Sohan Ghodla

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Education

Dec 2020 - present	University of Auckland, New Zealand Ongoing Ph.D. in Physics, supervised by Prof. J.J. Eldridge. Thesis: Impact of companion and surroundings on stellar and compact binary evolution.
Mar 2019 - Feb 2020	University of Auckland, New Zealand Masters in Physics, supervised by Prof. J.J. Eldridge. Thesis: Constraining the supernova remnant mass spectrum using gravitational wave transients.
Jul 2014 - Nov 2018	University of Auckland, New Zealand BSc: Physics & Mathematics & PGDip Physics Thesis: The Kibble Zurek Mechanism - supervised by Assoc. Prof. M. Grimson.

Publications

[1] **S., Ghodla**, R. Easther, M. M. Briel, and J. J. Eldridge. *Observational implications of cosmologically coupled black holes*. *The Open Journal of Astrophysics*, 6:25, July 2023.

[2] **S., Ghodla** and J. J. Eldridge. *Sustained super-Eddington accretion around neutron stars & black holes*. MNRAS, 523(2):1711–1717, August 2023.

[3] **S., Ghodla**, J. J. Eldridge, E. R. Stanway, and H. F. Stevance. *Evaluating chemically homogeneous evolution in stellar binaries: electromagnetic implications - ionizing photons, SLSN-I, GRB, Ic-BL*. MNRAS, 518(1):860–877, January 2023.

[4] **S., Ghodla**, W. G. J. van Zeist, J. J. Eldridge, H. F. Stevance, and E. R. Stanway. *Forward modelling the O3(a+b) GW transient mass distributions with BPASS by varying compact remnant mass and SNe kick prescriptions*. MNRAS, 511(1):1201–1209, March 2022.

[5] H. F. Stevance, **Ghodla, S.**, S. Richards, J. J. Eldridge, M. M. Briel, and P. Tang. *VFTS 243 as predicted by the BPASS fiducial models*. MNRAS, February 2023.

Contributed, Invited Talks and Colloquium

Feb 2023	University of Helsinki, Finland (Invited) [Link]
Nov 2022	Swinburne University of Technology, Melbourne, Australia (Contributed) [Link]
Aug 2022	Harvard & Smithsonian, USA (Contributed, online) [Link]
Jun 2022	Astronomical Society of Australia - University of Tasmania (Contributed online)
Jul 2021	*New Zealand Institute of Physics* - Wellington, New Zealand (Contributed)
Oct 2020	Ilya Mandel's group (COMPAS) - Monash University Melbourne, Australia (online)
May 2020	MSc colloquium - University of Auckland, New Zealand

Workshops Attended

Feb 2023	Summer School on Gravitational Waves.	*University of Auckland*
Dec 2022	Gravitational Wave Physics & Astronomy workshop (*Presented poster*)	*Monash University*
Aug 2021	Modules for experiments in Astrophysics (MESA) workshop (virtual).	*UC Santa Barbara*
Jan 2020	NZMRI summer school - Mathematical Aspects of General Relativity.	*Nelson NZ*
Dec 2018	Statistical Mechanics & Condensed Matter workshop (*Presented poster*).	*University of Auckland*

Teaching Duties and Advising

Aug 2023 - present	**Mentor** - final year Master's student. Topic: neutron star - white dwarf merger **Tutor** - Tuākana help room geared towards Māori and Pacific students.
Feb 2023 - Jul 2023	**Tutor** - Tuākana help room for Māori and Pacific students **Tutor** - Physics 102 - Basic concepts in Physics - *gave tutorials twice a week and ran help room session once a week.*
Jul 2022 - Nov 2022	**Tutor** - Physics 203: Relativity and Quantum Mechanics - *gave tutorials once a week and graded tutorials and assignments.* **Tutor** - *Drop in helproom for all Stage 1 courses.*
Feb 2022 - Jun 2022	**TA** Physics 202 - *Classical Mechanics & Thermodynamics* - graded assignments. **Lab demonstrator** - Physics 100 - *Introduction to Astrophysics.*
Jul 2021 - Nov 2021	**TA** Physics 201 - *Electromagnetism* - graded and provided solutions for assignments. **Lab demonstrator** - Physics 100 - *Introduction to Astrophysics.*
Feb 2021 - Jun 2021	**TA** Physics 202 - *Classical Mechanics & Thermodynamics* - graded assignments. **Lab demonstrator** - Physics 100 - *Introduction to Astrophysics.*

Public Talks & Outreach

Dec 2023	*TBD* - Upcoming public talk at Auckland Astronomical Society.
Jun 2023	*Black holes and dark energy.* Public talk at Hibiscus Coast Astronomical Society.
Mar 2023	*What leads to super-energetic supernovae & supermassive black holes?* - Public talk: Hamilton astronomical society.
Jul-Oct 2021	Three outreach events (talks & demonstrations) at Kowhai Intermediate School.
Jun 2019 & Apr 2020	Participated in representing University of Auckland Physics at MOTAT science fair.

Awards, Scholarships & Recognition

- University of Auckland doctoral scholarship Dec 2020 - Nov 2023: $95k (NZD)
- Recognized for outstanding Physics Tutoring, Semester 1 2023.
- Research Project Scholarship 2022 - Faculty of Science University of Auckland $6K (NZD)
- Granted 150K computation core hours, three times each between 2021 - 2023.
- Featured in the *Royal Society of New Zealand's* annual 2022 report for a series of successful school outreach.

Journal clubs & Posters

Feb 2021 - present	given 17+ talks at Astro & Cosmology Journal club.	*University of Auckland*
May 2023 - present	given 3+ talks at the NZ gravity Journal club	*New Zealand collaboration*
Sep 2023	Poster - Graduate research showcase. (shortlisted; results on 17 Oct 2023)	
Nov 2021	Poster - Graduate research showcase.	

Misceleneous professional service

- Journal referee for *Monthly Notices of the Royal Astronomical Society.*
- Host of Astrophysics & Cosmology journal club from Jun 2021 - present (organized 80+ talks).
- Organizer and primary contributor to astro reading group 2021-2022.
- Contributor to *Physics Stack Exchange* [Link] (top 2% this year, 60+ questions answered, 17K+ people reached) - top tags: general relativity, cosmology, quantum mechanics.

Coding and other skils

Astrophysical codes	Developed routines for Tui - a satellite code of Bpass suite - used in [1, 3, 5] . Proficiency in Mesa - a software suite used for modeling a range of phenomena in stellar astrophysics physics - Created models used in paper [1, 3].
Computing languages	Proficiency in Fortran - primary language of Tui and Mesa. Proficiency in Python - primary language for data analysis in all my work. Proficiency in SAGE - primary source to verify analytical calculations. Proficiency in Slurm - used in [1, 3] for scheduling jobs on high-performance computers.

References

Prof. J.J. Eldridge (PhD Supervisor)
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Prof. Richard Easther (Collaborator)
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University of Warwick, United Kingdom
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Dr. Heloise Stevance (Collaborator)
Department of Physics,
University of Oxford, United Kingdom
Email: heloise.stevance@physics.ox.ac.uk

Dr. Nicholas Rattenbury (Secondary Supervisor)
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