


James W. Gardner

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Education

Doctor of Philosophy (PhD) in Physics 2022–present
The Australian National University (ANU), Canberra ACT, Australia[†]
[†] Involving close collaboration and a majority of the time spend at The California Institute of Technology (Caltech), Pasadena CA, USA.

Bachelor of Philosophy (Honours) in Science with Honours in Physics 2018–2021
The Australian National University (ANU), Canberra ACT, Australia
Improving future gravitational-wave detectors using nondegenerate internal squeezing
Thesis available at <https://jamesgardner.info/>

Awards and scholarships

ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav) Travel Grant 2022
Yale Physics PhD offer (with funded tuition and stipend) 2022
ANU HDR Supplementary Scholarship 2022
Australian Government Research Training Program Domestic Scholarship 2022
The John Carver Physics Prize[‡] 2021 (awarded in October 2022)
[‡] Rewards academic excellence in the ANU Physics Honours specialisation
ANU First Class Honours 2021
ANU Achievement Prize for Third Year Physics 2020
ANU Dean’s Science Education Commendation Award 2020
ANU National University Scholarship 2018–2021

Employment

Research Officer Grade 5/6 (35 hours per week)
ANU Centre for Gravitational Astrophysics (CGA)
Benchmarking of future gravitational-wave detector networks February–June 2022
Summer Research Intern (35 hours per week)
ANU Centre for Gravitational Astrophysics (CGA)

Teaching

Science Mentors ACT (pro bono)

2019

Research

Research interests

Quantum optics, gravitational waves, quantum squeezing

Publications

James W. Gardner, Min Jet Yap, Vaishali Adya, Sheon Chua, Bram J. J. Slagmolen, David E. McClelland, 2022, *Nondegenerate internal squeezing: an all-optical, loss-resistant quantum technique for gravitational-wave detection*, Phys. Rev. D **106**, L041101. Letter available upon request or at <https://doi.org/10.1103/PhysRevD.106.L041101>

James W. Gardner, Hannah Middleton, Changrong Liu, Andrew Melatos, Robin Evans, William Moran, et al., 2022, *Continuous gravitational waves in the lab: recovering audio signals with a table-top optical microphone*, American Journal of Physics **90**, 286. Paper available upon request or at <https://doi.org/10.1119/10.0009409>

Presentations and posters

Gordon Research Conference (GRC) - Mechanical Systems in the Quantum Regime June 2022
Two-mode squeezing for gravitational-wave detection
Presented jointly with Mr Daniel Gould.

[Poster] GRC and Seminar - Mechanical Systems in the Quantum Regime June 2022
Nondegenerate internal squeezing: an all-optical, loss-resistant quantum technique for gravitational-wave detection

LIGO-Virgo-KAGRA Collaboration - Joint meeting of the advanced interferometer configurations, quantum noise, and laser and auxiliary working groups March 2022
Nondegenerate internal squeezing

OzGrav - Data/Astrophysics meeting February 2022
Continuous gravitational waves in the lab: recovering audio signals with a table-top optical microphone

LIGO-Virgo-KAGRA Collaboration - Interferometer simulation group December 2020
Verification of the newly-added non-linear element in Finesse for optical modelling of advanced gravitational-wave detector configurations

Membership

The Australian Institute of Physics (AIP)	2022–present
The Cosmic Explorer Consortium (ANU group)	2022–present
The LIGO Scientific Collaboration (LSC - OzGrav - ANU group)	2022–present
The ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav - ANU node)	2020–present
The Centre for Gravitational Astrophysics Research School of Physics and Research School of Astronomy and Astrophysics, ANU	2020–present

Media

SciTechDaily <i>Continuous Gravitational Waves in the Lab</i>	April 2022
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Outreach

OzGrav/CGA Student Symposium <i>From vacuum fluctuations to the next generation of ground-based gravitational-wave detectors</i>	May 2022
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References are available upon request.
Updated: October 21, 2022