



2nd New Horizons for Psi Workshop

2026 年 8 月 23 日-28 日 中国 北京

August 23-28, 2026 Beijing, China

New Horizons for Psi is an international workshop series devoted to exploring fundamental fields in the vicinity of compact objects and understanding how these extreme gravitational environments can serve as powerful laboratories for fundamental physics. The growing interplay among black-hole astrophysics, gravitational-wave observations, and particle physics has opened up new opportunities to investigate phenomena at the intersection of these areas. The series brings together researchers working on black holes, gravitational waves, and particle physics, fostering cross-disciplinary dialogue.

In addition to plenary talks, the workshop features contributed talks and focused mini-workshop sessions. The inaugural New Horizons for Psi Workshop was held in Lisbon in 2024. The 2nd New Horizons for Psi Workshop takes place in Beijing, China, from 23 to 28 August 2026 and is hosted by the International Centre for Theoretical Physics Asia-Pacific.

International Advisory Board

Gianfranco Bertone, Diego Blas, Richard Brito, Vitor Cardoso, Katy Clough, William East, Joseph Silk, Takahiro Tanaka, Yue-Liang Wu.

Local Organizing Committee

Haipeng An, Yifan Chen, Xiaoyong Chu, Huaike Guo, Da Huang, Jing Liu, Teng Ma, Andrew Miller, Shi Pi, Jing Ren, Yong Tang, Yu Tian, Shao-Jiang Wang, Huan Yang, Jun Zhang (chair), Yunlong Zhang, Yue Zhao.

Workshop Information

Registration

Time: 14:00-20:00 August 23, 2026

Place: S101, UCAS Teaching Building, No. 3, South 1st Street, Zhongguancun, Haidian District, Beijing 100190, China

Registration fee: 1,500 RMB/person

Scan the QR code to pay with Alipay or Wechat at the registration desk.

Dining

Lunch: 12:30 – 14:00 **Dinner:** 17:00 – 20:00

Dining Venue: Second floor, Wuke Restaurant

Important Notice: Please keep your meal card safe, as lost cards will not be reissued.

Contacts

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Workshop Venue

UCAS Teaching Building, No. 3, South 1st Street, Zhongguancun, Haidian District, Beijing 100190, China.



Workshop Schedule

2nd New Horizons for Psi Workshop						
23–28 August 2026						
Time	Sunday 23 Aug	Monday 24 Aug	Tuesday 25 Aug	Wednesday 26 Aug	Thursday 27 Aug	Friday 28 Aug
08:00–08:45		Registration				
08:45–09:00		Opening				
09:00–09:30		Gravitational waves beyond General Relativity (Enrico Barausse)	Superradiance-free searches of ultralight DM around massive objects at the precision front (Glad Perez)	Can the Universe actually inflate? (Eugene Lim)	Wave Dark Matter: Stochastic Fluctuation and Gravitational Probes (Hyungjin Kim)	Probing ultralight axion-like dark matter with pulsar arrays (Jing Ren)
09:30–10:00		Extreme mass-ratio inspirals in scalar cloud environments (Richard Brito)	GUEST: a mission to fill the microHz gap in GW searches (Diego Blas)	Hubble delayed vacuum decay and their gravitational wave signals (Halpeng An)	Sagittarius A* and its environment, a review on GRAVITY results (Arianna Foschi)	Quantum Evolution of a Superradiant Cloud (Hideotoshi Omiya)
10:00–10:30		Break				
10:30–11:00		Discovering gravitational atoms with binary systems (Giovanni Maria Tomaselli)	Evidence and Constraints on Ultralight Dark Matter (XiaoJun Bi)	FoPTs, PBHs, SIGWs, and SWs from e early Universe (Shao-Jiang Wang)	Weighing Dark Matter with Gravitational Waves (Rodrigo Luis Lourenço Vicente)	Black hole superradiance and beyond (Nils Siemonsen)
11:00–11:30		Matters of gravity: the interplay between environmental and beyond-GR effects in asymmetric binaries (Andrea Maselli)	Probing the wave nature of light degrees of freedom (Chen Sun)	Axion-Sourced Gravitational Waves in B-L Hybrid Inflation (Shaaban Khali)	Why Dark Matter May Have Self-Interactions (Hai-Bo Yu)	Rotating Real Scalar Condensate (Hong Zhang)
11:30–12:00		Panel Discussion	Panel Discussion	TBD (Volodymyr Takhistov)	Panel Discussion	Panel Discussion
12:00–12:10		Lunch			Panel Discussion	Closing Remarks
12:10–12:30						
12:10–14:00						
14:00–15:30	Registration	Parallel Session A	Parallel Session B	Parallel Session A	Parallel Session B	
15:30–16:00		Break			Break	
16:00–17:00		Parallel Session A	Parallel Session B	Parallel Session A	Miniworkshop: How Feasible Is Gravitational Detection of Dark Matter?	
17:00–17:45						
18:00–20:00						Banquet

