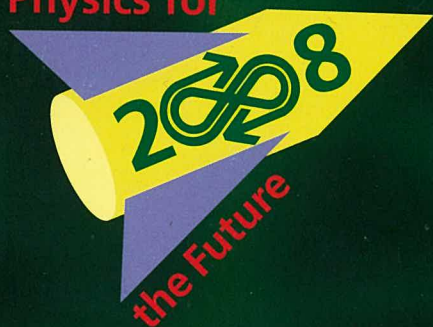


Physics for



Australian Institute of Physics (AIP)

# 18th National Congress

Incorporating the 27th AINSE Plasma Science Conference

30 November - 5 December 2008

The University of Adelaide, South Australia

## PROGRAM & ABSTRACT BOOK

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The Australian Institute of Physics exists to support professional physicists and to promote all aspects of physics to the wider community by:

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- recognising distinguished contributions to physics.

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The Congress appreciates the participation support of the following physics based societies:

Astronomical Society of Australia (ASA)

Australian Institute of Nuclear Science and Engineering (AINSE)

Australasian Society for General Relativity and Gravitation (ASGRG)

Australian Acoustical Society (AAS)

Australian Meteorological and Oceanographic Society (AMOS)

Australian Optical Society (AOS)

Australian Synchrotron (AS)



## Sunday 30 November

14:00-18:00	Registration
17:00 -19:00	Welcome Reception <i>sponsored by the Institute of Physics</i>

## Monday 1 December

08:30	<b>Congress Opening</b> To be opened by the Hon. Paul Caica MP Minister for Science and Information Economy
09:15	<b>Plenary 1</b> <b>Introducing Concentrated Solar Power on the International Market – Worldwide Incentives, Policies and Projects - 101</b> <i>Michael Geyer, Abengoa Solar</i>
Room	Elder Hall
Chairperson	Roger Clay, University of Adelaide
10:00	Morning tea
10:40-12:20	<b>Concurrent Sessions 1.1-1.7</b>

	<b>1.1 AOS</b> <b>Microstructured Optical</b> <b>Fibres</b>	<b>1.2 AS</b>	<b>1.3 AOS/AMP</b> <b>BEC 1</b>	<b>1.4 RE</b>	<b>1.5 AMOS</b>	<b>1.6 QUICC</b> <b>Fundamental Concepts</b>	<b>1.7 ASGRG</b>
Room	Napier 102	Napier 209	Napier G03	Napier LG29	Napier LG28	Napier G04	Napier LG24
Chairperson	Dave Lancaster	Andrea Gerson	John Close	Stewart Martin		Jason Twamley	Peter Veitch
10:40	Emerging Optical Fibres: New Materials, Designs and Properties - 102 <i>Tanya M. Monro, University of Adelaide, Australia</i>	Imaging with X-rays - Back to the Future - 106 <i>Murray J. Gibson, Argonne National Laboratory, USA</i>	Exploring the Potential of Ultra Cold Gases for Fundamental Tests in Space-110 <i>Wolfgang Ertmer, Institute for Quantum Optics (IQ) and Centre for Quantum Engineering and Space-Time Research (QUEST)</i>	Large Scale Concentrator Photovoltaic Systems using Multijunction III-V Solar Cells - 114 <i>Pierre J. Verlinden, Solar Systems Pty Ltd, Australia</i>	The Oceans and Climate Change - 117 <i>Matthew England, The University of New South Wales, Australia</i>	Black Box Quantum Information - 121 <i>Valerio Scarani, National University of Singapore, Singapore</i>	The Status of Enhanced LIGO - 125 <i>Aidan Brooks, California Institute of Technology, USA</i>
11:00							Encoding Cosmological Futures with Conformal Structures - 126 <i>Susan M. Scott, The Australian National University, Australia</i>
11:20	Fabrication of suspended nanowire optical fibres - 103 <i>Heike Ebendorff-Heidepriem, University of Adelaide, Australia</i>	On-line Synchrotron X-Ray Microbeam Radiation Dosimetry-107 <i>Michael L.F. Lerch, University of Wollongong, Australia</i>	Atom Interactions and The Optimum Input For A Double-Well BEC Interferometer - 111 <i>Joel Corney, The University of Queensland, Australia</i>	The State of Play in the Australian Geothermal Industry - 115 <i>Susan Jeanes, Australian Geothermal Industry, Australia</i>	The Southern Australia Integrated Marine Observing System - 118 <i>Charles James, South Australian Research and Development Institute, Australia</i>	Mechanical read-out for a Cooper-pair box qubit -122 <i>Andrew C. Doherty, University of Queensland, Australia</i>	Neutron stars in modified theories of gravity - 127 <i>Paul D. Lasky, Monash University, Australia</i>
11:40	Inscription of rotationally-variant fibre Bragg gratings in 12-ring photonic crystal fibre-104 <i>John Holdsworth University of Newcastle, Australia</i>	Developing non-invasive measures of airway physiology using synchrotron Phase Contrast X-ray Imaging-108 <i>Karen KW Siu, Monash University, Australia</i>	Non-equilibrium Bose gases: antibunching the atom laser - 112 <i>David W. Barry, University of Queensland, Australia</i>		Superpressure Balloon Studies of Gravity Waves - 119 <i>Robert Vincent, University of Adelaide, Australia</i>	Nanomechanical squeezing with detection via a microwave cavity - 123 <i>Matthew J. Woolley, University of Queensland, Australia</i>	Developments of low frequency squeezed state technology for the enhancement of laser interferometer type gravitational wave detectors - 128 <i>Sheon Chua, Australian National University, Australia</i>
12:00	Nonlocal Gap Solitons in Liquid-Infiltrated Photonic Crystal Fibres-105 <i>Francis Bennet, Australian National University, Australia</i>	Quantitative scanning differential phase contrast x-ray microscopy-109 <i>Martin de Jonge, Australian Synchrotron, Australia</i>	Towards an all-optical BEC in optical toroidal traps - 113 <i>Leif Humbert, University of Queensland, Australia</i>	Low Carbon Technologies - The Biggest Funding Opportunity Ever - 116 <i>Justin Blows, Griffith Hack Patent and Trademark Attorneys, Australia</i>	Direction-of-arrival bias in HF surface wave ocean radar systems - 120 <i>Stuart J. Anderson DSTO, Australia</i>	Giant Kerr Nonlinearities in Circuit-QED - 124 <i>Stojan Rebic, Macquarie University, Australia</i>	Entropy and holography in spin networks - 129 <i>Daniel R.erno, Macquarie University, Australia</i>

12:20	Lunch							
12:30-14:00	AUSHEP Board Meeting Convenor Ray Volkas							
Room	G20 Physics Building							
14:00-15:40	<b>Concurrent Sessions 2.1 –2.7</b>							
	<b>2.1 AOS Fibre Lasers</b>	<b>2.2 AS</b>	<b>2.3 AOS/AMP BEC 2</b>		<b>2.4 BMP</b>	<b>2.5 AMOS</b>	<b>2.6 QUICC Quantum Measurement</b>	<b>2.7 ASGRG</b>
Room	Napier 102	Napier 209	Napier G03		Napier LG29	Napier LG28	Napier G04	Napier LG24
Chairperson	Judith Dawes	Murray Gibson	Andrew Truscott				Thomas Symul	Susan Scott
14:00	Fibre index profiles for high power fibre lasers - 130 <i>Shayne Bennetts, DSTO, Australia</i>	Accelerator Physics and Operations at the Australian Synchrotron Lightsource - 135 <i>Mark J. Boland, Australian Synchrotron, Australia</i> Keynote	Bose-Einstein Condensation in a Dimple Trap - 139 <i>Michael C. Garrett, University of Queensland, Australia</i>		Structure and Function of the Bacterial Mechanosensitive Channel Mscl: from Biophysics to Applications in Medicine - 144 <i>Boris Martinac, The University of Queensland, Australia</i>	Drop Size Distribution Retrievals in the Tropics and Mid Latitudes - 148 <i>Bronwyn K. Dolman, University of Adelaide, Australia</i>	Quantum information, quantum control, and precision measurement - 153 <i>Geoff. J. Pryde, Griffith University, Australia</i>	Pre-Lock Acquisition Interferometer for Advanced Gravitational wave detectors - 157 <i>Bram J.J. Slagmolen, The Australian National University, Australia</i>
14:20	Relative intensity noise suppression of a fibre laser using passive filtering at low frequencies - 131 <i>Thanh T-H. Nguyen, Australian National University, Australia</i>		Quantum Coherence, Interaction Blockade and Symmetry-Breaking Transitions in Josephson Coupled Condensates - 140 <i>Chaohong Lee, Australian National University, Australia</i>			A radar for the lowest 500-m of the atmosphere - 149 <i>Iain M. Reid, University of Adelaide, and Atrad Pty Ltd, Australia</i>		How to use distances on a space-time to locate singularities in general relativity - 158 <i>Ben E. Whale, The Australian National University, Australia</i>
14:40	Velocity of heat dissipative solitons in optical fibres - 132 <i>Adrian Ankiewicz, Australian National University, Australia</i>	The Application of Synchrotron Microdiffraction to Identify 3D Strains in High Performance Steel - 136 <i>Andrea R. Gerson, University of South Australia, Australia</i>	Evolution of the Relative Phase in a Two-Component Bose-Einstein Condensate - 141 <i>Andrei I. Sidorov, Swinburne University of Technology, Australia</i>		Near Infrared Spectroscopic techniques to monitor bone tissue and bone marrow oxygenation - 145 <i>John C. Thomas, University of South Australia, Australia</i>	Mini VHF Spaced Antenna Profiler -150 <i>Andrew D. MacKinnon, University of Adelaide, Australia</i>	Adaptive state discrimination - 154 <i>Brendon L. Higgins, Griffith University, Australia</i>	Topological Features of the Abstract Boundary Construction - 159 <i>Richard Barry, The Australian National University, Australia</i>
15:00	Polarization rotation of gain-guided vector solitons in a dispersion-managed fiber laser - 133 <i>Dingyuan Tang, Nanyang Technological University, Singapore</i>	Synchrotron Soft X-ray Studies of Fluorinated Carbon Nanotube Surfaces - 137 <i>Anders Barlow, Flinders University, Australia</i>	Collapse Dynamics of Dipolar Dilute Gas Bose-Einstein Condensates - 142 <i>Andy M. Martin, University of Melbourne, Australia</i>		Nonlinear imaging of tissue by an endoscope probe incorporating a 3D scanning MEMS mirror - 146 <i>Min Gu, Swinburne University of Technology, Australia</i>	Sunspot Number, Southern Oscillation Index and their Correlation to Rainfall: Sydney, a Case Study - 151 <i>Daniel V. Cotton, The University of Newcastle, Macquarie University, Australia</i>	Phase estimation using the wedge entangled state - 155 <i>Guoyong Xiang, Griffith University, Australia</i>	Developing Technologies for Advanced Interferometer Gravitational Wave Detectors - 160 <i>Pablo Barriga, The University of Western, Australia</i>
15:20	Qualitative Investigation of Various Harmonic Components of a Fibre Bragg Grating - 134 <i>Greg Baxter, Victoria University, Australia</i>	The Microspectroscopy Beamline at the Australian Synchrotron: design and capabilities - 138 <i>David Paterson, Australian Synchrotron, Australia</i>	Generating number squeezing in Bose-Einstein condensates through nonlinear interactions - 143 <i>Mattias T. Johnsson, The Australian National University, Australia</i>		Mechanics of Hamstring Strain Injuries - 147 <i>Bronwyn K. Dolman, University of Adelaide, Australia</i>	The Sun's role in the regulation of the Earth's climate dynamics - 152 <i>Richard Mackey, Australian National Audit Office, Australia</i>	Theory for Heisenberg Limited Phase Measurement - 156 <i>Howard Wiseman, Macquarie University, Australia</i>	The physics of space-time singularities - 161 <i>Martin O'Loughlin, University of Nova Gorica, Slovenia</i>
15:40	Afternoon tea							



