

AIP 2024 Congress co-locating with NFO-17, COMMAD 2024 & ANZCOP 2024
2-5 December 2024
Melbourne Convention and Exhibition Centre

As at 01 December 2024 and subject to change

Monday, 02 December 2024

Room	Plenary Room				
08:30	Congress Opening				
08:30	Welcome to Country & Opening Ceremony				
09:00	Plenary Session				
	<i>Chairperson: Ling Sun, Stephan Rachel</i>				
09:00	Supernova cosmology with the complete Dark Energy Survey Tamara Davis				
09:45	Spin-3/2 holes in semiconductors for quantum electronics and quantum computing Alexander Hamilton				
10:30	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea
Room	Plenary Room	219	220	208	209
11:00	QST - Communications and Networks	NFO - Plasmonic Meta-optics I	QST - Error Correction	NFO - Molecular Layers: Light-Matter Interactions I	CMM - Magnetism I
	<i>Chairperson: Gavin Brennen</i>	<i>Chairperson: Filiz Yesilkoy</i>	<i>Chairperson: Ben Baragiola</i>	<i>Chairperson: Jer-Shing Huang</i>	<i>Chairperson: Julie Karel</i>
11:00	Entangling multiple parties with a single entangled photon-pair Sergei Slussarenko	Topological photonics in plasmonic lattices Päivi Törmä	Seek-Hyung Lee	Addressing fluorescence of a single-molecule coupled to a picocavity in a plasmonic tunneling junction Javier Aizpurua	Atomic scale magnetic field mapping in an antiferromagnet Scott Findlay
11:30	Revealing the nonlocality of Bell-local states via photonic quantum networks Luis Villegas-Aguilar	Plasmonic Twistronics Harald Giessen	Measurement-free code-switching for low overhead fault-tolerant quantum computation Yumang Jing	Cooperative emission from J-aggregates on dielectric metasurfaces in the strong coupling regime Alexander M. Dubrovkin	Structural and magnetic properties of a mixed antiferro- and ferromagnetic high entropy perovskite Mikayla Lord
11:45	Simulating Crosstalk Attacks and Defence in a Shared Quantum Computing Environment Ben Harper	Scanning exciton microscopy for mapping field and LDOS at the deep nanoscale Xue-Wen Chen	Non-local resources for error correction in quantum LDPC codes Omprakash Chandra	Enhanced second harmonic generation in NLO polymer/plasmonic Au nanoparticle hybrid system Atsushi Sugita	Nanoscale magnetism and magnetic phase transitions in atomically thin CrSBr David Broadway
12:00	Telecom band Blackbody Noise in Optical Fibres Erik Streed	Near-field chirality in achiral plasmonic nanostructures as probed by nanoscale photochemical imaging Minyu Chen	Utilising quantum entanglement characterisation for benchmarking quantum computers and improving circuit compilation Gary Mooney	Probing Interfacial Dynamics with Evanescent Wave-Induced Fluorescence Measurements Yang Xu	Inelastic neutron scattering and quantum magnets Dehong Yu
12:15	Proposal for a Bell test with momentum entangled 3He -4He atoms Tony Yan	Photoluminescence Engineering with Surface Lattice Resonances toward Directional Illumination Devices Shunsuke Murai	Gottesman-Kitaev-Preskill (GKP) qubit channel for photon loss Tom Harris	Probing the order of uniaxially aligned molecular aggregates via strong-light matter interaction Klas Lindfors	Enhancement of co-civivity for micro-fabricated Sm(Fe-Co)-B dot arrays with La-Ga cap layer Toshiyuki Shima
Room	Plenary Room	219	216		
12:30			Photonics and Quantum industry report: where to from here?		
12:40					
12:40	Lunch Break			Lunch Break	Lunch Break
12:45		Victorian AIP Annual General Meeting	Photonics and Quantum industry report: where to from here? Andy Boes		
12:45					
13:00		Victorian AIP Annual General Meeting Gail Iles			
13:20					
13:30	Plenary Session				
13:30	A New Paradigm for Photonic Integration – Direct III-V Growth on Si Kei May Lau				
14:15					
Room	Plenary Room	219	220	208	209
14:30	QST - Machine Learning I	NFO - Plasmonic Meta-optics II	QST - Advanced Devices	NFO - Electron-based Near-field Probing	CMM - Magnetism II
	<i>Chairperson: Behnam Tonekaboni</i>	<i>Chairperson: Renaud Bachelot</i>	<i>Chairperson: Ben Travagione</i>	<i>Chairperson: Javier Aizpurua</i>	<i>Chairperson: Anju Ahlawat</i>
14:30	Adversarial robustness guarantees for quantum classifiers Max West	Unraveling Hot Carrier Processes for Advancing Plasmonic Energy Devices Giulia Tagliabue	Creation and manipulation of Schrödinger cat states of a nuclear spin qubit in silicon Benjamin Wilhelm	Probing Soliton Formation Dynamics in Microresonators with Free Electrons Fee Jasmin Salome Kappert	The anisotropic magnetism of the cobalt-doped rare earth iron garnet Lu ₃ Fe ₄ Co _{0.5} Si _{0.5} O ₁₂ Siobhan Tobin
14:45			Enhancement of NV Centre Fluorescence in Silica-Encapsulated Nanodiamonds Through Plasmonic Gold Nanoparticle Integration Qiang Sun		
15:00	Stochastic Physical Neural Networks Ethan Sigler	Spatio-temporal topology of plasmonic spin meron pairs Tim Davis	Electromagnetic helicity in twisted resonators Jeremy Bourhill	Near-Field Optical Characterization and Nanoscale Valley Modulation Based on Electron Beams Zheyu Fang	Double helical spin ordering in the helimagnet YBaCuFeO ₅ Kirrilly Rule
15:15		Active control of nanogap plasmon using nano-electromechanical systems Kenzo Yamaguchi		Real-time surface plasmon polariton propagation in silver nanowires Alvaro Rodriguez Echarri	Spin wave frequencies in multilayer magnetic thin films with interfacial Dzyaloshinskii-Moriya interaction Ellen Lu
15:30	Graybox quantum system identification and control Akram Youssry			Mie-resonant nanoparticles under the electron microscope Christos Tserkezis	Weak first-order phase transitions in the frustrated square lattice J1-J2 classical Ising model Adil Gangat
15:45				Mie resonances in silicon nanospheres probed by pump-probe cathodoluminescence spectroscopy Saskia Fiedler	Giant resonant skew scattering of plasma waves in a two-dimensional electron gas Cooper Finnigan
16:00	Afternoon Tea & Poster Session I	Afternoon Tea & Poster Session I	Afternoon Tea & Poster Session I	Afternoon Tea & Poster Session I	Afternoon Tea & Poster Session I
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17:00	QST - Metrology and Sensing	NFO - Plasmonic Meta-optics III	QST - Timing	NFO - Nano- and Micro-fabrication	CMM - Superconductivity and Magnetism
	<i>Chairperson: Josh Combes</i>	<i>Chairperson: Päivi Törmä</i>	<i>Chairperson: Zixun Huang</i>	<i>Chairperson: Haoran Ren</i>	<i>Chairperson: Dirk Koenig</i>
17:00	Demonstrations of super-resolution imaging with incoherent sources using quantum metrology John Wallis	Unleashing the power of free-electron dynamics with heavily doped semiconductors Cristian Ciraci	Quantum-secured clock synchronisation using polarisation entangled photons Sabrina Slimani	"Sketch and peel" Neon Ion Beam Nanopatterning of Black Phosphorous Huan Liu	Granular superconductivity in topological insulator SnTe/Sn thin films Golrokh Akhgar
17:15				High-Dimensional Structured Light for Optical Anti-counterfeiting Hongtao Wang	

