

WEI CHIEH (MASON) NG

Massachusetts Institute of Technology

Office: McNair Building 37-638A ◊ 70 Vassar St ◊ Cambridge, MA 02139

masonng@mit.edu ◊ mason-ng.com

EDUCATION

Massachusetts Institute of Technology (MIT) 2018 - present

Ph.D. Candidate in Physics

Advisor: Professor Deepto Chakrabarty; GPA: 4.60/5.00

The University of Auckland 2017

Bachelor of Science (Honours) in Physics

Advisor: Professor Richard Easter; GPA: 8.63/9.00

The University of Auckland 2014 - 2016

Bachelor of Science

Majors: Physics and Mathematics; GPA: 8.74/9.00

RESEARCH EXPERIENCE

Massachusetts Institute of Technology 09/2018 - present

Graduate Research Assistant, Advisor: Prof. Deepto Chakrabarty

X-ray pulsation searches, timing, spectroscopic, and polarimetric analyses of pulsars (NICER/XMM-Newton/Swift/IXPE/RXTE/AstroSat data)

Australian National University 02/2018 - 07/2018

Graduate Research Assistant, Advisor: Prof. Martin Asplund

Modeling stellar atmospheres in 3D with different magnetic field configurations and strengths

Swinburne University of Technology 12/2017 - 02/2018

Summer Vacation Scholar, Advisors: Dr. Nikki Nielsen and Assoc. Prof. Glenn Kacprzak

Kinematics of the OVI Circumgalactic Medium: Halo Mass Dependence and Outflow Signatures

The University of Auckland 02/2017 - 11/2017

BSc (Honours) Student, Advisor: Prof. Richard Easter

Inflationary Model Selection ft. Dark Matter in the CMB

Australian National University 11/2016 - 02/2017

Summer Scholar, Advisors: Assoc. Prof. Christian Wolf and Dr. Christopher Onken

Diagnosing poor seeing of the SkyMapper telescope

The University of Auckland 12/2015 - 02/2016

Summer Research Scholar, Advisor: Assoc. Prof. Jan Jamie Eldridge

Modelling the emergent spectra of hot, massive stars to update the Binary Population and Spectral Synthesis (BPASS) code

PROFESSIONAL SERVICE

Referee 2023 - now

The Astrophysical Journal

Graduate Student Member <i>NICER Magnetars and Magnetospheres Working Group</i>	2021 - now
Graduate Student Member <i>IXPE Collaboration (Science Analysis and Simulations, Magnetars, and the Accreting White Dwarfs and Neutron Stars working groups)</i>	2021 - now
Graduate Student Member <i>NICER Bursts and Accretion Physics Working Group</i>	2020 - now
Graduate Student Member <i>NICER Searches and Multiwavelength Coordination Working Group</i>	2019 - now

PUBLICATIONS

Also part of **38 Astronomer's Telegrams** and GCN Circulars (led 9 of them).

First-author

Mason Ng, et al. 2022. *Spectral Evolution of Ultraluminous X-ray Pulsar NGC 300 ULX-1*. ApJ, 940, 138.

Herman L. Marshall, **Mason Ng**, et al. (IXPE Collaboration + Norbert S. Schulz, Deepto Chakrabarty) 2022. *Observations of 4U 1626-67 with the Imaging X-ray Polarimetry Explorer*. ApJ, 940, 70.

Mason Ng, Paul S. Ray, Peter Bult, Deepto Chakrabarty, et al. 2021. *NICER Discovery of Millisecond Pulsations and an Ultracompact Orbit in IGR J17494-3030*. ApJ, 908, L15.

M. Ng, N.M. Nielsen, G.G. Kacprzak et al. 2019. *Kinematics of the OVI Circumgalactic Medium: Halo Mass Dependence and Outflow Signatures*. ApJ, 886, 66.

Co-author

Manoj Mandal, et al. (12 co-authors including **Mason Ng**) 2023. *Probing spectral and timing properties of the X-ray pulsar RX J0440.9+4431 in the giant outburst of 2022-2023*. Submitted. arXiv:2306.08083.

A. C. Albayati, et al. (12 co-authors including **M. Ng**) 2023. *Thermonuclear Type-I X-ray Bursts and Burst Oscillations from the Eclipsing AMXP Swift J1749.4-2807*. MNRAS, 524, 2477.

Christian Malacaria, et al. (19 Tier 1 co-authors including **Mason Ng**) 2023. *A polarimetric-oriented X-ray stare at the accreting pulsar EXO 2030+375*. A&A, 675, 29.

