

CONGRESS HANDBOOK



20th Australian

9 - 13 December 2012

INSTITUTE OF PHYSICS CONGRESS

Incorporating the
37th Australian Conference on
Optical Fibre Technology
(Associated event: Australian Optical Society Conference)

THE UNIVERSITY OF NEW SOUTH WALES
2012 SYDNEY

www.aip2012.org.au

Open the door to collaboration

From developing antibodies to creating lighter metals for next generation aircraft, our materials science division offers scientists incredible opportunity to work on diverse projects with real industrial impact.

A critical part of our science and our success is collaboration. We thrive on working with new people with new perspectives.

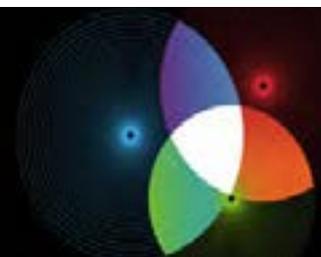
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- Funding for internships
- CSIRO scholarship program

To find out more visit:
www.csiro.au/careers or call us on 1300 363 400



IPAS Institute for Photonics & Advanced Sensing



The Institute for Photonics & Advanced Sensing (IPAS) is one of five research institutes at The University of Adelaide. IPAS fosters excellence in research in materials science, chemistry, biology and physics, and across these boundaries, and develops disruptive new tools for measurement.

IPAS creates the opportunity to invent and harness new tools for measurement to address many of the current exciting big questions in science. Many of the challenges we face as a society can only be solved by pursuing a transdisciplinary approach that brings together experimental physicists, chemists, material scientists, biologists, experimentally-driven theoretical scientists and medical researchers to create new sensing and measurement technologies. We work to create new tools that will change the questions scientists can ask, stimulate the creation of new industries, and create a new profession of transdisciplinary problem solvers.

Our research is focused around six Research Themes, which interconnect and allow us to tackle the major challenges facing Australia and the world and which offer particular opportunities for the development of new and disruptive technologies. An overview of these themes can be seen in a short video, which can be found at <http://www.adelaide.edu.au/ipas/>

We work on a wide spectrum of projects that range from fundamental to applied research projects, which gives us a feedstock of new approaches to bring to practical problems and opportunities to drive world-class research as well as engage closely with industry. The list below shows a cross section of some of the applications we are working on with industrial and government partners in specific market sectors:

- **Defence & national security** – corrosion detection, high power lasers and luminescence techniques.
- **Environmental & agricultural monitoring** – laser radar systems for monitoring wind, moisture and pollution in the atmosphere, sensors for monitoring soil and water quality.
- **Medical diagnostics** – rapid virus detection to help prevent global flu pandemics, early detection of cancer biomarkers and technologies to improve IVF success rates.
- **Food & wine** – monitoring of wine maturation, soil nutrient monitoring.

We are always seeking excellent scientists to join the team at IPAS – please visit our website www.adelaide.edu.au/ipas/jobs-study to find out more about the opportunities we have available.

Welcome from the Congress Chair

On behalf of the Australian Institute of Physics and the New South Wales Branch, it is my pleasure to welcome you to the 20th Australian Institute of Physics Congress held at the University of New South Wales over the coming week.

Co-located with the 37th Australian Conference on Optical Fibre Technology (ACOFT), the AIP/ACOFT 2012 Congress is the biggest and most diverse scientific meeting of the Australian physics calendar in 2012.

The Congress once again has attracted many of Australia's finest physicists plus a number of prominent overseas Plenary Speakers and attendees, representing over 14 different countries.

It provides a forum for discussions within specialist physics topic areas and opportunities for physicists from academia, government, industry and the commercial sector to keep up to date in areas outside their core interests. The Congress brings together approximately 20 special interest groups and, as was achieved in 2010, the incorporation of ACOFT will attract specialists working on diverse research applications of optical fibre technology.

Over the next four days I encourage you to maximise the opportunity to engage in plenary lectures, parallel sessions, poster sessions, a public lecture, industry workshops and poster sessions. In addition, please spend time in the exhibition area learning more about the latest products and services available in the marketplace.

Of course the social elements of the Congress allow for networking and engagement with your peers and colleagues so I look forward to seeing you at the Welcome Reception and Congress Dinner.

Thank you for taking the time to join us at the Congress and I hope you find the experience informative and enjoyable.

Dr Cathy Foley
Congress Chair

Welcome from the AIP President

Welcome to the 20th Australian Institute of Physics Congress, incorporating the 37th Australian Conference on Optical Fibre Technology (ACOFT). Once again many of our cognate societies have joined us at the Congress to hold their specialist meetings. Some of these are here for the first time like the Australian Society of Rheology and so we look forward to learning about new and varied areas of physics.

This has been a very special year for physics in Australia with Brian Schmidt (one of our plenary speakers) winning the Nobel Prize for Physics, the announcement of Western Australia as the selected site for the low frequency component of the Square Kilometre Array, operating funds for the Australian Synchrotron secured and the announcement, jointly at CERN and in Melbourne at the 36th International Conference on High Energy Physics, of the observation of the Higgs boson. We will hear about all these things and more.

In addition we start the 50th anniversary year of the Australian Institute of Physics at this Congress and there will be some announcements about activities for the year and new initiatives as part of the celebrations of our semi-centenary.

Running such a large and diverse meeting of physicists requires a team of dedicated and hard working people and I would like to thank the people behind the scenes who have made this meeting possible: Cathy Foley and her local Organising Committee; Rob Robinson and his Scientific Program Committee; the host organisations (AIP, AOS, ACOFT & Engineers Australia); and WALDRONSMITH Management our Conference Organisers and AIP Secretariat providers.

I wish all participants an enjoyable and productive Congress.

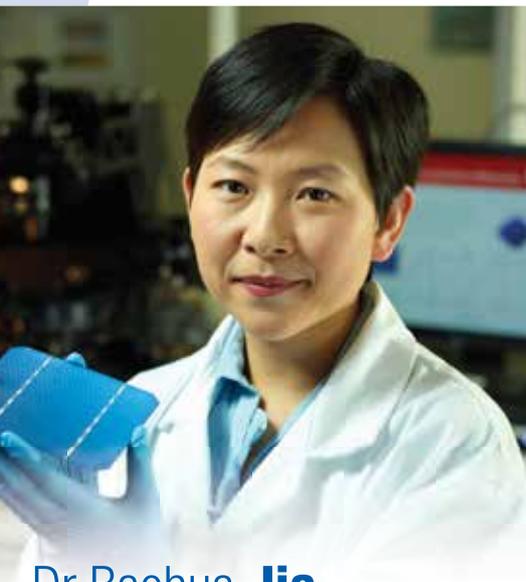
Dr Marc Duldig
President – Australian Institute of Physics

2012 AUSTRALIA & NEW ZEALAND L'ORÉAL FOR WOMEN IN SCIENCE FELLOWS

WE SUPPORT WOMEN WHO MOVE SCIENCE FORWARD.

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Dr Baohua Jia

Swinburne University of Technology, Melbourne, Australia.
More efficient solar cells using quantum dots.



Dr Suetonia Palmer

University of Otago, Christchurch, New Zealand.
Giving people with kidney disease control of their lives.



Dr Kylie Mason

**Walter and Eliza Hall Institute of Medical Research /
Royal Melbourne Hospital.** New treatments for blood cancers.

L'Oréal For Women in Science has grown into a global program that includes International, Regional and National Fellowships and an international network of more than 1,300 women in 106 countries. Each year, the national **L'Oréal For Women in Science Fellowship** awards three early career, female scientists with AUD\$25,000 for their remarkable contributions in science. Applications for the 2013 Australian & New Zealand Fellowships reopen in April, 2013. www.forwomeninscience.com

Australian
Synchrotron 

Beamtime Applications

Add your name to the list of over 3,000 users who have accessed the Synchrotron's unique capabilities as we celebrate our first five years of operation.

Submission dates for beamtime proposals at the Australian Synchrotron have been announced for 2013 access:

User Beamtime:	May – September 2013	September – December 2013
Call for proposals opens:	10:00am, 12 December 2012	10:00am, 8 May 2013
Call for proposals closes:	11:59pm, 13 February 2013	11:59pm, 5 June 2013

For more information on how to apply for beamtime at the Australian Synchrotron, please visit our website:

www.synchrotron.org.au

turning bright ideas into brilliant outcomes

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AIP 2012 Congress
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**UNSW School
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Media

Science in Public is assisting with the Congress media program. The Media Room is located in the Gonski Room in the John Niland Scientia Building. Alternatively you may contact Niall Byrne on mobile 0417 131 977 or email niall@scienceinpublic.com.au; or AJ Epstein on mobile 0433 339 141 or email aj@scienceinpublic.com.au

For further information visit: www.scienceinpublic.com.au/physicscongress

Congress Organisers

WALDRONSMITHManagement



We bring people together and your conference to life

119 Buckhurst Street
South Melbourne VIC 3205 Australia
T + 61 3 9645 6311
F + 61 3 9645 6322
E aip2012@wsm.com.au

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We encourage you
to keep in touch
with facebook and twitter
using the following:



facebook.com/AIP2012



[@aipc2012](https://twitter.com/aipc2012)

ANSTO is proud to support the

AIP / ACOFT 2012 Congress



Work with us and our specialised facilities to

ask and answer the **big questions.**

ANSTO's Bragg Institute is a world leader in neutron and X-ray scattering techniques, and houses the region's most comprehensive suite of neutron beam instruments.

Pictured: ANSTO's OPAL reactor building.

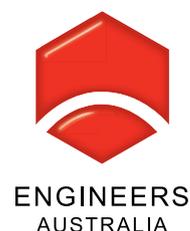
Organising Committee

Dr Cathy Foley (CSIRO), Chair
 A/Prof Brian James (University of Sydney), Secretary
 Dr Scott Martin (CSIRO), Treasurer
 A/Prof Judith Dawes (Macquarie University), Australian Optical Society
 Dr Rob Robinson (ANSTO), Scientific Program Committee Chair
 Dr Matt Arnold (University of Technology Sydney)
 Dr Dane McCamey (University of Sydney)
 Mr Peter Hitchiner (Engineers Australia)

Scientific Program Committee

Dr Rob Robinson (ANSTO), Condensed Matter Materials and Surface Physics, Chair
 Dr John Arkwright (CSIRO), Australian Conference on Optical Fibre Technology
 Prof Stephen Bartlett (University of Sydney), Quantum Information, Concepts and Coherence
 Dr David Cohen (ANSTO), Environmental Physics
 Dr Steve Gibson (Australian National University) Atomic and Molecular Physics
 Dr Pulin Gong (Sydney University), Complex Systems, Computational and Mathematical Physics
 Dr Tibor Kibedi (Australian National University), Nuclear Physics
 Dr Michael Lerch (University of Wollongong), Medical Physics
 Dr Dave Neudegg (Ionospheric Prediction Services), Solar, Terrestrial and Space Physics
 A/Prof John O'Byrne (University of Sydney), Astronomical Society of Australia
 A/Prof Manju Sharma (University of Sydney), Education
 A/Prof Michael Steel (Macquarie University), Australian Optical Society
 Dr John Steele (University of NSW), Australasian Society for General Relativity and Gravitation
 Prof Billy Todd (Swinburne University), Australian Society of Rheology
 A/Prof Kevin Varvell (University of Sydney), Particle Physics
 Prof Graham Town (Macquarie University), IEEE Photonics Society

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 Dr Jong Chow, Australian National University
 A/Prof Stuart Jackson, University of Sydney
 Dr Brendan Kennedy, University of Western Australia
 Dr Sergio Leon-Saval, University of Sydney
 A/Prof Steve Madden, Australian National University
 Prof Graham Town, Macquarie University

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Dr Rob Robinson, ANSTO

Astronomy and Astrophysics

Dr Kate Brookes, CSIRO
 A/Prof John O'Byrne, The University of Sydney
 Dr Katrina Sealey, Australian Astronomical Observatory
 Prof Lister Staveley-Smith, University of Western Australia

Atomic and Molecular Physics

Prof Michael Brunger, Flinders University
 Dr Jason Gascooke, Flinders University
 Dr Stephen Gibson, Australian National University
 Prof Anatoli Kheifets, Australian National University
 Dr James Sullivan, Australian National University
 A/Prof Duncan Wild, University of Western Australia

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 Dr Adam Hill, Victor Chang Cardiac Research Institute
 Dr Michael Lerch, University of Wollongong
 Prof Steve Meikle, University of Sydney
 Prof Peter Metcalfe, University of Wollongong
 Dr Marco Petasecca, University of Wollongong
 Dr Yujin Qi, University of Wollongong
 Prof Anatoly Rozenfeld, University of Wollongong
 Dr Mitra Safavi-Naeini, University of Wollongong
 Dr Moeava Tehei, University of Wollongong
 Prof Jamie Vandenberg, Victor Chang Cardiac Research Institute

Complex Systems, Computational and Mathematical Physics

Prof Pulin Gong, University of Sydney
 Prof Jaan Oitmaa, University of NSW

Condensed Matter, Materials and Surface Physics

Dr Jodie Bradby, Australian National University
 Dr Cathy Foley, CSIRO
 Prof Roger Lewis, University of Wollongong
 Dr Rob Robinson, ANSTO
 A/Prof Clemens Ulrich, University of NSW

Education

Mr John Daicopoulos, James Cook University
 Dr John Furst, University of Newcastle
 Dr David Hoxley, La Trobe University
 A/Prof Manjula Sharma, University of Sydney
 Dr Jim Webb, Griffith University

Energy, Energy Materials and Energy Systems

Dr Rob Robinson, ANSTO

Environmental Physics

Prof Dave Cohen, ANSTO

History of Physics and Industry

Dr Rob Robinson, ANSTO

Meteorology, Climate Change and Oceanography

Prof John Dodson, ANSTO

Nuclear and Particle Physics

Dr Tibor Kibedi, Australian National University
 A/Prof Kevin Varvell, University of Sydney

Optics, Photonics and Lasers

A/Prof Michael Steel, Macquarie University (Chair)
 Dr Chad Husko, University of Sydney
 Dr Maryanne Large, Canon Information Systems Research Australia
 Dr Christopher Poulton, University of Technology Sydney
 A/Prof Timothy Schmidt, University of Sydney
 A/Prof David Spence, Macquarie University

Plasma Science

A/Prof Brian James, University of Sydney
Dr Tony Murphy, CSIRO

Quantum Information, Concepts and Coherence Group

Prof Stephen Bartlett, University of Sydney
A/Prof Warwick Bowen, University of Queensland
A/Prof Matthew Davis, University of Queensland
Prof Geoff Pryde, Griffith University
A/Prof Gabriel Molina-Terriza, Macquarie University
Prof David Reilly, University of Sydney
Dr Tom Stace, University of Queensland
Dr Andrew Truscott, Australian National University

Relativity

Prof Susan Scott, Australian National University
Dr John Steele, University of NSW
Dr Ben Whale, University of Otago

Rheology

Dr Ahmad Jabbarzadeh, University of Sydney
Dr Ravi Jagadeeshan, Monash University
Dr Timothy Nicholson, University of Queensland
Dr Prabhakar Ranganathan, Monash University
Dr Anthony Strickland, University of Melbourne
Prof Billy Todd, Swinburne University of Technology

Solar, Terrestrial and Space Physics

Dr Iver Cairns, University of Sydney
Dr Marc Duldig, University of Tasmania
Dr Trevor Harris, DSTO
Prof Fred Menk, University of Newcastle
Dr Dave Neudegg, Bureau of Meteorology & Australian Ionospheric Prediction Service
Prof Iain Reid, University of Adelaide

Women in Physics

Dr Cathy Foley, CSIRO



THE UNIVERSITY OF
SYDNEY

IPOS

INSTITUTE OF PHOTONICS AND OPTICAL SCIENCE



The Institute of Photonics and Optical Science (IPOS) brings together photonics and optics research across the University of Sydney. IPOS is home to state of the art research facilities, including:

IPOS Research Laboratories

Some facilities are part of the Australian National Fabrication Facility (ANFF) Opto-Fab node, and can be accessed by Australian researchers.

Bandwidth Foundry International (BFI)

BFI has micro- and nano-fabrication capabilities and supports a wide range of research in photonics and semiconductors, as well as the education and training of postgraduate students.

Australian Institute of Nanoscience (AIN)

The AIN is a major new nanoscience fabrication and experimental facility underpinning research in photonics, quantum science, astronomy and space physics and materials.



For information please visit sydney.edu.au/ipos

Sponsors

The Congress gratefully acknowledges the support from its sponsors.

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CONGRESS DINNER SPONSOR



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POSTER SESSION SPONSOR



SPECIAL SESSION SPONSOR

ANFF Workshop:
Introduction to Fabrication
for Semi Conductors,
Optics and Photonics

Plenary 7

Joint: Optics, Photonics and
Lasers + Condensed Matter,
Materials and Surface
Physics (X-ray Optics)

Women in Physics Session



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astrophotonics

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Integral to the Congress is a valued exhibition allowing you the opportunity to meet and view the latest products and services available in the market place.

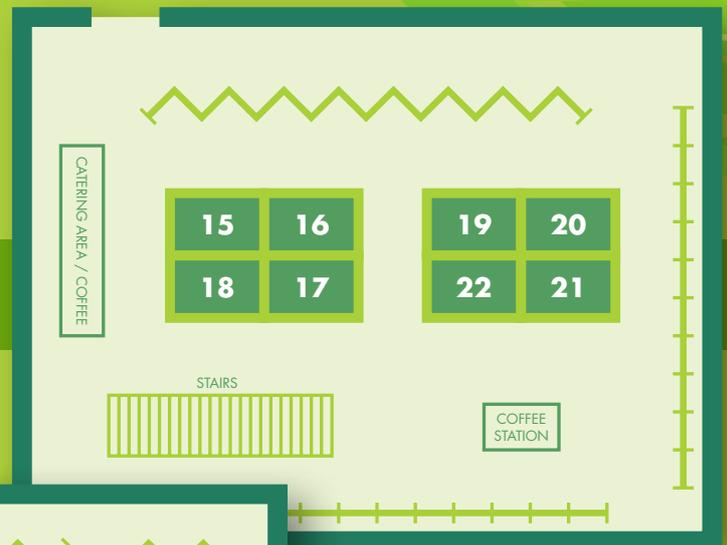
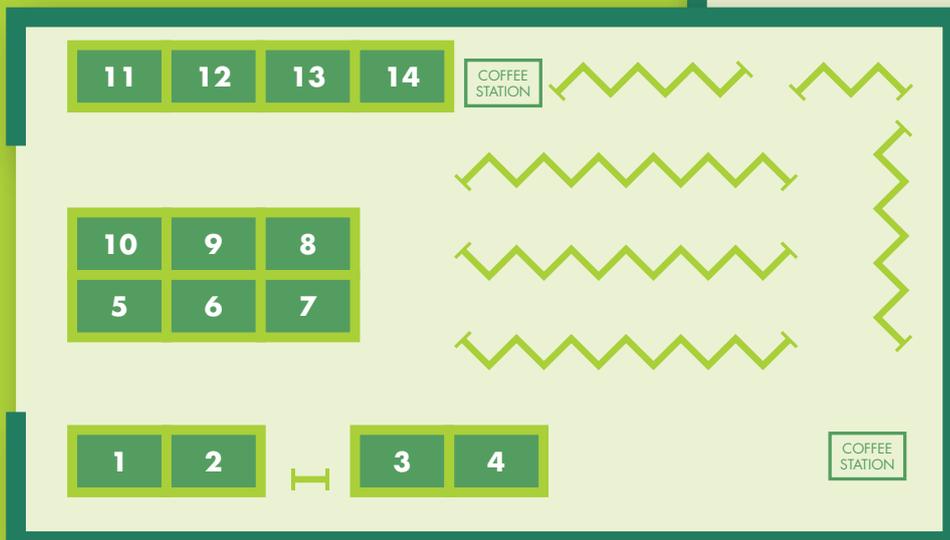
Located in Leighton Hall on the ground floor and Tyree Room on level 1 of the John Niland Scientia Building, the exhibition will be open the following times:

Sunday 09 December 2012	1700 – 1900 hrs
Monday 10 December 2012	0800 – 1830 hrs
Tuesday 12 December 2012	0800 – 1730 hrs
Wednesday 12 December 2012	0800 – 1830 hrs
Thursday 13 December 2012	0800 – 1530 hrs

The Scientific Posters and Exhibition have been combined in the same areas. Posters will be available for viewing from 0800hrs Monday – 1530hrs Thursday or the designated poster session time.

Exhibition Floor Plan

LEIGHTON HALL – Ground Floor



TYREE ROOM – Level 1

Venue

The University of New South Wales (UNSW) is the host venue for the Congress. Established in 1949, it is one of Australia's leading research and teaching universities.

Address:

High Street, Kensington, NSW 2052
Australia
www.unsw.edu.au

The Registration and Information Desk, Speaker Preparation Room, Media Room, Exhibition and Posters will be located in the John Niland Scientia Building (refer to building G19 on map below). The Opening Plenary Session will be located in the Clancy Auditorium (refer to building C24 on the map below) whilst the remainder of Plenary and Concurrent Sessions will be held in the nearby Central Lecture Block (refer to building E19 on the map below).

Delegates are encouraged to enter via Gate 11 on Botany Road, Kensington.

Directions and Transport

Located 7kms from the Sydney CBD in Sydney's Eastern suburbs, UNSW is well serviced by public transport. Onsite parking requires payment but, out of session, street parking is usually easy.

Onsite Parking Facilities

All day casual parking is generally available on the top floors of the Barker Street (Gate 14) and Botany Street (Gate 11) car parks. Sometimes this parking may not be available due to various other demands. Short-term, paid 2P parking is also available via most entrance gates.

Getting there from Sydney Airport

UNSW is only 6kms from Sydney Airport. Delegates can simply catch a taxi direct to UNSW or nearby accommodation or catch the Airport Train to the Central Station (www.airportlink.com.au) and then a bus or taxi to UNSW.

Public Transport

In regards to public transport, bus is the best method by which to get to the University.

Gate 9 on High Street is the stop closest to the bus stations.

Below are some suggested bus routes from key locations in Sydney.

From Central Station (Sydney CBD)

– 20 min journey

- 891 from Eddy Avenue Stand D
- M50 from Elizabeth Street near Devonshire Street, Surry Hills

From Circular Quay (Sydney CBD)

– 30 min journey

- 377 from Circular Quay Stand D
- 373 from Circular Quay Stand D

From Coogee Beach – 10 min journey

- 370 from Arden Street
- M50 from Arden Street

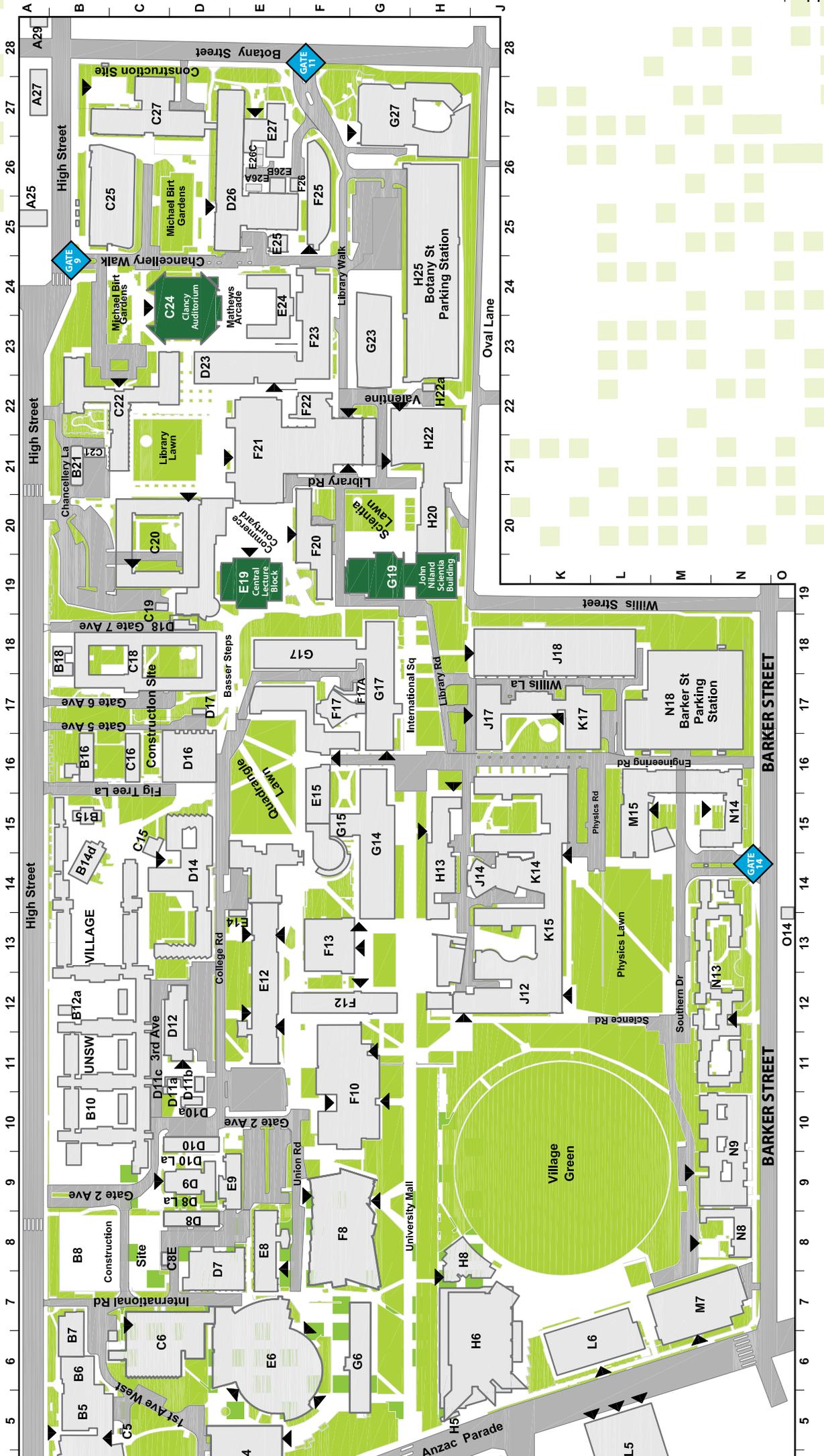
From Bondi Beach – 45 min journey

- 333 from Campbell Parade to Bondi Junction, then 400 from Bondi Junction Interchange Stand E

Important to Note: The above are suggested routes to take with approximate journey times.

It is recommended you refer to www.131500.com.au/plan-your-trip for further information.

Campus Map



General Information

ATM Facilities

The closest ATM facilities are a Westpac Bank located outside the Clancy Auditorium and a Commonwealth Bank located outside the Library.

Catering

Morning and afternoon tea will be served in Leighton Hall, where the Congress Exhibition will be held. Lunch is at your own arrangement and can be purchased at any of the food and beverage outlets located on Mathews Arcade, outside the Clancy Auditorium. There is also the Blue Stone Cafe which is located next to Central Lecture Block. Refreshments will be served during the Welcome Reception as well as both Poster Sessions.

CD of Proceedings

The CD of proceedings will be distributed at Registration.

Child Care Services

Sydney offers a wide range of activities and sights for your family to enjoy. If childcare or babysitting services are required, please contact your hotel concierge in advance for recommendations and bookings.

Climate

December in Sydney is the first month of summer with daytime temperatures reaching low 30 degrees Celsius. Evenings can be slightly cooler with an average of 16 degrees Celsius.

Credit Cards

Visa and MasterCard will be accepted at the Registration and Information Desk. Most hotels, large restaurants and shops will accept international credit cards, the most widely recognised being American Express, Diners Club, MasterCard and Visa.

Disclaimer

The AIP/ACOF 2012 Congress, including the Congress Organisers, will not accept liability for the damages of any nature sustained by participants or their accompanying persons for loss or damage to their personal property as a result of Congress and Exhibition or related events. All details contained in this handbook are correct at the time of printing.

Exhibition

The Exhibition will be held at Leighton Hall in the John Niland Scientia Building.

Exhibition

Opening Hours:

Sunday 09 December 2012
1700 – 1900 hrs

Monday 10 December 2012
0800 – 1730 hrs

Tuesday 11 December 2012
0800 – 1730 hrs

Wednesday 12 December 2012
0800 – 1730 hrs

Thursday 13 December 2012
0800 – 1530 hrs

Insurance

Delegates are strongly advised to secure appropriate travel and health insurance. Delegate registration fees do not provide any such insurance coverage. The Congress Organising Committee and the Congress Office accept no responsibility for any loss in this regard.

Internet Access

Please note that wireless internet is available for all delegates on a complimentary basis. The UNSW Campus Wireless Network which will be used is called UniWide Guest.

To access UniWide, you will need a properly configured 802.11a/b/g/n (WiFi) compatible laptop computer or mobile device. Most new laptops and handheld wireless devices come with in-built 802.11a/b/g/n WiFi support. You can also purchase a Wireless Network Interface Card and install it into an existing laptop.

The Congress Office has sent registered delegates the password details and configuration and installation details in advance. If you require any further assistance please contact the Registration and Information desk.

Language

The official language of the Congress is English.

Name Badges

Your name badge is your entry to all sessions, the exhibition, inclusive social functions as well as morning and afternoon teas (all served in the exhibition area). Please wear your name badge at all times. The swapping of the Congress lanyard with your own lanyard is not permitted. Tickets are required for admission to all non inclusive social functions, and if purchased, will be issued with your name badge.

People with Special Needs

Every effort will be made to ensure that delegates with special needs are catered for. However any special requirements given onsite at the Congress, without prior notice, cannot be guaranteed to be catered for.

Registration and Information Desk

The Registration Desk and Information Desk is in the foyer of the John Niland Scientia Building and will be open during the following times:

Sunday 09 December 2012
1330 – 1900 hrs

Monday 10 December 2012
0730 – 1730 hrs

Tuesday 11 December 2012
0730 – 1730 hrs

Wednesday 12 December 2012
0730 – 1730 hrs

Thursday 13 December 2012
0730 – 1700 hrs

Smoking Policy

Smoking is prohibited in all areas except within the designated smoking zones.

Speaker Preparation Room

Speakers will be able to review their presentations in the Speaker Preparation Room located in the Peter Farrell room in the John Niland Scientia Building as per the following times:

Sunday 09 December 2012
1300 – 1900 hrs

Monday 10 December 2012
0730 – 1700 hrs

Tuesday 11 December 2012
0730 – 1700 hrs

Wednesday 12 December 2012
0730 – 1700 hrs

Thursday 13 December 2012
0730 – 1530 hrs

Time Zone

Sydney operates on Eastern Daylight Savings Time 11 hours ahead of GMT.

Registration Entitlements

Registration Inclusions

Full Member Registrations

- Entry to program sessions
- Entry to the Exhibition
- Congress satchel and name badge
- Daily morning and afternoon tea
- Attendance at the Welcome Reception
- Attendance at poster sessions 1 & 2
- Option to attend the public lecture and associated workshops

Undergraduate/Post Graduate Students or Unfunded Retirees

- Entry to program sessions
- Entry to the Exhibition
- Congress satchel and name badge
- Daily morning and afternoon tea
- Attendance at the Welcome Reception
- Attendance at poster sessions 1 & 2
- Option to attend the public lecture and associated workshops

Day Registrations

- Entry to program sessions (on designated day only)
- Entry to the Exhibition (on designated day only)
- Congress satchel and name badge
- Daily morning and afternoon tea (on designated day only)
- Attendance at the Welcome Reception, poster session 1 & 2 (if applicable on designated day only)
- Option to attend the public lecture and associated workshops

Sponsors/Exhibitors

Entry to program sessions

- Entry to the Exhibition
- Congress satchel and name badge
- Daily morning and afternoon tea
- Attendance at the Welcome Reception
- Attendance at poster sessions 1 & 2
- Option to attend the public lecture and associated workshops

Lunch

Lunch is NOT included in registration fees.

Congress Dinner

The Congress Dinner (Tuesday 11 December 2012) is an ADDITIONAL social function and is NOT INCLUDED in any registration category.

Ticket/s are available for purchase at a cost of \$145 per person

Congress Accommodation

Crowne Plaza Coogee

242 Arden Street
Coogee NSW 2034
T: 02 9315 7600

Distance to UNSW: 3.1km
Public bus service available
(approximately 10 minutes)

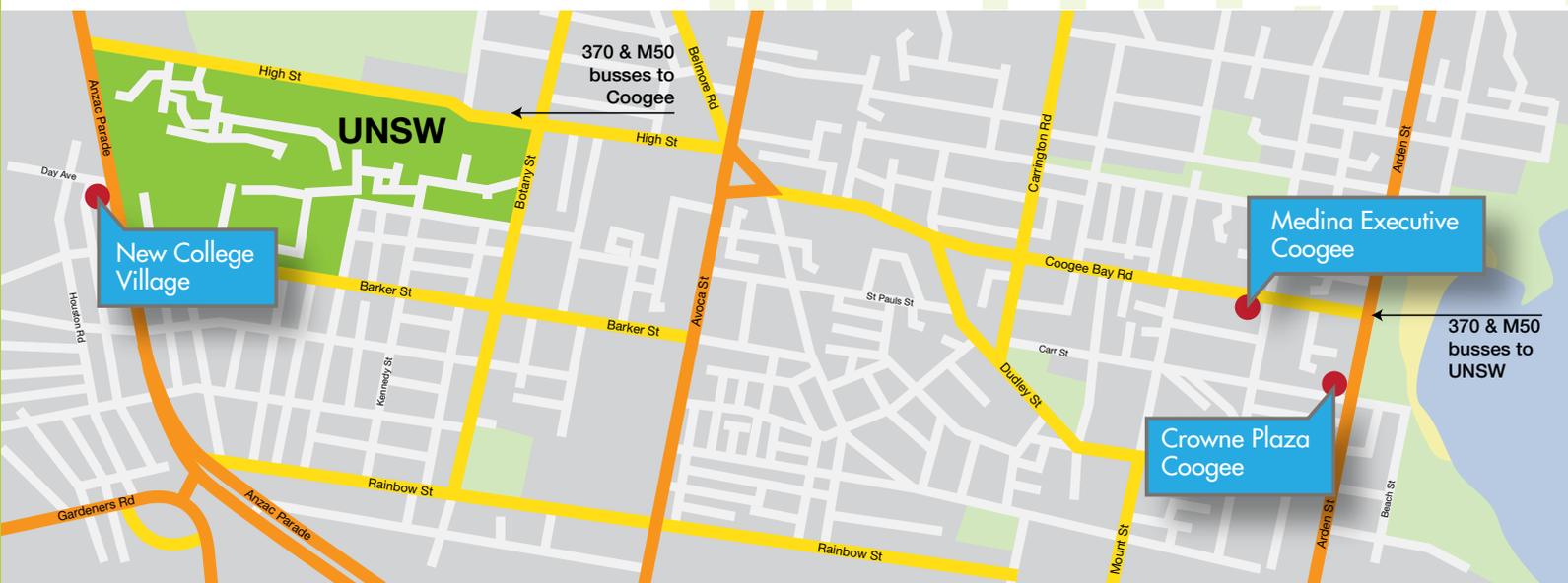
Medina Executive Coogee

183 Coogee Bay Road
Coogee NSW 2034
T: 02 9578 6000

Distance to UNSW: 3km
Time Public Bus Service available
(approximately 10 minutes)

New College Village

Corner of Anzac Parade
and Day Avenue
Kensington NSW 2052
T: 02 8344 4500



Social Program

Welcome Reception

Proudly sponsored by:

IOP Institute of Physics

Sunday 09 December 2012

Time: 1700 – 1900 hrs

Venue: Exhibition Area
John Niland Scientia Building

Dress: Smart Casual

Inclusive: Registered delegates

Enjoy a selection of canapés and drinks as you mingle throughout the Exhibition. It is a great opportunity to catch up with old friends and make new acquaintances.

Poster Sessions

Proudly sponsored by:



Poster Sessions will be held over two days in the Exhibition area and are available to all registered delegates.

Posters will be scheduled according to topic with presenting authors available at the poster board for informal discussion. Light refreshments will be served.

Poster Session 1

Monday 10 December 2012

1700 – 1830 hrs

Poster Session 2

Wednesday 12 December 2012

1700 – 1830 hrs

Congress Dinner

Proudly sponsored by:



Ansto

Nuclear-based science benefiting all Australians

Tuesday 11 December 2012

Time: 1900 – 2300 hrs

Venue: Dockside
Cockle Bay Wharf
Darling Harbour

Dress: Smart Casual

Cost: \$145 per person

The Congress dinner is an ADDITIONAL social function and is not included in ANY registration category.

Dockside is ideally positioned within Cockle Bay Wharf, Darling Harbour. With sparkling water and panoramic views stretching over Darling Harbour, Dockside blends function and space with a reputation for culinary excellence and exceptional service. An ideal evening to sit and enjoy some great food, wine and conversation.

Coach transfers will be available departing from the Gate 11, UNSW to the Congress Dinner Venue as follows;

- 1815 hrs
- 1830 hrs – Last bus

We will also have return coach transfers starting from 2230 hrs with the last bus leaving at 2315 hrs to take delegates back to UNSW, Crown Plaza Coogee and Medina Executive Coogee

AIP – Medals and Awards

The Congress will highlight contributions to Physics through the awarding of prizes for excellence. These will be awarded at the Congress dinner on Tuesday evening.

Alan Walsh Medal for Service to Industry

This award recognises significant contributions by a practising physicist to industry in Australia. It commemorates the late Sir Alan Walsh, Kt, FAA, FTS, FRS, one of Australia's most eminent and distinguished scientists, who was the originator and developer of Atomic Absorption Spectrophotometry (AAS) and pioneered its application as a tool in chemical analysis.

Born in Lancashire in 1916 and educated at Darwen Grammar School, Sir Alan studied physics at Manchester University. After a few years in industry in the UK, he was recruited in 1946 to join the newly created Chemical Physics Section of the CSIR Division of Industrial Chemistry in Melbourne. In 1952 he had the idea of using atomic absorption spectra, rather than atomic emission and molecular absorption spectra, in spectrochemical analysis. The subsequent development of AAS as a simple, rapid and inexpensive method for the analysis of minute traces of metals (and some non metals) is a tribute to Sir Alan's extraordinary creativity, his business acumen and his infectious enthusiasm. He promoted the establishment of an Australian manufacturer of the atomic absorption spectrophotometer, the original company Techtron Pty Ltd eventually growing into Varian Australia, now one of the world's leading spectroscopic instrument companies.



Winners: Prof Michael Tobar and Prof Eugene Ivanov for their outstanding research in the development of ultra low noise sapphire microwave oscillators, and their contributions to, and continuing involvement in, the realisation of commercial applications of this technology.

Bragg Gold Medal for Excellence in Physics

The Bragg Gold Medal for the best PhD thesis by a student from an Australian University was established in 1992 as an initiative of the South Australian Branch, to commemorate Sir Lawrence Bragg and his father Sir William Bragg. The medal is awarded annually to the student who is judged to have completed the most outstanding PhD in physics under the auspices of an Australian University.



Winner: Dr Eva Kuhnle from the Swinburne University of Technology for her thesis titled: *"Studies of Universality in Strongly*

Interacting ^6Li Fermi Gases with Bragg Spectroscopy"

Nature distinguishes between particles with integer spin and half-integer spin, bosons and fermions, respectively. At very low temperatures bosons can undergo Bose-Einstein condensation while fermions need to interact with another fermion of opposite spin to form a Fermi superfluid. A possible system to study pairing mechanisms of fermions is an ultracold gas of ^6Li atoms where the sign as well as strength of the interaction is tunable. In the thesis of Dr Kuhnle, such a system was employed to form a dilute strongly interacting Fermi gas on which Bragg spectroscopy was performed to measure structure factors and the universal contact parameter for short-range pair correlations.

Harrie Massey Medal and Prize

This prize is awarded every two years for contributions made by an Australian physicist working anywhere in the world, or to a non-Australian for work they have carried out in Australia.

The Massey Medal was proposed at the AIP Congress in 1988 and established in 1990 as a gift of the Institute of Physics, UK, to mark the 25th anniversary of the founding of the AIP as a separate institution in 1963.

Sir Harrie Massey, born near Melbourne in 1908, had a distinguished career in the UK and in 1931, with Edward Bullard, published the first experimental evidence for electron diffraction in gases. He saw the potential of using direct rocket probes of the atmosphere layers and eventually, as Chairman of the British National Committee for Space Research, he guided the entire UK space research program. From 1960 – 64 he was President of the European Preparatory Commission for Space Research. He was knighted in 1960.



Winner: Dr Tony Murphy for his outstanding research in the field of thermal plasmas, in particular his work on computational modelling and

measurement techniques, and their application to the development of industrial processes.

AIP – Medals and Awards – *continued*

AIP Education Medal

The purpose of this prize is to recognise an outstanding contribution to physics education in Australia.

The award was proposed as an initiative of the Physics Education Group at the 2002 AIP Congress in Adelaide.

The prize is awarded to any member of the AIP who is judged to have made a significant contribution to physics education in Australia. In determining the recipient of the award, the quality of the work, the significance to physics education and the creativity displayed will be taken into account.



Winner: A/Prof Manjula Sharma from the University of Sydney

A/ Prof Manjula Sharma has significantly contributed to

physics education in Australia. Her contribution has been sustained, as demonstrated by service over many years. The creativity and quality of her work is evidenced by repeated research funding, research publications, peer reviewed articles and citations. Her work has been of national importance which is clearly demonstrated by her leadership of national physics teaching initiatives. A/Prof Sharma is also the Leader of SaMnet, the Science and Mathematics network of Australian University Educators, representing physics education in the broader community. Her work is recognised internationally through research partnerships and service on the Editorial Board of Physical Reviews – Special Topic Physics Education Research and Scientific Advisory Committee of the World Conference on Physics Education.

A/Prof Sharma will be presenting a paper at Congress on the changing face of education and the challenges and opportunities for physics.

Walter Boas Medal

The Medal was established in 1984 to promote excellence in research in Physics and to perpetuate the name of Walter Boas. The award is for physics research carried out in the five years prior to the date of the award, as demonstrated by both published papers and unpublished papers prepared for publication.



2011 Winner: Prof Ben Eggleton

Prof Eggleton was awarded the 2011 Boas Medal for his fundamental research in

the physics of non-linear optics and the application of this work to the development of practical devices and disruptive technologies in optical communication, data storage and information processing. His work is unquestionably world-leading. Particularly impressive highlights are the development of chalcogenide materials for non-linear optics applications and the ability to precisely control the flow of light via innovative photonic-crystal structures. Prof Eggleton's establishment and leadership of CUDOS and IPOS augurs well for the future of this exciting work.

AIP Women in Physics Lecturer

The Australian Institute of Physics Women in Physics Lecture Tour celebrates the contribution of women to advances in physics. Under this scheme, a woman who has made a significant contribution in a field of physics gives lectures across the country to both specialist and non-specialist audiences. Presentations include school lectures, public lectures and research colloquia. Public lectures are expected to increase awareness among students and their families of the possibilities offered by a career in physics. In 2009 the Women in Physics group suggested that a medal should be awarded to each one of these remarkable women in order to recognise the outstanding contribution they have each made to physics.

Many of these medals were presented retrospectively to the AIP Women in Physics Lecturers at the 2010 Congress in Melbourne. The presentation to those recipients who were not able to attend the 2010 Congress and who are present at the 2012 will be made at this Congress. Awards still to be presented are listed below.

2011 – Dr Tamara Davis, Department of Physics, The University of Queensland

2006 – Prof Deb Kane, Physics Department, Macquarie University.

2002 – A/Prof Lidia Morawska, School of Physical and Chemical Sciences, Queensland University of Technology

2000 – Dr Michelle Simmons, School of Physics, University of New South Wales

1997 – Dr Rachel Webster, School of Physics, University of Melbourne

AOS – Prize Winners

The Australian Optical Society proudly announces the 2012 AOS Prize winners:

AOS W.H. (Beattie) Steel Medal
Prof Barry Luther-Davies

Awarded for outstanding contributions to the field of Optics within Australia. The AOS Medal is named in honour of WH (Beattie) Steel, one of the founders of the AOS, and an international authority on interferometry. We congratulate Prof Barry Luther-Davies as a distinguished winner of this award, for his achievements in lasers and nonlinear optics over many years.

AOS Geoff Opat Early Career Researcher Prize

Dr Nathan Langford

Recognising an outstanding early career researcher for his contribution to the field of optics

Associated Events

In addition to the main Congress Scientific Program, please be aware of the following events and meetings:

Sunday 09 December 2012

Australian National Fabrication Facility Workshop

Time: 0900 hrs Registration
0930-1330 hrs Workshop
Venue: Registration & Workshop – Central Lecture Block
All registered delegates are welcome to attend at no extra cost.

Connect YOUR Research to Industry Workshop

Time: 1330 hrs Registration
1400-1700 hrs Workshop
Venue: John Niland Scientia Building – Registration
Central Lecture Block 7 – Workshop
All registered delegates are welcome to attend at no extra cost. Prior booking is required so please see the Registration and Information Desk for details.

Monday 10 December 2012

AOS Council Meeting – by invitation only

Time: 1230-1330 hrs
Venue: Gallery Room 2 – John Niland Scientia Building

Women in Physics Dinner – rsvps required

Time: 1900 hrs
Venue: Mamma Teresa Italian Restaurant
412 Anzac Parade Kingsford
(walking distance of UNSW)
Cost: \$30 per person plus drinks
Payment: Required on the night
RSVP: sam.hogan@csiro.com.au

Tuesday 11 December 2012

ACOFT Steering Committee Meeting – by invitation only

Time: 1230-1330 hrs
Venue: Gallery Room 2 – John Niland Scientia Building

Wednesday 12 December 2012

AIP Sponsored Meeting of Heads of Physics in Universities, Government and Industry

Time: 1230-1330 hrs
Venue: Gallery Room 2 – John Niland Scientia Building

A celebration of the contributions of Prof Hans Bacher – by invitation only.

Time: 1800-1930 hrs
Venue: AGSM Building at Gate 11

Thursday 13 December

OSA Student Chapter Lunch

Time: 1230-1330 hrs
Venue: Gallery Room 2 – John Niland Scientia Building

Public Lecture

The Accelerating Universe



Prof Brian P. Schmidt

astronomers have used observations to trace our universe's history back more than 13 billion years, leading them to ponder the ultimate fate of the cosmos.

In 1998 two teams traced back the expansion of the universe over billions of years and discovered that it was accelerating, a startling discovery that suggests that more than 70% of the cosmos is contained in a previously unknown form of matter, called Dark Energy. The 2011 Nobel Laureate for Physics, Brian Schmidt, leader of the High-Redshift Supernova Search Team, will describe this discovery and explain how

A free public lecture will be held on Wednesday 12 December 2012 at the University of NSW at the Central Lecture Block Room 7 from 1830 – 2000 hrs presented by the 2011 Nobel Prize winner Prof Brian Schmidt.