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11:00	ANZCOP - Fiber Optics and Communications I	Focus Session - Precision Quantum Sensing	NUPP - Nuclear Physics I	COMMAD - COMMAD Session I	TPG - Condensed Matter Theory and Complex Systems
	<i>Chairperson: Bill Corcoran</i>		<i>Chairperson: James Zanotti</i>	<i>Chairperson: Patrick Parkinson</i>	<i>Chairperson: Jesper Levisen</i>
11:00	High Capacity SDM Systems Serving Future 6G Applications Ruben Luis	The last 20+ years of quantum in Australia and what next? Cathy Foley	A novel method for nuclear quadrupole moment measurements Andrew Stuchbery	In situ transmission electron microscopy for nanomaterial properties exploration Dmitri Golberg	Quasiparticle interactions in a Bose-Einstein condensate Meera Parish
11:30	Multiplicative Gaussian noise in optical communications Jorge Acosta	Development of Diamond NV Laser Threshold Magnetometry Towards Compact Integrated Sensors Michael Slocum	Investigating the onset of energy dissipative processes in heavy ions fusion using CUBE and MANTEIS detector arrays Caroline Da Costa Seabra	Heterogeneous Integration of Vertical III-V Nanowires on Si and Vertical Transistor Applications Katsuhiko Tomioka	Exact Results of Fermi Polarons with Ultracold Atoms Hui Hu
11:45	Single-mode fibre coupling in point-to-point and retroreflected free-space laser links Alex Frost		Shell model at a crossroads: Investigating the N = 28 and Z = 20 shell closures Aditya Babu		Q-function stochastic trajectories, quantum measurement and applications to quantum technologies Peter Drummond
12:00	Er:YAP microcrystals doped tellurite glass fibre using modified interface doping technique Jinho Lee	Precision Navigation Using a Vector Quantum Diamond Magnetometer Chris Lew	Lifetime measurements of the 2+1 and higher-lying states in even-even platinum isotopes with A = 180-186 Rikako Kono	The first radiation test of COTS microelectronic devices using advanced proton, X-ray and gamma radiation sources of ANSTO Zeljko Pastuovic	Complexity order of multiple resource algorithms Run Yan Teh
12:15	SpaceFiber – in pursuit of the ultimate ZBLAN fibre Heike Ebendorff-Heidepriem	A scalable multi-sensor array in a diamond integrated fibre Brett Johnson	Detailed nuclear structure calculations for coherent elastic neutrino-nucleus scattering Jayden Newstead	Thermally Evaporated 2eV Metal-Halide Perovskite Semiconductors for Triple-Junction Photovoltaics Jay Patel	Information bottleneck theory of high-dimensional regression: relevancy, efficiency and optimality Vudtiwat Ngampruetikorn
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12:30	Lunch Break	Victorian AIP Annual General Meeting Gail Iles	Photonics and Quantum industry report: where to from here?	Lunch Break	Lunch Break
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14:30	ANZCOP - Astronomy Optics and Instrumentation	Focus Session - Quantum Biotechnology	NUPP - B Physics	COMMAD - Semiconductor Lasers	TPG - Quantum Fields and Gravity
	<i>Chairperson: Sergio Leon-Saval</i>		<i>Chairperson: Shreya Saha</i>	<i>Chairperson: Mariusz Martyniuk</i>	<i>Chairperson: Archil Kobakhidze</i>
14:30	Capitalizing on the synergies between astronomy and photonics Lucas Labadie	Optically-pumped magnetoencephalography – a new imaging capability down under Marta Garrido	Measuring anti-neutron energies via time-of-flight signatures in Cherenkov Detectors at Belle II Shanette De La Motte	Ultracompact nanowire photonic crystal array lasers and optical elements for photonic integrated circuits Hans-Peter Wagner	On coherent state description of classical backgrounds Lasha Bereziani
14:45					
15:00	Aperiodic fiber Bragg gratings for astronomy J band OH suppression Qingshan Yu	Diamond Nitrogen-Vacancy Centres: A Quantum Probe for Biological Systems Melissa Mather	New experimental results on electroweak penguin decays of b-flavoured hadrons Riley Henderson	Mode analysis in dynamical semiconductor laser models Mindaugas Radziunas	Theta-vacua and low energy particle spectrum Otari Sakhelashvili
15:15	3-baseline integrated optics beam combiner performing nulling interferometry and simultaneous fringe tracking using tricouplers. Elizabeth Arcadi		Feebly interacting particles at Belle and Belle II Daniel Marcantonio, Isabelle Ostrowski		Scrambling is Necessary but Not Sufficient for Chaos Neil Dowling
15:30	High Sensitivity 2D Mapping of Spatially Inhomogeneous Birefringence Mitchell Richardson	Quantum sensing for identification of magnetoreception in African mole-rats Ella Walsh	Measurement of time-dependent CP asymmetry in B0 meson decays at Belle and Belle II Chia-Ling Hsu	Bottom-up, quasi-bound state in the continuum metasurface lasers Wei Wen Wong	The Hawking temperature of dynamical black holes via Conformal transformations Pravin Dahal
15:45	Suppression of Photon Noise with Fibre Bragg Grating Filters Benjamin Field	Optical Trapping and NV-based Sensing in Self-Assembled Nanodiamond Structures Peter Reece	Search for B mesons to invisible final states at the Belle II experiment using advanced machine learning algorithms Cameron Harris	Data-driven Discovery for Robust Optimization of Semiconductor Nanowire Lasers Patrick Parkinson	
16:00	Afternoon Tea & Poster Session I	Afternoon Tea & Poster Session I	Afternoon Tea & Poster Session I	Afternoon Tea & Poster Session I	Afternoon Tea & Poster Session I
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17:00	ANZCOP - Photonic Integrated Circuits	Focus Session - Additive Manufacturing of Optical Glass	NUPP - Particle Physics I	ATMOP - Dynamics	TPG - Condensed Matter Theory and Mathematical Physics
	<i>Chairperson: Lisa Haerteis</i>			<i>Chairperson: Tapio Simula</i>	<i>Chairperson: Murray Batchelor</i>
17:00	Laser-written waveguide interposer for broadband, high-density coupling to silicon photonic integrated circuits Simon Gross	Additive manufacturing of glass – a new route for optical fibre preform fabrication Heike Ebendorff-Heidepriem	The Hyper-Kamiokande Experiment Phillip Urquijo	Vortex flow and the response to rotation of shell-shaped Bose-Einstein condensates Angela White	Super Fermi polaron and Nagaoka ferromagnetism in a two-dimensional square lattice Xia-Ji Liu
17:15					

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17:30	Theory of quantum measurements for frequency comb metrology Noah Lordi	Meta-optics for quantitative phase imaging Haiwei Wang	An International Demonstration of Next-Generation Compact Optical Clocks Ashby Hilton	Optimizing Solvent Composition for High-Refraction-Index Nanocomposites in UV Metasurfaces via Nanoimprint Lithography Nara Jeon	Topological superconductivity in hexagonal lattice systems Matthew Bunney
17:45	Sensing coherent nuclear spin dynamics with optically-dark nitrogen spins Russell Goldblatt	Tracking the dynamic electrocatalytic activity of individual nanoparticles with Dark field microscopy Kishan Menghrajani	Demonstration of a compact Ytterbium magneto optical trap for precision timing applications Ben White	Laser nanodicing of transparent solids by near-field-induced nonlinear light confinement Zhen-Ze Li	Consequence of impurities in topological band structures revisited Stephan Rachel
18:00	Impact of quantum noise on Ramsey spectroscopy Diego Bernal Garcia	Helical Dichroism of Chiral Plasmonic Nanoparticles Sejeong Kim	Quantum-Secured Time Transfer: Beyond the Lab Laura Fang	C-EBID based lithography: a quantum leap in nanofabrication for integrated nanophotonic applications Stefano Palomba	Study Multiferroic/Magnetolectric Materials with Inelastic Neutron Scattering Guochu Deng
18:15					Braiding with an Altermagnet Themba Hodge
18:30					

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17:30	Microcomb-based microwave photonic signal processors for different input signal waveforms Yang Sun	Supercontinuum generation in 3D glass printed nonlinear photonic crystal fibers Ryszard Buczynski	Quality control of multi-pixel photon counters for the COMET experiment Alex Miles	Emergent Universal Drag Law in a Model of Superflow Maarten Christenhusz	Fermi polarons in doped two-dimensional semiconductors Jesper Levinsen
17:45	Towards backscattering enabled microphotonic gyroscope Suwan Sun		Search for heavy resonances in events with multiple top quarks with the ATLAS experiment Kevin Varvell	Shear-Induced Decaying Turbulence in Bose-Einstein Condensates Simeon Simjanovski	Symmetry resolved entanglement and entanglement asymmetry with non-invertible symmetries Jared Heymann
18:00	Thermo-optic response of integrated high-Index doped silica ring resonators Junkai Hu	Additive manufacturing of soft glass for MIR optical applications François Cheviré	Heavy neutrino searches in $B \rightarrow D^* \text{Inu}$ Paolo Rocchetti	Towards Discrete Time Crystals with Bouncing Ultracold Atoms Syed Shah	Detecting criticality in non-Hermitian many-body systems Dongchang Liu
18:15	Stimulated Brillouin Scattering and Frequency Combs Moritz Merklein	Filament extrusion-based 3D glass printing of optical fibre preforms Anna Radionova	Signal correction and sub-GeV dark matter search at XENONnT and XLZD Lorenzo Principe	Using atomic momentum spectroscopy to investigate how local atomic motion changes within different intramolecular chemical environments. Darryl Jones	Generalized probability theories with continuous variables Daniel Terno
18:30					