Plenary Session

Monday, 24 August 2026

Chair: Jun Zhang	Location: S101, UCAS Teaching Building
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Time	Title	Speaker
9:00–9:30	Gravitational waves beyond General Relativity	Enrico Barausse
9:30–10:00	Extreme mass-ratio inspirals in scalar cloud environments	Richard Brito
10:30–11:00	Discovering gravitational atoms with binary systems	Giovanni Maria Tomaselli
11:00–11:30	Matters of gravity: the interplay between environmental and beyond-GR effects in asymmetric binaries	Andrea Maselli

Tuesday, 25 August 2026

Chair: Yifan Chen	Location: S101, UCAS Teaching Building
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Time	Title	Speaker
9:00–9:30	Superradiance-free searches of ultralight DM around massive objects at the precision front	Gilad Perez
9:30–10:00	GUEST: a mission to fill the microHz gap in GW searches	Diego Blas
10:30–11:00	Evidence and Constraints on Ultralight Dark Matter	Xiaojun Bi
11:00–11:30	Probing the wave nature of light degrees of freedom	Chen Sun

Wednesday, 26 August 2026

Chair: Xiaoyong Chu	Location: S101, UCAS Teaching Building
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Time	Title	Speaker
9:00–9:30	Can the Universe actually Inflate?	Eugene Lim
9:30–10:00	Hubble delayed vacuum decay and their gravitational wave signals	Haipeng An
10:30–11:00	FoPTs, PBHs, SIGWs, and SWs from early Universe	Shao-Jiang Wang
11:00–11:30	Axion-Sourced Gravitational Waves in B-L Hybrid Inflation	Shaaban Khalil
11:30–12:00	TBD	Volodymyr Takhistov

Thursday, 27 August 2026

Chair: Richard Brito	Location: S101, UCAS Teaching Building
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Time	Title	Speaker
9:00–9:30	Wave Dark Matter: Stochastic Fluctuation and Gravitational Probes	Hyungjin Kim
9:30–10:00	Sagittarius A* and its environment, a review on GRAVITY results	Arianna Foschi
10:30–11:00	Weighing Dark Matter with Gravitational Waves	Rodrigo Luís Lourenço Vicente
11:00–11:30	Why Dark Matter May Have Self-Interactions	Hai-Bo Yu

Miniworkshop

Chair: Yifan Chen	Location: S101, UCAS Teaching Building
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Time	Title	Speaker
16:00–17:00	How Feasible Is Gravitational Detection of Dark Matter?	All

Friday, 28 August 2026

Chair: Diego Blas	Location: S101, UCAS Teaching Building
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Time	Title	Speaker
9:00–9:30	Probing ultralight axion-like dark matter with pulsar arrays	Jing Ren
9:30–10:00	Quantum Evolution of a Superradiant Cloud	Hidetoshi Omiya
10:30–11:00	Black hole superradiance and beyond	Nils Siemonsen
11:00–11:30	Rotating Real Scalar Condensate	Hong Zhang

Parallel Sessions

Monday, 24 August 2026

Parallel Session A · 14:00–15:30

Chair: Giovanni Maria Tomaselli | **Location:** S101, UCAS Teaching Building

Time	Title	Speaker
14:00–14:15	Searching for Scalar Ultralight Bosons through High-Frequency X-ray Variability	Zhiren Wang
14:15–14:30	Observation of Dwarf Galaxies and Fuzzy Dark Matter	Yu-Ming Yang
14:30–14:45	Probing black hole environments with gravitational waves	Chen Yuan
14:45–15:00	Heating Up the Black Hole X-ray Binary Accretion Disk by Superradiance	Fengwei Yang
15:00–15:15	Superradiant instability of area-quantized Kerr black hole with discrete reflectivity	Yun-Long Zhang
15:15–15:30	Periastron Precession of Spinning Binary Blackholes	Lingfeng Li

Parallel Session B · 14:00–15:30

Chair: Jing Ren | **Location:** S102, UCAS Teaching Building

Time	Title	Speaker
14:00–14:15	Instability and backreaction of massive spin-2 fields around black holes	Zhen Zhong
14:15–14:30	Black Hole Ringdown Seen in Photon Polarization Swings	Yehui Hou
14:30–14:45	Nonlinear Tidal Modes in Neutron Stars	Guangzhou Guo
14:45–15:00	Does a conformal transformation change the quasinormal mode spectrum?	Han-Wen Hu
15:00–15:15	Random Environmental Perturbations of Quasinormal Modes: Perturbative and Numerical Analyses in the Pöschl–Teller Model	Jianing Chen
15:15–15:30	Virtual absorption modes of Schwarzschild-de Sitter spacetimes in semi-open systems	Liang-Bi Wu