Sponsored by NSW Office of Science & Research, Department of Trade and Investment



sydneyaustralia.com

Connect YOUR Research with Industry Workshop

Proudly Sponsored by



You are invited to a workshop to learn how to connect your research with industry. Learn from four industry leaders as they share their insights and experiences with you on issues such as how to identify market opportunities, spinoffs versus technology licensing, the importance of patenting, business plans and venture capital, mentoring, etc. A valuable opportunity not to be missed.

The workshop is included for registered delegates at no extra cost and limited numbers are available.

Date: Sunday 09 December 2012

Registration: John Niland Scientia Building

Registration: 1330-1400 hrs

Workshop: 1400-1700 hrs

Welcome by Prof Mary Kane, NSW Chief Scientist and Engineer

Session Chaired by Prof Ben Eggleton

Presenters Include:

- 1415 hrs Dr Milton Chang – US based Entrepreneur
- 1455 hrs Dr Simon Poole, Sydney based Photonics Entrepreneur
- 1520 hrs Prof John Harvey, NZ based Entrepreneur and Physics Professor
- 1545 hrs A/Prof Jim Patrick, Senior Vice President, Chief Scientist, Cochlear Pty Ltd

Dr Milton Chang US based Entrepreneur



Dr Milton Chang is Managing Director of Incubic management and is the Author of *Toward Entrepreneurship* (www.miltonchang.com). He was President of Newport and New Focus, which he took public. He is currently Director of MBio Diagnostics, and Aurrion, spends time advising companies and mentoring

entrepreneurs, and writes a monthly business column for the *Laser Focus World*. Chang is currently a member of the SEC Advisory Committee on Small and Emerging Companies and a Trustee of the California Institute of Technology.

Chang earned a B.S. in electrical engineering with highest honors from the University of Illinois and M.S. and Ph.D. degrees in EE from Caltech and he has completed the Harvard Owner President Management program. He received a Distinguished Alumni Award from Caltech in 2002, and was also named a Distinguished Alumnus by the University of Illinois. He is a Fellow of IEEE, Optical Society of America, and the Laser Institute of America (LIA), and past president of IEEE Photonics Society and LIA. He has also served on the Visiting Committee of the National Institute of Standards and Technology and the Committee on Harnessing Light: Capitalizing on Optical Science Trends and Challenges for Future Research, a report published by the National Research Council of the National Academies. Chang is a Member of the Committee of 100, an association of Chinese Americans who are leaders in their fields.

Dr Simon Poole Sydney based Photonics Entrepreneur



Dr Simon Poole is an engineer/entrepreneur with over 30 years experience in photonics in research, academia and industry. He obtained his PhD from Southampton University and was a member of the team that invented the Erbium-Doped Fibe Amplifier (EDFA) in 1985.

After moving to Australia he founded the Optical Fiber Technology Centre (OFTC) and later directed the Australian Photonics Cooperative Research Centre (APCRC) node at the University of Sydney. The APCRC grew to over 150 researchers and led to 15 start-ups with over \$250m in Venture Capital funding.

In 1995, Dr Poole led the first spin-off company from the APCRC, Indx Pty Ltd which manufactured Fiber Bragg Gratings for optical communications. Indx was acquired by Uniphase Corporation (now JDS Uniphase) and subsequently grew to over 300 people with exports of over \$100m pa. He subsequently worked as a venture partner before co-founding Engana Pty Ltd in 2001. The company, now Finisar Australia, employs 280 people in Sydney and a similar number in China, with annual sales of Wavelength Selective Switches of >\$100m pa.

In 2008, Dr Poole started the New Business Ventures Group within Finisar, using the principles of Open Innovation. The first business within this group was the WaveShaper range of Programmable Optical Processors with sales of over \$6m pa.

Dr Poole is a Fellow of the IEEE and of the Institute of Engineers Australia. He has over 150 refereed papers and 7 patents.

Prof John Harvey

NZ based Entrepreneur and Physics Professor



John Harvey is a professor of Physics at the University of Auckland, and he is an internationally-recognised scientist in the fields of physics and optical communications. He is also the founder and Chief Executive Officer for Southern Photonics Ltd., an Auckland-based photonics company. Southern Photonics is the leading photonics technology

company in New Zealand, specialising in Test and Measurement equipment in the fields of coherent modulation communication technologies and short laser pulse characterisation. Southern Photonics offers a complete range of equipment from signal generation to performance monitoring in these areas, and has recently developed strategic partnerships with a number of local and overseas companies.

John has received numerous professional honours during the course of his career. He is a Fellow of the New Zealand Institute of Physics, the Royal Society of New Zealand and the Optical Society of America.

A/Prof Jim Patrick

Senior Vice President, Chief Scientist, Cochlear Pty Ltd

DEng, BSc, MSc, FIEAust, CPE (Biomed), FTSE



A/Prof Jim Patrick is responsible for the global research portfolio of projects that feed into the commercial development stream. One of the original researchers involved with the cochlear implant program in Melbourne from 1975, Jim has worked in a number of senior managerial positions at Cochlear since its inception in 1981. Jim is an

Associate Professor at the Department of Otolaryngology at The University of Melbourne and Adjunct Professor at La Trobe University.

Plenary Speakers

Professor Elisabetta Barberio

University of Melbourne,
Australia



Professor Elisabetta Barberio is a member of the Experimental Particle Physics Group at the University of Melbourne. She joined the University of Melbourne in 2004. Previously, she was a staff researcher at CERN, (CH), the European laboratory of Particle Physics. She played a crucial role in data analysis in the OPAL experiment at Large Electron Positron Collider at CERN. Precision measurements made at this collider have confirmed the theory describing the fundamental particle behaviour to an extraordinary degree of precision. She is currently participating in the e ATLAS experiment and her group had an important role in the discovery of the Higgs boson like-particle at the Large Hadron Collider.

Professor Gary Horowitz

University of California, USA



Professor Gary Horowitz is a Professor of Physics at the University of California, Santa Barbara. He received his B.A. at Princeton University in 1976 and Ph.D. at the University of Chicago in 1979. He was a postdoc at the Mathematical Institute, Oxford, and member of the Institute for Advanced Study, Princeton before moving to Santa Barbara.

Professor Horowitz is a member of the U.S. National Academy of Science, a fellow of the American Physical Society and member of the International Committee for the General Relativity and Gravitation Society. Professor Horowitz has written over 150 research articles, including the most cited particle physics paper in the 1980's.

Dr Thomas Mason

Oak Ridge National Laboratory,
USA



Dr Thomas Mason is a native of Dartmouth, Nova Scotia, in Canada. He graduated from Dalhousie University in Halifax, Nova Scotia, with a Bachelor of Science

degree in physics and completed his postgraduate study at McMaster University in Hamilton, Ontario, Canada, receiving a Doctor of Philosophy degree in experimental condensed matter physics.

After completing his Ph.D., he held a postdoctoral fellowship at AT&T Bell Laboratories in Murray Hill, New Jersey, and then became a Senior Scientist at Risø National Laboratory in Denmark. In 1993 he joined the faculty of the Department of Physics at the University of Toronto.

Dr Mason joined Oak Ridge National Laboratory (ORNL) in 1998 as Scientific Director for the U.S. Department of Energy's Spallation Neutron Source (SNS) project. In April 2001 he was named Associate Laboratory Director for SNS and Vice President of UT-Battelle, LLC, which manages ORNL for the Department.

In 2006 he became Associate Laboratory Director for Neutron Sciences, leading a new organization charged with delivering safe and productive scientific facilities for studying the structure and dynamics of materials. In May 2007, he was named Director of ORNL and President and CEO of UT-Battelle.

Dr Mason's research background is in the application of neutron scattering techniques to novel magnetic materials and superconductors using a variety of facilities in North America and Europe. As Director of the U.S. Department of Energy's largest science and energy laboratory he has an interest in advancing materials, neutron, nuclear, and computational science to drive innovation and technical solutions relevant to energy and global security.

Dr Mason was named a Fellow of the American Association for the Advancement of Science in 2001, a Fellow of the American Physical Society in 2007, and a Fellow of the Neutron Scattering Society of America in 2010. He received the Distinguished Alumni Award for the Sciences from McMaster University in 2008 and the degree of Doctor of Laws, honoris causa, from Dalhousie University in May 2011.

Professor Petra Rudolf

University of Groningen,
The Netherlands



Professor Petra Rudolf was born in Munich, Germany. She studied Physics at the La Sapienza, University of Rome, where she specialized in Solid State Physics. In

1987 she joined the National Surface Science laboratory TASC INFN in Trieste for the following five years, interrupted by two extended periods in 1989 and 1990/1991 at Bell Labs in the USA, where she started to work on the newly discovered fullerenes. In 1993 she moved to the University of Namur, Belgium where she received her PhD in 1995 and then quickly moved from postdoctoral researcher to lecturer and senior lecturer before taking up the Chair in Experimental Solid State Physics at the University in Groningen in 2003. Professor Rudolf was the President of the Belgian Physical Society in 2000/2001 and was elected fellow of the American Physical Society in 2010. Her principal research interests lie in the areas of condensed matter physics and surface science, particularly molecular motors, grapheme, organic thin films and inorganic-organic hybrids.

Professor Brian Schmidt

Australian National University,
Australia



Professor Brian Schmidt is a Laureate Fellow at The Australian National University's Mount Stromlo Observatory. Professor Schmidt was raised in

Montana and Alaska, USA, and received undergraduate degrees in Physics and Astronomy from the University of Arizona in 1989. Under the supervision of Robert Kirshner, he completed his Astronomy Master's degree (1992) and PhD (1993) from Harvard University. In 1994 he and Nick Suntzeff formed the HighZ SN Search team, a group of 20 astronomers on 5 continents who used distant exploding stars to trace the expansion of the Universe back in time. This group's discovery of an accelerating Universe was named Science Magazine's Breakthrough of the Year for 1998. Professor Schmidt joined the staff of the Australian National University in 1995, and was awarded the Australian Government's inaugural Malcolm McIntosh award for achievement in the Physical Sciences in 2000, The Australian Academy of Sciences Pawsey Medal in 2001, the Astronomical Society of India's Vainu Bappu Medal in 2002, and an Australian Research Council Federation Fellowship in 2005. In 2006 Schmidt was jointly awarded the US\$1M Shaw Prize for Astronomy, and shared the US\$0.5M 2007 Gruber Prize for Cosmology with his High-Z SN Search Team colleagues. In 2008 he was elected a Fellow of the Australian Academy of Sciences, a Fellow of the United States National Academy, and Foreign Member of the Spanish Royal Academy of Sciences. His work on the accelerating universe was awarded the 2011 Nobel Prize in Physics, jointly with Adam Riess and Saul Perlmutter. Professor Schmidt is continuing his work using exploding stars to study the Universe, and is leading Mt Stromlo's effort to build the SkyMapper telescope, a new facility that will provide a comprehensive digital map of the southern sky from ultraviolet through near infrared wavelengths.

Professor Bradley Sherrill

Michigan State University, USA



Professor Bradley Sherrill is Chief Scientist for the US Department of Energy Facility for Rare Isotope Beams. He is a fellow of the American Physical Society and the

American Association for the Advancement of Science. He was elected and served as Chair of the Division of Nuclear Physics for the APS and serves on many international committees including the IUPAP and IUPAC task force for evaluation of claims for new elements. His research interests include nuclear astrophysics and isotope production and applications. He has nearly 200 refereed papers in journals including Nature, Science, and Physical Review Letters.

Professor Svein Sjøberg

University of Oslo, Norway



Professor Svein Sjøberg is Professor in science education at Oslo University and Copenhagen University.

Educated as a nuclear physicist, later also in education (MA. Leeds University, dr. philos. Oslo University), Professor Sjøberg has been involved in curriculum reforms and the writing of textbooks for all levels, from primary school to University level. Professor Sjøberg has received many international prizes for his research, teaching and public writing.

Current research interests include social, cultural and ethical aspects of science, science education in an international context, critical approach to issues of scientific literacy and public understanding of science. Professor Sjøberg is organiser of ROSE (The Relevance of Science Education), a cross-cultural comparative project on pupils' interests, attitudes, perceptions etc. of importance to science teaching and learning.

Associate Professor Jelena Vuckovic

Stanford University, USA



Associate Professor Jelena Vuckovic received her PhD from California Institute of Technology (Caltech) in 2002, and has been on the faculty in the

Electrical Engineering Department and Ginzton Laboratory at Stanford University since 2003. She is currently an Associate Professor and a Chambers Faculty Scholar at Stanford, and leads the Nanoscale and Quantum Photonics research group.

Associate Professor Vuckovic is a recipient of several awards, including the Humboldt Prize, the Presidential Early Career Award for Scientists and Engineers (PECASE) – the highest honor for young scientists in the U.S.A., the Office of Naval Research Young Investigator Award, and the DARPA Young Faculty Award.

Program

SUNDAY 9 DECEMBER 2012

1330-1900	Registration <i>John Niland Scientia Building</i>
1400-1700	Industry Workshop <i>Connect your Research with Industry</i> Room: CLB 7 <i>Chair: Benjamin J. Eggleton</i> Milton Chang Simon Poole John Harvey Jim Patrick <i>Incubic Management LLC</i> <i>Sydney based Photonics Entrepreneur</i> <i>NZ based Entrepreneur and Physics Professor</i> <i>Cochlear</i>
1700-1900	Welcome Reception and Exhibition Opening <i>John Niland Scientia Building</i>

MONDAY 10 DECEMBER 2012

0730-1730	Registration <i>John Niland Scientia Building</i>
0800-1730	Exhibition Open <i>John Niland Scientia Building</i>
0830-0900	Congress Opening <i>Room: Clancy Auditorium</i> Her Excellency Professor Marie Bashir AC CVO, Governor of New South Wales
0900-1030	PLENARY 1 AND 2
0900-0945	Plenary 1 Room: Clancy Auditorium <i>Chair: Adi Paterson</i> <i>Science for the Energy Challenge</i> Thomas Mason <i>Oak Ridge National Laboratory</i>
0945-1030	Plenary 2 Room: Clancy Auditorium <i>Chair: Hans Bacher</i> <i>What Can We Learn – and Not Learn – From Comparative Studies of Educational Achievement in Science?</i> Svein Sjøberg <i>University of Oslo</i>
1030-1100	Morning Tea – Exhibition and Poster Viewing <i>John Niland Scientia Building</i>

1100-1230 CONCURRENT SESSION 1								
	1A Optics, Photonics and Lasers 1: Nanofabrication	1B Condensed-Matter, Materials and Surface Physics 1: Graphene and Diamond	1C Quantum Information, Concepts and Coherence 1: Optical Quantum Information	1D Atomic and Molecular Physics 1: Anti-hydrogen / Positrons	1E Nuclear and Particle Physics 1	1F Biomedical Physics 1	1G ACOFT 1 Nonlinear Photonics	1H Plasma Physics
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	Chair: Heike Ebendorff-Heidepriem	Chair: Alex Hamilton	Chair: Andrew White	Chair: Michael Brunger	Chair: Kevin Varvell	Chair: Michael Lerch	Chair: Martijn de Sterke	Chair: Brian James
1100-1130	<i>Progress in Extreme Ultraviolet Lithography for IC Manufacturing</i> William Arnold ASML Holding Inc.	<i>Graphene</i> Barbaros Özyilmaz National University of Singapore	<i>Overcoming Loss in Remote Entanglement Sharing</i> Geoff Pryde Griffith University	<i>Progress in Antihydrogen Physics and First Observations of Resonant Quantum Transitions</i> Mike Charlton Swansea University	<i>Higgs Discovery: Opening a New Era of Particle Physics</i> Csaba Balazs Monash University	<i>Molecular Level Assessments of Ion Induced Biodamage: Multiscale Approach</i> Andrey Solov'yov Frankfurt Institute for Advanced Studies	Walter Boas Medal: <i>Nonlinear Optical Phononics: Harnessing Sound and Light in Nonlinear Nanoscale Circuit</i> Ben Eggleton University of Sydney	<i>The Potential for Australian Participation in ITER</i> Matthew Hole Australian National University
1130-1145	<i>Adaptive Aberration Compensation for the Fabrication of Chalcogenide Gyroids</i> Benjamin Cumming Swinburne University of Technology	<i>Optical Imaging of Graphene Using Phase Shift Interferometry</i> Robert Elliman Australian National University	<i>Heralded Noiseless Amplification of a Photon Polarisation Qubit</i> Sacha Kocsis Griffith University	<i>Development of a Positron Reaction Microscope</i> Simon Armitage University of North Texas	<i>Standard Model Measurements at the Large Hadron Collider</i> Chiara Roda University of Pisa	<i>Radiation-Induced Biological Damage on Subcellular Scales: Beyond DNA</i> Hilary Byrne University of Sydney	<i>All-optical Pre-compensation of Fiber Nonlinearity for WDM RZ-DPSK 40 Gb/s Signals by Transmitter-based Phase Conjugation</i> Mark Pelusi University of Sydney	<i>Plasmas Meet Plasmonics: Fundamental Physical Links and How to Make the Best of Them</i> Amanda Rider CSIRO
1145-1200	<i>A Novel Hybrid Fabrication Approach for Three-dimensional Photonic Nanostructures</i> Isabelle Staude Australian National University	<i>Kelvin Probe Force Microscopy of the Diamond Surface Under Decane</i> David Hoxley La Trobe University	<i>The Breakdown of the Single-shot Microwave Photon Detection via Kerr-type Nonlinearity Induced by a Three-level System</i> Bixuan Fan University of Queensland	<i>Search for Positron Scattering Resonances in the Doubly Excited Region of the Helium Atom</i> Roisin Boadle Australian National University		<i>Cerium Oxide Nanoparticles Exhibit an Energy-dependent Protection to 9L Cells Under Exposure to X-ray Radiation Fields</i> Adam Briggs University of Wollongong	<i>Dispersion Engineered Ge_{1.5}As_{2.4}Se_{64.5} Chalcogenide Nanowires for Polarisation Independent Processing</i> Xin Gai Australian National University	<i>Metal Vapour in Arc Welding: Its Influence on the Arc and Weld, and the Formation of Fume Particles</i> Anthony Murphy CSIRO
1200-1215	<i>Alignment of Gold Nanorods by Photothermal Depletion, with Associated Single Particle Melting Studies</i> Adam Taylor Swinburne University of Technology	<i>Towards Hyperpolarised Nanodiamonds for Magnetic Resonance Imaging</i> Ewa Rej University of Sydney	<i>Conclusive Quantum Steering with Superconducting Transition-edge Sensors</i> Till Weinhold University of Queensland	<i>Kinetic Theory Model of Positron Transport in Gases and Liquids</i> Gregory Boyle James Cook University	<i>K-Isomers in Neutron-Rich Tungsten Nuclei</i> Gregory Lane Australian National University	<i>Microdosimetric Comparison between Proton and X-ray Computed Tomography Scars</i> Aimee McNamara University of Sydney	<i>Automatic DGD and GVD Compensator for a 640 Gb/s Single Channel Signal</i> Yvan Paquot University of Sydney	<i>Three-Dimensional Modelling of a Carbon Arc Discharge for Nanostructure Production</i> Eugene Tam CSIRO
1215-1230	<i>Updatable Digital Holographic Display in Nanoparticle-enabled Photorefractive Polymers</i> Xiangping Li Swinburne University of Technology	<i>Surface Modification of Porous Alumina Membranes with Nanodiamonds</i> Morteza Aramesh University of Melbourne	<i>Opto-Mechanical Upshifting of Scattered Light for Squeezed Light Measurement</i> Andrew Wade Australian National University	<i>Positron Binding to Excited States of Helium</i> Janina Grineviciute Charles Darwin University	<i>Search for Evidence of New Physics in Multilepton Final States with the ATLAS Detector</i> Nitesh Soni University of Adelaide	<i>SOI Microdosimetry of Hadron Therapy Fields</i> Dale Prokopovich Australian Nuclear Science and Technology Organisation	<i>Photonic Chip Based Narrowband Tunable and Reconfigurable Microwave Photonic Filter Using Stimulated Brillouin Scattering</i> Ben Eggleton University of Sydney	<i>Determination of the Electron Energy Distribution Function Using Integrated Data Analysis</i> Dominic Poznic University of Sydney
1230-1300				<i>Bragg Gold Medal Winner: Studies of Universality in Strongly Interacting 6Li Fermi Gases with Bragg Spectroscopy</i> Eva Kuhnle Swinburne University of Technology				
1230-1330	Lunch Break <i>Please note lunch is not provided by the Congress</i> Exhibition and Poster Viewing <i>John Niland Scientia Building</i>			<i>Please note: this runs for the first half of the lunch break</i>				

1330-1500 CONCURRENT SESSION 2								
	2A Optics, Photonics and Lasers 2: Classical Optics: From Fundamentals to Fabrication	2B Condensed-Matter, Materials and Surface Physics 2: Bulk Magnetism	2C Quantum Information, Concepts and Coherence 2: Optical Quantum Computing	2D Atomic and Molecular Physics 2: Chemical Physics	2E Nuclear and Particle Physics 2	2F Biomedical Physics 2	2G ACOFT 2 Photonic Crystal Fibres	2H Acoustic, Music and Ultrasonics and History of Physics
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	Chair: Christopher Poulton	Chair: Glen Stewart	Chair: Geoff Pryde	Chair: Jason Gascooke	Chair: Andrew E. Stuchbery	Chair: Scott Martin	Chair: Michel Digonnet	Chair: Richard Newbury
1330-1345	<i>Silicon Photonics for Interconnects and Biotechnology</i> Pieter Dumon Imec	<i>High Temperature Structural and Magnetic Transitions in Perovskite-type Technates ATcO₃ (A=Ca, Sr)</i> Maxim Avdeev Australian Nuclear Science and Technology Organisation	<i>Implementation of a Quantum Fredkin Gate Using an Entanglement Resource</i> Franck Ferreyrol Griffith University	<i>The Dissociation Dynamics of NO-based Van Der Waals Complexes Probed By Imaging Techniques</i> Warren Lawrence Flinders University	<i>Zeptosecond Dynamics of Superheavy Element Formation</i> David Hinde Australian National University	<i>From Higgs Detection to Saving Lives: Bench-to-bedside Technology Developments for Radiation Medicine</i> Anatoly Rozenfeld University of Wollongong	<i>Nonlinear Optics in Gas-filled Hollow-core Kagomé Photonic Crystal Fiber</i> Nicolas Joly Max-Planck Institute for The Science of Light	<i>How the Human Voice is Not Suited for Singing and What This Implies About Music</i> Joe Wolfe University of New South Wales
1345-1400			<i>Rephased Amplified Spontaneous Emission as a Single Photon Source</i> Robin Stevenson Australian National University					<i>Extremely High Q-factor Mechanical Modes in Quartz Bulk Acoustic Wave Resonators at Millikelvin Temperature</i> Daniel Credon University of Western Australia
1400-1415	<i>Designing Optically-Driven Microrotors for Maximum Torque Efficiency</i> Vincent Loke University of Queensland	<i>Magnetic and Electronic Properties of FeSr₂Y₂CeCu₂O_{8+x}</i> Sebastian Sambale MacDiarmid Institute	<i>Novel Bias Mode to Enhance Detection Efficiency and Signal to Noise Ratio For Superconducting Nanowire Single Photon Detector</i> Zhizhong Yan University of Waterloo	<i>Quasi-phase Matched High Harmonic Generation Using a Dual Gas, Multi Jet Array</i> Michael Pullen Swinburne University of Technology	<i>MSSM Higgs Boson Searches with Tau Leptons in the Final State at ATLAS</i> Guilherme Nunes Hanninger University of Melbourne	<i>Nano-ruby: A Promising Fluorescent Probe for Background-free Cellular Imaging</i> Andrew Edmonds Macquarie University	<i>Photon-pair Generation in Ultra-Compact Photonic Crystal Devices</i> Alex Clark University of Sydney	<i>An Investigation into the Effect of the Electric Guitar Body on the Harmonic Content of its Output</i> Matthew Angove La Trobe University
1415-1430	<i>In-band Localised Fano Surface States in Periodic Waveguiding Lattices</i> Andrey Sukhorukov Australian National University	<i>Neutron Scattering Studies Of YbMn₂Si₂</i> Richard Mole Australian Nuclear Science and Technology Organisation	<i>Deterministic Generation of a Photon Fock State on Demand from a Solid-State System</i> Keyu Xia Macquarie University	<i>Hyperfine Structure and Isotope Shifts in Sub-doppler Two-photon-excitation Rydberg Spectra of Xenon</i> Mitsu Kono Australian National University	<i>Bomb Plutonium at the Source: a Time Sequence from an Enewetak Coral</i> Keith Fifield Australian National University	<i>Structural Properties of Southern Ocean Pteropods</i> Clara Tenniswood Australian National University	<i>Spatio-spectral Identification of Solitons Occupying Higher Order Electromagnetic Modes in Photonic Crystal Fibre</i> Samuel Legge University of Newcastle	<i>The Heterodyne Description of Matter Waves</i> Chris Hawkings Canberra Institute of Technology
1430-1445	<i>Helicity and Angular Momentum – Symmetry-based Study of Light-Matter Interactions</i> Ivan Fernandez-Corbato Macquarie University	<i>Neutron and Synchrotron Studies of Iron Based Multiferroic Materials</i> Annemieke Mulders University of New South Wales, Canberra	<i>Shortening of Measurement-Based Quantum Computation Algorithms Using Temporal-Mode Continuous-Variable Cluster States</i> Seiji Armstrong University of Tokyo / Australian National University	<i>Spectral Properties of Far-infrared and Blue Light Generated in Rb Vapour</i> Russell McLean Swinburne University of Technology	<i>Fission Time Scale in ²⁰³At</i> Ramachandran Kandasamy Australian National University	<i>Structural Changes in Elastin Hydrogel During Cyclic Tensile Deformation and Drying by Synchrotron SAXS</i> Christopher Garvey Australian Nuclear Science and Technology Organisation	<i>Slow Light Dispersion Engineering of Photonic Crystal Waveguides Using a Selective Microfluidics Infiltration</i> Alvaro Casas Bedoya University of Sydney	<i>The History of Radiation Pressure and the Unity of Physics Exposed through the Inertia of Energy</i> Timo Nieminen University of Queensland
1445-1500	<i>Helicity Conservation Rules for Designing Optimal Chiral Structures</i> Xavier Vidal Macquarie University		<i>Non-Symplectic Gaussian Operations Generated by Non-deterministic Noiseless Linear Amplification</i> Austin Lund University of Queensland	<i>Velocity-map Imaging of Photoelectrons</i> Stephen Gibson Australian National University	<i>Supersymmetric N=2 Gauge Theory</i> Michael Kuchiev University of New South Wales	<i>Tumour Tracking in Cancer Radiotherapy: from Mathematical Formalism to Clinical Implementation</i> Jin Aun Ng University of Sydney	<i>Supercontinuum Generation in the Mid-infrared from Dispersion-engineered As₂S₃ Glass Waveguides</i> Barry Luther-Davies Australian National University	<i>Thomas Murday's Recording Micro-barometer of 1912</i> Norman Heckenberg University of Queensland
1500-1530	Afternoon Tea – Exhibition and Poster Viewing <i>John Niland Scientia Building</i>							

1530-1700 CONCURRENT SESSION 3								
	3A Optics, Photonics and Lasers 3: Metamaterials and Nanoresonators	3B Condensed-Matter, Materials and Surface Physics 3: Spintronics and Magnetic Films	3C Quantum Information, Concepts and Coherence 3: Optical Quantum Memories	3D Atomic and Molecular Physics 3: Positron Scattering Theory	3E Nuclear and Particle Physics 3	3F Biophysics 1	3G ACOF 3 Photonic Devices 1	3H Environmental Physics
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	Chair: Michael Steel	Chair: Jim Williams	Chair: Andrew Truscott	Chair: Dennis Mueller	Chair: Csaba Balazs	Chair: Roger Fulton	Chair: Sergio Leon-Saval	Chair: David Cohen
1530-1545	<i>Strong Chiral Optical Response from Planar Plasmonic Metamaterials</i> Tim Davis CSIRO	<i>The Magnetic Velcro Effect: Improved Model of Ferromagnet/Antiferromagnet Interfaces</i> David Cortie Australian Nuclear Science and Technology Organisation	<i>Performing Quantum Operations within Memories</i> Ping Koy Lam Australian National University	<i>Benchmark Calculations of Electron and Positron Scattering on Atoms</i> Igor Bray Curtin University	<i>The Belle II Experiment at the Super KEKB Accelerator</i> Martin Sevier University of Melbourne	<i>Towards Simultaneous Brain PET Imaging and Behavioural Studies in Freely Moving Animals</i> Steve Meikle University of Sydney	<i>Gratings in Multi-core Fibres / Photonic Lanterns</i> Tim Birks University of Bath	<i>Monitoring of Plutonium and Uranium-236 in and around a Decommissioned Nuclear Power Plant in Italy</i> Mario De Cesare Australian National University
1545-1600	<i>Excitation of Single Multipolar Resonances</i> Xavier Zambrana-Puyalto Macquarie University							
1600-1615	<i>Coupling Stabilisation of Microresonators</i> Jong Chow Australian National University	<i>Does the Side Jump Effect Exist?</i> Oleg Sushkov University of New South Wales	<i>Gradient Echo Memory Using Cold Atoms</i> Ben Sparkes Australian National University	<i>Positrophilic Electrons in Positron-electron Annihilation Process of Molecules</i> Feng Wang Swinburne University of Technology	<i>Auger Electron Emission in Nuclear Decay</i> Boon Lee Australian National University	<i>In Vivo Imaging of Nanodiamonds in Drosophila Melanogaster</i> David Simpson University of Melbourne	<i>Results of a Single-mode Multicore Fibre Bundle Fed Diffraction-Limited Spectrograph</i> Christopher Betters University of Sydney	<i>Measurements of Low-level Anthropogenic Actinides from Soils around Maralinga</i> Stephen Tims Australian National University
1615-1630	<i>Wideband Optical Activity in Coupled Chiral Meta Atoms</i> Kirsty Hannam Australian National University	<i>Polarised Neutron and X-ray Resonant Magnetic Reflectivity Studies of Multiferroic Thin Films</i> Joel Bertinshaw University of New South Wales	<i>Input Output Analysis of the Storage of Single Photons in Quantum Memories</i> Michael Hush Australian National University	<i>Detecting Positron-Atom Bound States through Resonant Annihilation and Scattering</i> Celal Harabati University of New South Wales	<i>Relativistic R Matrix and Continuum Shell Model</i> Janina Grineviciute Charles Darwin University	<i>Time-domain Biophotonics: Powering Next-generation Molecular Diagnostics</i> Dayong Jin Macquarie University	<i>Broadband Optical Devices Using Adiabatic Passage</i> Kelvin Chung University of Melbourne	<i>Using Meteoric Be-10 to Estimate Soil Residence Times and Geologic Denudation Rates in Northern Territory, Australia</i> Rajeev Lal Australian National University
1630-1645	<i>Biosensing with Microresonators using the Backscattered Light</i> George Brawley University of Queensland	<i>Probing Surface Magnetism by Spin-polarized Single- and Two-electron Spectroscopy</i> Sergey Samarin University of Western Australia	<i>Theory of an Atomic Bragg Interferometer</i> Graham Dennis Australian National University	<i>Convergent Close-Coupling Method for Positron Scattering from Noble Gases</i> Dmitry Fursa Curtin University	<i>Performance of the Upgraded Optical Fill Pattern Monitor at the Australian Synchrotron 3 GeV Electron Storage Ring</i> Sophie Dawson University of Melbourne	<i>Three-dimensional (3D) Optical Bioimaging with Quantitative Phase</i> Shan Shan Kou University of Melbourne	<i>Y-Junction Based Splitters and Combiners for Few-Mode Optical Fibre Networks</i> John Love Australian National University	<i>Estimation of Fugitive Emissions from Small-Scale Wastewater Treatment Facilities Using an Infrared Gas Analysis System</i> Peter Schouten CSIRO
1645-1700	<i>Multilayer Fishnet Metal-Dielectric Structures as Magnetic Hyperbolic Metamaterials</i> Sergey Kruk Australian National University	<i>Magnetic Nanostructures Investigated with Neutron Scattering Methods</i> Frank Klöse Australian Nuclear Science and Technology Organisation	<i>Ion-ion Interactions Between Qubits in EuCl₃.6D₂O</i> Rose Ahlefeldt Australian National University	<i>Positron Scattering from the H₂⁺ and H₂ Molecules Using the Convergent Close-Coupling Method</i> Mark Zammit Curtin University	<i>Search for Xb decays to the Upsilon(1S) pi+ pi- final state using the ATLAS detector</i> Cameron Cuthbert University of Sydney	<i>Silken Nanodiamonds: New Compound for Bio-sensing Applications</i> Asma Khalid University of Melbourne	<i>Fibre Bragg Grating Networks for Robust Sensing Systems</i> Nigel Hoschke CSIRO	<i>Prediction of Tropical Cyclone Seasonal Risk with Dynamical Climate Models</i> Andrew Charles Bureau of Meteorology
1700-1830	Poster Session 1 Presenting authors to be available for discussion Refreshments provided John Niland Scientia Building							

TUESDAY 11 DECEMBER 2012

0730-1730	Registration <i>John Niland Scientia Building</i>							
0800-1730	Exhibition Open <i>John Niland Scientia Building</i>							
0900-1030	PLENARY 3 AND 4							
0900-0945	Plenary 3 Room: CLB 7 <i>Chair: Ben Eggleton</i> <i>Quantum Dots in Optical Nanocavities: from Cavity QED to Device Applications</i> Jelena Vuckovic Stanford University							
0945-1030	Plenary 4 Room: CLB 7 <i>Chair: David J. Hinde</i> <i>Search for the Origin and Stability of the Elements</i> Bradley Sherrill University of Michigan							
1030-1100	Morning Tea – Exhibition Viewing <i>John Niland Scientia Building</i>							
1100-1230	CONCURRENT SESSION 4							
	4A Optics, Photonics and Lasers 4: Lasers I	4B Condensed-Matter, Materials and Surface Physics 4: Materials Physics	4C Quantum Information, Concepts and Coherence 4: Superconducting Quantum Devices	4D Atomic and Molecular Physics 4: Cold Atoms / BEC	4E Nuclear and Particle Physics 4	4F Biophysics 2	4G ACOF 4 Photonics in Action	4H Industry 1
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	<i>Chair: David Spence</i>	<i>Chair: Anita Hill</i>	<i>Chair: Michael Tobar and Daniel Creedon</i>	<i>Chair: Charles Clark</i>	<i>Chair: Gregory Lane</i>	<i>Chair: Jamie Vandenberg</i>	<i>Chair: Andrew Ellis</i>	<i>Chair: Cathy Foley</i>
1100-1115	<i>Phase-matched Generation of High Order Harmonics Radiation and Application</i> Lap Van Dao Swinburne University of Technology	<i>Neutron Diffraction Studies of the Stress Distribution in Particulate Materials</i> Erich Kisi University of Newcastle	<i>Quantum Light and Sound for Fun and Computation</i> Andrew Cleland University of California Santa Barbara	<i>Cold Atom Imaging with a Polarisation Interferometer</i> Philip Light University of Western Australia	<i>Free Ion Hyperfine Fields and Magnetic Moment Measurements on Radioactive Beams</i> Andrew Stuchbery Australian National University	<i>Rolling the Biological Dice: Quantifying Stochastic Gene Expression</i> Zdenka Kuncic University of Sydney	<i>NBN Network Design</i> Peter Ferris NBN	<i>Patenting 101</i> Will Monks Monks IP
1115-1130		<i>Molecular Dynamics Study of the Evolution of Topology in Nanoporous Metal Sponges</i> Michael Cortie University of Technology Sydney		<i>Direct Observation of Resonant Scattering Phase Shifts and their Energy Dependence</i> Stephen Gensemer University of Sydney				
1130-1145	<i>High Brightness High Power Yb:YAG End Pumped Cryogenic Zig Zag Slab Laser</i> Miftar Ganija University of Adelaide	<i>Resolving the Orientation and Morphology of Ultra-Fine Precipitates Using Atom Probe</i> Andrew Breen University of Sydney	<i>Parametric Down-conversion of Microwave Photons Using Superconducting Quantum Devices</i> Timothy Duty University of New South Wales	<i>A Neutral Mercury Optical Lattice Clock</i> John McFerran University of Western Australia	<i>A Standard Model Higgs Boson Search in the H->WW Decay Mode in ATLAS</i> Pere Rados University of Melbourne	<i>Unfolding Single Biomolecules</i> Erik Streed Griffith University	<i>From Boolardy to Brisbane: Accurate Time and Frequency for the Nation</i> Andre Luiten University of Western Australia	<i>Turning Research into Industries: Reflections from Both Sides of the Fence</i> Maryanne Large CISRA

1145-1200	<i>Frequency Locking of a 369nm Laser by Nonlinear Spectroscopy of Ytterbium Ions in a Discharge</i> Michael Lee University of Sydney	<i>Structural Health Monitoring of Space Vehicle Thermal Protection Systems: Material Properties</i> Don Price CSIRO	<i>Superconducting Resonators with Parasitic Electromagnetic Environments</i> John Hornibrook University of Sydney	<i>Microwave Field Imaging Using Atoms</i> Andrew Horsley University of Basel	<i>The Pair Decay of the 7.654 MeV State in ¹²C</i> Tibor Kibedi Australian National University	<i>PH Gradient Electrofocusing for Proteomics</i> Michael Startsev Macquarie University		
1200-1215	<i>A Novel High-power, Frequency-stabilised Solid-state 313 nm Laser Systems for ⁹Be⁺ ion Trapping</i> Harrison Ball University of Sydney	<i>Stresses in Inclusions Resulting from Plastic Flow in the Matrix of a Two-Phase Composite During Cyclic Loading</i> Trevor Finlayson University of Melbourne	<i>Delocalised Oxygen as the Origin Of Strongly Coupled Two-level Defects in Josephson Junctions</i> Timothy Dubois RMIT University	<i>Precise Manipulation of a Bose-Einstein Condensate's Wavefunction</i> Stuart Szigeti Australian National University	<i>Testing the Standard Model of Particle Physics at Parts in 10¹⁸, Using Rotating Cryogenic Sapphire Oscillators</i> Michael Tobar University of Western Australia	<i>Mechanism of Infrared Neural Stimulation of Murine Auditory Neurons in Vitro</i> William Brown Swinburne University of Technology	<i>Fibre Sensing Techniques Adapted from Gravitational Wave Detection</i> Daniel Shaddock Australian National University	<i>ANFF: Delivering Scientific Innovation from the Lab to Australian Industry</i> Warren McKenzie Australian National Fabrication Facility
1215-1230	<i>Generation of Spiral Beams With Multimode Optical Fibres</i> David Coultts Macquarie University	<i>Metals Behavior at Very High Temperature</i> Klaus-Dieter Liss Australian Nuclear Science and Technology Organisation	<i>Behaviour of the Fe³⁺ Paramagnetic Ion in Sapphire Whispering Gallery Mode Resonator at mK Temperatures Under DC Magnetic Field</i> Warrick Farr University of Western Australia	<i>Coherent Tunneling via Adiabatic Passage in a Three-Well Bose-Hubbard System</i> Chris Bradly University of Melbourne	<i>Time-Dependent Recoil in Vacuum – Improved Sensitivity to Hyperfine Fields and Nuclear Moments</i> Asif Ahmed Australian National University	<i>Methodology to Measure the Electrical Conductivity of Seizing and Non-Seizing Mouse Brain Slices</i> Maher Elbohouty University of Waikato		<i>Ask Not What Industry Can Do For You</i> Scott Martin CSIRO
1230-1330	Lunch Break <i>Please note lunch is not provided by the Congress</i> Exhibition and Poster Viewing <i>John Niland Scientia Building</i>							
1235-1320	Plenary Discussion Room: CLB 7 <i>Physics Decadal Plan led by David Jamieson</i>							

TUESDAY

1330-1500 CONCURRENT SESSION 5								
	5A Optics, Photonics and Lasers 5: Lasers 2 and Laser Applications	5B Condensed-Matter, Materials and Surface Physics 5: Optical and Meta-materials	5C Quantum Information, Concepts and Coherence 5: Quantum Information Theory	5D Atomic and Molecular Physics 5: Scattering Dynamics	5E Nuclear and Particle Physics 5	5F Biophysics 3	5G ACOF5 5 Photonic Sensing 1	5H Industry 2
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	Chair: Lap van Dao	Chair: Olivia Samardzic	Chair: Stephen Bartlett	Chair: Igor Bray	Chair: Martin Sevier	Chair: Martin Carolan	Chair: David Sampson	Chair: Cathy Foley
1330-1345	Studying the Spectra of the Individual Orders Produced by Transient Multi-frequency Raman Generation Donna Strickland University of Waterloo	Light-Tunable Metamaterial Mirror Ilya Shadrivov Australian National University	New Physics in Two Dimensions: Braiding Interactions of Anyons Gavin Brennen Macquarie University	Topological Phase in Spin Polarised Electron Exchange Excitation of an Atom Jim Williams University of Western Australia	Theoretical Implications of the LHC Resonance at 125-126 GeV Archil Kobakhidze University of Sydney	Potential Treatment of Radioresistant Tumours Using Synchrotron Generated X-Ray Microbeams Michael Lerch University of Wollongong	Sub-Picostrain Sensors Using Slow Light in Fiber Bragg Gratings Michel Digonnet Stanford University	Presentation title not available at time of print Doron Ben-Muir Commercialisation Australia
1345-1400		Anisotropic Metamaterials with Broadband Diamagnetic Response Mikhail Lapine University of Sydney						
1400-1415	Continuous Wave, 10 W External Cavity Raman Laser: Experiment and Modeling Ondrej Kitzler Macquarie University	Comparative Study on Electrical and Optical Properties of Random and Aligned Metal Nanowire Networks as Transparent Electrodes for Optoelectronic Devices Shouyi Xie Swinburne University of Technology	Low Depth Quantum Circuits for Ising Models Mauro Cirio Macquarie University	Electron and Positron Scattering from Pyrimidine Compared with Other Biological Analogs Prasanga Palihawadana Australian National University	Determination of the Angular Distribution of Evaporation Residues Following Transmission through the Superconducting Solenoidal Separator SOLITAIRE Ian Carter Australian National University	Simulated Diffusion Tensor of Water in Fiber Networks with Distributions of Fiber Alignment Monique Tourell Queensland University of Technology	A Low Profile Fibre Optic Force Sensing Tape for Monitoring Pressures Under a Compression Bandage John Arkwright CSIRO	What Physics Can Do for the Engineering Industry Lyndon Edwards Australian Nuclear Science and Technology Organisation
1415-1430	Efficient High-Power (>10 W) Pulsed Diamond Raman Laser Operation in the Eye-Safe Region Aaron McKay Macquarie University	Simulations of Local Plasmon Modes of Cuboids Matthew Arnold University of Technology Sydney	Universal Topologically Protected Adiabatic Cluster State Quantum Computation Courtney Brell University of Sydney	Low-Energy Positron Scattering From Molecular Hydrogen Joshua Machacek Australian National University	Radiative Inverse Seesaw Models and Baryogenesis Iason Baldes University of Melbourne	Neurite Outgrowth in Neuronal Cells is Promoted by Laser Exposure of Gold Nanoparticles Chiara Paviolo Swinburne University of Technology	Microscopic Imaging of the Mechanical Properties of Breast Tumour Margins Using Optical Coherence Elastography Brendan Kennedy University of Western Australia	
1430-1445	Mapping Instabilities in VCSEL Nonlinear Dynamics Joshua Toomey Macquarie University	Structure Studies of Flux and Hydrothermally Grown Nonlinear Optical Material $KBe_2BO_3F_2$ Maxim Avdeev Australian Nuclear Science and Technology Organisation	A 2D Quantum Walk Simulation of Two-Particle Dynamics Peter Rohde Macquarie University	The Interaction of Ultrafast Light Pulses with Exotic Atoms James Calvert Griffith University	Structure of Tantalum Nuclei Beyond the Line of Stability Nyaladzi Palalani Australian National University	Navigating Near Walls at Zero Reynolds Number with Flagellar Propellers Prabhakar Ranganathan Monash University	Fabrication of Suspended and Exposed Core Silica Fibres for Sensing Applications Roman Kostecki University of Adelaide	The New SI: Why We Need It, What It Might Look Like, and What It Means for Users Peter Fisk NMI
1445-1500		Photochromism and the Origin of Colouration in Natural Pink Diamond Keal Byrne University of Western Australia	Measuring Detector Proximity with Acceleration-Assisted Entanglement Harvesting Nicolas Menicucci University of Sydney	C^{6+} -Impact Fully Differential Ionisation of Helium in the Coplanar and Perpendicular Planes Ilkhom Abdurakhmanov Curtin University	Neutrino Signals from Electroweak Bremsstrahlung in Solar WIMP Annihilation Amelia Brennan University of Melbourne	The NV Centre In Nanodiamond: A Donor for Single Molecule Förster Resonance Energy Transfer Jana Say Macquarie University	Regenerated Gratings in Helium-loaded Optical Fibre Kevin Cook University of Sydney	
1500-1530	Afternoon Tea – Exhibition and Poster Viewing John Niland Scientia Building							

