

TIMOTHY GRAY

PERSONAL INFORMATION

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ORCID [0000-0003-3965-6130](https://orcid.org/0000-0003-3965-6130)
ResearcherID [N-3551-2017](https://orcid.org/N-3551-2017)

WORK EXPERIENCE

2021-present **Postdoctoral Researcher**
Oak Ridge National Laboratory Continuing nuclear structure research with focuses on nuclear shapes, emerging collectivity, gamma-ray spectroscopy, and Coulomb excitation studies.

2018-2020 **Physics Lab Demonstrator**
Australian National University Demonstrated for two Stage 1 Physics Labs, including experiments and lab report marking.

2015 **Physics Lab Demonstrator**
University of Auckland Demonstrated for a Stage 1 Physics Lab. Covered a variety of topics and helped students carry out experiments as well as marking lab reports.

EDUCATION

2017 - 2021 **The Australian National University, Australia**
Doctor of Philosophy Nuclear Physics · *Research School of Physics*
Thesis: *Electromagnetic Moments and Emerging Nuclear Collectivity near $Z = 50$*
Description: This research investigated emerging nuclear collectivity in the Sn region. A wide range of experimental techniques were used to measure static and dynamic electromagnetic moments, and the results were compared to state-of-the-art theoretical calculations.
Supervisor: Prof. Andrew STUCHBERY

2016 **The Australian National University, Australia**
Bachelor of Science (Hons) Nuclear Physics · *Research School of Physics and Engineering*
Thesis: *Applications of LaBr₃ detectors: Internal fields and g-factor measurements*
Description: The thesis explored new detector technology and its applications to measuring magnetic moments of isomeric states in-beam using the Time Differential Perturbed Angular Distribution method.
Supervisor: Prof. Andrew STUCHBERY

2013-2015 **The University of Auckland, New Zealand**
Bachelor of Science GPA: 8.7 · Double Major: Physics and Pure Mathematics

SELECTED PUBLICATIONS

Phys. Rev. Lett.
(under review) “Shape polarization in the tin isotopes near $N = 60$ from precision g-factor measurements on short-lived $11/2^-$ isomers”
Authors: **T. J. Gray**, A. E. Stuchbery, J. Dobaczewski *et al.*

Phys. Rev. Lett.
130 242501 (2023) “Microsecond Isomer at the $N = 20$ Island of Shape Inversion Observed at FRIB”
Authors: **T. J. Gray**, J. M. Allmond, Z. Xu *et al.*

Phys. Rev. Lett.
129 212501 (2022) “Crossing $N = 28$ Toward the Neutron Drip Line: First Measurement of Half-Lives at FRIB”
Authors: H. L. CRAWFORD, V. TRIPATHI, J. M. ALLMOND *et al.*

Phys. Lett. B **834**
137446 (2022) “E2 rotational invariants of 0_1^+ and 2_1^+ states for ^{106}Cd : The emergence of collective rotation”
Authors: **T. J. Gray**, J. M. ALLMOND, R. V. F. JANSSENS *et al.*

NIM A **1041**
167392 (2022) “CLARION2-TRINITY: A Compton-suppressed HPGe and GAGG:Ce-Si-Si array for absolute cross-section measurements with heavy ions”
Authors: **T. J. Gray**, J. M. ALLMOND, D. T. DOWLING *et al.*

Phys. Rev. Lett.
128, 252501 (2022) “Electric Monopole Transition from the Superdeformed Band in ^{40}Ca ”
Authors: E. IDEGUCHI, T. KIBEDI, J. T. H. DOWIE *et al.*