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Tuesday, 03 December 2024

Room	Plenary Room	220				207
08:00		DE-GAP Breakfast session				
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09:00	Plenary Session Chairperson: <i>Andy Boes, Kaye Morgan</i>					Attocube Near-field Optical Nanoscopy Workshop - Session 1
09:00	Optical Nanofibres: A Tool for Cold Atom and Particle Trapping Sile Nic Chormaic					Opening Remarks Daniel Day
09:10						Introduction to s-SNOM and application examples Rainer Hillenbrand
09:45						Terahertz nanoscopy: Advances, challenges, and the road ahead Xiao Guo
10:00	101 things to do with an energetic electron Joanne Etheridge					
10:30	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea
11:00	Plenary Room	219	220	208	209	216
11:00	QST - Communication and Cryptography Chairperson: <i>Sergei Slussarenko</i>	NFO - 2D Materials I Chairperson: <i>Giulia Tagliabue</i>	QST - Control and Modelling Chairperson: <i>Gasparo Pantaleoni</i>	NFO - Near-field Microscopy I Chairperson: <i>Stefano Palomba</i>	CMM - Microstructural Characterisation Chairperson: <i>Scott Findlay</i>	ANZCOP - Laser Physics and Active Photonics I Chairperson: <i>Alex Fierbach</i>
11:00	Twin field quantum key distribution across national scale telecommunication infrastructure Matthew Winnel	First and second order energy transfer in TMD-based tunnel junctions Shengyu Shan	Time-tronics: from temporal printed circuit board to quantum computer Krzysztof Giergiel	Beam optimization for tip-enhanced Raman scattering Volker Deckert	Theoretical probes of Topological Matter using Scanning Tunneling Spectroscopy Eric Mascot	Nano, Pico and Femtosecond Lasers for Micromachining Jim Kafka
11:15						
11:30	Measuring higher-order coherence for quantum communication with intensity fluctuations on a fast-photoncode Toby Dowling	White light-driven extraordinary fluorescence from monolayer of semiconductor nanoplatelets with gap plasmon Deepshikha Arora	Acoustically Controlled Edge States in Dynamic Topological Waveguide Arrays Daniel Biazzo	Full control of the electric and magnetic light-matter interactions Eric Charron	Realization of flat band in ultra-thin Kagome metal Mn3Sn film Mengting Zhao	High power scaling of Ho:YAG laser oscillator Miftar Ganija
11:45	Mitigation of channel tampering attacks in continuous-variable quantum key distribution Sebastian Kish	Engineering hyperbolic phonon polaritons in anisotropic 2D materials Qingdong Ou	Multi-qubit pathfinding in quantum circuit compilation Gary Mooney	Helicity-dependent photocurrent nanoscopy on structured topological insulators Alexander M. Dubrovkin	Measuring the medium-range order of amorphous materials via fluctuation electron diffraction Andrew Martin	GHz Chip Comb Laser David Lancaster
11:50						
12:00	Phase stabilised links for quantum communication and sensing Joshua Collier	Metasurfaces with a strong nonlinear chiral response Pavel Tonkaev	Harnessing Tensor Tree Geometry to Efficiently Model Multiscale, Long-range Memory in Open Quantum Systems Neil Dowling	Near-field investigation of light localization in hyperuniform systems Francesca Intonti	Measuring, mapping and manipulating charged defects inside diamond Alexander Wood	Passively mode-locked Ho:YAG laser Jonte Reilly
12:10						
12:15		Ultrafast directional phonon polariton relaxation in hexagonal boron nitride Yang Luo, Xing Zhu	Lie-algebraic classical simulations for variational quantum computing Matthew Goh	Quasi-normal mode perturbation theory to achieve Q-factor optimization of resonances in ordered and disordered photonic systems Nicoletta Granchi	Advanced Fabrication Methods for Next-Generation Optical Technologies John Scott	High Repetition Rate Q-Switched Ho:YAG Laser Henry Rogers
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12:35			CMM - Annual General Meeting			
12:35				Optica Student Member Lunch (Advance registration required)	ANZOS Annual General Meeting	
12:40						
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12:45		Gavin Reid (ARC Executive Director: MPCE) Talk and Q&A				
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13:20						
13:25						
13:40						
13:45	Harris Massey Medal Recipient					
13:45	Precision and Quantum Metrology with Photons, Phonons and Spins: Answering Major Unsolved Problems in Physics and Advancing Translational Science Michael Tobar					
14:00						
14:00						
14:30						
14:30	Plenary Room	219	220	208	209	216
14:45	QST - Atoms and Ions Chairperson: <i>Nicolas Menicucci</i>	NFO - 2D Materials II Chairperson: <i>Jer-Shing Huang</i>	QST - Transduction Chairperson: <i>Matthew Broome</i>	NFO - Molecular Layers: Light-Matter Interactions II Chairperson: <i>Javier Aizpurua</i>	CMM - Transition Metal Dichalcogenides Chairperson: <i>Sibhan Tobin</i>	ANZCOP - Biophotonics and Optical Sensors I Chairperson: <i>Colther Simpson</i>
14:45	Robust and Deterministic Preparation of Bosonic Logical States in a Trapped Ion Vassili Matsos	van der Waals heterostructure metasurfaces Luca Soritino	Numerical dynamics of microwave-optical photon pair generation in an atomic ensemble Maria Nicolae	Materials for nonlocal and nonlinear nanophotonic Stephane Kena-Cohen	Electronic properties of 1T-TiSe2, numerical models of the melting and reformation of the charge density wave state Joshua Gray	Cartilage degeneration assessment using compression-based depth-resolved polarisation-sensitive optical coherence tomography Darven Murali Tharan
15:00	Violation of Bell's inequality with entangled momentum states of atoms Yogesh Sridhar	Meta-waveguide photocurrent detection of valley-selective emission Chi Li	Polaron effect in waveguide quantum optomechanics Denis Ilin		Polariton-induced superconductivity in transition metal dichalcogenides Kenneth Choo	Super-resolved photonic force microscopy for detecting sub-IN force in solution Lei Ding
15:15	Realization of the Fine-Structure Qubit in a Single Alkaline-Earth Atom: The Building Block for a 500-Qubit Neutral Atom Quantum Processor (QRydDemo) Christopher Bounds	High-resolution infrared single-pixel imaging with a BP/MoS2 photodetector Jinyuan Chen	Optical-to-microwave quantum state transfer by feedback in the unresolved optomechanical sideband regime Jesse Slim	Near-field probing of in-plane and out-of-plane molecular vibrations in anisotropic molecular thin layers Isabel Pascual Robledo	Circularly Polarized Second-Harmonic Generation from MoS2 Monolayers Coupled with Plasmonic Gold Nanoparticles Laura Daniela Valencia Molina	Fabricating an optical fibre spectroscopic microprobe for medical diagnostics Paul Stoddart
15:30	Certifying quantumness in the uniform precession of a single nuclear qubit Martin Nurizzo	Enhanced exciton-plasmon-polariton interaction and charge transfer between monolayer transition metal dichalcogenides and plasmonic nanoparticles Anastasia Romashkina	Nonlinear effects can enhance microwave-to-optics quantum state transduction James Bainbridge	Acousto-Plasmonic Coupling: The Raman Energy Density (RED) Nicolas Large	Engineering three-dimensional band dispersions in artificial heterostructures of transition metal dichalcogenides Oliver Clark	Ultra-compact meta-waveguide endoscopy Chi Li
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16:15	QST - Fundamental Physics Chairperson: <i>Nicolas Fung</i>	NFO - Near-field Microscopy II Chairperson: <i>Renaud Bachelot</i>	QST - Machine Learning II Chairperson: <i>Muhammad Usman</i>	NFO - Dielectric Meta-Optics Chairperson: <i>Sile Nic Chormaic</i>	CMM - Thermo- and Magneto-electrics Chairperson: <i>Gunther Andersson</i>	ANZCOP - Fiber Optics and Communications II Chairperson: <i>Simon Fleming</i>
16:15	Temporal Electric and Gravitational Scalar Aharonov-Bohm Effects Michael Tobar	Ten Years of Electrochemical Tip-enhanced Raman Spectroscopy for Studying Structures and Reactions Bin Ren	Using matrix-product states for time-series machine learning Sahand Mahmoodian	Advanced Biochemical Sensors Enabled by Metasurface Photonic Nanocavities Filiz Yesilkoy	Zero-emission thermoelectric power generation and refrigeration for carbon neutrality Zhigang Chen	Fabrication of phosphate glass/metal multimaterial fibers for photoelectrochemical sensing applications Johann Troles