G. K. Jaisawal, et al. (9 co-authors including **M. Ng**) 2023. *On the cyclotron absorption line and evidence of the spectral transition in SMC X-2 during 2022 giant outburst*. MNRAS, 521, 3951.

Paul A. Draghis, et al. (9 co-authors including **Mason Ng**) 2023. *The Spin of a Newborn Black Hole: Swift J1728.9-3613*. ApJ, 947, 39.

Mayura Balakrishnan, et al. (14 co-authors including **Mason Ng**) 2023. *The Black Hole Candidate Swift J1728.9-3613 and the Supernova Remnant G351.9-0.9*. ApJ, 947, 38.

G. C. Mancuso, et al. (10 co-authors including **M. Ng**) 2023. *Detection of millihertz quasi-periodic oscillations in the low-mass X-ray binary 4U 1730-22 with NICER*. MNRAS, 521, 5616.

Silvia Zane, et al. (26 Tier 1 co-authors including **Mason Ng**) 2023. *A strong X-ray polarization signal from the magnetar 1RXS J170849.0-400910*. ApJL, 944, 27.

- Giulia Illiano, et al. (21 co-authors including **Mason Ng**) 2022. *Timing analysis of the 2022 outburst of SAX J1808.4-3658: hints of an orbital shrinking*. ApJL, 942, 40.
- C. Malacaria, et al. (13 co-authors including **M. Ng**) 2022. *The unaltered pulsar: GRO J1750-27, a super-critical X-ray neutron star that does not blink an eye*. A&A, 669, 38.
- Sergey S. Tsygankov, et al. (17 Tier 1 co-authors including **Mason Ng**) 2022. *The X-ray polarimetry view of the accreting pulsar Cen X-3*. ApJL, 941, 14.
- Peter Bult, et al. (13 co-authors including **Mason Ng**) 2022. *The thermonuclear X-ray bursts of 4U 1730-22*. ApJ, 940, 81.
- Roberto Taverna, et al. (21 Tier 1 co-authors including **Mason Ng**) 2022. *Polarized x-rays from a magnetar*. Science, 378, 646.
- A. Sanna, et al. (14 co-authors including **M. Ng**) 2022. *MAXI J1957+032: a new accreting millisecond X-ray pulsar in an ultra-compact binary*. MNRAS, 516, L76
- Peter Bult, et al. (17 co-authors including **Mason Ng**) 2022. *The Discovery of the 528.6 Hz Accreting Millisecond X-Ray Pulsar MAXI J1816-195*. ApJL, 935, 32.
- Tolga Guver, et al. (13 co-authors including **Mason Ng**) 2022. *Burst-Disk Interaction in 4U 1636-536 as observed by NICER*. ApJ, 935, 154.
- A. Marino, et al. (20 co-authors including **M. Ng**) 2022. *Outflows and spectral evolution in the eclipsing AMXP SWIFT J1749.4-2807 with NICER, XMM-Newton and NuSTAR*. MNRAS, 515, 3838.
- Kishalay De, et al. (26 co-authors including **Mason Ng**) 2022. *SRGA J181414.6-225604: A New Galactic Symbiotic X-Ray Binary Outburst Triggered by an Intense Mass-loss Episode of a Heavily Obscured Mira Variable*. ApJ, 935, 36.
- A. Sanna, et al. (17 co-authors including **M. Ng**) 2022. *On the peculiar long-term orbital evolution of the eclipsing accreting millisecond X-ray pulsar SWIFT J1749.4-2807*. MNRAS, 514, 4385.
- R. M. Ludlam, et al. (10 co-authors including **Mason Ng**) 2022. *Radius Constraints from Reflection Modeling of Cygnus X-2 with NuSTAR and NICER*. ApJ, 927, 112.
- Pasham, D.R., et al. (18 co-authors including **Mason Ng**) 2021. *Evidence for a compact object in the aftermath of the extragalactic transient AT2018cow*. Nat Astron. <https://doi.org/10.1038/s41550-021-01524-8>
- The LIGO Scientific Collaboration; the Virgo Collaboration; the KAGRA Collaboration (including **Mason Ng**) 2021. *Search for continuous gravitational waves from 20 accreting millisecond X-ray pulsars in O3 LIGO data*. Phys. Rev. D 105, 022002.
- Yuhan Yao, et al. (27 co-authors including **Mason Ng**) 2020. *A Comprehensive X-ray Report on AT2019wey*. ApJ, 920, 121.
- Teruaki Enoto, **Mason Ng** et al. 2021. *A Month of Monitoring the New Magnetar Swift J1555.2-5402 during an X-Ray Outburst..* ApJ, 920, L4.
- D. J. K. Buisson, et al. (including **Mason Ng**) 2021. *Dips and eclipses in the X-ray binary Swift J1858.6-0814 observed with NICER*. MNRAS, 503, 5600.
- Peter Bult, et al. (including **Mason Ng**) 2021. *Long term coherent timing of the accreting millisecond pulsar IGR J17062-6143*. ApJ, 912, 120.

