Global Open Transient Telescope Array to Probe the Dynamical Universe	Jifeng Liu
12:00–13:20	Lunch Break	
	9. Afternoon session (Chair: Richard de Grijs)	
13:20–14:00	Discussion Session	
14:00–15:00	Preparation for the Drafting of the Review Papers	Richard de Grijs
15:00–	End of Workshop	

PRACTICAL INFORMATION

Venue

The Workshop will be held in the Earth Hall (A0401), NSSC building A, 4th Floor.

Address:
N°1 Nanertiao, Zhongguancun, Haidian District, Beijing, 100190
北京市海淀区中关村南二条一号

ISSI–BJ Office:
The ISSI-BJ office is located at NSSC, Building A, 4th Floor. It is equipped with a printing machine, connected to staff members computers. If you need to print something, you can send the file both via email or USB transfer.

WIFI Access

To access WIFI, please connect to NSSC-Guest, and then fill in the information as shown here down below:

Accomodation

ISSI-BJ covers the cost of the accommodation and breakfast. Please kindly note that all the other expenses in hotel will be deducted from your check-in deposit.

Park Plaza Hotel Beijing Science Park No.25, Zhichun Road, Haidian District, 100083, Beijing China
北京市海淀区知春路25号

Directions: Turn right when going out of Park Plaza Hotel and walk straight for 3 minutes, there is road "DAYUNCUN LU" (大运村路) in front of the Exit F of ZHICHUNLU (知春路) subway station, then keep going north along "DAYUNCUN LU" (大运村路) for 7-8 minutes, there is JINGZHANG RAILWAY PARK (京张铁路遗址公园) on your left, pass by the football field in the park, and follow the sign (down below) towards the National Microgravity Laboratory Tower, then cross the path, NSSC (国家空间科学中心) is located at the end of the path.

Lunch

Lunch for all participants of the ISSI-BJ forum will be available at the canteen on the -1 floor of the NSSC Building A.

Coffee Breaks

Coffee breaks will be provided by ISSI-BJ just in front of Earth Hall.

See the Program section to check the coffee break times.

Useful Information

Credit Cards: Credit and debit cards can be used in ATMs displaying the appropriate sign. Credit cards are increasingly becoming accepted in major shopping zones and high level restaurants but keep some cash handy just in case.
You can find an ATM at the NSSC lobby of Building A.

Currency: Chinese Yuan Renminbi (RMB)
(1 USD = approx. 7.2 RMB)
(1 EUR = approx. 7.8 RMB)

Drinking Water: Avoid drinking tap water directly. Bottled water and mineral water can be found in convenience stores and drink stalls. The price is 2-10 yuan RMB per bottle.

Electricity: 220 volts AC

Emergency Contacts in China

Ms. Lijuan EN +86-136 9912 1288

Ms. Francesca GARFAGNOLI +86-195 68739884

Dinner on April 15

Dinner offered by ISSI-BJ on Tuesday, April 15, 2024 at 18:00.

Restaurant:
Amber 6, 2nd Floor of Park Plaza Beijing Science Park
丽亭华苑酒店2楼金辉6厅

Address:
No. 25 Zhichun Road, Haidian District, Beijing
北京市海淀区知春路25号

PARTICIPANTS

No.	Name	Affiliation
CONVENERS & WORKSHOP LEADERS		
1	Martin Barstow	Leicester University, UK
2	Pengfei Chen	Nanjing University, China
3	Richard de Grijs	Macquarie University, Australia; International Space Science Institute - Beijing, China
4	Ana Ines Gomez de Castro	Complutense University of Madrid, Spain
5	Li Ji	Purple Mountain Observatory, Chinese Academy of Sciences, China
6	Chao Liu	National Astronomical Observatories, Chinese Academy of Sciences, China
7	Annapurni Subramaniam	Indian Institute of Astrophysics Bangalore, India (*online*)
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9	Andrew Battisti	International Centre for Radio Astronomy Research, Australia
10	Ada Canet	Complutense University of Madrid, Spain
11	Deepak Chahal	Macquarie University, Australia
12	Samyaday Choudhury	Ahmedabad University, India

13	Matti Dorsch	University of Potsdam, Germany
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22	Vikrant Vinayak Jadhav	University of Bonn, Germany
23	Shingo Kameda	Rikkyo University, Japan
24	Chengyuan Li	Sun Yat-sen University, China
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28	Shengbang Qian	School of Physics and Astronomy, Yunnan University, China

29	Nicole Reindl	Heidelberg University, Germany
30	Mikhail Sachkov	Institute of Astronomy, Russian Academy of Sciences, Russia
31	Snehalata Sahu	University of Warwick, UK
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33	Firoza Sutaria	Indian Institute of Astrophysics, Bangalore, India
34	Hui Tian	Peking University, China
35	Giovanna Tinetti	University College London, UK
36	Kaushar Vaidya	Birla Institute of Technology and Science Pilani, India
37	Alexandre Vazdekis	International Astronautical Congress, Spain
38	Li Wang	Sun Yat-sen University, China
39	Benjamin Wilcock	Blue Skies Space, UK
40	Yu Xu	Peking University, China
41	Dongdong Yan	Yunnan Astronomical Observatory, Chinese Academy of Sciences, China
42	Yong Zhang	Sun Yat-sen University, China