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10:30	Morning Tea 217	Morning Tea 218	Morning Tea 206	Morning Tea 214	Morning Tea 207
11:00	Focus Session - Quantum Biotechnology	ANZCOP - Nonlinear Photonics	ATMOP - Ultra Cold Atoms <i>Chairperson: Angela White</i>	TPG - Quantum Fields <i>Chairperson: Daniel Tempo</i>	Attocube Near-field Optical Nanoscopy Workshop - Session 2
11:00	Quantum enhanced biosensing and bioimaging Nicolas Mauranyapin	Solitons with piecewise-linear dispersion Van Thuy Hoang	Measurement of the s-wave scattering length between metastable helium isotopes Kannan Suresh	Quantum tunnelling of particles through a barrier in quantum field theory Cedric Simenel	In-Situ Nanoscale Hydrogen Diffusion Dynamics and Plasmonic Twistronics Harald Giessen
11:15		Dispersion engineered frequency combs in MgF2 belt resonators Vincent Ng			
11:30	Towards nanoscale voltage imaging with nitrogen-vacancy centers in nanodiamonds Patrick Voorhoeve	Experimental implementation of an optical Ising machine using polarization symmetry breaking in a Kerr resonator Liam Quinn	n-body correlations and anti-bunching in an ultracold Fermi gas of ^3He atoms Sean Hodgman	Electroweak phase transition from xSM: A collider approach Mohamed Aboudonia	
11:45					Near-field imaging of designer surface phonon-polariton modes Stefan Maier
11:50	NV-AFM towards single molecule NMR Mitch Conway	Stable packaged structure for ultrahigh-Q micro-cavities and soliton microcomb generation Jiamin Bai	Information Erasure with Spin-polarised atoms Rose Manakil	Scale limited fields and the Casimir effect Simon Vedl	
12:00					Nano-IR imaging and spectroscopy for bio(chemical) applications Adrian Cernescu
12:10	Applications of Quantum Microscopy Michael Mlodzianowski	Pushing the limits of a novel analytic method for finding soliton solutions Long Qiang	Long-distance interaction between ensembles of cold atoms Maarten Hoogerland	On the effects of bandlimitation and sampling theory on interacting quantum field theories Dominic G. Lewis	
12:15					Nanoscale optical and structural characterization of silk Saulius Juodkazis
12:15		Enhanced frequency tuning of third-harmonic using self-frequency shift of Q-switched mode-locked pulses at 1500 nm Seth Mathew V, Ravi Pant	Deducing thermodynamic properties of short-ranged interacting many-body systems from local atom-atom correlations Karen Karen Kheruntsyan	Covariant bandlimitation in RQI protocols Nicholas Funai	
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14:00					Attocube Near-field Optical Nanoscopy Workshop - Session 3
14:30					Nanoscale investigation of drug delivery systems Volker Deckert
14:30					
Room	217	218	206	214	
14:45	ANZCOP - Nanophotonics and Nanoplasmonics <i>Chairperson: Sarah Walden</i>	NUPP - Nuclear Physics II <i>Chairperson: Cedric Simenel</i>	STSP - Space Science I <i>Chairperson: Stuart Anderson</i>	TPG - Quantum Theory and Plasma Physics <i>Chairperson: Margaret Reid</i>	
14:45	Enhanced nonlinear emission in freeform dielectric metasurfaces Rocio Camacho	QCD Strings - junctions, strangeness, popcorn and beyond Javira Altmann	Response of an electromagnetic shield to accelerator particle beams and space radiation Ming Xin Jeannie Ng	Aspects of closed timelike curves in a rotating Alcubierre spacetime Achintya Sajendran	Enhanced Interactions of Interlayer Excitons in Free-standing Hetero-bilayers Yuerui Lu
15:00	Multispectral Polarisation Imaging using Metasurfaces Sarah Dean		"MolecularDNA": A simulation platform for modelling the induction of DNA damage and early stage biological response of cellular systems from ionising/space radiation Jeremy Brown	The quantum theory of time: emergence of Lorentz invariance Joan Vaccaro	Polaritons in 2D materials Qingdong Ou
15:15	Design principles for resonant chiral metasurfaces Ivan Toftul	Resolving puzzles in nuclear lifetimes and nuclear structure Jack Woodside	Rotational relativistic damping and linear stability analysis of lightsails Liam Van Ravenstein	Resolving Schrödinger's paradoxical analysis of the Einstein-Podolsky-Rosen argument Christopher McGuigan	
15:30	Tailored spectral biphoton entanglement from a nonlinear metasurface Tongmiao Fan	Investigating structural characteristics of deformed, odd-odd nuclei in the A = 100 mass region Abhijith Aswathy Gopakumar		Continuum Damping of Toroidal Alfvén Eigenmodes Due to Magnetic Island Chains in Magnetically Confined Fusion Plasmas Matthew Thomas	Closing Remarks Adrian Cernescu
15:40					
Room	217	218	206	214	
15:45	Afternoon Tea	Afternoon Tea	Afternoon Tea	Afternoon Tea	
16:15	Focus Session - Precision Quantum Sensing	NFO - Fundamentals I <i>Chairperson: Ann Roberts</i>	ATMOP - Atoms, Ions and Nuclei <i>Chairperson: Erik Streed</i>	NUPP - Nuclear Physics III <i>Chairperson: Greg Lane</i>	
16:15	Precision sensing using slow and fast light effects with atomic vapours Mark Baker	Adiabatic topological metasurfaces	Protophobic boson searches and nuclear insights with precision isotope shift spectroscopy Julian Berengut	Growing Australia's particle accelerator expertise: the Australian Collaboration for Accelerator Science Suzie Sheehy	

16:45	Searching for High Frequency Gravitational Waves with Acoustic Systems William Campbell	Optical energy localization at the termination of a topological photonic waveguide Daniel Muis	Implementing quantum error detection with variational quantum machine learning Eromanga Adermann	Multiplication of polaritonic vortices via sublinear dispersion Haoran Ren	Well Ordered Magneto-electric Coupled PMN:PT/NiFe ₂ O ₄ nanostructures Anju Ahlawat	A holmium doped multimode fiber amplifier with high quality focused output using wavefront-shaping Linh Nguyen
17:00	Interplay of information gain and disturbance relation with efficiency of measurement driven engines Abhinash Roy	Long-Propagating Ghost Phonon Polaritons Enabled by Selective Mode Excitation. Manuka Suriyaga	Quantum kernel learning for bosonic modes Carolyn Wood	Nonlocal meta-lens for high-quality-factor wavefront shaping Jin Yao	Theory of dipolariton interactions in semiconductor microcavities Yasufumi Nakano	Assessing Automation in Fiber Splicing Localization with Digital Lensless Holography and Quantitative Phase Imaging Georgiy Kalenkov
17:15	Investigation of CIM numerical simulations with quantum jump methods Manushan Thenabadu	Experimental verification of field-enhanced molecular vibrational scattering at single infrared antennas Rainer Hillenbrand	Supervised Machine Learning Optimisation for Variational Quantum Algorithms Akib Karim	Cascading meta-devices for 6G applications and beyond Jingcheng Zhang	Tuneable room-temperature giant nonlinear magnetoelectric effect Julie Karel	Investigation of Thermal Splicing Conditions Between Silica and Zirconium-Fluoride Fibres Ori Henderson-Sapir
17:30	On Demand Formation of Topological Defects in Ferromagnetic Spinor Bose Einstein Condensates Zachary Kerr	Terahertz scattering-type scanning near-field optical microscopy of collective excitations for quantum technologies Xiao Guo		Tunable metasurfaces for infrared multi-modal image processing Shaban Sulejman	The influence of γ -doses irradiation on structural and optical properties of NiO thin films prepared by spin coating method Tesfaslasie Mgina	Beam shaping the evanescent field for distributed fluorescence-based optical fibre sensing Stephen Warren-Smith
17:45						
Room	Plenary Room					
19:00	Public Lecture					
19:00	What you shouldn't know about quantum physics Christopher Ferrie					

16:45	Sensor fusion quantum metrology in an alkali ground-state manifold Sam White	Daria Smirnova	The role of muonic atoms in constraining nuclear structure effects on the hyperfine interaction in heavy atoms James Vandeleur	New directions for nuclear-structure research via charged-particle spectroscopy Aj Mitchell		
17:00	An Alkali-Noble SERF co-magnetometer not reliant on passive compensation Ankit Papreja	Generation of entangled photon pairs by swift electrons and free-space illumination into guided modes Alvaro Rodriguez Echarri	Probing nuclear structure using heavy muonic atoms Odile Smits	Nuclear Fission of the Pre-Actinides Tony Tran		
17:15	Fundamental limits on precision of time transfer over optical fibre. Wayne Maione	Observing high-k magnons with Mie-resonance enhanced Brillouin light scattering Tomáš Šikola	Using selective ionisation of Rydberg atoms to reduce chromatic aberration in focused ion beams Kaih Mitchell	Investigation of excitation energy dependence of fission modes in thorium through transfer-induced fission Hyeonseop Lee		
17:30		Photonic Band Structure Calculation for Finite 3D Superlattices Nicolas Large	Ultralight Dark Matter Search with Space-Time Separated Atomic Clocks and Cavities Ben Roberts	Shell effects in fission: from compound nucleus to fragment formation Cedric Simenel		
17:45						
Room	Plenary Room					
19:00	Public Lecture					
19:00	What you shouldn't know about quantum physics Christopher Ferrie					