Concurrent Sessions 3.1-3.7							
Time	3.1 AOS BEC 3	3.2 AAS	3.3 NUPP New Physics from Belle	3.4 BMP	3.5 EP	3.6 QUICC Quantum Optics and QED	3.7 ASGRG
16:20-18:00							
16:20	Napier 102	Napier 209	Napier G03	Napier LG29	Napier LG28	Napier G04	Napier LG24
Chair	Andrei Sidorov			Kent Gregory		Craig Savage	David McClelland
16:20	Quantum Brownian Motion in a Bose-Einstein Condensate - 162 <i>Peter D. Drummond, Swinburne University of Technology, Australia</i>	The essential nonlinearity of musical instruments - 167 <i>Neville H. Fletcher Australian National University, Australia</i>	The Belle experiment at the start of the LHC era - 171 <i>Bruce D. Yabsley, University of Sydney, Australia</i>	The System of Radiation Protection - what does it have to do with physics? - 175 <i>Peter Burns, Australian Radiation Protection and Nuclear Safety Agency, Australia</i>	Measurement of ultraviolet radiation reflectivity: underestimating the influence of specular reflection in personal ultraviolet radiation exposure from non-horizontal surfaces - 179 <i>Joanna Turner, University of Southern Queensland, Australia</i>	New Bells for old: inequalities for continuous-variable correlations - 184 <i>Eric Cavalanti, Swinburne University of Technology, Australia</i>	Digital implementation of the Pound-Drever-Hall technique - 189 <i>Timothy T-Y. Lam, Australian National University, Australia</i>
16:40					The Transport of Nanoparticles with Magnetic Properties in Potential Field - 180 <i>Liudmila A. Uvarova, Moscow State University of Technology, Russia</i>	Design of high-Q microcavities in diamond-based photonic crystal heterostructures - 185 <i>Snjezana Tomljenovic-Hanic, University of Sydney, Australia</i>	Computational study of space-time metrics - 190 <i>Benjamin R. Lewis, The Australian National University, Australia</i>
17:00	Quantum statistics and the spatial structure of dissociated elongated molecular condensates - 164 <i>Karen V. Kheruntsyan, University of Queensland, Australia</i>	The elastic anisotropy of some Australian wood species used for classical guitars - 168 <i>Voichita Bucur, CSIRO, Australia</i>	Cross-section measurements for $e^+e^- \rightarrow 3\gamma$ plus light hadron final states using initial state radiation at Belle - 172 <i>Samuek T. McOnie, University of Sydney, Australia</i>	Modelling the erythemally effective UV to students in a school environment - 176 <i>Nathan Downs, University of Southern Queensland, Australia</i>	Micrometeorology and Nanoparticle Concentrations near a Busy Road - 181 <i>Galina Gramotnev, Queensland University of Technology, Australia</i>	Harmonic Entanglement from Second-order Nonlinearity - 186 <i>Michael S. Stefszky, The Australian National University, Australia</i>	Unmasking the Global Structure of the Zipoy-Voorhees Metrics - 191 <i>Philip A. Threlfall, The Australian National University, Australia</i>
17:20	Theory of Bose-Einstein condensate interferometry - 165 <i>Bryan J. Dalton, Swinburne University of Technology, Australia</i>	Towards a complete acoustics model of bat echolocation - Possibilities and limitations - 169 <i>Timos Papadopoulos, University of Southampton, UK</i>	Measurement of Inclusive Radiative B-meson decays at Belle - 173 <i>Antonio Limosani, University of Melbourne, Australia</i>	Quantitative Analysis of Dose Reduction in MammoSite Brachytherapy Breast Cancer Technique by Monte Carlo Simulations - 177 <i>Saleh Bensafeh, Renewable Energy and Water Desalination Research Centre, Tripoli, Libya; University of Adelaide, Royal Adelaide Hospital, Australia</i>	The Quantification of Atmospheric Turbulence using Angle of Arrival Statistics - 182 <i>Ray J. Oermann, Defence Science &amp; Technology Organisation, Australia</i>	Spatial and multimode entanglement for laser beams - 187 <i>Katherine Wagner, Australian National University, Australia</i>	Continuous Operation of an Odd Parity Lorentz Invariance Test in Electrodynamics using a Microwave Interferometer - 192 <i>Michael E. Tobar, University of Western Australia, Australia</i>
17:40	Bragg Scattering of a Strongly Interacting Fermi Gas - 166 <i>Chris J. Vale, Swinburne University of Technology, Australia</i>	The Shape of the Bell - 170 <i>Katherine A. Legge, La Trobe University, Australia</i>	H $\rightarrow$ tau tau Search with early data from ATLAS - 174 <i>Will Davey, University of Melbourne, Australia</i>	The Enhancement of Natural Background Radiation Dose around Depleted Uranium Micro-particles in the Human Body - 178 <i>John E Pattison, University of South Australia, Australia</i>	Estimating Fine Scale Ground Solar Radiation From GIS Modelled Data And Historical Meteorological Records - 183 <i>Anirudh Singh, The University of the South Pacific, Fiji</i>	Ensemble production of Fock states and Kitten states using only Continuous Variables Gaussian resources - 188 <i>Thomas Symul, The Australian National University, Australia</i>	Gradient of pressure and shell crossing singularities - 193 <i>Krzysztof Bolejko, University of Melbourne, Australia; Nicolaus Copernicus Astronomical Center, Poland</i>
18:00	<b>Posters Bonython Hall</b> Finger food and drinks will be served						
19:30	The Australian Institute of Physics and Australian & New Zealand Solar Energy Society (SA Branch) Public Lecture, <b>Concentrated Solar Power on the International Scene - Worldwide Incentives, Policies and Projects</b> Dr. Michael Geyer, Abengoa Solar						
Room	Napier 102						

## Tuesday 2 December

08:30	<b>Plenary 2</b> <b>"How many readings do we need to take?" What is the role of measurement in the modern introductory physics lab? - 201</b> <i>Andy Buffler</i> <i>Department of Physics, University of Cape Town, South Africa</i>							
09:15	<b>Plenary 3</b> <b>Carbon Ion Beams: A Novel Radiotherapy Treatment Modality - 202</b> <i>Oliver Jäkel</i> <i>Department of Medical Physics in Radiation Oncology, German Cancer Research Center, Heidelberg; Heidelberg Ion Therapy Center, University of Heidelberg, Heidelberg, Germany</i>							
Room	Elder Hall							
Chairperson	Jamie Quinton, Flinders University							
10:00	Morning tea							
10:40-12:20	<b>Concurrent Sessions 4.1-4.7</b>							
	<b>4.1 AOS Lasers</b>	<b>4.2 AAS</b>	<b>4.3 NUPP Atlas Experiment at the LHC</b>		<b>4.4 BMP</b>	<b>4.5 AMOS/EP/STSP</b>	<b>4.6 AMP Fermi gas, BEC and cold atoms</b>	<b>4.7 SASTA Applications</b>
Room	Napier 102	Napier 209	Napier G03		Napier LG29	Napier LG28	Napier G04	Napier LG24
Chairperson	Richard Mildren	Con Doolan			Eva Bezak		Peter Drummond	Chris Jordison
10:40	A stabilised fibre laser for infrasonic sensing applications - 203 <i>Timothy T-Y. Lam, Australian National University, Australia</i>	Industrial Applications of Ultrasound - 208 <i>Anthony F. Collings, CSIRO Materials Science &amp; Engineering, Australia</i>	The LHC and the ATLAS Experiment at the LHC - Status and Perspectives - 212 <i>Allan G. Clark, Université de Genève, Geneva, Switzerland</i>		Progress in Targeted Alpha Therapy for Cancer - 216 <i>Barry Allen, St George Hospital Cancer Care Centre, Australia</i>	SCOSTEP: Past, Present and Future Programs - 220 <i>Robert Vincent, University of Adelaide, Australia</i>	Universal Thermodynamic Behaviour of Strongly Interacting Fermi Gases - 225 <i>Hui Hu, the University of Queensland, Australia and Renmin University of China, China</i>	Medical Applications of Ionizing Radiation: Physics workforce implications <i>Eva Bezak, Royal Adelaide Hospital</i>
11:00	Design and construction of a vibration-insensitive optical cavity - 204 <i>Andre N. Luiten, University of WA, Australia</i>					Projects carried out by IPS in support of IHY / IPY - 221 <i>Philip Wilkinson, IPS, Australia</i>	Strongly Interacting Polarized Fermi Gases - 226 <i>Xia-Ji Liu, the University of Queensland, Australia and Renmin University of China, China</i>	Lasers <i>Peter Veitch, University of Adelaide</i>
11:20	Er:YAG lasers for eye-safe coherent lidar - 205 <i>Nick Chang, University of Adelaide, Australia</i>	Bluff Body Noise Reduction Using Aerodynamic Interference - 209 <i>Con Doolan, University of Adelaide, Australia</i>	Utilizing Early Data from the ATLAS Experiment - 213 <i>Anthony Morley, The University of Melbourne, Australia</i>		Three years clinical experience with 2D and 3D EPID in vivo dose verification - 217 <i>Leah N. McDermott, Netherlands Cancer Institute - Antoni van Leeuwenhoek Hospital, The Netherlands</i>	Applying Cosmic Ray research: Space weather, atmospheric circulation and radiation dose in aircraft - 222 <i>Març Duldig, Australian Antarctic Division, Australia</i>	Quantum State Transfer between Spatially Separated Atom Laser Beams - 227 <i>Simon A. Haine, ARC CoE for Quantum Atom Optics and University of Queensland, Australia</i>	Satellites <i>Ed Arbon, DSTO</i>
11:40	High average power injection mode-locked lasers for advanced astronomical adaptive optics systems - 206 <i>Thomas P. Rutten, University of Adelaide, Australia</i>	Ultrasonic Remediation of Bauxite Waste - 210 <i>Anthony F. Collings, CMSE, Australia</i>	First performance studies of the ATLAS detector - 214 <i>Aldo Saavedra, University of Sydney, Australia</i>		Monte Carlo Modelling of Head and Neck Cancer Oxygenation - 218 <i>Wendy Tuckwell, University of Adelaide, Australia</i>	ULF Waves and Plasma Diagnostics in the Magnetosphere - 223 <i>Frederick W. Menk, University of Newcastle, Australia</i>	Spinor Bose-Einstein condensates: measuring mean-field and quantum dynamics - 228 <i>Lincoln D. Turner, Monash University, Australia</i>	Electron Microscopes <i>John Terlet, University of Adelaide</i>
12:00	Mode-locked laser operation of Yb:GdVO4 pumped by high-power diode - 207 <i>Hang Luo, Nanyang Technological University, Singapore</i>	Computer Recognition of Sounds That Have Never Been Heard Before - 211 <i>Neil J Boucher, SoundID, Australia</i>	Measuring hadronic energy deposition and losses in the ATLAS calorimeters with the first data of the LHC - 215 <i>Nadia Davidson, University of Melbourne, Australia</i>		Discretisation Artifact Correction in PET Motion Compensation - 219 <i>Roger R. Fulton, University of Sydney and Westmead Hospital, Sydney, Australia</i>	Investigations of the auroral and sub-auroral regions using the Tasman International Geospace Environment Radars (TIGER) - 224 <i>Peter L. Dyson, La Trobe University, Australia</i>	Dual Species Metastable Helium-Rubidium Magneto-Optical Trap - 229 <i>Lesa J. Byron, Australian National University, Australia</i>	Nuclear Power <i>Jesper Munch, University of Adelaide</i>
12:20	Lunch							
13:00-14:00	<b>Investing in the Future of Physics (National Committee for Physics of the ASS, and AIP)</b>							
Room	Napier G04							