1530-1700 CONCURRENT SESSION 6								
	6A Joint: Quantum Information, Concepts + Optics, Photonics and Lasers : Trends in Quantum Optics	6B Condensed-Matter, Materials and Surface Physics 6: Positrons and Nanoscience	6C Quantum Information, Concepts and Coherence 6: Quantum Foundations	6D Atomic and Molecular Physics 6: Theory	6E Solar, Terrestrial and Space Physics 1	6F Rheology 1	6G ACOFT 6 Sub-wavelength Photonics	6H Nuclear and Particle Physics 6
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	Chair: Peter Drummond	Chair: Steve Buckman	Chair: Howard Wiseman	Chair: James Sullivan	Chair: Dave Neudegg	Chair: Billy Todd	Chair: Francois Ladouceur	Chair: Keith Fifield
1530-1545	<i>Quantum Technology for a Networked World</i> Peter Knight Imperial College London	<i>What Positrons Can Contribute to Materials Physics</i> Anita Hill CSIRO	<i>Verifying Quantum Measurements with Discord</i> Marcelo Pereira De Almeida University of Queensland	<i>Quantum Chaos, Statistical Theory of Finite Systems and Enhancement of Electron Recombination</i> Victor Flambaum University of New South Wales	<i>Relativistic Solar Proton Events at Earth – What Do We Know and Does It Matter?</i> Marc Duldig University of Tasmania	<i>Unusual Molecular Transport Properties of Carbon Nanotubes (CNTs)</i> Mainak Majumder Monash University	<i>Recent Progress in Drawn Metamaterials</i> Boris Kuhlmeiy University of Sydney	<i>Stars and Supernovae: Laboratory Studies of Nucleosynthesis</i> Anton Wallner Australian National University
1545-1600			<i>Quantum Discord as Resource for Remote State Preparation</i> Martin Ringbauer University of Vienna					
1600-1615	<i>Universality of the Heisenberg Limit</i> Dominic Berry Macquarie University	<i>Positron Annihilation and Electron Microscopy of Off-Stoichiometric Zn₂TiO₄</i> Eric Vance Australian Nuclear Science and Technology Organisation	<i>Local Non-realistic States Observed via Weak Tomography – Resolving the Two-slit Paradox</i> Dylan Saunders Griffith University	<i>Simulating Quantum Effects of Cosmological Expansion Using a Static Ion Trap</i> Nicolas Menicucci University of Sydney	<i>Long Term Variations in the Cosmic Ray Flux at 1 AU</i> John Humble University of Tasmania	<i>Measuring Viscometric Functions for Non-colloidal Suspensions with Newtonian Matrices</i> Roger Tanner University of Sydney	<i>Low Loss Coupling to Sub-micron Thin Film Rib and Nanowire Waveguides By Vertical Tapering</i> Steve Madden Australian National University	<i>Measurement of Top Quark Pair Production Cross Section with the ATLAS Detector at the LHC</i> Andrea Bangert University of Sydney
1615-1630	<i>Direct Characterisation of a Linear Optical Network</i> Matthew Broome University of Queensland	<i>PALS-based Characterisation of Defect Structures in F-implanted Germanium</i> David Sprouster Australian National University	<i>How Well Can One Jointly Measure Two Incompatible Observables on a Given Quantum State?</i> Cyril Branciard University of Queensland	<i>Electric Dipole Moment Enhancement Factor of Thallium</i> Marianna Safronova University of Delaware	<i>Partial Taylor Relaxation in Solar and Laboratory Plasmas</i> Graham Dennis Australian National University	<i>Factors Affecting The Extrudate Swell For High Density Polyethylene</i> Timothy Nicholson University of Queensland	<i>Chalcogenide Glass Photonic Crystal Nanocavity Fully Embedded in an Index-matched Cladding with a High Q-factor (>750,000)</i> Xin Gai Australian National University	<i>Measurements of Isomers in the GSI Storage Ring (ESR) with Schottky Mass Spectrometry</i> Matthew Reed Australian National University
1630-1645		<i>Positron Annihilation Studies of Materials</i> Paul Guagliardo University of Western Australia	<i>Entanglement Verification When Alice and Bob Can't Be Trusted</i> Michael Hall Griffith University	<i>The Fe³⁺:Sapphire Whispering Gallery Modes Maser Oscillator</i> Karim Benmessai University of Western Australia	<i>Spatial and Temporal Detection of Sporadic E in Backscatter and Oblique Incidence Sounders</i> David Netherway Defence Science and Technology Organisation	<i>The Rheology and Fluid Mechanics of Oscillatory Squeeze Flow</i> David Konigsberg University of Queensland	<i>Correlated Photon-Pair Generation in a Chalcogenide Ge_{11.5}As₂₄Se_{64.5} Nanowire</i> Jiakun He University of Sydney	<i>Heavy Particles Bound via Higgs Boson Exchange</i> Victor Flambaum University of New South Wales
1645-1700		<i>Comparative X-ray and Raman Study of Cellulose Texture and Nanostructure in Wood</i> Chris Garvey Australian Nuclear Science and Technology Organisation	<i>Non-negative Subtheories and Quasiprobability Representations of Qubits</i> Joel Wallman University of Sydney	<i>Testing Space-Time Invariance of the Fine-structure Constant</i> Julian Berengut University of New South Wales	<i>An EOF Based Regional Climatological Model of TEC Over Australia</i> Zahra Bouya Bureau of Meteorology	<i>Rheology of Dendrimers and Hyperbranched Polymers Undergoing Planar Elongational Flow</i> Elnaz Hajizadeh Swinburne University of Technology	<i>Amorphous Silicon Nanowires with High FOM, High Nonlinearity and Good Stability</i> David Moss University of Sydney	<i>Parity of Pions and CP Violation in Neutral Kaon System</i> Brian Robson Australian National University
1700-1830	Post-deadline session for AOS and ACOFT Room: CLB 7							
1900-2300	Congress Dinner Dockside Darling Harbour							

WEDNESDAY 12 DECEMBER 2012

0730-1730	Registration <i>John Niland Scientia Building</i>							
0800-1730	Exhibition Open <i>John Niland Scientia Building</i>							
0900-1030	PLENARY 5 AND 6							
0900-0945	Plenary 5 Room: CLB 7 <i>Chair: Andrew Peele</i> <i>Molecular Motors and Switches at Surfaces</i> Petra Rudolf Zernike Institute for Advance Materials							
0945-1030	Plenary 6 Room: CLB 7 <i>Chair: Susan Scott</i> <i>Surprising Connections between Gravity and Condensed Matter</i> Gary Horowitz University of California Santa Barbara							
1030-1100	Morning Tea – Exhibition and Poster Viewing <i>John Niland Scientia Building</i>							
1100-1230	CONCURRENT SESSION 7							
	7A Optics, Photonics and Lasers 7: Metamaterials	7B Condensed-Matter, Materials and Surface Physics 7: Superconductivity	7C Quantum Information, Concepts and Coherence 7: Frontiers in Quantum Optics	7D Atomic and Molecular Physics 7: Matter Interactions	7E Solar, Terrestrial and Space Physics 2	7F Rheology 2	7G ACOFT 7 Lasers 1	7H Joint: Optics, Photonics and Lasers + Condensed-Matter, Materials and Surface Physics (X-ray Optics)
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	<i>Chair: Tim Davis</i>	<i>Chair: Oleg Sushkov</i>	<i>Chair: Gabriel Molina-Terriza</i>	<i>Chair: Michael Charlton</i>	<i>Chair: John Humble</i>	<i>Chair: Timothy Nicholson</i>	<i>Chair: Graham Town</i>	<i>Chair: Klaus-Dieter Liss</i>
1100-1130	<i>Transformation Media in Space and Time: Causality, Cloaks, and Curvature</i> Paul Kinsler Imperial College London	<i>Topological Insulators: A New Platform for Novel Spintronics and Superconductivity</i> Xiaolin Wang University of Wollongong	<i>Loophole-free Steering for Quantum Cryptography and for Testing the Subjectivity of Atomic Quantum Jumps</i> Howard Wiseman Griffith University	<i>Positron Transport in Soft-Matter – Biomedical Applications</i> Ronald White James Cook University	<i>New Results of Type II and III Solar Radio Bursts</i> Bo Li University of Sydney	<i>Nonequilibrium Statistical Mechanics Applied to Fluid Rheology</i> Denis Evans Australian National University	<i>CMOS Compatible Microcavity Lasers</i> Dave Moss University of Sydney	<i>Coherent X-ray Science, Free-Electron Lasers and Crystallography</i> Keith Nugent Australian Synchrotron
1130-1145	<i>Magnetic Quasi-crystal Metamaterials</i> Dragomir Neshev Australian National University	<i>Bistable Defects in Josephson Junction Devices: When Superconducting Circuits Are Not So Super</i> Jared Cole RMIT University	<i>Engineering Photonic Quantum Emulators and Simulators</i> Andrew White University of Queensland	<i>Low Energy Positron Scattering from Uracil</i> Emma Anderson Australian National University	<i>Spherical Harmonic Analysis of Geomagnetic Variations</i> Robert Stening University of New South Wales	<i>Structural Transitions During Starch Pasting: Deducing the Branching Structure of Starch Gels with Small-angle Scattering</i> Elliot Gilbert Australian Nuclear Science and Technology Organisation	<i>Widely Tunable 2.9 micron Ho³⁺, Pr³⁺-Doped Fluoride Glass Fibre Laser Used to Identify 317 cm⁻¹ Raman Shift</i> Stephanie Crawford University of Sydney	<i>Coherent X-rays to Shine a Light on the Alzheimer's Disease</i> Alberto Cereser La Trobe University

1145-1200	<i>Semi-Analytic Impedance Modelling of 3D Photonic and Metamaterial Structures</i> Kokou Dossou University of Technology, Sydney	<i>Structure Evolution and Spin Dynamics of Highly Ca-doped Spin Ladder Superconductor $Sr_{1-x}Ca_xCu_{2-y}O_{41}$</i> Guochu Deng Australian Nuclear Science and Technology Organisation	<i>Biological Measurement Beyond the Quantum Limit</i> Michael Taylor University of Queensland	<i>Nonequilibrium Modelling of Atomic and Molecular Processes in Planetary Atmospheres</i> Laurence Campbell Flinders University	<i>Wavelength Matched Etalons for the Solar Orbiter Polarimetric and Helioseismic Imager</i> David Farrant CSIRO	<i>Spin and Linear Momentum Coupling: Generating Steady-State Flow Without Mechanical Pumping at the Nanoscale</i> Sergio De Luca Swinburne University of Technology	<i>Splice-Free DFB Fibre Laser Array</i> Alexei Tikhomirov Defence Science and Technology Organisation	<i>Cellular Imaging Using Fresnel Coherent Diffractive Imaging</i> Hannah Coughlan La Trobe University
1200-1215	<i>Photoluminescence Enhancement in Magnetic Quantum-Dot Metamaterials</i> Manuel Decker Australian National University	<i>Quantum Noise in a SQUID-Tunable Microchip Resonator</i> Yarema Reshitnyk University of Queensland	<i>Results from the LIGO Squeezed Light Injection Experiment</i> Sheon Chua Australian National University	<i>Two-Centre Convergent Close-Coupling Calculations of Positron Scattering from Magnesium</i> Ravshanbek Utamuratov Curtin University	<i>The Australian Empirical Real Time Regional Ionosphere Model</i> Matt Francis IPS Radio and Space Services	<i>A Hyperelastic Constitutive Approach for the Rheology of Concentrated Particulate Suspensions under Combined Shear and Compression Loads</i> Anthony Stickland University of Melbourne	<i>Single-Polarisation DBR Fibre Laser in Photosensitive Ho-doped Fibre</i> Michael Oermann Defence Science and Technology Organisation	<i>Fluctuations and Avalanches in Diffusionless Phase Transitions Probed by Coherent X-Rays</i> Uwe Klemradt RWTH Aachen University
1215-1230		<i>Practical Superconductors: Measurements and Reality</i> Alexey Pan University of Wollongong	<i>Discretely Observable 3D Quantum Walk Structures</i> Michael Steel Macquarie University	<i>Positron Scattering From Ethene</i> Luca Chiari Flinders University	<i>Significant Events to Date in Cycle 24</i> Dave Neudegg Bureau of Meteorology	<i>Role of Self-Concentration and Coil-Stretch Hysteresis in Electrospinning of Nominally Dilute Polymer Solutions</i> Ranganathan Prabhakar Monash University		
1230-1250	2012 AOS W.H. (Beattie) Steel Medal Winner: <i>Nonlinear Optics: Starting and Finishing in the Mid Infrared</i> Barry Luther-Davies Australian National University							
1230-1330	Lunch Break <i>Please note lunch is not provided by the Congress</i> Exhibition and Poster Viewing <i>John Niland Scientia Building</i>							
1235-1320	Women in Physics Session Room: CLB 6 <i>What is the Real Status of Women in Physics in Australia and What Are the Issues Right Now?</i> Cathy Foley CSIRO <i>The Role of Women Academics in Australian Universities</i> Susan Feteris Deakin University <i>Female Participation in Tertiary Physics: a Case Study</i> Juna Sathian Queensland University of Technology							

WEDNESDAY

1330-1500 CONCURRENT SESSION 8								
	8A Optics, Photonics and Lasers 8: Nonlinear Optics 1	8B Condensed-Matter, Materials and Surface Physics 8: Semiconductors-I	8C Quantum Information, Concepts and Coherence 8: Optomechanics	8D Atomic and Molecular Physics 8: Spin	8E Astronomy and Astrophysics 1: Instrumentation Session	8F Complex Systems, Computational and Mathematical Physics 1	8G ACOFT 8 Photonic Devices 2	8H Optics, Photonics and Lasers 13: Plasmonics (Fabrication)
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	Chair: Neil Broderick	Chair: Jody Bradby	Chair: Ping Koy Lam	Chair: Brian Orr	Chair: Warrick Couch	Chair: Pulin Gong	Chair: Mick Withford	Chair: Isabelle Staude
1330-1345	<i>Shaping and Twisting Light Beams Using Nonlinear Photonic Crystals</i> Ady Arie Tel Aviv University	<i>Quantum Computing in Silicon with Donor Electron Spins</i> Michelle Simmons University of New South Wales	<i>Quantum Optomechanics for Sensing and Fundamental Science</i> Warwick Bowen University of Queensland	<i>Electron Scattering Phenomena from Radicals of Technological Interest</i> Darryl Jones Flinders University	<i>The Australian Square Kilometre Array Pathfinder</i> Lisa Harvey-Smith CSIRO	<i>Physical Principles Underlying Complex Brain Network Organisation</i> Peter Robinson University of Sydney	<i>Ultrafast Laser Inscription of Integrated "Photonic Lanterns"</i> Robert Thomson Herriot Watt University	<i>Nanostructures for Photovoltaics</i> Kylie Catchpole Australian National University
1345-1400			<i>Measurable Quantum Geometric Phase from a Rotating Single Spin</i> Andrew Martin University of Melbourne					
1400-1415	<i>Randomly Poled Lithium Niobate Crystal for Broadband Optical Frequency Conversion</i> Yan Sheng Australian National University	<i>Nuclear Magnetic Resonance and Hyperfine Coupling in GaAs Electron and Hole Quantum Wires</i> Alex Hamilton University of New South Wales	<i>Vibration Stabilisation for Quantum Optomechanics</i> David McAuslan University of Queensland	<i>RF-induced Feshbach Resonances in Rb-87</i> Mikhail Egorov Monash University	<i>The H.E.S.S. II Gamma-Ray Telescope – A New Window onto the GeV Gamma-Ray Sky</i> Gavin Rowell University of Adelaide	<i>Blow-Up Phenomenon For Evolutional Inequalities with Singularities on Unbounded Sets</i> Evgeny Galakhov and Olga Salieva Russian Peoples' Friendship University	<i>Nanophotonic Phase Modulator</i> Ranjith Rajasekharan Unnithan University of Melbourne	<i>Hybrid Semiconductor-metal Nanostructures: Active Plasmonics</i> Daniel Gomez University of Melbourne
1415-1430	<i>Phase-sensitive Amplification by Four-Wave-Mixing on a Chalcogenide Waveguide</i> Richard Neo University of Sydney	<i>Fabrication and Characterisation of Ambipolar AlGaAs/GaAs Heterostructure Devices</i> Daisy Wang University of New South Wales	<i>Enhanced Micromechanical Sensors: Active Feedback vs Optimal Postprocessing</i> Glen Harris University of Queensland	<i>The Role of Spin in Triplet-Triplet Upconversion</i> Andrew Danos University of Sydney	<i>Redesign of the Integrated Photonic Spectrograph for Improved Astronomical Performance</i> Nick Cvetojevic Macquarie University	<i>New Applications of Sparse Methods in Physics</i> Ra Inta Australian National University	<i>Modifying the Contact Angle Of Glass Substrates with Laser Irradiation for Self-Assembly of Photonic Microwire Waveguides</i> Masood Naqshbandi University of Sydney	<i>Hybrid Response from Resonant Coupling Between Near Percolating Metal Films and Metal Mirrors</i> Fadi Bonnie University of Technology Sydney
1430-1445	<i>Controllable Photon-Pair Generation and Quantum Walks in Nonlinear Waveguide Arrays</i> Andrey Sukhorukov Australian National University	<i>A New Crystalline Phase of Silicon Formed from Indentation-Induced High-Pressure Phases</i> Bianca Haberl Australian National University	<i>Phonon Number Measurements Using Single Photon Opto-Mechanics</i> Sahar Basiri-Esfahani University of Queensland	<i>Three-atom Collisions in a Dilute Thermal Vapour</i> Tom Stace University of Queensland	<i>Laser Tomography Adaptive Optics System for the Giant Magellan Telescope</i> Francis Bennet Australian National University		<i>Design for Broadband On-Chip Isolator Using Stimulated Brillouin Scattering</i> Christopher Poulton University of Technology Sydney	<i>Broadband Unidirectional Yagi-Uda Nanoantennas</i> Isabelle Staude Australian National University
1445-1500	<i>Effect of Loss on Photon-Pair Generation and Correlations in Nonlinear Waveguide Arrays</i> Diana Antonosyan Australian National University	<i>The 1D g-factor and 0.7 Anomaly in QPCs with Independent Control Over Density</i> Adam Burke University of New South Wales	<i>Two Photon Conditional Optomechanics</i> Uzma Akram University of Queensland	<i>Dynamics and Control of Electron Localisation in Dissociating Molecules</i> Igor Litvinyuk Griffith University	<i>Phasing Concept for Segmented Mirror Telescopes Using Digital Interferometry</i> Silvie Ngo Australian National University		<i>Relative Intensity Noise of Yb DFB Waveguide Laser Fabricated Using Femtosecond Laser Direct-write Technique</i> Yuwen Duan Macquarie University	<i>Tuning Photosensitivity for Ultra-high Resolution Nanofabrication with Metals</i> Faoyu Cao Swinburne University of Technology
1500-1530	Afternoon Tea – Exhibition and Poster Viewing <i>John Niland Scientia Building</i>							

1530-1700 CONCURRENT SESSION 9								
	9A Optics, Photonics and Lasers 9: Non-linear Optics 2	9B Condensed-Matter, Materials and Surface Physics 9: Semiconductors-II	9C Quantum Information, Concepts and Coherence 9: Quantum Theory	9D Physics Education 1	9E Astronomy and Astrophysics 2: Science Session	9F Complex Systems, Computational and Mathematical Physics 2	9G ACOFT 9 Photonic Sensing 2	9H Optics, Photonics and Lasers 14: Ultra-precise Frequency Determination and Distribution
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	Chair: Alexander Judge	Chair: David Jamieson	Chair: Gavin Brennen	Chair: Judith Pollard	Chair: John O'Byrne	Chair: Jaan Oitmaa	Chair: John Arkwright	Chair: Brian Orr
1530-1545	<i>Tailorable On-chip Stimulated Brillouin Scattering in Nanoscale Silicon Waveguides</i> Heedeuk Shin Sandia National Laboratories	<i>Ab Initio Calculation of Si:P Nanowires Confined Atomically in Two Dimensions</i> Daniel Drumm RMIT University	<i>Genuine N-partite Einstein-Podolsky-Rosen Steering</i> Margaret Reid Swinburne University of Technology	<i>Development of Threshold Learning Outcomes for Australian Graduates in Physics</i> Margaret Wegener University of Queensland	<i>Using Asteroseismology to Probe Stellar Interiors with NASA's Kepler Mission</i> Tim Bedding University of Sydney	<i>Fractional Diffusion and Continuous Time Random Walks with Trapping, Forcing and Reactions</i> Bruce Henry University of New South Wales	<i>Advanced Fiber Sensing Techniques for Security and Defense</i> Geoffrey Cranch Naval Research Laboratory	<i>Ultra-Stable Time and Frequency Dissemination Networks for Diverse Applications by Multiple Users</i> Sascha Schediwy University of Western Australia
1545-1600		<i>Realising Lateral Wrap-gated Nanowire FETs and Controlling Gate Length with Chemistry</i> Adam Micolich University of New South Wales	<i>Quantum Control in Foundational Experiments</i> Daniel Terno Macquarie University		<i>Electron Beam Extraction of Cometary Material from STARDUST Silica Aerogel</i> Aiden Martin University of Technology, Sydney			<i>Long-distance Analog and Digital Dissemination of Reference Radio Frequencies Over Optical Fibers</i> Ken Baldwin Australian National University
1600-1615	<i>Transformation of Higher-order Spatial Solitons in Nematic Liquid Crystals</i> Yana Izdebskaya Australian National University	<i>Influence of Strain to the Electron-phonon Coupling in Degenerately Doped Silicon at Low Temperatures</i> Juha Muhonen University of New South Wales	<i>Quantum Control of a Bose-Einstein Condensate in a Harmonic Trap</i> Sarah Adlong Australian National University	<i>Preparing Demonstrators to Facilitate Learning in Inquiry-oriented Practicals</i> Les Kirkup University of Technology, Sydney	<i>Carbon Monoxide Distribution Below Venus' Clouds</i> Daniel Cotton University of New South Wales	<i>Critical Slowing in Excitable Systems</i> Alistair Steyn-Ross University of Waikato	<i>Ultra-low Frequency Noise DBR Fibre Laser for Sensing Strain in the Femto-strain Regime</i> Scott Foster Defence Science and Technology Organisation	<i>Frequency Stabilisation in Whispering-Gallery-Mode Resonators Based on Frequency Doubling Self-Referencing Technique</i> Wenle Weng University of Western Australia
1615-1630	<i>Nonlinear Conical Diffraction in Photonic Lieb Lattices</i> Daniel Leykam Australian National University	<i>Measuring the Hardness of Silicon</i> Jody Bradby Australian National University	<i>Ultimate Limits to Quantum Metrology</i> Marcin Zwierz Griffith University	<i>Can We Test Representational Ability Independent of Physics Conceptual Knowledge?</i> Matthew Hill University of Sydney	<i>X-Ray Halos, Dark Gravitational Eigenstates and Cooling Flow</i> Allan Ernest Charles Sturt University		<i>Wavelength Division Multiplexing of a Fibre Bragg Grating Sensor Using Transmit-Reflect Detection System</i> Gary Allwood Edith Cowan University	<i>Ultra Weak-Light Phase Detection</i> Sam Francis Australian National University
1630-1645	<i>Signatures of Integrability Breaking Via Dark-Bright Soliton Collisions in a Two-Component Bose-Einstein Condensate</i> James Mills University of Queensland	<i>Structural Relaxation of Ion-implanted Amorphous Silicon</i> Leonardus Bimo Bayu Aji Australian National University	<i>Nonlinear Metrology: A Quantum Scaling Paradox</i> Michael Hall Griffith University	<i>Tiered Assessment in Upper-level Undergraduate Physics</i> Timo Nieminen University of Queensland	<i>Identifying the Physical Mechanisms Driving Rapid Galaxy Evolution via Multiwavelength Studies</i> Warrick Couch Swinburne University of Technology	<i>Statistical Characterisation of Hole Turbulence in 1D Complex Ginzburg-Landau Equation</i> Yusuke Uchiyama University of Tsukuba	<i>Coupled Waveguide Array Sensing Platform Exploiting Discrete Trapping Behaviour</i> Eike Zeller RMIT University	<i>An Internally Sensed Optical Phased Array</i> David Bowman Australian National University
1645-1700	<i>High-pressure Phase Transformations by Fs-laser in Transparent and Opaque Media</i> Eugene Gamaly Australian National University	<i>Single keV Ion Detection in Silicon</i> Changyi Yang University of Melbourne	<i>Open Time-like Curves Violate Heisenbergs Uncertainty Principle</i> Jacques Pienaar University of Queensland	<i>Developing an Educational Video for Utilising an Oscilloscope in First Year Physics</i> Steven Hinckley Edith Cowan University	<i>Astrophysical Evidences for the Variation of Fundamental Constants and Proposals of Laboratory Tests</i> Victor Flambaum University of New South Wales	<i>Validation of PET-SORTEO Monte Carlo Simulations for the Geometry of the Inveon PET Preclinical Scanner</i> Frederic Boisson Australian Nuclear Science and Technology Organisation	<i>Broadband Optical Supercontinuum Generation in a Long Cavity Fibre Laser</i> Graham Town Macquarie University	<i>Australian Contributions to the GRACE Follow-On Satellite Mission</i> Roland Fleddermann Australian National University

WEDNESDAY

1700-1830	Poster Session 2 Presenting authors to be available for discussion <i>Refreshments provided</i> <i>John Niland Scientia Building</i>
1830-2000	Public Lecture <i>Room: CLB 7</i> Brian Schmidt Australian National University

THURSDAY 13 DECEMBER 2012

0730-1730	Registration <i>John Niland Scientia Building</i>							
0800-1545	Exhibition Open <i>John Niland Scientia Building</i>							
0900-1030	PLENARY 7 AND 8							
0900-0945	Plenary 7 Room: CLB 7 <i>Chair: Marc Duldig</i> <i>Type Ia Supernovae, the Accelerating Cosmos and Dark Energy</i> Brian Schmidt Australian National University							
0945-1030	Plenary 8 Room: CLB 7 <i>Chair: Geoff Taylor</i> <i>Discovery of the Higgs Boson</i> Elisabetta Barberio University of Melbourne							
1030-1100	Morning Tea – Exhibition and Poster Viewing <i>John Niland Scientia Building</i>							
1100-1230	CONCURRENT SESSION 10							
	10A Optics, Photonics and Lasers 10: Plasmonics 2	10B Condensed-Matter, Materials and Surface Physics 10: Semiconductors-III	10C Quantum Information, Concepts and Coherence 10: Spins in Solids	10D Physics Education 2	10E Relativity and Gravitation 1	10F Condensed-Matter, Materials and Surface Physics 13: Instruments and Methods	10G ACOFT 10 Future Telecomms	10H Optics, Photonics and Lasers 15: Spectroscopy
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	<i>Chair: Isabelle Staude</i>	<i>Chair: Ron White</i>	<i>Chair: Jason Twamley</i>	<i>Chair: David Hoxley</i>	<i>Chair: Susan Scott</i>	<i>Chair: Shane Kennedy</i>	<i>Chair: Simon Fleming</i>	<i>Chair: Maryanne Large</i>
1100-1115	<i>Fluorescent Nanoparticles for Advanced Bioimaging and Biosensing</i> Ewa Goldys Macquarie University	<i>Transport and Recombination in Disordered Organic Semiconductors</i> Almantas Pivrikas University of Queensland	<i>Diamond Based Quantum Technologies</i> Fedor Jelezko University of Ulm	PEG Medal Winner: Manjula Sharma University of Sydney	<i>Gravitational Wave Detection Using Laser Interferometry</i> David McClelland Australian National University	<i>An Ultra-stable Atomic Force Microscope with Integrated Laser Interferometry</i> Jan Herrmann Department of Innovation, Industry, Science and Research	<i>Current Trends in Optical Communications</i> Andrew Ellis IEEE Distinguished Lecturer	<i>High Accuracy Absorption Spectroscopy at the Shot-Noise Limit</i> James Anstie University of Western Australia
1115-1130								

1130-1145	<i>Collision of Non-diffracting Airy Surface Plasmons</i> Alexander Minovich Australian National University	<i>A Spin-based Organic Magnetic Field Sensor</i> Dame McCamey University of Sydney	<i>A New Optically Addressable Spin Qubit in Diamond</i> Marcus Doherty Australian National University	<i>The Impact of Values and Self-Identity on University Physics Learning</i> Margaret Wegener University of Queensland	<i>Photons, Qubits and Satellite Experiments</i> Daniel Terno Macquarie University	<i>Single-parameter Quantised Charge-pumping via a Few Dopant Atoms</i> Guiseppe C. Tettamanzi University of New South Wales	<i>Broadband RF Phase Shifting with a Simple Fibre Interferometer</i> Manik Attygalle Defence Science and Technology Organisation	<i>Applications of Two-Photon Spectroscopy of Rubidium Within Hollow-Core Optical Fibre</i> Christopher Perrella University of Western Australia
1145-1200	<i>Plasmonic Whispering Gallery Mode Biosensors</i> Jon Swaim University of Queensland	<i>Annealing Study of Ion Implanted Diamond</i> Barbara Fairchild University of Melbourne	<i>Scalable Patterned Nanodiamond Arrays Containing Single Nitrogen-vacancy Emitters</i> Brant Gibson University of Melbourne	<i>Comparison of Two Physics Honours Seminar Assessment Strategies</i> Sarah Walden Queensland University of Technology	<i>Gravitational Entropy within the Quiescent Cosmology Framework</i> Philip Threlfall Australian National University	<i>Plane-Based Lattice Rectification of hcp Crystals</i> Anna Ceguerra University of Sydney	<i>Simple Frequency Shift Keyed Radio-Over-Fibre Communication System</i> Graham Town Macquarie University	<i>Mid-infrared Femtosecond Spectroscopy for Broadband and Rapid Greenhouse Gas Characterisation</i> Tyler Neely University of Queensland
1200-1215	<i>Efficient Control of Polarisation-Entangled Photon Pairs with Plasmonic Nanoantennas</i> Ivan Maksymov Australian National University	<i>Is Thermal Annealing a Viable Alternative for Crystallization in Triethylsilylethynyl Anthradithiophene (TESADT) Organic Transistors?</i> Adam Micolich University of New South Wales	<i>Slow Hopping of Polaron Pairs in MEH-PPV</i> Thomas Keevers University of Sydney	<i>Improving Student Engagement and Outcomes in Level 1 Physics</i> Judith Pollard University of Adelaide	<i>Rovibrational Quantum Interferometers and Gravitational Waves</i> Oleg Sushkov University of New South Wales	<i>Cathodoluminescence Characterisation of Point Defects in GaN Nanomembranes</i> Marion Stevens-Kalceff University of New South Wales	<i>Reconfigurable Remote Nodes in 60 GHz Radio-over-Fiber Networks</i> Cibby Pulikkaseril Finisar Australia	<i>Trace-level Sensing of Greenhouse Gases by Continuous-wave Cavity-ringdown Spectroscopy</i> Brian Orr Macquarie University
1215-1230	<i>Plasmonic Cross-slot Antennas</i> Ann Roberts University of Melbourne	<i>Fractional Kinetics in Phase and Configuration Space</i> Robert Robson James Cook University	<i>Diamond NV Spin Qubits for Sensing in Biology</i> Lloyd Hollenberg University of Melbourne	<i>How a Physics Degree Changes Students' Attitudes and Learning Behaviours</i> Anton Rayner University of Queensland	<i>Narrow Resonances and Black-Hole-Like Absorption in a Non-Black-Hole Metric</i> Graeme Gossel University of New South Wales	<i>Phonons Observed by Laue Diffraction on a Continuous Neutron Source</i> Garry McIntyre Australian Nuclear Science and Technology Organisation	<i>Three-Core Weakly-Guiding Mode-Selective Fibre Couplers</i> Nicolas Riesen Australian National University	<i>Manipulating an Optical Frequency Comb</i> Fred Baynes University of Western Australia
1230-1330	Lunch and Exhibition Viewing Please note lunch is not provided by the Congress John Niland Scientia Building							
1235-1320	Alan Walsh Medal Winners Room: CLB 7 Michael Tobar and Eugene Ivanov University of Western Australia Harrie Massey Medal Winner Room: CLB 7 <i>Thermal Plasmas: From Fundamental Science to Industrial Processes</i> Tony Murphy CSIRO							

THURSDAY

1330-1500 CONCURRENT SESSION 11								
	11A Optics, Photonics and Lasers 11: Trapping and Beams	11B Condensed-Matter, Materials and Surface Physics 11: Theoretical Condensed-Matter Physics	11C Quantum Information, Concepts and Coherence 11: Cold Atoms 1	11D Joint: Quantum Information, Concepts and Condensed-Matter, Materials and Surface Physics	11E Relativity and Gravitation 2	11F Condensed-Matter, Materials and Surface Physics 14	11G ACOFT 11 Lasers 2	11H Optics, Photonics and Lasers 16: Single Photon Sources
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	Chair: Dragomir Neshev	Chair: Jody Bradley	Chair: Andrew Doherty	Chair: Michelle Simmons	Chair: Ben Whale	Chair: Clemens Ulrich	Chair: Steve Madden	Chair: Alex Clark
1330-1345	<i>Levitation of Particles in Air with Optical Vector Beams</i> Vladlen Shvedov Australian National University	<i>Floquet Majorana Fermions in Non-magnetic Quantum Wires</i> Andres Alejandro Reynoso University of Sydney	<i>Correlations in Lower Dimensional Quantum Gases</i> Andrew Truscott Australian National University	<i>Single-Atom Spin Qubits in Silicon</i> Andrea Morello University of New South Wales	<i>Current Status of the Analysis of Data from Ground-based Gravitational Wave Observatories</i> Ra Inta Australian National University	<i>Opportunities for Materials Research Using Opal, Australia's New Neutron Source</i> Shane Kennedy Australian Nuclear Science and Technology Organisation	<i>Single Transverse Mode, 2.9 Micron Q-switched HoPr-doped Fluoride Fiber Laser</i> Tomonori Hu University of Sydney	<i>Room Temperature Single Photon Emission In Silicon Carbide</i> Stefania Castelletto Macquarie University
1345-1400	<i>Particle Dynamics in Photophoretic Optical Traps in Air</i> Niko Eckerskorn Australian National University	<i>The Bose-Hubbard Model for Dipolar Atoms</i> Bogusz Bujnowski University of Melbourne					<i>Air-clad Holmium-doped Silica Fibre Laser</i> Sebastian Ng University of Adelaide	<i>Single Photon Sources in Silica Using Nanoparticle Convective Self-assembly Induced Fracturing</i> John Canning University of Sydney
1400-1415	<i>An Optically Driven Stochastic Motor</i> Alexander Stilgoe University of Queensland	<i>Fractional Quantum Hall Physics in Jaynes-Cummings-Hubbard Lattices</i> Andrew Hayward University of Melbourne	<i>Two-Dimensional Vortex Turbulence in a Bose-Einstein Condensate</i> Tyler Neely University of Queensland	<i>Single Atom Electron and Nuclear Spin Qubits in Silicon</i> Jarryd Pla University of New South Wales	<i>The Abstract Boundary and Extensions of Space-times</i> Richard Barry Australian National University	<i>Polarised Neutrons for Magnetism Research Using Polarised Helium-3 techniques on ANSTO's Neutron Scattering Instruments</i> Wai Tung Lee Australian Nuclear Science and Technology Organisation	<i>High Gain Waveguide Amplifier and Laser Using Erbium Doped Tellurium Oxide Pumped at 980nm</i> Khu Vu Australian National University	<i>Near-Surface, Spectrally Stable Nitrogen Vacancy Centres</i> Timothy Karle University of Melbourne
1415-1430	<i>Frozen Light Enhancement of Optical Tweezers Near a Stationary Inflection Point</i> Rachael Fulcher University of Sydney	<i>Simulation of Trapped Bose-Einstein Condensates Using the Truncated Wigner Method</i> Bogdan Opanchuk Swinburne University	<i>Bell Inequality Test Using Colliding Condensates</i> Karen Kheruntsyan University of Queensland	<i>Spin Guides, Magnon Collisions and Quantum Magnonics</i> Andrew Greentree RMIT University	<i>Testing for Periodic Changes in Fundamental Constants Due to Varying Gravitation Fields and Boosts Using Long-Term Comparison of the SYRTE Atomic Fountains and H-masers</i> Michael Tobar University of Western Australia	<i>Spatially Resolved Exchange Interaction of Coupled Acceptor Dopants in Silicon</i> Joseph Salfi University of New South Wales	<i>A kW Class 2 Um-wavelength Chip Laser</i> David Lancaster University of Adelaide	<i>Effects of the Nanodiamond Host on an NV Centre Emission State</i> Carlo Bradac University of Sydney
1430-1445	<i>Dark Field Optical Tweezers for Studying Nanoparticle Dynamics</i> Wen Jun Toe University of New South Wales	<i>Alkali Metal Dynamics in the Beta-Pyrochlores AOs_2O_6 ($A = K, Rb, Cs$) and Their Prospects as Thermoelectric Materials</i> Elvis Shoko Australian Nuclear Science and Technology Organisation	<i>Quantum Relaxation of the Tonks-Girardeau Gas</i> Tod Wright University of Queensland	<i>Size-reduction of Nanodiamonds Hosting NV Centres via Air Oxidation</i> Torsten Gaebel University of Sydney	<i>Looking Beyond Coordinate Singularities</i> Benjamin Lewis Australian National University	<i>Structural Modifications of Silicon by Ultrafast Laser Micro-explosion</i> Andrei Rode Australian National University	<i>Ultrashort Pulse Fiber Laser Operating in the Mid-Infrared</i> Darren Hudson University of Sydney	<i>Single-photon Emission from Zinc-oxide Defects</i> Snejana Tomljenovic-Hanic University of Melbourne
1445-1500	<i>Measurement of Macrophage Phagocytosis Using Optical Tweezers</i> Daryl Preece University of Queensland	<i>Phase Diagrams of Spin $S=1$ Bilinear-Biquadratic Heisenberg Models</i> Jaan Oitmaa University of New South Wales	<i>Macroscopic Quantum Self-Trapping in Dynamical Tunnelling with Bose-Einstein Condensates</i> Matthew Davis University of Queensland	<i>Engineering Atoms in Silicon: Building Qubits for the Quantum Internet of the Mid-21st C</i> David Jamieson University of Melbourne	<i>Off-resonance Thermal Noise of Aluminum Flexure</i> Thanh Nguyen Australian National University	<i>Spatial Metrology Of Single Atom Spin Qubit Devices</i> Fahd Mohiyaddin University of New South Wales	<i>Noise Like Pulses in Yb Doped All-Normal Dispersion Fibre Laser with Raman Process</i> Neil Broderick Auckland University	<i>NV Centre Emission in an Aerogel Environment</i> Faraz Inam Macquarie University

1500-1530	Afternoon Tea and Exhibition Viewing <i>John Niland Scientia Building</i>							
1530-1630	CONCURRENT SESSION 12							
	12A Optics, Photonics and Lasers 12: Nanomeasurement	12B Condensed-Matter, Materials and Surface Physics 12: Spin Chains, Spin Ladders and Spin Ice	12C Quantum Information, Concepts and Coherence 13: Cold Atoms 2	12D Quantum Information, Concepts and Coherence 12: Trapped Ions	12E Relativity and Gravitation 3	12F Energy, Energy Materials and Energy Systems	12G ACOFT 12 Chalcogenide Waveguides	12H Optics, Photonics and Lasers 17: Novel Techniques in Optical Measurement
	Room: CLB 7	Room: CLB 8	Room: CLB 6	Room: CLB 5	Room: CLB 4	Room: CLB 3	Room: CLB 2	Room: CLB 1
	<i>Chair: Manuel Decker</i>	<i>Chair: Chris Harmer</i>	<i>Chair: Matthew Davis</i>	<i>Chair: David Reilly</i>	<i>Chair: John Steele</i>	<i>Chair: Matthew Hole</i>	<i>Chair: Tanya Monro</i>	<i>Chair: Stefania Castelletto</i>
1530-1545	<i>Exploiting the Symmetries of Nanostructures for Metrology Applications</i> Nora Tischler Macquarie University	<i>Ice Rule Coherence in Stuffed Spin Ice</i> Bob Aldus Australian Nuclear Science and Technology Organisation	<i>Precision Measurement of S-wave Scattering Lengths</i> Mikhail Egorov Monash University	<i>From Quantum Control to Quantum Simulation with Trapped Ions</i> Michael Biercuk University of Sydney	<i>Balanced Electric-Magnetic Dihole in Kaluza-Klein Theory</i> Edward Teo Australian National University	<i>Multiscale Structure and Energetics in Photosynthetic Solar Energy Harvesting</i> Andrew Ringsmuth University of Queensland	<i>Intensity-Dependent Photosensitivity of Chalcogenide As₂S₃ Fibers</i> Irina Kabakova University of Sydney	<i>Light Extraction and Fluorescence in UV Micro-fluidic Applications</i> Gediminas Gervinskas Swinburne University of Technology
1545-1600	<i>Digitally Enhanced Homodyne Interferometry for Multiplexed, Picometer Sensitive Metrology</i> Andrew Sutton Australian National University	<i>Thermodynamic Properties of an Anisotropic Heisenberg Model for the XY Pyrochlore Er₂Ti₂O₇</i> Jaán Oitmaa University of New South Wales	<i>Entanglement and Optimised Interferometric Phase Measurement in BECs</i> Peter Drummond Swinburne University of Technology	<i>The Standard Chart Based Approach to Studying the Global Structure of a Spacetime Induces a Coordinate Invariant Boundary of Ideal Points</i> Ben Whale University of Otago	<i>Broadband Absorption Enhancement in Ultra-thin Crystalline Si Solar Cells by a Sandwich Photonic-Plasmonic Structure</i> Yinan Zhang Swinburne University	<i>Stimulated Brillouin Scattering and Bragg Grating Formation in As₂S₃ Fiber</i> Irina Kabakova University of Sydney	<i>Characterisation of Nanodiamond-dispersed Photopolymers Towards High-density Optical Data Storage</i> Jelle Storteboom Swinburne University of Technology	
1600-1615	<i>Ultrasensitive Cavity Optomechanical Magnetometry</i> Stefan Forstner University of Queensland	<i>The Complex Magnetic Phase Diagram of the Quantum Spin Chain Material, Linarite, PbCuSO₄(OH)₂</i> Kirrily Rule Australian Nuclear Science and Technology Organisation	<i>Exact Quench Dynamics of the One-Dimensional Bose Gas Using the Lieb-Liniger Model</i> Jan Zill University of Queensland	<i>Observation of a Large Optical Phase Shift from a Single Atom</i> Benjamin Norton Griffith University	<i>Gauge Invariant Qubits in Curved Space-time</i> Tommaso Demarie Macquarie University	<i>Coupling Metal Hydrides with Concentrated Solar Thermal Applications for Electricity Generation in Remote Areas</i> Craig Buckley Curtin University	<i>Hybrid As₂S₃ on Er Doped TeO₂ Waveguide for Lossless Nonlinear Optics</i> Khu Vu Australian National University	<i>Three-photon Absorption in Quantum Dots Using Ultrafast Fibre Lasers</i> Matthew Petrasianus Griffith University
1615-1630	<i>High-speed, 3D Tracking of Colloidal Systems Using Digital Holographic Microscopy</i> Anna Wang Harvard University	<i>Coulombic Charge Ice</i> Aroon O'Brien University of Sydney	<i>Toroidal Optical Trap Potentials with a ⁸⁷Rb BEC</i> Mark Baker University of Queensland	<i>The Shadow of a Single Atom</i> Erik Streed Griffith University	<i>Australia and the Advanced LIGO Gravitational Wave Detector</i> Bram Slagmolen Australian National University	<i>Bathchromic Shift in Photoabsorption Spectra of Organic Dye Sensitisers Through Structural Modifications for Better Solar Cells</i> Narges Mohammadi Swinburne University	<i>Impact of Raman Noise and Dispersion on Photon-pair Generation in Chalcogenide (As₂S₃)</i> Matthew Collins University of Sydney	
1630-1700	Congress Closing Room: CLB 7							

THURSDAY

Paper Summaries

Monday 10 December 2012

0900 – 0945

Plenary 1

Room: Clancy Auditorium

Chair: Adi Paterson, Australian Nuclear Science and Technology Organisation NSW AUSTRALIA

Time

0900 – 0945

Thomas Mason

Oak Ridge National Laboratory, TN UNITED STATES OF AMERICA

Science for the Energy Challenge

Overcoming the energy challenge demands advances in technology. Close coupling of basic and applied research and development, with a sustained focus on translating discovery and innovation to practice, can accelerate the delivery of these advances.

0945 – 1030

Plenary 2

Room: Clancy Auditorium

Chair: Hans Bacher, Australian National University ACT AUSTRALIA

Time

0945 – 1030

Svein Sjøberg

University of Oslo, NORWAY

What Can We Learn – and Not Learn – From Comparative Studies of Educational Achievement in Science?

Studies like OECDs PISA (Program for International Student Achievement) has an increasing influence on educational policies in participating countries. The presentation will argue that these studies have fundamental problems and flaws as well as unwarranted influence.

1100 – 1230

Concurrent Session 1A – Optics, Photonics and Lasers 1: Nanofabrication

Room: CLB7

Chair: Heike Ebendorff-Heidepriem, University of Adelaide, SA AUSTRALIA

Time

1100 – 1130

William Arnold

ASML Holding Inc., UNITED STATES OF AMERICA

Progress in Extreme Ultraviolet Lithography for IC Manufacturing

Extreme ultraviolet lithography is developed to enable 1Xnm IC manufacturing. High numerical aperture step and scan systems have been constructed and deployed. Recent results and progress towards high volume manufacturing are reviewed.

1130 – 1145

Benjamin Cumming

Swinburne University of Technology VIC AUSTRALIA

Adaptive Aberration Compensation for the Fabrication of Chalcogenide Gyroids

Gyroid network structures are fabricated in the chalcogenide glass As₂S₃ by means of direct laser writing. An adaptive aberration compensation scheme is employed to reduce the total aberration magnitude by over an order of magnitude.

- 1145 – 1200 **Isabelle Staude**
Nonlinear Physics Centre, Australian National University ACT AUSTRALIA
A Novel Hybrid Fabrication Approach for Three-dimensional Photonic Nanostructures
 We suggest a novel approach for fabricating three-dimensional (3D) metal nanostructures, which combines direct laser writing with electron-beam lithography. Using this approach we experimentally realize two key 3D structures of plasmonic metamaterials and nanoantennas
- 1200 – 1215 **Adam Taylor**
Swinburne University of Technology VIC AUSTRALIA
Alignment of Gold Nanorods by Photothermal Depletion, with Associated Single Particle Melting Studies
 Photothermal reshaping by a polarized laser is shown to impose alignment on as-made randomly aligned nanorod films, with aspect ratio dependent rod melting temperatures for these rods being also studied on a single particle basis.
- 1215 – 1230 **Xiangping Li**
Swinburne University of Technology VIC AUSTRALIA
Updatable Digital Holographic Display in Nanoparticle-enabled Photorefractive Polymers
 This paper reports on the updatable digital holographic three-dimensional display in nanoparticle-sensitized photorefractive polymers. Applying the localised refractive-index modulation induced by the exciton-plasmon coupling mediated photorefractivity using a femtosecond pulsed laser beam in digital holographic display is demonstrated.

1100 – 1230

Concurrent Session 1B – Condensed-Matter, Materials and Surface Physics 1: Graphene and Diamond

Room: CLB 8

Chair: Alex Hamilton, University of New South Wales, NSW AUSTRALIA

Time

- 1100 – 1130 **Barbaros Özyilmaz**
National University of Singapore, SINGAPORE
Graphene
 Here we show quasi-periodic nanoripple arrays introduce anisotropic charge transport and sets limits. I will also show our recent efforts in using a ferroelectric polymer coating to reduce the sheet resistance below values of ITO.
- 1130 – 1145 **Robert Elliman**
Australian National University ACT AUSTRALIA
Optical Imaging of Graphene Using Phase Shift Interferometry
 Phase-shifting interferometric imaging is shown to be a powerful analytical tool for studying graphene films, providing quantitative analysis of large area samples with a thickness resolution of 0.05 nm.
- 1145 – 1200 **David Hoxley**
La Trobe University VIC AUSTRALIA
Kelvin Probe Force Microscopy of the Diamond Surface Under Decane
 Scanning Kelvin Probe Force Microscopy is used to map the work function of hydrogen-terminated diamond surfaces on the sub-micron scale under an oil (decane). The values obtained are consistent with those obtained in air.
- 1200 – 1215 **Ewa Rej**
University of Sydney NSW AUSTRALIA
Towards Hyperpolarised Nanodiamonds for Magnetic Resonance Imaging
 We report magnetic resonance experiments on diamond nanoparticles towards the development of MRI contrast agents based on ^{13}C . Our purpose-built spectrometer allows for spin dynamics to be examined at ambient and milli-Kelvin temperatures.
- 1215 – 1230 **Morteza Aramesh**
University of Melbourne VIC AUSTRALIA
Surface Modification of Porous Alumina Membranes with Nanodiamonds
 We will present our recent results of surface modification of porous alumina membranes with nano-diamond that dramatically improves their chemical stability and bio-compatibility.