Peter Bult, et al. (12 co-authors including **Mason Ng**) 2020. *The X-ray bursts of XTE J1739-285: a NICER sample*. ApJ, 907, 79.

J.J. Eldridge, E.R. Stanway, et al. (7 co-authors including **M. Ng**) 2017. *Binary Population and Spectral Synthesis Version 2.1: construction, observational verification and new results*. PASA, 34.

ACCEPTED OBSERVING PROPOSALS AS PI

Chandra DDT Observation 2023 - present
Tracking the Ne X Accretion Disk Line Emission of Ultracompact X-ray Binary 4U 1626-67 Across a Torque Reversal (60 ks).

NICER (AO5) 2023
Detecting Millisecond X-ray Pulsations and Confirming the Ultracompact Nature of the Low Mass X-ray Binary 4U 1850-087 (40 ks)

NICER (AO4) 2022
Time-Resolved Spectroscopic and Polarimetric Studies of 4U 1626-67 with NICER and IXPE (20 ks).

Swift ToO Observations 2022 - present
Total of 7 ks over 2 sources

NICER ToO Observations 2021 - present
Total of 370 ks over 9 sources

PRESENTATIONS

* = Virtual

Poster - 20th Divisional Meeting of the High Energy Astrophysics Division Mar 2023
Discovery of a 7.8 Hz QPO from the High-Intensity Outburst of Dipping NS LMXB 1A 1744-361

Poster - 20th Divisional Meeting of the High Energy Astrophysics Division Mar 2023
IXPE Observations of the Pulsar 4U 1626-67

Contributed Talk - 241st Meeting of the American Astronomical Society Jan 2023
IXPE Observations of the Pulsar 4U 1626-67

Seminar - Nanyang Technological University Dec 2022
IXPE Observations of the Neutron Star Low-Mass X-ray Binary 4U 1626-67

Seminar - JAXA/ISAS Nov 2022
IXPE Observations of the Neutron Star Low-Mass X-ray Binary 4U 1626-67

Seminar - Kyoto University Nov 2022
IXPE Observations of the Neutron Star Low-Mass X-ray Binary 4U 1626-67

***Contributed Talk - Astrophysical Polarimetry in the Time-Domain Era** Sep 2022
IXPE Observations of the Pulsar 4U 1626-67

Poster - 19th Divisional Meeting of the High Energy Astrophysics Division Mar 2022
NICER Pulsation Search and Spectroscopy of the Original Black Widow Pulsar, PSR B1957+20

Poster - Celebrating 20 Years of Chandra Science Symposium Dec 2019
Spectral Evolution of NGC 300 ULX-1

Invited Talk - Auckland Astronomical Society Aug 2016
Modelling the spectra of hot stars

TECHNICAL SKILLS

Programming	Python, HTML/CSS, IDL, L ^A T _E X
High Performance Computing	OpenMP, MPI, Slurm

HONORS & AWARDS

School of Science Service Fellowship (<i>Massachusetts Institute of Technology</i>)	2022
Graduate Service Award, Physics Department (<i>Massachusetts Institute of Technology</i>)	2021
Department of Physics Scholarship, 2017 (<i>The University of Auckland</i>)	2016
University of Auckland Postgraduate Honours/PG Diploma Scholarships	2016
Joyce Mary Clark Scholarship (<i>The University of Auckland</i>)	2016
First in Course Award (x6) (<i>The University of Auckland</i>)	2014 - 2017
Scholarship (<i>New Zealand Qualifications Authority</i>)	2014
The Trusts Charitable Foundation Scholarship (<i>The Trusts Charitable Foundation</i>)	2013
Dux Litterarum (<i>Lynfield College</i>)	2013