ONLINE SPEAKERS		
43	Frédéric Auchere	Institute of Space Astrophysics, France
44	Giulio Del Zanna	University of Cambridge, UK
45	Louise Harra	Physikalisch-Meteorologisches Observatorium Davos/World Radiation Center, Switzerland
46	Coralie Neiner	Paris Observatory, France
47	Gajendra Pandey	Indian Institute of Astrophysics, India
48	Thirupathi Sivarani	Indian Institute of Astrophysics, Bangalore, India
49	Durgesh Kumar Tripathi	Inter-University Centre for Astronomy and Astrophysics, India
50	Norbert Werner	Masaryk University, Czech Republic

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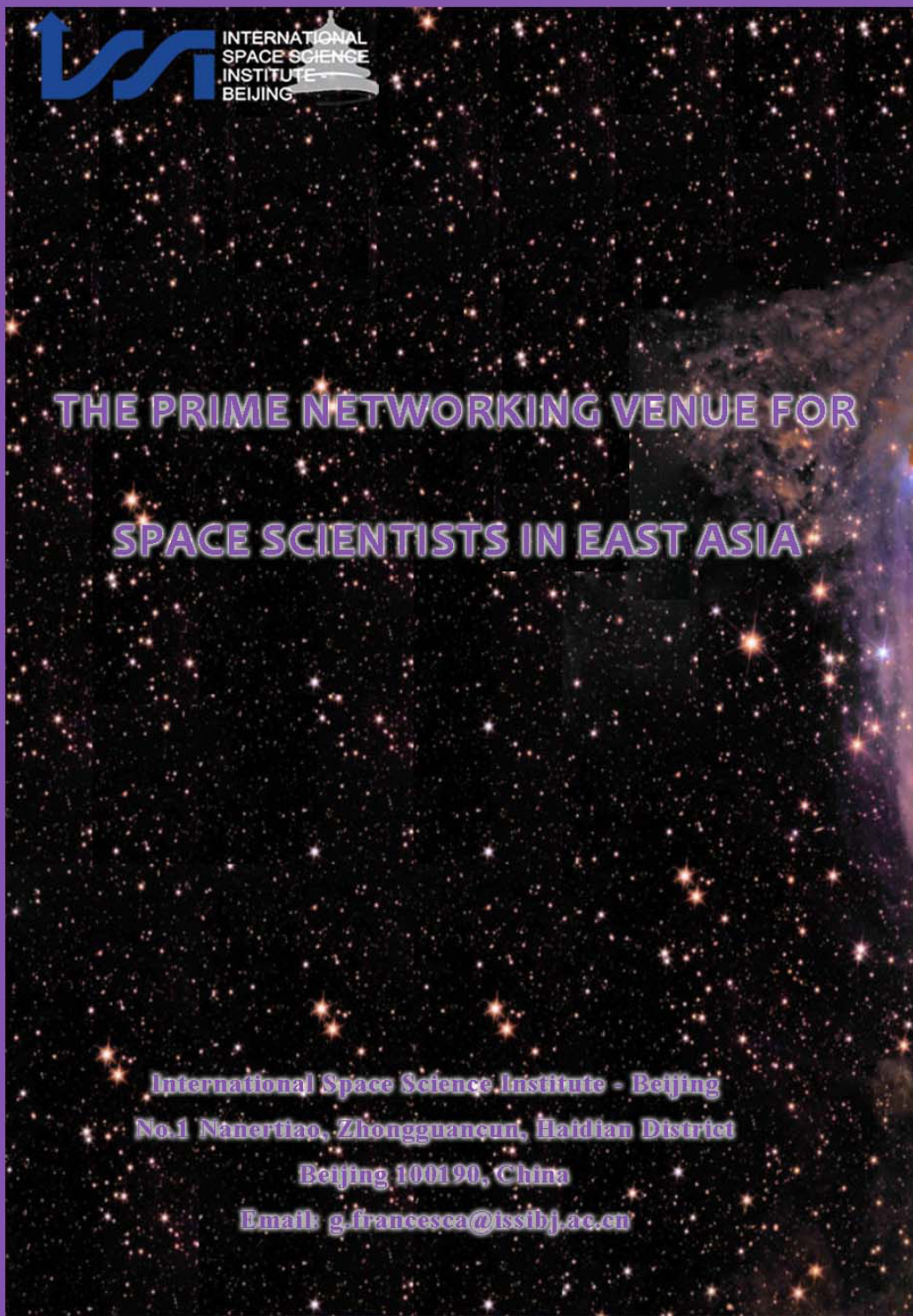

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