1100 – 1230**Concurrent Session 1C – Quantum Information, Concepts and Coherence 1: Optical Quantum Information**

Room: CLB 6

Chair Andrew White, University of Queensland QLD AUSTRALIA

Time

1100 – 1130

Geoff Pryde*Griffith University, QLD AUSTRALIA***Overcoming Loss in Remote Entanglement Sharing**

We demonstrate EPR-steering, by which Bob can verify shared entanglement with Alice, over a high-loss channel with the detection loophole closed. We also demonstrate heralded loss reduction of a qubit channel using a noiseless amplifier.

1130 – 1145

Sacha Kocsis*Griffith University QLD AUSTRALIA***Heralded Noiseless Amplification of a Photon Polarization Qubit**

We demonstrate heralded loss reduction of a qubit channel, using a two-mode coherent noiseless amplifier operating on the polarization of a single photon. We increase transmission fidelity by up to a factor of five.

1145 – 1200

Bixuan Fan*University of Queensland QLD AUSTRALIA***The Breakdown of the Single-shot Microwave Photon Detection via Kerr-type Nonlinearity Induced by a Three-level System**

We analyze Cross-Kerr phase shifts for photon counting and other quantum technologies. Using a generic atomic model we calculate the signal-to-noise (SNR) ratio for photon counting, and find atomic saturation effects require $\text{SNR} < 1$.

1200 – 1215

Till Weinhold*University of Queensland QLD AUSTRALIA***Conclusive Quantum Steering with Superconducting Transition-edge Sensors**

We demonstrate quantum steering between two parties by at least 48 standard deviations, closing the 'detection loophole' with an unprecedented 62% conditional detection efficiency by combining an optimised entangled photon-pair source with superconducting transition-edge sensors.

1215 – 1230

Andrew Wade*Australian National University ACT AUSTRALIA***Opto-Mechanical Upshifting of Scattered Light for Squeezed Light Measurement**

Spurious scattered light reflections couple low frequency environmental noise into the homodyne measurement of squeezed light states. We present a method of path length dithering to frequency up-shift these parasitic interferences.

1100 – 1230**Concurrent Session 1D – Atomic and Molecular Physics 1: Anti-hydrogen / Positrons**

Room: CLB 5

Chair: Michael Brunger, ARC Center for Antimatter-Matter Studies, Flinders University, SA AUSTRALIA

Time

1100 – 1130

Mike Charlton*Swansea University, UNITED KINGDOM***Progress in Antihydrogen Physics and First Observations of Resonant Quantum Transitions**

We describe how antihydrogen atoms have been stored for long periods in a neutral atom trap and subjected to microwave radiation to induce transitions between hyperfine levels of the ground state of the anti-atom.

1130 – 1145

Simon Armitage*University of North Texas, THE UNITED STATES OF AMERICA***Development of a Positron Reaction Microscope**

Progress will be presented on the development of a positron reaction microscope for kinematically complete measurements of ionization of atoms and simple molecules at the Centre for Antimatter/Matter Studies (CAMS), Australian National University.

- 1145 – 1200 **Roisin Boadle**
Australian National University ACT AUSTRALIA
Search for Positron Scattering Resonances in the Doubly Excited Region of the Helium Atom
 An experimental search for positron resonances in the doubly excited region of the helium atom has been conducted. Total scattering and positronium formation cross sections are presented and compared with recent theory.
- 1200 – 1215 **Gregory Boyle**
James Cook University QLD AUSTRALIA
Kinetic Theory Model of Positron Transport in Gases and Liquids
 A kinetic theory model of positron transport in dilute gaseous and soft-condensed matter has been developed. Results are compared with existing dilute gas-phase benchmarks, and preliminary soft-condensed results are reported.
- 1215 – 1230 **Janina Grineviciute**
Charles Darwin University NT AUSTRALIA
Positron Binding to Excited States of Helium
 The existence of broad resonances in the positron excitation spectrum of helium was demonstrated by explicit calculations using two different theoretical approaches. Positrons were found to attach to three doubly excited states of neutral helium.

1100 – 1230

Concurrent Session 1E – Nuclear and Particle Physics 1

Room: CLB 4

Chair: Kevin Varvell, University Of Sydney, NSW AUSTRALIA

Time

- 1100 – 1130 **Csaba Balazs**
Monash University VIC AUSTRALIA
Higgs Discovery: Opening a New Era of Particle Physics
 A new bosonic state was recently discovered at the Large Hadron Collider. Speculating that it is a Higgs boson, we review its impact on supersymmetry, the unification of all fundamental forces, dark matter and beyond.
- 1130 – 1200 **Chiara Roda**
CERN
Standard Model Measurements at the Large Hadron Collider
 The LHC provides an excellent environment for testing the Standard Model of Particle Physics (SM) in a previously inaccessible energy regime. We present the status of SM measurements based on LHC running to date.
- 1200 – 1215 **Gregory Lane**
Australian National University ACT AUSTRALIA
K-Isomers in Neutron-Rich Tungsten Nuclei
 Isomeric states have been investigated in tungsten nuclei from A=182 to A=190, well beyond the heaviest stable isotope, ¹⁸⁶W. Changes in deformation, in particular the triaxial deformation, result in a complex picture of changing configurations and transition strengths.
- 1215 -1230 **Nitesh Soni**
University of Adelaide SA AUSTRALIA
Search for Evidence of New Physics in Multilepton Final States with the ATLAS Detector
 A generic search for New Physics beyond the Standard Model is presented using multilepton final states in the ATLAS detector at the Large Hadron Collider

1100 – 1230

Concurrent Session 1F – Biomedical Physics 1

Room: CLB 3

Chair: Michael Lerch, Wollongong University NSW AUSTRALIA

Time

- 1100 – 1130 **Andrey V. Solov'yov**
Frankfurt Institute for Advanced Studies GERMANY
Molecular Level Assessments of Ion Induced Biodamage: Multiscale Approach
 Multiscale approach to the physics of radiation damage considers a number of physical effects that happen on different scales in order to understand biological action on tissue irradiated with ions on the quantitative level.

1130 – 1145

Hilary Byrne*University of Sydney NSW AUSTRALIA***Radiation-Induced Biological Damage on Subcellular Scales: Beyond DNA**

A virtual cell model is developed to investigate the effects of biological damage caused by low-energy electromagnetic interactions that occur outside the cell nucleus. Implications for healthy tissue exposed during cancer radiotherapy treatment are discussed.

1145 – 1200

Adam Briggs*University of Wollongong NSW AUSTRALIA***Cerium Oxide Nanoparticles Exhibit an Energy-dependent Protection to 9L Cells Under Exposure to X-ray Radiation Fields**

Cerium oxide (CeO₂) nanoparticles scavenge reactive oxygen species to confer radiation protection. We uncover energy-dependent radioprotection using CeO₂ nanoparticles. We observe protection at megavolt energies and no protection when using kilovolt X-rays.

1200 – 1215

Aimee McNamara*University of Sydney NSW AUSTRALIA***Microdosimetric Comparison between Proton and X-ray Computed Tomography Scans**

A comparison of the dose distribution of proton and x-ray beams, applicable to computed tomography (CT) beam energies, on the micron or cellular scale using Monte Carlo simulations with a detailed pediatric head model.

1215 – 1230

Dale Prokopovich*Australian Nuclear Science and Technology Organisation, NSW AUSTRALIA***SOI Microdosimetry of Hadron Therapy Fields**

SOI microdosimetry of hadron therapy treatment beam both the HIMAC in Chiba Japan and HIT in Heidelberg Germany have been performed. In and out of field measurements of the treatment fields will be presented

1100 – 1230**Concurrent Session 1G – ACOFT 1 Nonlinear Photonics***Room: CLB 2**Chair: Martijn de Sterke, University of Sydney NSW AUSTRALIA*

Time

1100 – 1130

Ben Eggleton*University of Sydney NSW AUSTRALIA***Nonlinear Optical Phononics: Harnessing Sound and Light in Nonlinear Nanoscale Circuit**

The convergence of optics and phononics, enabled by new nonlinear materials in which acoustic phenomena can be excited on small scales and nanoscale structures that enhance the interaction between sound and light, is unlocking innovations for chip-based information processing. This paper will review our recent breakthroughs that harness this optical-phononic interaction for a new paradigm in information processing, including tunable slow light, frequency comb sources and microwave photonic signal processing.

1130 – 1145

Mark Pelusi*University of Sydney NSW AUSTRALIA***All-optical Pre-compensation of Fiber Nonlinearity for WDM RZ-DPSK 40 Gb/s Signals by Transmitter-based Phase Conjugation**

Compensation of optical fiber nonlinearity in dispersion managed links is demonstrated for 100 GHz-spaced WDM 40 Gb/s RZ-DPSK signals by applying nonlinear pre-distortion and phase-conjugation at the transmitter. The Q-factor is improved by 1.3-2.4 dB for four channels.

1145 – 1200

Xin Gai*CUDOS (LPC) The Australian National University ACT AUSTRALIA***Dispersion Engineered Ge_{11.5}As₂₄Se_{64.5} Chalcogenide Nanowires for Polarisation Independent Processing**

We demonstrate the design and fabrication of square Ge_{11.5}As₂₄Se_{64.5} (Ge11) nonlinear nanowires fully embedded in a silica cladding for polarization independent (P-I) nonlinear processing. A near P-I operation was obtained for FWM and supercontinuum generation.

1200 – 1215 **Yvan Paquot**
University of Sydney NSW AUSTRALIA
Automatic DGD and GVD Compensator for a 640 Gb/s Single Channel Signal
 We report the first demonstration of a real time all-optical compensator based on an integrated signal monitor for group velocity dispersion and differential group delay for ultra high symbol rate (640 Gb/s) signals.

1215 – 1230 **Ben Eggleton**
University of Sydney NSW AUSTRALIA
Photonic Chip Based Narrowband Tunable and Reconfigurable Microwave Photonic Filter Using Stimulated Brillouin Scattering
 We demonstrate a photonic-chip based narrowband, tunable microwave photonic filter with shape and bandwidth reconfiguration. The filter has a stable amplitude (20 dB) and bandwidth (23.2 MHz) over 2.12 GHz resulting in high Q ~520.

1100 – 1230

Concurrent Session 1H – Plasma Physics

Room: CLB 1

Chair: Brian James, University of Sydney NSW AUSTRALIA

Time

1100 – 1130 **Matthew Hole**
Australian National University ACT AUSTRALIA
The Potential for Australian Participation in ITER
 ITER is the next step fusion experiment, designed to explore the physics of burning plasmas and demonstrate the technical feasibility of fusion power. I will outline our capacity to participate in the world's largest experiment.

1130 – 1145 **Amanda Rider**
CSIRO NSW AUSTRALIA
Plasmas Meet Plasmonics: Fundamental Physical Links and How to Make the Best of Them
 Physical links between classical plasma physics and plasmonics will be discussed, with analogies drawn between macro- (and micro-) scale gaseous plasmas and plasmons (essentially nanoscale metal plasmas). These fundamental similarities can be exploited in nanotechnological devices

1145 – 1200 **Anthony Murphy**
CSIRO Materials Science And Engineering NSW AUSTRALIA
Metal Vapour in Arc Welding: Its Influence on the Arc and Weld, and the Formation of Fume Particles
 We examine the physics underlying the formation of metal vapour in arc welding, its (very significant) effects on the arc and weld, and the formation of fume particles from the vapour.

1200 – 1215 **Eugene Tam**
CSIRO NSW AUSTRALIA
Three-Dimensional Modelling of a Carbon Arc Discharge for Nanostructure Production
 We present details of three-dimensional simulations of dc arcs between carbon electrodes. The model is applied to investigate how various parameters can affect nanostructure production

1215 – 1230 **Dominic Poznic**
University of Sydney NSW AUSTRALIA
Determination of the Electron Energy Distribution Function Using Integrated Data Analysis
 A analysis framework is presented that determines the electron energy distribution function of an argon discharge plasma through the integrated data analysis of optical emission spectroscopy and Langmuir probe diagnostics.

1330 – 1500

Concurrent Session 2A – Optics, Photonics and Lasers 2: Classical Optics: From Fundamentals to Fabrication

Room: CLB 7

Chair: Christopher Poulton, University of Technology NSW AUSTRALIA

Time

1330 – 1400

Pieter Dumon*Imec BELGIUM*

Silicon Photonics for Interconnects and Biotechnology

We developed an integration platform for photonic integrated circuits in 200mm and 300mm wafer CMOS facilities. Sporting waveguide devices, modulators, and photodetectors, we demonstrate applications such as short-range optical interconnects as well as biosensors.

1400 – 1415

Vincent Loke*University of Queensland QLD AUSTRALIA*

Designing Optically-Driven Microrotors for Maximum Torque Efficiency

We discuss how computational modelling is used as an aid in designing an optically-driven microrotor for optimal torque. The discrete dipole approximation method with symmetry optimization is used to formulate the T-matrix of the microrotor

1415 – 1430

Andrey Sukhorukov*Australian National University ACT AUSTRALIA*

In-band Localised Fano Surface States in Periodic Waveguiding Lattices

We predict theoretically and demonstrate experimentally a novel surface state based on a Fano resonance which facilitates complete electromagnetic field localization although the mode frequency is embedded in a transmission band of a semi-infinite waveguide lattice.

1430 – 1445

Ivan Fernandez-Corbaton*Macquarie University NSW AUSTRALIA*

Helicity and Angular Momentum – Symmetry-based Study of Light-Matter Interactions

We propose a new theoretical and practical framework for the study of light-matter interactions and the angular momentum of light. Our proposal is based on helicity, total angular momentum, and the use of fundamental symmetries.

1445 – 1500

Xavier Vidal*Macquarie University NSW AUSTRALIA*

Helicity Conservation Rules for Designing Optimal Chiral Structures

We show the fundamental relation between optical activity and helicity conservation in chiral particles. Such relation imposes certain symmetry restrictions on the particle, which we study here.

1330 – 1500

Concurrent Session 2B – Condensed-Matter, Materials and Surface Physics 2: Bulk Magnetism

Room: CLB 8

Chair: Glen Stewart, University of New South Wales ACT AUSTRALIA

Time

1330 – 1400

Maxim Avdeev*Australian Nuclear Science and Technology Organisation NSW AUSTRALIA*

High Temperature Structural and Magnetic Transitions in Perovskite-type Technates $ATcO_3$ (A=Ca, Sr)

Perovskite-type oxides $ATcO_3$ (A=Ca, Sr) were studied by in situ X ray and neutron powder diffraction in a wide temperature range. On heating crystal structure evolves from orthorhombic toward cubic while magnetic ordering persists up to extraordinarily high temperature (TN ~ 800 K, 1000 K).

1400 – 1415

Sebastian Sambale*MacDiarmid Institute NEW ZEALAND*

Magnetic and Electronic Properties of $FeSr_2Y_{2-y}Ce_yCu_2O_{8+x}$

We have successfully synthesized $FeSr_2Y_{2-y}Ce_yCu_2O_{8+x}$ (Fe1222) with a wide Ce concentration range. We observed a spin-glass transition from the FeOx layer at ~26 K and variable range hopping. A large magnetoresistance is observed below the spin-glass temperature

- 1415 – 1430 **Richard Mole**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Neutron Scattering Studies of YbMn₂Si₂
 The results of our neutron scattering investigation of the rare earth intermetallic YbMn₂Si₂ are presented. Inelastic scattering is used to elucidate the nature of the interaction between the transition metal and rare earth sublattices.
- 1430 – 1500 **Annemieke Mulders**
University of New South Wales ACT AUSTRALIA
Neutron and Synchrotron Studies of Iron Based Multiferroic Materials
 Magnetolectric interactions in advanced multiferroic materials, where ferroelectricity and magnetism coexist and interact, are much of current interest. The magnetic moments and electric dipoles are investigated on a fundamental level using neutron and resonant x-ray diffraction techniques.

1330 – 1500

Concurrent Session 2C – Quantum Information, Concepts and Coherence 2: Optical Quantum Computing

Room: CLB 6

Chair: Geoff Pryde, Griffith University QLD AUSTRALIA

Time

- 1330 – 1345 **Franck Ferreyrol**
Griffith University QLD AUSTRALIA
Implementation of a Quantum Fredkin Gate Using an Entanglement Resource
 We experimentally realise an optical quantum Fredkin gate. We use an entanglement resource and an expanded Hilbert space technique for adding control to an arbitrary quantum operation, leading to a quite simple experimental setup.
- 1345 – 1400 **Robin Stevenson**
Australian National University ACT AUSTRALIA
Rephased Amplified Spontaneous Emission as a Single Photon Source
 In this presentation I show how Rephased Amplified Spontaneous Emission can be configured as a high efficiency single photon source.
- 1400 – 1415 **Zhizhong Yan**
University of Waterloo CANADA
Novel Bias Mode to Enhance Detection Efficiency and Signal to Noise Ratio For Superconducting Nanowire Single Photon Detector
 When an RF bias current is applied in presence of dc bias to a Superconducting Nanowire Single Photon Detector, the measurement results demonstrate over 100 times enhancement of Device Quantum Efficiency (DQE) and Signal to Noise Ratio (SNR).
- 1415 – 1430 **Keyu Xia**
Macquarie University NSW AUSTRALIA
Deterministic Generation of a Photon Fock State on Demand from a Solid-State System
 Using an optical toroidal cavity coupled to a Nitrogen-vacancy center in a nanodiamond, we present a method to deterministically and on-demand generate pure photon Fock states with high photon occupation in the visible light frequency.
- 1430 – 1445 **Seiji Armstrong**
University of Tokyo / Australian National University ACT AUSTRALIA
Shortening of Measurement-Based Quantum Computation Algorithm Using Temporal-Mode Continuous-Variable Cluster States
 We show how to shorten certain algorithm for measurement-based quantum computations using temporal-mode continuous-variable cluster states. Our method makes use of the fact that there are multiple modes per logical node in such states.
- 1445 – 1500 **Austin Lund**
University of Queensland QLD AUSTRALIA
Non-Symplectic Gaussian Operations Generated by Non-deterministic Noiseless Linear Amplification
 Non-deterministic noiseless linear amplification generates a Gaussian non-symplectic transformation of the mean vector and covariance matrix. This non-symplectic map helps in the understanding of non-deterministic amplification and also uncovers a variety of surprising new phenomena.

1330 – 1500

Concurrent Session 2D – Atomic and Molecular Physics 2: Chemical Physics

Room: CLB 5

Chair: Jason Gascooke, Flinders University SA AUSTRALIA

Time

1330 – 1400

Warren Lawrance*Flinders University SA AUSTRALIA*

The Dissociation Dynamics of NO-based Van Der Waals Complexes Probed By Imaging Techniques

The dissociation dynamics of van der Waals complexes of NO have been studied by a combination of velocity map imaging and two dimensional laser induced fluorescence, providing binding energies and correlated product distributions.

1400 – 1415

Michael Pullen*Swinburne University of Technology VIC AUSTRALIA*

Quasi-phase Matched High Harmonic Generation Using a Dual Gas, Multi Jet Array

We present an improved method of quasi-phase matched high harmonic generation using a dual gas, multi jet array. Individual control of the gas jet pressures allows more degrees of freedom over other schemes.

1415 – 1430

Mitsu Kono*Australian National University ACT AUSTRALIA*

Hyperfine Structure and Isotope Shifts in Sub-doppler Two-photon-excitation Rydberg Spectra of Xenon

Diverse angular-momentum-dependent isotope energy shifts and hyperfine structure are measured for 33 high-energy Rydberg levels of atomic xenon by sub-Doppler two-photon excitation spectroscopy, using narrowband pulsed coherent UV light at 205-213 nm.

1430 – 1445

Russell McLean*Swinburne University of Technology VIC AUSTRALIA*

Spectral Properties of Far-infrared and Blue Light Generated in Rb Vapour

The properties of blue light resulting from wave mixing of resonant low-power laser radiation in Rb vapour have been used for evaluating spatial and temporal coherence of the 5.2 μm radiation generated as a result of population inversion.

1445 – 1500

Stephen Gibson*Australian National University ACT AUSTRALIA*

Velocity-map Imaging of Photoelectrons

Velocity-map imaging is now capable of providing relative electron kinetic energy resolutions of <0.4%, giving detailed spectra that reveal new information on the structure of the anion and neutral, and the dynamics of the photodetachment process.

1330 – 1500

Concurrent Session 2E – Nuclear and Particle Physics 2

Room: CLB 4

Chair: Andrew Stuchbery, Australian National University ACT AUSTRALIA

Time

1330 – 1400

David Hinde*Australian National University ACT AUSTRALIA*

Zeptosecond Dynamics of Superheavy Element Formation

The formation of new superheavy elements by fusion of two heavy nuclei is severely inhibited by quasi-fission, in which the system breaks apart early. New measurements reveal reaction time-scales and the important variables controlling quasi-fission.

1400 – 1415

Guilherme Nunes Hanninger*University of Melbourne VIC AUSTRALIA*

MSSM Higgs Boson Searches with Tau Leptons in the Final State at ATLAS

Searches for Minimal Supersymmetric Standard Model (MSSM) Higgs bosons decaying to τ leptons performed with the ATLAS detector at the LHC are presented.

- 1415 – 1430 **Keith Fifield**
Australian National University ACT AUSTRALIA
Bomb Plutonium at the Source: a Time Sequence from an Enewetak Coral
 Plutonium isotopes have been measured in a coral from Enewetak atoll that was growing throughout the period 1952-1958 of extensive nuclear testing at the atoll. Signatures of individual tests are clearly observed.
- 1430 – 1445 **Ramachandran Kandasamy**
Australian National University ACT AUSTRALIA
Fission Time Scale in ^{203}At
 Measurement and consistent analysis of pre-scission neutron, proton, alpha particle and Ggamma ray and evaporation residue cross-sections for $^{28}\text{Si}+^{175}\text{Lu}\rightarrow^{203}\text{At}$ system at 159MeV to probe the fission time scale are presented.
- 1445 – 1500 **Michael Kuchiev**
University of New South Wales NSW AUSTRALIA
Supersymmetric N=2 Gauge Theory
 A brief introduction (for non-experts) into the Seiberg-Witten approach to the N=2 supersymmetric gauge theory is outlined. The general solution of this problem for an arbitrary gauge group is found.

1330 – 1500

Concurrent Session 2F – Biomedical Physics 2

Room: CLB 3

Chair: Scott Martin, CSIRO NSW AUSTRALIA

Time

- 1330 – 1400 **Anatoly Rozenfeld**
University of Wollongong NSW AUSTRALIA
From Higgs Detection to Saving Lives: Bench-to-bedside Technology Developments for Radiation Medicine
 Exciting Australian developments from the CMRP, (in many aspects is a spin-off of HEP), in semiconductor radiation detection technology for application in advanced real time quality assurance in radiation therapy and medical imaging is discussed.
- 1400 – 1415 **Andrew Edmonds**
Macquarie University NSW AUSTRALIA
Nano-ruby: A Promising Fluorescent Probe for Background-free Cellular Imaging
 Bioprobes based on ruby nanoparticles, produced by femto-second laser ablation, suitable for ultrasensitive imaging, are reported. Their emission at 694 nm is photostable, with long lifetime (1-4 ms) and immunoassay to target biomolecules is demonstrated.
- 1415 – 1430 **Clara Tenniswood**
Australian National University ACT AUSTRALIA
Structural Properties of Southern Ocean Pteropods
 This study aims to determine the impact of ocean acidification on Southern Ocean pteropods via a detailed understanding of the structural and mechanical properties of their shells.
- 1430 – 1445 **Christopher Garvey**
Australian Nuclear Science and Technology Organisation, NSW AUSTRALIA
Structural Changes in Elastin Hydrogel During Cyclic Tensile Deformation and Drying by Synchrotron SAXS
 Time resolved synchrotron small angle x-ray (SAXS) measurements are made on a cyclically stretched free standing film of elastin. The originally isotropic scattering pattern becomes anisotropic when stretched. Other structural changes become apparent as the film dries.
- 1445 – 1500 **Jin Aun Ng**
University of Sydney NSW AUSTRALIA
Tumour Tracking in Cancer Radiotherapy: from Mathematical Formalism to Clinical Implementation
 Medical linear accelerators are used to treat prostate cancer. Prostate tumour position determination is critical during treatment. A novel method has been clinically tested, utilizing 2-dimensional to 3-dimensional reconstruction, allowing real-time measurements with sub-millimeter accuracy.

1330 – 1500

Concurrent Session 2G – ACOFT 2 Photonic Crystal Fibres

Room: CLB 2

Chair: Michael Dignonnet, Stanford University UNITED STATES OF AMERICA

Time

1330 – 1400

Nicolas Joly*Max-Planck Institute for the Science of Light GERMANY***Nonlinear Optics in Gas-filled Hollow-core Kagomé Photonic Crystal Fiber**

Pressure-control of dispersion in noble-gas-filled hollow-core kagome fibre allows compression of ultrashort μJ pulses to few-cycle durations. Recent results include efficient tunable dispersive waves in the deep UV and a plasma-related soliton self-frequency blue shift.

1400 – 1415

Alex Clark*University of Sydney NSW AUSTRALIA***Photon-Pair Generation in Ultra-Compact Photonic Crystal Devices**

We report our progress in ultra-compact photonic crystal platform for photon-pair generation through spontaneous four-wave mixing. We generate correlated pairs with a coincidence-to-accidental ratio as high as 130 and compare silicon and GaInP device performance.

1415 – 1430

Samuel Legge*University of Newcastle NSW AUSTRALIA***Spatio-spectral Identification of Solitons Occupying Higher Order Electromagnetic Modes in Photonic Crystal Fibre**

Solitons occupying higher order electromagnetic modes in photonic crystal fibre have been generated. The unique spatial and spectral measurement of a supercontinuum output field details characteristic signature wavelengths and mode structure not previously observed.

1430 – 1445

Alvaro Casas Bedoya*University of Sydney NSW AUSTRALIA***Slow Light Dispersion Engineering of Photonic Crystal Waveguides Using a Selective Microfluidics Infiltration**

We demonstrate experimentally dispersion engineering in slow light photonic crystals waveguides using a selective liquid infiltration technique. The photonic crystal waveguide exhibits group velocity of $\sim c/80$ that depends on the liquid physical properties

1445 – 1500

Barry Luther-Davies*Australian National University ACT AUSTRALIA***Supercontinuum Generation in the Mid-infrared from Dispersion-engineered As₂S₃ Glass Waveguides**

We report the generation of a mid-IR supercontinuum created by passing 7-8psec duration pulses at $\approx 3260\text{nm}$ through a dispersion-engineered As₂S₃ waveguide

1330 – 1500

Concurrent Session 2H – Acoustic, Music and Ultrasonics and History of Physics

Room: CLB 1

Chair: Richard Newbury, University of New South Wales NSW AUSTRALIA

Time

1330 – 1345

Joe Wolfe*University of New South Wales NSW AUSTRALIA***How the Human Voice is Not Suited for Singing and What This Implies About Music**

Musics requiring independent control of pitch and loudness. are somewhat difficult for the voice, whose pitch and loudness are strongly correlated. From that perspective, this paper discusses advantages and possible origins of fixed pitch singing.

1345 – 1400

Daniel Creedon*University of Western Australia WA AUSTRALIA***Extremely High Q-factor Mechanical Modes in Quartz Bulk Acoustic Wave Resonators at Millikelvin Temperature**

Quartz BAW resonators demonstrate mechanical quality factors of several billion when cooled below 20 millikelvin. The Q-factor near the quantum ground state can be four orders of magnitude better than previously attained, with applications to quantum information and control.

- 1400 – 1415 **Matthew Angove**
La Trobe University VIC AUSTRALIA
An Investigation into the Effect of the Electric Guitar Body on the Harmonic Content of its Output
The electric guitar produces sound by directly converting the string vibrations to an electrical signal. In this paper we investigate luthiers' claim that the solid body of the guitar affects the quality of its sound.
- 1415 – 1430 **Christopher Hawkings**
Canberra Institute of Technology ACT AUSTRALIA
The Heterodyne Description of Matter Waves
The self-field model, de Broglie's double solution and Schrodinger's smeared particle, give a background for derivation of waves with properties identical to de Broglie's matter waves. The origin, nature and implications of such waves are then discussed.
- 1430 – 1445 **Timo Nieminen**
University of Queensland QLD AUSTRALIA
The History of Radiation Pressure and the Unity of Physics Exposed through the Inertia of Energy
Radiation pressure has a long history, from Kepler to modern applications such as optical tweezers. The underlying principle – the inertia of energy – shows essential links between classical mechanics, thermodynamics, and relativity.
- 1445 – 1500 **Norman Heckenberg**
University of Queensland QLD AUSTRALIA
Thomas Murday's Recording Micro-barometer of 1912
Thomas Murday immigrated to Sydney in 1911 to head the workshop of Prouds Ltd, Electric Clock and Scientific Instrument Makers. There he produced – 'Murday's thread recording electric micro-barometer'

1530 – 1700

Concurrent Session 3A – Optics, Photonics and Lasers 3: Metamaterials and Nanoresonators

Room: CLB 7

Chair: Michael Steel, Macquarie University NSW AUSTRALIA

Time

- 1530 – 1545 **Tim Davis**
CSIRO MSE VIC AUSTRALIA
Strong Chiral Optical Response from Planar Plasmonic Metamaterials
The chiral optical response refers to an ability to distinguish between states of circular polarization. We show using theory and experiment how a strong chiral response is obtained using arrays of subwavelength-scale plasmonic structures.
- 1545 – 1600 **Xavier Zambrana-Puyalto**
Macquarie University NSW AUSTRALIA
Excitation of Single Multipolar Resonances
A new method to excite single multipolar resonances and control the scattered field from spheres is shown. Our method uses the spatial properties of light and is valid for the non-paraxial regime.
- 1600 – 1615 **Jong Chow**
Australian National University ACT AUSTRALIA
Coupling Stabilisation of Microresonators
We present a laser homodyne technique to actively stabilize the critical coupling of a microresonator by controlling the evanescent coupling gap to a tapered optical fibre with an inferred stability of better than $1 \text{ pm}/\text{Å}^{\circ}\text{Hz}$.
- 1615 – 1630 **Kirsty Hannam**
Nonlinear Physics Centre the Australian National University ACT AUSTRALIA
Wideband Optical Activity in Coupled Chiral Meta Atoms
We stack alternate layers of a meta-atom and its complementary structure, coupling magnetic and electric dipole responses. This results in broadband polarization rotation, with corresponding low ellipticity.
- 1630 – 1645 **George Brawley**
University of Queensland QLD AUSTRALIA
Biosensing with Microresonators using the Backscattered Light
We show that biosensing with microresonators using the backscattered light allows shot noise limited particle detection that is insensitive to laser phase noise and therefore broadly applicable

1645 -1700

Sergey Kruk*Australian National University ACT AUSTRALIA***Multilayer Fishnet Metal-Dielectric Structures as Magnetic Hyperbolic Metamaterials**

We study anisotropic optical properties of multilayer fishnet metamaterials and reveal that they exhibit hyperbolic dispersion. This unique magnetic form of hyperbolic media is promising for the control of enhanced spontaneous emission.

1530 – 1700**Concurrent Session 3B – Condensed-Matter, Materials and Surface Physics 3: Spintronics and Magnetic Films***Room: CLB 8**Chair: Jim Williams, University of Western Australia WA AUSTRALIA*

Time

1530 – 1600

David Cortie*Australian Nuclear Science and Technology Organisation***The Magnetic Velcro Effect: Improved Model of Ferromagnet/Antiferromagnet Interfaces**

Polarised neutron reflectometry was used to determine the magnetic depth profile of a Ni₈₀Fe₂₀/Fe₂O₃ thin film. A three-dimensional Monte Carlo simulation was developed to implement a realistic Hamiltonian, and account for the microstructure, to model the exchange-bias behavior.

1600 – 1615

Oleg Sushkov*University of New South Wales NSW AUSTRALIA***Does the Side Jump Effect Exist?**

It is widely accepted that the side jump effect is a major mechanism for spintronics. We demonstrate that this accepted view is wrong. The effect is so small that practically it is irrelevant.

1615 – 1630

Joel Bertinshaw*University of New South Wales / Australian Nuclear Science and Technology Organisation, NSW AUSTRALIA***Polarised Neutron and X-ray Resonant Magnetic Reflectivity Studies of Multiferroic Thin Fil**

Bismuth Ferrite (BiFeO₃) is a multiferroic compound with potential use in functional thin film heterostructures, like tunnel junctions. Using neutron and resonant X-ray reflectometry, we have studied La_{0.67}Sr_{0.33}MnO₃/BiFeO₃ bilayers, focusing on intriguing interfacial physics.

1630 – 1645

Sergey Samarin*University of Western Australia WA AUSTRALIA***Probing Surface Magnetism by Spin-polarized Single- and Two-electron Spectroscopy**

Analysis of the spin-dependent interaction of low-energy electrons with ferromagnetic surfaces and thin fil provides information on their spin-dependent electronic structure.

1645 – 1700

Frank Klose*Australian Nuclear Science and Technology Organisation, NSW AUSTRALIA***Magnetic Nanostructures Investigated with Neutron Scattering Methods**

Magnetic thin film nanostructures are crucial to numerous applications in data storage and other electronic devices. This paper will present striking examples which illustrate the usefulness of neutron scattering in magnetic thin film research.

1530 – 1700**Concurrent Session 3C – Quantum Information, Concepts and Coherence 3: Optical Quantum Memories***Room: CLB 6**Chair: Andrew Truscott, Australian National University ACT AUSTRALIA*

Time

1530 – 1600

Ping Koy Lam*Australian National University ACT AUSTRALIA***Performing Quantum Operations within Memories**

We present a new method for performing quantum operations with a series of high efficiency quantum memories. Our memory scheme is based on a photon echo process that stores light via Fourier decomposition.

- 1600 – 1615 **Ben Sparkes**
Australian National University ACT AUSTRALIA
Gradient Echo Memory Using Cold Atoms
 Currently there exists a demand for quantum memories. One promising candidate is the gradient echo memory scheme (GEM). We present the latest experimental results from our move from warm to cold atoms to improve GEM.
- 1615 – 1630 **Michael Hush**
Australian National University ACT AUSTRALIA
Input Output Analysis of the Storage of Single Photons in Quantum Memories
 We examine a quantum memory performed using the GEM protocol with single photon inputs using input output theory. Furthermore, we consider the conditional behavior of the memory when the output is monitored.
- 1630 – 1645 **Graham Dennis**
Australian National University ACT AUSTRALIA
Theory of an Atomic Bragg Interferometer
 We theoretically analyse recent experimental results of a precision atomic gravimeter based on Bragg diffraction with thermal atoms, and consider the potential for improvement by using a narrower momentum-width source such as BEC.
- 1645 – 1700 **Rose Ahlefeldt**
Australian National University ACT AUSTRALIA
Ion-ion Interactions Between Qubits in $\text{EuCl}_3 \cdot 6\text{D}_2\text{O}$
 We present measurements of ion-ion interactions between prototype qubits in $\text{EuCl}_3 \cdot 6\text{D}_2\text{O}$, and show that the interactions are not adequately described by an electric dipole-dipole model. We describe a method for enacting gates using these interactions.

1530 – 1700

Concurrent Session 3D – Atomic and Molecular Physics 3: Positron Scattering Theory

Room: CLB 5

Chair: Dennis Mueller, University of North Texas UNITED STATES OF AMERICA

Time

- 1530 – 1600 **Igor Bray**
Curtin University WA AUSTRALIA
Benchmark Calculations of Electron and Positron Scattering on Atoms
 There has been much progress in the field of electron- and positron-atom collisions during the last decade. The talk will give an overview of the recent advances and present a number of unique benchmark results.
- 1600 – 1615 **Feng Wang**
Swinburne University of Technology VIC AUSTRALIA
Positrophilic Electrons in Positron-electron Annihilation Process of Molecules
 The study, an ARC DP project, proposes that positrophilic molecular electrons of a target molecule, rather than all electrons in the molecule, dominate the annihilating process and the Doppler-shift of the gamma-ray spectra of molecules. Preliminary results are given.
- 1615 – 1630 **Celal Harabati**
University of New South Wales NSW AUSTRALIA
Detecting Positron-Atom Bound States through Resonant Annihilation and Scattering
 A method is proposed for detecting positron-atom bound states by observing enhanced positron annihilation due to electronic Feshbach resonances. Positron binding energies for a range of open-shell transition metal atoms have been calculated.
- 1630 – 1645 **Dmitry Fursa**
Curtin University WA AUSTRALIA
Convergent Close-Coupling method for positron scattering from noble gases
 The convergent close-coupling method has been applied to positron scattering from noble gases. The scattering calculations have been performed in the single-center approximation with target wave functions calculated within a model of one-electron excitations from the outermost p_6 shell.
- 1645 – 1700 **Mark Zammit**
Curtin University WA AUSTRALIA
Positron Scattering from the H^+_{-2} and H_{-2} Molecules Using the Convergent Close-Coupling Method
 Positron scattering from diatomic molecules has been investigated using the single center convergent close-coupling method. A fixed nuclei formulation was used to obtain total cross sections, which are compared with available experimental and theoretical data.

1530 – 1700

Concurrent Session 3E – Nuclear and Particle Physics 3

Room: CLB 4

Chair: Csaba Balazs, Monash University, VIC AUSTRALIA

Time

1530 – 1600

Martin Seviar*University of Melbourne VIC AUSTRALIA***The Belle II Experiment at the Super KEKB Accelerator**

The requirements for the next-generation B-factory at KEK in Japan, consisting of the SuperKEKB accelerator and Belle II detector are presented, along with the present status of the project.

1600 – 1615

Boon Lee*Australian National University ACT AUSTRALIA***Auger Electron Emission in Nuclear Decay**

Auger electrons emitted in nuclear decay offer a unique tool to treat cancer cell at the scale of a DNA molecule. We present a new model to evaluate the energy spectrum of Auger electrons, and hence overcome the limitations of existing computations.

1615 – 1630

Janina Grineviciute*Charles Darwin University NT AUSTRALIA***Relativistic R Matrix and Continuum Shell Model**

The R matrix formalism has been extended to the relativistic case so that the many-coupled channels problem may be solved for system which binary breakup channels satisfy a relative Dirac equation.

1630 – 1645

Sophie Dawson*University of Melbourne VIC AUSTRALIA***Performance of the Upgraded Optical Fill Pattern Monitor at the Australian Synchrotron 3 GeV Electron Storage Ring**

The fill pattern monitor on the optical diagnostic beamline at the Australian Synchrotron 3 GeV electron storage ring was upgraded to improve performance. New electronics and optical fibre coupling to the photodiode has been added.

1645 – 1700

Cameron Cuthbert*University of Sydney NSW AUSTRALIA***Search for Xb decays to the Upsilon(1S) pi+ pi- final state using the ATLAS detector**

We present a study of the Upsilon(1S)pi+pi- final state at the ATLAS experiment. This mode can be used to study conventional bottomonium mesons, and a hypothetical analogue ("Xb") of the candidate exotic state X(3872).

1530 – 1700

Concurrent Session 3F – Biophysics 1

Room: CLB 3

Chair: Roger Fulton, University of Sydney NSW AUSTRALIA

Time

1530 – 1600

Steve Meikle*The University of Sydney NSW AUSTRALIA***Towards Simultaneous Brain PET Imaging and Behavioural Studies in Freely Moving Animals**

We are developing a PET imaging system for simultaneously measuring the brain function and behaviour of freely moving rats. This paper describes progress towards that goal and initial validation results from a pilot animal study.

1600 – 1615

David Simpson*University of Melbourne VIC AUSTRALIA***In Vivo Imaging of Nanodiamonds in Drosophila Melanogaster**

We report in vivo imaging of nanodiamonds in the Drosophila melanogaster embryo. Fluorescence correlation spectroscopy and widefield imaging techniques are used to track and determine the motion of the nanodiamonds during the cellularisation stage of embryonic development.

1615 – 1630

Dayong Jin*Macquarie University NSW AUSTRALIA***Time-domain Biophotonics: Powering Next-generation Molecular Diagnostics**

Engineering to tune the lanthanide bioprobes in both spectral and temporal domains, smart Biophotonics platform devised to detect trace amounts of cells and molecular disease markers with high speed, super-resolution and low uncertainty.

- 1630 – 1645 **Shan Shan Kou**
University of Melbourne VIC AUSTRALIA
Three-dimensional (3D) Optical Bioimaging with Quantitative Phase
The morphological behavior of cells and organisin their natural living state are of paramount importance for biomedical studies. Here we present several novel techniques that will underpin the final goal of “super-resolved” 3D microscopy.
- 1645 – 1700 **Asma Khalid**
School of Physics, University of Melbourne VIC AUSTRALIA
Silken Nanodiamonds: New Compound for Bio-sensing Applications
We demonstrate fluorescence, single photon emission and enhanced collection efficiency from nanodiamonds coated on the marked silicon substrate and embedded in silk. This combination has the potential to create a new compound for bio-sensing applications.

1530 – 1700

Concurrent Session 3G – ACOFT 3 Photonic Devices 1

Room: CLB 2

Chair: Sergio Leon-Saval, University of Sydney NSW AUSTRALIA

Time

- 1530 – 1600 **Tim Birks**
University of Bath, UNITED KINGDOM
Prof Tim Birks is supported by Professor Joss Bland-Hawthorn (University of Astrophotonics)
Gratings in Multi-core Fibres / Photonic Lanterns
By tapering a multicore optical fibre with Bragg gratings written into its 120 single-mode cores, a multimode “photonic lantern” spectral filter with applications in astronomy can be made.
- 1600 – 1615 **Christopher Betteres**
University of Sydney NSW AUSTRALIA
Results of a Single-mode Multicore Fibre Bundle Fed Diffraction-Limited Spectrograph
Here we present a method for feeding a compact diffraction-limited spectrograph that exploits a single-mode fibre bundle/ multicore fibre to simplify overall design and optimize use of detector real estate.
- 1615 – 1630 **Kelvin Chung**
University of Melbourne VIC AUSTRALIA
Broadband Optical Devices Using Adiabatic Passage
We numerically demonstrate a three-rib waveguide structure for coherent tunneling adiabatic passage. We also present a five-rib structure that is a new class of octave spanning power divider.
- 1630 – 1645 **John Love**
Australian National University ACT AUSTRALIA
Y-Junction Based Splitters and Combiners for Few-Mode Optical Fibre Networks
It is shown how planar Y-junction based combiners and splitters can form the basis for the individual excitation and detection of the fundamental and low-order modes in a few-mode optical fibre network.
- 1645 – 1700 **Nigel Hoshcke**
CSIRO NSW AUSTRALIA
Fibre Bragg Grating Networks for Robust Sensing Systems
The results of a feasibility study into a network of fibre Bragg grating sensors are presented. A networked optical sensing system is robust to fibre breakage through the ability to route light around damaged regions

1530 – 1700

Concurrent Session 3H – Environmental Physics

Room: CLB 1

Chair: Dave Cohen, Australian Nuclear Science and Technology Organisation NSW AUSTRALIA

Time

- 1530 – 1600 **Mario De Cesare**
Australian National University ACT AUSTRALIA
Monitoring of Plutonium and Uranium-236 in and around a Decommissioned Nuclear Power Plant in Italy
In this work we present preliminary results on environmental and structural samples collected in and around a Nuclear Power Plant in Italy. The sample measurements were obtained with the CIRCE and ANU A systems.

1600 – 1615

Stephen Tims*Australian National University ACT AUSTRALIA***Measurements of Low-level Anthropogenic Actinides from Soils around Maralinga**

Plutonium and uranium isotopes have been measured in soils collected from around the Maralinga nuclear weapons test site. A significant deviation from the accepted average global fallout $^{240}\text{Pu}/^{239}\text{Pu}$ ratio is observed.

1615 – 1630

Rajeev Lal*Australian National University ACT AUSTRALIA***Using Meteoric Be-10 to Estimate Soil Residence Times and Geologic Denudation Rates in Northern Territory, Australia**

We use meteoric Be-10 measurements to estimate soil residence times and geological erosion rates in a monsoon climate, in northern Australia

1630 – 1645

Peter Schouten*CSIRO, VIC AUSTRALIA***Estimation of Fugitive Emissions from Small-Scale Wastewater Treatment Facilities Using an Infrared Gas Analysis System**

Methane and nitrous oxide emissions were measured at decentralised wastewater treatment plants across Melbourne using an infrared gas analyser. The results show that decentralised plants are high emitters of methane and nitrous oxide. As such, operators should consider refining their treatment regimes to reduce these emissions.

1645 – 1700

Andrew Charles*Bureau of Meteorology, VIC AUSTRALIA***Prediction of Tropical Cyclone Seasonal Risk with Dynamical Climate Models**

The feasibility of using physically based general circulation models for seasonal forecasting of tropical cyclone risk in the South Pacific is assessed. Practical limitations on the predictability of seasonally averaged tropical cyclone activity are discussed.

Tuesday 11 December 2012

0900 – 0945**Plenary 3***Room: CLB 7*

Chair: Ben Eggleton, University of Sydney NSW AUSTRALIA

Time

0900 – 0945

Jelena Vuckovic*Stanford University CA USA***Quantum Dots in Optical Nanocavities: from Cavity QED to Device Applications**

Quantum dots in optical nanocavities are interesting both as a test-bed for fundamental studies of light-matter interaction (a field known as cavity quantum electrodynamics - cavity QED), as well as an integrated platform for both quantum and classical information processing.

0945 – 1030**Plenary 4***Room: CLB 7*

Chair: David Hinde, Australian National University ACT AUSTRALIA

Time

0945 – 1030

Bradley Sherrill*Michigan State University USA***Search for the Origin and Stability of the Elements**

Unanswered questions in nuclear science include how the elements were formed in nature and the limits of atomic nuclei both in atomic number and in neutron number. Answers require production and study of rare isotopes.

