Anna Y. Q. Ho

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PRIMARY RESEARCH INTERESTS

Stellar death (supernovae, gamma-ray bursts), transients, time-domain astronomy, high-energy astrophysics, radio and sub-millimeter interferometry, large surveys

EDUCATION & APPOINTMENTS

2022–Present	Assistant Professor, Astronomy Department, Cornell
2020–Present	Affiliate, Lawrence Berkeley National Laboratory
2020–2022	Miller Fellow, Astronomy Department, U.C. Berkeley
2020	Ph.D., California Institute of Technology, Astrophysics
	• Thesis: *The Landscape of Relativistic Stellar Explosions*
	• Advisor: Prof. Shri Kulkarni
2017	M.S., California Institute of Technology, Astrophysics
2014–2015	Fulbright Scholar, Max Planck Institute for Astronomy, Heidelberg, Germany
	• Host: Prof. Hans-Walter Rix
2014	B.S., Massachusetts Institute of Technology, Physics

AWARDS & HONORS

2021	Springer Thesis Prize
	In recognition of outstanding Ph.D. research in the physical sciences.
2020	AAS Rodger Doxsey Travel Prize
2014–2019	National Science Foundation Graduate Research Fellowship
2019	Keck Institute for Space Studies Affiliate
2017	TA Award, Caltech
	For being one of the highest rated TAs for the Spring 2017 term.
2017	Garmire Scholarship, Caltech
	Annual award for an outstanding graduate student in Physics, Math, and Astronomy.
2014	MIT Karl Taylor Compton Prize
	The highest awards presented by the Institute to students...in recognition of excellent achievements in citizenship and devotion to the welfare of MIT.
2014	MIT Ida M. Green Fellowship (declined)
	For the MIT Graduate Program in Science Writing
2013	First Place, MIT DeWitt Wallace Prize for Science Writing for the Public
2012	MIT Burchard Scholar

SELECTED PUBLICITY

2021	**Quanta**, *New Kind of Space Explosion Reveals the Birth of a Black Hole*
2020	Wrote the **Scientific American** cover article, *Extreme Supernovae*
2020	**Science News**, *A weird cosmic flare called the Cow now has company*
2020	**Science Daily**, *Astronomers discover new class of cosmic explosions*
2020	**Sky & Telescope**, *Two New Beasts for an Explosive Zoo*
2019	Wrote article for the **Submillimeter Array Newsletter**, *SMA Observations of AT2018cow: A Prototype for Millimeter Time-domain Astronomy*

2019 **Science News**, *The cosmic Cow may be a strange supernova*
2019 **The Washington Post**, *Scientists had never seen anything like this supernova*
2019 **WIRED**, *We may have finally spotted a star turning into a black hole*
2018 **Nature News**, *Holy Cow! Astronomers agog at mysterious new supernova*

PAPERS IN PRESS

First Author

[1] **Ho, A. Y. Q.**, Perley, D. A., et al. 2022, *Cosmological Fast Optical Transients with the Zwicky Transient Facility: A Search for Dirty Fireballs*, submitted to the Astrophysical Journal, (arXiv:2201.12366)

[2] **Ho, A. Y. Q.**, Perley, D. A., et al. 2021, *The Photometric and Spectroscopic Evolution of Rapidly Evolving Extragalactic Transients in ZTF*, submitted to the Astrophysical Journal, (arXiv:2105.08811)

Selected Co-author

[1] Yadlapalli, N., Ravi, V., & **Ho, A. Y. Q.** 2022, *Models of Millimeter and Radio Emission from Interacting Supernovae*, accepted for publication in the Astrophysical Journal (arXiv:2206.03518)

[2] Yao, Y., **Ho, A. Y. Q.**, et al. 2022, *The X-ray and Radio Loud Fast Blue Optical Transient AT2020mrf: Implications for an Emerging Class of Engine-Driven Massive Star Explosions*, submitted to the Astrophysical Journal (arXiv:2112.00751)

PUBLISHED PAPERS IN REFEREED JOURNALS

First Author

[1] **Ho, A. Y. Q.**, Margalit, B., et al. 2022, *Luminous Millimeter, Radio, and X-ray Emission from ZTF20acigmel (AT2020xnd)*, The Astrophysical Journal, **932**, 116 (arXiv:2110.05490)

[2] **Ho, A. Y. Q.**, Perley, D. A., Beniamini, P., et al. 2020, *ZTF20aajnksq (AT 2020blt): A Fast Optical Transient at $z \approx 2.9$ With No Detected Gamma-Ray Burst Counterpart*, The Astrophysical Journal, **905**, 98 (arXiv:2006.10761)