14:00-15:40	Concurrent Sessions 5.1-5.7							
	5.1 AOS New Wavelength Lasers	5.2 AOS Optics and the Life Sciences	5.3 NUPP Standard Model Physics and Beyond	5.4 AMP Spectroscopy and Trapping	5.5 STSP	5.6 QUICC Quantum Computation 1	5.7 SASTA/PEG	
Room	Napier 102	Napier LG29	Napier G03	Napier 209	Napier LG28	Napier G04	Napier LG24	
Chairperson	Jesper Munch	Ann Roberts	Derek Leinweber			Howard Wiseman	Jamie Quinton	
14:00	Generation of High Flux, Highly Coherent Extreme Ultraviolet Radiation for Coherent Diffraction Imaging - 235 <i>Lap Van Dao, Swinburne University of Technology, Australia</i>	Imaging of Nanoparticle Penetration in Human Skin in vitro and in vivo - 240 <i>Andrei V. Zvyagin, Macquarie University, Australia</i>	The Quest for New Dimensions at the Large Hadron Collider - 244 <i>Tony Gherghetta, The University of Melbourne, Australia</i>	Low-intensity nonlinear processes in coherent atomic media - 248 <i>Alexander M. Akulshin, Swinburne University of Technology, Australia</i>	Evidence for Wind-Like Regions, Acceleration of Shocks in the Deep Corona, and Relevance of 1/f Dynamic Spectra to Coronal Type II Bursts - 253 <i>Iver H. Cairns, University of Sydney, Australia</i>	Quantum information science with photons on a chip - 258 <i>Jeremy L. O'Brien, University of Bristol, UK</i>	Educational Outreach at the Cavendish Laboratory: models of good practice - 262 <i>Mike J. Morley, Department of Physics, University of Cambridge, UK</i>	
14:20	CVD-Diamond Raman Laser - 236 <i>Richard P. Mildren, Macquarie University, Australia</i>			Single atom detection with optical cavities - 249 <i>Rachel Poldy, The Australian Research Council Centre of Excellence for Quantum Atom Optics and Australian National University, Australia</i>	Recent Relativistic Solar Proton Production - 254 <i>Marc L. Duldig, Australian Antarctic Division, Australia</i>		So you want to be a physicist ... - 263 <i>Craig Savage, The Australian National University, Australia</i>	
14:40	Active waveguide devices directly written into glass materials using a femtosecond laser - 237 <i>Martin Ams, Macquarie University, Australia</i>	Revealing the Dynamics in Light-harvesting Carotenoid Molecules by Two-colour Non-Interferometric Two Dimensional Fourier Transform Spectroscopy - 241 <i>Jeffrey A. Davis, Swinburne University of Technology, Australia</i>	Sifting the sand of the QCD vacuum - 245 <i>Peter J. Moran, University of Adelaide, Australia</i>	Universal Dipolar Scattering - 250 <i>Christopher Ticknor, Swinburne University of Technology, Australia</i>	Type 3L Radio Emission as a Predictor for Solar Particle Events - 255 <i>Owen Giersch, Learmonth Solar Observatory and Curtin University of Technology, Australia</i>	Dynamics beyond completely positive maps: some properties and applications - 259 <i>Daniel R. Terno, Macquarie University, Australia</i>	Multi-layered national curriculum design principles - 264 <i>Neil Champion, Williamstown High School, Australia</i>	
15:00	Core doped tellurite microstructured optical fibre for erbium fibre laser at 2.7µm - 238 <i>Michael R. Oermann, University of Adelaide, Australia</i>	Optical needles for probing local tissue properties for biopsy and guidance in medicine - 242 <i>Loretta Scolaro, The University of Western Australia, Australia</i>	Neutrino magnetic moments and electromagnetic leptogenesis - 246 <i>Nicole F. Bell, The University of Melbourne, Australia</i>	Towards BEC in a 1D Magnetic Lattice on an Atom Chip - 251 <i>Peter Hannaford, Swinburne University of Technology, Australia</i>	Comparison of Type II Theory with Observations for the 24-26th August 1998 Event - 256 <i>Dean S. Hillan, University of Sydney, Australia</i>	Ion-photon coupling with phase Fresnel lenses for large-scale quantum computing - 260 <i>Erik W. Streed, Griffith University, Australia</i>	The use of a web-based environment for years 7 to 10 high school physics - 265 <i>M. Sait Gokalp, University of Sydney, Australia</i>	
15:20	An efficient scalable multi-watt broadband mid-IR laser source - 239 <i>Alex Hemming, Defence Science and Technology Organisation, Australia</i>	Imaging muscle pathology with three-dimensional optical coherence tomography - 243 <i>Blake R. Klyen, The University of Western Australia, Australia</i>	The Generation Model and the Origin of Mass - 247 <i>Brian A. Robson, Australian National University, Australia</i>	Ultra-cold atoms in a time averaged optical potential - 252 <i>Sebastian K. Schnelle, The University of Queensland, Australia</i>	Simulations of Coronal Type III Solar Radio Bursts - 257 <i>Iver Cairns, University of Sydney, Australia</i>	Spectral Effects of Kerr Non-linearity on Quantum Fredkin Gate - 261 <i>Patrick M. Leung, University of Queensland, Australia</i>	Diagrams for understanding Physics - 266 <i>Christine Creagh, Murdoch University, Australia</i>	
15:40	Afternoon tea							

16:20-18:00 Concurrent Sessions 6.1-6.7								
Time	6.1 AOS Sensing	6.2 CMMSP Magnetic/ism	6.3 NUPP 'Extreme' Accelerator Physics	6.4 AOS/AMP Atom Optics	6.5 STSP	6.6 QUICC Quantum Computation 2	6.7 SASTA Cutting Edge Physics	
Room	Napier 102	Napier LG29	Napier G03	Napier 209	Napier LG28	Napier G04	Napier LG24	
Chairperson	Tanya Monro			Halina Rubinsztein-Dunlop		Andrew Doherty	Mike Roach	
16:20	An Optical Sonar? - 267 <i>David Farrant, CSIRO, Australia</i>	Magnetic and Electronic Properties of SrFeOx - 272 <i>Grant V. M. Williams, MacDairmid Institute, Industrial Research, New Zealand</i>	TeV Gamma-Ray Astronomy and the Study of Extreme Particle Accelerators - 277 <i>Gavin Rowell, University of Adelaide, Australia</i>	A model for a pumped atom laser - 281 <i>Graham Dennis, The Australian National University, Canberra, Australia</i>	Estimating plasma convection direction from magnetometer measurements - 286 <i>Jason M. Siddaway, La Trobe University, Australia</i>	Quantum computing using shortcuts through higher dimensions - 291 <i>Andrew G. White, University of Queensland, Australia</i>	Climate Change <i>Jain Reid, University of Adelaide</i>	
16:40	Suspended optical nanowires for sensing applications - 268 <i>Stephen Warren-Smith, The University of Adelaide, Australia</i>	Effective Medium Method for Multiferroic Composite Materials - 273 <i>Karen L. Livesey, University of Western Australia, Australia</i>	Excited-state Magnetic Moments in the Fe Isotopes: From Stable to Radioactive Beams - 278 <i>Michael C. East, The Australian National University, Australia</i>	A Pumped Atom Laser - 282 <i>Daniel Döring, The Australian National University, Canberra, Australia</i>	Electric and magnetic waves in the magnetosphere - 287 <i>Brian J. Fraser, University of Newcastle, Australia</i>	Very low noise, high efficiency quantum memory using Stark-gradient echoes - 292 <i>Morgan P. Hedges, Australian National University, Australia</i>	Photonics <i>Tanya Monro, University of Adelaide</i>	
17:00	Fuel Degradation Sensing Using Small-Core Microstructured Optical Fibres - 269 <i>Erik P. Schartner, The University of Adelaide, Australia</i>	Origin of Field Induced Ferromagnetism of Pd-Ni-Fe-P Alloy - 274 <i>Dehong H. Yu, Australian Nuclear Science and Technology Organization, Australia</i>	Measured g factors and the tidal wave description of transitional nuclei near A=100 - 279 <i>Sanjay K Chamoli, The Australian National University, Australia</i>	Feedback Control of an Atom Laser - 283 <i>Andrew G. Truscott, The Australian National University, Canberra, Australia</i>	A Parametric Analysis of Magnetospheric Energy Budgets of Non-Stormtime Substorms - 288 <i>Alexa J. Halford, University of Newcastle, Australia</i>	Storage of light in Rb vapour cell using GEM - 293 <i>Benjamin Sparkes, The Australian National University, Australia</i>	An Overview of LIGO: The Laser Interferometer Gravitational-Wave Observatory <i>Aidan Brooks, California Institute of Technology</i>	
17:20	Implementation of a low cost interrogation technique for an optical fibre Bragg grating sensor for simultaneous transverse and longitudinal strain measurement - 270 <i>Stephen Collins, Victoria University, Australia</i>	Probing magnetic interfaces in thin films via standing spin wave modes - 275 <i>Rhet Magaraggia, University of Western Australia, Australia</i>		A high flux atom laser for precision measurement - 284 <i>John E. Debs, The Australian National University, Canberra, Australia</i>	Dynamics of the Magnetospheric Cusp: Cluster Multi-Point Observations - 289 <i>Yulia V. Bogdanova, La Trobe University, Australia</i>	Measurement only based Grover search with decoherence - 294 <i>Charles D. Hill, The University of Melbourne, Australia</i>	Is interplanetary travel now possible? <i>Rod Boswell, Australian National University</i>	
17:40	Comparison of Two Approaches for the Analysis of Fibre Bragg Intragrating Sensing of Strain Profiles - 271 <i>Stephen F. Collins, Victoria University, Australia</i>	Magnetic properties of plane arrays of metallic magnetic nano-elements fabricated using self-organized lithographic mask - 276 <i>Mikhail Kostylev, University of Western Australia, Australia</i>	Simulations of Spallation Neutron Sources for Accelerator Driven Advanced Reactors using MCNPX and Geant4 Monte Carlo Codes - 280 <i>Jacob Borger, University of Sydney, Australia</i>	Coherence properties of a continuous-wave atom laser at finite temperature - 285 <i>Geoffrey M. Lee, University of Queensland, Australia</i>	Effects of Solar Wind Parameters on the Diurnal Patterns of High Latitude ULF Waves - 290 <i>Sean T. Ables, University of Newcastle, Australia</i>	Arrays of coupled cavities: a new vista for condensed matter physics and quantum optics - 295 <i>Andrew D. Greentree, The University of Melbourne, Australia</i>	Understanding the Universe with the Large Hadron Collider <i>Tony Gherghetta, University of Melbourne</i>	
18:00	Posters Bonython Hall Finger food and drinks will be served							
19:30	Close							