1100 – 1230**Concurrent Session 4A – Optics, Photonics and Lasers 4: Lasers**

Room: CLB 7

Chair: David Spence, Macquarie University NSW AUSTRALIA

Time

1100 – 1130

Lap Van Dao*Swinburne University VIC AUSTRALIA***Phase-matched Generation of High Order Harmonics Radiation and Application**

Using a semi-infinite gas cell the phase-matched harmonic radiation is generated in a range of 30 – 4.4 nm. The source has been used for coherent diffractive imaging and study molecular dynamic

1130 – 1145

Miftar Ganija*University of Adelaide SA AUSTRALIA***High Brightness High Power Yb:YAG End Pumped Cryogenic Zig Zag Slab Laser**

We report on the development of a high power, CW cryogenic conduction-cooled end pumped zigzag Yb:YAG slab laser with excellent beam quality that is robust and power scalable.

1145 – 1200

Michael Lee*University of Sydney NSW AUSTRALIA***Frequency Locking of a 369nm Laser by Nonlinear Spectroscopy of Ytterbium Ions in a Discharge**

We demonstrate a technique for frequency locking a 369nm direct diode laser to Ytterbium ions in a discharge by performing a polarization spectroscopy measurement on the ions. Frequency locking with a standard deviation of ~400 KHz is achieved.

1200 – 1215

Harrison Ball*University of Sydney NSW AUSTRALIA***A Novel High-power, Frequency-stabilised Solid-state 313 nm Laser System for ${}^9\text{Be}^+$ ion Trapping**

We report a frequency-stabilized, solid-state cw source of 313 nm using nonlinear conversion of high-power infrared from a fibre laser for use in ${}^9\text{Be}^+$ ion trapping.

1215 – 1230

David Coutts*Macquarie University NSW AUSTRALIA***Generation of Spiral Beams with Multimode Optical Fibres**

Stimulated Raman scattering in a multimode optical fibre generates high orbital angular momentum modes. These modes are then converted to generate an output beam with a spiral far-field intensity distribution.

1100 – 1230**Concurrent Session 4B – Condensed-Matter, Materials and Surface Physics 4: Material Physics**

Room: CLB 8

Chair: Anita Hill, CSIRO, VIC AUSTRALIA

Time

1100 – 1115

Erich Kisi*University of Newcastle NSW AUSTRALIA***Neutron Diffraction Studies of the Stress Distribution in Particulate Materials**

Neutron diffraction strain scanning applied to particulate materials during compaction in a die revealed the complete three dimensional distribution of the stress tensor. Longitudinal exponential decay of stress and large wall shear stress were observed.

1115 – 1130

Michael Cortie*University of Technology Sydney NSW AUSTRALIA***Molecular Dynamics Study of the Evolution of Topology in Nanoporous Metal Sponges**

Nanoporous sponges produced by de-alloying exhibit a spectrum of morphologies depending on starting composition. Their topology can be reproduced with a molecular dynamics model that evaporates atoms of the active constituent while permitting sintering.

1130 – 1145

Andrew Breen*University of Sydney NSW AUSTRALIA***Resolving the Orientation and Morphology of Ultra-Fine Precipitates Using Atom Probe**

Conventionally, resolving the orientation and morphology of ultra-fine high-field precipitates using atom probe is very challenging due to the so-called local magnification effect. In this presentation we present a novel technique to solve the problem.

1145 – 1200

Don Price*CSIRO Materials Science and Engineering NSW AUSTRALIA***Structural Health Monitoring of Space Vehicle Thermal Protection Systems: Material Properties**

Ultrasonic measurements have been made on a thermally-insulating ceramic foam material. The elastic constant tensor deduced indicates extreme anisotropy that is shown to have significant consequences for echolocation of potentially damaging impacts.

1200 – 1215

Trevor Finlayson*University of Melbourne VIC AUSTRALIA***Stresses in Inclusions Resulting from Plastic Flow in the Matrix of a Two-Phase Composite During Cyclic Loading**

Stresses in the Si particles of an Al-7Si-0.4Mg casting were measured by neutron diffraction, in samples cyclically strained to +/- 2% at 130 deg C. The results are compared with theories of stress partitioning in metal-matrix composites.

1215 – 1230

Klaus-Dieter Liss*Australian Nuclear Science and Technology Organisation NSW AUSTRALIA***Metals Behavior at Very High Temperature**

The kinetic behavior on crystal perfection in metals at high temperature has been studied with neutron and high-energy synchrotron X-radiation. Dislocation annihilation, nucleation and growth mechanisms, and thermo-mechanic deformation mechanisms were obtained from the in-situ and real-time observations.

1100 – 1230**Concurrent Session 4C – Quantum Information, Concepts and Coherence 4: Superconducting Quantum Devices***Room: CLB 6**Chair: Michael Tobar and Daniel Creedon, University of Western Australia, WA AUSTRALIA*

Time

1100 – 1130

Andrew Cleland*University of California UNITED STATES OF AMERICA***Quantum Light and Sound for Fun and Computation**

I will describe using a superconducting qubit to probe the quantum behaviour of electromagnetic ("light") and mechanical resonators ("sound"), and briefly describe how these provide the basic building elements for a quantum computer.

1130 – 1145

Timothy Duty*University of New South Wales NSW AUSTRALIA***Parametric Down-conversion of Microwave Photons Using Superconducting Quantum Devices**

The strong nonlinearity provided by superconducting Josephson tunnel junctions can be used in experiments for parametric down conversion of microwave photons, and has many potential uses for nanoscale engineered quantum systems. I will describe experiments where parametric driving is implemented using a superconducting quantum interference device (SQUID), with one example being observation of the dynamical Casimir effect (DCE).

1145 – 1200

John Hornibrook*University of Sydney NSW AUSTRALIA***Superconducting Resonators with Parasitic Electromagnetic Environments**

Parasitic electromagnetic fields are shown to decrease the Quality factor of superconducting resonators. Low temperature measurements and numerical simulations are presented, demonstrating an increase in loaded Quality factor as parasitic fields are suppressed.

1200 – 1215

Timothy Dubois*RMIT University VIC AUSTRALIA***Delocalised Oxygen as the Origin Of Strongly Coupled Two-level Defects in Josephson Junctions**

Decoherence is a major limitation for Josephson junction based quantum devices, which stem from environmental two-level systems. Using atomic positions and species we compute experimentally observed parameters of these defects, finding excellent agreement with experiments.

- 1215 – 1230 **Warrick Farr**
University of Western Australia WA AUSTRALIA
Behaviour of the Fe³⁺ Paramagnetic Ion in Sapphire Whispering Gallery Mode Resonator at mK Temperatures Under DC Magnetic Field
 We measure properties of a sapphire whispering gallery mode (WG) resonator by measuring the interaction between the WG mode and the Fe³⁺ electron spin resonance under the influence of a DC magnetic field.

1100 – 1230

Concurrent Session 4D – Atomic and Molecular Physics 4: Cold Atoms/ BEC

Room: CLB 5

Chair: Charles Clark, National Institute of Standards and Technology (NIST), GAITHERSBURG, USA

Time

- 1100 – 1115 **Philip Light**
University of Western Australia WA AUSTRALIA
Cold Atom Imaging with a Polarisation Interferometer
 We propose and demonstrate phase imaging of a cold-atom cloud using a polarisation interferometer. The technique provides straightforward retrieval of phase-shift and absorption experienced in the probe arm of the interferometer.
- 1115 – 1130 **Stephen Gensemer**
University of Sydney NSW AUSTRALIA
Direct Observation of Resonant Scattering Phase Shifts and their Energy Dependence
 We have observed the influence of scattering resonances on the collisional phase shift in ultracold atom-atom scattering with a novel technique for direct measurement of quantum scattering phase shifts.
- 1130 – 1145 **John McFerran**
University of Western Australia WA AUSTRALIA
A Neutral Mercury Optical Lattice Clock
 We report on the first operation of a Hg optical lattice clock, producing an absolute frequency measurement with mid-10⁻¹⁵ range systematic uncertainty and low 10⁻¹⁶ range statistical uncertainty.
- 1145 – 1200 **Andrew Horsley**
University of Basel SWITZERLAND
Microwave Field Imaging Using Atoms
 We are developing a sensitive, high-resolution and frequency-tunable technique for the imaging of microwave magnetic fields. Both ultracold and hot atomic vapours have been successfully used to completely reconstruct microwave fields, including phase.
- 1200 – 1215 **Stuart Szigeti**
Australian National University ACT AUSTRALIA
Precise Manipulation of a Bose-Einstein Condensate's Wavefunction
 We present a scheme, based upon radiofrequency (RF) resonance and magnetic field gradients, that can be used to apply arbitrary spatially-dependent phase shifts to the BEC order parameter at the healing-length scale.
- 1215 – 1230 **Chris Bradly**
University of Melbourne VIC AUSTRALIA
Coherent Tunnelling via Adiabatic Passage in a Three-Well Bose-Hubbard System
 We employ the Bose-Hubbard model to investigate the adiabatic transport of particles across a three-well chain without occupation of the middle well, and compare to mean-field results.

1100 – 1230

Concurrent Session 4E – Nuclear and Particle Physics 4

Room: CLB 4

Chair: Gregory Lane, Australian National University, ACT AUSTRALIA

Time

- 1100 – 1130 **Andrew Stuchbery**
Australian National University ACT AUSTRALIA
Free Ion Hyperfine Fields and Magnetic Moment Measurements on Radioactive Beams
 Recent magnetic-moment measurements on neutron-rich nuclei produced as radioactive beams are discussed. The focus is on the recoil in vacuum technique, which makes use of the intense hyperfine fields of highly charged free ions.

- 1130 – 1145 **Pere Rados**
University of Melbourne VIC AUSTRALIA
A Standard Model Higgs Boson Search in the H → WW Decay Mode in ATLAS
A search for the Standard Model Higgs boson produced in association with a W boson and decaying to a pair of W bosons which decay leptonically is presented, based on 2011 data from the ATLAS detector.
- 1145 – 1200 **Tibor Kibedi**
Australian National University ACT AUSTRALIA
The Pair Decay of the 7.654 MeV State in ¹²C
A new pair spectrometer is being developed at the ANU to observe the electron-positron pair emission from the decay of the Hoyle state at 7.654 MeV in ¹²C.
- 1200 – 1215 **Michael Tobar**
University of Western Australia WA AUSTRALIA
Testing the Standard Model of Particle Physics at Parts in 10¹⁸, Using Rotating Cryogenic Sapphire Oscillators
Since the early 2000s we have been using cryogenic sapphire resonators to test the Standard Model of Particle Physics through Lorentz Invariance experiments in collaboration with LNE-SYRTE at the Paris Observatory, Harvard and Humboldt University.
- 1215 – 1230 **Asif Ahmed**
Australian National University ACT AUSTRALIA
Time-Dependent Recoil in Vacuum – Improved Sensitivity to Hyperfine Fields and Nuclear Moments
Motivated by applications to nuclear moment measurements on radioactive beams, the development of methods to measure the time dependence of the hyperfine fields of free ions recoiling in vacuum will be described.

1100 – 1230

Concurrent Session 4F – Biophysics 2

Room: CLB 3

Chair: Jamie Vandenberg, University of New South Wales, NSW AUSTRALIA

Time

- 1100 – 1130 **Zdenka Kuncic**
University of Sydney NSW AUSTRALIA
Rolling the Biological Dice: Quantifying Stochastic Gene Expression
Underpinning all living matter is a complex network of interacting genes and proteins. Over the last decade, experimental studies have revealed that this genetic network is driven by stochastic fluctuations, implying intrinsically non-deterministic cell-to-cell variations in protein levels and hence, cell function and fate. This has far-reaching implications for developmental and indeed evolutionary biology. However, quantitative methods for analyzing and interpreting live cell microscopy data are lacking. We have developed a wavelet analysis approach to gain new insights into noisy gene expression. We show that the wavelet power spectra predicted by a noisy genetic network model can exhibit a bimodal probability distribution, indicative of two dynamical populations interrelated by gaussian noise.
- 1130 – 1145 **Erik Streed**
Griffith University QLD AUSTRALIA
Unfolding Single Biomolecules
The conformational dynamics of biomolecules drives the chemistry of life. We propose trapping single biomolecular ions in a Paul trap to probe their dynamics and that of their surrounding solvent cage.
- 1145 – 1200 **Michael Startsev**
Macquarie University NSW AUSTRALIA
pH Gradient Electrofocusing for Proteomics
Dynamic equilibrium pH gradient protein electrofocusing was demonstrated on a fused silica nanofluidic device. R-Phycoerythrin concentration was achieved in narrow bands (3.11¼m) within the nanochannels at concentration enhancement factors of 320 within 5 minutes. within the nanochannels at concentration enhancement factors of 320 within 5 minutes.
- 1200 – 1215 **William Brown**
Swinburne University of Technology VIC AUSTRALIA
Mechanism of Infrared Neural Stimulation of Murine Auditory Neurons in Vitro
Despite recent progress, the detailed mechanism of infrared neural stimulation (INS) remains controversial. In vitro studies of INS in murine auditory neurons suggest that both capacitance changes in the cell membrane and heat sensitive ion channels play a role.

- 1215 – 1230 **Maher Elbohouty**
University of Waikato NEW ZEALAND
Methodology to Measure the Electrical Conductivity of Seizing and Non-Seizing Mouse Brain Slices
 We present two methods for measuring electrical conductivity of (2 mm 2 mm 0.4 mm) living sections of cerebral cortex. We have successfully measured the electrical conductivity in seizing and non-seizing conditions.
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1100 – 1230

Concurrent Session 4G – ACOFT 4 Photonics in Action

Room: CLB 2

Chair: Andrew Ellis, University College Cork, IRELAND

Time

- 1100 – 1130 **Peter Ferris**
National Broadband Network ACT AUSTRALIA
Professor Peter Ferris is supported by CUDOS
NBN Network Design
 Three key elements of the NBN Co Network Design will be explored in this presentation:
1. What: the structure and the design method for the fibre Customer Access Network (CAN) replacing the twisted pair copper in Australia's Telecommunications' access network.
 2. Where: the method used in determining where the fibre access network is to be installed.
 3. When: the scheduling algorithm used to determine the order of deployment of the network.

- 1130 – 1200 **Andre Luiten**
University of Western Australia WA AUSTRALIA
From Boolardy to Brisbane: Accurate Time and Frequency for the Nation
 We report on the key components for building a continental-scale time and frequency dissemination system. The information will be carried on the AARNet fiber network and can support activities in radio astronomy, geodesy and measurement science.

- 1200 – 1230 **Daniel Shaddock**
Australian National University ACT AUSTRALIA
Fibre Sensing Techniques Adapted from Gravitational Wave Detection
 The field of gravitational wave detection has driven improvements in the sensitivity of optical interferometry. Recently, several of these techniques have been adapted to improve the performance of fibre sensors.
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1100 – 1230

Concurrent Session 4H – Industry 1

Room: CLB 1

Chair: Cathy Foley

Time

- 1100 – 1130 **Will Monks**
Monks IP
Patenting 101
 An overview of the types of Intellectual Property, the benefits of patenting, what types of subject matter can be patented, the patent process and costs, and some key trapdoors.
- 1130 – 1200 **Maryanne Large**
Canon Information Systems Research Australia NSW AUSTRALIA
Canon Information System Research Australia
 Dr. Large will discuss the differences in approach and priorities in academia and industry and some of the current impediments to commercialisation in Australia.
- 1200 – 1215 **Warren McKenzie**
Australian National Fabrication Facility
ANFF: Delivering Scientific Innovation from the Lab to Australian Industry
 The Australian National Fabrication Facility has a track record of enabling industry to use new science for their innovation. A number of case studies illustrate the benefits of ANFF to Australian industry.

1215 – 1230

Scott Martin*CSIRO***Ask Not What Industry Can Do For You**

The seminar will present some contrasting approaches to forging connections between research and commercialisers, manufacturers and end-user group - it will include examples from experience at CSIRO.

1330 – 1500**Concurrent Session 5A – Optics, Photonics and Lasers 5: Lasers 2 and Laser Applications***Room: CLB 7**Chair: Lap Van Dao, Swinburne University of Technology, VIC AUSTRALIA*

Time

1330 – 1400

Donna Strickland*OSA President, University of Waterloo CANADA***Studying the Spectra of the Individual Orders Produced by Transient Multi-frequency Raman Generation**

Multi-frequency Raman generation efficiently generates a large number of Raman orders. The spectra of the individual Raman orders are studied as a function of dispersion, pump intensity, pulse chirp, and frequency detuning..

1400 – 1415

Ondrej Kitzler*Macquarie University NSW AUSTRALIA***Continuous Wave, 10 W External Cavity Raman Laser: Experiment and Modeling**

We present an experimental and analytical study of the performance of a continuous-wave diamond Raman laser in external-cavity setup operating at 10 W. We discuss the effects of thermal loading on further power scaling.

1415 – 1430

Aaron McKay*Macquarie University NSW AUSTRALIA***Efficient High-Power (> 10 W) Pulsed Diamond Raman Laser Operation in the Eye-Safe Region**

We report a nanosecond-pulsed 2nd-Stokes external-cavity diamond Raman laser operating in the eye-safe region with more than 10 W of average output power and slope efficiencies approaching that of the quantum conversion limit.

1430 – 1445

Joshua Toomey*Macquarie University NSW AUSTRALIA***Mapping Instabilities in VCSEL Nonlinear Dynamics**

High resolution dynamic maps of the output from nonlinear laser systems are now achievable from computer controlled experimental characterization. Here-in mapping tools are researched that detect regions of operation where the nonlinear dynamics are unstable.

1330 – 1500**Concurrent Session 5B – Condensed-Matter, Materials and Surface Physics 5: Optical and Meta-materials***Room: CLB 8**Chair: Olivia Samardzic, Defence Science and Technology Organisation, VIC AUSTRALIA*

Time

1330 – 1345

Ilya Shadrivov*Australian National University ACT AUSTRALIA***Light-Tunable Metamaterial Mirror**

We introduce an original approach for creating light-tunable electromagnetic metamaterials. We design and study the metamaterial mirror, which can dynamically manipulate reflected waves. We demonstrate that our mirror can steer, focus and defocus electromagnetic beams.

1345 – 1400

Mikhail Lapine*University of Sydney NSW AUSTRALIA***Anisotropic Metamaterials with Broadband Diamagnetic Response**

We present a detailed analysis of the diamagnetic response which emerges in anisotropic stacks of densely packed conductive rings. We show how the effective permeability of the corresponding metamaterial is controlled by the structure parameters.

- 1400 – 1415 **Shouyi Xie**
Swinburne University VIC AUSTRALIA
Comparative Study on Electrical and Optical Properties of Random and Aligned Metal Nanowire Networks as Transparent Electrodes for Optoelectronic Devices
The optical and electrical properties of three major types of metal nanowire networks, random mesh with circular wires, orthogonal mesh and gratings with rectangular wires were investigated as transparent electrodes in this paper.
- 1415 – 1430 **Matthew Arnold**
University of Technology Sydney NSW AUSTRALIA
Simulations of Local Plasmon Modes of Cuboids
The evolution of local plasmon modes of cuboids is investigated using the boundary element method. Sharp edges increase field concentration, and mode symmetry determines radiative character.
- 1430 – 1445 **Maxim Avdeev**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Structure Studies of Flux and Hydrothermally Grown Nonlinear Optical Material $\text{KBe}_2\text{BO}_3\text{F}_2$
Different structures of R32 and R-3c have been identified for the deep-UV nonlinear optical single crystals of $\text{KBe}_2\text{BO}_3\text{F}_2$ (KBBF), fabricated by flux and hydrothermal methods respectively, by single crystal and powder X-ray and neutron diffractions.
- 1445 – 1500 **Keal Byrne**
University of Western Australia WA AUSTRALIA
Photochromism and the Origin of Colouration in Natural Pink Diamond
Natural pink diamond exhibits a stable, optically reversible photochromism that is attributed to an unknown colour centre. We exploit this phenomenon, among other techniques, aiming to determine the structure and properties of this defect.

1330 – 1500

Concurrent Session 5C – Quantum Information, Concepts and Coherence 5: Quantum Information Theory

Room: CLB 6

Chair: Stephen Bartlett, University of Sydney NSW AUSTRALIA

Time

- 1330 – 1400 **Gavin Brennen**
Macquarie University NSW AUSTRALIA
New Physics in Two Dimensions: Braiding Interactions of Anyons
We investigate the non-equilibrium physics of anyons in structured and random topological environments. Quite distinct behaviour is found between Abelian and non-Abelian models and could be exploited to observe and control these systems.
- 1400 – 1415 **Mauro Cirio**
Macquarie University NSW AUSTRALIA
Low Depth Quantum Circuits for Ising Models
A scheme for measuring complex temperature Ising partition functions is introduced. Several applications exploiting the well known relation between time evolution in quantum mechanics and classical statistical models are then presented.
- 1415 – 1430 **Courtney Brell**
University of Sydney NSW AUSTRALIA
Universal Topologically Protected Adiabatic Cluster State Quantum Computation
We define generalized cluster states based on the quantum double of a finite group. Using these states, we propose an adiabatic protocol for universal quantum computation that takes advantage of topological fault-tolerance techniques.
- 1430 – 1445 **Peter Rohde**
Macquarie University NSW AUSTRALIA
A 2D Quantum Walk Simulation of Two-Particle Dynamics
We present an optical implementation of a quantum walk on a two-dimensional lattice. The experiment provides a test-bed for studying entanglement and two-particle dynamics.
- 1445 – 1500 **Nicolas Menicucci**
University of Sydney NSW AUSTRALIA
Measuring Detector Proximity with Acceleration-Assisted Entanglement Harvesting
Entanglement harvested from a quantum field by local interaction with detectors undergoing anti-parallel acceleration can be used to measure the distance of closest approach between the two detectors.

1330 – 1500**Concurrent Session 5D – Atomic and Molecular Physics 5: Scattering Dynamics**

Room: CLB 5

Chair: Igor Bray, Curtin University, PERTH, AUSTRALIA

Time

1330 – 1400

Jim Williams*University of Western Australia WA AUSTRALIA***Topological Phase in Spin Polarised Electron Exchange Excitation of an Atom**

The observation of a non-zero StokesP2 parameter, of the radiation emitted during spin exchange excitation of a single atom, is interpreted as evidence of a geometric Berry phase.

1400 – 1415

Prasanga Palihawadana*Australian National University ACT AUSTRALIA***Electron and Positron Scattering from Pyrimidine Compared with Other Biological Analogs**

Electron and positron scattering cross sections from pyrimidine are presented together with a comparison to other biological analogs.

1415 – 1430

Joshua Machacek*Australian National University ACT AUSTRALIA***Low-Energy Positron Scattering From Molecular Hydrogen**

Molecular hydrogen is the simplest, stable neutral molecule. It is therefore the prototypical target for positron-molecular chemistry. We present positron scattering experiments; measuring positronium formation, total elastic and total inelastic scattering cross sections below 200eV.

1430 – 1445

James Calvert*Griffith University QLD AUSTRALIA***The Interaction of Ultrafast Light Pulses with Exotic Atoms**

Neon ions from the interaction of metastable neon and 6fs laser pulses are detected using a reaction microscope, enabling the resolution of ionization mechanisms. We will report results of preliminary experimental investigations of these processes.

1445 – 1500

Ilkhom Abdurakhmanov*Curtin University WA AUSTRALIA***C⁶⁺ – Impact Fully Differential Ionisation of Helium in the Coplanar and Perpendicular Planes**

A recently developed fully quantum-mechanical convergent-close-coupling (CCC) approach is applied to calculate in- and out-of-plane triple differential cross sections for single ionization of helium by C⁶⁺ projectile at impact energy of 100 MeV/amu.

1330 – 1500**Concurrent Session 5E – Nuclear and Particle Physics 5**

Room: CLB 4

Chair: Martin Sevier, University of Melbourne, MELBOURNE, AUSTRALIA

Time

1330 – 1400

Archil Kobakhidze*University of Sydney NSW AUSTRALIA***Theoretical Implications of the LHC Resonance at 125-126 GeV**

Theoretical implications of the 125-126 GeV resonance recently discovered at CERN LHC are discussed with particular emphases on vacuum stability, naturalness and possible physics beyond the Standard Model.

1400 – 1415

Ian Carter*Australian National University ACT AUSTRALIA***Determination of the Angular Distribution of Evaporation Residues Following Transmission through the Superconducting Solenoidal Separator SOLITAIRE**

An investigation into two methods developed at the ANU that extracts the Evaporation Residues angular distribution in the superconducting solenoid. Accurate knowledge of this distribution is a critical step in the determination of absolute fusion cross-sections.

- 1415 – 1430 **Iason Baldes**
University of Melbourne VIC AUSTRALIA
Radiative Inverse Seesaw Models and Baryogenesis
We examine two radiative inverse seesaw models which explain neutrino masses with TeV scale physics and also incorporate dark matter candidates. We examine compatibility with baryogenesis and possible experimental signatures.
- 1430 – 1445 **Nyaladzi Palalani**
Australian National University ACT AUSTRALIA
Structure of Tantalum Nuclei Beyond the Line of Stability
Excited states in neutron-rich tantalum isotopes ($A > 183$) have been studied with deep-inelastic reactions. New structures in this isotopic chain have been identified and the corresponding intrinsic and collective states characterized.
- 1445 – 1500 **Amelia Brennan**
University of Melbourne VIC AUSTRALIA
Neutrino Signals from Electroweak Bremsstrahlung in Solar WIMP Annihilation
We study a WIMP model where the natural helicity suppression of the annihilation rate is lifted by the bremsstrahlung of electroweak bosons, and calculate the neutrino spectra arising from solar WIMP annihilation.

1330 – 1500**Concurrent Session 5F – Biophysics 3**

Room: CLB 3

Chair: Martin Carolan, University of Wollongong, NSW AUSTRALIA

Time

- 1330 – 1400 **Michael Lerch**
University of Wollongong NSW AUSTRALIA
Potential Treatment of Radioresistant Tumours Using Synchrotron Generated X-Ray Microbeams
Synchrotron submillimeter radiosurgery, using synchrotron generated X-rays, is a new form of cancer treatment being developed for inoperable and otherwise untreatable brain tumours. This talk focuses will discuss the international effort to bring this exciting treatment modality to Australia.
- 1400 – 1415 **Monique Tourell**
Queensland University of Technology QLD AUSTRALIA
Simulated Diffusion Tensor of Water in Fiber Networks with Distributions of Fiber Alignment
Monte Carlo simulations were used to investigate the diffusion tensor of water in fiber networks with varying distributions of fiber alignment and fiber volume fraction, in an effort to quantify the relationship.
- 1415 – 1430 **Chiara Paviolo**
Swinburne University of Technology VIC AUSTRALIA
Neurite Outgrowth in Neuronal Cells is Promoted by Laser Exposure of Gold Nanoparticles
Gold, poly(4-styrenesulfonic acid) (PSS)-coated and SiO₂ coated nanorods were taken up by NG108-15 neuronal cells. Exposure to laser light at the plasmon resonance wavelength was found to promote neurite outgrowth in the nanoparticle treated cells.
- 1430 – 1445 **Ranganathan Prabhakar**
Monash University VIC AUSTRALIA
Navigating Near Walls at Zero Reynolds Number with Flagellar Propellers
The hydrodynamics of a flagellum-propelled microscale swimmer near a boundary are investigated. Stokesian dynamics simulations are used to elucidate the role of directional switching in flagellar rotation in cell steering near a wall.
- 1445 – 1500 **Jana Say**
Macquarie University NSW AUSTRALIA
The NV Centre In Nanodiamond: A Donor for Single Molecule Förster Resonance Energy Transfer
We demonstrate the use of nanodiamonds containing Nitrogen-Vacancy centres for single molecule Förster Resonance Energy Transfer. Our measurements reveal the position of the photostable NV centre to be in the core of 15 nm nanodiamonds.

1330 – 1500**Concurrent Session 5G – ACOFT 5 Photonic Sensing 1**

Room: CLB 2

Chair: David Sampson, University of Western Australia, WA AUSTRALIA

Time

1330 – 1400

Michel Digonnet

Stanford University STANFORD USA

Sub-Picostrain Sensors Using Slow Light in Fiber Bragg Gratings

We describe ultra-sensitive strain sensors utilising slow-light resonances at the band edge of strong, low-loss fiber Bragg gratings fabricated with ultrafast pulses. A record resolution of 280 fe/vHz at 23 kHz is reported.

1400 – 1415

John Arkwright

CSIRO NSW AUSTRALIA

A Low Profile Fibre Optic Force Sensing Tape for Monitoring Pressures Under a Compression Bandage

A low profile fibre optic force sensor based on two draw tower grating arrays is presented. The sensor arrays are contained within a low profile tape suitable for monitoring pressures underneath compression garments.

1415 – 1430

Brendan Kennedy

University of Western Australia WA AUSTRALIA

Microscopic Imaging of the Mechanical Properties of Breast Tumour Margins Using Optical Coherence Elastography

We present results of optical coherence elastography (OCE) imaging of excised tumour margins using a customized portable 3D-OCE system. This technique provides microscopic spatial resolution and has the potential to improve tumour margin identification.

1430 – 1445

Roman Kostecki

University of Adelaide SA AUSTRALIA

Fabrication of Suspended and Exposed Core Silica Fibres for Sensing Applications

We report on the fabrication of both enclosed and exposed suspended-core silica microstructured optical fibres. Both the fibre loss and environmental stability are characterised when exposed to some typical sensing and storage environments

1445 – 1500

Kevin Cook

University of Sydney NSW AUSTRALIA

Regenerated Gratings in Helium-loaded Optical Fibre

We demonstrate regeneration of optical fibre Bragg gratings loaded with inert helium. The gratings survive ultra-high temperatures of up to 1200 Å°C for extended time periods. The inert nature of He excludes models centred around simple chemical reactions with hydrogen and instead demonstrates the role of glass relaxation.

1330 – 1500**Concurrent Session 5H – Industry 2**

Room: CLB 1

Chair: Cathy Foley

Time

1330 – 1400

Doron Ben-Muir

Commercialisation Australia AUSTRALIA

Abstract summary not available at the time of print

1400 – 1430

Lyndon Edwards

Australian Nuclear Science and Technology Organisation NSW AUSTRALIA

What Physics Can Do for the Engineering Industry

Abstract summary not available at the time of print

1430 – 1500

Peter Fisk

National Measurement Institute

The New SI: Why We Need It, What It Might Look Like, and What It Means for Users

The talk will discuss aspects and consequences of the proposal to redefine the SI system of units in terms of invariant constants. The redefined system is commonly referred to as the "New SI".

1530 – 1700

Concurrent Session 6A – Joint: Quantum Information, Concepts + Optics, Photonics and Lasers: Trends in Quantum Optics

Room: CLB 7

Chair: Peter Drummond, Swinburne University of Technology, HAWTHORN, AUSTRALIA

Time

1530 – 1600

Peter Knight

Imperial College LONDON UK

Quantum Technology for a Networked World

Quantum technologies which depend on atomic coherence will be described with particular emphasis on applications to next generation atomic clocks

1600 – 1615

Dominic Berry

Macquarie University NSW AUSTRALIA

Universality of the Heisenberg Limit

We prove a rigorous form of the Heisenberg limit for arbitrary phase measurement schemes, provided that there is no additional phase information given. This result rules out the possibility of super-Heisenberg measurements.

1615 – 1630

Matthew Broome

University of Queensland QLD AUSTRALIA

Direct Characterisation of a Linear Optical Network

We present an efficient method for characterizing passive linear optical networks of phase shifters and beam splitters. The technique employs single- and two-mode coherent states and can be used to reliably predict non-classical dynamics.

1530 – 1700

Concurrent Session 6B – Condensed-Matter, Materials and Surface Physics 6: Positrons and Nanoscience

Room: CLB 8

Chair: Stephen Buckman, Australian National University, ACT AUSTRALIA

Time

1530 – 1600

Anita Hill

CSIRO VIC AUSTRALIA

What Positrons Can Contribute to Materials Physics

Nanostructured materials are emerging as the most efficient materials for use in molecular separations technology due to the ability to tailor the porosity to optimize transport. Porosity in membrane materials can be examined using positrons.

1600 – 1615

Eric Vance

Australian Nuclear Science and Technology Organisation NSW AUSTRALIA

Positron Annihilation and Electron Microscopy of Off-Stoichiometric Zn_2TiO_4

While cation vacancies are regarded as the charge compensators in Ti-rich Zn_2TiO_4 , or Ta-doped Zn_2TiO_4 samples targeted to contain cation vacancies, no evidence of such vacancies was evident from positron annihilation lifetime spectroscopy.

1615 – 1630

David Sprouster

Australian National University ACT AUSTRALIA

PALS-based Characterisation of Defect Structures in F-implanted Germanium

We present positron annihilation lifetime spectroscopy results pertaining to the thermal evolution of vacancy related defects in F-rich Ge. We find that F enriches the Ge matrix with various vacancy-like clusters that inhibit recrystallization.

1630 – 1645

Paul Guagliardo

University of Western Australia WA AUSTRALIA

Positron Annihilation Studies of Materials

Positron annihilation has been used to study a range of materials and defect types, from metals and semiconductors containing point defects, to mesoporous insulators containing pores, cages and channels as part of their structure.

1645 – 1700

Christopher Garvey*Australian Nuclear Science and Technology Organisation NSW AUSTRALIA***Comparative X-ray and Raman Study of Cellulose Texture and Nanostructure in Wood**

Nanoscale arrangements of the cellulosic component in wood are mapped onto sections of wood with polarized Raman spectroscopy and x-ray scattering.

1530 – 1700**Concurrent Session 6C – Quantum Information, Concepts and Coherence 6: Quantum Foundations***Room: CLB 6**Chair: Howard Wiseman, Centre for Quantum Dynamics, QLD AUSTRALIA*

Time

1530 – 1545

Marcelo Pereira De Almeida*University of Queensland QLD AUSTRALIA***Verifying Quantum Measurements with Discord**

Quantum discord provides a computational advantage even in the absence of entanglement. Here we demonstrate this advantage in a quantum information task and show that mixed states can be used to verify quantum measurements.

1545 – 1600

Martin Ringbauer*University of Vienna AUSTRIA***Quantum Discord as Resource for Remote State Preparation**

We provide an operational interpretation to quantum discord by relating it to remote state preparation. We further show that entanglement can be misleading and does not qualify as a distinctive resource for this task.

1600 – 1615

Dylan Saunders*Griffith University QLD AUSTRALIA***Local Non-realistic States Observed via Weak Tomography – Resolving the Two-slit Paradox**

We present experimental observation of local non-realistic states via weak tomography, implemented using a single photon entangling gate. This offers a resolution of the two-slit paradox, albeit by introducing observable non-real states.

1615 – 1630

Cyril Branciard*University of Queensland QLD AUSTRALIA***How Well Can One Jointly Measure Two Incompatible Observables on a Given Quantum State?**

We consider the approximate joint measurement of two incompatible observables on a given quantum state, and present an optimal relation for the trade-off between the noise on one observable and the noise on the other.

1630 – 1645

Michael Hall*Griffith University QLD AUSTRALIA***Entanglement Verification When Alice and Bob Can't Be Trusted**

Entanglement between two parties can be verified for all entangled states even when a referee does not trust the parties or their apparatuses.

1645 – 1700

Joel Wallman*University of Sydney NSW AUSTRALIA***Non-negative Subtheories and Quasiprobability Representations of Qubits**

Negative probabilities are interpreted as indicating nonclassicality, but depend upon the particular quasiprobability representation. We completely classify the sets of qubit bases that can be nonnegative and be permuted by a nontrivial unitary group.

1530 – 1700**Concurrent Session 6D – Atomic and Molecular Physics 6: Theory***Room: CLB 5**Chair: James Sullivan, Australian National University ACT AUSTRALIA*

Time

1530 – 1600

Victor Flambaum*University of New South Wales NSW AUSTRALIA***Quantum Chaos, Statistical Theory of Finite System and Enhancement of Electron Recombination**

In an atom with several excited electrons the eigenstates are chaotic superpositions of large number of Hartree-Fock configurations. We developed statistical theory to calculate matrix elements between the chaotic many-body eigenstates. Applications include calculations of electron resonance recombination with highly charged ions which may be enhanced 1000 times (in agreement with experiments).

1600 – 1615

Nicolas Menicucci*University of Sydney NSW AUSTRALIA***Simulating Quantum Effects of Cosmological Expansion Using a Static Ion Trap**

We propose an experimental testbed that uses ions in the collective ground state of a static trap for studying the analog of quantum-field effects in cosmological spacetimes.

1615 – 1630

Marianna Safronova*University of Delaware UNITED STATES OF AMERICA***Electric Dipole Moment Enhancement Factor of Thallium**

The goal of this work is to resolve the present controversy in the value of the electric dipole moment (EDM) enhancement factor of Tl. We have carried out several calculations by different high-precision methods.

1630 – 1645

Karim Benmessai*University of Western Australia WA AUSTRALIA***The Fe³⁺:Sapphire Whispering Gallery Modes Maser Oscillator**

This paper reports on the comparison of a Cryocooled Sapphire Oscillator with our Cryocooled Maser Oscillator made possible due to a home-made synthesis chain. The maser oscillator demonstrates for the first time a fractional frequency deviation below 6×10^{-15} over 4 s sampling time which is comparable to the conventional Cryogenic sapphire Oscillator, but achieved in a free running configuration.

1645 – 1700

Julian Berengut*University of New South Wales NSW AUSTRALIA***Testing Space-Time Invariance of the Fine-structure Constant**

We discuss how terrestrial measurements of time-variation of the fine-structure constant in atomic clocks, meteorite data, and analysis of Oklo nuclear reactor can be used to corroborate the spatial variation observed by astronomers.

1530 – 1700**Concurrent Session 6E – Solar, Terrestrial and Space Physics 1**

Room: CLB 4

Chair: Dave Neudegg, BoMet/IPS, NSW AUSTRALIA

Time

1530 – 1600

Marc Duldig*University of Tasmania TAS AUSTRALIA***Relativistic Solar Proton Events at Earth – What Do We Know and Does It Matter?**

A review of what we know about the acceleration, transport and arrival of relativistic solar energetic particles at Earth and the impacts they have on natural and technological systems and on aircraft passengers and crew.

1600 – 1615

John Humble*University Of Tasmania TAS AUSTRALIA***Long Term Variations in the Cosmic Ray Flux at 1 AU**

At the 2009 solar minimum the Cosmic Ray intensity at 1 AU was significantly higher than had been seen at previous minima. This unexpected result affected the production rate of Carbon-14.

1615 – 1630

Graham Dennis*Australian National University ACT AUSTRALIA***Partial Taylor Relaxation in Solar and Laboratory Plasmas**

We apply the theory of partial Taylor relaxation to recent experimental results in the Reversed-Field Pinch, and scope the potential application to nonlinear force-free fields for modeling the solar corona.

1630 – 1645

David Netherway*Department Science and Technology Organisation SA AUSTRALIA***Spatial and Temporal Detection of Sporadic E in Backscatter and Oblique Incidence Sounders**

Here we report on spatial and temporal distribution of sporadic E as detected simultaneously by backscatter ionospheric sounders and a network of oblique incidence ionospheric sounders.

1645 – 1700

Zahra Bouya*Bureau of Meteorology NSW AUSTRALIA***An EOF Based Regional Climatological Model of TEC Over Australia**

A climatological regional model for the Total Electron Content over Australia using Spherical Cap Harmonic Analysis (SCHA) and Empirical Orthogonal Function (EOF) techniques.

1530 – 1700**Concurrent Session 6F – Rheology 1***Room: CLB 3**Chair: Billy Todd, Swinburne University of Technology, HAWTHORN, AUSTRALIA*

Time

1530 – 1600

Mainak Majumder*Monash University VIC AUSTRALIA***Unusual Molecular Transport Properties of Carbon Nanotubes (CNTs)**

The hollow conduit (~ 1 -10 nm diameter) of CNTs has emerged as a model nanofluidic system in which rapid mass transport phenomena has been reported by several research groups. I'll discuss, rationalize and ask the question is a common thread among these observations? Additionally, I'll point out future applications in desalination, lab-on-chip devices, gas separations and nanopore sensors.

1600 – 1615

Roger Tanner*University of Sydney NSW AUSTRALIA***Measuring Viscometric Functions for Non-colloidal Suspensions with Newtonian Matrices**

We present the results of measuring three viscometric functions [the relative viscosity, and the first () and second () normal stress differences] for monosize sphere suspensions in a silicone fluid, which is nominally Newtonian.

1615 – 1630

Timothy Nicholson*University of Queensland QLD AUSTRALIA***Factors Affecting The Extrudate Swell For High Density Polyethylene**

A finite element simulation of the extrusion of polyethylene shows that an accurate prediction of the extrudate profile requires good parameterisation of both the viscoelastic and thermal properties of the polymer

1630 – 1645

David Konigsberg*University of Queensland QLD AUSTRALIA***The Rheology and Fluid Mechanics of Oscillatory Squeeze Flow**

A new squeeze flow rheometer capable of making on-line measurements of process fluids is investigated through the use of laboratory experiments and finite element simulation.

1645 – 1700

Elnaz Hajizadeh*Swinburne University of Technology VIC AUSTRALIA***Rheology of Dendrimers and Hyperbranched Polymers Undergoing Planar Elongational Flow**

The extensional melt rheology of dendrimers and hyperbranched polymers has been studied using non-equilibrium molecular dynamics simulation (NEMD). We found that the highly symmetric and constrained topology of these polymers allow for significant differences in their properties compared to the linear polymers.

1530 – 1700**Concurrent Session 6G – ACOFT 6 Sub-wavelength Photonics***Room: CLB 2**Chair: Francois Ladouceur, University of New South Wales, NSW AUSTRALIA*

- Time
1530 – 1600
- Boris Kuhlmeiy**
University of Sydney NSW AUSTRALIA
- Recent Progress in Drawn Metamaterials**
Using fibre drawing techniques we produce metamaterials with electric and magnetic responses for the terahertz and far-infrared spectrum. The technique is suitable for mass production and can be scaled for operation at optical wavelengths.
- 1600 – 1615
- Steve Madden**
Australian National University ACT AUSTRALIA
- Low Loss Coupling to Sub-micron Thin Film Rib and Nanowire Waveguides By Vertical Tapering**
Fibre coupling to small mode area high index contrast planar chalcogenide waveguides via vertical tapering of the waveguide film was analysed and experimentally demonstrated. Taper couplers with essentially zero excess loss were demonstrated
- 1615 – 1630
- Xin Gai**
Australian National University
- Chalcogenide Glass Photonic Crystal Nanocavity Fully Embedded in an Index-matched Cladding with a High Q-factor (>750,000)**
We designed and fabricated a 2-D photonic crystal hetero-structure cavity in the Ge_{11.5}As₂₄Se_{64.5} chalcogenide glass that is fully embedded in a cladding with refractive index of 1.44. An intrinsic $Q_v > 7.6 \times 10^5$ is observed.
- 1630 – 1645
- Jiakun He**
University of Sydney NSW AUSTRALIA
- Correlated Photon-Pair Generation in a Chalcogenide Ge_{11.5}As₂₄Se_{64.5} Nanowire**
We experimentally demonstrate correlated photon-pair generation in an integrated chalcogenide Ge_{11.5}As₂₄Se_{64.5} photonic nanowire via spontaneous-four-wave-mixing. Spontaneous Raman scattering acts as the main source of noise and can be mitigated using the characteristic low-Raman window.
- 1645 – 1700
- David Moss**
University of Sydney NSW AUSTRALIA
- Amorphous Silicon Nanowires with High FOM, High Nonlinearity and Good Stability**
We demonstrate optically stable amorphous silicon nanowires with both high nonlinear figure of merit (FOM) of ~5 and high nonlinearity $\text{Re}(\tilde{\chi}^3) = 1200\text{W}^{-1}\text{m}^{-1}$

1530 – 1700

Concurrent Session 6H – Nuclear and Particle Physics 6

Room: CLB 1

Chair: Keith Fifield, Australian National University, ACT AUSTRALIA

- Time
1530 – 1600
- Anton Wallner**
Australian National University ACT AUSTRALIA
- Stars and Supernovae: Laboratory Studies of Nucleosynthesis**
Accelerator-mass-spectrometry represents a sensitive direct atom-counting technique for studying nucleosynthesis processes in the laboratory. It has been applied to search for minute amounts of live supernova-produced radionuclides in terrestrial archives – resulting in stringent constraints on time scales and sites for actinide nucleosynthesis. Other applications include isotope-ratio measurements of nanodiamonds extracted from meteorites; and reaction-studies relevant to nucleosynthesis in stars.
- 1600 – 1615
- Andrea Bangert**
University of Sydney NSW AUSTRALIA
- Measurement of Top Quark Pair Production Cross Section with the ATLAS Detector at the LHC**
We present an inclusive measurement of the top quark pair production cross section in the dilepton final state using 4.71 inverse femtobarns of 7 TeV proton-proton collisions collected by the ATLAS detector in 2011.
- 1615 – 1630
- Matthew Reed**
Australian National University ACT AUSTRALIA
- Measurements of Isomers in the GSI Storage Ring (ESR) with Schottky Mass Spectrometry**
Review of the Schottky Mass Spectrometry technique for measurements of isomers in the Experimental Storage Ring and reporting on some recent results in neutron-rich hafnium, tantalum and tungsten isotopes.

1630 – 1645

Victor Flambaum*University of New South Wales NSW AUSTRALIA***Heavy Particles Bound via Higgs Boson Exchange**

Heavy particles (fourth generation leptons and quarks, also new heavy bosons) may be bound due to the Higgs boson exchange. We calculate bound states of such particles including relativistic and radiative corrections. We also calculate the decay widths to major channels. Such bound states may be detected at LHC.

1645 – 1700

Brian Robson*Australian National University ACT AUSTRALIA***Parity of Pions and CP Violation in Neutral Kaon System**

It is shown that the mixed-parity nature of pions predicted by the Generation Model indicates that the 1964 CP violating experiment of Christenson et al. may be understood without CP violation.

Wednesday 12 December 2012

0900 – 0945**Plenary 5***Room: CLB 7*

Chair: Andrew Peele, La Trobe University, VIC AUSTRALIA

Time

0900 – 0945

Petra Rudolf*Zernike Institute for Advanced Materials AE NETHERLANDS***Molecular Motors and Switches at Surfaces**

Nanometre positional changes in individual molecules by biased Brownian motion triggered by light can collectively cause a change in the macroscopic physical surface properties, for example ultimately leading to transport of a droplet.

0945 – 1030**Plenary 6***Room: CLB 7*

Chair: Susan Scott, Australian National University, ACT AUSTRALIA

Time

0945 – 1030

Gary Horowitz*University of California THE UNITED STATES OF AMERICA***Surprising Connections between Gravity and Condensed Matter**

In addition to describing gravitational phenomena, general relativity can describe aspects of nongravitational physics including condensed matter. I will explain this surprising development and illustrate it by using general relativity to reproduce aspects of superconductivity.