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Wednesday, 04 December 2024

Room	Plenary Room	220	220	208	209	216
08:00		Physics in Education Breakfast session				
08:00		Physics in Education Breakfast session				
09:00	Plenary Session Chairperson: Stefan Maier, Anna Phillips Exploring light and life: Nanophotonics and AI for scalable molecular sensing, sequencing, and synthesis					
09:45	Declining physics student numbers: Can we reverse the trend? Manjula Sharma					
10:30	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea
11:00	QST - Process Tomography Chairperson: Akram Youssry	NFO - Nanophotonic Devices and Systems Chairperson: Seieona Kim	QST - Color Centers Chairperson: Andy Greenlee	NFO - Fundamentals II Chairperson: Haoran Ren	QST - Simulation I Chairperson: Alexei Gilchrist	ANZCOP - Quantum Optics Chairperson: Daria Smirnova
11:00	Memory Minimal Predictive Models for Quantum Processes Graeme Berk	3D Printing With Light For Light Joel Yang	Optically detected magnitic resonance of blue to near-infrared emitters in hexagonal boron nitride Priya Singh	Optical field topologies in plasmonics and metamaterials Anatoly Zayats	High-performance Trotter formulae for quantum simulation Dominic Berry	The power of counting photons: Photonic quantum computing in large optical networks Michael Stefsky
11:15			NMR Spectroscopy Using NV Centres in Diamond Sepehr Ahmadi			
11:30	Multi-time quantum process tomography of a superconducting qubit Christina Giarmatzis	Three-dimensional metamaterial absorber for high-sensitive IR spectroscopy Takuo Tanaka	Plasmonically Engineering Diamond Quantum Spin Readout Harini Hapuarachchi	Nano-optical enhanced photodetection and imaging Ann Roberts	Effects of Higher-order Trotterisation on Threshold Behaviours and Performance in Digital Quantum Simulations Treetat Srivipat	Quantum phase imaging with a nonlocal metasurface Jinliang Ren
11:45			Towards nanoscale voltage imaging with nitrogen-vacancy centers in nanodiamonds Patrick Voorhoeve			Nonlinear metasurfaces for photon-triplet generation via TOPDC Miguel Bacaoco
12:00	Learning multi-time quantum processes Isobel Aloisio	Metasurface Microspectrometer with Mid Infrared Free-Standing Guided Mode Resonance Bandpass Filters Jiajun Meng	Mitigating the effects of FND inhomogeneity on T1 relaxometry using an exponential decomposition method Erin Grant	Circularly polarized upconversion in chiral metasurfaces with rotational symmetry Dmitrii Gromyko	Trotterisation Thresholds and Quantum Chaos in Open-System Digital Quantum Simulation Angsar Manatuly	The exploration of colour centres in naturally formed lonsdaleite Daniel Stavrevski
12:15		Plasmonic nanoresonators for enhanced absorption in thermoelectric photodetectors Golnoush Zamiri	The nature and applications of spin-active visible emitters in hBN Islay Robertson	Inverse Design of Helically Dichroic Metamaterials with Photonic Orbital Angular Momentum Chia-Chun Pan		Optically tunable generation of biphoton polarization entanglement from an InGaP nonlinear metasurface Tongmiao Fan
12:30		209	216	217		
12:45	Lunch Break	Physics Education Group lunch	ANZCOP Community support of the International day of light – can we do more?	Heads of School Meeting	Lunch Break	Lunch Break
12:45		Physics Education Group lunch Physics Education Group Lunch	ANZCOP community support of international day of light – can we do more? Deb Kane	Heads of School Meeting Aip 2024 Congress		
13:30	Plenary Session					
13:30	Elisabetta Barbario Plenary Presentation Elisabetta Barberio					
14:15						
14:30	QST - Simulation II Chairperson: Akib Karim	QST - Boson Sampling Chairperson: Christina Giarmatzis	QST - Sensing/Timing Chairperson: David Broadway	CMM - Thin Films Chairperson: John Scott	NUPP - Facilities Chairperson: Gail Iles	ANZCOP - Spectroscopy and Imaging II Chairperson: John Holdsworth
14:30	Doubling efficiency of Hamiltonian simulation via Quantum Signal Processing Giacomo Pantaleoni	Classical gaussian boson sampling: Has quantum advantage been achieved in optics? Ned Goodman	Exact quantum sensing limits for bosonic dephasing channels Zixin Huang	Atomic Layer Deposited Overlayers on Metal Clusters for Photocatalysis Gunther Andersson	High Energy Electron-Positron Collider Proposals for Future Higgs Factory. Geoffrey Taylor	Simple optics -> accurate, convenient & cost-effective diagnostics Cather Simpson
15:00						
15:00	Rapid initial state preparation for quantum chemistry simulation Dominic Berry	General bounds on boson sampling distributions Deepesh Singh	Field test of a laser-cooled optical ytterbium beam clock Rachel Offer	Identification of defects and the origins of surface noise on hydrogen-terminated (100) diamond Rebecca Griffin	Conceptual Design for a new Australian Light Source Facility Rohan Dowd	Measurements of Hydrodynamic Interactions and Viscometry using Rotational Ballistic Tweezers Mark Watson
15:15		Dimension reduction in quantum sampling of stochastic processes Chengran Yang		Enhanced interactions of interlayer excitons in free-standing heterobilayers Xueqian (queenie) Sun	Fixed Field Accelerator rings to enable rapid energy switching at hadron therapy facilities Adam Steinberg	Precision Measurement of Non-Integer Orbital Angular Momentum Using Speckle Metrology Chris Perrella
15:30	Algorithmic shadow spectroscopy Matthew Goh	An algebraic geometry based approach for deciding feasibility of heralded linear optical state generation tasks Deepesh Singh	Efficient sequencing for vector magnetometry with NV ensembles in diamond Rajan Paul	Pseudo-laminar chaos from superwalking droplets Rudra Sekhri	Strongly Curved Superconducting Magnets and their Effects in Compact Accelerators for Hadron Therapy Hannah Norman	X-ray speckle-based phase-contrast and dark-field imaging: State of the art and recent developments Marie-Christine Zdora
15:45		Faster and improved validation algorithm for boson sampling using coarse graining. Gopikrishnan Muralaetharan	Rotation sensing with guided atomic matter-wave interferometry in a ring trap Jessica Eastman			Enhanced Stability in Speckle Metrology Through Material Engineering of an Integrating Sphere Alexander Trowbridge
16:00	Afternoon Tea & Poster Session II	Afternoon Tea & Poster Session II	Afternoon Tea & Poster Session II	Afternoon Tea & Poster Session II	Afternoon Tea & Poster Session II	Afternoon Tea & Poster Session II
17:00	QST - Causality and Foundations I Chairperson: Eric Cavalanti	COMMAD - Nanowires Chairperson: Patrick Parkinson	QST - Materials and Devices I Chairperson: Andrew Martin	ANZCOP - Nanophotonics and Nanoplasmonics Chairperson: Haoran Ren	ASGRG - General Relativity and Gravitation I Chairperson: David Wiltshire	CMM - Topological Materials Chairperson: Matthew Bunnay
17:00	Bell nonlocality, hidden causal loops and stochastic trajectories in a model for reality motivated by the Q function Margaret Reid	Optical properties of III-V nanowires on demand: a new route to create site-controlled and energy-controlled quantum emitters Marta De Luca	Low Loss Acoustic Cavities: from Solid State to Fundamental Physics Maxim Goryachev	Sensitive Biodetection in Flow using quasi-BIC Metasurface Resonances Sarah Walden	Gyroscopes orbiting gargantuan black holes: Spinning secondary effects in extreme mass-ratio inspirals Lisa Drummond	Imaging topological polar structures in marginally twisted 2D semiconductors Mark Edmonds
17:15			Strong Microwave Squeezing Above 1 Tesla and 1 Kelvin Arjen Vaartjes		Gingin technology demonstrator and 15kHz gravitational wave detector proposal Carl Blair	
17:30	Partially deterministic polytopes: properties and applications Marwan Haddara	Hollow cathode plasma sources for atomic layer deposition – the use of different cathode materials K. Scott A. Butcher	Improvements in superconducting resonator performance by in-situ cleaning with solid neon Kyle Matkovic	Topology Optimised Non-local Metasurface for Single-Shot Quantitative Amplitude and Phase Imaging Niken Priscilla	Physical Properties of Kerr-Vaidya metrics Swayamsiddha Maharana	Wiener-Hopf factorization approach to a bulk-boundary correspondence and stability conditions for topological zero-energy modes Abhijeet Laxman Alase
17:40						