# Wednesday 3 December

08:30	<b>Plenary 4</b> <b>The LHC: the world's most powerful microscope and telescope -301</b> John Ellis <i>Theoretical Physics Division of CERN</i>							
09:15	<b>Plenary 5</b> <b>Quantum Gravity and Black Holes -302</b> Steven Carlip <i>Department of Physics, University of California, Davis, U.S.A.</i>							
10:00	Morning tea							
10:30	<b>Plenary 6</b> <b>Solar Variability Influences on the Earth's Climate -303</b> Marvin A. Geller <i>Stony Brook University, Stony Brook, New York, USA</i>							
11:15	<b>Plenary 7</b> <b>Scanning probes for atomic scale devices: from imaging to fabrication -304</b> Michelle Y. Simmons <i>School of Physics, University of New South Wales, Sydney, Australia</i>							
Room	Elder Hall							
Chairperson	Peter Veitch, University of Adelaide							
12:00	Lunch							
12:45-13:45	<b>AIP Feedback Forum</b>							
Room	Napier G04							
14:00-15:40	<b>Concurrent Sessions 7.1-7.7</b>							
	<b>7.1 AOS Optical Metrology 1</b>	<b>7.2 CMMSP Surface Characterization</b>	<b>7.3 NUPP LHC Phenomena</b>		<b>7.4 HoP</b>	<b>7.5 STSP</b>	<b>7.6 QUICC Quantum Control</b>	<b>7.7 AOS Optical Microscopy</b>
Room	Napier 102	Napier LG29	Napier G03		Napier LG24	Napier LG28	Napier G04	Napier 209
Chairperson	Andre Luiten				John Humble		Geoff Pryde	David Sampson
14:00	Rapid and reliable reference sphere calibration for Fizeau interferometry - 305 <i>Jan Burke, CSIRO, Australia</i>	Investigating the Molecular Structure of Liquid Surfaces - 310 <i>Gunther Andersson, Flinders University, Australia</i>	A peek beyond the standard particle model - 314 <i>Csaba Balazs, Monash University, Australia</i>		Australian Electrical Clocks - 318 <i>Norman Heckenberg, The University of Queensland, Australia</i>	Pc3-4 ULF waves observed by Cluster prenoon in outer magnetosphere - 323 <i>Yonghua H. Liu, University of Newcastle, Australia</i>	Rapid Measurement and Purification using Quantum Feedback Control - 327 <i>Joshua Combes, Griffith University, Australia</i>	Optical Coherence Tomography – the missing link of 3D in-vivo imaging - 332 <i>Rainer A. Leitgeb, Medical University Vienna, Austria</i>
14:20	Microwave Phase Detection at the Level of $10^{-11}$ rad - 306 <i>Michael E. Tobar, University of Western Australia, Australia</i>				A Century After A Nobel Prize: The Legacy of Lippmann's Colour Photography - 319 <i>Margaret Wegener, The University of Queensland, Australia</i>	ULF Wave Monitoring by Super Dual Auroral Radar Network - 324 <i>Pavlo V. Ponomarenko, The University of Newcastle, Australia</i>	Quantum Control of a Multimode Atom Laser - 328 <i>Michael Hush, Australian National University, Australia</i>	
14:40	Redefining Temperature: Spectroscopic Determination of the Boltzmann Constant - 307 <i>Gar-Wing Truong, University of Western Australia, Australia</i>	Quasi-elastic Neutron Scattering Study of Diffusion in Cu-Se Superionic Conductor - 311 <i>Sergey A. Danilkin, Australian Nuclear Science and Technology Organization, Australia</i>	Parameterised Simulation of EM Cascades Across a Non-Uniform Calorimeter - 315 <i>Anthony Waugh, University of Sydney, Australia</i>		The discovery of the pinch effect in 1905 - 320 <i>Brian W. James, The University of Sydney, Australia</i>	Symbolic Statistics of Magnetic Fluctuation Measurements in Plasmas - 325 <i>Frank Detering, The Australian National University, Australia</i>	Controlling Entanglement by quantum-jump-based feedback - 329 <i>Andre R. R. Carvalho and Joseph J. Hope, The Australian National University, Australia</i>	Multi-wavelength Elemental Full-field Contrast Imaging - 333 <i>Mac B. Luu, La Trobe University, Australia</i>
15:00	Testing Lorentz Invariance Using an Asymmetric Optical Resonator - 308 <i>Fred Baynes, University of Western Australia, Australia</i>	The surface structure of imidazolium based ionic liquids by ARXPS - 312 <i>Vera Lockett, University of South Australia, Australia</i>	Soft supersymmetry breaking from the stochastic superspace - 316 <i>Archil Kobakhidze, The University of Melbourne, Australia</i>		The great Geomagnetic Disturbances in August/September 1859: Some Australian observations - 321 <i>John E. Humble, University of Tasmania, Australia</i>	Space Weather Plan 2010 and Beyond - the current status - 326 <i>Philip Wilkinson, IPS, Australia</i>	Real-time quantum control of a photonic qubit - 330 <i>Geoff Gillett, University of Queensland, Australia</i>	Supercontinuum generation for fibre-optic multicolour nonlinear microscopy - 334 <i>Wei Tao, Swinburne University of Technology, Australia</i>

PROGRAM WEDNESDAY

PROGRAM WEDNESDAY

15:20	Alignment Sensing using Digital Interferometry - 309 <i>Bram J.J. Slagmolen, The Australian National University, Australia</i>	Carbon Surfaces Modified with Methane Plasma: The Influence of Plasma Parameters - 313 <i>Alec Deslandes, Flinders University, Australia</i>	Z decay to electrons in ATLAS - 317 <i>Jason Lee, University of Sydney, Australia</i>	Arthur Hogg and Cosmic Ray Studies at Mt. Stromlo - 322 <i>Roger Clay, University of Adelaide, Australia</i>	Business Meeting	Experimental criteria for steering and EPR-nonlocality - 331 <i>Margaret Reid, Griffith University, Australia</i>	Synthetic-aperture generation issues in wide-field, digital-Fourier-holographic optical microscopy - 335 <i>Timothy R. Hillman, The University of Western Australia, Australia</i>
15:40	break						
16:20-18:00	<b>WIP Sponsored Forum - Building Success in a Complicated Life.</b> Chair Jenny Gibson DSTO						
Room	Napier G04						
17:30	<b>Public Lecture - Pulsars and extreme physics.</b> <i>Jocelyn Bell Burnell, Elder Hall</i>						
19:00	<b>Congress Dinner (optional), Adelaide Convention Centre</b>						

## Thursday 4 December

08:30	<b>Plenary 8</b> <b>Metamaterials Open New Horizons in Electromagnetism - 401</b> <i>John B. Pendry</i> <i>Department of Physics, Imperial College London, UK</i>						
09:15	<b>Plenary 9</b> <i>Alain Aspect</i> <i>Laboratoire Charles Fabry, Institut d'Optique, CNRS, France</i>						
Room	Elder Hall						
Chairperson	John Thomas, University of South Australia						
10:00	Morning tea						
10:40-12:20	<b>Concurrent Sessions 8.1 - 8.7</b>						
	<b>8.1 AOS</b> <b>Slow light</b>	<b>8.2 CMMSP</b> <b>Semi/Super conductors</b>	<b>8.3 NUPP</b> <b>Nuclear-Particle Physics</b>	<b>8.4 PP</b>	<b>8.5 STSP</b>	<b>8.6 QUICC/AOS</b> <b>Quantum Computation 3</b>	<b>8.7 Industry</b>
Room	Napier 102	Napier LG29	Napier G03	Napier LG24	Napier LG28	Napier G04	Napier 209
Chairperson	Ben Eggleton			Neil Cramer		David Kielpinski	
10:40	Slow Light - 403 <i>Martijn de Sterke</i> <i>University of Sydney, Australia</i>	Phase Transformations and Magnetic Properties at the Nanoscale for a Melt-Spun SmCo-based Alloy Following Isochronal Ageing Treatments - 407 <i>Trevor R. Finlayson, University of Melbourne, Australia</i>	2007 Boas Medal Keynote Lecture  Electromagnetic structure of hadrons 412 <i>Derek B. Leinweber, University of Adelaide, Australia</i>	Plasma Nanoscience: Plasma-Architected Nanoworld for Future Nanotechnologies - 416 <i>Kostya Ostrikov, CSIRO and the University of Sydney, Australia</i>	Improvements to a real-time ionospheric model for northern Australia - 420 <i>Brett Northey DSTO, Australia</i>	Fabrication of nickel related single photon centers in diamond for quantum optical applications - 425 <i>Alastair Stacey, University of Melbourne, Australia</i>	Jackie Craig DSTO
11:00		Observation of persistent photoconductivity and modified permittivity in bulk Gallium Arsenide and Gallium Phosphide samples at cryogenic temperatures using the Whispering Gallery mode method - 408 <i>John G. Hartnett, University of Western Australia, Australia</i>			HF coherent radar backscatter occurrence during geomagnetic storms - 421 <i>Tom A. Kane, La Trobe University, Australia</i>	Non-Linear Spectroscopy of Rubidium in Hollow-Core Fibres - 426 <i>Christopher Perrella, University of WA, Australia</i>	BAE Systems representative
11:20	Shaping and switching of light in periodically modulated photonic lattices - 404 <i>Ivan L. Garanovich, Australian National University, Australia</i>	Novel views on the spin structure of high temperature copper oxide superconductors - 409 <i>Oleg P. Sushkov, University of New South Wales, Australia</i>	Evidence of Decoherence in Nuclear Reactions at near-Barrier Energies? - 413 <i>Mahananda Dasgupta, Australian National University, Australia</i>	Effect of Particle Growth on Plasma Properties in a Complex Plasma - 417 <i>Brian W. James, The University of Sydney, Australia</i>	Some features of quiet time ionospheric electric current systems - 422 <i>Robert J. Stening, University of New South Wales, Australia</i>	Investigation of the coherent optical properties of rare-earth dopant ions near the crystal surface - 427 <i>John Bartholomew, Australian National University, Australia</i>	<i>Jain Reid, ATRAD and University of Adelaide</i>



