

# Xuheng Ding

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## Research Interests

- Galaxies Evolution;
- Observational Cosmology;
- Strong Gravitational Lensing;
- Gravitational Wave.

## Education

- 2012.09 **Ph.D.**,  
—2017.06 *Beijing Normal University*, Beijing  
Adviser: Prof. Zong-Hong Zhu
- 2015.09 **Visiting Graduate Researcher**,  
—2017.03 *The University of California*, Los Angeles  
Adviser: Prof. Tommaso Treu
- 2008.09 **B.S.**,  
—2012.06 *Hunan Normal University*, Changsha

## Working Experience

- 2020.09 **Postdoc (Kavli Fellow)**, *University of Tokyo, Kavli IPMU*, Tokyo, Japan  
—present
- 2018.09 **Postdoc**, *Department of Physics and Astronomy, UCLA*, Los Angeles, US  
—2020.08
- 2018.07.08 **Visiting Researcher**, *Kavli IPMU*, Tokyo, Japan  
—2018.08.03
- 2017.06 **Postdoc**, *Wuhan University, School of Physics and Technology*, Wuhan,  
—2018.09 China
- 2014 **Teaching Assistant**, *Beijing Normal University*  
Stellar Atmosphere for Third Year Students.
- 2014 **Assistant Adviser**, *Beijing Normal University*  
Summer Camp of Astronomy for High School Students.

2011 **High-school Practice Teacher**, *Liling No. 4 high school*,  
Teaching High School Physics.

## Grants

PI **HST Program**: IDENTIFICATION OF DUAL QUASARS WITH CLOSE SEPARATIONS AT  $z > 1$ ,  
Project ID: [Cycle 30-GO-17143](#)

Co-PI **JWST Program**: A COMPLETE CENSUS OF SUPERMASSIVE BLACK HOLES AND HOST GALAXIES AT  $z = 6$ ,  
Project ID: [Cycle 1-GO-1967](#)  
leading the high redshift ( $z > 6$ ) QSO imaging data analysis.

## Academic Activities (selected)

Referee for – The Astrophysical Journal;  
– Monthly Notices of the Royal Astronomical Society;  
– Astronomy & Astrophysics;  
– Astronomical Journal.

Programming Developed [Galight](#): A python package that analyzes and models the imaging data of galaxies, QSOs, and duals.

Collaboration participation – [COSMOS-webb](#): Decomposition for JWST imaged QSOs;  
– [Subaru HSC](#): developing tools for galaxy/QSO imaging analysis;  
– [TDCOSMO](#) & [H0LiCOW](#): strong lensing time delay cosmography;

Collaboration leading [TDLMC](#): Time delay lens modelling challenge.

Moderator IPMU Astro Journal Club.

Instructor CSST summer school, KIAA, Peking University (2022).

Lecturer Speaker of IPMU Orientation Session of JSPS Grants-in-Aid for Scientific Research (2022).

Outreach The Willows Community School, Los Angeles, US — Demonstration of a Water Bottle Rocket (2016).

## Awards (selected)

### as postdoc

2022 JSPS Grant-in-Aid for Early-Career Scientists.

2020 First author paper “Testing the Fidelity of Simulations of Black Hole – Galaxy Coevolution at  $z \sim 1.5$  with Observations” recognized as [AAS Nova research highlight](#) (2020/09/30).

### as student

2018 Excellent doctoral thesis of Beijing Normal University.

- 2015–17 China Scholarship Council Fellowship.
- 2016 Young Scholars Outstanding Paper Award — Chinese Physical Society.
- 2016 First Prize in Young Astronomers Academic Reports Workshop— Chinese Astronomical Society.
- 2015 Ph.D. candidates Chinese National Scholarship.

## Scientific Research Mentoring

- Graduate student
  - Shenli Tang, (2020-Present, Tokyo University): on HSC dual quasar searching and analysis.
  - Junyao Li, (2018-2019, Tokyo University): on HSC quasar imaging decomposition.
  - Lilan Yang, (2018-2019, WHU): on strong lensed GW detection rate prediction.
  - Xianlong He, (2021-2022, WHU): on HST galaxy and strong lensing image data analysis.
- Undergrad. Changhao Chen, (2021-2022, USTC): on HST deep image of simulation.