1100 – 1230**Concurrent Session 7A – Optics, Photonics and Lasers 7: Metamaterials***Room: CLB 7*

Chair: Tim Davis, CSIRO, VIC AUSTRALIA

Time

1100 – 1130

Paul Kinsler*Imperial College London UNITED KINGDOM***Transformation Media in Space and Time: Causality, Cloaks, and Curvature**

We present our unification of Transformation Optics with Transformation Acoustics and other wave theories, which allows naturally for spacetime Transformation devices. This is expedited by taking a causality-centric approach from the very start.

- 1130 – 1145 **Dragomir Neshev**
Australian National University ACT AUSTRALIA
Magnetic Quasi-crystal Metamaterials
 We analyze the effect of lattice symmetries on anisotropy of magnetic metamaterials. We reveal that metamaterials with quasi-crystal structure exhibit strong resonances and weak dependence on incident angle, opening a new path to optical isotropy in metamaterials.
- 1145 – 1200 **Kokou B Dossou**
University of Technology, NSW AUSTRALIA
Semi-Analytic Impedance Modelling of 3D Photonic and Metamaterial Structures
 We develop a semi-analytic method for modeling the scattering of light by absorbing, three-dimensional, periodic photonic and metamaterial structures. The advantages (in design and intuition) of the formalism are demonstrated through two applications.
- 1200 – 1230 **Manuel Decker**
Australian National University ACT AUSTRALIA
Photoluminescence Enhancement in Magnetic Quantum-Dot Metamaterials
 We experimentally study PL-enhancement of quantum dots coupled to split-ring-resonator metamaterials. Performing confocal micro-photoluminescence spectroscopy and -mapping, we demonstrate polarization-dependent control of emission via strong interaction between quantum dots and magnetic modes of the metamaterial.

1230-1250

2012 AOS W.H. (Beattie) Steel Medal Winner

Room: CLB 7

Prof Barry Luther-Davies

Australian National University ACT AUSTRALIA

Nonlinear Optics: Starting and Finishing in the Mid Infrared

My research over the past forty or so years has been united by the theme of nonlinear optics, and started in the 1970s with studies of the use of parametric processes for generating tunable mid-IR light. In the intervening years I got interested in nonlinear optics in plasmas, photorefractive nonlinear optics; nonlinear materials and recently as part of CUDOS all-optical signal processing. Right now though I find myself "back" in the mid-IR tackling developing waveguide devices that may finally open up some of the exciting applications of this important spectral region.

1100 – 1230

Concurrent Session 7B – Condensed-Matter, Materials and Surface Physics 7: Superconductivity

Room: CLB 8

Chair: Oleg Sushkov, University of New South Wales, NSW AUSTRALIA

Time

1100 – 1130

Xiaolin Wang

University of Wollongong NSW AUSTRALIA

Topological Insulators: A New Platform for Novel Spintronics and Superconductivity

Materials with zero band gap, namely gapless semiconductors, have unique physical properties compared to conventional semiconductors, insulators and metals. Their band structures are extremely sensitive to external influences such as temperature, pressure, electric or magnetic field. Spin gapless semiconductors that bridge the gap between semiconductors and halfmetallic ferromagnets exhibit a band gap in one of the spin channels and a zero band gap in the other and thus allow for tunable spin transport [1,2]. Topological insulators are materials that behave as insulators in their bulk state and metals on their gapless surface states with linear dispersion between energy and momentum. An overview on novel physical properties will be given for some typical zero gap materials with either quadratic or linear dispersion. New physics and potential applications in spintronics, electronics, multiferroics on a number of spin related gapless semiconductors, topological insulators, and other new class of zero gap materials will be addressed. Some experimental data on their fascinating physical properties such as observation of Josephson supercurrent through a topological insulator surface state and room temperature giant magnetoresistance in topological Bi_2Te_3 nano-sheet will be presented [3,4].

1130 – 1145

Jared Cole

RMIT University VIC AUSTRALIA

Bistable Defects in Josephson Junction Devices: When Superconducting Circuits Are Not So Super

Bistable defects are ubiquitous in superconducting quantum circuits and are a major contributor to decoherence. Experiments on individual strongly-coupled defects have opened up new possibilities for differentiating between the many theories that have been suggested for their origin.

1145 – 1200

Guochu Deng*Australian National Nuclear Research and Development Organisation NSW AUSTRALIA***Structure Evolution and Spin Dynamics of Highly Ca-doped Spin Ladder Superconductor $\text{Sr}_{14-x}\text{Ca}_x\text{Cu}_{24}\text{O}_{41}$**

The crystal structure and charge distribution and spin dynamics of spin ladder superconductor $\text{Sr}_{14-x}\text{Ca}_x\text{Cu}_{24}\text{O}_{41}$ have been investigated with the Ca doping content. Superconducting transition was observed under hydrostatic and uniaxial pressure. Inelastic neutron scattering results indicated that the spin gap of the ladder subsystem doesn't collapse with highly Ca doping, overturning the conclusion from NEXPERIMENTS

1200 – 1215

Yarema Reshitnyk*University of Queensland QLD AUSTRALIA***Quantum Noise in a SQUID-Tunable Microchip Resonator**

Nanojunction based SQUID sensors are developed for incorporation into the centre strip of a superconducting coplanar waveguide to make tuneable resonators. The current-voltage characteristics and magnetic field modulation of niobium nanobridge-based SQUIDs are presented and optimized using focused ion beam techniques.

1215 – 1230

Alexey V Pan*University of Wollongong NSW AUSTRALIA***Practical Superconductors: Measurements and Reality**

We show that practical superconductors respond differently to measurement techniques due to fundamental issues as well as unaccounted phenomena, which considerably affect measured properties of the superconductors and corresponding explanations.

1100 – 1230**Concurrent Session 7C – Quantum Information, Concepts and Coherence 7: Frontiers in Quantum Optics***Room: CLB 6**Chair: Gabriel Molina-Terriza, Macquarie University, NSW AUSTRALIA*

Time

1100 – 1130

Howard Wiseman*Griffith University QLD AUSTRALIA***Loophole-free Steering for Quantum Cryptography and for Testing the Subjectivity of Atomic Quantum Jumps**

Schrödinger's "steering" enables 1-sided device independent (DI) quantum key distribution (QKD), which would be far easier to demonstrate than fully DI QKD, and also allows for experiments to test the detector-dependence of atomic quantum jumps.

1130 – 1145

Andrew White*University of Queensland QLD AUSTRALIA***Engineering Photonic Quantum Emulators and Simulators**

We discuss our recent results in engineering photonic systems for emulating topological phases of matter, biological phenomena, and simulating computationally-difficult problems.

1145 – 1200

Michael Taylor*University of Queensland QLD AUSTRALIA***Biological Measurement Beyond the Quantum Limit**

We demonstrate the first biological measurement to beat the quantum noise limit. Using squeezed light, lipid particles within yeast cells are tracked with sub-shot noise sensitivity. This measurement reveals the viscoelasticity of the cellular cytoplasm.

1200 – 1215

Sheon Chua*Australian National University ACT AUSTRALIA***Results from the LIGO Squeezed Light Injection Experiment**

We report on the results of the Australian partnered-international collaborative experiment that successfully injected squeezed light for sensitivity-enhancement into a kilometre-scale laser interferometric gravitational-wave detector, the LIGO Squeezed Light Injection Experiment.

1215 – 1230

Michael Steel*Macquarie University NSW AUSTRALIA***Discretely Observable 3D Quantum Walk Structures**

We introduce a family of continuous-time quantum walk devices that permit discrete observation of the quantum statistics and are suited to existing 3D fabrication techniques. The topologies induce novel time-dependent photon correlations.

1100 – 1230**Concurrent Session 7D – Atomic and Molecular Physics 7: Matter Interactions**

Room: CLB 5

Chair: Mike Charlton, Swansea University, UNITED KINGDOM

Time

1100 – 1130

Ronald White

James Cook University QLD AUSTRALIA

Positron Transport in Soft-Matter – Biomedical Application

We present recent developments in the modeling of the transport positron and electron in biological media, with primary application in the fields of positron emission tomography and radiation damage.

1130 – 1145

Emma Anderson

Australian National University ACT AUSTRALIA

Low Energy Positron Scattering from Uracil

A low energy, high resolution positron pulsed beam was used to measure positron scattering from uracil between 1 and 200 eV. Total scattering, total elastic scattering and positronium formation cross sections will be presented.

1145 – 1200

Laurence Campbell

Flinders University SA AUSTRALIA

Nonequilibrium Modelling of Atomic and Molecular Processes in Planetary Atmospheres

Atomic and molecular processes in planetary atmospheres have a wide range of time scales. A nonequilibrium algorithm is introduced which allows this wide range to be addressed, along with verification and an example application.

1200 – 1215

Ravshanbek Utamuratov

Curtin University WA AUSTRALIA

Two-Centre Convergent Close-Coupling Calculations of Positron Scattering from Magnesium

Two-centre convergent close-coupling (CCC) method has been applied to positron scattering from magnesium. The results confirm the existence of a P-wave resonance that has been predicted by previous single-centre methods [3,4] for low energy elastic scattering.

1215 – 1230

Luca Chiari

Flinders University SA AUSTRALIA

Positron Scattering from Ethene

Cross section results for low energy positron scattering from ethene are presented. New experimental total cross sections and calculated elastic integral cross sections are compared with earlier measurements and computations on this target species.

1100 – 1230**Concurrent Session 7E – Solar, Terrestrial and Space Physics 2**

Room: CLB 4

Chair: John Humble, University Of Tasmania, TAS AUSTRALIA

Time

1100 – 1130

Bo Li

University of Sydney NSW AUSTRALIA

New Results of Type II and III Solar Radio Bursts

Latest results of theoretical and numerical modeling of type II and III solar radio bursts are presented. These bursts are produced by electron beaccelerated at shocks and magnetic reconnection sites on the Sun.

1130 – 1145

Robert Stening

University of New South Wales NSW AUSTRALIA

Spherical Harmonic Analysis of Geomagnetic Variations

Magnetic variation data from a worldwide distribution of observatories are subjected to spherical harmonic analysis in order to obtain the equivalent overhead ionospheric current systems. Seasonal and longitude variations of the current system are examined.

1145 – 1200

David Farrant
CSIRO NSW AUSTRALIA

Wavelength Matched Etalons for the Solar Orbiter Polarimetric and Helioseismic Imager

We describe the design, fabrication and metrology of ultra-narrowband optical filters (etalons) for the ESA Solar Orbiter satellite mission, including sub-angstrom matching of the passband wavelength.

1200 – 1215

Matt Francis
IPS Radio and Space Services NSW AUSTRALIA

The Australian Empirical Real Time Regional Ionosphere Model

This talk describes the latest developments towards an empirical real time ionospheric model assimilating data from ionosondes and GPS receivers.

1215 – 1230

Dave Neudegg
Bureau of Meteorology NSW AUSTRALIA

Significant Events to Date in Cycle 24

Solar Cycle 24 is nearing the maxima of sunspot number and it has provided a range of interesting events and subsequent effects on the geomagnetic field, ionosphere and technologies affected by them.

1100 – 1230

Concurrent Session 7F – Rheology 2

Room: CLB 3

Chair: Timothy Nicholson, University of Queensland, QLD AUSTRALIA

Time

1100 – 1130

Denis Evans
Professor Dennis Evans is supported by Australian Society of Rheology (ASR)

Nonequilibrium Statistical Mechanics Applied to Fluid Rheology

Each of the "Laws" of thermodynamics are now theorems of nonequilibrium statistical mechanics. These "laws" are proved using the laws of mechanics and the axiom of causality. We illustrate these theorems with simulations of a viscoelastic fluid.

1130 – 1145

Elliot Gilbert
Australian National Nuclear Research and Development Organisation NSW AUSTRALIA

Structural Transitions During Starch Pasting: Deducing the Branching Structure of Starch Gels with Small-angle Scattering

Simultaneous neutron scattering and pasting data were obtained from various starches. The scattering patterns indicated mass-fractal structure within the pastes and the degree of branching was deduced with the unified methodology, with interesting botanical variation.

1145 – 1200

Sergio De Luca
Swinburne University of Technology VIC AUSTRALIA

Spin and Linear Momentum Coupling: Generating Steady-State Flow Without Mechanical Pumping at the Nanoscale

We present both theoretical and simulation studies that demonstrate the importance of the non-classical phenomenon of coupling of molecular spin to linear translational momentum, which is a fundamental feature of fluid flow under extreme confinement

1200 – 1215

Anthony Stickland
University of Melbourne VIC AUSTRALIA

A Hyperelastic Constitutive Approach for the Rheology of Concentrated Particulate Suspensions under Combined Shear and Compression Loads

A hyper-viscoelastic constitutive approach has been developed to describe the flow and deformation of concentrated suspensions. The approach allows for strain and strain-rate dependent bulk shear flow and compressive solid-liquid separation.

1215 – 1230

Ranganathan Prabhakar
Monash University VIC AUSTRALIA

Role of Self-Concentration and Coil-Stretch Hysteresis in Electrospinning of Nominally Dilute Polymer Solutions

Self-concentration of dilute polymer solutions leads to enhanced coil-stretch hysteresis in extensional flows. This sustains large elastic stresses in electrified jets and is thus critical in the control of polymer nanofiber synthesis by electrospinning.

1100 – 1230**Concurrent Session 7G – ACOFT 7 Lasers 1**

Room: CLB 2

Chair: Graham Town, Macquarie University, NSW AUSTRALIA

Time

1100 – 1130

David Moss*University of Sydney NSW AUSTRALIA***CMOS Compatible Microcavity Lasers**

We demonstrate novel microcavity lasers in an integrated, CMOS compatible platform. This platform has promise for telecommunications and on-chip WDM optical interconnects for computing.

1130 – 1145

Stephanie Crawford*University of Sydney CUDOS NSW AUSTRALIA***Widely Tunable 2.9 μm Ho³⁺, Pr³⁺-Doped Fluoride Glass Fibre Laser Used to Identify 317 cm⁻¹ Raman Shift**

A 0.675 W Ho³⁺, Pr³⁺ doped fluoride glass fibre laser with 24.4% slope efficiency was tuned between 2.838 and 2.936 μm and used to identify a Raman frequency shift of 317 cm⁻¹ in ZBLAN glass.

1145 – 1200

Alexei Tikhomirov*Defence Science and Technology Organisation SA AUSTRALIA***Splice-Free DFB Fibre Laser Array**

We propose and investigate a double-core splice-free fibre laser array with fibre tapers to transmit the light at the pump and signal wavelengths between cores. A two-element monolithic FL array is demonstrated

1200 – 1215

Michael Oermann*Defence Science and Technology Organisation SA AUSTRALIA***Single-Polarisation DBR Fibre Laser in Photosensitive Ho-doped Fibre**

We investigate the enhanced photosensitivity measured in Ho-doped germanosilicate fibres and demonstrate single-longitudinal-mode single-polarisation lasing at 2.13 μm . The laser cavity is formed by fibre Bragg gratings UV-written into the core of the active fibre.

1100 – 1230**Concurrent Session 7H – Joint: Optics, Photonics and Lasers + Condensed-Matter, Materials and Surface Physics (X-ray Optics)**

Room: CLB 1

Chair: Klaus-Dieter Liss, Australian Nuclear Science and Technology Organisation, NSW AUSTRALIA

Time

1100 – 1130

Keith Nugent*Australian Synchrotron VIC AUSTRALIA***Coherent X-ray Science, Free-Electron Lasers and Crystallography**

X-ray lasers are opening up new frontiers in materials science, biophysics and ultrafast science. I will review coherent X-ray science progress and present some intriguing new results that have emerged from our recent work.

1130 – 1145

Alberto Cereser*La Trobe University VIC AUSTRALIA***Coherent X-rays to shine a light on the Alzheimer's disease**

Fresnel Coherent Diffractive Imaging (FCDI) is a recent microscopy technique applicable at third generation synchrotrons. Combining FCDI with tomography and ptychography we imaged the interior of a yeast cell, a model for neuronal cells.

1145 – 1200

Hannah Coughlan*La Trobe University/CXS VIC AUSTRALIA***Cellular Imaging using Fresnel Coherent Diffractive Imaging**

Soft X-ray Fresnel coherent diffractive imaging (FCDI) has been utilised for imaging with high sensitivity, elemental contrast and high spatial resolution. It has long been that contrast between biological components and water is enhanced by using X-rays of energy between the carbon and oxygen absorption edges (2.2 to 4.4 nm). We report initial results obtained in an effort to extend FCDI to this energy range with whole cell samples.

1200 – 1230

Uwe Klemradt*RWTH Aachen University, GERMANY***Fluctuations and Avalanches in Diffusionless Phase Transitions Probed by Coherent X-Rays**

Shape memory alloys are based on diffusionless (martensitic) phase transitions. Although most materials undergo fast athermal dynamics, some exhibit superimposed slow phenomena, e.g. ageing. We discuss novel possibilities to investigate such non-equilibrium processes using coherent X-rays.

1235 – 1320**Women in Physics Session****Cathy Foley***CSIRO NSW AUSTRALIA***What is the Real Status of Women in Physics in Australia and What Are the Issues Right Now?**

Since some improvements for women in physics up until 2006, there has been a new decline in recent years. Women are underrepresented in all aspects of physics education and work including participation in school, university, and research laboratories. Women physicists usually have lower seniority and earn less. This is compounded by the Australian Institute of Physics Women's group being inactive since December 2010.

Susan Feteris*Deakin University VIC AUSTRALIA***The Role of Women Academics in Australian Universities**

Women academics have been employed in Australian universities for a century. Why, then, are women so poorly represented at senior levels in our universities? DEEWR statistics show very different environments in Go8 universities, and the others.

Juna Sathian*Queensland University of Technology QLD AUSTRALIA***Female Participation in Tertiary Physics: a Case Study**

A seven-year study has been conducted on female enrolment in physics, from bachelors through to PhD, at QUT. An overall increase in female participation, with the highest percentage increase in research degree has been reported.

1330 – 1500**Concurrent Session 8A – Optics, Photonics and Lasers 8: Nonlinear Optics 1***Room: CLB 7**Chair: Neil Broderick, University of Auckland, NEW ZEALAND*

Time

1330 – 1400

Ady Arie*Tel Aviv University ISRAEL***Shaping and Twisting Light Beams Using Nonlinear Photonic Crystals**

Recent developments in quadratic nonlinear photonic crystals enable to convert fundamental Gaussian beams into beams of arbitrary shapes by implementing holographic techniques in nonlinear optics. Vortex beams and high order Hermite-Gaussian beams were generated.

1400 – 1415

Yan Sheng*Australian National University ACT AUSTRALIA***Randomly Poled Lithium Niobate Crystal for Broadband Optical Frequency Conversion**

We design and fabricate a randomly poled lithium niobate crystal via electric-field poling technique. We show that the randomness enables one to realize an efficient broadband emission of high-quality second harmonic.

1415 – 1430

Richard Neo*University of Sydney NSW AUSTRALIA***Phase-sensitive Amplification by Four-Wave-Mixing on a Chalcogenide Waveguide**

We demonstrate for the first time a chip-based phase-sensitive parametric amplifier based on four-wave-mixing within a chalcogenide planar waveguide. A peak-to-peak on-chip phase-sensitive gain of 10 dB is observed.

- 1430 – 1445 **Andrey Sukhorukov**
Australian National University ACT AUSTRALIA
Controllable Photon-Pair Generation and Quantum Walks in Nonlinear Waveguide Arrays
 We demonstrate experimentally simultaneous photon-pair generation and quantum walks in a nonlinear waveguide array where the output photon correlations can be controlled by varying the pump laser wavelength, switching from classical to quantum statistics.
- 1445 – 1500 **Diana Antonosyan**
Australian National University ACT AUSTRALIA
Effect of Loss on Photon-Pair Generation and Correlations in Nonlinear Waveguide Arrays
 We model photon-pair generation through spontaneous parametric down-conversion in quadratic nonlinear waveguide arrays. We study the effect of loss on quantum spatial correlations between photon pairs and determine the tolerance to the loss.

1330 – 1500

Concurrent Session 8B – Condensed-Matter, Materials and Surface Physics 8: Semiconductors-I

Room: CLB 8

Chair: Jodie Bradby, Australian National University, ACT AUSTRALIA

Time

- 1330 – 1400 **Michelle Simmons**
University of New South Wales NSW AUSTRALIA
Quantum Computing in Silicon with Donor Electron Spins
 We will discuss the recent progress in donor based silicon quantum computation where individual dopant atoms are placed in silicon aligned to epitaxial gate electrodes and charge sensors using scanning probe microscopy.
- 1400 – 1415 **Alex Hamilton**
University of New South Wales NSW AUSTRALIA
Nuclear Magnetic Resonance and Hyperfine Coupling in GaAs Electron and Hole Quantum Wires
 There is growing interest in the use of hole spins in semiconductor quantum devices to store and process information. We compare the coupling of electron and hole spins with nuclei in the GaAs host crystal.
- 1415 – 1430 **Daisy Wang**
University of New South Wales NSW AUSTRALIA
Fabrication and Characterisation of Ambipolar AlGaAs/GaAs Heterostructure Devices
 We have fabricated AlGaAs/GaAs heterostructure devices in which the conduction channel can be populated with either electrons or holes. We found significant discrepancies in scattering mechanisms between electrons and holes by comparing experiment to theory.
- 1430 – 1445 **Bianca Haberl**
Australian National University ACT AUSTRALIA
A New Crystalline Phase of Silicon Formed from Indentation-Induced High-Pressure Phases
 A new crystalline phase of silicon is formed upon thermal annealing of indentation-induced high-pressure phases. This new phase appears unique to indentation and may thus be attributed to the nucleation behaviour under these complex stresses.
- 1445 – 1500 **Adam Burke**
University of New South Wales NSW AUSTRALIA
The 1D g-factor and 0.7 Anomaly in QPCs with Independent Control Over Density
 We report the dependence of the 1D Lande g-factor g^* on electron density in QPCs. We obtain g^* values up to 2.8 significantly exceeding previous values for AlGaAs/GaAs QPCs and approaching that in InGaAs/InP QPCs.

1330 – 1500

Concurrent Session 8C – Quantum Information, Concepts and Coherence 8: Optomechanics

Room: CLB 6

Chair: Ping Koy Lam, Australian National University NSW AUSTRALIA

Time

1330 – 1400

Warwick Bowen

University of Queensland QLD AUSTRALIA

Quantum Optomechanics for Sensing and Fundamental Science

Quantum optomechanical systems promise to advance both fundamental science and applications. Here we report quantum control techniques using electric fields and squeezed light, progress towards room temperature operation, and applications in sensing, most particularly magnetometry.

1400 – 1415

David McAuslan

University of Queensland QLD AUSTRALIA

Vibration Stabilisation for Quantum Optomechanics

External vibrations are a significant issue in optomechanics as they introduce an extra source of noise into the system. Here we discuss techniques for reducing the effect of vibrations, and demonstrate a 105 reduction in vibrational noise of a cavity optomechanical system.

1415 – 1430

Glen Harris

University of Queensland QLD AUSTRALIA

Enhanced Micromechanical Sensors: Active Feedback vs Optimal Postprocessing

Thermomechanical noise is a limiting factor in many MEMS and NEMS-based sensors. It has been predicted and shown that feedback cooling can enhance force sensing. Here we show the same enhancement can be made with optimal post-processing.

1430 – 1445

Sahar Basiri-Esfahani

University of Queensland QLD AUSTRALIA

Phonon Number Measurements Using Single Photon Opto-Mechanics

We describe a system composed of two optical modes, coupled via a mechanical resonator, and fed by a single photon source. We can engineer phonon number states of the mechanics using successive photon counting conditional measurements.

1445 – 1500

Uzma Akram

University of Queensland QLD AUSTRALIA

Two Photon Conditional Optomechanics

An optomechanical system driven by a single photon is conditioned on long detection times, imparting a large momentum to the mechanics. Consequent delayed injection of a second photon results in a periodic photon router effect.

1330 – 1500

Concurrent Session 8D – Atomic and Molecular Physics 8: Spin

Room: CLB 5

Chair: Brian Orr, Macquarie University, NSW AUSTRALIA

Time

1330 – 1345

Darryl Jones

Flinders University SA AUSTRALIA

Electron Scattering Phenomena from Radicals of Technological Interest

Progress on the ongoing development of an apparatus for measuring cross sections for electron scattering from radical species will be reported.

1345 – 1400

Andrew Martin

University of Melbourne VIC AUSTRALIA

Measurable Quantum Geometric Phase from a Rotating Single Spin

We show that the internal magnetic states of a single nitrogen-vacancy defect, within a rotating diamond crystal, acquire geometric phases. Under reasonable experimental conditions we show that a phase shift of up to four radians could be measured.

- 1400 – 1415 **Mikhail Egorov**
Monash University VIC AUSTRALIA
RF-induced Feshbach Resonances in Rb-87
Using BEC of Rb-87 at an atom chip we observe a group of predicted RF-induced Feshbach resonances. The frequency and amplitude of the RF field can tune properties of the Feshbach resonances.
- 1415 – 1430 **Andrew Danos**
University of Sydney NSW AUSTRALIA
The Role of Spin in Triplet-Triplet Upconversion
Spectral management of solar radiation via organic sensitized incoherent frequency upconversion is a proven method of boosting photovoltaic efficiencies. Magnetic resonance techniques are used to better understand the spin mixing processes that underlie upconversion.
- 1430 – 1445 **Tom Stace**
University of Queensland QLD AUSTRALIA
Three-atom Collisions in a Dilute Thermal Vapour
We show experimental and theoretical evidence for significant coherent, multi-atom, laser-induced collisions in fluorescence spectroscopy of a room-temperature Rb vapour.
- 1445 – 1500 **Igor Litvinyuk**
Griffith University QLD AUSTRALIA
Dynamics and Control of Electron Localisation in Dissociating Molecules
We study the effects of pulse intensity, duration and carrier-envelope phase on asymmetry in hydrogen and deuterium molecular ions dissociated by intense few-cycle near-infrared laser pulses. We compare experimental results with model calculations.

1330 – 1500**Concurrent Session 8E – Astronomy and Astrophysics 1: Instrumentation Session**

Room: CLB 4

Chair: Warrick Couch, Swinburne University Of Technology, VIC AUSTRALIA

Time

- 1330 – 1400 **Lisa Harvey-Smith**
CSIRO VIC AUSTRALIA
The Australian Square Kilometre Array Pathfinder
The Square Kilometre Array is an international project to build the world's most powerful radio telescope. This talk describes CSIRO's Australian SKA Pathfinder – a highly innovative radio telescope in outback Western Australia, which prototypes a number of unique technologies that will be required for the Square Kilometre Array.
- 1400 – 1415 **Gavin Rowell**
University of Adelaide SA AUSTRALIA
The H.E.S.S. II Gamma-Ray Telescope – A New Window onto the GeV Gamma-Ray Sky
The H.E.S.S. II telescope is a ~28 metre diameter Cherenkov imaging telescope designed to study >20 GeV gamma-rays. It will bridge the gap between space and ground-based gamma-ray telescopes and provide high statistics views of gamma-ray bursts, supernova remnants and pulsars.
- 1415 – 1430 **Nick Cvetojevic**
Macquarie University NSW AUSTRALIA
Redesign of the Integrated Photonic Spectrograph for Improved Astronomical Performance
We present the next generation of miniature integrated photonic spectrographs for use in astronomy. These devices have been substantially redesigned to enhance their performance, focusing on high-resolution spectroscopy for planet hunting, and an all-photonics platform.
- 1430 – 1445 **Francis Bennet**
Australian National University ACT AUSTRALIA
Laser Tomography Adaptive Optics System for the Giant Magellan Telescope
We present the design of the adaptive optics system under development for the Giant Magellan Telescope, including the laser guidestar facility, wavefront sensor, and segment piston sensor.

1445 – 1500

Silvie Ngo*Australian National University ACT AUSTRALIA***Phasing Concept for Segmented Mirror Telescopes Using Digital Interferometry**

A new method for phasing large segmented mirror telescopes is proposed. The technique uses digital interferometry to measure mirror displacements. We describe here the first experiment planned to investigate the technique's performance.

1330 – 1500**Concurrent Session 8F – Complex Systems, Computational and Mathematical Physics 1***Room: CLB 3**Chair: Pulin Gong, University of Sydney NSW AUSTRALIA*

Time

1330 – 1400

Peter Robinson*University of Sydney NSW AUSTRALIA***Physical Principles Underlying Complex Brain Network Organisation**

Physical limitations arising from stability and geometry are shown to provide strong constraints on brain network architecture, and to account for the main features of such networks, without invoking other principles or imposing ad hoc artificial structures. This underlines the need to consider the physical embedding of networks when analyzing their properties.

1400 – 1415

Evgeny Galakhov and Olga Salieva*Russian Peoples' Friendship University RUSSIAN FEDERATION***Blow-Up Phenomenon For Evolutional Inequalities with Singularities on Unbounded Sets**

Many physical phenomena can be described by differential inequalities with singular coefficients. In the present work, necessary conditions of solvability for such inequalities in certain functional classes are established.

1415 – 1430

Ra Inta*Australian National University ACT AUSTRALIA***New Applications of Sparse Methods in Physics**

Many problem in physics have a level of redundancy, or sparsity, in their formulation. I show here there are useful applications arising from compressive sampling techniques and a recent sparse fast Fourier transform.

1330 – 1500**Concurrent Session 8G – ACOFT 8 Photonic Devices 2***Room: CLB 2**Chair: Mark Withford, Macquarie University, NSW AUSTRALIA*

Time

1330 – 1400

Robert Thomson*Herriot Watt University UNITED KINGDOM**Dr Robert Thomson is supported by Professor Joss Bland-Hawthorn (University of Astrophotonics)***Ultrafast Laser Inscription of Integrated "Photonic Lanterns"**

We discuss our work on ultrafast laser fabricated integrated "photonic lanterns". These devices offer exciting possibilities in the field of astrophotonics for efficiently coupling multimode celestial light into single mode devices such as fibre Bragg-gratings.

1400 – 1415

Ranjith Rajasekharan Unnithan*University of Melbourne VIC AUSTRALIA***Nanophotonic Phase Modulator**

The paper presents the development of an ultra-high resolution nanophotonic phase modulator, where nanotube electrodes are exploited to define pixels in a liquid crystal media.

1415 – 1430

Masood Naqshbandi*University of Sydney NSW AUSTRALIA***Modifying the Contact Angle Of Glass Substrates with Laser Irradiation for Self-Assembly of Photonic Microwire Waveguides**

We report on modification of contact angle of glass substrates with water using laser treatment (ArF, $\lambda = 193$ nm) both as lines and areas on the substrate surface. Different energies below and above a damage threshold were used. Asymmetric contact angles lead to an improvement in microwire growth.

- 1430 – 1445 **Christopher Poulton**
University of Technology NSW AUSTRALIA
Design for Broadband On-Chip Isolator Using Stimulated Brillouin Scattering
 We present a design for an on-chip photonic isolator with linear response, in which Stimulated Brillouin Scattering is used to induce one-directional mode conversion within a multi-moded chalcogenide (As₂S₃) rib waveguide.
- 1445 – 1500 **Yuwen Duan**
Macquarie University NSW AUSTRALIA
Relative Intensity Noise of Yb DFB Waveguide Laser Fabricated Using Femtosecond Laser Direct-write Technique
 We demonstrate the relative intensity noise (RIN) measurement of a monolithic Yb waveguide laser fabricated by femtosecond laser direct-write technique. The maximum RIN density at the relaxation resonance is -85 dB/Hz at 400 kHz.

1330 – 1500

Concurrent Session 8H – Optics, Photonics and Lasers 13: Plasmonics (Fabrication)

Room: CLB 1

Chair: Isabelle Staude, Australian National University, ACT AUSTRALIA

Time

- 1330 – 1400 **Kylie Catchpole**
Australian National University ACT AUSTRALIA
Nanostructures for Photovoltaics
 We describe recent progress and future prospects for enhancement of solar cells using nanophotonic structures.
- 1400 – 1415 **Daniel Gomez**
University of Melbourne VIC AUSTRALIA
Hybrid Semiconductor-metal Nanostructures: Active Plasmonics
 We discuss our work aimed at understanding the optical properties and fabricating hybrid metal-semiconductor hetero-nanostructures. We present our current progress in the theory and fabrication of coupled systems and the ultrafast response of hybrid structures.
- 1415 – 1430 **Fadi Bonnie**
University of Technology NSW AUSTRALIA
Hybrid Response from Resonant Coupling Between Near Percolating Metal Filament Metal Mirrors
 Ultra-thin metal filament percolation displays unique resonant responses. The optical modes formed when these excitations couple to metal mirrors are observed and explained. Evanescent and image couplings are tuned via the film-mirror gap.
- 1430 – 1445 **Isabelle Staude**
Australian National University ACT AUSTRALIA
Broadband Unidirectional Yagi-Uda Nanoantennas
 We fabricate and optically characterize novel tapered Yagi-Uda nanoantennas for broadband unidirectional emission enhancement. Measured transmittance spectra reveal broad resonances reflecting the nanoantennas' wide-band performance. Our experimental results are in good agreement with numerical calculations.
- 1445 – 1500 **Yaoyu Cao**
Swinburne University of Technology VIC AUSTRALIA
Tuning Photosensitivity for Ultra-high Resolution Nanofabrication with Metals
 We demonstrate the improvement of feature size down to sub 30 nm, corresponding to $\lambda/26$, in the fabrication of silver nanostructures through the two-photon absorption induced photoreduction process with enhanced photosensitivity.

1530 – 1700

Concurrent Session 9A – Optics, Photonics and Lasers 9: Non-linear Optics 2

Room: CLB 7

Chair: Alexander Judge, University of Sydney, NSW AUSTRALIA

Time

1530 – 1600

Heedeuk Shin*Sandia National Laboratories UNITED STATES OF AMERICA***Tailorable On-chip Stimulated Brillouin Scattering in Nanoscale Silicon Waveguides**

We explore the physics of stimulated Brillouin scattering in nanoscale silicon waveguide. With strong lateral photon-phonon confinement, we show forward- and backward-SBS enhanced by a coherent combination of radiation pressures and electrostrictive forces

1600 – 1615

Yana Izdebskaya*Australian National University ACT AUSTRALIA***Transformation of Higher-order Spatial Solitons in Nematic Liquid Crystals**

We report on the first observation of the transformation of higher-order spatial solitons in nematic liquid crystals, and demonstrate their strong dependence on the geometry of a nonlinear sample.

1615 – 1630

Daniel Leykam*Australian National University ACT AUSTRALIA***Nonlinear Conical Diffraction in Photonic Lieb Lattices**

We study analytically and numerically nonlinear conical diffraction in Lieb lattices and derive an equation for pseudo-spin 1 waves. Conical diffraction distinguishes different pseudo-spin states. Nonlinearity reduces its circular symmetry to four-fold discrete rotational symmetry.

1630 – 1645

James Mills*University of Queensland QLD AUSTRALIA***Signatures of Integrability Breaking Via Dark-Bright Soliton Collisions in a Two-Component Bose-Einstein Condensate**

We study collisions of bright-dark solitons in a two-component Bose-Einstein condensate to shed light on a fundamental problem in physics: how do the constraints of integrability affect the relaxation dynamics of isolated quantum systems?

1645 – 1700

Eugene Gamaly*Australian National University ACT AUSTRALIA***High-pressure Phase Transformations by Fs-laser in Transparent and Opaque Media**

We present studies of phase transformations under extreme pressure generated by intense fs-laser inside sapphire, silicon, olivine, diamond, and demonstrate a novel phenomenon of permanent atoseparation specific to non-equilibrium conditions of confined micro-explosion.

1530 – 1700**Concurrent Session 9B – Condensed-Matter, Materials and Surface Physics 9: Semiconductors-II***Room: CLB 8**Chair: David Jamieson, University of Melbourne, VIC AUSTRALIA*

Time

1530 – 1545

Daniel Drumm*RMIT University VIC AUSTRALIA***Ab Initio Calculation of Si:P Nanowires Confined Atomically in Two Dimensions**

The first ab initio calculations of donor structures in silicon, atomically confined both vertically and laterally, have been performed. Bandstructures, valley splitting, effective masses, and the extent of the electronic density are presented.

1545 – 1600

Adam Micolich*University of New South Wales NSW AUSTRALIA***Realising Lateral Wrap-gated Nanowire FETs and Controlling Gate Length with Chemistry**

We report the first lateral wrap-gated NW-FETs produced using a variant of the well-established methods for fabricating vertical NW-FETs. It enables control over gate length with a single wet etch step with no additional lithography.

1600 – 1615

Juha Muhonen*University of New South Wales NSW AUSTRALIA***Influence of Strain to the Electron-phonon Coupling in Degenerately Doped Silicon at Low Temperatures**

Strain can be used to modify the electron-phonon coupling in silicon at low temperatures. We have demonstrated this experimentally in degenerately n-doped silicon at temperatures below 0.5 K and used the effect to enhance the cooling phenomenon in superconductor-semiconductor tunnel junctions.

- 1615 – 1630 **Jodie Bradby**
Australian National University ACT AUSTRALIA
Measuring the Hardness of Silicon
 It is well known that silicon undergoes a series of phase transformations during nanoindentation. Measuring the ‘hardness’ of this material using instrumented nanoindentation is thus challenging and raises the interesting question ‘what is hardness?’.
- 1630 – 1645 **Leonardus Bimo Bayu Aji**
Australian National University ACT AUSTRALIA
Structural Relaxation of Ion-implanted Amorphous Silicon
 The structural relaxation of ion-implanted amorphous silicon (α -Si) has been studied by indentation-induced deformation, Raman microspectroscopy, and electrical conductivity measurement. The maximum α -Si network relaxation is characterized by a minimum bond-angle distortion of 9.4° .
- 1645 – 1700 **Changyi Yang**
University of Melbourne VIC AUSTRALIA
Single keV Ion Detection in Silicon
 Single ion detection in silicon is essential for the implantation fabrication of nano-scaled single donor devices. We address critical issues of the ion-beam-charging-up effect and noise issues associated with wafer-detector handling and the future improvement.

1530 – 1700

Concurrent Session 9C – Quantum Information, Concepts and Coherence 9: Quantum Theory

Room: CLB 6

Chair: Gavin Brennen, Macquarie University NSW AUSTRALIA

Time

- 1530 – 1545 **Margaret Reid**
Swinburne University of Technology VIC AUSTRALIA
Genuine N-partite Einstein-Podolsky-Rosen Steering
 We develop the concept of genuine N-partite steering. This nonlocality is realized as a multiparty Einstein-Podolsky-Rosen paradox, and is the key resource for quantum secret sharing. Useful properties emerge not guaranteed for multipartite entangled states.
- 1545 – 1600 **Daniel Terno**
Macquarie University NSW AUSTRALIA
Quantum Control in Foundational Experiments
 We present a framework to analyze quantum controlling devices in experiments in foundations of quantum theory. We illustrate it by a quantum delayed-choice experiment, discuss its implications, present some recent experiments and outline future applications.
- 1600 – 1615 **Sarah Adlong**
Australian National University ACT AUSTRALIA
Quantum Control of a Bose-Einstein Condensate in a Harmonic Trap
 Feedback control has been successfully applied to small quantum systems, however, there has been limited application to large systems. An interesting, large quantum system with accessible controls is the Bose-Einstein condensate (BEC). We examine the robustness of previous control schemes to various experimental noise sources, and the accuracy of the approximations used to model the state of the quantum field.
- 1615 – 1630 **Marcin Zwierz**
Griffith University QLD AUSTRALIA
Ultimate Limits to Quantum Metrology
 We give the ultimate formulation of the Heisenberg limit for quantum metrology applicable to all measurement strategies. We prove that this limit holds for the evolutions governed by the generators with an upper-bounded spectrum.
- 1630 – 1645 **Michael Hall**
Griffith University QLD AUSTRALIA
Nonlinear Metrology: A Quantum Scaling Paradox
 Proposed ‘optimal’ nonlinear phase estimation schemes cannot yield more than 1 bit of information per estimate, and their mean square errors cannot beat the Heisenberg limit – a paradox only partially resolved via iterative implementations.

1645 – 1700

Mr Jacques Pienaar*University of Queensland QLD AUSTRALIA***Open Time-like Curves Violate Heisenbergs Uncertainty Principle**

Models of quantum evolution in the presence of closed time-like curves (CTCs) predict unusual information theoretic effects. We show that even CTCs containing no interactions can violate Heisenbergs uncertainty principle for continuous variables.

1530 – 1700**Concurrent Session 9D – Physics Education 1***Room: CLB 5**Chair: Judith Pollard, University of Adelaide SA AUSTRALIA*

Time

1530 – 1600

Margaret Wegener*University of Queensland QLD AUSTRALIA***Development of Threshold Learning Outcomes for Australian Graduates in Physics**

Academic standards for physics across Australian universities have been collaboratively developed, to aid with emerging regulatory requirements, and to foster good practice in higher education in physics.

1600 – 1615

Les Kirkup*University of Technology NSW AUSTRALIA***Preparing Demonstrators to Facilitate Learning in Inquiry-oriented Practicals**

We report an innovation in the professional development of demonstrators which focusses on the student perspective in order to enhance demonstrators' capacity to support learning in inquiry-oriented practicals.

1615 – 1630

Matthew Hill*University of Sydney NSW AUSTRALIA***Can We Test Representational Ability Independent of Physics Conceptual Knowledge?**

Multiple representations of information are used in physics teaching and practice. A survey of representational ability, collated and administered to 625 University of Sydney physics students, found representational ability differs from academic ability.

1630 – 1645

Timo Nieminen*University of Queensland QLD AUSTRALIA***Tiered Assessment in Upper-level Undergraduate Physics**

Tiered assessment is a differentiated assessment strategy where students can choose to attempt advanced assessment tasks. We discuss the use of tiered assessment in second and third year electromagnetics courses.

1645 – 1700

Steven Hinckley*Edith Cowan University WA AUSTRALIA***Developing an Educational Video for Utilising an Oscilloscope in First Year Physics**

We report the development of a multimedia resource designed to aid undergraduate engineering and physics students in learning the operation and functions of a Digital Storage Oscilloscope.

1530 – 1700**Concurrent Session 9E – Astronomy and Astrophysics 2: Science Session***Room: CLB 4**Chair: John O'Byrne, University Of Sydney NSW AUSTRALIA*

Time

1530 – 1545

Tim Bedding*University of Sydney NSW AUSTRALIA***Using Asteroseismology to Probe Stellar Interiors with NASA's Kepler Mission**

Kepler's observations of oscillations in thousands of stars have led to a revolution in asteroseismology. Key results include detecting gravity modes in red giant stars and characterizing stars found to host exoplanets.

- 1545 – 1600 **Aiden Martin**
University of Technology NSW AUSTRALIA
Electron Beam Extraction of Cometary Material from STARDUST Silica Aerogel
XeF₂-mediated electron beam induced etching is being developed as a technique for the extraction of STARDUST cometary material from silica aerogel collectors. Methodology, results and application to the study of cometary particles are described.
- 1600 – 1615 **Daniel Cotton**
University of New South Wales NSW AUSTRALIA
Carbon Monoxide Distribution Below Venus' Clouds
Carbon Monoxide is an important tracer of atmospheric dynamics and chemistry on Venus. Radiative transfer modelling has been used to interpret observations made of Venus' lower atmosphere and determine the distribution of carbon monoxide therein.
- 1615 – 1630 **Allan Ernest**
Charles Sturt University NSW AUSTRALIA
X-Ray Halos, Dark Gravitational Eigenstates and Cooling Flow
Collisions between weakly-coupled baryons in dark-matter gravitational eigenstates will contribute baryons and energy to the visible x-ray halos of galaxies and galactic clusters by redistributing the eigenstate configurations of dark baryons to more-highlyinteracting quantum compositions.
- 1630 – 1645 **Warrick Couch**
Swinburne University of Technology VIC AUSTRALIA
Identifying the Physical MechanisDriving Rapid Galaxy Evolution via Multiwavelength Studies
This talk presents the latest results from combining integral field spectroscopy at optical wavelengths with observations taken with the world's most advanced radio telescopes to understand the physical mechanisthat produce the rapidly evolving E+A galaxies.
- 1645 – 1700 **Victor Flambaum**
University of New South Wales NSW AUSTRALIA
Astrophysical Evidences for the Variation of Fundamental Constants and Proposals of Laboratory Tests
New results based on the quasar absorption data indicate variation of the fine structure constant alpha in space. These results are tested in different astrophysical measurements and laboratory experiments with atomic and nuclear clocks. Systemwith enhanced effects of the variation may be especially important

1530 – 1700

Concurrent Session 9F – Complex Systems, Computational and Mathematical Physics 2

Room: CLB 3

Chair: Jaan Oitmaa, University of New South Wales NSW AUSTRALIA

Time

- 1530 – 1600 **Bruce Henry**
University of New South Wales NSW AUSTRALIA
Fractional Diffusion and Continuous Time Random Walks with Trapping, Forcing and Reactions
Fractional diffusion caused by obstacles, traps and crowding is common in physical, biological and financial processes. Mathematical models, including effects from reactions and forcing, are derived from continuous time random walks, fractional calculus and stochastic calculus.
- 1600 – 1630 **Alistair Steyn-Ross**
University of Waikato NEW ZEALAND
Critical Slowing in Excitable Systems
Excitable systeexhibit a nonlinear increase in sensitivity to stimulus as the threshold for state change is approached. This can be quantified by analyzing the properties of noise-evoked fluctuations, looking for evidence of critical slowing and growing.
- 1630 – 1645 **Yusuke Uchiyama**
University of Tsukuba JAPAN
Statistical Characterisation of Hole Turbulence in 1D Complex Ginzburg-Landau Equation
Statistical properties of hole turbulence in complex Ginzburg-Landau equation have been studied. It is found that the probability distribution functions of some characteristic quantities can be identified by Mittag-Leffler function and hyper gamma function.

1645 – 1700

Frederic Boisson*Australian National Nuclear Research and Development Organisation NSW AUSTRALIA***Validation of PET-SORTEO Monte Carlo Simulations for the Geometry of the Inveon PET Preclinical Scanner**

This work aimed at validating the use of the PET-SORTEO Monte Carlo simulation tool to numerically reproduce accurate measurements of the Inveon small animal PET scanner.

1530 – 1700**Concurrent Session 9G – ACOFT 9 Photonic Sensing 2***Room: CLB 2**Chair: John Arkwright, CSIRO, NSW AUSTRALIA*

Time

1530 – 1600

Geoffrey Cranch*Naval Research Laboratory UNITED STATES OF AMERICA***Advanced Fiber Sensing Techniques for Security and Defense**

This manuscript describes a range of miniature photonic sensors that have been developed for underwater applications based on fiber laser strain sensor technology. These include hydrophones, inertial and magnetic field sensors.