11:40	Slow Light Tunneling in Coupled Periodic Waveguides: Theory and Experiment - 405 <i>Andrey Sukhorukov, Australian National University, Australia</i>	Metastability in the electroresistance of electronic oxides - 410 <i>J. C. Knott, University of Wollongong, Australia</i>	Search for an Intrinsic Scale in Chiral Effective Field Theory - 414 <i>Jonathan. M. M. Hall, University of Adelaide, Australia</i>	Investigation on Laser Induced Metallic Plasma - 418 <i>Khurshid. A. Bhatti, University of Engineering and Technology, Pakistan</i>	Investigation of small and medium-scale variations in the ionosphere - 423 <i>Trevor J. Harris, Defence Science and Technology Organisation, Australia</i>	Controlled production of Ni-related optical centers in diamond by ion implantation - 428 <i>Julius O. Orwa, University of Melbourne, Australia</i>	<i>Tanya Monro, University of Adelaide</i>
12:00	Spatial-Spectral Optical Vortices in Quadratic Lattices - 406 <i>Zhiyong Xu, Australian National University, Australia</i>	Atomically Controlled Dopant Devices in Silicon - 411 <i>Frank Rueß, University of New South Wales, Australia</i>	Systematic study of the nuclear potential through high precision back-angle quasi-elastic scattering measurements of <sup>16</sup> O on various targets - 415 <i>Maurits Evers, The Australian National University, Australia</i>	Achieving Steady State FRC Equilibria by means of two Counter-Rotating Magnetic Fields - 419 <i>Denis C. Visentin, University of Tasmania, Australia</i>	A novel approach for the analysis of traveling ionospheric disturbances - 424 <i>Manuel A. Cervera, Defence Science and Technology Organisation, Australia</i>	Transitions in universality for measurement-based quantum computation in a quantum many-body system - 429 <i>David Jennings, The University of Sydney, Sydney, Australia</i>	<i>Rod Watkins, Scan Optics</i>
12:20	Lunch		Lunch				
12:30		Lunch					
13:00-14:00	<b>Physics Education Group</b>						
Room	Napier G04						
14:00-15:40	<b>Concurrent Sessions 9.1-9.7</b>						
	<b>9.1 AOS Optical Metrology 2</b>	<b>9.2 CMMSP Materials</b>	<b>9.3 NUFP Heavy Ion Accelerator Physics</b>	<b>9.4 PP</b>	<b>9.5 STSP</b>	<b>9.6 PEG</b>	<b>9.7 Industry</b>
Room	Napier 102	Napier LG29	Napier G03	Napier LG24	Napier LG28	Napier G04	Napier 209
Chairperson	Jan Burke		Mahananda Dasgupta	Robin Storer		Judith Pollard	
14:00	A comparative study on the analysis of delayed self heterodyne interferometry signals - 435 <i>John Holdsworth, University of Sydney, Australia and University of Newcastle, Australia</i>	Complementary In-situ Neutron and High-Energy X-Ray Powder Diffraction Analysis of the Phase Transformations in Titanium Aluminides - 440 <i>Ian Watson, Australian Nuclear Science and Technology Organisation, Australia</i>	Medical Applications of Nuclear Physics - 445 <i>Anatoly Rosenfeld, University of Wollongong, Australia</i>	The modern vector of change: Plasma Processing - 449 <i>Rod Boswell, Australian National University, Australia</i>	Backscatter and Oblique Ionogram Leading Edge Correspondence over Several Paths - 453 <i>David J. Netherway, DSTO, Australia</i>	A Modern View of Modelling in Physics Teaching and Learning - 458 <i>Andy Buffler, University of Cape Town, South Africa</i>	<i>Cathy Foley, CSIRO Materials Science and Engineering</i>
14:20	A frequency comb for testing on the Ultra-High Resolution Facility at the Anglo-Australian Telescope 436 <i>Keal S. Byrne, The University of WA, Australia</i>	The thermophysical response of Ammonium Nitrate emulsions to plate impact loading -441 <i>Mike Morley, University of Cambridge, UK</i>	Investigation of the Anomalous Decay of the K <sup>+</sup> =12+ Isomer in <sup>174</sup> W* - 446 <i>Chris J. Weekes, Australian National University, Australia</i>	Antenna Sputtering in a Radiofrequency Plasma Reactor and the Influence of External Circuitry - 450 <i>Alec Deslandes, Flinders University, Australia</i>	Total Electron Content (TEC) dependence on ionospheric parameters at mid- and low latitudes - 454 <i>Mike Terkildsen, Bureau of Meteorology, Australia</i>		<i>Chris Deller, Canon Information Systems Research Australia</i>
14:40	High-performance Laser Frequency Stabilization - 437 <i>Andre N. Luiten, The University of WA, Australia</i>	Force on a Slow Moving Impurity due to Thermal and Quantum Fluctuations in a 1D Bose-Einstein Condensate - 442 <i>Andrew Sykes, University of Queensland, Brisbane, Australia</i>	K-hindered transitions and multi-quasiparticle structure in <sup>187</sup> Re - 447 <i>Albert B. F. Lee, Australian National University, Australia</i>	The Effects of Plasma Shape on Stability and Confinement in the H-1NF Heliac - 451 <i>Boyd D. Blackwell, Australian National University, Australia</i>	Oblique sounding validation of an HF radio propagation model and anomalies related to upper atmospheric and geomagnetic effects - 455 <i>Dave Neudegg, IPS Radio and Space Services, Australia</i>	From idea to reality - The integration of Map Meetings into first year physics - 459 <i>Christine Lindström, University of Sydney, Australia</i>	<i>John Sutton, Department of Environment and Conservation, Government of W.A.</i>
15:00	Towards a compact optical fibre clock - 438 <i>Anna Lurie, The University of WA, Australia</i>	MCD and EPR spectroscopy of a dynamic Jahn-Teller system - 443 <i>Mark J. Riley, University of Queensland, Australia</i>	Shape Changes and Isomeric States in Neutron-Rich Tungsten Nuclei - 448 <i>Gregory J. Lane, Australian National University, Australia</i>	Equilibria and Stability of a Partially Relaxed 3D MHD Model with KAM Surfaces - 452 <i>Matthew J. Hole, Australian National University, Australia</i>	Can HF Radar Measure Neutral Winds in the Equatorial Ionosphere? - 456 <i>Stuart J. Anderson, DSTO, Australia</i>	Evaluation of online problem solving software 'Mastering Physics' in 1st year Applied Physics courses - 460 <i>Bruce Wedding, University of South Australia, Australia</i>	<i>Roger Atkinson, Bureau of Meteorology</i>
15:20	A crisscrossed optical clock approaching the 10 <sup>-14</sup> /√τ level - 439 <i>John J. McFerran, The University of WA, Australia</i>	Anomalous dependence of the electrical properties of α-glycine crystals - 444 <i>Benno P. Schoenborn, University of Sydney, Australia; Los Alamos National Laboratory, USA</i>			Results of a meteor radiant survey using multiple meteor radars - 457 <i>Joel Younger, University of Adelaide, Australia</i>	Poster orals	IP Databases' for Research and Educational Applications - 465 <i>Stephen O'Brien, Phillips Ormonde &amp; Fitzpatrick, Australia</i>
15:40	Afternoon tea						

16:20-18:00 Concurrent Sessions 10.1-10.7								
	10.1 AOS Meta/Nano Materials	10.2 CMSP Optical	10.3 NUPP Gauge Fixing and Vortices in the QCD Vacuum		10.4 PP Plasma Astrophysics	10.5 STSP	10.6 PEG ALTC Project Workshop	10.7 Industry
Room	Napier 102	Napier LG29	Napier G03		Napier LG24	Napier LG28	Napier G04	Napier 209
Chairperson	John Love	Bruce Wedding	Kevin Varvell		Matthew Hole		Geoff Swan	
16:20	Local Density of States of Metamaterial Photonic Crystals - 466 <i>Ara A. Asatryan, University of Technology Sydney, Australia</i>	Far-infrared spectroscopy of P- <sup>+</sup> ion-implanted Si - 471 <i>Roger A. Lewis, University of Wollongong, Australia</i>	Exploring confining degrees of freedom in lattice QCD - 476 <i>Andre Sternbeck, University of Adelaide, Australia</i>		Astrophysical Plasmas: What can we learn from Space Physics? - 480 <i>Zdenka Kuncic, University of Sydney, Australia</i>	The Turbulent Oxygen Mixing Experiment (TOMEX) and Instabilities in the Mesopause Region - 484 <i>James H. Hecht, The Aerospace Corporation, USA</i>	ALTC Physics Project: Workshop on Service Teaching, Undergraduate Experimentation and Graduates in the Workforce - 487 <i>Manjula D. Sharma, University of Sydney, Australia</i>	<i>Petar Atanakov, Z-cells</i>
16:40	Nanoparticle doping of polymer materials for the enhancement of magneto-optic effects - 467 <i>Helmut C. Y. Yu, The University of Sydney, Australia</i>	Markov Chain Analysis of Polymer Influences on Poly(p-phenylene vinylene) Lithography - 472 <i>Daniel V. Cotton, The University of Newcastle and Macquarie University, Australia</i>						<i>Peter Foster, Chronologic</i>
17:00	Collective spin wave modes in 1D magnonic crystals -468 <i>Mikhail Kostylev, University of Western Australia, Australia</i>	Constructing optically-functional arrays using electron beam lithography - 473 <i>Nicholas Stokes, University of Technology Sydney, Australia</i>	$SU(2)$ lattice gauge theory in 2+1 dimensions: critical couplings from twisted boundary conditions and universality - 477 <i>Sam Edwards, University of Adelaide, Australia</i>		Drift Wave Instability In A Self-Gravitating Dusty Magnetoplasma With Dust Charge Fluctuation Effects - 481 <i>M Khademul Islam, University of the Witwatersrand, South Africa</i>	Icy aerosols in the mesopause region – a Southern Hemisphere perspective - 485 <i>Andrew R. Klekocluk, Australian Antarctic Division, Australia</i>		<i>Philip Crouch, Radiation Protection</i>
17:20	Two-dimensional cut-wire metamaterials - 469 <i>David A. Powell, Australian National University, Australia</i>	Temperature dependence of infrared optical properties of vanadium dioxide - 474 <i>Annette Dowd, University of Technology Sydney, Australia</i>	Monopoles and vortices in theories with more than one gauge group - 478 <i>Bao-Loc Nguyen, University of Adelaide, Australia</i>		Lower hybrid wave properties in heliospheric environments - 482 <i>Alix L. Nulsen, University of Sydney, Australia</i>		A semester of physics: What difference does it make to non-physics majors? - 488 <i>Les Kirkup, University of Technology Sydney, Australia</i>	<i>Graham Heinson, University of Adelaide</i>
17:40	Exciton-Plasmon coupling: The interaction of nanocrystals - quantum dots and metallic surfaces - 470 <i>Daniel Gomez, CSIRO, Australia</i>	Ultrafast photonic hammer: A new strategy to synthesise super-hard nanomaterials - 475 <i>Andrei V. Rode, the Australian National University, Australia</i>	Stereographically Projected Gauge Fields and the Gribov Problem on the Lattice - 479 <i>Dhagash Mehta, University of Adelaide, Australia</i>		From an electric double layer to the Australian Helicon Double Layer Plasma Thruster - 483 <i>Christine Charles The Australian National University, Australia</i>	Latest developments in studying Polar Mesospheric Clouds and upper mesospheric environment - 486 <i>Svetlana Petelina, La Trobe University, Australia</i>	Improving undergraduate laboratory work in physics: outcomes of the 'Forging new directions in physics education in Australian universities' project - 489 <i>Kate Wilson, Australian National University, Australia</i>	<i>Bryan Crosby, Thermo Fisher Scientific</i>
18:00	<b>Posters Bonython Hall</b> Finger food and drinks will be served							
19:30	Close							



