Qianhang Ding

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Education

PhD in Physics 09/2018 – 10/2023
Department of Physics, The Hong Kong University of Science and Technology
Supervisor: Prof. Yi Wang

Bachelor of Science 09/2014 – 06/2018
Department of Physics, Shanxi University

Employment

Senior Researcher 10/2023 – present
Center for Theoretical Physics of the Universe (CGA Group), Institute for Basic Science

QUPIP Researcher 05/2024 – 06/2024
International Center for Quantum-field Measurement Systems for Studies of the Universe and Particles

Research Assistant 09/2022 – 08/2023
Department of Physics, The Hong Kong University of Science and Technology

Research

Research Interests

Theory: gravitational wave cosmology, cosmic tensions, dark matter, black hole, and fundamental topics
Observation: multi-messenger astronomy such as gravitational wave astronomy, pulsar astronomy and CMB

Research Topics

Dark Matter in Multi-messenger Astronomy: studying the imprints of dark matter with multi-messengers
PBHs as Cosmic Probes: using the GWs from PBHs to probe Hubble parameter and structure formation
Cosmology in Void: understanding Hubble tension, dipole tension, cosmological principle in void cosmology
Standard Timers: tracking redshift-time relation through the statistics in cosmological dynamical systems
Collider in the Universe: studying cosmological collider in CMB and gravitational collider in PSR-BH binary

Publications (Authors are listed in alphabetical order)

[14] **Qianhang Ding**, Minxi He, and Hui-Yu Zhu "Extracting Properties of Dark Dense Environments around Black Holes from Gravitational Waves," arXiv:2510.27424 [gr-qc], Under review in PRD.

[13] **Qianhang Ding**, Minxi He, Volodymyr Takhistov, and Hui-Yu Zhu "Dark Matter-Independent Orbital Decay Bounds on Ultralight Bosons from OJ287," *Phys. Rev. D* **112** no. 10, (2025) 103051.

[12] **Qianhang Ding**, Minxi He, and Volodymyr Takhistov "Primordial Black Hole Mergers as Probes of Dark Matter in Galactic Center," *Astrophys.J.* **981** no. 1, (2025) 62.

[11] **Qianhang Ding** "Merger rate of primordial black hole binaries as a probe of Hubble parameter," *Phys. Rev. D* **110** no. 6, (2024) 063542.

[10] Ali Akil, **Qianhang Ding** "A Dark Matter Probe in Accreting Pulsar-Black Hole Binaries," *JCAP* **09** (2023) 011.

[9] Tingqi Cai, **Qianhang Ding**, and Yi Wang "Reconciling cosmic dipolar tensions with a gigaparsec void," *Phys. Rev. D* **111** no. 10, (2025) 103502.

[8] **Qianhang Ding**, "Toward cosmological standard timers in primordial black hole binaries," *Phys. Rev. D* **108** no. 2, (2023) 023514.

[7] Yi-Fu Cai, Chao Chen, **Qianhang Ding**, and Yi Wang, "Cosmological Standard Timers from Unstable Primordial Relics," *Eur. Phys. J. C* **83** no. 913, (2023).

[6] Yi-Fu Cai, Chao Chen, **Qianhang Ding**, and Yi Wang, "Ultrahigh-energy Gamma Rays and Gravitational Waves from Primordial Exotic Stellar Bubbles," *Eur. Phys. J. C* **82** no. 464, (2022).

[5] **Qianhang Ding**, "Detectability of primordial black hole binaries at high redshift," *Phys. Rev. D* **104** no. 4, (2021) 043527.

[4] **Qianhang Ding**, Xi Tong, and Yi Wang, "Gravitational Collider Physics via Pulsar-Black Hole Binaries," *Astrophys.J.* **908** no. 1, (2021) 78.

[3] **Qianhang Ding**, Tomohiro Nakama, and Yi Wang, "A gigaparsec-scale local void and the Hubble tension," *Sci.China Phys.Mech.Astron.* **63** no. 9, (2020) 290403.

[2] **Qianhang Ding**, Tomohiro Nakama, Joseph Silk and Yi Wang, "Detectability of Gravitational Waves from the Coalescence of Massive Primordial Black Holes with Initial Clustering," *Phys. Rev. D* **100** no. 10, (2019) 103003.

[1] Wan Zhen Chua, **Qianhang Ding**, Yi Wang, and Siyi Zhou, "Imprints of Schwinger Effect on Primordial Spectra," *JHEP* **04** (2019) 066.

Summary of Publications

Google Scholar: 284 citations, h-index: 7, 20.3 citations per paper
INSPIRE HEP: 252 citations, h-index: 7, 18.0 citations per paper
NASA ADS: 229 citations, h-index: 8, 16.4 citations per paper

Awards and Distinctions

The 2025 Blaumann Prize, *Blaumann Foundation* 2025

Selected Young Scientist Participant, *The Hong Kong Laureate Forum* 2022

Honorable Mention for Best Teaching Assistant, *Department of Physics, HKUST* 2020

Postgraduate Studentship, *HKUST* 2018 – 2022

National Scholarship, *Ministry of Education of the People's Republic of China* 2016

Teaching Assistant

PHYS3031: Mathematical Methods in Physics II, HKUST Fall Term 2020 – 2021

PHYS1114: General Physics II, HKUST Fall & Spring Term 2019 – 2020

PHYS1002: Introduction to Astrophysics and Astronomy, HKUST Spring Term 2018 – 2019