Parallel Session A · 16:00–17:30**Chair:** Chen Sun | **Location:** S101, UCAS Teaching Building

Time	Title	Speaker
16:00–16:15	Gravitational Atomic Spectra: Dynamics, Emission, and the Axion Potential	Ximeng Li
16:15–16:30	Background-Induced Forces from Quadratically Coupled Ultralight Dark Matter	Hailin Xu
16:30–16:45	Dynamical gravitational-wave lensing by gravitational atoms	Zhen-Hong Lyu
16:45–17:00	Illuminating Black Hole Shadows with Dark Matter Annihilation	Yanjie Zeng
17:00–17:15	Constraints on Symmetric Dark Matter from Neutron Star Capture and Collapse	Yuxin Liu
17:15–17:30	Black hole superradiance of interacting multifield	Zhi-Qing Zhu

Parallel Session B · 16:00–17:45**Chair:** Haitian Wang | **Location:** S102, UCAS Teaching Building

Time	Title	Speaker
16:00–16:15	XOB Reveals Physics inside Black Holes	Dingfang Zeng
16:15–16:30	Neutron stars more compact than black holes as a probe of strong-field gravity	Shoulong Li
16:30–16:45	Shaving off soft hairs and black hole image memory effect	Shaoqi Hou
16:45–17:00	Causal Green function decomposition for quantum black hole seismology	Xi-Li Zhang
17:00–17:15	Gravitational-Wave Echoes from Layered Compact Objects: A Double-Shell Model	Qi Su
17:15–17:30	Extending Kerr–Bertotti–Robinson Spacetime Through Infinity: A Wormhole Connecting a Black Hole’s Exterior and Interior	Yu-Sen Zhou

Tuesday, 25 August 2026

Parallel Session A · 14:00–15:30

Chair: Lingfeng Li | **Location:** S101, UCAS Teaching Building

Time	Title	Speaker
14:00–14:15	Learning Physically Structured Corrections for Numerical Relativity	Bo-Xuan Ge
14:15–14:30	Black-hole - neutron-star mergers: new numerical-relativity simulations and multipolar effective-one-body model with spin precession and eccentricity	Alejandra Gonzalez
14:30–14:45	Following massive black hole binaries and triplets to coalescence in live galaxy simulations: gravitational wave source predictions with RAMCOAL	Kunyang Li
14:45–15:00	Boson star-black hole binaries: initial data and head-on collisions	Zhuan Ning
15:00–15:15	Relativistic treatment of extreme mass ratio inspirals crossing accretion disks	Yuhe Zeng
15:15–15:30	Third-Body Detection in LISA Massive Black Hole Triples via Acceleration	Zheng Wu

Parallel Session B · 14:00–15:15

Chair: Chen Yuan | **Location:** S102, UCAS Teaching Building

Time	Title	Speaker
14:00–14:15	Primordial black holes as cosmic accelerators of light dark matter	Sk Jeesun
14:15–14:30	SM-Charged Portals for Dark Photons Protected by Dark Charge Conjugation	Qiyuan Gao
14:30–14:45	Particle productions during collisions of highly boosted bubble walls	Hongyi Jiang
14:45–15:00	Mechanism of kinetic equilibrium between SIMP and radiation	Ajay Kaladharan
15:00–15:15	Rethinking Neutron-Star Structure with Continuous Gravitational-Wave Constraints	Ayush Hazarika

Parallel Session A · 16:00–17:45**Chair:** Andrew Miller | **Location:** S101, UCAS Teaching Building

Time	Title	Speaker
16:00–16:15	Gravitational Wave Data Analysis using the F-statistic method	Haitian Wang
16:15–16:30	Efficiency of current gravitational wave microlensing searches using isolated compact object lenses	Uddeepta Deka
16:30–16:45	Resolving individual supermassive black hole binaries in pulsar timing arrays: a harmonic-space framework	Hanyu Cheng
16:45–17:00	Searches for the Isotropic Gravitational-Wave Backgrounds with LIGO-Virgo-KAGRA detectors.	Mai Qiao
17:00–17:15	SPRING: A Spectral-Level Framework for Strong-Field Tests with Gravitational-Wave Ringdowns	Shitong Guo
17:15–17:30	Accounting for Dark-Dresses in Searches for Gravitational waves from Inspiring Primordial Black Holes using Pattern-Recognition Techniques	Charchit Kumar Sethi
17:30–17:45	Accelerated Bayesian noise estimation for multivariate and non-stationary LISA data	Avi Vajpeyi