## Friday 5 December

08:30	<b>Plenary 10</b> <b>Pulsars and extreme physics - 501</b> <i>Jocelyn Bell Burnell</i> <i>Oxford University Astrophysics, UK</i>							
09:15	<b>Plenary 11</b> <b>Fusion Energy: the Power of Plasma Physics - 502</b> <i>Howard Wilson</i> <i>Department of Physics, University of York, UK</i>							
Room	Elder Hall							
Chairperson	Olivia Samardzic, DSTO							
10:00	Morning tea							
10:40-12:20	<b>Concurrent Sessions 11.1-11.7</b>							
	<b>11.1 AOS</b> <b>Non Linear Optics</b>	<b>11.2 CMMSP</b> <b>Theory</b>	<b>11.3 NUPP</b> <b>Astrophysics &amp; Ion Beams</b>		<b>11.4 ASA</b> <b>Astronomy Highlights</b>	<b>11.5 STSP</b>	<b>11.6 PEG</b>	<b>11.7 AOS</b> <b>General Optics 1</b>
Room	Napier 102	Napier LG29	Napier G03		Napier G04	Napier LG28	Napier LG24	Napier 209
Chairperson	Martijn de Sterke		Ray Volkas		Roger Clay		Manju Sharma	Stephen Collins
10:40	Ultra-short Pulsed Pump Raman Gain In Highly Nonlinear As <sub>2</sub> Se <sub>3</sub> Chalcogenide Fibre - 503 <i>Alessandro Tuniz, University of Sydney, Australia</i>	Band Theory Of Solid Light In Coupled Cavity Systems - 508 <i>James Q. Quach, The University of Melbourne, Australia</i>	Neutrino Astrophysics with the IceCube Observatory - 513 <i>Jenni A. Adams, University of Canterbury, New Zealand</i>		The Magnetic Universe Revealed Through Radio Polarimetry - 517 <i>Bryan M. Gaensler, The University of Sydney, Australia</i>	Mesospheric observations using VHF meteor radar - 520 <i>Daniel McIntosh, University of Adelaide, Australia</i>	Initiative and exploration in student-directed experiments - 525 <i>David Mills Monash University, Australia</i>	Metal-Clad Optical Fibres and Fibre Devices - 530 <i>John D. Love, Australian National University, Australia</i>
11:00	Total internal reflection assisted second harmonic generation in random nonlinear structure - 504 <i>Dragomir N. Neshev, Australian National University, Australia</i>	Ab-initio determination of the electronic and optical properties of the nitrogen - vacancy centre in diamond - 509 <i>Marcus W. Doherty, University of Melbourne, Australia</i>				Tide-Planetary Wave Interactions in the Upper Mesosphere and Lower Thermosphere - 521 <i>Richard L. Walterscheid, Aerospace Corporation, USA</i>	A framework for developing enquiry-oriented experiments for non-physics majors - 526 <i>Les Kirkup, University of Technology Sydney, Australia</i>	Investigation of fs-laser induced modification of fused silica by circularly and linearly polarised beams 531 <i>Douglas J. Little, Macquarie University, Australia</i>
11:20	Slow light enhanced Third-Harmonic Generation in Silicon Photonic Crystal Waveguides - 505 <i>Bill Corcoran, University of Sydney, Australia</i>	Phoretic Motion of Axisymmetrical Objects via Self-Generated Composition Gradients - 510 <i>Mihail N. Popescu, University of South Australia, Australia</i>	Hybrid Stars in the Octet QMC Model - 514 <i>Jonathan D. Carroll, University of Adelaide, Australia</i>		Radioastronomy in Software - 518 <i>Matthew Bailes, Swinburne University of Technology, Australia</i>	Temperature measurements in the MLT region using meteor radar and arglow - 522 <i>Iain M. Reid, University of Adelaide and Atrid Pty Ltd, Australia</i>	Fortune lines as sources of qualitative and quantitative data - 527 <i>Susan M. Feteris Monash University, Australia</i>	The Refractive Index Of Ion Implanted Diamond - 532 <i>Martin A. Draganski, RMIT University, Australia</i>
11:40	Higher-order four wave mixing spectral sideband generation in fiber lasers - 506 <i>Dingyuan Tang, Nanyang Technological University, Singapore</i>	First Principles Electronic Structure Calculations of Large Nanostructures - 511 <i>Burak O. Cankurtaran, Curtin University of Technology and University of Technology, Sydney, Australia</i>	An Exotic Radioactive Ion Beam Capability for Australia - 515 <i>Ramin Rafiei, The Australian National University, Australia</i>			Central Australian VHF Meteor Radar - 523 <i>Andrew D. MacKinnon, University of Adelaide, Australia</i>	Teaching Physics Using Virtual Reality - 528 <i>Margaret Wegener, The Australian National University, Australia</i>	A magnetometer based on single spins in nanodiamond - 533 <i>Carlo Bradac, Macquarie University, Sydney, Australia</i>
12:00	Photostability of Organic Non Linear Optical Polymers - 507 <i>Sebastian G. Raymond, Industrial Research Ltd, New Zealand</i>	Non-Adiabatic Nano-Focusing in Metallic Rods - 512 <i>Dmitri K. Gramotnev, Queensland University of Technology, Australia</i>	A High Efficiency Pixelated Detector Array for Break-up Studies - 516 <i>Duc H. Luong, The Australian National University, Australia</i>		The Giant Magellan Telescope: Sailing to the next Frontier - 519 <i>Penny Sackett, Australian National University, Australia</i>	Radar studies of the large-scale dynamics of the mesosphere and lower thermosphere above Antarctica - 524 <i>Damian J. Murphy, Australian Antarctic Division, Australia</i>	Do second chance assessments in physics drive student learning? - 529 <i>Gilbert J. Vella, The University of Sydney, Australia</i>	Speckle and Conservation - 534 <i>Elaine Miles, University of Melbourne, Australia</i>
12:20	Lunch							
12:45-13:45	<b>Women in Physics</b>							
Room	Napier G04							

14:00-15:40	Concurrent Sessions 12.1-12.7							
	12.1 AOS Plasmonics meets Optics	12.2 CMMS Nano materials	12.3 CSCMP		12.4 ASA/ASGRG	12.5 AOS General Optics 2	12.6 PEG	12.7 AOS Solitons
Room	Napier 102	Napier LG29	Napier LG28		Napier G04	Napier 209	Napier LG24	Napier G03
Chairperson	Hans Bacher				Bruce Dawson	John Haub	David Mills	Wiesiek Krollhowski
14:00	Can Metal Alloys Advance Plasmonics? - 535 <i>Martin G. Blaber, University of Technology Sydney, Australia</i>	Crystallization and glass formation in hard sphere colloids - 540 <i>Gary Bryant, RMIT University, Australia</i>	Physical methods in high-frequency finance - 545 <i>Marco Bartolozzi, Boronia Capital and University of Adelaide, Australia</i>		Testing fundamental physics, astrophysics and cosmology with a worldwide array of gravitational wave detectors - 549 <i>David Blair, University of WA, Australia</i>	Design of photonic crystal cavities for sensing applications - 554 <i>Snjezana Tomljenovic-Hanic, ARC Centre of Excellence for Ultrahigh-bandwidth Devices for Optical Systems (CUDOS), and University of Sydney, Australia</i>	How effective is 'Peer Instruction' in a Third Year Physics subject? - 559 <i>Judith Pollard, University of Adelaide, Australia</i>	Dissipative soliton resonances and their applications - 564 <i>Nail Akhmediev, The Australian National University, Australia</i>
14:20	Nano-Focusing of Surface Plasmons in Metallic Nano-Structures: New Developments and Results - 536 <i>Dmitri K. Gramotnev, Queensland University of Technology, Australia</i>	Incorporation of Nickel into diamond growth centres - 541 <i>Virginia S. Gill, University of Melbourne, Australia</i>			The gamma-ray and radio glow of the Central Molecular Zone and the Galactic centre magnetic field - 550 <i>Roland Crocker, Monash University, Australia</i>	Recent Developments in Large-Aperture Fabry-Perot Etalons - 555 <i>David I. Farrant, CSIRO, Australia</i>	Guest physics teaching - 560 <i>Geoff I. Swan, Edith Cowan University, Australia</i>	Multivortex solitons in photonic lattices: theoretical predictions and experimental observation - 565 <i>Bernd Terhalle, Australian National University, Australia</i>
14:40	Coupling of Plasmon Energy into Nano-focusing Metal Wedges - 537 <i>Shiaw J. Tan, Queensland University of Technology, Australia</i>	Systematic analysis of bimodal suspensions of latex nanoparticles using dynamic light scattering - 542 <i>Åsa K. Jamting, National Measurement Institute, Australia</i>	Self-organized nanoarrays of quantum dots and nanostructures from low-temperature plasmas - 546 <i>Kostya Ostrikov, The University of Sydney, and CSIRO, Australia</i>		Practical template generation for continuous gravitational wave searches - 551 <i>Karl Wette, The Australian National University, Australia</i>	All-optical switching in periodic structures with nematic liquid crystal defects - 556 <i>Andrey Miroshnichenko, ANU, Australia</i>	Enhancing the Transition to University Physics - 561 <i>Maria B Parappilly, Flinders University, Australia</i>	Quasi-periodic dynamics and topological reactions in nonlocal nonlinear optical media - 566 <i>Daniel Buccellero, Australian National University, Australia</i>
15:00	Wavefront control using spatially varying near-resonant aperture arrays - 538 <i>Xiao Ming Goh, University of Melbourne, Australia</i>	Optical gamut of sub-percolative films of Ag nano-islands - 543 <i>Michael Cortie, University of Technology Sydney, Australia</i>	Pattern formation in a granular fluid system - 547 <i>Bjonar Sandnes, University of Oslo, Norway and University of Sydney, Australia</i>		Interstellar scintillation, AGN physics and the SKA - 552 <i>Hayley E. Bignall, Curtin University of Technology, Australia</i>	Experimental investigation of bright photovoltaic spatial soliton-like fields in unbiased self-defocusing photorefractive BaTiO <sub>3</sub> - 557 <i>Michael W. Jones, Queensland University of Technology, Australia</i>	What are students' perceptions of Physics? - 562 <i>Paul Evans, University of the Sunshine Coast, Australia</i>	Polychromatic and partially coherent optical vortices - 567 <i>Vladlen G. Shvedov, Australian National University, Australia and Taurida National University, Ukraine</i>
15:20	Localised and long-range surface plasmon resonances in aperture arrays - 539 <i>Ann Roberts, The University of Melbourne, Australia</i>	Plasma-related controls in the nanoassembly of binary and ternary quantum dots - 544 <i>Kostya Ostrikov, The University of Sydney, and CSIRO, Australia</i>	Ratchets: Directed transport without a bias force - 548 <i>Steven J. Lade, The Australian National University, Australia</i>		Finding Gravitational Wave Counterparts to Optical Transients - 553 <i>Matthew Satterthwaite, The Australian National University, Australia</i>	Non collinear second harmonic generation in random media and its application for femtosecond pulse characterization - 558 <i>Wieslaw Krollikowski Australian National University, Australia</i>	Physics Graduates in the Workforce: Where does a Physics degree lead? - 563 <i>John O'Byrne, Sydney University, Australia</i>	Experimental generation of optical azimuthons - 568 <i>Yana Izdebskaya, Australian National University, Australia</i>
15:50	Closing Session							
Room	Napier 102							

# POSTERS

## MONDAY | DECEMBER

### 18:00-19:30 Poster 1.1

#### AAS

Modelling of particle dynamics in strong ultrasonic fields in fluids - 601

*Peter J. Lesniewski, University of South Australia, Australia*

Influence of sono chemical reactor shape on acoustic pressure distribution under applied 20 kHz ultrasound field : A modeling study - 602

*Kandasamy Thangavadeivel, University of South Australia, and Cooperative Research Centre for Contamination Assessment and Remediation of the Environment, Australia*

Ultrasonic Manipulation and Trapping of Airborne Nano-particles - 603

*Mark Flegg, Queensland University of Technology, Australia*

### 18:00-19:30 Poster 1.2

#### BMP

Firings of bursting neurons under sinusoidal drives in mean-field modelling - 604

*Peter Robinson, University of Sydney, Australia*

Ventilation-Perfusion scanning techniques with Joint Histogram

Analysis for the detection of Pulmonary Embolisms - 605

*Wang Liang, RMIT University and St Vincent's Hospital, Australia*

Effects of distributed axonal delays on mean-field brain dynamics - 606

*Peter Robinson, University of Sydney, Australia*

Describing the stochastic dynamics of neurons using Hamilton's equations of classical mechanics - 607

*Marcus T. Wilson, University of Waikato, New Zealand*

Detection of known mutations in DNA oligonucleotides using fluorescence spectroscopy - 608

*Anamika Aneja, University of Delhi South Campus, India*

Velocity determination from ultrasound video images - 609

*John C. Thomas, University of South Australia, Australia*

Golfers and UV exposures: An application of miniaturised polysulphone dosimetry - 610

*Nathan Downs, University of Southern Queensland, Australia*

A Predictive Model for Breast Cancer Diagnosis: A Novel Data Mining Approach - 611

