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Education

Dec 2020 - present	University of Auckland, New Zealand Ongoing Ph.D. in Physic Thesis: Impact of companion and surroundings on stellar and compact binary evolution.
Mar 2019 - Feb 2020	University of Auckland, New Zealand Masters in Physics Thesis: Constraining the supernova remnant mass spectrum using Gravitational waves.
Jul 2014 - Nov 2018	University of Auckland, New Zealand BSc: In Physics & Mathematics and PGDip in Physics Thesis: The Kibble Zurek Mechanism

Publications

[1] **S. Ghodla**. *An indirect probe of galactic dark matter with LISA*. In prep.

[2] **S. Ghodla**. *The effect of the interstellar medium on LVK's black holes*. Accepeted by MNRAS, June 2024.

[3] **S. Ghodla** and J. J. Eldridge. *The effect of stellar rotation on black hole mass and spin*. arXiv: 2312.10400, Submitted to MNRAS, December 2023.

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

[5] **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.

[6] **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, November 2022.

[7] **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.

Publications as Nth Author

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

Research Talks

Jun 2024	Astronomical Society of Australia Annual Scientific Meeting (*Contributed)*
Jun 2024	Cosmology from Home (*Contributed*)
Apr 2024	American Physical Society, California USA (*Contributed*)
Mar 2024	THEA Seminar, Columbia University, NYC USA (*Invited*)
Mar 2024	Informal talk given to the Gravitational Wave group, Flatiron Institute, NYC USA (*Invited*)
Mar 2024	Black board pizza talk, Columbia University, NYC USA (*Invited*)
Mar 2024	Friday Afternoon Research Talk, Liverpool John Moores University, UK (*Invited*)
Feb 2024	Talk at the NZ gravity workshop (Contributed), Auckland University of Technology, New Zealand
Feb 2023	Astrophysics Seminar at the University of Helsinki, Finland (*Invited*) [Link]
Nov 2022	Swinburne University of Technology, Melbourne, Australia (*Contributed*) [Link]

Research Talks continued

Aug 2022	Harvard & Smithsonian, USA (*Contributed*, online) [Link]
Jun 2022	Astronomical Society of Australia - University of Tasmania (*Contributed* online)
Nov 2021	Provisional year presentation, University of Auckland, New Zealand
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, NZ*
Dec 2022	Gravitational Wave Physics & Astronomy workshop.	*Monash University, Australia*
Aug 2021	Modules for experiments in Astrophysics (MESA) workshop (virtual).	*UC Santa Barbara, USA*
Jan 2020	NZMRI summer school; Mathematical aspects of General Relativity.	*Victoria University Wellington*
Dec 2018	Statistical Mechanics & Condensed Matter workshop.	*University of Auckland, NZ*

Teaching Duties and Advising

Jun 2024	**Invited** to codesign content and TA at the MESA workshop.	*University of Sydney*
Feb 2024 - Present	**Tutor** - Physics help room for Māori and Pacific students (year 1 to 4)	
Aug 2023 - Nov 2023	**Mentor** - Adib Mowaz, Master's student. Topic: *Neutron Star & White Dwarf merger*. **Tutor** - Physics help room geared towards the underrepresented community Pacific students (year 1 to 4).	
Feb 2023 - Jul 2023	**Tutor** - Physics help room for Māori and Pacific students (year 1 to 4) **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 assignments & tutorials.* **Tutor** - *Drop in helproom for all year 1 courses.*	
Feb 2022 - Jun 2022	**TA** Physics 202 - *Classical Mechanics and 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 and Thermodynamics* - graded assignments. **Lab demonstrator** - Physics 100 - *Introduction to Astrophysics*	

Journal clubs & Posters

Aug 2024	Poster - Upcoming IAU General Assembly 2024	*Capetown, South Africa*
Apr 2024	Poster - American Physical Society.	*California, USA*
Feb 2021 - present	Given 19+ talks at Astro & Cosmology Journal club.	*University of Auckland, NZ*
May 2023 - present	Given 3+ talks at the NZ gravity Journal club.	*New Zealand collaboration*
Sep 2023	Poster - Graduate research showcase. (shortlisted)	*University of Auckland, NZ*
Dec 2022	Poster - Gravitational Wave Physics & Astronomy workshop.	*Monash University, Australia*
Nov 2021	Poster - Graduate research showcase.	*University of Auckland, NZ*
Dec 2018	Poster - Statistical Mechanics & Condensed Matter workshop	*University of Auckland, NZ*

Scholarships & Recognition

- University of Auckland doctoral scholarship Dec 2020 - present: $116k (NZD)
- Featured in American Physical Society April Press Event.
- American Physical Society travel award $500 (USD).
- Recognized for outstanding Physics Tutoring, Semester 1 2023.
- Awarded 150K computation core hours, thrice each between 2021 - 2023.
- Featured in the *Royal Society of New Zealand's* 2022 annual report for a series of successful school outreach.

Public Talks & Outreach

Dec 2023	Invited public talk on *Black holes & dark energy*, Auckland Astronomical Society [URL].
Jun 2023	Invited public talk *Black holes, dark energy & Gravitational waves* at Hibiscus Coast Astronomical Society.
Mar 2023	Invited public talk on *What leads to super-energetic supernovae & supermassive black holes?* at the Hamilton astronomical society.
Jul 2021 - Oct 2021	Three outreach events at Kowhai Intermediate School. Co-organized and designed engaging presentations and hands-on demonstrations under the theme -"Where do we come from?".
Jun 2019 & Apr 2020	Participated in representing the University of Auckland Physics at the MOTAT science fair.

Miscellaneous service

- Journal referee for the *Monthly Notices of the Royal Astronomical Society.*
- Session chair at the APS April 2024 meeting - Numerical advancements in Particle Astrophysics.
- Session chair at the APS April 2024 meeting - Gravitational waves.
- Session chair at the APS April 2024 meeting - General Physics.
- Host of Astrophysics & Cosmology journal club from Jun 2021 - Nov 2023 (organized 80+ talks).
- Organizer and primary contributor to Astro reading group 2021-2022.
- Contributor to *Physics Stack Exchange* (top 0.95% in 2023, top 10% overall).

Coding skills

Astrophysical codes	Proficiency in Bpass - Developed routines for Tui - a satellite code of the Bpass suite & used in 2 publications. Proficiency in Mesa - a software suite used for modeling a range of phenomena is stellar & compact binary astrophysics- Created models for use in 2 publications.
Computing languages	Proficiency in Fortran - primary language of Tui and Mesa. Proficiency in Python - primary language for data analysis and plotting in all my work. Proficiency in Sage (a free equivalent of Mathematica) - used Sage Manifolds in 1 paper. Proficiency in Mathematica - working knowledge. Proficiency in Slurm - used in 5 papers to schedule jobs on high-performance computers.

References

Prof. J.J. Eldridge (PhD Supervisor)
Department of Physics,
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Email: j.eldridge@auckland.ac.nz

Prof. Richard Easther (Collaborator)
Department of Physics,
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Dr. Heloise Stevance (Collaborator)
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University of Oxford, United Kingdom
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