

Yuhan Yao

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PRIMARY RESEARCH INTERESTS

- Time domain astronomy; Observational high energy astrophysics; Sky surveys
- Tidal disruption events; Deaths of massive stars; Accretion and jet physics; Intermediate-mass black holes

EDUCATION

2020-2023	Ph.D., Astrophysics, California Institute of Technology, USA Thesis: High Energy Transients Powered by Black Holes Advisors: Prof. Shrinivas R. Kulkarni & Prof. Fiona A. Harrison
2018-2020	M. Sc. Astrophysics, California Institute of Technology, USA
2014-2018	B. Sc. Astronomy, Peking University, China

APPOINTMENTS

2023/08-present	Miller Fellow Miller institute for Basic Research in Science, University of California, Berkeley
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SELECTED HONORS and AWARDS

2023	Miller Fellowship Award, University of California, Berkeley
2021	Garmire Scholarship, Caltech
2017	Study Abroad Scholarship for Outstanding Students, China Scholarship Council
2017	Summer Undergraduate Research Fellowship, Caltech

SUCCESSFUL PI OBSERVING PROPOSALS

2023	XMM-Newton (ToO): X-ray Follow-up Observation of AT2022lri (40ks) VLA (DDT): Radio Afterglows from Optically Overluminous Tidal Disruption Events (8.2 hr) NICER Cycle 5 (\$43k); NICER+NuSTAR Observations of Tidal Disruption Events: Opening a New Chapter in Black Hole Super-Eddington Accretion (300ks, ToO)
2022	VLA 2023A : Opening a New Chapter in Relativistic Tidal Disruption Events (28hr) NICER Cycle 4 (\$44k); NICER Observation of X-ray Bright Tidal Disruption Events (300ks, ToO) NuSTAR (DDT); NuSTAR observations of the Jetted Tidal Disruption Event AT2022cmc (80ks)
2021	NuSTAR (DDT); NuSTAR observation of the Tidal Disruption Event AT2021ehb (80ks) NICER (DDT); NICER observation of the Tidal Disruption Event AT2021ehb (100ks) XMM-Newton AO-21 (\$105k); A Systematic Exploration of Late-time X-rays from ZTF TDEs (213ks) Chandra Cycle 23 (\$77k); Late-time Chandra Observations of eROSITA Selected TDEs (75ks) Chandra DDT (\$23k); Chandra Observation of AT2020mrf: the Most X-ray Luminous FBOT (40ks) NuSTAR Cycle 7 (\$81k); NuSTAR Observations of Tidal Disruption Events” (80ks, ToO) NuSTAR Cycle 7; Understanding the Central Engine of Luminous FBOTs (80ks, ToO)
2020	NuSTAR (DDT); NuSTAR Observation of the High-Mass X-ray Binary ZTF18abjpmzf (20ks) NuSTAR (DDT); NuSTAR Observations of the Low-Mass X-ray Binary AT2019wey (120ks) VLA (DDT); VLA observations of AT2019wey (6.3hr)
2018-23	Swift (ToO); Submitted >60 approved Swift observations (>400ks)

OBSERVING EXPERIENCE

Keck-I telescope, the Low Resolution Imaging Spectrometer (LRIS) – more than 20 nights
Palomar Hale telescope, the Double Spectrograph (DBSP) – more than 20 nights
Keck-II telescope, the Echellette Spectrograph and Imager (ESI) – 5 nights
Lick Shane telescope, the KAST spectrograph – 3 nights

INVITED CONFERENCE TALKS

2023/09	ZTF Theory Network, Santa Margarita, CA
2022/10	Workshop on Super-massive Black Holes, Cornell University, Ithaca, NY
2022/09	ZTF Theory Network, Santa Margarita, CA
2022/09	NICER 2022 Proposal and Science Workshop, Online meeting
2022/06	NuSTAR 10-yr Anniversary Science Meeting, Cagliari, Sardinia, Italy (remote talk)

INVITED COLLOQUIA / SEMINARS

2023/10	Seminar, University of Utah, Salt Lake City, UT
2022/12	AXIS Seminar, Virtual
2022/10	Seminar, Theoretical Astrophysics Center, UC Berkeley, Berkeley, CA
2022/10	Seminar, Center for Cosmology and Astroparticle Physics, Ohio State University, Columbus, OH
2022/09	Colloquium, Department of Astronomy, University of Maryland, College Park, MD
2021/12	Explosive Seminar, UC Berkeley, Berkeley, CA

