



New Zealand Institute of Physics
The institute for professional physicists

NZIP & PHYSIKOS 2025

CONFERENCE • 1–3 JULY 2025

University of Auckland
Waipapa Taumata Rau



Draft Programme v9 June 2025

DAY 1 – Tuesday 1 July

08:00	Check in open @ Building 302 Foyer		
08:45	Conference Opening: Mihi whakatau & Welcome Room: PLT1 Lecture Theatre (Building 303)		
09:15	Keynote: Nicole Bell “Searching for Dark Matter, on Earth and in the Stars” Room: PLT1 Lecture Theatre (Building 303)		
10:00	Morning Tea + Exhibition open		
10:45 - 12:15	Session 1A: General	Session 1B: Education	Session 1C: Education
	Room: PLT1 Lecture Theatre (Building 303)	Room: Studio Space G03 (Building 303)	Room: Case Room G20 (Building 302)
10:45	Ocean monitoring using optical interferometry in subsea cables Annette Koo	A critical examination of generative AI technology Benny Pan	Why is thinking in Physics so difficult for many students? What are the issues? How can we help students learn to take the risks required? Sue Napier
11:00			Learning How to Learn through Self-Assessment: A Study Skills Survey Tool for Secondary School Students Yuanyuan Hu
11:15			
11:30	Why your battery meter tells lies and it's hard to fix: Effect of pauses in cycling on sub-millihertz battery impedance Marcus Wilson	The Visible Spectrum of Physics Students: Promoting Diversity in Physics Classrooms Thalia Rutherford	First-Year Physics and High School Outreach at Otago Blair Blakie
11:45	Measuring human vision – history of the photopic response curve Ellie Molloy		
	Development of Microfluidic Ion Pipette Aspiration (IPA) for Single-Particle Mechanical Characterization Chi Minh Truong		

12:00	Analysis and Segmentation of AI-Denoised Propagation-Based X-ray Phase-Contrast CT Images of the Breast Amritha Ramchandar		
12:15	Lunch in the Exhibition Area		
13:15-14:45	Session 2A: General	Session 2B: Education	Session 2C: Education
	Room: PLT1 Lecture Theatre (Building 303)	Room: Studio Space G03 (Building 303)	Room: Case Room G20 (Building 302)
13:15	What is driving recent changes in Antarctic sea ice? Inga Smith	AI in the Classroom: Enhancing Teaching and Guiding Responsible Use Kate Jackson	Physics courses in NZ High schools; different pathways in a selection of schools Jeffery Yang
13:30			
13:45	An MSci physics student co-created Northern Lights simulator, building, testing, and impact Ian Whittaker	Lighting Up Physics: Hands-On Electricity and Electromagnetism for Secondary School Students Dulsha Kularatna-Abeywardana & Rajith Abeywardana	Practicals: Why do we do practicals Chris Currie & Mark Standley
14:00	Big Bang Matter and Neutron Stars Arno Tripolt		
14:15	Modelling and Analysis of Semiconductor Lasers Subject to Fiber Bragg Grating Feedback Joe Steele		
14:30	Temperature-dependent photoluminescence in rare-earth-doped NaMgF ₃ Shen Chong		
14:45	Afternoon Tea in the Exhibition Area		
15:15-16:45	Session 3A: General	Session 3B: Education	Session 3C: Education
	Room: PLT1 Lecture Theatre (Building 303)	Room: Studio Space G03 (Building 303)	Room: Case Room G20 (Building 302)
15:15	Galactic Archaeology in the Southern Sky C.Clare Worley	Teaching L2 mechanics and electricity with a potpourri of experiments, demonstrations, applets and videos etc. Sue Napier & Brenda MacKechnie	Rheostats, Eclipses, Planks, Surprises and Non-Sequiturs. A collection of small things that are useful and fun for teachers and students Haggis Henderson
15:30			
15:45	An analogy between chemical and magnetic nozzles from the perspective of numerical simulations Sashin Leuke Bandara Karunaratne		
16:00	Controlling the activity of intrinsic and extrinsic defects in doped SnO2 by ion implantation and annealing Abubakar Sadiq Yusuf	NCEA External Assessment – an NZQA perspective Ian Phillips	
16:15	The Effects of Non-hydrostatic Pressure and Shear on Silicon Carbide Samuel Case		
16:30	Bound Excited States of Fröhlich Polarons in One Dimension Jamie Taylor	An update - Curriculum, NCEA and NEX Dave Thrasher & David Housden	