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Wednesday, 04 December 2024						
Room	Plenary Room	220				
08:00		Physics in Education Breakfast session				
08:00		Physics in Education Breakfast session				
09:00	Plenary Session <i>Chairperson: Stefan Meier, Anna Phillips</i>					
09:00	Exploring light and life: Nanophotonics and AI for scalable molecular sensing, sequencing, and synthesis Jennifer Dionne					
09:45	Declining physics student numbers: Can we reverse the trend? Manjula Sharma					
10:30	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea
Room	217	218	206	214		
11:00	Focus Session - Excitons, Polaritons and Emerging Applications of Polaritons	ANZCOP - Spectroscopy and Imaging I <i>Chairperson: Sara Miller</i>	NUPP - Particle Physics II <i>Chairperson: Matthew Dolan</i>	Focus Session - Bridging High School and Tertiary Physics		
11:00	Manipulating matter by strong coupling to vacuum fields Francisco Garcia-Vidal	Finding the needle in the haystack: Using spectroscopy to identify minor components in mixtures Cushla McGoverin	Observation of four-top-quarks and the determination of the Higgs width Paul Jackson			
11:15						
11:30	Strong Light-Matter Coupling Leads to a Longer Charge Carrier Lifetime in Organic Solar Cells Girish Lakhwani	Propagation-based X-ray diffusive dark-field imaging Jannis Ahlers	Anomaly Detection in Particle Physics Shreya Saha	Focus Session - Bridging High School and Tertiary Physics Anna Phillips		
11:45		Quantitative measurement of extinction, scattering, and absorption spectra from metallic nanoparticles Baptiste Auguie	Searching for supersymmetric tops at the ATLAS detector Hitarthi Pandya			
12:00	Revealing and Quantifying Polariton Interactions Jeff Davis	Development of Glass-Based Phantoms for Calibration of Clinical Fluorescence Imaging Systems in Neurosurgery Mingze Yang	Tools for Studying Toponium Physics at the collider experiments Aman Desai			
12:15		Characterizing Liquid-Liquid Phase Separation in Proteins Using Brillouin Spectroscopy with Principle Component Analysis Irina Kabakova				
Room		218	206	214		
12:30						
12:45	Lunch Break	ATMOP Annual General Meeting	Nuclear and Particle Physics lunch	Theoretical Physics Group lunch	Lunch Break	Lunch Break
12:45		ATMOP Annual General Meeting Andy Martin	Nuclear and Particle Physics lunch Nuclear And Particle Physics Lunch	Theoretical Physics Group lunch Theoretical Physics Group Lunch		
13:30	Plenary Session					
13:30	Elisabetta Barbario Plenary Presentation Elisabetta Barberio					
14:15						
Room	217	218	206	214		
14:30	Focus Session - Excitons, Polaritons and Emerging Applications of Polaritons	ANZCOP - Biophotonics and Optical Sensors II <i>Chairperson: Jawen Li</i>	GAP - Astroparticle I	PEG - PEG Education Across Settings <i>Chairperson: Kate Jackson</i>		
14:30	Exciton-polariton lasing: New insights and new materials Elena Ostrovskaya	Revolutionising IVF with advanced photonics Kylie Dunning	Differential torsion sensor for direct detection of ultralight vector dark matter Ling Sun	Learning abstract physics with immersive Virtual Reality experiences Margaret Wegener	Royal Botanical Garden	
15:00					NFO - Excursion	
15:00	Microscopic many-body theory of two-dimensional coherent spectroscopy of exciton polaritons and beyond Hui Hu	Wireless stereoscopic optical palpation probe for tumour margin assessment in breast conserving surgery Qi Fang	High-precision study of E1 transition amplitudes for single-valence atoms and ions Ben Roberts	Einstein-First: Teaching modern physics in schools Kyla Adams		
15:15		Quantitative blood flow mapping in bone models with photoacoustic imaging Caitlin Smith	A phenomenological model approach for dark matter detection with gamma rays Liam Pinchbeck	Einstein - First and Quantum Girls: An initiative to improve students' attitudes toward physics Jyoti Kaur		
15:30	Polaronic polariton quasiparticles in a dark excitonic medium Olivier Bleu	Tracking bacterial active matter in complex environments Patrick Grant	Status of the LUX-ZEPLIN dark matter experiment Robert James	Participation in Secondary School Physics Dan O'Keeffe		
15:45		Photon counting cameras for low-light biological imaging of autofluorescence Zane Peterkovic	Cosmic-ray boosted dark matter confronted by constraints on new light mediators Iman Shaukat Ali	The rainbow connection – advocating light-in-nature observations for public science communication and physics education Deb Kane		
16:00	Afternoon Tea & Poster Session II	Afternoon Tea & Poster Session II	Afternoon Tea & Poster Session II	Afternoon Tea & Poster Session II	NFO Excursion to Royal Botanic Gardens	
17:00	NUPP - Particle Physics III <i>Chairperson: Kevin Varvell</i>	NUPP - Dark Matter <i>Chairperson: Anthony Thomas</i>	STSP - Space Science II <i>Chairperson: Jeremy Brown</i>	PEG - Effective Approaches to Teaching <i>Chairperson: Tom Dixon</i>		
17:00	Investigation of TORCH silicon photomultiplier candidates for Upgrade-II at the LHCb experiment Sam Dekkers	Impact of shell model interactions on nuclear responses to WIMP elastic scattering Raghad Abdel Khaleq	Precursor studies for an assessment of OTHR operation in a nuclear-stressed environment Stuart Anderson	Building a better base - can we learn from how the IOP supports their teaching communities? Barbara Mckinnon		
17:15	Novel robotic characterisation facility for bulk characterisation of Hyper-Kamiokande Photomultipliers Wi Han Ng	Towards improved energy resolution in micropattern gaseous detectors Lachlan Mckie	Lightweight Ground Penetrating Radar prototype for operation on the Moon Matthew Auld	CAEN Educational: Innovative Educational Tools in Modern Physics Yuri Venturini		
17:30	Photomultiplier Noise Discrimination Algorithms and Characterisation for SABRE South Lachlan Milligan	Directional recoil detection for particle physics and nuclear applications Victoria Utaree Bashu	Observed and modelled neutral densities during the 2015 St. Patrick's Day geomagnetic storm Elise Blanchfield	Teaching complex physics through familiar phenomena and technologies Timo Nieminen		
17:40			Developing free space optical communications technology for lunar and quantum applications Jamie Soon			

17:45	Quantum randomness beyond bipartite nonlocality: pushing the boundaries via quantum networks. Emanuele Polino	Non-destructive 3D terahertz imaging via laser feedback interferometry Jorge Silva	Intra-cavity squeezing for beating the fundamental sensitivity limit of cavity enhanced optical sensors Jiayi Qin	3D-nanoprinted CMOS-integrated metalens for stereoscopic optical palpation Haoyi Yu	Discerning the true nature of black holes with quasinormal modes Fil Simovic	Leakage in Majorana qubits in the presence of charge noise Marcus Goffage
17:50						
18:00						
18:30						

Wednesday, 04 December 2024

17:45	A Ramsey Neutron-Beam Experiment to Search for Ultralight Axion Dark Matter at the European Spallation Source Yevgeny Stadnik	Nuclear isomers for high-density, on-demand energy storage Ben Coombes	Developing free space optical communications technology for lunar and quantum applications Jamie Soon	A measure of motivation in an online astronomy course Kate Jackson	NFO Excursion to Royal Botanic Gardens	
17:50			Comparison of electromagnetic active vs passive radiation shielding against space radiation; mass saving and equivalent dose reduction Samuel Cox			
18:00						
18:30						