Project Mentoring

Capstone Project: Three Body System Analysis, Mentoring for three students, HKUST 2020 – 2021

Service

The journal referee for *The Astrophysical Journal Letters*, *Physics of the Dark Universe*

The co-host of Cosmology from Home 2025 2025

The organizer of IBS CTPU-CGA Workshop on (Primordial) Black Holes and Gravitational Waves 2024

The chair of 2023 Joint Annual Conference of Physical Societies in Greater Bay Area 2023

The organizer of journal club talk series at fundamental physics group of IAS HKUST 2018 – 2022

The assistant of IAS Program on High Energy Physics 2019, 2020, 2022

The assistant of IAS Workshop on Black Holes, Inflation and Gravitational Waves 2019

The assistant of Pan Pearl River Delta Physics Olympiad 2019, 2020, 2022

Skills

Computer Languages Mathematica, Python, C, HTML, CSS, LaTeX

Programming MCMC, N–body simulation, Gradient descent, Error BP algorithm

Software Tools	BlackHawk, CAMB, MathGR, Blender
Outreach	Astrophotography [Channel] Popular science article for the Hong Kong Laureate Forum [Link]

Conference & Seminar Talks

Invited & Seminar Talks

Seminar Talk, *The Chinese University of Hong Kong*	11/2025
Seminar Talk, *Westlake University*	08/2025
Dark Matter and Neutrino Focus Week, *Tsung-Dao Lee Institute*	08/2025
Seminar Talk, *City University of Hong Kong*	06/2025
Seminar Talk, *The Hong Kong University of Science and Technology*	06/2025
Seminar Talk, *The Education University of Hong Kong*	06/2025
Seminar Talk, *Majorana-Raychaudhuri Seminar Series* [Video]	05/2025
Seminar Talk, *Institut d'Astrophysique de Paris*	04/2025
Seminar Talk, *Université libre de Bruxelles*	04/2025
CAS-IBS CTPU-CGA-ISCT Workshop in Cosmology, Gravitation and Particle Physics	04/2025
100 + 9 GR & Beyond, Current Topics in Cosmology, *Jeju National University*	11/2024
Seminar Talk, *Shenzhen University*	09/2024
IBS CTPU-CGA, Tokyo Tech, USTC workshop on cosmology, gravity, and particle physics	09/2024
IBS CTPU-CGA 2024 Workshop for Particle Physics and Cosmology in Korea	07/2024
Seminar Talk, *Jinan University*	06/2024
Seminar Talk, *High Energy Accelerator Research Organization, KEK*	06/2024
IBS CTPU-CGA 2024 Workshop on (Primordial) Black Holes and Gravitational Waves	03/2024
Seminar Talk, *Huazhong University of Science and Technology*	09/2023
Seminar Talk, *Chongqing University*	04/2023
Seminar Talk, *Sun Yat-Sen University*	03/2023
Seminar Talk, *Tsung-Dao Lee Institute*	02/2023
Seminar Talk, *Tsinghua University*	10/2022
Seminar Talk, *Institute of Theoretical Physics, Chinese Academy of Science* [Video]	10/2022
Innovative Talk, USTC Seminar Series, *University of Science and Technology of China*	05/2021
Seminar Talk, *Particle Cosmology Group, University of Science and Technology of China*	11/2019

Contributed Talks

The End of Lambda, *Korea Astronomy and Space Science Institute*	09/2025
The 3rd International Workshop on Gravitational Waves and the Early Universe, *Ningbo U*	09/2025
IBS CTPU-CGA 2025 Workshop for High Energy Physics and Cosmology in Korea	07/2025
International Symposium on Cosmology and Particle Astrophysics 2025, *IBS CTPU-CGA*	07/2025
Cosmology from Home 2025 [Video]	06/2025
High1 Workshop on Paritcle, String and Cosmology, *KIAS, IBS CTPU-CGA, CKC*	01/2025
Cosmology from Home 2024 [Video]	06/2024
International Symposium on Cosmology and Particle Astrophysics CosPA 2024, *Ningbo U*	06/2024
Gravity and Cosmology 2024, *Yukawa Institute for Theoretical Physics, Kyoto University*	02/2024
High1 Workshop on Paritcle, String and Cosmology, *KIAS and IBS CTPU-CGA*	01/2024
New Perspectives on Cosmology 2024, *APCTP*	01/2024
International Workshop on Multi-probe approach to wavy dark matters, *Korea University*	11/2023
International Symposium on Cosmology and Particle Astrophysics CosPA 2023, *CUHK*	11/2023
2023 Joint Annual Conference of Physical Societies in Greater Bay Area, *CityU*	08/2023
Cosmology from Home 2023 [Video]	07/2023
Gravitation and Relativistic Astrophysics 2023, CPS, *Chongqing University*	04/2023
The 15th Asia Pacific Physics Conference, *AAPPS, Korean Physical Society*	08/2022
The 23rd International Conference on General Relativity and Gravitation, *ITP, CAS*	07/2022
Cosmology from Home 2022 [Video]	07/2022
Gravity: Current challenges in black hole physics and cosmology, *YITP, Kyoto University*	06/2022
Atlantic General Relativity 2022, *Memorial University of Newfoundland and Labrador*	05/2022
The KEK–PH + KEK–Cosmo joint workshop on "Primordial Black Holes", *KEK*	10/2021
The 24th International Conference on Particle Physics and Cosmology, *UIUC*	08/2021
Gordon Research Seminar on Particle Physics, *HKUST*	06/2019