Parallel Session B · 16:00–17:15**Chair:** Huaike Guo | **Location:** S102, UCAS Teaching Building

Time	Title	Speaker
16:00–16:15	Multimessenger Tests of the Strong Equivalence Principle and Hidden Extra Dimensions with Gravitational-Wave Observations	Hanlin Song
16:15–16:30	Constraints on modified gravity theories of dark energy with the latest LVK data	Anson Chen
16:30–16:45	Parameter Estimation of Substellar-Mass Compact Objects with Mini Extreme Mass-Ratio Inspirals	Qimin Song
16:45–17:00	Effects of dark dipole radiation on eccentric supermassive black hole binary inspirals	Muchun Chen
17:00–17:15	Testing Dipole Radiation with Eccentric Multiband Binary Black Holes	Han Wang

Thursday, 27 August 2026

Parallel Session A · 14:00–15:15

Chair: Rodrigo Luís Lourenço Vicente | **Location:** S101, UCAS Teaching Building

Time	Title	Speaker
14:00–14:15	Relativistic frequency shifts in gravitational waves from axion clouds	Takuya Takahashi
14:15–14:30	Relativistic signatures of scalar clouds in extreme-mass-ratio inspirals	Qi-Xuan Xu
14:30–14:45	Constraining Ultralight Scalar Dark Matter in the Galactic Center with the S2 Orbit	Jiangchuan Yu
14:45–15:00	Evolution of ultralight boson clouds in binary black hole systems	Ao Guo
15:00–15:15	Ultralight Boson Ionization from Comparable-Mass Binaries	Yuhao Guo

Parallel Session B · 14:00–15:30

Chair: Yun-Long Zhang | **Location:** S102, UCAS Teaching Building

Time	Title	Speaker
14:00–14:15	Parameter estimation of generalized Ghosh black holes using shadow observables and Event Horizon Telescope Constraints	Himanshi Gulia
14:15–14:30	Long-living Rings and direct wave related with black hole horizon	Wenbiao Han
14:30–14:45	Probing Hairy Black Holes through Eikonal Ringdown and Null-Geodesic Diagnostics	Ariadna Uxue Palomino Ylla
14:45–15:00	3D Summation-by-Parts scheme on Hyperboloidal Slices	Shalabh Gautam
15:00–15:15	Dyonic hairy black holes in U(1) gauge-invariant scalar-vector-tensor theories: Third- and fourth-order sectors	Masaki Kitagawa
15:15–15:30	Linear stability of dyonic black holes in U(1) gauge-invariant scalar-vector-tensor theories	Shunta Nishimura

About ICTP-AP

The International Centre for Theoretical Physics Asia-Pacific (ICTP-AP) is jointly established by the Chinese Academy of Sciences (CAS), the National Natural Science Foundation of China (NSFC), and the International Centre for Theoretical Physics. It is UNESCO's first Category II centre in China in the field of basic sciences. This year, the Centre successfully renewed its cooperation agreement with UNESCO. Taking this as a new starting point, it seizes opportunities for international cooperation and development, ushering in a new stage of development featuring deep collaboration, innovation, and quality enhancement.

ICTP-AP is organizationally hosted by the University of Chinese Academy of Sciences (UCAS). It is a non-profit organization dedicated to high-level scientific research, education, and training in frontier basic sciences and related interdisciplinary fields. Adhering to UCAS's educational philosophy of "integration of research and education," the Centre respects, understands, and cares for its students, creating favorable conditions for their growth and development, opening diverse pathways, and providing abundant resources. It is committed to becoming an international talent training base and an open platform for academic exchange.

The Centre's research areas not only cover fundamental and frontier research in physics but also extend to applied fields. While proactively targeting scientific frontiers and conducting original scientific research, it also addresses critical national strategic needs and achieves continual breakthroughs in the physical sciences. The Centre has long led and promoted the planning and implementation of China's space-based gravitational wave detection project, the Taiji program. In 2017, ICTP-AP, together with national research institutions and universities involved in space-based gravitational wave detection, initiated the "Consortium of Gravitational Wave Detection Taiji Program in Space". The "Taiji-1" satellite was successfully launched in 2019, marking the foundational first step in China's space-based gravitational wave detection endeavor. It was named one of the Top Ten Scientific and Technological Advances in China for 2019 and was also recognized as a major achievement under the Chinese Academy of Sciences' Pilot Initiative Phase I. Since 2022, ICTP-AP has been approved as one of six theoretical physics centres funded by the Theoretical Physics Special Fund of NSFC. With a strong research platform, an outstanding community of scientists, and extensive international exchanges, the Centre has gained considerable international reputation and standing.

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