Yuhan Yao

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PRIMARY RESEARCH INTERESTS

- Time domain astronomy; 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-present	**Miller Fellow**
	Miller institute for Basic Research in Science, University of California, Berkeley

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 OBSERVING PROPOSALS AS PRINCIPAL INGESTIGATOR

Total grants obtained as PI: **$513k**

X-ray — 15 proposals: 7 *NuSTAR* (560ks), 3 *NICER* (700ks), 3 *XMM-Newton* (293ks), 2 *Chandra* (115ks)

- *NuSTAR* GO: three (2 x Cycle 7, Cycle 10): totaling 260ks
- *NuSTAR* DDT: four (2 x Cycle 6, 2 x Cycle 7), totaling 300ks
- *NICER* GO: two (Cycle 4, 5), totaling 600ks
- *NICER* DDT*:* one (Cycle 4), totaling 100ks
- *XMM-Newton* GO*:* two (AO-21, AO-23), totaling 253 ks
- *XMM-Newton* DDT: one (AO-24), totaling 40ks
- *Chandra* GO: one (Cycle 23), totaling 75ks
- *Chandra* DDT: one (Cycle 22), totaling 40ks
- *Swift* ToO: numerous, totaling >400ks

Optical — 2 proposals: P48, Shane (5 nights)

- Palomar 48-inch telescope: ZTF Shadowing SRG survey (5% of ZTF time, 2020/07—2022/02)
- Lick Observatory 3-meter Shane telescope, Kast spectrograph (2024B)

Radio — 7 proposals: 7 VLA (65.4hr)

- VLA Regular: two (23A, 24A): totaling 42.4hr
- VLA DDT: five (2x20B, 23B, 2x24A): totaling 23hr

LEADERSHIP & PROFESSIONAL SERVICE

Scientific Leadership and Membership Roles

2023-present	Co-chair, LS4 Massive Black Hole science working group
2023-present	Member, Rubin LSST Transients and Variable Stars (TVS) Science Collaboration
2022-present	Member, Advanced X-ray Imaging Satellite (AXIS), *NASA APEX* Concept
2021-present	Member, UltraViolet EXplorer (UVEX) Mission, *NASA MIDEX: launch 2030*
2018-present	Member, Zwicky Transient Facility (ZTF)

Service

2022-present	Referee/reviewer (total ~10) for Nature, ApJ, ApJ Letters, MNRAS, Open Research Europe
2024	Time Allocation committee: Chandra, ALMA
2023-24	UCB Astronomy Diversity, Equity, Inclusion & Climate Committee Postdoc Representative
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	Student Representative, Caltech Astronomy Colloquium Committee

PUBLICATION SUMMARY & SELECTED HIGHLIGHTS

- **As first author: 12 (including 1 submitted under review)**
- Total: 81 (including 1 white paper and 7 submitted under review)
- Citations: >2400 / **>300**
- h-index: 30 / **10**

First Author Journal Submission

[1] **Yao, Y.**, Guolo, M., Tombesi, F., et al. 2024, arxiv:2405.11343
Sub-relativistic Outflow and Hours-Timescale Large-amplitude X-ray Dips during Super-Eddington Accretion onto a Low-mass Massive Black Hole in the Tidal Disruption Event AT2022lri

First Author Journal Publications

[11] **Yao, Y.**, Lu, W., Harrison, F., et al. 2024, ApJ, **965**, 39
The On-axis Relativistic Tidal Disruption Event AT2022cmc: X-ray Observations and Broadband Spectral Modeling

[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, 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, 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. 2024, ApJ, **966**, 160
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, 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

TEACHING AND MENTORING

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

Student Mentoring

2024/06—present	Zoe Kan (pre-PhD student at Hong Kong University): *Late-time X-ray and UV evolution of TDE AT2021ehb*
2024/05-2024/06	Aditi Anand (undergrad at UC Berkeley) *Host galaxy probability association of Einstein Probe transients*
2023/06-2024/04	Vismaya Pillai (undergrad at Hong Kong University) *eROSITA and Chandra observations of X-ray loud TDEs* (Caltech SURF program)
2019-20	David Oliveira (undergrad at Caltech) *Automation of photometric data reduction pipeline at the Kitt Peak 84-inch telescope*
2019-21	Peer Mentor for Caltech graduate students Zhuyun Zhuang and Sam Ponnada

PRESS COVERAGE

2024	NuSTAR Story featuring my study of the jetted TDE AT2022cmc
2023	Caltech magazine featuring my TDE studies in honor of NASA black hole week
2022	NASA-JPL news-release on my study of AT2021ehb (see a short writeup on yahoo!life)
2022	My presentation on AT2020mrf at the 239th AAS press conference [video] garnered media attention (e.g., Caltech News, Scientific American, Science News, IFLScience, BigThink, spacecom)

PUBLIC OUTREACH

2024	Speaker, UC Berkeley Astronomy Night
2023	Speaker, Caltech Stargazing Lecture Series
2023	Speaker, 241th AAS AXIS Splinter Session
2022	Speaker, 240th AAS NASA Hyper-wall Booth [vedio]
2021	Interviewee, KAZN AM1300 Radio Station (in Mandarin)
2021	Speaker, Astronomy on Tap (virtual, in Mandarin)
2020	Speaker, Amateur Astronomical Society
2019	Speaker, ZTF Summer Institute
2018-23	Volunteer, Caltech Astronomy Outreach Program

INVITED CONFERENCE TALKS

2024/05	Workshop *Towards a Physical Understanding of TDEs*, KITP, Santa Barbara, CA
2024/04	Conference *Anticipating the Rising Tide of TDEs*, KITP, Santa Barbara, CA
2024/04	The 21st HEAD Meeting TDE Special Session, Horseshoe Bay, TX
2023/12	The 32nd Texas Symposium on Relativistic Astrophysics, Shanghai, China
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 COLLOQUIUA / SEMINARS

2024/02	Cosmology and Astronomy Seminar, UC Davis, CA
2024/02	Colloquium, Department of Astronomy and Astrophysics, UC Santa Cruz, CA
2023/10	High Energy and Astrophysics 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

2024/02	Explosive Seminar, UC Berkeley, Berkeley, CA
2023/03	UVEX Community Workshop, Pasadena, CA
2023/01	PhD Dissertation Talk, 241th 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

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) – 8 nights

Lick Shane telescope, the KAST spectrograph – 5 nights