SELECTION OF CONTRIBUTED TALKS

2023/03	UVEX Community Workshop, Pasadena, CA
2023/01	PhD Dissertation Talk, 241 th AAS Meeting, Seattle, WA
2022/06	Theoretical High Energy Astrophysics Group Meeting, U. Columbia, New York, NY
2021/11	ZTF Collaboration Meeting, virtual
2020/10	ZTF Theory Network, virtual
2019/08	Hot Wiring Transient VI Meeting, Evanston, IL
2019/08	GROWTH Collaboration Meeting, San Diego, CA

LEADERSHIP & PROFESSIONAL SERVICE

2023-present	Co-chair, LS4 Massive Black Hole science working group
2022-present	Referee/reviewer for ApJ, ApJ Letters, MNRAS
2022-present	Member, Advanced X-ray Imaging Satellite (AXIS) TDA&MM working group
2021-present	Member, Ultraviolet Explorer (UVEX) AGN/TDE working group
2020-21	Organizer, Weekly ZTF AGN/TDE science working group discussion
2019-21	Co-organizer, Weekly ZTF Caltech transient discussion
2020	Time Allocation Committee (Palomar Hale Telescope; Liverpool Telescope)
2020	Co-organizer, Caltech X-ray Club (34 lectures given by PIs or members of X-ray missions)
2019-21	Peer Mentor, Caltech Astronomy Mentorship Program
2019-21	Student Representative, Caltech Astronomy Colloquium Committee

TEACHING

Spring 2020	TA for Ay125 at Caltech (graduate course, “High Energy Astrophysics”)
Winter 2020	TA for Ay102 at Caltech (undergraduate course, “Physics of ISM”, taught 2 lectures)
Fall 2019	TA for Ay121 at Caltech (graduate course, “Radiative Processes”)
2019-20	TA, GROWTH Summer School

PRESS COVERAGE

2023/03	Caltech magazine featuring my TDE studies in honor of NASA black hole week
2022/12	NASA-JPL news-release on my study of AT2021ehb (see a short writeup on yahoo!life)
2022/01	I presented AT2020mrf at the 239 th AAS press conference [video], which received some media attention (e.g., Caltech News , Scientific American , Science News , IFLScience , BigThink , spacecom)

PUBLIC OUTREACH

2023	Speaker, Caltech Stargazing Lecture Series, <i>Fireworks from Black Holes Devouring Stars</i>
2023	Speaker, 241 th AAS AXIS Splinter Session, <i>Transient Science with the AXIS Probe Mission</i>
2022	Speaker, 240 th AAS NASA Hyper-wall Booth, <i>NuSTAR: Ten Years of the High Energy Universe in Focus</i>
2021	Interviewee, KAZN AM1300 Radio Station (in Mandarin), <i>Life as a Scientist at Caltech</i>
2021	Speaker, Astronomy on Tap (virtual, in Mandarin), <i>Searching for Stars Ripped Apart by Black Holes</i>
2020	Speaker, Amateur Astronomical Society, <i>Finding Supernovae from Mt. Palomar</i>
2019	Speaker, ZTF Summer Institute, <i>Early Observations of Type Ia Supernovae by ZTF</i>
2018-23	Volunteer, Caltech Astronomy Outreach Program

PUBLICATION SUMMARY & SELECTED HIGHLIGHTS

- Total / as **first author**: 72 (including 11 submitted under review) / **11 (including 1 submitted under review)**
- Citations: >1800 / >**250**
- h-index: 26 / **9**

First Author Journal Submission & in Press

- [1] **Yao, Y.**, Lu, W., Harrison, F., et al. 2023, submitted to ApJ, [arxiv: 2308.09834](#)
The On-axis Relativistic Tidal Disruption Event AT2022cmc:
X-ray Observations and Broadband Spectral Modeling