1600 – 1615

Scott Foster*Defence Science and Technology Organisation SA AUSTRALIA***Ultra-low frequency noise DBR fibre laser for sensing strain in the femto-strain regime**

We report a single frequency erbium doped distributed Bragg reflector fibre laser, with a cavity length of 10cm. Measured frequency fluctuations are consistent with the fundamental thermodynamic limit above 100Hz with a frequency noise floor of approximately $6\text{Hz}/\sqrt{\text{Hz}}$ at 1kHz

1615 – 1630

Gary Allwood*Edith Cowan University WA AUSTRALIA***Wavelength Division Multiplexing of a Fibre Bragg Grating Sensor Using Transmit-Reflect Detection System**

Here we have performed dense wavelength division multiplexing of a single fibre Bragg grating (FBG) sensor interrogated using a transmit-reflect detection system. The FBG was used to sense an applied ultrasonic signal.

1630 -1645

Eike Zeller*RMIT University VIC AUSTRALIA***Coupled Waveguide Array Sensing Platform Exploiting Discrete Trapping Behaviour**

We report on a novel refractive index sensing concept for aqueous solutions exploiting discrete trapping behavior in coupled waveguide arrays. Modal and beam propagation analysis were performed, allowing sensitivity and detection limit to be estimated.

1645 – 1700

Graham Town*Macquarie University NSW AUSTRALIA***Broadband Optical Supercontinuum Generation in a Long Cavity Fibre Laser**

We describe optical supercontinuum generation in an actively modelocked fibre ring laser using a pulsed mode-locking technique. Recirculation of a section of the continuum facilitated spectral broadening

1530 – 1700**Concurrent Session 9H – Optics, Photonics and Lasers 14: Ultra-precise Frequency Determination and Distribution***Room: CLB 1**Chair: Brian Orr, Macquarie University NSW AUSTRALIA*

Time

1530 – 1545

Sascha Schediwy*University of Western Australia WA AUSTRALIA***Ultra-Stable Time and Frequency Dissemination Networks for Diverse Applications by Multiple Users**

In this paper we discuss the progress of optical fibre time and frequency dissemination from experimental, single-use, point-to-point links, to fully-featured, dissemination networks that simultaneously serve multiple users with diverse applications.

- 1545 – 1600 **Ken Baldwin**
Australian National University ACT AUSTRALIA
Long-distance Analog and Digital Dissemination of Reference Radio Frequencies Over Optical Fibers
 Novel analog and digital techniques facilitate dissemination of radio frequency reference signals via optical fiber over long distances (100 km or more). Applications of this National Time and Frequency Network project include Australian radio astronomy.
- 1600 – 1615 **Wenle Weng**
University of Western Australia WA AUSTRALIA
Frequency Stabilisation in Whispering-Gallery-Mode Resonators Based on Frequency Doubling Self-Referencing Technique
 By locking a laser and its second-harmonic to two modes in a whispering-gallery-mode resonator, nano-Kelvin temperature sensitivity could be achieved. This can result in improved frequency stabilization with active temperature control.
- 1615 – 1630 **Sam Francis**
Australian National University ACT AUSTRALIA
Ultra Weak-Light Phase Detection
 We present an ultra weak-light heterodyne phase measurement technique that uses pre-stabilised lasers to lock to a sub-femtowatt optical signal without cycle slipping in an optical phase lock loop.
- 1630 – 1645 **David Bowman**
Australian National University ACT AUSTRALIA
An Internally Sensed Optical Phased Array
 Optical frequency phased-arrays typically rely on an external mechanism to sense aberrations in the outgoing beam. We describe a method that can maintain an arbitrary beam profile without the need for external sensors.
- 1645 – 1700 **Roland Fleddermann**
Australian National University ACT AUSTRALIA
Australian Contributions to the GRACE Follow-On Satellite Mission
 The GRACE mission has provided 10 years of Earth gravity field measurements. GRACE Follow-On will ensure continuity of data and improve the precision. We discuss mission technologies with a special focus on Australian contributions.

Thursday 13 December 2012

0900 – 0945

Plenary 7

Room: CLB 7

Chair: Marc Duldig, University of Tasmania, TAS AUSTRALIA

Time

0900 – 0945

Brian Schmidt

Australian National University ACT AUSTRALIA

Type Ia Supernovae, The Accelerating Cosmos and Dark Energy

Type Ia supernovae remain one of Astronomy's most precise tools for measuring distances in the Universe. I will describe the cosmological application of these stellar explosions, and chronicle how they were used to discover an accelerating Universe in 1998 – an observation which is most simply explained if more than 70% of the Universe is made up of some previously undetected form of 'Dark Energy'. Over the intervening 13 years, a variety of experiments have been completed, and even more proposed to better constrain the source of the acceleration. I will review the range of experiments, describing the current state of our understanding of the observed acceleration, and speculate about future progress in understanding Dark Energy.

0945 – 1030

Plenary 8

Room: CLB 7

Chair: Geoff Taylor, University of Melbourne, VIC AUSTRALIA

Time

0945 – 1030

Elisabetta Barberio*University of Melbourne VIC AUSTRALIA***Discovery of the Higgs Boson**

The Higgs boson explain the origin of mass in the Standard Model of particle physics. July 4 2012, the LHC experiments announced the discovery of a new subatomic Higgs-like particle. I will present the most recent results on this particle.

1100 – 1230

Concurrent Session 10A – Optics, Photonics and Lasers 10: Plasmonics 2

*Room: CLB 7**Chair: Isabelle Staude, Australian National University ACT AUSTRALIA*

Time

1100 – 1130

Ewa Goldys*Macquarie University NSW AUSTRALIA***Fluorescent Nanoparticles for Advanced Bioimaging and Biosensing**

Fluorescent nanoparticles form brighter and stable labels for biological applications. We demonstrated background-free imaging of single nanoparticle bioprobes based on nanoscale ruby and plasmonically enhanced lanthanides. A similar plasmonic approach was applied to upconverting nanoparticles.

1130 – 1145

Alexander Minovich*Australian National University ACT AUSTRALIA***Collision of Non-diffracting Airy Surface Plasmons**

We study theoretically and experimentally the interference of two Airy surface plasmons. We investigate the variation of the focal spot for different separation distance between the beams. We demonstrate methods for controlling the focal maximum.

1145 – 1200

Jon Swaim*University of Queensland QLD AUSTRALIA***Plasmonic Whispering Gallery Mode Biosensors**

We demonstrate real-time detection of 10 nm gold nanorods with a SNR of 11.25 and a resonator Q factor of 6×10^5 , using the Pound-Drever-Hall frequency stabilization technique.

1200 – 1215

Ivan Maksymov*Australian National University ACT AUSTRALIA***Efficient Control of Polarization-Entangled Photon Pairs with Plasmonic Nanoantennas**

We demonstrate that integration of a plasmonic cross-shaped nanoantenna with a gold mirror allows to overcome the fundamental tradeoff between the spontaneous emission enhancement and extraction efficiency of entangled photons pairs emitted by a single quantum dot.

1215 -1230

Ann Roberts*University of Melbourne VIC AUSTRALIA***Plasmonic Cross-slot Antennas**

We discuss progress in the development of slot antennas based on resonant apertures in metal films. We show that simultaneous field enhancement and beaming can be produced when an antenna is surrounded by periodic corrugations.

1100 – 1230

Concurrent Session 10B – Condensed-Matter, Materials and Surface Physics 10: Semiconductors-III

*Room: CLB 8**Chair: Ron White, James Cook University, QLD AUSTRALIA*

Time

1100 – 1130

Almantas Pivrikas*University of Queensland QLD AUSTRALIA***Transport and Recombination in Disordered Organic Semiconductors**

Charge carrier transport studies in organic solar cells, employing a range of complementary classical and novel techniques, are presented. The relationship between charge carrier transport and bimolecular recombination in high efficiency devices is demonstrated.

- 1130 – 1145 **Dane McCamey**
University of Sydney NSW AUSTRALIA
A Spin-based Organic Magnetic Field Sensor
We present a magnetic field sensor, based on electrically detecting spin resonance in organic semiconductors, which operates over two orders of both temperature and magnetic field, including room temperature, and is robust to material degradation.
- 1145 – 1200 **Barbara Fairchild**
University of Melbourne VIC AUSTRALIA
Annealing Study of Ion Implanted Diamond
We report on the progressive graphitisation of the damaged region in ion implanted diamond with isochronal annealing. Nanostructured graphite is formed initially from lower density amorphous carbon (a-C) and higher density a-C at higher temperatures.
- 1200 – 1215 **Adam Micolich**
University of New South Wales NSW AUSTRALIA
Is Thermal Annealing a Viable Alternative for Crystallization in Triethylsilylethynyl Anthradithiophene (TESADT) Organic Transistors?
Solvent annealing is a well-known method for crystallization of the TESADT semiconductor film in organic transistors. We show that although thermal annealing is also effective in producing crystallization, it compromises the resulting electrical performance.
- 1215 – 1230 **Robert Robson**
James Cook University QLD AUSTRALIA
Fractional Kinetics in Phase and Configuration Space
We solve the fractional BGK kinetic equation in phase space, allowing for trapping of charged carriers. Its projection onto configuration space produces a new fractional diffusion equation from which we analyse experimental current profiles.

1100 – 1230

Concurrent Session 10C – Quantum Information, Concepts and Coherence 10: Spins in Solids

Room: CLB 6

Chair: Jason Twamley, Macquarie University, NSW AUSTRALIA

Time

- 1100 – 1130 **Fedor Jelezko**
University of Ulm GERMANY
Diamond Based Quantum Technologies
Quantum information, sensing, magnetic resonance, optical microscopy
- 1130 – 1145 **Marcus Doherty**
Australian National University ACT AUSTRALIA
A New Optically Addressable Spin Qubit in Diamond
A report of the discovery of a new optical defect in engineered diamond. The new defect exhibits optical spin-polarisation and readout and is a promising electronic spin qubit or bus for a nuclear spin registry.
- 1145 – 1200 **Brant Gibson**
University of Melbourne VIC AUSTRALIA
Scalable Patterned Nanodiamond Arrays Containing Single Nitrogen-vacancy Emitters
We report methodologies for the nanopositioning of nanodiamonds containing single nitrogen-vacancy quantum emitters in an array.
- 1200 – 1215 **Thomas Keevers**
University of Sydney NSW AUSTRALIA
Slow Hopping of Polaron Pairs in MEH-PPV
Charge transport in organic materials occurs via stochastic hopping processes. These cause fluctuations in the local Overhauser field, inducing quantum spin-phase decoherence, which we measure to determine the rate of hopping for polaron pairs.

1215 – 1230

Lloyd Hollenberg*University of Melbourne VIC AUSTRALIA***Diamond NV Spin Qubits for Sensing in Biology**

Qubits are not just for quantum computing – the latest theoretical and experimental results will be presented showing how the nitrogen-vacancy spin qubit in diamond can be used as a nanoscale magnetometer/sensor in biology with high sensitivity and resolution.

1100 – 1230**Concurrent Session 10D – Physics Education 2***Room: CLB 5**Chair: David Hoxley, La Trobe University, VIC AUSTRALIA*

Time

1130 – 1145

Margaret Wegener*University of Queensland QLD AUSTRALIA***The Impact of Values and Self-Identity on University Physics Learning**

We investigate helping students who may find first-year university physics threatening, because they don't identify themselves as people who are supposed to succeed, via an intervention that bolsters students' sense of self.

1145 – 1200

Sarah Walden*Queensland University of Technology QLD AUSTRALIA***Comparison of Two Physics Honours Seminar Assessment Strategies**

Assessment data of 53 physics honours seminars at QUT from 2006-2012 is presented. The results show that the intuitive 'gut feel' response of academics is often within a few percent of a more detailed assessment.

1200 – 1215

Judith Pollard*University of Adelaide SA AUSTRALIA***Improving Student Engagement and Outcomes in Level I Physics**

Extended Physics drop-in centre hours, in-semester tests and direct contact with disengaging students have been used in an attempt to improve student engagement, retention and results. Preliminary analysis indicates some positive outcomes.

1215 – 1230

Anton Rayner*University of Queensland QLD AUSTRALIA***How a Physics Degree Changes Students' Attitudes and Learning Behaviours**

Surveys and interviews show that as student progress through a Physics degree, they more readily discuss ideas with peers, increasingly recognise the importance of communication, and relate Physics to daily life.

1100 – 1230**Concurrent Session 10E – Relativity and Gravitation 1***Room: CLB 4**Chair: Susan Scott, Australian National University ACT AUSTRALIA*

Time

1100 – 1130

David McClelland*Australian National University ACT AUSTRALIA***Gravitational Wave Detection Using Laser Interferometry**

I report on the status of the global effort to detect gravitational waves using long baseline laser interferometry.

1130 – 1145

Daniel Terno*Macquarie University NSW AUSTRALIA***Photons, Qubits and Satellite Experiments**

QEYSSAT satellite quantum communication experiments push direct tests of quantum theory up to the scale where the interaction between gravity and quantum phenomena becomes important. We discuss several quantum effects that are relevant for the project.

1145 – 1200

Philip Threlfall*Australian National University ACT AUSTRALIA***Gravitational Entropy within the Quiescent Cosmology Framework**

We address the asymptotic behavior of the beginning and end of a large class of conformally related cosmologies. We study these regimes by considering gravitational entropy at very early and late stages of these solutions.

- 1200 – 1215 **Oleg Sushkov**
University of New South Wales NSW AUSTRALIA
Rovibrational Quantum Interferometers and Gravitational Waves
We discuss physics of a quantum system in the field of a gravitational wave and estimate the sensitivity of possible quantum experiments.
- 1215 – 1230 **Graeme Gossel**
University of New South Wales NSW AUSTRALIA
Narrow Resonances and Black-Hole-Like Absorption in a Non-Black-Hole Metric
We show that a dense spectrum of resonances leading to black hole-like absorption arises in metrics that develop singularities before the black hole condition ($R = r_s$) is fulfilled.

1100 – 1230**Concurrent Session 10F – Condensed-Matter, Materials and Surface Physics 13: Instruments and Methods***Room: CLB 3*

Chair: Shane Kennedy, Australian Nuclear Science and Technology Organisation NSW AUSTRALIA

Time

- 1100 – 1130 **Jan Herrman**
Department of Innovation, Industry, Science and Research NSW AUSTRALIA
An Ultra-stable Atomic Force Microscope with Integrated Laser Interferometry
We report on the development of a metrological scanning probe microscope to implement a primary standard for nanoscale dimensional measurement. It incorporates a quartz tuning fork force detector and a high performance heterodyne laser interferometer system.
- 1130 – 1145 **Giuseppe Carlo Tettamanzi**
University of New South Wales NSW AUSTRALIA
Single-parameter Quantised Charge-pumping via a Few Dopant Atoms
Several charge pump geometries have been recently developed for quantum metrology applications; however, none of them has yet achieved high currents and accuracies, together. In this work, a novel approach to the problem is discussed.
- 1145 – 1200 **Anna Ceguerra**
University of Sydney NSW AUSTRALIA
Plane-Based Lattice Rectification of hcp Crystals
The plane-based lattice rectification method for atom probe tomography was revisited, in order to apply the method to a non-Bravais crystal system such as hcp magnesium alloys.
- 1200 – 1215 **Marion Stevens-Kalceff**
University of New South Wales NSW AUSTRALIA
Cathodoluminescence Characterisation of Point Defects in GaN Nanomembranes
Cathodoluminescence microanalysis (CL) enables high sensitivity, nanoscale spatial resolution detection of impurities and defects in continuous gallium nitride (GaN) membranes of nanometer-scale thickness.
- 1215 – 1230 **Garry McIntyre**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Phonons Observed by Laue Diffraction on a Continuous Neutron Source
The projection of the four-dimensional dispersion surfaces of coherent inelastic scattering onto the two dimensions observed by neutron Laue diffraction is dominated by characteristic bow-ties from acoustic phonons to permit rapid determination of sound velocities.

1100 – 1230**Concurrent Session 10G – ACOFT 10 Future Telecomms***Room: CLB 2*

Chair: Simon Fleming, University of Sydney, NSW AUSTRALIA

Time

- 1100 – 1130 **Andrew Ellis**
IEEE Distinguished Lecturer University College Cork IRELAND
Current Trends in Optical Communications
The performance of optical communication systems becoming firmly limited by the fundamental trade off between signal to noise ratio and optical nonlinearity. This presentation will review these limits, and investigate options to enhance performance.

- 1130 – 1145 **Manik Attygalle**
Defence Science and Technology Organisation SA AUSTRALIA
Broadband RF Phase Shifting with a Simple Fibre Interferometer
A novel photonic technique to produce fixed or time varying phase shifts in radio-frequency signals is experimentally demonstrated. The technique uses an optical interferometric configuration based on a single fibre Bragg grating.
- 1145 – 1200 **Graham Town**
Macquarie University NSW AUSTRALIA
Simple Frequency Shift Keyed Radio-Over-Fibre Communication System
We present numerical and preliminary experimental results demonstrating a novel frequency-shift-keyed radio-over-fibre communication system. The system requires no expensive electro-optic or microwave components, and is capable of operating with terahertz frequency wireless carriers.
- 1200 – 1215 **Cibby Pulikkaseril**
Finisar Australia NSW AUSTRALIA
Reconfigurable Remote Nodes in 60 GHz Radio-over-Fiber Networks
We demonstrate the use of a reconfigurable optical processor to demultiplex and optimize 60 GHz radio-over-fiber channels.
- 1215 – 1230 **Nicolas Riesen**
Australian National University ACT AUSTRALIA
Three-Core Weakly-Guiding Mode-Selective Fibre Couplers
The coupling behaviour of two-core mode-selective couplers (MSC) depends on the spatial-orientation of the asymmetric higher-order modes. This restricts their use for mode de-multiplexing in few-mode fibre networks. The use of three-core MSC's is presented as a solution.

1100 – 1230

Concurrent Session 10H – Optics, Photonics and Lasers 15: Spectroscopy

Room: CLB 1

Chair: Maryanne Large, Canon Information Systems Research Australia, NSW AUSTRALIA

Time

- 1100 – 1130 **James Anstie**
University of Western Australia WA AUSTRALIA
High Accuracy Absorption Spectroscopy at the Shot-Noise Limit
We present results of lineshape analysis of spectra produced by a highly accurate dual-beam spectrometer, including: a ppm level determination of the Boltzmann constant, a newly reported power broadening mechanism and an investigation of transit-time broadening.
- 1130 – 1145 **Christopher Perrella**
University of Western Australia WA AUSTRALIA
Applications of Two-Photon Spectroscopy of Rubidium Within Hollow-Core Optical Fibre
Spectroscopy of a Rubidium two-photon transition conducted within hollow-core fibre is presented. We consider two applications: cross phase modulation between two interacting beams and frequency stabilization are presented.
- 1145 – 1200 **Tyler Neely**
University of Queensland QLD AUSTRALIA
Mid-infrared Femtosecond Spectroscopy for Broadband and Rapid Greenhouse Gas Characterization
We present a comb source and spectrometer for simultaneous broadband measurements in the mid-infrared molecular fingerprint region. Detection of CH is demonstrated, with >3750 resolution elements spanning >80 nm with ~600 MHz resolution.
- 1200 – 1215 **Brian Orr**
Macquarie University NSW AUSTRALIA
Trace-level Sensing of Greenhouse Gases by Continuous-wave Cavity-ringdown Spectroscopy
Rapidly-swept continuous-wave cavity-ringdown spectroscopy enables sensing of trace gases using long-range optical-fiber coupling with a single-ended transmitter-receiver configuration. Sensitive instruments are field-deployable for monitoring of greenhouse gases (e.g., methane emissions from livestock).

1215 – 1230

Fred Baynes*University of Western Australia WA AUSTRALIA***Manipulating an Optical Frequency Comb**

Using an all optical technique we have divided and multiplied the repetition rate of an optical frequency comb. The comb mode linewidth has also been reduced by locking to a high finesse cavity.

1330 – 1500**Concurrent Session 11A – Optics, Photonics and Lasers 11: Trapping and Beams***Room: CLB 7**Chair: Dragomir Neshev, Australian National University, ACT AUSTRALIA*

Time

1330 – 1345

Vladlen Shvedov*Australian National University ACT AUSTRALIA***Levitation of Particles in Air with Optical Vector Beams**

We trap spherical particles using a single radially or azimuthally polarized light and demonstrate polarization sensitivity of the photophoretic force. It adds additional flexibility to the optical micromanipulation of the particles in gaseous media.

1345 – 1400

Niko Eckerskorn*Australian National University ACT AUSTRALIA***Particle Dynamics in Photophoretic Optical Traps in Air**

We investigate the optically induced thermal forces in photophoretic traps, where micron-sized light absorbing particles are confined in the dark region of a laser beam, using high speed video particle tracking.

1400 – 1415

Alexander Stilgoe*University of Queensland QLD Australia***An Optically Driven Stochastic Motor**

Here, Alex presents a stochastic motor driven by optical tweezers. This system displays specific, controllable, non-equilibrium behaviours with the choice of fluid, particle size and refractive index.

1415 – 1430

Rachael Fulcher*University of Sydney NSW AUSTRALIA***Frozen Light Enhancement of Optical Tweezers Near a Stationary Inflection Point**

Forces on particles near a waveguide can be enhanced by using frozen light modes in waveguides with stationary inflection points. Such modes have finite coupling at zero group velocity, showing potential for waveguide-based optical tweezers.

1430 – 1445

Wen Jun Toe*University of New South Wales NSW AUSTRALIA***Dark Field Optical Tweezers for Studying Nanoparticle Dynamics**

We report a method of characterising physical and optical properties of nanoparticles using optical tweezers combined with dark field microscopy. The technique combines measurements from Brownian motion and spectroscopy to determine nanoparticle size information.

1445 – 1500

Daryl Preece*University of Queensland QLD AUSTRALIA***Measurement of Macrophage Phagocytosis using Optical Tweezers**

Macrophages play a key role in the body's defense system. They dispose of pathogens and regulate homeostasis. We describe a system based around an optical tweezers enabling measurement of the mechanical properties of phagocytosis.

1330 – 1500**Concurrent Session 11B – Condensed-Matter, Materials and Surface Physics 11: Theoretical Condensed-Matter Physics***Room: CLB 8**Chair: Jodie Bradby, Australian National University ACT AUSTRALIA*

Time

1330 – 1345

Andres Alejandro Reynoso*University of Sydney NSW AUSTRALIA***Floquet Majorana Fermions in Non-magnetic Quantum Wires**

For non-magnetic quantum wires in presence of s-wave electron-hole pairing, we show that Majorana fermions appear at the edges of the sample by virtue of a time-dependent rotating spin-orbit coupling driving.

1345 – 1400

Bogusz Bujnowski*University of Melbourne VIC AUSTRALIA***The Bose-Hubbard Model for Dipolar Atoms**

We study the zero temperature phase diagram of the Bose-Hubbard model including long-range dipolar interactions. We use a mean-field approach to investigate the appearance of non uniform Mott-insulating phases.

1400 – 1415

Andrew Hayward*University of Melbourne VIC AUSTRALIA***Fractional Quantum Hall Physics in Jaynes-Cummings-Hubbard Lattices**

We propose the Jaynes-Cummings Hubbard (JCH) model as a simulator of fractional quantum hall (FQH) physics. We show how to generate artificial magnetic fields in a JCH lattice, and demonstrate the existence of FQH states.

1415 – 1430

Bogdan Opanchuk*Swinburne University of Technology VIC AUSTRALIA***Simulation of Trapped Bose-Einstein Condensates Using the Truncated Wigner Method**

A Wigner representation based method to simulate the behavior of multicomponent BEC is presented. The method is based on first principles, takes into account nonlinear losses, and is accurate in the limit of large N.

1430 – 1445

Elvis Shoko*Australian National Nuclear Research and Development Organisation NSW AUSTRALIA***Alkali Metal Dynamics in the Beta-Pyrochlores AOs_2O_6 ($A = \text{K}, \text{Rb}, \text{Cs}$) and Their Prospects as Thermoelectric Materials**

We are studying oxides of the defect pyrochlore structure as candidates for development into high temperature thermoelectric materials. In this talk I will demonstrate that, indeed, these materials show some promising properties for thermoelectric applications.

1445 – 1500

Jaan Oitmaa*University of New South Wales NSW AUSTRALIA***Phase Diagram of Spin $S=1$ Bilinear-Biquadratic Heisenberg Models**

Series expansion methods are used to investigate the phase diagram of spin-1 bilinear-biquadratic Heisenberg models on several two-dimensional lattices. A number of recent predictions, particularly near the edge of the Néel phase, are tested.

1330 – 1500**Concurrent Session 11C – Quantum Information, Concepts and Coherence 11: Cold Atoms***Room: CLB 6**Chair: Andrew Doherty, University of Sydney, NSW AUSTRALIA*

Time

1330 – 1400

Andrew Truscott*Australian National University ACT AUSTRALIA***Correlations in Lower Dimensional Quantum Gases**

A fundamental property of a three-dimensional Bose-Einstein condensate (BEC) is long range coherence. In lower dimensions, however, this property is not only destroyed, but new states of matter are predicted to exist. Using higher order atom-atom correlations we probe lower dimensional quantum gases and observe the transition to transverse condensation.

1400 – 1415

Tyler Neely*University of Queensland QLD AUSTRALIA***Two-Dimensional Vortex Turbulence in a Bose-Einstein Condensate**

We experimentally and numerically examine two-dimensional quantum turbulence in a highly oblate BEC, initiated through smallscale forcing. A highly disordered arrangement of vortices is experimentally produced. Numerical examination reveals additional evidence of 2D turbulence

- 1415 – 1430 **Karen Kheruntsyan**
University of Queensland QLD AUSTRALIA
Bell Inequality Test Using Colliding Condensates
We present the results of a theoretical proposal to demonstrate a Bell inequality violation with massive particles, by realizing a matter-wave analog of the Rarity-Tapster optical setup and applying it to pair-correlated atoms produced in condensate collisions.
- 1430 – 1445 **Tod Wright**
University of Queensland QLD AUSTRALIA
Quantum Relaxation of the Tonks-Girardeau Gas
We investigate the relaxation dynamics of a strongly interacting one-dimensional Bose gas. We discuss the failure of the system to relax to thermal equilibrium, and the nature of its configuration after long evolution times.
- 1445 – 1500 **Matthew Davis**
University of Queensland QLD AUSTRALIA
Macroscopic Quantum Self-Trapping in Dynamical Tunnelling with Bose-Einstein Condensates
We find that increasing interactions causes dynamical tunnelling in Bose-Einstein condensates to shut down above a critical value, however in some parameter regimes tunnelling surprisingly reappears. We develop a minimal model that explains this behaviour.

1330 – 1500

Concurrent Session 11D – Joint: Quantum Information, Concepts and Condensed-Matter, Materials and Surface Physics

Room: CLB 5

Chair: Michelle Simmons, University of New South Wales NSW AUSTRALIA

Time

- 1330 – 1400 **Andrea Morello**
University of New South Wales NSW AUSTRALIA
Single-Atom Spin Qubits in Silicon
A phosphorus atom in silicon contains highly-coherent electron- and nuclear-spin quantum bits. Here I describe recent breakthroughs in control and readout of both types of qubit, with a single atom in a silicon nanostructure
- 1400 – 1415 **Jarryd Pla**
University of New South Wales NSW AUSTRALIA
Single Atom Electron and Nuclear Spin Qubits in Silicon
We demonstrate all-electrical single-shot readout and coherent control of both the electron and nuclear spins of a single phosphorus atom implanted in a silicon nanostructure device.
- 1415 – 1430 **Andrew Greentree**
RMIT University VIC AUSTRALIA
Spin Guides, Magnon Collisions and Quantum Magnonics
We report on the dynamics of magnons in one-dimensional spin chains, with spatially and temporally varying potential. This system has application for quantum information transport and processing, as well as quantum emulation of molecular systems.
- 1430 – 1445 **Torsten Gaebel**
University of Sydney NSW AUSTRALIA
Size-reduction of Nanodiamonds Hosting NV Centres via Air Oxidation
We present the control of the size of nanodiamonds hosting nitrogen-vacancy centres in nanodiamond. We characterize the etch rates for different annealing temperatures in air and follow individual crystals throughout the process.
- 1445 – 1500 **David Jamieson**
University of Melbourne VIC AUSTRALIA
Engineering Atoms in Silicon: Building Qubits for the Quantum Internet of the Mid-21st C
New technologies based on the applications of quantum mechanical principles promise revolutionary applications. Described here is a technique based on top-down fabrication principles employing ion implantation offer a fast route to the fabrication of prototype devices.

1330 – 1500**Concurrent Session 11E – Relativity and Gravitation 2**

Room: CLB 4

Chair: Ben Whale University of Otago NEW ZEALAND

Time

1330 – 1400

Ra Ina*Australian National University ACT AUSTRALIA***Current Status of the Analysis of Data from Ground-based Gravitational Wave Observatories**

Currently the most promising platform for directly detecting gravitational waves are the ground-based laser interferometers. We present the status of ground-based gravitational wave observatories, emphasising the significant contribution made by Australian data analysis groups.

1400 – 1415

Richard Barry*Australian National University ACT AUSTRALIA***The Abstract Boundary and Extensions of Space-times**

The Abstract Boundary construction produces a boundary for an n-dimensional manifold by considering multiple embeddings at once. It therefore provides us with an ideal tool with which to consider the properties of space-time extensions.

1415 – 1430

Michael Tobar*University of Western Australia WA AUSTRALIA***Testing for Periodic Changes in Fundamental Constants Due to Varying Gravitation Fields and Boosts Using Long-Term Comparison of the SYRTE Atomic Fountains and H-masers**

We analyze data sets from Cs and Rb Fountains compared to various Hydrogen Masers to search for periodic changes correlated with the changing gravitational potential and boost with respect to the Cosmic Microwave Background

1430 – 1445

Benjamin Lewis*Australian National University ACT AUSTRALIA***Looking Beyond Coordinate Singularities**

Visual properties of the skies of different types of black hole are investigated from the perspective of observers on either side of event horizons, to demonstrate software able to utilise a plurality of coordinate charts.

1445 – 1500

Thanh Nguyen*Australian National University ACT AUSTRALIA***Off-resonance Thermal Noise of Aluminum Flexure**

We report measured the thermal noise of an Aluminum flexure suspension. The measured noise shows the existence of both structural and viscous damping

1330 – 1500**Concurrent Session 11F – Condensed-Matter, Materials and Surface Physics 14**

Room: CLB 3

Chair: Clemens Ulrich, University of New South Wales, NSW AUSTRALIA

Time

1330 – 1400

Shane Kennedy*Australian National Nuclear Research and Development Organisation NSW AUSTRALIA***Opportunities for Materials Research Using Opal, Australia's New Neutron Source**

The presentation will focus on the capabilities at the Neutron Beam Facility at the OPAL research reactor, including scientific highlights from our research selected to illustrate the potential for applications in condensed matter physics.

1400 – 1415

Wai Tung Hal Lee*Australian National Nuclear Research and Development Organisation NSW AUSTRALIA***Polarised Neutrons for Magnetism Research Using Polarised Helium-3 techniques on ANSTO's Neutron Scattering Instruments**

This presentation will illustrate how polarized neutron scattering can be used for magnetism studies and provide the latest status of the new polarised neutron capabilities at ANSTO instruments using polarised Helium-3 techniques. Instruments

- 1415 – 1430 **Joseph Salfi**
University of New South Wales NSW AUSTRALIA
Spatially Resolved Exchange Interaction of Coupled Acceptor Dopants in Silicon
Spin orbit coupling produces acceptor-bound Kramer's doublets with spin 3/2 and 1/2 in Silicon. Holes occupying tunnel coupled acceptors were studied by scanning tunnelling spectroscopy, elucidating Kramers doublet coupling spectroscopically and in real space.
- 1430 – 1445 **Andrei Rode**
Australian National University ACT AUSTRALIA
Structural Modifications of Silicon by Ultrafast Laser Micro-explosion
We present the results of structural characterization of a silicon crystal exposed to a strong shock wave induced by femtosecond-laser micro-explosion in confined geometry into the unexplored area of up to terapascal pressure.
- 1445 – 1500 **Fahd Mohiyaddin**
University of New South Wales NSW AUSTRALIA
Spatial Metrology Of Single Atom Spin Qubit Devices
We demonstrate a non invasive metrology technique to track down the location of an ion implanted donor in a spin qubit experiment, using a combination of classical and quantum-mechanical (atomistic) device simulation platforms.

1330 – 1500

Concurrent Session 11G – ACOFT 11 Lasers 2

Room: CLB 2

Chair: Steve Madden Australian National University ACT AUSTRALIA

Time

- 1330 – 1345 **Tomonori Hu**
University of Sydney NSW AUSTRALIA
Single Transverse Mode, 2.9 Micron Q-switched HoPr-doped Fluoride Fiber Laser
We present a Q-switched holmium based fiber laser operating at 2.9 microns reaching peak powers of 96 W, for mid-infrared photonics based applications.
- 1345 – 1400 **Sebastian Ng**
University of Adelaide SA AUSTRALIA
Air-clad Holmium-doped Silica Fibre Laser
We report the first air-jacketed holmium fibre laser. The silica fibre laser operates at 2.1 μm with an internal slope efficiency of 69%, and is in-band pumped with a 1.94 μm thulium fibre laser.
- 1400 – 1415 **Khu Vu**
Australian National University ACT AUSTRALIA
High Gain Waveguide Amplifier and Laser using Erbium Doped Tellurium Oxide Pumped at 980nm
The 980nm pumped Er doped TeO₂ waveguide amplifier produced internal gain of more than 14dB over 5cm long devices and started to laser due to Fresnel reflectivity of the end facets.
- 1415 – 1430 **David Lancaster**
University of Adelaide SA AUSTRALIA
A kW class 2 μm -wavelength chip laser
We report a directly-written Tm³⁺:ZBLAN waveguide chip laser with $M^2 = 1.12 \pm 0.08$ from a large 45 μm diameter waveguide. We demonstrate 1.9 kW Q-switched pulses at 1.9 μm and 67% slope efficiency.
- 1430 – 1445 **Darren Hudson**
University of Sydney NSW AUSTRALIA
Ultrashort Pulse Fiber Laser Operating in the Mid-Infrared
We demonstrate an ultrashort pulse Holmium-Praseodymium co-doped fiber laser that exhibits passive Q-switching and mode-locking at 2.87 micron via an intra-cavity Semiconductor Saturable Absorber Mirror (SESAM).
- 1445 – 1500 **Neil Broderick**
Auckland University NEW ZEALAND
Noise like Pulses in Yb Doped All-Normal Dispersion Fibre Laser with Raman Process
We observe for the first time noise-like-pulses with co-existing Raman pulses in an ANDi laser. We study the strong pulse to pulse fluctuations showing that such laser is not mode-locked despite a regular pulse train.

1330 – 1500

**Concurrent Session 11H – Optics, Photonics and Lasers
16: Single Photon Sources**

Room: CLB 1

Chair: Alex Clark, University of Sydney NSW AUSTRALIA

Time

1330 – 1345

Stefania Castelletto

Macquarie University NSW AUSTRALIA

Room Temperature Single Photon Emission In Silicon Carbide

Bright room temperature single photon emission from isolated defects in bulk 4H silicon carbide (SiC) is reported. The photo-physical properties of the defect, having emission around 700 nm, is presented.

1345 – 1400

John Canning

University of Sydney NSW AUSTRALIA

Single Photon Sources in Silica Using Nanoparticle Convective Self-assembly Induced Fracturing

Single photon emitting NV-centre containing nanodiamonds are integrated directly into silica using self-assembly and fracturing.

1400 – 1415

Timothy Karle

University of Melbourne VIC AUSTRALIA

Near-Surface, Spectrally Stable Nitrogen Vacancy Centres

We demonstrate homoepitaxial growth of diamond containing spectrally stable nitrogen vacancy (NV) centres. The linewidth of NV centres in a 100 nm layer are ~140 MHz at $T < 12$ K, with favourable spin properties.

1415 – 1430

Carlo Bradac

University of Sydney NSW AUSTRALIA

Effects of the Nanodiamond Host on an NV Centre Emission State

We present the control of the quantum states of nitrogen-vacancy centres in nanodiamond. We investigate the phenomenon of luminescence intermittency (blinking) of the centres as a function of nanodiamond size, surface moieties and interfacing substrate.

1430 – 1445

Snjezana Tomljenovic-Hanic

University of Melbourne VIC AUSTRALIA

Single-photon Emission from Zinc-oxide Defects

Single-photon sources are important for a range of quantum protocols. We report room temperature single-photon emission and quantum characterization for isolated defects in zinc oxide.

1445 – 1500

Faraz Inam

Macquarie University NSW AUSTRALIA

NV Centre Emission in an Aerogel Environment

We studied nanodiamond NV centre emission in a substrate free air-like aerogel environment. This novel approach resulted in the identification of the host crystal geometry contributions to emission and estimation of the quantum efficiency.

1530 – 1630

**Concurrent Session 12A – Optics, Photonics and Lasers
12: Nanomeasurement**

Room: CLB 7

Chair: Manuel Decker, Australian National University, ACT AUSTRALIA

Time

1530 – 1545

Nora Tischler

Macquarie University NSW AUSTRALIA

Exploiting the Symmetries of Nanostructures for Metrology Applications

We experimentally and theoretically study the interaction of light with nanostructures by making use of symmetries and conserved quantities. We investigate the potential of this approach using nanoapertures in metal for metrology and related applications.

- 1545 – 1600 **Andrew Sutton**
Australian National University ACT AUSTRALIA
Digitally Enhanced Homodyne Interferometry for Multiplexed, Picometer Sensitive Metrology
 We present a novel optical metrology technique capable of measuring multiple targets with a demonstrated sensitivity of 0.8 pm/Hz. Significant reductions in hardware complexity are achieved through multiplexed, homodyne detection of sensing signals.
- 1600 – 1615 **Stefan Forstner**
University of Queensland QLD AUSTRALIA
Ultrasensitive Cavity Optomechanical Magnetometry
 Optimization of the geometry of cavity optomechanical magnetometers allows a sensitivity surpassing all previous magnetostrictive magnetometers of comparable size. Such ultrasensitive magnetometers may have significant applications in areas such as low field MRI.
- 1615 – 1630 **Anna Wang**
Harvard University UNITED STATES OF AMERICA
High-speed, 3D Tracking of Colloidal Systems Using Digital Holographic Microscopy
 Digital holographic microscopy is used to track colloids at 1000s fps in 3D as they approach an oil-water interface. Their approach as well as their interactions challenge existing literature.

1530 – 1630

Concurrent Session 12B – Condensed-Matter, Materials and Surface Physics 12: Spin Chains, Spin Ladders and Spin Ice

Room: CLB 8

Chair: Chris Hamer, University of New South Wales NSW AUSTRALIA

Time

- 1530 – 1545 **Bob Aldus**
Australian National Nuclear Research and Development Organisation NSW AUSTRALIA
Ice Rule Coherence in Stuffed Spin Ice
 We present results obtained via polarized neutron scattering on a single crystal of stuffed spin ice down to 0.05 mK and an interpretation of the diffuse neutron scattering patterns obtained.
- 1545 – 1600 **Jaan Oitmaa**
University of New South Wales NSW AUSTRALIA
Thermodynamic Properties of an Anisotropic Heisenberg Model for the XY Pyrochlore $\text{Er}_2\text{Ti}_2\text{O}_7$
 Series expansion methods are used to calculate thermodynamic properties of an anisotropic spin model for the material $\text{Er}_2\text{Ti}_2\text{O}_7$, an antiferromagnetic XY pyrochlore system. Results are compared with experimental data, with good agreement.
- 1600 – 1615 **Kirrily Rule**
Australian National Nuclear Research and Development Organisation NSW AUSTRALIA
The Complex Magnetic Phase Diagram of the Quantum Spin Chain Material, Linarite, $\text{PbCuSO}_4(\text{OH})_2$
 Linarite, $\text{PbCuSO}_4(\text{OH})_2$, is a 1D, Cu-O spin chain material with competing J1-J2 interactions. The magnetic structure and complex phase diagram will be presented from neutron scattering and bulk properties measurements.
- 1615 – 1630 **Aroon O'Brien**
University of Sydney NSW AUSTRALIA
Coulombic Charge Ice
 We consider a classical model of charges on a pyrochlore lattice in the presence of long-range Coulomb interactions. We show that the model supports a Coulomb phase and discuss analogies with the dipolar spin ice model.

1530 – 1630

Concurrent Session 12C – Quantum Information, Concepts and Coherence 13: Cold Atoms

Room: CLB 6

Chair: Matthew Davis, University of Queensland QLD AUSTRALIA

Time

1530 – 1545

Mikhail Egorov*Monash University VIC AUSTRALIA***Precision Measurement of S-wave Scattering Lengths**

We have developed a 1D treatment of collective oscillations of a two-component BEC and used them for the precision measurement of a scattering length in ^{87}Rb with a relative uncertainty of 1.6×10^{-4} .

1545 – 1600

Peter Drummond*Swinburne University of Technology VIC AUSTRALIA***Entanglement and Optimised Interferometric Phase Measurement in BECs**

We derive novel phase-entanglement and spin-squeezing criteria that are immune to number fluctuations. These are utilized to obtain an operational definition of relative phase-measurement sensitivity, via analysis of quantum entanglement in atom interferometry.

1600 – 1615

Jan Zill*University of Queensland QLD AUSTRALIA***Exact Quench Dynamics of the One-Dimensional Bose Gas Using the Lieb-Liniger Model**

Using the Bethe ansatz, we investigate the exact relaxation dynamics of the one-dimensional Bose gas following a sudden change of the interparticle interaction strength, and compare the final state to the predictions of statistical mechanics.

1615 – 1630

Mark Baker*University of Queensland QLD AUSTRALIA***Toroidal Optical Trap Potentials with a ^{87}Rb BEC**

We present details of our initial experiments with a Rb BEC in toroidal traps generated using time-averaged optical potentials. Our preliminary results of our loading technique and extension to atom interferometry will be detailed.

1530 – 1630**Concurrent Session 12D – Quantum Information, Concepts and Coherence 12: Trapped Ions**

Room: CLB 5

Chair: David Reilly, University of Sydney, NSW AUSTRALIA

Time

1530 – 1600

Michael Biercuk*University of Sydney NSW AUSTRALIA***From Quantum Control to Quantum Simulation with Trapped Ions**

We provide an overview of recent experimental results using ion crystals in a Penning trap for quantum control, quantum metrology, and quantum simulation.

1600 – 1615

Benjamin Norton*Griffith University QLD AUSTRALIA***Observation of a Large Optical Phase Shift from a Single Atom**

Here we show a large phase shift on an illumination field by a single atom. We achieve a maximum phase shift of $1.3\text{Å} \pm 0.1$ rad measured by changing the illumination field detuning from red to blue.

1615 – 1630

Erik Streed*Griffith University QLD AUSTRALIA***The Shadow of a Single Atom**

We have shown the first absorption imaging of a single atom. Contrast of 3.1(3)% was observed in the absorption of 370 nm light by a single $^{174}\text{Yb}^+$, imaged with a 0.64 NA phase Fresnel lens.

1530 – 1630**Concurrent Session 12E – Relativity and Gravitation 3**

Room: CLB 4

Chair: John Steele, University of New South Wales NSW AUSTRALIA

Time

1530 – 1545

Edward Teo*Australian National University ACT AUSTRALIA***Balanced Electric-Magnetic Dihole in Kaluza-Klein Theory**

We present a dihole solution in Kaluza-Klein theory, describing a superposition of an electric and a magnetic black hole. The balanced system has a space-time that is completely regular on and outside the event horizons.

1545 – 1600

Ben Whale*University of Otago NEW ZEALAND***The Standard Chart Based Approach to Studying the Global Structure of a Spacetime Induces a Coordinate Invariant Boundary of Ideal Points**

Results and examples are presented which demonstrate that the boundary is a coordinate invariant foundation for the intuitive analysis of global structure. Moreover, it generalises Penrose's conformal boundary and carries a differential structure.

1600 – 1615

Mr Tommaso Demarie*Macquarie University NSW AUSTRALIA***Gauge Invariant Qubits in Curved Space-time**

Gravity causes light polarization to rotate. We demonstrate that while the amount of rotation depends on the choice of the reference frame, a gauge-independent geometric phase exists for closed paths in general space-times.

1615 – 1630

Bram Slagmolen*Australian National University ACT AUSTRALIA***Australia and the Advanced LIGO Gravitational Wave Detector**

We shall describe results of initial commissioning of the interferometer at the Advanced LIGO Hanford Observatory.

1530 – 1630**Concurrent Session 12F – Energy, Energy Materials and Energy Systems***Room: CLB 3**Chair: Matthew Hole, Australian National University ACT AUSTRALIA*

Time

1530 – 1545

Andrew Ringsmuth*University of Queensland QLD AUSTRALIA***Multiscale Structure and Energetics in Photosynthetic Solar Energy Harvesting**

We predict long-range quantum coherence between excitation energy transfer states in biomimetic light harvesting networks, at ambient temperature. We extend the model to light harvesting energetics more broadly, towards whole-system optimization for efficient energy harvesting.

1545 – 1600

Yinan Zhang*Swinburne University VIC AUSTRALIA***Broadband Absorption Enhancement in Ultra-thin Crystalline Si Solar Cells by a Sandwich Photonic-Plasmonic Structure**

We demonstrate a more than 45% enhancement in broadband light absorption in 2 Åµm Si solar cells with periodic Si photonic nanostructure on the front surface and plasmonic metal nanoparticles on the rear surface.

1600 – 1615

Craig Buckley*Curtin University WA AUSTRALIA***Coupling Metal Hydrides with Concentrated Solar Thermal Applications for Electricity Generation in Remote Areas**

Concentrated solar thermal can be used to efficiently generate electricity in remote locations both day and night. The solar energy is converted to heat energy and then chemical energy is stored in a metal-hydrogen compound.

1615 – 1630

Narges Mohammadi*Swinburne University of Technology VIC AUSTRALIA***Bathchromic Shift in Photoabsorption Spectra of Organic Dye Sensitisers Through Structural Modifications for Better Solar Cells**

A new strategy is proposed to design organic dye sensitizers with desirable photo-absorption properties for better solar cells. Rational chemical substitutions and their effects on band-gap and absorption spectra of the dyes are investigated computationally.

1530 – 1630**Concurrent Session 12G – ACOFT 12 Chalcogenide Waveguides**

Room: CLB 2

Chair: Tanya Monro, University of Adelaide, SA AUSTRALIA

Time

1530 – 1545

Irina V. Kabakova*University of Sydney NSW AUSTRALIA***Intensity-Dependent Photosensitivity of Chalcogenide As_2S_3 Fibers**

We investigate the photoinduced refractive index changes in As_2S_3 chalcogenide fibers and show that the index evolution is an intensity-dependent two-stage process. These novel findings can have application in design and fabrication of photoinduced devices.

