Megan Masterson

PhD Candidate | MIT Department of Physics, Astrophysics Division
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Education

PhD in Physics, Massachusetts Institute of Technology 2020–2026
Thesis: A Multi-Wavelength Exploration of Transient Accretion onto Supermassive Black Holes
Supervisor: Professor Erin Kara

MASt in Astrophysics, Churchill College, University of Cambridge 2019–2020
Thesis: Extended Fe Kα Emission in Nearby AGN Revealed by Multi-Order Chandra HETG Data
Supervisor: Professor Chris Reynolds

BS in Astronomy, BS in Mathematics & Physics, Case Western Reserve University 2015–2019
Graduated summa cum laude

Awards & Scholarships

Graduate Student Poster Award, 20th HEAD Meeting 2023
Kavli Graduate Fellowship, MIT Kavli Institute for Astrophysics and Space Research 2020–2021
Gates Cambridge Scholarship, MASt in Astrophysics, University of Cambridge 2019–2020
Chambliss Astronomy Achievement Student Award, 233rd AAS Meeting 2019
Jason J. Nassau Prize, Department of Astronomy, Case Western Reserve University 2019
To an outstanding senior student in astronomy
Patricia B. Kilpatrick Award, Case Western Reserve University 2019
To the four-year varsity athlete with the highest GPA
Richard F. Sigal Award, Department of Physics, Case Western Reserve University 2018
For demonstrating excellence in their studies and intending to pursue a career in physics

Publications & Astronomer's Telegrams

ORCID: 0000-0003-4127-0739, ADS Library: https://tinyurl.com/mastersonADS
7 first author publications, 24 co-author publications, 2 ATels
h-index = 10, total citations = 383

First-Author Publications

[7] Masterson, M., De, K., Panagiotou, C., et al. 2025, *JWST's First View of Tidal Disruption Events: Compact, Accretion-Driven Emission Lines & Strong Silicate Emission in an Infrared-selected Sample*, ApJL, 988, 2, L48. doi:10.3847/2041-8213/ade153

[6] Masterson, M., Kara, E., Panagiotou, C., et al. 2025, *Millihertz Oscillations Near the Innermost Orbit of a Supermassive Black Hole*, Nature, 638, 370–375. doi:10.1038/s41586-024-08385-x

[5] Masterson, M., De, K., Panagiotou, C., et al. 2024, *A New Population of Mid-Infrared-Selected Tidal Disruption Events: Implications for Tidal Disruption Event Rates and Host Galaxy Properties*, ApJ, 961, 211. doi:10.3847/1538-4357/ad18bb

[4] Masterson, M., Kara, E., et al. 2023, *Unusual Hard X-ray Flares Caught in NICER Monitoring of the Binary SMBH Candidate AT2019cuk/Tick Tock/SDSS J1430*, ApJL, 945, L34. doi:10.3847/2041-8213/acbea9

[3] Masterson, M., McDonald, M., et al. 2023, *Evidence for AGN-Regulated Cooling in Clusters at $z \sim 1.4$: A Multi-Wavelength View of SPT-CL J0607-4448*, ApJ, 944, 164. doi:10.3847/1538-4357/acae9e

[2] Masterson, M. & Reynolds, C.S. 2022, *Probing the Extent of Fe Kα Emission in Nearby AGN Using Multi-Order Analysis of Chandra High Energy Transmission Grating Data*, ApJ, 936, 66. doi:10.3847/1538-4357/ac83ae

[1] Masterson, M., Kara, E., et al. 2022, *Evolution of a Relativistic Outflow and the X-ray Corona in the Extreme Changing-Look AGN 1ES 1927+654*, ApJ, 934, 35. doi:10.3847/1538-4357/ac76c0

Co-Author Publications

[24] Baldini, P. et al. (including **Masterson, M.**) 2025, *A new Bowen Fluorescence Flare and Extreme Coronal Line Emitter discovered by SRG/eROSITA*, accepted in A&A. arXiv:2507.05342

[23] Arcodia, R. et al. (including **Masterson, M.**) 2025, *SRG/eROSITA No. 5: Discovery of quasi-periodic eruptions every ∼3.7 days from a galaxy at $z > 0.1$*, accepted in ApJ. arXiv:2506.17138

[22] Grotova, I. et al. (including **Masterson, M.**) 2025, *The population of tidal disruption events discovered with eROSITA*, A&A, 697, A159. doi:10.1051/0004-6361/202553669

[21] Chakraborty, J. et al. (including **Masterson, M.**) 2025, *Rapidly varying ionization features in a Quasi-periodic Eruption: a homologous expansion model for the spectroscopic evolution*, ApJ, 984, 2, 124. doi:10.3847/1538-4357/adb972