## Presentations

- 2022 **IPMU Colloquium (invited)**,  
*Kavli IPMU (remotely)*, Kashiwa, Japan
- 2022 **HSC-AGN collaboration new science report (invited)**,  
*HSC collaboration*, Japan
- 2022 **COSMOS2022**,  
*Institut d'Astrophysique de Paris*, Paris, France
- 2021 **SHAO Colloquium (invited)**,  
*Shanghai Astronomical Observatory*, Shanghai, China
- 2021 **WHU Colloquium (invited)**,  
*Wuhan University*, Wuhan, China
- 2021 **USTC Colloquium (invited)**,  
*Department of Astronomy - School of Physical Sciences*, Hefei, China
- 2021 **IPMU Colloquium (invited)**,  
*Kavli IPMU (remotely)*, Kashiwa, Japan
- 2019 **Seminar of Lunch Talks (invited)**,  
*Peking University KIAA*, Beijing
- 2019 **Annual AGN-Starburst Conference**,  
*National Astronomical Observatories of China*, Guiyang, Guizhou
- 2019 **Annual Galaxy evolution workshop (invited)**,  
*Kavli IPMU*, Tokyo, Japan

- 2019 **Lunch Seminar (invited)**,  
*Kavli IPMU, Tokyo, Japan*
- 2018 **Annual Meeting of STRIDES/H0LiCOW**,  
*Max Planck Institute for Astrophysics, Garching, Germany (remotely)*
- 2018 **Lunch Seminar (invited)**,  
*Kavli IPMU, Tokyo, Japan*
- 2017 **Annual meeting of the Division of Gravitation and Relativistic Astrophysics of the Chinese Physical Society**,  
*Southwest Jiaotong University, Chengdu, China*
- 2016 **Young Astronomers Academic Reports Workshop**,  
*NAOC, Beijing, China*
- 2016 **Annual Meeting of STRIDES/H0LiCOW**,  
*UCLA, Los Angeles, USA*
- 2015 **Annual Meeting of the Chinese Physical Society**,  
*Division of Gravitation and Relativistic Astrophysics, Hangzhou, China*
- 2015 **Ningbo Cosmology Workshop**,  
*The University of Nottingham Ningbo, China*

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## Languages

- English (Fluent)
- Japanese (Basic)
- Chinese (Mother-tongue)

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## List of Publications ([ADS link](#); h-index:21; g-index: 42)

### First Author and Mentoring Publication (15 in total)

- 2022 “Opening the era of quasar host studies at high redshift with JWST”  
[Ding, Xuheng](#); Silverman, John D.; Onoue, Masafusa, [2022, ApJL submitted](#)
- 2022 “Concordance between Observations and Simulations in the Evolution of the Mass Relation between Supermassive Black Holes and Their Host Galaxies”  
[Ding, Xuheng](#); Silverman, John D.; Treu, Tommaso and et al., [2022, ApJ, 933, 132D](#)
- 2021 “Improved time-delay lens modelling and H0 inference with transient sources”  
[Ding, Xuheng](#); Liao, Kai; Birrer, Simon and et al., [2021, MNRAS, 504, 5621D](#)
- 2021 “Time delay lens modelling challenge”  
[Ding, Xuheng](#); Treu, T.; Birrer, S. and et al., [2021, MNRAS, 503, 1096D](#)
- 2021 “Testing the evolution of correlations between supermassive black holes and their host galaxies using eight strongly lensed quasars”  
[Ding, Xuheng](#); Treu, Tommaso; Birrer, Simon and et al., [2021, MNRAS, 501, 269D](#)
- 2020 “Testing the Fidelity of Simulations of Black Hole-Galaxy Coevolution at  $z \sim 1.5$  with Observations”  
[Ding, Xuheng](#); Treu, Tommaso; Silverman, John D. and et al., [2020, ApJ, 896, 159D](#)
- 2020 “Black Hole Mass Function and Its Evolution – The First Prediction for the Einstein Telescope”  
[Ding, Xuheng](#); Liao, Kai; Biesiada, Marek and et al., [2020, ApJ, 891, 76D](#)
- 2020 “The Mass Relations between Supermassive Black Holes and Their Host Galaxies at  $1 < z < 2$  HST-WFC3”  
[Ding, Xuheng](#); Silverman, John; Treu, Tommaso and et al., [2020, ApJ, 888, 37D](#)
- 2019 “How Does the Earth’s Rotation Affect Predictions of Gravitational Wave Strong Lensing Rates?”  
Yang, Lilan; [Ding, Xuheng](#); Biesiada, Marek and et al., [2019, ApJ, 874, 139Y](#)
- 2019 “Cosmological inference from standard sirens without redshift measurements”  
[Ding, Xuheng](#); Biesiada, Marek; Zheng, Xiaogang and et al., [2019, JCAP, 04, 033D](#)