TEACHING EXPERIENCE

Graduate Teaching Assistant for 8.901 <i>Department of Physics, Massachusetts Institute of Technology</i>	Spring 2021, Spring 2022
Graduate Teaching Assistant for 8.282J and 8.284 <i>Department of Physics, Massachusetts Institute of Technology</i>	Spring 2020
Graduate Teaching Assistant (Physics) for PHYSICS 107/107G <i>Department of Physics, The University of Auckland</i>	2017
Marker (MATHS 110/150/208/250/362) <i>Department of Mathematics, The University of Auckland</i>	2015 - 2017
Teaching Assistant for PHYSICS 107/107G/120 <i>Department of Physics, The University of Auckland</i>	2015 - 2016

LEADERSHIP & POSITIONS

Vice-Chair <i>Graduate Research and Development (GRAD) Coalition. Assisting the co-Chairs and members of the GRAD Caucus in the House of Representatives to present issues and concerns by graduate students and provide a platform to discuss possible legislative solutions.</i>	2023
Graduate Student Member <i>Graduate Admissions Committee, Department of Physics, MIT. Worked with the Graduate Admissions Chair to review prospective physics PhD applicants.</i>	2020 - 2022
Co-Organizer <i>Physics Graduate Application Assistance Program, Department of Physics, MIT. Co-led the establishment of mentoring-based physics PhD application assistance programs as well as virtual webinars. Successfully co-developed a proposal for funding graduate student mentors.</i>	2020 - 2022

MIT Graduate Student Council External Affairs Board 2019 - 2023
Vice-Chair (2021-2023), Development (2020-2021), Public Outreach (2019-2020). Led the groundwork for the annual MIT Research Slam (2020); led the writing and publishing of the monthly advocacy newsletter (2021-2023); led multiple in-person trips with 8-10 student teams to Washington D.C. to meet with Congressional offices to advocate for graduate student concerns - have overseen the scheduling for over 100 Congressional offices and committees over two trips.

Committee Member (Graduate Student) 2019 - present
MIT Open Space Programming Advisory Committee. Advising the Open Space Programming team on activities and programming for the Kendall Square Open Space by providing graduate student input and acting as a liaison.

MITvote Graduate Liaison 2018 - present
MITvote. Developing and sending informational emails on voting in local, state, and federal elections during election seasons.

Volunteer Observer 2018 - present
MIT Sidewalk Astrogazers. Have participated in over a dozen pop-up public astrogazing events so far and trained other students in operating the telescopes.

Executive Member 2017
Science Students' Association. Introduced the annual Science Trivia, and worked with other executive members to obtain funding from the various departments for this new association.

President 2015 - 2017
The Physics Association of The University of Auckland (PAUA). Introduced the annual Physics Careers Panel Discussion, organized monthly social gatherings ("Fluid Dynamics"), introductory Python workshops, and research seminars for undergraduate students.

OUTREACH AND PANELS

Physics Graduate Application/Admissions Information Session Jul 2023
Speaker for a virtual presentation and Q&A session (> 45 attendees) for undergraduates of IISER Bhopal

Physics Graduate Application/Admissions Information Session Dec 2022
Speaker for an in-person presentation and Q&A session (> 15 attendees) for undergraduates of the Nanyang Technological University in Singapore

Physics Graduate Applications Panel for Cenca Bridge Apr 2022
Panelist for a live virtual webinar (> 5 attendees) to talk about the graduate admissions process. This panel was particularly for the Central American-Caribbean Bridge in Astrophysics students

PhysGAAP Webinar for Prospective Applicants Dec 2021
Panelist for a live virtual webinar (>90 attendees) to talk about the graduate admissions process

International Graduate School Panel Nov 2021
Panelist for a live virtual webinar (>10 attendees) to talk about international opportunities for graduate school to current undergraduate students in New Zealand

PGSC Career Panel Nov 2021
In-person panelist on a career panel (> 20 attendees); spoke about physics graduate admissions

Site 4 Art Kits & Stargazing Program Nov 2021
In-person presentation to two dozen graduate students and their family from all backgrounds about neutron stars

Discord Panel for Physics/Astro Graduate School Applicants <i>Panelist for a live virtual panel (> 20 attendees); spoke about physics graduate admissions</i>	Oct 2021
PhysGAAP Webinar for Prospective Applicants <i>Panelist for a live virtual webinar (>140 attendees) to talk about the graduate admissions process</i>	Sep 2021
Physics Information Session for MSRP Students <i>Panelist for a live virtual panel (>20 attendees) to talk about the graduate school</i>	July 2021
Graduate Admissions Panel for MIT SPS <i>Panelist for a live virtual panel (>20 attendees) to talk about the graduate admissions</i>	May 2021
Graduate School Panel for UPRM <i>Panelist for a live virtual panel (>20 attendees) to talk about the graduate admissions</i>	Sep 2020