*Liang Y. Ng, University of South Australia, Australia*

An Intelligent Framework for Microarray Gene Expression Data Analysis for Cancer Diagnosis - 612

*Ahmed R. Hasan, University of South Australia, Australia*

Neuron signalling probed by luminescent nanoparticles - 613

*Bjornar Sandnes, Macquarie University, Australia and University of Oslo, Norway*

Active impedance matching locking for cavity enhanced amplitude modulated absorption spectroscopy - 614

*Jong Chow, The Australian National University, Australia*

Quantitative study of the effects of sugars on membrane damage during dehydration - 615

*Gary Bryant, RMIT University, Australia*

### 18:00-19:30 Poster 1.3

#### EP

Analysis of Combustion Aerosols from Diesel Trains - 616

*Michael J Burchill, Queensland University of Technology, Australia*

Using the Polyphenylene Oxide Dosimeter for Extended

Underwater UV Measurements - 617

*Nathan Downs, University of Southern Queensland, Australia*

New plasma prepared electrodes for hydrogen fuel cells - 618

*Christine Charles, The Australian National University, Australia*

### 18:00-19:30 Poster 1.4

#### AMOS

Upgraded Buckland Park Stratospheric-Tropospheric Radar - 619

*Andrew D. MacKinnon, University of Adelaide, Australia*

Iceberg freshwater transportation sustainable techniques - 623

*Bruno Spandonide, University of Tasmania, Australia*

A Low-cost DIAL for Profiling Atmospheric Water Vapour - 624

*Alex Dinovtser, The University of Adelaide, Australia*

A Sequential Analysis Method for the Prediction of Tropical Hurricanes - 625

*Alexander I. Sukov, Moscow State Technological University, Russia*

Thermal Structure of an Air-Water Interface - 626

*Annie E. Weeks, Naval Research Laboratory, USA*

### 18:00-19:30 Poster 1.5

#### QUICC

Time observables for quantum systems with arbitrary discrete energy spectra - 627

*Michael J.W. Hall, Australian National University, Australia*

Quantum Particles near Closed Timelike Curves: an Epistemic Perspective - 628

*Joel J. Wallman, The University of Sydney, Australia*

Creating an AKLT State Quantum Wire Using Single Photons - 630

*Andrew S. Darmawan, University of Sydney, Australia*

Quantifying the performance of MBQC gates using correlation functions - 631

*Thomas Chung, University of Sydney, Australia*

A Retrodictive Interpretation for Continuous and Weak Measurements - 632

*Joshua Combes, Griffith University, Australia*

An alternative fidelity measure for quantum states - 633

*Yeong-Cherng Liang, The University of Sydney, Australia*

Steering inequalities for two-qubit states - 634

*Dylan J. Saunders, Griffith University, Australia*

Time dependent analysis of the one dimensional Jaynes-Cummings-Hubbard model - 635

*Andrew D. Greentree, The University of Melbourne, Australia*

QCA-style universal quantum computation in arbitrary dimension - 636

*Jason Twamley, Macquarie University, Australia*

Quantum reference frames in background-independent theories - 637

*Matthew C. Palmer, The University of Sydney, Australia*

Surface code simulations in one and two dimensions - 638

*David Wang, The University of Melbourne, Australia*

Experimental quantum computing without entanglement - 639

*Marcelo P. Almeida, University of Queensland, Australia*



A Robust Unravelling for the Feedback Control of Quantum Brownian Motion - 640

*Andy Chia, Griffith University, Australia*

Dynamical quantum memories - 641

*Qiongyi Y. He, Swinburne University of Technology, Australia*

Universal Quantum Computer - 642

*Antonio A. Laguna, University of Adelaide, Australia*

Quantum Matching Pennies Game - 643

*Azhar Iqbal, The University of Adelaide, Australia*

Oxide Quality Control in Spin Dependent Transport devices for Quantum Computing - 644

*Michael Plazzer, The University of Melbourne, Australia*

Entanglement decoherence and Bohm's discrete EPR paradox - 645

*Margaret D. Reid, The University of Queensland, Australia*

Optical Quantum Circuits Created Using the Femtosecond Laser Direct Write Technique - 646

*Graham D. Marshall, Macquarie University, Australia*

Generation of Non Classical Light with Microtoroids - 647

*Terry McRae, University of Otago, , New Zealand and University of Queensland, Australia*

Quantum Computing with Kittens - 648

*Timothy C. Ralph, The University of Queensland, Australia*

Optical Entanglement in Curved Space-Time - 649

*Tony Downes, The University of Queensland, Australia*

Channel Characterisation in Continuous Variable Quantum Key Distribution - 650

*Nathan Walk, The University of Queensland, Australia*

Entanglement via continuous measurement in a driven opto-mechanical system - 651

*E. Babourina-Brooks, The University of Queensland, Australia*

### 18:00-19:30 Poster 1.6

#### ASGRG

The natural philosophy of the cosmos (A) - 652

*Riccardo Storti, Delta Group Engineering, Australia*

The Properties of Eigenstates in Weak Gravity - 653

*Allan D. Ernest Charles Sturt University, Australia*

Hartmann wavefront sensors for advanced gravitational wave interferometry - 654

*Peter Veitch, University of Adelaide, Australia*

Impedance matching locking for gravitational wave interferometer applications - 655

*Jong Chow, The Australian National University, Australia*

Dimension reduction of search parameter manifolds used to detect continuous gravitational wave sources - 656

*Ra Inta, Australian National University, Australia*

### 18:00-19:30 Poster 1.7

#### AS

Bunch Purity Measurements at the Australian Synchrotron - 657

*David J. Peake, University of Melbourne, Australia*

### 18:00-19:30 Poster 1.8

#### AOS

Q-switching in the single photon regime with coupled atom-cavity systems - 658

*Chun-Hsu Su, The University of Melbourne, Melbourne, Australia*

Lasing without inversion on forbidden transition made allowed by quantum interference - 659

*Reuben Shuker, University of the Negev, Israel*

Towards a single mode waveguide in single crystal diamond - 660

*Barbara A. Fairchild, University of Melbourne, Australia*

A modified Gross-Pitaevskii equation for dynamics in cigar-shaped Bose Einstein condensates - 661

*Christopher J. Foster, The University of Queensland, Australia*

A comparative study of simulation methods for the dissociation of molecular Bose-Einstein condensates - 662

*Sarah L. Midgley, University of Queensland, Australia*

Topological defects formation and dynamics in  $^{87}\text{Rb}$  Bose

Ferromagnet with quantum noise - 663

*Jacopo Sabbatini, University of Queensland, Australia*

Josephson vortices in coupled co-planar double-ring Bose-Einstein condensates - 664

*Tania Haigh, Massey University, New Zealand*

Mean Field Simulations of Superfluid Behaviour in Bose-Einstein Condensates - 665

*Chao Feng, University of Queensland, Brisbane, Australia*

On the Application of Genetic Algorithms to Maker Fringes Analysis - 666

*Sean Manning, University of Adelaide, Australia*

Spin-Hall and Magnus effects in optics - 667

*Konstantin Y. Bliokh, Australian National University, Australia and Institute of Radio Astronomy, Ukraine*

A high-quality, easy-to-use optical frequency comb - 668

*Jenni L. Gorham, University of WA, Australia*

Mach-Zehnder Stripe Interferometer for Sensing in the Visible Regime - 669

*Kristy C. Vernon, CSIRO, Australia*

Measurements of the effect of source distance and a diffuser on X-ray coherence, using a two-beam interferometer - 670

*Kaye S. Morgan, Monash University, Australia.*

Scintillation Simulation, Modeling and Analysis - 671

*John C. Thomas, University of South Australia, Australia*

Correlation in atmospheric scintillation noise for co-propagating laser radiation as a function of wavelength separation - 672

*Ken Grant, Defence Science & Technology Organisation, Australia*

An all fibre common transmit-receive aperture - 673

*Shayne Bennetts, Defence Science & Technology Organisation, Australia*

Novel Optical Approach based on Polarised Phase Imaging as a Tool to Study Anisotropic Specimens - 674

*Nicoleta Dragomir The University of Melbourne, Australia*

Q-factors of Non-Ellipsoidal Metallic Nanoparticles - 675

*Kristy C. Vernon, CSIRO, Australia*

Photonic Bloch oscillations and beam propagation in chirped layered structures with metamaterials - 676

*Artur R. Davoyan, , Australian National University, Australia*

Modulation of a tunnel current by surface plasmons - towards light frequency electronics - 677

*Tim J. Davis, CSIRO, Australia*

Mesoglasses: Mathematical Modeling of Electrodynamics Properties According to the Technologies "Up.- Down" - 678

*Alexander I. Sukov, Moscow State Technological University, Russia*

All-optical slow light switching and Fano-Feshbach resonances - 679

*Andrey Miroshnichenko, ANU, Australia*

Phase-only holograms for 3D multi-foci projection - 680

*Vincent Ricardo Daria, Australian National University, Australia*

# TUESDAY 2 DECEMBER

## 18:00-19:30 Poster 2.1

### AMP

- Shock Waves in a Bose-Einstein Condensate - 701  
*Erik D. van Ooijen, University of Queensland, Australia*
- The New Maser Sapphire Frequency Standard: Observation of the Fundamental Thermal Noise Limit using Bimodal Maser Oscillations - 702  
*Michael E. Tobar, University of Western Australia, Australia*
- Frequency Comb Spectroscopy of Laser Cooled Rubidium-85 - 703  
*Andre Luiten, University of WA, Australia*
- Progress towards a quasi-2D gas of fermions - 704  
*Paul Dyke, Swinburne University of Technology, Australia*
- Experimental Determination of the Helium  $2^3S_1-1^1S_0$  Transition Rate - 705  
*Sean S. Hodgman, The Australian National University, Australia*
- Production of a pure metastable neon beam for studies into UV free atom lithography - 706  
*Joshua P. Beardmore, Griffith University, Australia*
- Theoretical studies of High Harmonic Generation in atoms and small molecules - 707  
*Olena Ponomarenko, University of Melbourne, Australia*

## 18:00-19:30 Poster 2.2

### CMMSF

- Coplanar-line broadband magnetic field resolved ferromagnetic resonance for the study and characterization of magnetic multilayers and magnetic nanostructures - 709  
*Mikhail Kostylev, University of Western Australia, Australia*
- A mean field theory for multiferroic materials - 710  
*Karen L. Livesey, University of Western Australia, Australia*
- Parametric spin wave excitation during switching in thin magnetic films - 711  
*Karen L. Livesey, University of Western Australia, Australia*
- Theory of Magnetic Polaritons in Multiferroic Materials with Canted Spin Structure - 712  
*Vincensius G.S. Kadarrisman, University of Western Australia, Australia*
- Effective Coupling at a Ferromagnet/Multiferroic Interface - 713  
*Khian-Hooi Chew, The University of Western Australia, Australia*
- High-field far-infrared magnetospectroscopy of cobaltite/manganites - 714  
*Roger A. Lewis, University of Wollongong, Australia*
- Dynamically bound domain walls in magnetic multilayers - 715  
*Peter J. Metaxas, University of Western Australia, Australia and Univ. Paris-Sud, France*
- Magnetic domain walls in periodic pinning potentials - 716  
*Peter J. Metaxas, University of Western Australia, Australia and Univ. Paris-Sud, France*
- Relativistic DFT studies of spin and orbital magnetism in iron nanowires: effects of structure and coordination - 717  
*Olena Ponomarenko, The University of Melbourne, Australia*