[3] **Ho, A. Y. Q.**, Kulkarni, S., R., et al. 2020, *SN2020bvc: a Broad-lined Type Ic Supernova with a Double-peaked Optical Light Curve and a Luminous X-ray and Radio Counterpart*, The Astrophysical Journal, **902**, 86 (arXiv:2004.10406)

[4] **Ho, A. Y. Q.**, Perley, D. A., et al. 2020, *The Koala: A Fast Blue Optical Transient with Luminous Radio Emission from a Starburst Dwarf Galaxy at $z = 0.27$*, The Astrophysical Journal, **895**, 1 (arXiv:2003.01222)

[5] **Ho, A. Y. Q.**, Corsi, A., et al. 2020, *The Broad-lined Ic Supernova ZTF18aaqjovh (SN 2018bvw): An Optically-discovered Engine-driven Supernova Candidate with Luminous Radio Emission*, The Astrophysical Journal, **893**, 132 (arXiv:1912.10354)

[6] **Ho, A. Y. Q.**, Goldstein, D. A., Schulze, S., et al. 2019, *Evidence for Late-stage Eruptive Mass-loss in the Progenitor to SN2018gep, a Broad-lined Ic Supernova: Pre-explosion Emission and a Rapidly Rising Luminous Transient*, The Astrophysical Journal, **887**, 169H (arXiv:1904.11009)

[7] **Ho, A. Y. Q.**, Phinney, E. S., Ravi, V., et al. 2019, *AT2018cow: a luminous millimeter transient*, The Astrophysical Journal, **871**, 73 (arXiv:1810.10880)

[8] **Ho, A. Y. Q.**, Kulkarni, S.R., Nugent, P. E. et al. 2018, *iPTF Archival Search for Fast Optical Transients*, The Astrophysical Journal Letters, **854**, 13 (arXiv:1712.00949)

[9] **Ho, A. Y. Q.**, Rix, H.-W., Ness, M. K., Hogg, D. W., et al. 2017, *Masses and Ages for 230,000 LAMOST Giants, via Their Carbon and Nitrogen Abundances*, The Astrophysical Journal, **841**, 40 (arXiv:1609.03195)

[10] **Ho, A. Y. Q.**, Ness, M. K., Hogg, D. W., et al. 2017, *Label Transfer from APOGEE to LAMOST: Precise Stellar Parameters for 450,000 LAMOST Giants*, The Astrophysical Journal, **836**, 5 (arXiv:1602.00303)

Selected Co-author

[1] Margalit, B., Quataert, E., & **Ho, A. Y. Q.** 2022, *Optical to X-Ray Signatures of Dense Circumstellar Interaction in Core-collapse Supernovae*, The Astrophysical Journal, **928**, 122 (arXiv:2109.09746)

[2] Perley, D. A., **Ho, A. Y. Q.** et al. 2021, *Real-time discovery of AT2020xnd: a fast, luminous ultraviolet transient with minimal radioactive ejecta*, MNRAS, **508**, 5138 (arXiv:2103.01968)

[3] Dong, D. Z., et al. 2021, *A transient radio source consistent with a merger-triggered core collapse supernova*, Science, 373, 1125 (arXiv:2109.01752)

[4] Andreoni, I., et al. 2021, *Fast-transient Searches in Real Time with ZTFReST: Identification of Three Optically Discovered Gamma-Ray Burst Afterglows and New Constraints on the Kilonova Rate*, ApJ, 918, 63 (arXiv:2104.06352)

[5] De, K., et al. 2020, *The Zwicky Transient Facility Census of the Local Universe I: Systematic search for Calcium rich gap transients reveal three related spectroscopic sub-classes*, The Astrophysical Journal, **905**, 58 (arXiv:2004.09029)

[6] Perley, D. A., et al. 2020, ApJ, *The Zwicky Transient Facility Bright Transient Survey. II. A Public Statistical Sample for Exploring Supernova Demographics* , The Astrophysical Journal, **904**, 35 (arXiv:2009.01242)

[7] Duffell, P. C. & **Ho, A. Y. Q.** 2020, *How Dense a CSM is Sufficient to Choke a Jet?*, The Astrophysical Journal, **900**, 193

[8] Szkody, P., Dicenzo, B., **Ho, A. Y. Q.**, et al. 2020, *Cataclysmic Variables from the First Year of the Zwicky Transient Facility*, Astronomical Journal, **159**, 198 (arXiv:2002.08447)

[9] Casey, A.R., **Ho, A. Y. Q.**, et al. 2019, *Tidal interactions between binary stars drives lithium production in low-mass red giants*, The Astrophysical Journal, **880**, 125 (arXiv:1902.04102)

[10] Graham, M. J. et al. 2019, *The Zwicky Transient Facility: Science Objectives*, Publications of the Astronomical Society of the Pacific, 131, 078001 (arXiv:1902.01945)