[20] Chakraborty, J. et al. (including **Masterson, M.**) 2025, *Discovery of Quasi-periodic Eruptions in the Tidal Disruption Event and Extreme Coronal Line Emitter AT2022upj: implications for the QPE/TDE fraction and a connection to ECLEs*, ApJL, 983, 2, L39. doi:10.3847/2041-8213/adc2f8

[19] Yao, Y. et al. (including **Masterson, M.**) 2025, *Distinguishing Tidal Disruption Events and Changing-look Active Galactic Nuclei via Variation of Mid-infrared Color*, submitted to ApJ. arXiv:2503.10053

[18] Earl, N. et al. (including **Masterson, M.**) 2025, *AT 2020nov: Evidence for Disk Reprocessing in a Rare Tidal Disruption Event* , ApJ, 983, 1, 28. doi:10.3847/1538-4357/adb974

[17] Rani, B. et al. (including **Masterson, M.**) 2025, *High-Frequency Power Spectrum of AGN NGC 4051 Revealed by NICER*, ApJL, 981, 1, L18. doi:10.3847/2041-8213/adace8

[16] Grotova, I. et al. (including **Masterson, M.**) 2025, *eRO-ExTra: eROSITA extragalactic non-AGN X-ray transients and variables in eRASS1 and eRASS2*, A&A, 693, A62. doi:10.1051/0004-6361/202451253

[15] Laha, S. et al. (including **Masterson, M.**) 2025, *Multi-wavelength observations of a jet launch in real time from the post-changing-look Active Galaxy 1ES 1927+654*, ApJ, 981, 2, 125. doi:10.3847/1538-4357/adaea0

[14] Meyer, E. et al. (including **Masterson, M.**) 2025, *Emergence of a radio jet in the changing-look AGN 1ES 1927+654*, ApJL, 979, 1, L2. doi:10.3847/2041-8213/ad8651

[13] García, J. et al. (including **Masterson, M.**) 2024, *The high energy X-ray probe (HEX-P): science overview*, FrASS, 11, 1471585. doi:10.3389/fspas.2024.1471585

[12] De, K. et al. (including **Masterson, M.**) 2024, *The disappearance of a massive star marking the birth of a black hole in M31*, under review at Science, arXiv:2410.14778

[11] Li, R. et al. (including **Masterson, M.**) 2024, *The Interplay between the Disk and Corona of the Changing-look Active Galactic Nucleus 1ES 1927+654*, ApJ, 975, 140. doi:10.3847/1538-4357/ad7aed

[10] Zhang, Z. et al. (including **Masterson, M.**) 2024, *Modeling X-Ray Multi-Reflection in Super-Eddington Winds*, ApJ, 977, 2, 157. doi:10.3847/1538-4357/ad86c0

[9] Myers, C. et al. (including **Masterson, M.**) 2024, *WTP19aalnxx: Discovery of a bright mid-infrared transient in the emerging class of low luminosity supernovae revealed by delayed circumstellar interaction*, ApJ, 976, 230. doi:10.3847/1538-4357/ad8922

[8] Pasham, D. et al. (including **Masterson, M.**) 2024, *A Case for a Binary Black Hole System Revealed via Quasi-Periodic Outflows*, Science Advances, 10, 13. doi:10.1126/sciadv.adj8898

[7] Wang, Y. et al. (including **Masterson, M.**) 2024, *Rapid dimming followed by a state transition: a study of the highly variable nuclear transient AT 2019avd over 1000+ days*, ApJ, 962, 78. doi:10.3847/1538-4357/ad182b

[6] Kammoun, E., Lohfink, A. M., **Masterson, M.**, et al. 2024, *The High Energy X-ray Probe (HEX-P): Probing the physics of the X-ray corona in active galactic nuclei*, FrASS, 10, 1308056. doi:10.3389/fspas.2023.1308056

[5] Brightman, M. et al. (including **Masterson, M.**) 2024, *The High Energy X-ray Probe (HEX-P): Sensitive broadband X-ray observations of transient phenomena in the 2030s*, FrASS, 10, 1292656. doi:10.3389/fspas.2023.1292656

[4] Panagiotou, C., De, K., **Masterson, M.**, et al. 2023, *A Luminous Dust-Obscured Tidal Disruption Event Candidate in a Star Forming Galaxy at 42 Mpc*, ApJL, 948, L5. doi:10.3847/2041-8213/acc02f

[3] Kara, E. et al. (including **Masterson, M.**) 2023, *UV/Optical disk reverberation lags despite a faint X-ray corona in the AGN Mrk 335*, ApJ, 947, 62. doi:10.3847/1538-4357/acbcd3

[2] Xu, Y. et al. (including **Masterson, M.**) 2022, *Ejection-Accretion Connection in NLS1 AGN 1H 1934-063, MNRAS, 513, 1910*, MNRAS, 513, 1910, doi:10.1093/mnras/stac1058