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Thursday, 05 December 2024

Room	Plenary Room	219	220	208	209	207
08:00	Plenary Session					
09:00	Chairperson: Susan Scott, Nicolas Menicucci					SPIE Pacific Rim Security + Defence Workshop
09:00	Cosmology beyond the dark ages David Wiltshire					USAF basic science engagements in Australia Geoff Andersen
09:30						Accelerating the Transition of Directed Energy Capabilities Mark Spencer
09:45	Quantum Computing with Neutral Atoms Ivan Deutsch					ONR's Fundamental Research Portfolio, it's "like a box of chocolates..." Mike Wardlaw
10:00						Morning Tea
10:30	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea
Room	Plenary Room	219	220	208	209	216
11:00	NFO - Near-field Microscopy III Chairperson: Stefano Palomba	QST - Causality and Foundations II Chairperson: Nicolas Menicucci	QST - Algorithms and Theoretical Methods I Chairperson: Dominic Berry	QST - Optical Quantum Information I Chairperson: Harini Hapurachchi	CMM - Nanoparticles and Thin Films Chairperson: Dehong Yu	ANZCOP - ANZOS Award Presentations Chairperson: David Lancaster
11:00	Tip-enhanced nanocavities for active control of vibrational sum-frequency generation Philippe Roelli	Nonclassical causal explanations for Wigner's friend experiments require fine-tuning Eric Cavalcanti	Large time-step discretisation of adiabatic quantum dynamics Dong An	Quantum information science with continuously-coupled photonic waveguide systems Yang Yang	Thermodynamics with long-range correlations from first principles: Liouvilian dynamics and MaxEnt with self-similar correlations Joan Vaccaro	Advancing Imaging Technologies Through Metaphotonics Rocio Camacho
11:15	Nanoscale Control over Magnetic Light-Matter Interactions Benoit Reynier		Further improving quantum algorithms for nonlinear differential equations via higher-order methods and rescaling Pedro Contino Da Silva Costa			
11:30	Real-space observation of ultra-confined in-plane anisotropic acoustic THz plasmon polaritons Rainer Hillenbrand	Experimental research on causal nonseparability Yu Guo	Semi-device-independent certification of quantum non-Markovianity using sequential Random Access Codes Soumik Mahanti	Deterministic preparation of optical squeezed cat and Gottesman-Kitaev-Preskill states Matthew Winnel	Coherent ferromagnetic spin states in carbon nanoparticles Jacob Martin	Ultrathin 3D-nano-printed imaging devices for more accurate heart disease detection Jiawen LI
11:45	Scanning near-field photocurrent microscopy of sub-surface nanostructures in antiferromagnetic layers Dinghe Dai		Efficient fault-tolerant quantum protocol for differential privacy in the shuffle model Arghya Mukherjee	Time-bin encoded photonic quantum information protocols enabled using Hong-Ou-Mandel Interference Simon White	A singlet-triplet hole-spin qubit in MOS silicon Scott Liles	
12:00	Nondestructive near-field infrared nanoscopic and spectroscopic detection of atomic-scale lattice defects in β -Ga ₂ O ₃ nanoflakes Debo Hu	Measuring impossible parameters with indefinite causal order Andrew White	Unveiling classical non-Markovian process: Hamiltonian characterisation Varun Srivastava	Heralded distributed noiseless linear amplification for entanglement distillation Farzad Ghafari	Reactivity of ultra-thin Kagome Metal FeSn towards Oxygen and Water Sadhana Sridhar	Solitons galore—adventures with a fibre laser Martijn De Sterke
12:15		Algorithms for quantum causal discovery Jasleen Kaur		Modular phase: measurement, metrology, and bosonic codes Joshua Combes	Garnet-PVDF composite film modified lithium manganese oxide cathode for lithium-ion battery Gebregziher Berhe	
Room		209	217	218		
12:30		NFO Annual General Meeting	AIP executive & IoP Meeting	QST Annual General Meeting		
12:45	Lunch Break	NANOPHOT Graduate School Presentation Renaud Bachelot	AIP executive & IoP Meeting	QST Annual General Meeting		Lunch Break
13:00		NFO Lunch Meeting (including announcement of NFO18)				
13:30						
13:45						
Room	Plenary Room					
14:00	Plenary Session					
14:00	Plasmonic Nanoparticles for Sustainability and Societal Impact Naomi Halas					
14:30						
14:45						
Room	Plenary Room	219	220	208	209	216
15:00	NFO - Fundamentals III Chairperson: Reuven Gordon	QST - Materials and Devices II Chairperson: Behnam Tonekaboni	QST - Optical Quantum Information II Chairperson: Andrew White	GAP - Astroparticle II Chairperson: Roland Crooker	CMM - Phononics, Photoluminescence, Superconductivity and Antiferromagnets Chairperson: Xueqian (Queenie) Sun	ANZCOP - Novel Photonic Materials and Fabrication Chairperson: Simon Gross
15:00	Synthesizing complex-frequency waves to compensate for optical loss of polaritons Shuang Zhang	Probing ground state properties of spin models using quantum computed moments Harish Vallury	Generation of a 3-mode NOON state in a heralded manner. Sukhjit Singh	The Cherenkov Telescope Array Observatory. A new Paradigm in Gamma-Ray Astronomy and Astroparticle Physics Gavin Rowell	Scaled up phononic circuits with dispersion control Timothy Hirsch	Recent advances of femtosecond-laser-written crystalline waveguides for photonic applications Feng Chen
15:15		Synthesis pathways for ultra-shallow ensembles of color centers in 4H-SiC Agatha Ulibarri			Modelling Radiative and non-Radiative pathways in Light Harvesting Materials Salvy Russo	
15:30	Modelling light absorption in hybrid core-satellite metal nanostructures Baptiste Augué	Machine learning assisted precision manufacturing of atom qubits in silicon Aaron Tranter	Programmable High-dimensional Quantum Gates via MPLC Daniel Dahl	Exploring millimetre transients: opportunities and insights from modern CMB surveys and The Simons Observatory Justin Clancy	Localized modification of YBa ₂ Cu ₃ O _{7-δ} microbridges by advanced nanofabrication Hanh Duong	Enhanced solar reflection in zinc oxide nanoparticle attached cotton Ming Gao
15:45	A Magnetic Monopole Antenna Benoit Reynier		Utilising quantum sampling for proof-of-work consensus Gopikrishnan Muraleedharan	XLZD - a next generation liquid xenon dark matter detector Theresa Fruth	Asymmetric antiferromagnets: statics and dynamics Pavel Vorobyev	Thickness-dependent nonlinear optical absorption in 2D MXene films Di Jin
16:00	Afternoon Tea	Afternoon Tea	Afternoon Tea	Afternoon Tea	Afternoon Tea	Afternoon Tea
16:15						
16:30	NFO - Optical Nanotweezers Chairperson: Takuo Tanaka	QST - Dynamics and Control Chairperson: Josh Combes	QST - Algorithms and Theoretical Methods II Chairperson: Gavin Brannen	QST - Sensing Chairperson: Jean-Philippe Tetienne	CMM - Electron Band Theory Chairperson: Eric Mascot	ANZCOP - Laser Physics and Active Photonics II Chairperson: Milfar Gania
16:30	Polarization sensitivity of inversely designed double resonant plasmonic nanotweezers for optical trapping Damian Nelson	Atomic and molecular platforms for nonlinear quantum acoustics Mikolaj Schmidt	The discrete adiabatic quantum linear system solver has the best cost in practice Pedro Contino Da Silva Costa	Detecting single gravitons with quantum sensing Germain Tobar	Artificial electrostatic crystals: a new platform for quantum simulations Oleh Klochian	GLS Waveguide Array: A Novel Saturable Absorber for Ultrafast Mid-Infrared Fibre Lasers Trong Thuy Ha
16:45	Mie-Resonant Nanoparticles in Optical Manipulation Ivan Toftul			Towards the implementation of a maser that surpasses the standard quantum limit for coherence Lucas Ostrowski		A 2.7- μ m Q-switched Er:ZBLAN fiber laser with a V4C3 MXene Saturable Absorber Junha Jung
17:00	Trapping Nanoparticles Using Metamaterials Site Nic Chormaic	Engineered Donor-Qubit Arrays for Silicon Quantum Computing Alexander Malwin Jakob	Quantum leakage and the time-dependent Bloch equation Zsolt Szabó	Magnetic navigation with quantum diamond-aided INS approaches for a GNSS denied environment Xuezhi Wang	A polaron approach to modelling bose-fermi mixtures Sam Foster	Supercontinuum generation in an Er-doped mode-locked femtosecond fibre laser Andrew Matulick
17:15	Nanoaperture Optical Tweezers for Biophysical Investigations Reuven Gordon	Feedback Cooling of Degenerate Quantum Gases Kaiwen Zhu	Generalized Quantum Geometric Tensor and Wave-Packet Dynamics in Non-Hermitian Exciton-Polariton Systems Robin Hu	Holistic detection of a levitated nanocrystal's 3D motion Thomas Dinter	A DFT-based investigation into high temperature superconductivity in 2D metal borides Ke Ri Liang	A gain-switched semiconductor laser self-injection-locked to a lithium niobate whispering-gallery-mode resonator Wenle Weng