16:45	Odd-frequency superfluidity from a particle-number-conserving perspective Joachim Brand	
17:00	Poster Networking Session in the Exhibition Area	
19:00	PUBLIC LECTURE – Panel Discussion “<i>Quantum Centuries</i>” MC Kim Hill PLT1 Lecture Theatre, University of Auckland, Science Centre Building 303 (23 Symonds Street)	

DAY 2 – Wednesday 2 July				
08:30	Registration desk & Exhibition Open			
09:00	Day 2 Welcome Room: PLT1 Lecture Theatre (Building 303)			
09:15	Keynote: Professor Manjula Sharma “<i>Rigour, relevance and reflection in physics education</i>” Room: PLT1 Lecture Theatre (Building 303)			
10:00	Morning Tea in the Exhibition Area			
10:30-12:00	Session 4A: Quantum Technologies Aotearoa	Session 4B: General	Session 4C: Education	Session 4D: Education
	Room: PLT1 Lecture Theatre (Building 303)	Room: MLT1 Lecture Theatre (Building 303)	Room: Studio Space G03 (Building 303)	Room: Case Room G20 (Building 302)
10:30	Search for Chaos in the Quantum Three-Body Problem Alex Kerin	Materials for magnonics - optimised spin-wave propagation in magnetic Heusler alloys Co ₂ MnGa _{1-x} Gex Simon Granville	Harnessing AI to Revolutionize Physics Education: Planning, Teaching, and Assessment Kris Bhatt	Folk Music Physics. Songs that boost retention of key ideas Haggis Henderson
10:45				
11:00	How to make a p-wave superfluid with ultracold molecules? Satyanand Kuwar	Should we be teaching science communication skills - who should be the audience and what do we need to cover? Ian Whittaker		From the takoto to the qubit – the story of measurement in New Zealand Ellie Molloy & Annette Koo

11:15	Pulsed Squeezed Driving of a Two-Level Atom as a Source of Wigner Negative Light Rory Robertson	Dynamics of Brownian Janus Spheres Stephen Chung		Physics Scholarship Workshop Matt McGovern
11:30	Multimode photon correlations from a single atom Alex Elliott	AC voltage standard Vladimir Bubanja		
11:45	Lattice Bose polarons near a quantum phase transition Matija Cufar			
12:00	Lunch in the Exhibition Area			
13:00	Keynote: Andrew Doherty Room: PLT1 Lecture Theatre (Building 303)			
14:00 – 15:00	Session 5A: Quantum Technologies Aotearoa	Session 5B: Education	Session 5C: Education	
	Room: PLT1 Lecture Theatre (Building 303)	Room: Studio Space G03 (Building 303)	Room: Case Room G20 (Building 302)	
14:00	Entangled photon-pair emission in waveguide circuit QED from a Cooper pair splitter Michele Governale	Rural Physics-Contexts for reaching students from rural backgrounds Haggis Henderson	Quantum – What is the Hype? Brenda MacKechnie	
14:15				
14:30	Inserting magnetic semiconductors into superconducting Josephson junctions Ben Ruck	Simple Harmonic Motion guided teaching with simulations, quizzes and graphing programs Jeffery Yang	What I learned from doing Master's research in physics education Matt McGovern	
14:45				
15:00	Afternoon Tea in the Exhibition Area			
15:30 – 17:00	Session 6A: Quantum Technologies Aotearoa	Session 6B: General	Session 6C: Education	Session 6D: Education
	Room: PLT1 Lecture Theatre (Building 303)	Room: MLT1 Lecture Theatre (Building 303)	Room: Studio Space G03 (Building 303)	Room: Case Room G20 (Building 302)
15:30	Interfacing cold atoms with an optical nanofiber Wayne Crump	TBC Richard Easther	Testing Student-Focused STEM Workshops with Teachers: A Hands-On Electronics and Computing Experience Wesley Key & Neha Desu	Dark Matter and Gravitational Wave Detection: From the Lab to the Classroom Jackie Bondell & Laura Burn
15:45				
16:00	Progress towards coherent transduction in a monolithihic triple resonant electro-optic device Nicholas Lambert			