First Author Journal Publications

- [10] **Yao, Y.**, Ravi, V., Gezari, S., et al. 2023, [ApJL, 955, L6](#)
Tidal Disruption Event Demographics with the Zwicky Transient Facility:
Volumetric Rates, Luminosity Function, and Implications for the Local Black Hole Mass Function
- [9] **Yao, Y.**, Lu, W., Guolo, M. et al. 2022, [ApJ, 937, 8](#)
The Tidal Disruption Event AT2021ehb:
Evidence of Relativistic Disk Reflection, and Rapid Evolution of the Disk—Corona System
- [8] **Yao, Y.**, Ho, Y. Q. A., Medvedev, P. et al., 2022, [ApJ, 934, 104](#)
The X-ray and Radio Loud Fast Blue Optical Transient AT2020mrf:
Implications for an Emerging Class of Engine-driven Massive Star Explosions
- [7] **Yao, Y.**, Kulkarni S. R., Gendreau, K. C. et al., 2021, [ApJ, 920, 121](#)
A Comprehensive X-ray Report on AT2019wey
- [6] **Yao, Y.**, Kulkarni, S. R., Burdge, K. B. et al., 2021, [ApJ, 920, 120](#)
Multi-wavelength Observations of AT2019wey: a New Candidate Black Hole Low-mass X-Ray Binary
- [5] **Yao, Y.**, De, K., Kasliwal, M. M. et al., 2020 August 31, [ApJ, 900, 46](#) (24 pages)
SN2019dge: a Helium-rich Ultra-Stripped Envelope Supernova
- [4] **Yao, Y.**, Miller, A. A., Kulkarni, S. R. et al., 2019, [ApJ, 886, 152](#)
ZTF Early Observations of Type Ia Supernovae. I. Properties of the 2018 Sample
- [3] **Yao, Y.**, & Feng, H. 2019 October 3, [ApJL, 884, L3](#)
A Wind-disk Self-irradiation model for Supercritical Accretion
- [2] **Yao, Y.**, Meyer, M. R., Covey, K. R. et al., 2018, [ApJ, 869, 72](#)
IN-SYNC. VIII. Primordial Disk Frequencies in NGC 1333, IC 348, and the Orion A Molecular Cloud
- [1] **Yao, Y.**, Liu, C., Deng, L., et al. 2017, [ApJS, 232, 16](#)
Mira Variable Stars from LAMOST DR4 Data:
Emission Features, Temperature Types, and Candidate Selection

Selected Co-author Publications (with Significant Contribution)

- [13] Somalwar, J., Ravi, V., **Yao, Y.** et al. 2023, submitted, [arxiv: 2310.03782](#)
The first systematically identified repeating partial tidal disruption event
- [12] Guolo, M., Gezari, S., **Yao, Y.** et al. 2023, submitted, [arxiv: 2308.13019](#)
A systematic analysis of the X-ray emission in optically selected tidal disruption events:
observational evidence for the unification of the optically and X-ray selected populations
- [11] Andreoni, I., Coughlin, M. W., Perley, D. A., **Yao, Y.** et al. 2022, [Nature, 612, 430](#)
A very luminous jet from the disruption of a star by a massive black hole
- [10] Ho, Y. Q. A., Perley, D. A., **Yao, Y.** et al. 2022 October 14, [ApJ, 938, 85](#)
Cosmological Fast Optical Transients with the Zwicky Transient Facility: A Search for Dirty Fireballs
- [9] Ho, Y. Q. A., Margalit, B., Bremer, M., Perley, D. A., **Yao, Y.** et al., 2022, [ApJ, 932, 116](#)
Luminous Millimeter, Radio, and X-Ray Emission from ZTF 20acigmel (AT 2020xnd)
- [8] Perley, D. A., Sollerman, J., Schulze, S., **Yao, Y.** et al., 2022, [ApJ, 927, 180](#)
The Type Icn SN 2021csp:
Implications for the Origins of the Fastest Supernovae and the Fates of Wolf-Rayet Stars
- [7] Sazonov, S., Gilfanov, M., Medvedev, P., **Yao, Y.** et al. 2021, [MNRAS, 508, 3820](#)
First tidal disruption events discovered by SRG/eROSITA:

X-ray/optical properties and X-ray luminosity function at $z < 0.6$

- [6] Perley, D. A., Ho, Y. Q. A., **Yao, Y.** et al. 2021, [MNRAS, 508, 5138](#)

Real-time Discovery of AT2020xnd: A Fast, Luminous Ultraviolet Transient with Minimal Radioactive Ejecta

- [5] Yadlapalli, N., Ravi, V., **Yao, Y.** et al. 2021, [ApJL, 909, L27](#)

VLBA Discovery of a Resolved Source in the Candidate Black Hole X-ray Binary AT2019wey

- [4] Piro, A. L., Haynie, A., **Yao, Y.** 2021, [ApJ, 909, 209](#)

Shock Cooling Emission from Extended Material Revisited

- [3] Bulla, M., Miller, A. A., **Yao, Y.** et al. 2020, [ApJ, 902, 48](#)

ZTF Early Observations of Type Ia Supernovae III:

Early-Time Colors as a Test for Explosion Models and Multiple Populations

- [2] Miller, A. A., **Yao, Y.**, Bulla, M. et al. 2020, [ApJ, 902, 47](#)

ZTF Early Observations of Type Ia Supernovae II:

First Light, the Initial Rise, and Time to Reach Maximum Brightness

- [1] Zhou, Y., Feng, H., Ho, L. C., **Yao, Y.** 2019, [ApJ, 871, 115](#)

Evidence for Optically Thick, Eddington-limited Winds Driven by Supercritical Accretion