[11] Bellm, E. C. et al. 2019, *The Zwicky Transient Facility: System Overview, Performance, and First Results*, Publications of the Astronomical Society of the Pacific, 131, 018002 (arXiv:1902.01932)

[12] Ness, M., et al. 2016, *Spectroscopic Determination of Masses (and Implied Ages) for Red Giants*, The Astrophysical Journal, **823**, 114 (arXiv:1511.08204)

[13] Ness, M., et al. 2015, *The Cannon: A data-driven approach to stellar label determination*, The Astrophysical Journal, **808**, 16 (arXiv:1501.07604)

PROFESSIONAL SERVICE

2022	Member, SOC, CMB-S4 Collaboration Meeting
2022	Member, SOC, Workshop on "Astrophysics with the CMB-S4 Survey"
2021–Present	Co-chair, Sources & Transients Working Group, CMB-S4
2019–Present	Referee/reviewer for ApJ, ApJL, MNRAS, Nature Astronomy
2017–Present	Interviewer, MIT Admissions
2022	Member, Miller Annual Symposium Organizing Committee

2021–2022	Co-organizer, Theoretical Astrophysics Center Seminar Series, UC Berkeley
2021–2022	Organizer, Explosive Astronomy Seminar Series, UC Berkeley
2021	Member, Chandra Time Allocation Committee
2021	Member, Gemini Time Allocation Committee
2021	Co-organizer, Cal-URSA Research Program
2021	Co-organizer, Session on Transients with CMB-S4, CMB-S4 Summer Workshop
2021	Organizer, Workshop on Status of Millimeter-Transient Searches (virtual)
2019–2020	Graduate representative to the faculty, Astronomy Department
2017–2020	Graduate student mentor, Astronomy Department
2018	Graduate admissions committee, Astronomy Department
2018	Department representative, Graduate Student Council
2014	AAS Representative, Congressional Visits Day, Washington DC

SUCCESSFUL OBSERVING PROPOSALS AS PRINCIPAL INVESTIGATOR

Millimeter — 20 proposals: 11 SMA (426 hr), 7 NOEMA (104 hr), 2 ALMA (12 hr)

- SMA Regular: eight (18B, 19A&B, 20A&B, 21A&B, 22A), 35 tracks (≈ 210 hrs)
- SMA DDT: three (2×18A, 21B), 36 tracks (≈ 216 hrs)
- NOEMA Regular: five (19B, 20B, 21A&B, 22B), 91.8 hrs
- NOEMA DDT: two (2×20A), 12.0 hrs
- ALMA Regular: one (Cycle 7), 9.7 hr
- ALMA DDT: one (Cycle 5), 2.6 hr

Radio — 14 proposals: 11 VLA (150 hrs), 2 VLBA (48 hrs), 1 GMRT (3 hrs)

- VLA Regular: 8 (13A, 19A, 2x20A, 20B, 21A, 21B, 22B, 23A) totaling 142.78 hrs
- VLA DDT: 3 (17A, 17B, 19B) totaling 7 hrs
- VLBA DDT: 2 (18A, 20A) totaling 48 hrs
- GMRT DDT: 1 (Cycle 36), totaling 3 hrs

Optical — 5 proposals: 3 Gemini (15.4 hrs), 2 Palomar 60-inch (11.95 hrs)

- Gemini: three (21A, 22A, 22B), 14.0 hr GMOS-S & 6.2 hr GMOS-N
- Palomar 60-inch: two (2019, 2020), totaling 11.95 hrs

X-ray — 34 *Swift* ToO observations (each 3–5 ks; total ≈ 150 ks)
2 *Chandra* DDT proposals (Cycle 21, 22) totaling 40 ksec

DATA REDUCTION, OBSERVING, PROGRAMMING EXPERIENCE

Reduction	Radio (VLA), optical (DBSP, LRIS, Gemini), X-ray (Swift/XRT, Chandra/ACIS)
Observing	Millimeter (SMA; 5 nights), optical (DBSP/LRIS; 21 nights)
Software	Python, CASA, LaTeX, Mathematica, HTML, Postgres, SQL

TEACHING AND MENTORING

Student Mentoring

Summer 2022	Co-supervised (with Peter Nugent) two undergraduate students at LBL
Summer 2021	Co-supervised (with Peter Nugent) four undergraduate students at LBL
2016–2020	Graduate-student mentor for two graduate students at Caltech

University Teaching

2017	TA for Ay1 at Caltech (undergraduate course, "The Evolving Universe") Recognized as "outstanding TA" by Caltech registrar
2016	TA for Ay122b at Caltech (graduate course, "Radio Astronomy")
2016	TA for Ay20 at Caltech (undergraduate course, "Basic Astronomy and the Galaxy")