- Phys. Lett. B* **823**
136738 (2021) “Emerging collectivity in neutron-hole transitions near doubly magic ^{208}Pb ”
Authors: M. S. M. GERATHY, A. J. MITCHELL, G. J. LANE *et al.*
- Phys. Lett. B* **811**
135855 (2020) “Evidence for shape coexistence and superdeformation in ^{24}Mg ”
Authors: J. T. H. DOWIE, T. KIBEDI, D. G. JENKINS *et al.*
- Phys. Rev. C* **101**
054302 (2020) “Hyperfine fields at ^{66}Ga , $^{67,69}\text{Ge}$ implanted into iron and gadolinium hosts at 6 K, and applications to g -factor measurements”
Authors: T. J. Gray, A. E. STUCHBERY, B. J. COOMBES *et al.*
- EPJ Web of Conferences* **232**
04007 (2020) “E2 collectivity in shell-model calculations for odd-mass nuclei near ^{132}Sn ”
Authors: T. J. Gray, A. E. STUCHBERY, L. A. FUDERER, J. M. ALLMOND
- Phys. Rev. Lett.*
124 032502 (2020) “Early Signal of Emerging Nuclear Collectivity in Neutron-Rich ^{129}Sb ”
Authors: T. J. Gray, J. M. ALLMOND, A. E. STUCHBERY *et al.*
- Phys. Rev. C* **100**
044317 (2019) “First-excited state g factors in the stable, even Ge and Se isotopes”
Authors: B. P. McCORMICK, A. E. STUCHBERY, B. A. BROWN *et al.*
- Phys. Rev. C* **100**
024322 (2019) “Spectroscopy and excited-state g factors in weakly collective ^{111}Cd : Confronting collective and microscopic models”
Authors: B. J. COOMBES, A. E. STUCHBERY, A. BLAXHEV *et al.*
- Phys. Rev. C* **96**,
054332 (2017) “Perturbed angular distributions with LaBr_3 detectors: The g factor of the first 10^+ state in ^{110}Cd reexamined”
Authors: T. J. Gray, A. E. STUCHBERY, M. W. REED *et al.*
- EPJ Web of Conferences* **123**
04004 (2016) “Nuclear lifetime measurements from data with independently varying observation times”
Authors: T. J. Gray, M. W. REED, G. J. LANE, A. AKBER, Yu. A. LITVINOV, and P. M. WALKER

AWARDS

- 2021 Bragg Medal for Excellence in Physics · AUSTRALIAN INSTITUTE OF PHYSICS
- 2021 JG Crawford Prize — finalist · AUSTRALIAN NATIONAL UNIVERSITY
- 2021 Jagadishwar Mahanty Prize for best PhD Thesis · *Research School of Physics* · AUSTRALIAN NATIONAL UNIVERSITY
- 2019 Outstanding Student Presentation · *Heavy Ion Accelerator Symposium 2019* · AUSTRALIAN NATIONAL UNIVERSITY
- 2018 People’s Choice Award RSPE 3 Minute Thesis · AUSTRALIAN NATIONAL UNIVERSITY
- 2017-2020 Australian Government Research Training Program · AUSTRALIAN GOVERNMENT
- 2016-2017 Summer Research Scholarship in Physics · UNIVERSITY OF AUCKLAND
- 2015-2016 Summer Research Scholarship in Physics · AUSTRALIAN NATIONAL UNIVERSITY

INVITED TALKS

- 2021 Weakening shell structure near $N = 60$: g -factor measurements in $^{109,111}\text{Sn}$ · HYPERFINE2021
- 2022 First FRIB experiment: new microsecond isomer in ^{32}Na discovered with the FDSi · AIP CONGRESS 2022
- 2023 Suppressed Electric Quadrupole Collectivity in ^{49}Ti Relative to Semi-Magic ^{50}Ti · ISTROS 2023
- 2023 Suppressed Electric Quadrupole Collectivity in ^{49}Ti Relative to Semi-Magic ^{50}Ti · NUCLEAR CHEMISTRY GORDON RESEARCH CONFERENCE 2023

OTHER INFORMATION

Computer Experience C++, ROOT, PYTHON, L^AT_EX, Linux, FORTRAN

June 15, 2023