[1] Chakraborty, J., Kara, E., **Masterson, M.**, et al. 2021, *Possible X-ray Quasi-Periodic Eruptions in a Tidal Disruption Event Candidate, ApJL, 921, L40*, ApJL, 921, L40, doi:10.3847/2041-8213/ac313b

ATels

[2] Hamada, R., et al. (including **M. Masterson**) 2024, *PRIME discovery of a heavily reddened classical nova PRIME24aadwvh at the Galactic center*, ATel#16824

[1] Pasham, D., et al. (including **M. Masterson**) 2022, *AT2019cuk/SDSSJ1430/ZTF18aarippg: High-cadence NICER and NuSTAR X-ray observations of the potential supermassive black hole binary with imminent merger (the tick-tock source)*, ATel#15225

Accepted Observing Proposals (as PI in bold)

Total grant money obtained as PI: $215.9k

JWST (AO4), co-PI, 3.6 hours, $80k, Mid-IR overview of turn-on AGN and X-ray QPE SDSS1335+0728	2025
NICER (AO7), 104 ks, $38.5k, X-ray QPOs and the corona-jet connection in 1ES 1927+654	2024
Swift (AO21), 116 targets, 232 ks, fill-in proposal, A Late-Time X-ray View of Mid-IR TDE Candidates	2024
XMM-Newton (AO24), 30 ks, Constraining the Central Engine & Dust Geometry in Mid-IR TDEs	2024
IRTF (2024B), 16.5 hours, SpeX Spectroscopy of eROSITA-detected Mid-IR Nuclear Flares	2024
IRTF (2024A), 22.5 hours, SpeX spectroscopy of luminous IR echoes of extreme accretion phenomena	2024
XMM-Newton (AO23), 5 $\times$ 30 ks, Late-Time X-ray Emission in Mid-IR TDEs	2023
JWST (AO2), 19 hours, A Population of Hidden TDEs with JWST	2023
NICER (AO5), 52 ks (NICER), 26 ks (Swift), $43k, Post-Outburst State of 1ES 1927+654	2022
XMM-Newton (AO21), 70 ks (XMM-Newton & NuSTAR), $54.4k, Post-Outburst State of 1ES 1927+654	2021
XMM-Newton DDT Observations, Total of 315 ks over 11 observations	2024–
NICER ToO Observations, Total of 19 ks over 4 observations	2021–
Swift ToO Observations, Total of 65 ks over 16 observations	2021–
Magellan (MIT Internal Review), Total of 12 nights over 5 semesters	2023–

Ground-Based Observing

Magellan Clay/LDSS3, 8 nights, In person & remote	2023-2024
IRTF/SpeX, 12 nights, Remote	2023-2025
Magellan Baade/IMACS, 3 nights, Remote	2024
Magellan Baade/FIRE, 3 nights, In person & remote	2023
Magellan Baade/MagE, 1 night, Remote	2023
1m class telescopes, $>$ 10 nights, In person	2022-2024

Talks & Presentations

Invited Talks

Institute for Fundamental Sciences Seminar, University of Oregon, Eugene, OR	2025
X-ray Quasi-Periodic Eruptions and Repeating Nuclear Transients, ESAC, Madrid, Spain	2025
AXIS TDAMM Science Working Group Community Day, Virtual	2025
UMBRELA Dialogues, Center for Astrophysics, Cambridge, MA	2025
IASF Seminar, INAF/IASF-Palermo, Virtual	2024
Tidal Disruption Events and Nuclear Transients: Entering the Data-Rich Era, Crete, Greece	2024
Towards a Physical Understanding of Tidal Disruption Events, UCSB KITP Workshop, Santa Barbara, CA	2024
21st HEAD Meeting TDE Special Session, Horseshoe Bay, TX	2024

Boston Area Black hole Accretion Meeting (BABAM), Center for Astrophysics, Cambridge, MA 2023
AAS HEAD Frontiers Seminar, Virtual 2023
Astro Seminar, Tufts University, Department of Physics & Astronomy, Somerville, MA 2023
CfA Seminar, Center for Astrophysics, Cambridge, MA 2023
Extreme Astrophysics Seminar, University of Michigan, Department of Astronomy, Virtual 2022

Contributed Talks

Transients from Space, Space Telescope Science Institute, Baltimore, MD 2025
Anticipating the Rising Tide of Tidal Disruption Events, UCSB KITP Conference, Santa Barbara, CA 2024
BLack holes Across Space and Time (BLAST) Workshop, Virtual 2022
COSPAR 2022, 44th Scientific Assembly, Virtual 2022
XMM-Newton Workshop: Black Hole Accretion Under the X-ray Microscope, ESAC, Madrid, Spain 2022
19th HEAD Meeting, Pittsburgh, PA 2022