Workshops

2018	Instructor, ZTF Summer School
2016	Lead Instructor, Gemini Observatory Workshop on Data-Driven Modeling of Spectra

K-12 Teaching

2019	2-day workshop for K-12 teachers, Huntington Library, Pasadena CA
2016	9-week class for 7-12 year olds, Institute for Educational Advancement, Pasadena CA
2010-2014	Designed and taught 12 classes for over 500 middle- and high-school students, MIT
2010	High-school teaching assistant for 1 month, Pueblo Pintado Navajo Reservation, NM

RECENT INVITED TALKS

2022	Talk, AAS Special Session on "An Update on Astrophysics and Cosmology from Cosmic Microwave Background Measurements in the Next Decade"
2022	Colloquium, Radboud University, Nijmegen, Netherlands
2022	Colloquium, Carnegie Observatories, Pasadena CA
2022	Talk, APS April Meeting, Cecilia Payne-Gaposchkin Dissertation Award Finalist
2022	CCAT-Prime/FYST Collaboration Meeting (virtual)
2022	Tor Vergata Astrophysics Seminar (virtual)
2022	Special Physics & Astronomy Seminar, Northwestern University, Evanston IL
2022	Colloquium, U.T. Austin, Austin TX
2022	Colloquium, Cornell University, Ithaca NY
2021	Colloquium, Max Planck Institute for Astronomy, Heidelberg, Germany (virtual)
2021	Colloquium, U.C. Santa Cruz
2021	Talk, SuperVirtual (virtual)
2021	Seminar, Kavli Institute for Cosmological Physics, U. Chicago
2021	Astro Seminar, Center for Cosmology and Particle Physics, NYU
2021	Colloquium, Jodrell Bank Centre for Astrophysics (virtual)
2021	Seminar, Princeton Gravity Initiative (virtual)
2021	Colloquium, Centre of Astrophysics and Supercomputing, Swinburne University of Technology (virtual)
2021	Talk, BigBoom, University of Arizona (virtual)
2021	Seminar, CGCA, UW-Milwaukee (virtual)
2020	Astroseminar, Florida State University (virtual)
2020	Colloquium, Institute for Theory and Computation, Harvard CfA (virtual)
2019	Keck Institute for Space Studies, Pasadena, CA
2019	Stars and Planets Seminar, Harvard-Smithsonian CfA, Cambridge, MA
2019	SMA Seminar, Harvard-Smithsonian CfA, Cambridge, MA
2019	Brown Bag Lunch, MIT, Cambridge, MA

SCIENCE POLICY

2018-2020	Founder and Chair, Science Policy Committee, Caltech Graduate Student Council
2017-2019	Vice President, Science and Engineering Policy At Caltech (Student Club)
2017	International Summer Symposium on Science and World Affairs, Germany One of 40 international researchers selected to participate Talk title: *Towards a Framework for Space Traffic Control*
2017	Selected by Caltech to participate in Congressional Visits Day, Washington DC
2014	Selected by the American Astronomical Society to participate in Congressional Visits Day, Washington DC

COMMUNITY ENGAGEMENT

See also "K-12 Teaching" in "Teaching and Mentoring" section.

2022	Keynote Speaker, Annual Cray User Group Meeting, Monterey CA
2021	Compass Lecture, UC Berkeley
2021	Speaker, Riverside Astronomical Society (virtual)
2019	Speaker, Greenway Talk Series, Palomar Observatory
2019	Speaker, Owens Valley Radio Observatory Lecture Series
2019	Speaker, Caltech Graduate Research Spotlight
2019	Speaker, Ventura County Astronomical Society
2019	Speaker, Greenway Talk Series, Palomar Observatory
2018	Contributing Writer, Caltech Letters
2018	Speaker, College of the Canyons Star Party
2018	Visitor, 8th-grade class, St. Philip the Apostle School, Pasadena CA
2017	Volunteer, Orbit Deep Learning Days, Huntington Library, Pasadena CA
2017	Speaker, Astro on Tap, Pasadena CA
2017	Speaker, Riverside Astronomical Society
2017	Speaker, Ventura County Astronomical Society
2017	Speaker, High School Summer Camp, Culver City CA
2016	Speaker, Santa Monica Astronomy Club
2016	Volunteer, Field Trip, iChicas After-school Program
2015	Speaker, St. Philip Reverse Science Fair, Pasadena CA
2015	Volunteer, Webster Elementary Science and Stargazing Night, Pasadena CA
2015-2020	Volunteer, Caltech Astronomy Outreach program
2014–2015	Volunteer, Center for Astronomy Education and Outreach, Heidelberg, Germany
2014	AAS Astronomy Ambassadors Workshop, AAS 223rd Meeting
2012–2013	Volunteer, McCormick Public Observatory, Charlottesville VA