## 18:00-19:30 Poster 2.3

### NUPP

- Supersymmetry and Dark Matter at the LHC: An Analysis of the SUSY Mass Spectrum - 718  
*Chiara Bryan, The University of Melbourne, Australia*
- Measurement of the Branching Fraction of  $B \rightarrow h' K g$  Decays at the Belle Detector - 719  
*Robin Wedd, University of Melbourne, Australia*
- Kink finding in the inner detector of ATLAS - 720  
*Tony Shao, University of Melbourne, Australia*
- Hadronic classification of pion clusters in minimum bias - 721  
*Denis Margetic, University of Melbourne, Australia*
- Gluon flux distribution in baryons at finite temperature - 722  
*Ahmed Bakry, University of Adelaide, Australia*
- Continuum Suppression - Investigating computational methods of continuum suppression in  $B \rightarrow \rho \gamma$  - 723  
*T'Mir Julius*
- Exclusive Semileptonic Decays of B mesons in the Belle experiment - 724  
*Kevin E. Varvell, The University of Sydney, Australia*
- Sparse data and an angular analysis of the  $X(3872)$  - 725  
*Maki Takahashi, University of Sydney, Australia*
- A Novel Spectrometer for Characterising Isomeric States - 726  
*Tibor Kibédi, The Australian National University, Australia*
- Development and Characterisation of Si(Li) detectors for Electron Spectroscopy - 727  
*Alan Devlin, The Australian National University, Australia*
- Fission rate of heated nuclei: analytical formulas versus dynamical modeling - 728  
*Igor I. Gontchar, Omsk State Transport University, Russia*
- Microscopic Optical Model and a Simple Functional Form for Estimating Neutron-Nucleus Total Cross Sections up to 600 MeV - 729  
*Pradip K. Deb, University of Tasmania, and RMIT University, Australia*
- Imaging High Energy Photons with Pilatus II at the Tagged Photon Beam at MAX-Lab - 730  
*Vivien Lee, University of Melbourne, Australia*

## 18:00-19:30 Poster 2.4

### STSP

- Generation and use of a real-time estimated Dst-index at the Australian Space Forecast Centre - 731  
*David Neudegg, IPS Radio and Space Services, Australia*
- University of Newcastle - Activities in Space Research - 732  
*Brian J. Fraser, University of Newcastle, Australia*
- Automatic Recognition of Type III Solar Radio Bursts: The Method and First Observations - 733  
*Iver Cairns, University of Sydney, Australia*
- Multipoint observations of Pc1-2 waves in the dusk sector - 734  
*Steven K. Morley, University of Newcastle, Australia*
- Monitoring of N.Q.R. Signal During Recent Partial Solar Eclipse Sydney - 735  
*Edwin P.A. Sullivan, University of Technology, Sydney, Australia*
- Identifying auroral boundaries using the TIMED-GUVI instrument - 736  
*Steven K. Morley, University of Newcastle, Australia*

Ionospheric effects on global HF radio direction-finding from the Australasian region - 737

*Dave Neudegg, IPS Radio and Space Services, Australia*

Annual and Longitudinal Variation in Density in the Inner Magnetosphere - 738

*Frederick W. Menk, University of Newcastle, Australia*

A ULF wave model to study the Earth's magnetopause boundary - 739

*Matthew S. Ford, University of Newcastle, Australia*

IGY and the Development of a Small Government Agency - 740

*Philip Wilkinson, IPS Radio and Space Services, Australia*

The ionosphere of Mars - 741

*Dave Neudegg, IPS Radio and Space Services, Australia*

### 18:00-19:30 Poster 2.5

#### BMP

Out-of-field radiations dosimetry using  $^6\text{LiF:Mg,Cu,P}$  and  $^7\text{LiF:Mg,Cu,P}$  glass-rod TLDs - 742

*Rundgham Takam, The University of Adelaide, and Royal Adelaide Hospital, Australia*

A dosimetric evaluation of solid phantoms for low energy photon beams - 743

*Robin Hill, The University of Sydney, and Royal Prince Alfred Hospital, Australia*

Quasielastic Neutron Scattering from Water Confined in Porous Silicate - 744

*Daniel E. Page, Australian Nuclear Science and Technology Organization, Australia*

Partial Volume Effect in Small Animal Brain Positron Emission Tomography - 745

*Wencke Lehnert, University of Sydney, Australia*

Modeling the Projection Process in Pinhole SPECT Iterative Reconstruction - 746

*Steve Meikle, The University of Sydney, Australia*

Modeling of pixelated photon-counting detector for medical applications - 747

*Anja Schubert, The University of Melbourne, Australia*

Characterisation of an optical motion tracking device for small animal positron emission tomography - 748

*Andre Z Kyme, University of Sydney, Australia*

Clinical Implementation of the Eclipse Electron Monte Carlo Algorithm - 749

*Robin Hill, Royal Prince Alfred Hospital, Australia*

An evaluation of ionisation chambers for kilovoltage x-ray beam dosimetry - 750

*Robin Hill, The University of Sydney, and Royal Prince Alfred Hospital, Australia*

Initial Stage of the Experimental Investigation of the Radiation Induced Bystander Effect and its Possible Effect on Cell Survival in Dose Cold Spot. - 751

*Svetlana Sjotedt, University of Adelaide and Royal Adelaide Hospital, Australia*

Reducing Event Losses in PET Motion Correction Performed with LOR Rebinning - 752

*Roger Fulton, University of Wollongong, Australia*

### 18:00-19:30 Poster 2.6

#### AOS

Development of an Er:Yb:glass coherent laser radar - 753

*Matthew Heintze, University of Adelaide, Australia*

Dual-wavelength synchronously mode-locked Nd:CNNG laser - 754

*Dingyuan Tang, Nanyang Technological University, Singapore*

Control of the spectrum of Raman lasers - 755

*David J. Spence, Macquarie University, Australia*

Effect of Phase Mask Orders other than  $\pm 1$  on Spectral Properties of Fibre Bragg Gratings - 757

*Stephen F. Collins, Victoria University, Australia*

Power scaling 0.79 $\mu\text{m}$  pumped 2 $\mu\text{m}$  Thulium Fibre lasers - 758

*Shayne Bennetts, Defence Science and Technology Organisation, Australia*

Comparison of upconversion emissions in Er<sup>3+</sup>-doped ZBLAN and tellurite fibre laser - 759

*Yahua Li, University of Adelaide, Australia*

Confirmation that Fibre Bragg Gratings fabricated with a Phase Mask exhibit Features with a Wavelength corresponding to the Phase Mask Periodicity - 760

*Stephen F. Collins, Victoria University, Australia*

Short Pulse Gain-switched Thulium and Holmium Fibre Lasers - 761

*Ka S. Wu, University of Adelaide, Australia*

A LWIR imaging hyperspectral radiometer - 762

*Vladimyros Devrelis, Defence Science and Technology Organisation, Australia*

Modelling of glass flow during fibre preform extrusion - 763

*Heike Eborndorff-Heidepriem, University of Adelaide, Australia*

Simulations of quantum dynamics in optical fibre - 764

*Joel Corney, The University of Queensland, Australia*

Consistency of optical alignment during FBG fabrication and the spectral responses at twice the Bragg wavelength - 765

*Stephen F. Collins, Victoria University, Australia*

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*Andre Luiten, University of WA, Australia.*

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*Vladimyros Devrelis, Defence Science and Technology Organisation, Australia*

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*Andrew Lee, Macquarie University, Australia*

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*Nemanja Jovanovic, Macquarie University, Australia*

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#### PEG

Enhancing student engagement in Physics using portable interactive whiteboards - 840

*Christine Creagh, Murdoch University, Australia*

Physics lectures and the Tablet PC - 841

*Christine Creagh, Murdoch University, Australia*



# THURSDAY 4 DECEMBER

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### ASA

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*Laurence Campbell, Flinders University, Australia*

Some Models of the products of Solar Nucleosynthesis - 802  
*Peter Norman, Monash University, Australia*

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*Ragbir Bhathal, University of Western Sydney, Australia*

The Dark Quantum States of Gravity - 804  
*Allan D. Ernest, Charles Sturt University, Australia*

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### CSCMP

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*Jason A. Smith, University of Melbourne, Australia*

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*Graham Dennis, The Australian National University, Australia*

Thermal Fragmentation for Polymer-like Systems and Nano-clusters - 807  
*Mark Flegg, Queensland University of Technology, Australia*

A method for automate alpha peak characterization - 808  
*Peter Robinson, University of Sydney, Australia*

Plasma grown surface bound single walled carbon nanotubes: a large-scale simulation - 809  
*Kostya Ostrikov, The University of Sydney and CSIRO, Australia*

Chaotic Synchronisation of Scale Free Networks - 810  
*Skye Platten, University of Adelaide, Australia*

Emerging stripe patterns in drying suspension droplets - 811  
*Bjornar Sandnes, University of Oslo, Norway and University of Sydney, Australia*

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### CMMSP

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*Amid Ranjkesh, Guilan University, Iran*

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*Inderpreet Singh, University of Delhi South Campus, India*

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*Khian-Hooi Chew, The University of Western Australia, Australia*

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*Anders Barlow, Flinders University, Adelaide, Australia*

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*Jessica Van Donkelaar, The University of Melbourne, Australia*

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*Byron J Willis, University of Melbourne, Australia*

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*Dmitri K. Gramotnev, Queensland University of Technology, Australia.*

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*John C. Thomas, University of South Australia, Australia*

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*Greg Jakovidis, Monash University, Australia*

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*Liudmila A. Uvarova, Moscow State University of Technology, Russia*

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*Dimitri Gramotnev, Queensland University of Technology, Australia*

Adiabatic Nano-Focusing in Metal Tips with Different Shapes - 825  
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*Simon K. H. Lam, CSIRO, Australia*

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*Michelle Strack, University of Melbourne, Australia*

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*Andrew Alves, The University of Melbourne, Australia*

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*Darren J. Goossens, Australian National University, Australia*

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*Jessica M. Hudspeth, The Australian National University, Australia*

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*Daniel W. Drumm, University of Melbourne, Australia*

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*Cameron Langley Flinders University, Australia*

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*Dimitri Gramotnev, Queensland University of Technology, Australia.*

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*Cuong Ton-That, University of Technology Sydney, Australia*

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*Eric Tavenner, University of South Australia and University of Queensland, Australia*

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*Christine Lindstrom, University of Sydney, Australia*

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*Christine Creagh, Murdoch University, Australia*

Physics lectures and the Tablet PC - 841  
*Christine Creagh, Murdoch University, Australia*

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*Pradip K. Deb, University of Tasmania, and RMIT University, Australia*

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*Marc Wilke, Technische Universität Berlin, Germany*

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*Robert J. Carman, Macquarie University, Australia*

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*Duk-Yong Choi, Australian National University, Australia*

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*Matthew J. Hole, Australian National University, Australia*

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*Neil F. Cramer, University of Sydney, Australia*

Phase Removal Method for Fast Solution of Nonlinear Plasma Wave Equations - 864  
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**18:00-19:30 Poster 3.6****AOS**

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*Wonkeun Chang, The Australian National University, Australia*

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*Ming Shen, Australian National University, Australia and Shanghai University, P. R. China*

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*Natasha Devine, The Australian National University, Australia*

**18:00-19:30 Poster 3.7****ASGRG**

Galaxy redshift abundance periodicity from Fourier analysis of number counts from SDSS and 2dF GRS galaxy surveys - 869  
*John G. Hartnett, University of Western Australia, Australia*

Sensitivity of Pulsar Timing Arrays to Individual Sources of Gravitational Waves - 870  
*Daniel R.B. Yardley, CSIRO and University of Sydney, Australia*