- 2017 “H0LiCOW VII: cosmic evolution of the correlation between black hole mass and host galaxy luminosity”  
[Ding, Xuheng](#); Treu, Tommaso; Suyu, Sherry H. and et al., 2017, *MNRAS*, 472, 90D
- 2017 “H0LiCOW. VI. Testing the fidelity of lensed quasar host galaxy reconstruction”  
[Ding, Xuheng](#); Liao, Kai; Treu, Tommaso and et al., 2017, *MNRAS*, 465, 4634D
- 2015 “Strongly lensed gravitational waves from intrinsically faint double compact binaries—prediction for the Einstein Telescope”  
[Ding, Xuheng](#); Biesiada, Marek; Zhu, Zong-Hong., 2015, *JCAP*, 12, 006D
- 2015 “Toward cosmological-model-independent calibrations for the luminosity relations of Gamma-Ray Bursts”  
[Ding, Xuheng](#); Li, Zhengxiang; Zhu, Zong-Hong., 2015, *IJMPD*, 2450057D
- 2015 “Is There Evidence for Dark Energy Evolution?”  
[Ding, Xuheng](#); Biesiada, Marek; Cao, Shuo and et al., 2015, *ApJ*, 803L, 22D

### 2nd, 3rd Author Publication (16 in total)

- 2022 “A Candidate of a Least-Massive Black Hole at the First 1.1 Billion Years of the Universe”  
 Onoue, Masafusa; Inayoshi, Kohei; [Ding, Xuheng](#), and et al. *ApJL*, submitted
- 2022 “Inferences on Relations between Distant Supermassive Black Holes and Their Hosts Complemented by the Galaxy Fundamental Plane”  
 Silverman, John D.; Li, Junyao; [Ding, Xuheng](#), 2022, *ApJ*, 933, 165S
- 2021 “Synchronized Coevolution between Supermassive Black Holes and Galaxies over the Last Seven Billion Years as Revealed by Hyper Suprime-Cam”  
 Li, Junyao; Silverman, John D.; [Ding, Xuheng](#) and et al., 2021, *ApJ*, 922, 142L
- 2021 “Optical Spectroscopy of Dual Quasar Candidates from the Subaru HSC-SSP program”  
 Tang, Shenli; Silverman, John D.; [Ding, Xuheng](#) and et al., 2021, *ApJ*, 922, 83T
- 2021 “Hyper Suprime-Cam Subaru Strategic Program: A Mass-dependent Slope of the Galaxy Size-Mass Relation at  $z < 1$ ”  
 Kawinwanichakij, Lalitwadee; Silverman, John D.; [Ding, Xuheng](#) and et al., 2021, *ApJ*, 921, 38K
- 2021 “A Local Baseline of the Black Hole Mass Scaling Relations for Active Galaxies. IV. Correlations Between MBH and Host Galaxy  $\dot{M}$ , Stellar Mass, and Luminosity”  
 Bennert, Vardha N.; Treu, Tommaso; [Ding, Xuheng](#) and et al., 2021, *ApJ*, 921, 36B