16:15	Maximum likelihood estimations for analysing photon counts in few atom experiments Marvin Weyland	Melting of noble gas systems under extreme conditions Diana Yu	DC Circuits L2 Chris Currie & Mark Standley	Names of colleagues, students, places and concepts in Te Reo. A revisit from 2021 PLUS Mātauranga Māori and Physics: Some examples and contexts Haggis Henderson & Mat Synge
16:30	Long optical coherence times in a rare-earth-doped antiferromagnet Masaya Hiraishi	First Principles Study of Square Tin-Oxide Nanotubes and Surface Modified Derivatives Alex Barnes		
16:45	Quantum properties of parametrically driven cavity solitons in a bichromatically driven Kerr resonator Sophie Shamailov	TBC		
Break				
18:30 - late	Conference Dinner @ Maritime Room			

DAY 3 – Thursday 3 July	
08:30	Registration desk & Exhibition Open
08.55	Day 3 Welcome Room: PLT1 Lecture Theatre (Building 303)
09:00	Physics in the real world 9.00am: Space Weather risk to New Zealand: Collaborative response by the Solar Tsunami research team and Industry – Daniel Mac Manus 9.30am: Non-rocket spacelaunch research at Rocket Lab - Hamish McDonald 10.00am: OpenStar Technologies: Exploring the Levitated Dipole as a Commercial Fusion Reactor - Craig Chisholm Room: PLT1 Lecture Theatre (Building 303)
10:30	Morning Tea in the Exhibition Area

11:00 - 12:30	Session 7A: Quantum Technologies Aotearoa	Session 7B: Education	Session 7C: Education
	Room: PLT1 Lecture Theatre (Building 303)	Room: Studio Space G03 (Building 303)	Room: Case Room G20 (Building 302)
11:00	A shorter introduction to Quantum-computing Aided Composition (QAC) Omar Costa Hamido	Reflection in linear videos Manjula Sharma	NCEA Internal Assessment – an NZQA perspective Raymond Neal
11:15			
11:30	Rare-Earth ions in CaF ₂ nanoparticles for scalable quantum technologies Michael Moull		Showcasing our Smart Carts: Co-design an outreach activity with us! Ashleigh Fox & Jenny Nguyen
11:45			
12:00	Three, Four and More Body Spinor Interactions via Nanofibre Cavity QED Thomas Clarkson		
12:15	Nonlinear Dynamics of Coupled Light-Matter Systems Ofri Adiv		
12:30	Lunch in the Exhibition Area		
13:30-15:00	Session 8A: Quantum Technologies Aotearoa	Session 8C: Education	Session 8D: Education
	Room: PLT1 Lecture Theatre (Building 303)	Room: Studio Space G03 (Building 303)	Room: Case Room G20 (Building 302)
13:30	Progress towards simplified measurement schemes for optomechanical quantum-correlation thermometers Ana Rakonjac	NCEA Internal Assessment – an NZQA perspective (repeat) Raymond Neal	Python notebook for illustrating electrodynamics concepts like AC current/voltage, phasors and resonances (year 13 NCEA content) Elke Pahl & Tristan O’Hanlon
13:45			
14:00	Analysis of frequency-dependent coupling for Josephson parametric devices Waltraut Wustmann		
14:15	Storing single photons in a rare-earth doped crystal Luke Trainor	Astronomy – Stars & Exoplanets Chris Currie & Mark Standley	
14:30			
14:45	Trapping Dysprosium in a Magnetic Optical Trap Directly from a Thermal Beam Liam Domett-Potts		
15:00-15:30	Closing Session & student awards Room: PLT1 Lecture Theatre (Building 303)		

POSTER PRESENTATIONS

Poster Session: Tuesday 1 July 2025, 17:00 – 19:00

Location: Exhibition Area

P.01	Measuring $6\text{Li}(n,3\text{H})4\text{He}$ Reaction Cross-Sections in the 1970's for Today's Requirements	Murray Bartle
P.02	Tracking a Space Mission: Engaging Classrooms with the Hēki Mission Aboard the International Space Station	Tane Butler
P.03	An in-depth Study of Phase-Shifted EPR-Bell States	J.J. Joshua Davis
P.04	Dynamics of Multiple Fields in Ultra-Light Dark Matter Models	Leon Ge
P.05	Microwave to Optical Frequency Conversion in Rare Earth Ions	Gavin King
P.06	Sea ice GPS trackers confirm the existence of the Victoria Land Coastal Current	Inga Smith
P.07	Can we have Newtonian Solitons in the Early Universe?	Chiara Testini
P.08	Engaging Foundation year students with the personal tutorial system	Ian Whittaker

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