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Thursday, 05 December 2024					
Room	Plenary Room	219	220	208	207
08:00	Plenary Session <i>Chairperson: Susan Scott, Nicolas Menicucci</i>				SPIE Pacific Rim Security + Defence Workshop
09:00	Cosmology beyond the dark ages David Wiltshire				USAF basic science engagements in Australia Geoff Andersen
09:30					Accelerating the Transition of Directed Energy Capabilities Mark Spencer
09:45	Quantum Computing with Neutral Atoms Ivan Deutsch				ONR's Fundamental Research Portfolio, it's "like a box of chocolates..." Mike Wardlaw
10:00					Morning Tea
10:30	Morning Tea	Morning Tea	Morning Tea	Morning Tea	Morning Tea
Room	217	218	206	214	207
11:00	Focus Session - Synergies between particle and astrophysics in the hunt for dark matter	Focus Session - Accelerator Science in Australia	ATMOP - Sensing <i>Chairperson: Andy Martin</i>	COMMAD - COMMAD Session 3 <i>Chairperson: Mariusz Martyniuk</i>	SPIE Pacific Rim Security + Defence Workshop
11:00	Review of Dark Matter Theory Ciaran O'Hare	Introduction to ACAS and its Goals Suzie Sheehy	In-vacuum Atom Interferometer for Field Applications Elizaveta Klantsataya	Quantum diamond microscopy for biological imaging David Simpson	GWEO-Guided Weapons and Explosive Ordnance Enterprise Van Nguyen
11:15		Current Australian Accelerator Facilities and Techniques Ceri Brennar			
11:30	Astrophysical modelling for dark matter searches Roland Crocker	Accelerator Technology Development Activities in Australia Rohan Dowd	Phononic crystals for inertial sensing with dilute gas superfluids Lachlan Miller	Voltage sensing with nanodiamonds embedded in a polymer thin film Roy Styles	UWA Defence & Security Institute Giacinta Parish
11:45		Future Accelerator Projects and International Collaborations Tessa Charles	Hybrid atom-photonics vapour cell sensors Erik Streed	Enhancing Ni-Co-based LDH Flexible Micro-supercapacitors by Inkjet-printing Cobalt-oxide-hydroxide Composite Nanomaterial Naimeh Naseri	
12:00	Open Discussion	Developing the Pulsed Energetic Electrons for Research (PEER) End-station for Very High-Energy Electron (VHEE) Dosimetry and Australian Research Yaw-Ren Eugene Tan	Fifth force searches in the isotope shift of odd nuclides Zachary Stevens-Hough	Electromechanically tuneable extraordinary optical transmission in the long-wavelength infrared range Oleg Bannik	Integrated Microwave Photonics Linh Nguyen
12:15		Open Discussion & Questions and Answers	Detecting dark matter with atomic systems Ashlee Caddell	Design and Simulation of Metasens Arrays for Enhanced MWIR HgCdTe Infrared Detector Performance Wenwu Pan	
Room		209	217	218	
12:30		NFO Annual General Meeting	AIP executive & IoP Meeting	GST Annual General Meeting	
12:45	Lunch Break	NANOPHOT Graduate School Presentation Renaud Bachelot	AIP executive & IoP Meeting	GST Annual General Meeting	Lunch Break
13:00		NFO Lunch Meeting (including announcement of NFO18)			
13:30					
13:45					
Room	Plenary Room				207
14:00	Plenary Session				SPIE Pacific Rim Security + Defence Workshop
14:00	Plasmonic Nanoparticles for Sustainability and Societal Impact Naomi Halas				Australian Defence Science and Universities Network (ADSUN) Driving research collaboration across the innovation ecosystem Callum Wright
14:30					
14:45					
Room	217	218	206	214	207
15:00	AIP Award Talks - AIP Awards <i>Chairperson: Stephen Collins</i>	NUPP - Theory <i>Chairperson: Jacinda Ginges</i>	PEG - Labs and Hands on Learning <i>Chairperson: Margaret Mooney</i>	ASGRG - General Relativity and Gravitation II <i>Chairperson: Carl Blair</i>	Advanced photonic image processing with flat optics Dragomir Neshev
15:00	Alan Walsh Medal Presentation David Simpson	Neutron stars with hyperons at finite temperature Anthony Thomas	Laboratories in physics education: do they need a re-think? Kostan D. F. Mataubenu	Physical black holes: geometry, matter, observational signatures Daniel Terno	Accelerating Australia's Semiconductor Sector: Building a Globally Connected and Competitive Industry Nadia Court
15:15		Revealing transverse force distributions in the proton from lattice QCD Joshua Crawford	"Flex Labs" in first year physics – improving inclusivity and equity Thomas Dixon	Black Holes as Time-Entangled Phenomena with Fuzzy Singularities Estelle Asmodelle	
15:30	Cosmology with galaxy surveys Cullan Howlett	Multi-nucleon matrix elements on the lattice with e-graph optimised Wick contractions and the Feynman-Hellmann theorem Nabil Humphrey	Making as a pathway to engaging students in authentic computational practice Anna Phillips	Light rings of nonsingular ultracompact objects sourced by nonlinear electrodynamics Ioannis Soranidis	Australian optical and quantum communications for space Howard D'Abeta
15:45		Centre vortex geometry at finite temperature Jackson Mickleley	FARLabs in Japan David Hoxley	Photon trajectories in curved spacetimes from a covariant spin optics approximation Sebastian Murk	
16:00	AIP T.H. Laby Medal Presentation Sophie Young	Afternoon Tea	Afternoon Tea	Afternoon Tea	Afternoon Tea
16:15					
16:30	Focus Session - Synergies between particle and astrophysics in the hunt for dark matter	ANZCOP - Optoacoustics and Optomechanics <i>Chairperson: Moritz Merklein</i>	ATMOP - From Droplets to Relativistic Quantum Mechanics <i>Chairperson: Jacinda Ginges</i>	COMMAD - COMMAD Session 4 <i>Chairperson: Naimeh Naseri</i>	SPIE Pacific Rim Security + Defence Workshop
16:30	Review of dark matter direct detection Amy Cottle	Photonic computation enabled by sound waves Birgit Stiller	Topological droplet pumps Tapio Simula	Novel Plasmon Modes in Twisted Bilayer Graphene YI Shi	Multi-disciplinary research solving society's greatest challenges at the ANU Institute for Space Anna Moore
16:45					
17:00	Astrophysical modelling for dark matter searches Sabrina Einecke	Fibre-coupled and on-chip photonic acoustic sensors Lauren McQueen	Fate of the false vacuum: Phase-space simulations of momentum instabilities and entanglement properties in a ring-lattice model Alexander Dellios	Resolving Interlayer Charge Transfer Dynamics in Twisted WS ₂ Bilayers Kyle Boschen	A brief overview of the Research programme of The Dodd Walls Centre for Photonic and Quantum Technologies relevant to defence applications Frédérique Vanholsbeek
17:15		Using quantum optomechanics to probe vibration-enabled biological function Max Foreman	Fundamental Atomic Physics Theory and Experiment and Synchrotron Science: Discovery of new satellites using extended range High Energy Resolution Fluorescence Detection Christopher Chantler	Liquid metal-derived ultra-thin SnO ₂ as a multifunctional material Nitu Syed	

17:30	Characterisation of a metasurface-generated solenoid beam Maryam Setareh	Optimization and Comparison of Energetic Performance for Silicon Spin Qubit Quantum Devices Konstantina Koteva	Non-unitary Gaussian dynamics in the extended Siegel Disk Giacomo Pantaleoni		Modelling transverse magnetic focusing in two-dimensional hole gases Yik Kheng Lee	Demonstrating the universality of nonlinear mode coupling in a fibre laser Martijn De Sterke
17:45	Quantitative determination of the thrust of optical nanomotors through far-field scattering patterns Xiaofei Wu	Spin physics and modern decoherence theory in photochemistry Jared Cole	Quantum-inspired Ising spin system for combinatorial optimization utilizing complex time evolution Hyunjun Ma		Direct Acceptor-Modulation-Doped Si: Foundations, Material Systems, Applications Dirk Koenig	Soliton in a fibre laser with intrinsic asymmetric dispersion Wenhao Liu
18:00	Closing Ceremony					
18:30						

17:30	Open Discussion	Stimulated Brillouin Scattering from wedge and corner modes in nanophotonic waveguides Michael Steel	Advanced Computational Relativistic Quantum Mechanics for Zinc Atomic Structure and Mineral Processes Trung Nguyen	Scalable Fabrication of Black Phosphorous Films for Infrared Photodetector Arrays Alexander Corletto	Polariton Enhanced Mid-Infrared Thermal Emission in Graphene-Coupled Silicon Carbide Metasurfaces on Silicon Patrick Rufangura
17:45		On-chip Stimulated Brillouin Scattering in Lithium Niobate Waveguides Lisa Haerteis	Calculation of differential ionisation in proton collisions with H2 Corey Plowman	Interface Nanopores - Dynamic Nanopore Sensors for Biomolecular Sensing Morteza Aramesh	
18:00					
18:30					