Contributed Posters

20th HEAD Meeting, Waikaloa, HI 2023
Awarded Graduate Student Poster Award
233rd AAS Meeting, Seattle, WA 2019
Awarded Chambliss Undergraduate Student Prize

Research Supervision

Bernard Leal, MIT MSRP Undergraduate Student (co-supervised with Joheen Charkraborty) 2025
Multi-Wavelength Analysis of the Changing-Look AGN RHS 10

Taisiia Karasova, MIT Undergraduate Research Student 2024–2025
Host Galaxy Properties of a New Population of Infrared-Selected Tidal Disruption Events

Kylee Carden, MIT Undergraduate Research Student (co-supervised with Erin Kara) 2022–2023
Probing the Circumnuclear Environment and Ionized Wind in the Changing-Look AGN NGC 1365 with Chandra HETG
Currently an Astrophysics PhD student at Ohio State

Isabella Guilherme, MIT MSRP Undergraduate Student (co-supervised with Erin Kara) 2021–2022
Investigating the Late-Time X-ray Emission in the Tidal Disruption Event AT2019azh
Currently a Physics PhD student at Caltech

Teaching

Mentor, 8.02 (Introductory Electricity and Magnetism) Spring 2025
Mentored 2 students, assisting with problem sets, exam preparation, and time management skills
TA for 12.411 (Astronomy Field Camp), senior undergraduate course at MIT Jan. 2024
Assisted with observations for three weeks at Teide Observatory in Tenerife, Spain
TA for 12.411 (Astronomy Field Camp), senior undergraduate course at MIT Jan. 2023
Assisted with observations for three weeks at Teide Observatory in Tenerife, Spain
Mentor, MIT Physics Directed Reading Program Jan. 2023
Supervised student in 3 week project learning the basics of black hole accretion physics
TA for 8.287 (Observational Techniques in Optical Astronomy), senior undergraduate course at MIT Fall 2022
Supervised weekly observing, assisted with data reduction and analysis, gave a specialty lecture on X-ray astronomy
Student Evaluation Score: 6.8/7
Teacher for Educational Studies Program, MIT 2021
Designed and taught two classes on black holes, designed for middle school and high school students

Professional Service

Departmental Service

Chair, Graduate Student Search Committee, MIT Kavli Institute Faculty Hiring Committee 2025

Graduate Student Representative, MIT Kavli Institute Public Engagement Officer Hiring Committee 2024

Collaborations & Working Groups

Member, Roman Science Collaboration, Explosive Transients Science Group 2025–

Member, HEX-P Coronal Physics Working Group 2023–2024

Graduate Student Member, NICER Observatory Science Working Group 2021–

Peer Review

Referee, *Astrophysical Journal, Astrophysical Journal Letters* 2023–

Conference Organization

SOC Member, 25th Anniversary of XMM-Newton, Baltimore, MD 2025

Selected Press Coverage

Star-Shredding Black Holes Hiding in Dusty Galaxies, Masterson et al., ApJL 2025
Covered by MIT News, Columbia News

Millihertz Oscillations Near the Innermost Orbit of a Supermassive Black Hole, Masterson et al., Nature 2025
Featured in a press conference at the 245th AAS Meeting in January 2025 – watch here!
Covered by NASA, ESA, MIT News, Scientific American, USA Today, Reuters, Smithsonian Magazine, Swedish National TV +

A New Population of Mid-Infrared-Selected Tidal Disruption Events, Masterson et al., ApJ 2024
Covered by MIT News, the Boston Globe, Newsweek, AAS Nova, +

Advocacy & Outreach

Advocacy

Grads Advising Grad Admissions Committee Member, MIT Physics Graduate Student Council 2022–
Co-lead of organization during 2024-2025 academic year

Advocacy Board Member, MIT Physics Graduate Student Council 2021–2022

Mentor, MIT Physics Graduate Application Assistance Program 2021–

Mentor, MIT Graduate & Undergraduate Womxn in Physics 2021–

Outreach

Invited Talk, MIT List Visual Arts Center April 2025
Watch here: `https://listart.mit.edu/calendar/graduate-student-talk-megan-masterson`

Graduate Student Writer, Astrobites 2023–2025
Find my articles here: `https://astrobites.org/author/mmasterson/`

Event Organizer, Boston Astronomy on Tap 2023–2024

Member, MIT Sidewalk Astrogazers 2021–
Co-lead of organization during 2023-2024 academic year

Logistics Officer, Cambridge University Girls in STEM 2019–2020

Institute of Astronomy Open Evenings Volunteer, University of Cambridge 2019–2020

Public Outreach Volunteer, Astrophysics Research Lab at the NC Museum of Natural Sciences 2017, 2019
Ran solar observing sessions, developed new cart programs, and supervised local high school student