- 2021 “The Sizes of Quasar Host Galaxies in the Hyper Suprime-Cam Subaru Strategic Program”  
Li, Junyao; Silverman, John D.; [Ding, Xuheng](#) and et al., 2021, *ApJ*, 918, 22L
- 2020 “Probing compact dark matter with gravitational wave fringes detected by the Einstein Telescope”  
Liao, Kai; Tian, Shuxun; [Ding, Xuheng](#)., 2020, *MNRAS*, 495, 2002L
- 2019 “Where Do Quasar Hosts Lie with Respect to the Size-Mass Relation of Galaxies?”  
Silverman, John D.; Treu, Tommaso; [Ding, Xuheng](#) and et al., 2019, *ApJ*, 887L, 5S
- 2018 “Anomalies in Time Delays of Lensed Gravitational Waves and Dark Matter Substructures”  
Liao, Kai; [Ding, Xuheng](#); Biesiada, Marek and et al., 2018, *ApJ*, 867, 69L
- 2018 “Strongly lensed repeating fast radio bursts as precision probes of the universe”  
Li, Zheng-Xiang; Gao, He; [Ding, Xu-Heng](#) and et al., 2018, *NatCo*, 9, 3833L
- 2018 “Curvature from Strong Gravitational Lensing: A Spatially Closed Universe or Systematics?”  
Li, Zhengxiang; [Ding, Xuheng](#); Wang, Guo-Jian and et al., 2018, *ApJ*, 854, 146L
- 2017 “Precision cosmology from future lensed gravitational wave and electromagnetic signals”  
Liao, Kai; Fan, Xi-Long; [Ding, Xuheng](#) and et al., 2017, *NatCo*, 8, 1148L
- 2016 “What Are the  $\Omega_m^2(z_1, z_2)$  and  $\Omega_m(z_1, z_2)$  Diagnostics Telling us in Light of  $H(z)$  Data?”  
Zheng, Xiaogang; [Ding, Xuheng](#); Biesiada, Marek and et al., 2016, *ApJ*, 825, 17Z
- 2015 “Unbiased constraints on the clumpiness of the Universe from standard candles”  
Li, Zhengxiang; [Ding, Xuheng](#); Zhu, Zong-Hong., 2015, *PhRvD*, 91h3010L,
- 2014 “Strong gravitational lensing of gravitational waves from double compact binaries-perspectives for the Einstein Telescope”  
Biesiada, Marek; [Ding, Xuheng](#); Piórkowska, Aleksandra and et al., 2014, *JCAP*, 10, 080B

### Co-Author Publication (11 in total)

- 2022 “Early results from GLASS-JWST. V: the first rest-frame optical size-luminosity relation of galaxies at  $z > 7$ ”  
Yang, Lilan; Morishita, T.; Leethochawalit, N and et al. [ApJL](#), accepted

- 2022 “Event rate predictions of strongly lensed gravitational waves with detector networks and more realistic templates”  
Yang, Lilan; Wu, Shichao; Liao, Kai and et al., [2022, MNRAS, 509, 3772Y](#)
- 2021 “lenstronomy II: A gravitational lensing software ecosystem”  
Birrer, Simon; Shajib, Anowar; Gilman, Daniel and et al., [2021, JOSS, 6, 3283B](#)
- 2021 “Inspiring Double Compact Object Detection and Lensing Rate: Forecast for DECIGO and B-DECIGO”  
Piórkowska-Kurpas, Aleksandra; Hou, Shaoqi; Biesiada, Marek and et al., [2021, ApJ, 908, 196P](#)
- 2020 “TDCOSMO. IV. Hierarchical time-delay cosmography - joint inference of the Hubble constant and galaxy density profiles”  
Birrer, S.; Shajib, A. J.; Galan, A. and et al., [2020, A&A, 643A, 165B](#)
- 2020 “H0LiCOW - XIII. A 2.4 percent measurement of H0 from lensed quasars: 5.3 $\sigma$  tension between early- and late-Universe probes”  
Wong, Kenneth C.; Suyu, Sherry H.; Chen, Geoff C. -F. and et al., [2020, MNRAS, 498, 1420W](#)
- 2020 “Dual Supermassive Black Holes at Close Separation Revealed by the Hyper Suprime-Cam Subaru Strategic Program”  
Silverman, John D.; Tang, Shenli; Lee, Khee-Gan and et al., [2020, ApJ, 899, 154S](#)
- 2020 “TDCOSMO. I. An exploration of systematic uncertainties in the inference of H0 from time-delay cosmography”  
Millon, M.; Galan, A.; Courbin, F. and et al., [2020, A&A, 639A, 101M](#)
- 2019 “A SHARP view of H0LiCOW: H0 from three time-delay gravitational lens systems with adaptive optics imaging”  
Chen, Geoff C. -F.; Fassnacht, Christopher D.; Suyu, Sherry H. and et al., [2019, MNRAS, 490, 1743C](#)
- 2019 “Strongly gravitationally lensed type Ia supernovae: Direct test of the Friedman-Lemaître-Robertson-Walker metric”  
Qi, Jingzhao; Cao, Shuo; Biesiada, Marek and et al., [2019, PhRvD, 100b3530Q](#),
- 2017 “H0LiCOW - I. H0 Lenses in COSMOGRAIL’s Wellspring: program overview”  
Suyu, S. H.; Bonvin, V.; Courbin, F. and et al., [2017, MNRAS, 468, 2590S](#)