1545 – 1600

Irina V. Kabakova*University of Sydney NSW AUSTRALIA***Stimulated Brillouin Scattering and Bragg Grating Formation in As_2Se_3 Fiber**

We demonstrate formation of internal gratings in step-index As_2Se_3 chalcogenide fibers via two-photon absorption of a 1550 nm light. Together with the grating growth, a strong SBS signal is generated resulting in grating-SBS interplay.

1600 – 1615

Khu Vu*Australian National University ACT AUSTRALIA***Hybrid As_2S_3 on Er Doped TeO_2 Waveguide for Lossless Nonlinear Optics**

We have fabricated single mode anomalous dispersion As_2S_3 on Er doped TeO_2 waveguide with near zero propagation loss. Lossless waveguide with high nonlinear coefficient can be achieved with higher 1480nm pump power.

1615 – 1630

Matthew Collins*University of Sydney NSW AUSTRALIA***Impact of Raman Noise and Dispersion on Photon-Pair generation in chalcogenide (As_2S_3)**

We directly measured the spontaneous Raman spectrum in As_2S_3 and successfully mitigated Raman-noise using dispersion engineering, enhancing the coincidence-to-accidental ratio (CAR) to 16.8. We measured $g(2)(0)=0.23$ in the quantum regime, confirming heralded single photon operation.

1530 – 1630**Concurrent Session 12H – Optics, Photonics and Lasers 17: Novel Techniques in Optical Measurement**

Room: CLB 1

Chair: Stefania Castelletto, Macquarie University, NSW AUSTRALIA

Time

1530 – 1545

Gediminas Gervinskas*Swinburne University of Technology VIC AUSTRALIA***Light Extraction and Fluorescence in UV Micro-fluidic Applications**

Patterns for light extraction from light emitting diodes (LEDs) in the limiting UV spectral range of 240-300 nm are fabricated by focused ion beam lithography. A micro-fluidic chip for time-resolved fluorescence imaging under UV-LED excitation is demonstrated.

1545 – 1600

Jelle Storteboom*Swinburne University of Technology VIC AUSTRALIA***Characterisation of Nanodiamond-dispersed Photopolymers Towards High-density Optical Data Storage**

We report on the experimental investigation of the photochromic effect of nitrogen vacancy centres in nanodiamonds dispersed in photopolymers, as well as their applications in high-density optical data storage.

1600 – 1615

Matthew Petrasiusas*Griffith University QLD AUSTRALIA***Three-photon Absorption in Quantum Dots Using Ultrafast Fibre Lasers**

We present measurements of three-photon absorption and emission in CdSe and InP quantum dots, with applications to biological imaging. We excite quantum dots with pulses from ultrafast fibre lasers at 1.5-2.0 μ m in wavelength.

Poster Presentations

Monday 10 December 2012

1700 – 1830

Poster Session 1

Room: Tyree Room / Leighton Hall in the John Niland Scientia Building

Poster
Board No

-
- 1** **Noel Hanna**
University of New South Wales NSW AUSTRALIA
Resonances and Bandwidths in the Vocal Tract and Why They Are Important for Speech Comprehension
The bandwidths of vocal tract resonances are critical: too narrow allows speech harmonics to resonances, too broad gives insufficient boost to identify phonemes. We report the first measurements of bandwidths and low frequency behaviour.
-
- 2** **Samuel Blake**
University of Sydney NSW AUSTRALIA
Towards a Next-Generation Electronic Portal Device for Dual-Mode Imaging and Dosimetry
The x-ray and optical response of an electronic portal imaging device was modeled using Monte Carlo simulations. Optical absorption in the photodiode produced broader profiles than those obtained for x-ray energy deposition in the phosphor.
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- 3** **Frederic Boisson**
Australian National Nuclear Research and Development Organisation NSW AUSTRALIA
Imaging Performance Of The Inveon SPECT System Comparing Rat And Mouse Dedicated Single And Multi-Pinhole Collimators
This study focused on comparing the performance obtained with the Inveon SPECT using different collimators. The NU-4 Image Quality phantom was used to derive quantitative metrics for different acquisition and reconstruction settings.
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- 4** **Michael Lerch**
University of Wollongong NSW AUSTRALIA
Enhancing The Sensitivity Of In Vitro 9L Cells Exposed To X-ray Radiation Fields Using Tantalum Pentoxide Nanoparticles
Irradiation of 9L cells with tantalum pentoxide nanoparticles and 10 MV, 6 MV and 150 kV bearevealed a sensitisation enhancement ratio (SER) of 1.21, 1.07 and 1.05 respectively.
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- 5** **Michael Lerch**
University of Wollongong NSW AUSTRALIA
Characterization of the Valley Dose between Synchrotron Generated X-Ray Microbeams
We present the first direct measurement and systematic analysis of satellites in an MRT context. Such satellites will need to be included in future radiation transport models to be developed for MRT dose planning systems.
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- 6** **Aimee McNamara**
University of Sydney NSW AUSTRALIA
Positron Emission Tomography Coincidence Detection with Photon Polarisation
Positron annihilation photons are emitted in a pure quantum state and when detected in coincidence, the photon pairs possess orthogonal polarisation. This polarisation correlation can be exploited to improve image quality in positron emission tomography.
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- 7** **Aimee McNamara**
University of Sydney NSW AUSTRALIA
Evaluating the Imaging Performance of Electronic Portal Imaging Devices
The imaging performance of an electronic portal imaging device was evaluated with Monte Carlo simulations, which self-consistently modelled both x-ray and optical photon interactions. The optical contribution to signal noise was found to be non-negligible.

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- 8 Michael Lerch**
University of Wollongong NSW AUSTRALIA
Enhanced Radiosensitization of Resistant Tumour Cells to Radiotherapy: A Novel Approach on Biomodulation in DNA by Chemotherapy Drug
 A significant enhancement in targeted tumour treatment due to Auger electrons can be achieved by combining the effects of the anticancer drugs methotrexate (MTX) and the halogenated thymidine analog bromodeoxyuridine (BrUdR) with X-ray radiation beams.
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- 9 Kathy Willowson**
University of Sydney NSW AUSTRALIA
Quantitative Positron Emission Tomography of ⁹⁰Y
 Quantitative dosimetry using ⁹⁰Y PET/CT images and dose kernel convolution has been validated and applied to patient data following radioembolisation to treat liver cancer. The possibility of ⁹⁰Y 3D polymer dosimetry has also been demonstrated.
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- 10 Chiara Paviolo**
Swinburne University of Technology VIC AUSTRALIA
Plasmonic properties of gold nanoparticles can induce intracellular calcium transients
 It is shown that laser excitation of Au nanoparticles taken up by NG108-15 neuronal cells can induce an intracellular Ca²⁺ release without altering other normal cell functions. This may serve to enhance the process of infrared nerve stimulation.
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- 11 Monique Tourell**
Queensland University of Technology QLD AUSTRALIA
A Study of Water Diffusion in Partially Aligned Fibre Networks.
 Langevin dynamics computer simulations were used to study the quantitative relationship between the organisation of fibre networks and the diffusion tensor of water in model anisotropic tissue.
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- 12 Feng Wang**
Swinburne University of Technology VIC AUSTRALIA
Dynamics of Cu²⁺-phenylalanine complexes under micro-hydrated environment simulated using CPMD
 Dynamics of Cu²⁺ and phenylalanine (Phe) under micro-hydration process has been studied using quantum mechanical (QM) and Car-Parrinello molecular dynamics (CPMD) simulation. It unveils that stable complexes of Cu²⁺-Phe.nH₂O (n<=4) has a unique hydrogen bond network.
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- 13 Wayne Hutchison**
University of New South Wales ACT AUSTRALIA
Magnetic Structure of TbNiAl₄ in Applied Field
 Single crystal neutron diffraction in applied magnetic fields up to 11.5 T are used to follow the evolution of the TbNiAl₄ magnetic structures. These results, together with magnetometry, can explain the inverse magnetocaloric effect.
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- 14 Shane Kennedy**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Magnetic Properties and Magnetocaloric Effect of NdMn_{2-x}Ti_xSi₂ Compounds
 Magnetocaloric effect around TC is found to decrease with Ti content in NdMn_{2-x}Ti_xSi₂ from 28 J kg⁻¹ K⁻¹ (B = 0.5T) for x=0 to 10 J kg⁻¹ K⁻¹ for x=0.3. Neutron investigations indicate that magnetostructural coupling plays a critical role on the Magnetocaloric effect.
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- 15 Tim Bastow**
CSIRO VIC AUSTRALIA
NMR Detection of Defect Phases in Solids
 NMR is shown to provide valuable insights into the defect structures occurring in a number of solid inorganic and metallic systems.
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- 16 Richard Mole**
Australian National Nuclear Research and Development Organisation NSW AUSTRALIA
A neutron spectroscopy investigation of highly anisotropic Co(II) spin centres
 The results of a neutron scattering investigation of a series of cobalt dimer molecular magnets are presented. Inelastic scattering is used to elucidate the coupling between Co ions in zero field.
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- 17 Anton Stampfl**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
The Magnetic Behaviour of CrO₂ up to 40 GPa
 The abstract describes the magnetic behaviour of CrO₂ under pressure.

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- 18** **Glen Stewart**
University of New South Wales NSW AUSTRALIA
The Magnetic Hyperfine Field at the ^{169}Tm -site in TmFe_2Ti
 In this presentation, low temperature ^{169}Tm -Mossbauer spectra recorded for tetragonal TmFe_2Ti reveal that the Tm^{3+} ion's 4f-shell is "fully-stretched" with $|\langle J_z \rangle| = J$, in accordance with proposed crystal field and exchange interaction parameters.
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- 19** **Glen Stewart**
University of New South Wales NSW AUSTRALIA
Magnetic Order in ErGa and TmGa
 Neutron diffraction and Moessbauer spectroscopy are employed to monitor the temperature dependence of the magnetic structures for ErGa and TmGa and to investigate the role of the rare earth site crystal field interaction.
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- 20** **Shane Kennedy**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Magnetostructural Coupling and Giant Magnetocaloric Effect in NdMn_2Si_2
 A giant magnetocaloric effect ($28 \text{ J kg}^{-1} \text{ K}^{-1}$ with $B = 0.5\text{T}$) is obtained around $T_C = 32 \text{ K}$ in NdMn_2Si_2 . Detailed Neutron investigations indicate that this effect can be ascribed to the magnetostructural coupling.
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- 21** **Daniel Drumm**
University of Melbourne VIC AUSTRALIA
The Xe center in diamond by Raman spectroscopy
 Raman spectroscopy of Xe centres in diamond using the novel probe-enhanced technique shows evidence in support of theoretical predictions of the geometry of the Xe defect centre in diamond.
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- 22** **Ranojit Kumar Dutta**
City University DHAKA BANGLADESH
Optical and Structural Properties of Lead Doped Cadmium Sulfide Thin Film Deposited by Spray Pyrolysis Technique
 Lead doped cadmium sulfide thin film were deposited onto glass substrate at temperature 523K by a low cost spray pyrolysis technique. The film were characterized their structural and optical properties by energy dispersive x-ray, scanning electron microscopy, x-ray diffraction, UV-VIS spectrophotometer respectively.
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- 23** **Sajad Ghatreh-Samani**
Macquarie University NSW AUSTRALIA
Transmittance and effective refractive index of polymer nanocomposites
 This paper presents calculations of the extinction coefficient of three different polymer nanocomposites highlighting the useful range of parameters (nanoparticle radius, wavelength, and volume fraction) for controlling the effective index in transmissive optical devices.
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- 24** **Alice Mahoney**
Quantum Nanoscience Lab NSW AUSTRALIA
Dispersive Charge Detection with Radio Frequency Gate Sensors
 We outline a new charge sensing technique aimed at reading out large arrays of qubits. By detecting small changes in (quantum) capacitance, our method uses gate electrodes that define a quantum dot as charge sensors.
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- 25** **Dale Prokopovich**
Australian National Nuclear Research and Development Organisation NSW AUSTRALIA
Investigation of Spatially Localised Radiation Induced Polarisation in CdTe
 We have investigated the localized electric field polarisation effect in CdTe detector material. The polarisation effect produces a localised degradation in the electric field strength resulting in a reduction of detector performance.
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- 26** **Ilya Shadrivov**
Australian National University ACT AUSTRALIA
Giant pure nonlinear optical activity
 We propose a metamaterial with giant nonlinear optical activity, but vanishing linear activity. Such properties are not found in natural materials, and we refer to this regime as pure nonlinear optical activity.
-
- 27** **Robert Elliman**
Australian National University ACT AUSTRALIA
Resistive Switching in High-k Dielectrics for Non-volatile Memory Applications
 We review our recent research on resistive switching in transition metal oxides for use as nonvolatile resistive random access memory (ReRAM), including the effect of film microstructure on switching characteristics and new data on metal-bridge memory.

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- 28 Jodie Bradby**
Australian National University ACT AUSTRALIA
Deformation of Amorphous Germanium by Nanoindentation
The mechanical deformation mechanism of pure-ion-implanted amorphous germanium are investigated using nanoindentation. In contrast to crystalline germanium a series of high-pressure phase transformations are observed to occur.
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- 29 Adam Burke**
University of New South Wales NSW AUSTRALIA
The Origin of Gate Hysteresis in p-type Si-doped AlGaAs/GaAs Heterostructures
We studied the gate hysteresis in the modulation-doped AlGaAs/GaAs heterostructures used for low-dimensional hole devices. We show the hysteresis arises from a combination of GaAs surface-state trapping and charge migration in the doping layer.
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- 30 Stefania Castelletto**
Macquarie University NSW AUSTRALIA
Hybrid Sapphire-Diamond Spin measurements
We propose a non-optical sensing technology based on precision microwave and millimetre-wave technology. Quantum measurements of the spin resonances of various engineered doped diamond samples will be performed as low as 25 mK.
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- 31 Juan Pablo Dehollain**
University of New South Wales NSW AUSTRALIA
Nanoscale Broadband Transmission Lines for Spin Qubit Control
This work presents guidelines for the design and simulation of nanoscale transmission lines, aimed at generating oscillating magnetic fields to control single spin qubits through magnetic resonance.
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- 32 Daniel Drumm**
University of Melbourne VIC AUSTRALIA
Ab initio calculation of atomically confined Si:P bilayers
Silicon technology is moving towards the third dimension. We perform the first ab initio calculations of atomically confined dual donor structures in silicon. Bandstructures, valley splittings, and the extent of the electronic density are presented.
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- 33 Daniel Drumm**
University of Melbourne VIC AUSTRALIA
Vibrational spectra of NV- defects in diamond by ab initio calculation
Assumptions in the literature regarding methodological choices for examining vibrational spectra of NV defects in diamond are tested. The results challenge previously held views on the efficacy of functionals and the sufficiency of supercell size.
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- 34 Rachpon Kalra**
University of New South Wales NSW AUSTRALIA
Towards Two-Qubit Gate Operations on Coupled Spin Qubits in Silicon
We report on progress towards demonstrating phosphorous donor-based two-qubit operations in silicon.
-
- 35 Desmond Lau**
University of Melbourne VIC AUSTRALIA
High Yield Fabrication of Near Infrared Single Photon Sources in Diamond
We present recent progress made in fabricating high yield, high quality single photon emitters in the infrared range in single crystal diamond.
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- 36 Kiran Mangalampalli**
Australian National University CANBERRA ACT AUSTRALIA
Controlled Temperature Indentation on Si to Investigate the Phase Transformations
Nanoindentation has been performed with a sharp indenter on silicon structures in order to understand the plastic deformation mechanisms. The deformed structures were characterized using Transmission Electron Microscopy and Raman spectroscopy.
-
- 37 Richard Mildren**
Macquarie University NSW AUSTRALIA
Polarisation dependent nanostructuring of diamond surface by two-photon ultraviolet etching
We report wavelength-scale corrugations in the ultraviolet-laser etched surface of single crystal diamond which are produced depending on the incident polarization. The results are important for understanding the mechanism for atom ejection.
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- 38 Sherman Wong**
Australian National University ACT AUSTRALIA
Silicon High-Pressure Phases under High Load Nanoindentation
The effects of tip diameter and maximum load on the volume of high pressure phases of silicon created through nanoindentation were explored, especially in the previously unexplored large tip diameter/high load range.

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- 39** **John Aslanides**
Australian National University ACT AUSTRALIA
Relativity Concept Inventory
 Concept inventories are useful instruments to probe student understanding in science topics, but little has been done to develop one for special relativity. The authors aim to develop and validate one, the Relativity Concept Inventory.
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- 40** **Scott Daniel**
Swinburne University of Technology VIC AUSTRALIA
Addressing student misconceptions of phasors and AC resonance
 Interactive Lecture Demonstrations, using a 'Predict, Observe, Discuss, Synthesise' learning cycle and audience response devices (i.e. clickers), have been used to improve students' conceptual understanding of phasors and AC resonance in an introductory electronics course.
-
- 41** **Paul Evans**
Sunshine Coast Grammar School QLD AUSTRALIA
Indicators of Senior Physics Enrolment
 A logistic regression analysis used to identify indicators that impact on a student selecting senior physics, revealed that a confidence level in describing physics concepts is the most important.
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- 42** **Norman Heckenberg**
University of Queensland QLD AUSTRALIA
The UQ Physics Museum – New Learning Opportunities from Old Equipment?
 The UQ Physics Museum has been refurbished. I will discuss ways we have used the collection to help students learn about instrument design in the past, and our expanded plans for the future.
-
- 43** **Alan Murray**
University of Sydney NSW AUSTRALIA
Educational Games For Undergraduate Physics
 We present our case for why games provide another tool in the repertoire for education. We state the WUPI Principle: Teaching, Learning, Assessment and Fun 'While you Play It'
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- 44** **John O'Byrne**
University of Sydney NSW AUSTRALIA
'Just in Time' for the Lecture
 Is the traditional university lecture worthwhile, especially in the modern information-rich world? We have trialled a 'just in time' teaching approach to nudge staff and student use of the lecture towards a more effective experience.
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- 45** **Maria Parappilly**
Flinders University SA AUSTRALIA
Try Before You Buy-Trialling Teaching Methods to Inform Topic Redesign
 To prepare for the redesign of a first year physics topic in 2013, we have trialed team-based learning and inquiry-based practicals. This paper presents the evaluation of these trials and our design progress so far.
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- 46** **Geoff Swan**
Edith Cowan University WA AUSTRALIA
An Introduction to Climate Change
 A lecture presentation has been developed that introduces physics students to the science of climate change and its impact in society. Student feedback indicates a high level of satisfaction with the presentation.
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- 47** **Elzbieta Chelkowska**
EPA Division TAS AUSTRALIA
Fire At Tyre Recycling Facility In Tasmania – A Case Study Of Monitoring and Prognostic Air Simulations Used During Environmental Emergency
 The fire destroyed thousands of tyres and was burning for three days. The use of mobile monitoring station and meteorological forecasting were crucial for providing advice on the immediate implications of smoke movements and patterns.
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- 48** **Liudmila Uvarova**
Moscow State University of Technology RUSSIAN FEDERATION
On gravitational sedimentation of an agglomerate consisting of two identical spherical particles
 Mathematical modeling and analysis of a gravitational sedimentation process of an agglomerate consisting of two spherical particles has been carried out. It has been shown, that simultaneously to a vertical sedimentation can occur and appreciable transversal drift of the agglomerate. A velocity of the agglomerate's sedimentation proves to be much greater than the sedimentation velocity of spherical particles forming it.

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- 49** **Jim Williams**
University of Western Australia WA AUSTRALIA
A History of Measurement at UWA from Idea to Workshop to Discovery
 Some modern historical developments of atomic and surface Physics achievements at UWA are indicated from birth to success, with pictures following the concepts of great idea, design, construction, testing, results, analysis and publications.
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- 50** **Luca Chiari**
Flinders University SA AUSTRALIA
Lower Bounds To Future Sea Level Rise
 Lower bounds to 2000-2200 global-mean sea level rise are projected by coupling a semi-empirical method to a simple climate model that is run under a range of fossil fuel exhaustion scenarios.
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- 51** **Murray Hamilton**
University of Adelaide SA AUSTRALIA
Polarsonde: Profiling Supercooled Liquid Water in Clouds.
 Polarsonde is a low-cost instrument for profiling supercooled liquid in clouds. Progress toward validation of the instrument will be presented.
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- 52** **Andres Albornoz**
University of Sydney NSW AUSTRALIA
A study of exclusive charmed semileptonic decays of B mesons at Belle with a fully reconstructed hadronic tag method
 We present a study of charmed semileptonic B meson decays with the aim of extracting the shape of the hadronic form factor in order to decrease the uncertainty in the determination of the CKM matrix element $|V_{cb}|$.
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- 53** **Badriah Alshahrani**
Australian National University ACT AUSTRALIA
Measurement of the radiative branching ratio for the Hoyle state using cascade gamma decays
 A new setup, consisting of four 5" by 5" NaI scintillators and an array of particle detectors, is being developed to improve the Trad/T ratio for the Hoyle state in ^{12}C .
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- 54** **Sundance Bilson-Thompson**
University of Adelaide SA AUSTRALIA
Preons as Topological Features of Quantum Gravity
 We discuss the possibility that in theories of quantum gravity with discrete spacetime, the Standard Model fermions and bosons may arise as composites of defects in spacetime, with interactions governed by topological constraints.
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- 55** **Igor Gontchar**
Omsk State Transport University RUSSIA
Nuclear Fission as Thermal Decay of the Metastable State: How Accurate is Our Description of this Process?
 Accuracy of analytical Kramers formulas for fission rate of excited nuclei is studied. This is done solving numerically the Smoluchowski equation. Results are relevant for general problem of thermal decay of metastable state.
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- 56** **Geng-Yuan Jeng**
University of Sydney NSW AUSTRALIA
Search for the Standard Model Higgs in the $H \rightarrow t\bar{t}$ Channel with the ATLAS Detector at the LHC
 A search for the Standard Model (SM) Higgs boson decaying into a pair of t leptons performed with the ATLAS detector at the LHC is presented.
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- 57** **Thomas Cunningham**
University of Sydney NSW AUSTRALIA
A Search for Purely Leptonic B Meson Decays at Belle
 We present a search for the purely leptonic B decays $B^+ \rightarrow e^+ \hat{1}/2^- e$ and $B^+ \rightarrow \hat{1}/4^+ \hat{1}/2^- \hat{1}/4^-$ using the full data set of 711 fb $^{-1}$ collected at the $\Upsilon(4S)$ resonance by the Belle detector at the KEKB asymmetric collider.
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- 58** **Mushtaq Loan**
Jinan University ACT AUSTRALIA
Analysis of Static Hexaquark Potential in Lattice QCD
 We study the static hexaquark potential of in lattice QCD. Our preliminary results suggest that, for the separation between diquarks larger than internal diquark distance, the hexaquark system behaves as a multiquark bound state.

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- 59** **Mapril Ng**
Australian National University ACT AUSTRALIA
Development of a new Si(Li) Array for the Pair Spectroscopy of the Hoyle state
 A new magnetic pair spectrometer combined with high resolution Si(Li) detector array is being developed for the measurement of high energy transition in low mass nuclei. One of the first applications of the spectrometer will be the electromagnetic decay properties of the Hoyle state in ^{12}C .
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- 60** **Francesco Nuti**
University of Melbourne VIC AUSTRALIA
WW/WZ production in the semileptonic channel in ATLAS
 Results on WW and WZ production in the semileptonic channel in 7 TeV proton-proton scattering are presented, based on data taken by the ATLAS experiment in 2011.
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- 61** **Puvanesvari Rajan**
Australian National University ACT AUSTRALIA
Particle-plus-Core Models of Nuclear Models
 Selected problem particle-plus-core models of nuclear structure are considered, including the implications of core-vibrations for nuclear structure as one to three nucleons are added to a closed shell.
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- 62** **Nathan Hall**
University of Adelaide SA AUSTRALIA
Interference Radiative Corrections to the Proton's Weak Charge
 By making the most precise determination of the proton's weak charge to date, QWEAK will search for evidence of new physics. We examine those corrections important to the accurate interpretation of the QWEAK experiment
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- 63** **Shaun Smith**
Queensland University of Technology QLD AUSTRALIA
Development of a Time Coincident Detection System for Detection of Cosmic-Ray Muons
 This work presents a time coincident detection system used to quantify muon counts.
-
- 64** **Michaela Srnecik**
Australian National University AUSTRALIA
Is it Possible to Detect ^{236}U and Pu in European Roe Deer Antlers?
 The potential to use antlers for the analysis of the ^{236}U and plutonium uptake in the environment was investigated. The respective measurements were carried out by Accelerator Mass Spectrometry (AMS).
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- 65** **Rizki Syarif**
University of Sydney NSW AUSTRALIA
J/psi pair analysis as a probe of double parton scattering using ATLAS data
 We present a study of J/psi pairs produced from proton-proton collisions at centre-of-mass energy of 7 TeV at ATLAS as a probe of Double Parton Scattering (DPS).
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- 66** **Jason Yue**
University of Sydney NSW AUSTRALIA
An inclusive dilepton analysis
 Cross sections of $t\bar{t}$, WW and $Z\ell\ell$ production are measured at the ATLAS detector from pp collisions at $\sqrt{s} = 7$ TeV in the $e\ell$ channel. Systematics of the analysis are examined using $\sigma_{\text{ET}} - N_{\text{jets}}$ phase space.
-
- 67** **Morteza Aramesh**
University of Melbourne VIC AUSTRALIA
Fabrication, Characterisation & Optical Properties of Silver Nanowires in NanoPorous Alumina Templates
 We report fabrication and optical properties of electrochemically deposited silver nanowires into the nano-porous alumina template.
-
- 68** **Christopher Artlett**
Macquarie University NSW AUSTRALIA
Ranged Remote Sensing of Water Temperature using Raman Spectroscopy
 In this work we investigate depth-resolved remote sensing of water temperature using Raman scattering. Spectral features are analysed for effective temperature measurement parameters. Laboratory-based remote sensing experiments are conducted using a 5 metre water cell.

-
- 69** **Henrique Baltar**
Macquarie University NSW AUSTRALIA
Plasmonic Periodic Arrays of Single and Double Silver Cylinders, and the Effects of a Metallic Layer
 Motivated by applications in surface-enhanced spectroscopies, we report enhancement of electric field and tailored extinction in a bi-dimensional periodic array of single and double silver nanocylinders over a silver layer.
-
- 70** **James Bennett**
University of Queensland QLD AUSTRALIA
Cavity-Enhanced Optomechanics with Cold Atoms
 A theoretical model of cavity-enhanced interactions between cold atoms and optomechanical systems presented, and experimental progress towards this goal reported. Such systems allow improved mechanical cooling and quantum state preparation.
-
- 71** **Ann Bui**
University of Queensland QLD AUSTRALIA
Brownian Motion of Nonspherical Particles in Optical Tweezers
 The force field of an optically trapped nonspherical particle is mapped by considering a potential, averaged over many orientations from Brownian motion. We investigate how accurately the pseudopotential represents the average force in optical tweezers.
-
- 72** **Geoff Campbell**
Australian National University ACT AUSTRALIA
Quantum memory as a linear optical network
 We present a proposal for using a series of optical quantum memories as a linear optical network. The network is optically configurable to perform arbitrary unitary transformations of frequency multiplexed optical states.
-
- 73** **Aidan Carroll**
La Trobe University VIC AUSTRALIA
Near Field Broadband Phase Imaging using Fresnel and Iterative Techniques
 We present an algorithm and experimental layout which has the potential to overcome inherent complications due to a broadband laboratory source, and is capable of conducting phase imaging using Fresnel diffraction and iterative techniques.
-
- 74** **Robert Chapman**
University of Queensland QLD AUSTRALIA
Optical Polarisation and Depolarization of Electronic Spin and Some Other Unresolved Questions in the Physics of Nitrogen-Vacancy Centres in Diamond
 Nitrogen-vacancy centres in diamond display anomalous saturation behaviour which we investigate and conclude that a well-known optically induced spin polarization in these crystal defects is counterbalanced by optically induced spin depolarization.
-
- 75** **James Chon**
Swinburne University of Technology VIC AUSTRALIA
Strategies for continuous-wave readout multi-dimensional optical storage based on plasmonic nanorods
 We study the detuned surface plasmon resonance in polarization space for continuous-wave multilayered optical recording medium based on plasmonic nanorods. We also explore the progressively twisted NR alignment in multilayer for a potential recording medium.
-
- 76** **Tin Yen Timothy Chow**
Swinburne University Of Technology VIC AUSTRALIA
Gold Nanorod Orientation Characterisation using Image Correlation Spectroscopy
 We propose a method for characterizing the orientation distribution of anisotropic nanoparticles such as plasmonic gold nanorods by image correlation spectroscopy. This method is superior to the conventional polarization transmission method.
-
- 77** **Elliott Claven**
Queensland University of Technology QLD AUSTRALIA
The usefulness and application of ellipsoidal nanowires is considered along with current control challenges and how these are being overcome.
 The usefulness and application of ellipsoidal nanowires is considered along with current control challenges and how these are being overcome.
-
- 78** **Robin Cole**
University of Queensland QLD AUSTRALIA
Precision measurement of motion using SNOM
 Abstract – we propose a high precision measurement of nanoparticle motion by observing the optical transmission from a SNOM (scanning near field optical microscope) probe, giving a spatial resolution of $10\text{-}13 \text{ m}/\text{Hz}^{1/2}$.

-
- 79** **Tim Davis**
CSIRO MSE VIC AUSTRALIA
Superchiral electromagnetic fields from localised surface plasmons
 Superchiral electromagnetic fields have a chirality exceeding that of circularly polarized light. We discuss the generation of superchiral fields by surface plasmon resonances in metal nanostructures.
-
- 80** **Manuel Decker**
Australian National University ACT AUSTRALIA
Tuning Magnetic Metamaterials with Liquid Crystals
 We study both experimentally and numerically the effect of liquid crystal alignment and anchoring on the tunability of optical magnetic metamaterials. We demonstrate controlled tuning of the metamaterials response by applying an electric field.
-
- 81** **Amir Djalalian-Assl**
University of Melbourne VIC AUSTRALIA
Cross-Shaped Aperture Optical Antenna Array
 Report on the variation of resonant cavity modes in the visible regime with respect to changes in the geometry of cross-shaped slot antenna arrays in metallic thin films.
-
- 82** **Svetlana Dligatch**
CSIRO NSW AUSTRALIA
Development of Prototype Retro-reflectors for the Gravity Recovery and Climate Experiment Follow-up Mission
 The manufacture and testing of two alternative designs of retro-reflectors are described. These are prototype components of a proposed interferometric ranging system for the Gravity Recovery and Climate Experiment follow-up, capable of detecting relative length changes of 10-15m.
-
- 83** **Svetlana Dligatch**
CSIRO NSW AUSTRALIA
Ion-assisted Deposition of Protected Silver Nanoparticle Films
 The application of ion-assisted deposition to the manufacture of stable multilayer plasmonic silver structures for surface-enhanced Raman spectroscopy (SERS) is described. Longevity data and analysis of the results are presented.
-
- 84** **Svetlana Dligatch**
CSIRO NSW AUSTRALIA
Ion Beam Sputtered Multilayer Coating of Optics for the Laser Interferometer Gravitational-Wave Observatory
 The application and metrology of multilayer ion beam sputtered coatings on some of the principal optical elements of the Advanced Laser Interferometer Gravitational-Wave Observatory (LIGO) are described.
-
- 85** **Jiahao Dong**
Australian National University ACT AUSTRALIA
Towards Cavity Enhanced Laser Absorption Spectroscopy for Isotopic Ratio Measurement
 We present a technique to measure the molecular absorption of carbon dioxide, based on cavity enhanced amplitude modulated laser absorption spectroscopy (CEAMLAS), with the aim of developing an instrument for isotopic ratio measurements.
-
- 86** **Stuart Earl**
University of Melbourne VIC AUSTRALIA
Vanadium Dioxide based tunable optical antennas
 Nanoscale metallic particles have been integrated with the phase-change material Vanadium Dioxide (VO₂) to investigate modulation of their resonant modes. These will form the basis of tunable optical antennas.
-
- 87** **Chikara Egami**
Shizuoka University N/A JAPAN
Cross Section Measurement of Nanoparticle with Polarization-interferometric Confocal Microscope
 Polarization-interferometric nonlinear confocal microscopy is proposed for measuring a nano-sized particle with optical anisotropy. The anisotropy in the particle was spectroscopically imaged through a three-dimensional distribution of third-order nonlinear dielectric polarization photoinduced.
-
- 88** **Jacob Evans**
Macquarie University NSW AUSTRALIA
Optics of Spider Orb Web Capture Droplets Modelled as Elliptical Micro-lenses
 An elliptical micro-lens is proposed as a model for the optical function of capture droplets on certain spider orb webs. The optics of elliptical lenses is largely unstudied. Ray tracing within 2-D cross-sections is used.

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- 89** **Matthew Arnison**
Canon Information Systems Research Australia NSW AUSTRALIA
3D Alignment Using a Chiral Phase Aperture Mask
 We propose an extension of alignment using image correlation to 3D, using a chiral phase aperture mask. Microscope simulations show a transverse accuracy of 1 nm and a depth accuracy of 3 nm.
-
- 90** **Ken Grant**
Defence Science and Technology Organisation SA AUSTRALIA
Ship-to-Shore Free Space Optical Communications
 This paper describes a novel analogue FM ship-to-shore free space optical communications system, which was used to demonstrate video and bi-directional audio transmission up to 3 km.
-
- 91** **Ken Grant**
Defence Science and Technology Organisation SA AUSTRALIA
Estimation of Refractive Index Structure Constant by Measurement of Angle-of-arrival Variation at 1.55um
 The refractive index structure constant is estimated along a 1.5km path using the angle-of-arrival technique, and the results are compared to those taken concurrently with a commercial boundary layer scintillometer.
-
- 92** **Steven Hinckley**
Edith Cowan University WA AUSTRALIA
Gamma Irradiation Effects in Fibre Bragg Gratings
 This paper reports on a preliminary study of gamma radiation effects on the current generation of optical fibre Bragg grating sensors as a function of dose rate, and the effects of relaxation after gamma irradiation.
-
- 93** **Steven Hinckley**
Edith Cowan University WA AUSTRALIA
Low-Cost Educational Optical Coherence Tomography System for Thickness Measurements
 We have developed an inexpensive rudimentary low coherence interferometer that can be used to measure sample thickness in the micron to mm range, and for exploring educational aspects of interferometry and optical coherence tomography.
-
- 94** **Sarah Walden**
Queensland University of Technology QLD AUSTRALIA
SHG in nanostructured thin gold films
 The plasmon-plasmon contribution to SHG in thin gold films investigated experimentally and theoretically. The dependence of the SHG on fundamental wavelength, film thickness and film structure are of particular interest.
-
- 95** **Sarah Walden**
Queensland University of Technology QLD AUSTRALIA
Enhancing Raman scattering signals through increased gold film reflectivity
 The observed increase of a factor of 7 in Raman signals at 785 nm of nitrobenzene adsorbed onto thin gold films shown to be a result of the increased reflectivity of the film.
-
- 96** **Baohua Jia**
Swinburne University of Technology VIC AUSTRALIA
Hybrid photonic crystals for emission manipulation
 Hybrid photonic crystals fabricated using the multi-photon direct laser writing method combined with the electroless deposition of silver have been employed to control the spontaneous emission of near-infrared core-shell quantum dots.
-
- 97** **Nikita Kostylev**
University of Western Australia WA AUSTRALIA
Plasmon-Assisted Enhancement of Magneto-Optical Effects in Periodic Arrays of Ferromagnetic Nanostripes
 One-dimensional periodic arrays of ferromagnetic nanostripes are shown to enhance Transverse Magneto-Optical Kerr Effect by an order of magnitude. Nanostripe-coupled Surface Plasmon Resonance is found to be responsible for this phenomenon.
-
- 98** **Timothy Lam**
Australian National University ACT AUSTRALIA
Polarization insensitive strain sensor
 Random wander in polarization orientation of optical fibers can cause accuracy degradation in high performance strain sensing systems. We present a strain sensing measurement technique capable of extracting longitudinal displacement independent of polarization induced phase fluctuations.

-
- 99** **Andrew Lee**
Macquarie University NSW AUSTRALIA
Low threshold diode pumped solid-state THz source
 We report a compact, solid-state terahertz (THz) radiation source that operates with a very low diode pump threshold of 2.5 W, generates 6.45 μW average output power, and is frequency-tunable across the range 1.65-2.65 THz.
-
- 100** **Jipeng Lin**
University of Sydney NSW AUSTRALIA
Cascaded self-Raman lasers based on 382 cm^{-1} shift in Nd:GdVO₄
 We report quasi-continuous-wave, cascaded Nd:GdVO₄ self-Raman lasers based on a secondary Raman transition at 382 cm^{-1} . Multiple laser lines were obtained at both infrared and visible regions by incorporating intracavity sum-frequency mixing.
-
- 101** **Timothy Van Der Laan**
CSIRO NSW AUSTRALIA
Self-Assembled Vertically-Standing Graphene Nanosheets on Alumina Template
 An efficient plasma-enhanced chemical vapour deposition technique has been used to grow vertically-standing graphene nanosheet pattern on highly-ordered, free-standing alumina template. Various properties of the graphene nanosheets are investigated.
-
- 102** **Jim Williams**
University of Western Australia WA AUSTRALIA
The Scattering of Free Electrons by Free Electrons
 Free 2000 eV electron-electron angular differential (e,e) scattering measurements agree with Born approximation and indicate quantum diffraction and symmetry reduce the cross section by orders of magnitude below the classical values around 90° scattering angle.
-
- 103** **Sarah Adlong**
Australian National University ACT AUSTRALIA
Robustness of a system-filter separation for the feedback control of a Bose-Einstein condensate
 We consider the application of estimation-based feedback control to a Bose-Einstein Condensate in a harmonic trap under continuous measurement, and show that it can successfully cooled in the presence of reasonable experimental limitations.
-
- 104** **Muhammad Hamid Ahmed**
RMIT University VIC AUSTRALIA
Realistic Spin Guides
 We report calculations showing the guidance of individual magnons in one-dimensional spin chains for applications in quantum information transport. In particular, we show the effect of confinement potential, disorder, and realistic materials parameters.
-
- 105** **Rafael Alexander**
University of Sydney NEW SOUTH WALES AUSTRALIA
Efficient Use of Temporal-Mode Continuous-Variable Cluster States
 We consider the efficiency of measurement-based quantum computation with optical temporal-mode continuous-variable cluster states, comparing two schemes for information encoding in terms of the efficiency with which they use squeezing resources.
-
- 106** **Ping Koy Lam**
Australian National University ACT AUSTRALIA
Fast real-time random numbers from vacuum fluctuations
 We present a robust quantum random number generator based on measuring the quantum fluctuations of the vacuum field. This is one of the fastest in the world with a throughput of 5.7 Gbits per second.
-
- 107** **Adam Bennet**
Griffith University QLD AUSTRALIA
Experimentally characterising nonlocal correlations in entanglement swapping
 We experimentally demonstrate that local models describing pairs of independent, uncorrelated system photonic entanglement swapping experiments are violated by quantum correlations for visibilities as low as 50%, contrasted with 66% in the standard analysis.
-
- 108** **Christopher Bentley**
Australian National University ACT AUSTRALIA
Fast Gates for Trapped Ions
 We present a simple, implementable ion trap scheme for 30ns phase gates; a quarter of the trap period. This is three orders of magnitude faster than previously achieved gates.

-
- 109 Julien Bernu**
Australian National University ACT AUSTRALIA
Characterisation and Optimisation of Gradient Echo Memory Using Cold Atoms
 Many quantum memory experiments now use cold atomic ensembles, as they promise long storage times and high efficiencies. We present the first detailed characterisation and optimisation of the gradient echo memory scheme with cold atoms
-
- 110 Sylvain Blanvillain**
University of Sydney NSW AUSTRALIA
Suppressing On-Chip EM Crosstalk for Spin Qubit Devices
 We report the development and performance of on-chip interconnects designed to suppress electromagnetic crosstalk in spin qubit device with the large number of gate. Low temperature measurement and numerical simulation confirm that control and readout signal crosstalk can be suppressed to levels of order 1%, from dc to 1 GHz.
-
- 111 Andrew Bolt**
University Of Queensland QLD AUSTRALIA
Scalable Measurement Based Fault-Tolerant Quantum Communication
 We present a fault-tolerant measurement based scheme for creating encoded Bell pair resources on foliated CSS codes. We supplement this with an efficient decoding scheme for CSS Turbo codes based on belief propagation.
-
- 112 Allen Boston**
Griffith University QLD AUSTRALIA
Operational use of Discord in an Extended State Merging Protocol
 We experimentally investigate discord and its possible use as a measure of resource use in extended state merging operations. This is done with entangled single photons using both polarization and spatial degrees of freedom.
-
- 113 George Brawley**
University of Queensland QLD AUSTRALIA
Towards Room Temperature Quantum Optomechanics in a Microsphere-Nanostring System
 Measurements of the optomechanical coupling rate of a system comprising of a high-Q nanostring mechanical element evanescently coupled to an optical microsphere have shown potential for cooperativity sufficient to observe quantum effects such as radiation pressure backaction at room temperature.
-
- 114 Jacob Bridgeman**
University of Sydney NSW AUSTRALIA
Multiscale Entanglement Renormalization Ansatz Study of Spin Chains with a Line of Criticality
 Ground state energies and conformal data extracted from a MERA simulation of critical quantum lattice models are presented. The Ashkin-Teller, XXZ and perturbed cluster models are discussed with regard to their respective $c=1$ CFTs.
-
- 115 Michael Bromley**
University of Queensland QLD AUSTRALIA
Atomic Sagnac Interferometry with Bose-Einstein Condensates
 We have computationally explored the Sagnac effect using a novel theoretical scheme involving localised Bose-Einstein condensates. We find, remarkably, that instead of a linear accumulation of the phase shift with time, we find phase plateaus.
-
- 116 Michael Bromley**
University of Queensland QLD AUSTRALIA
Vortex Eigenstates of Bose-Einstein Condensates
 We have computationally investigated the production of excited eigenstates of the non-linear Schrödinger equation. Our focus is on the generation of Bose-Einstein condensates with multiple vortices imprinted, and their stabilisation using internal boundary conditions.
-
- 117 Andre Carvalho**
Australian National University ACT AUSTRALIA
Quantum computing with incoherent resources and quantum jumps
 We show that all the fundamental blocks needed to perform quantum computation can be built from the addition of an extra decoherence channel followed by a suitable measurement strategy.
-
- 118 Helen Chrzanowski**
Australian National University ACT AUSTRALIA
Discord as a Quantum Resource for Bi-Partite Communication
 We present an operational method to exploit discord as a physical resource, demonstrating that the discord within a bipartite system can be consumed to encode information that can only be accessed by coherent quantum interactions.

-
- 119** **Helen Chrzanowski**
Australian National University ACT AUSTRALIA
Photon number discrimination using only Gaussian resources and measurements
 We experimentally demonstrate a protocol for accessing the statistics of the non-Gaussian Schrödinger kitten state using only continuous variable resources.
-
- 120** **James Cresser**
Macquarie University NSW AUSTRALIA
Coarse-Grained Master Equations And Heat Transport Fluctuation TheoreFor Open Quantum System
 We derive novel phase-entanglement and spin-squeezing criteria that are immune to number fluctuations. These are utilized to obtain an operational definition of relative phase-measurement sensitivity, via analysis of quantum entanglement in atom interferometry.
-
- 121** **Nicola Dalla Pozza**
University of Padova ITALY
Adaptive Discrimination for Quantum PPM signals
 In the scenario of binary communication over a noisy quantum channel we study the region of admissible transition probabilities between transmitted and received symbol. We then derive the quantum state and measurement operators that yield the best performance in term of error probability or mutual information.
-
- 122** **Andrew Darmawan**
University of Sydney NSW AUSTRALIA
Interpolating Between Spin Models with Universal Ground States
 We study the relationship between the AKLT model and the cluster model by considering an interpolating path of Hamiltonians. These spin models are physically distinct yet are both universal computational resources.
-
- 123** **Tommaso Demarie**
Macquarie University NSW AUSTRALIA
Topologically ordered states with continuous variables modes on a 2D lattice
 Topological entanglement entropy detects topologically ordered states. We investigate several different measures of topological entropy for finitely squeezed continuous variables toric codes and comment on their physical interpretation.
-
- 124** **Chandni Doshi**
La Trobe University VIC AUSTRALIA
Characterisation of a CsI(Tl) Scintillator for Indirect X-ray Detection by Simulation and Experiment
 The energy dependent point spread function of a commercial indirect imaging X-ray detector was modeled, validated using synchrotron radiation and extended to polychromatic sources. The results can be used for optimisation of an imaging system.
-
- 125** **Kate Ferguson**
Australian National University ACT AUSTRALIA
Cavity enhanced rephased amplified spontaneous emission
 This work describes progress towards demonstrating cavity enhanced rephased amplified spontaneous emission (RASE) in a rare-earth ion doped solid. This is a source of on demand single photons and could be used to demonstrate a discrete-variable quantum repeater.
-
- 126** **Natasha Gabay**
University of Sydney NSW AUSTRALIA
Optical Continuous-Variable Cluster States as Spin States
 We interpret continuous-variable cluster states as spin states using the Schwinger representation of $SU(2)$. We compare the entanglement structure in the two pictures, with the goal of using such states in fault-tolerant quantum computing.
-
- 127** **Adil Gangat**
University of Queensland QLD AUSTRALIA
Mechanical Schrodinger Cats via the Attractive Bose-Hubbard model in a Superconducting Circuit
 We propose a scheme to generate entangled coherent states in coupled microwave resonators and subsequently transfer them to an array of micromechanical oscillators.
-
- 128** **Todd Green**
University of Sydney NSW AUSTRALIA
Generalised Noise Filtering for Arbitrary Single-Qubit Control Operations
 We present a novel analytical method for calculating the effect of environmental noise on arbitrary single-qubit control sequences. The qubit fidelity is conveniently expressed in terms of the noise power spectrum and generalised filter functions.

129 Joseph Ho*Centre for Quantum Dynamics QLD AUSTRALIA***Realising Noiseless Linear Amplification Using Weak Measurements**

We experimentally demonstrate that nondestructive weak measurements on an optical mode can be used to implement heralded noiseless linear amplification of quantum states of the mode.

130 Anthony Hope*RMIT University VIC AUSTRALIA***Coherent Tunneling Adiabatic Passage in thin-ridge silicon waveguides**

Coherent tunneling adiabatic passage is a robust method for transferring information between quantum states. We describe a novel basic quantum logic element and its implementation with silicon integrated photonic circuits.

131 Nicholas Miller*RMIT University VIC AUSTRALIA***Thermophoresis in Nanofluidic Colloidal Fluids**

We predict the temperature dependent concentration profiles across colloidal fluids confined by planar walls, by independently obtaining transport coefficients for a bulk fluid and applying them to the continuum mechanics relation of temperature and concentration.

132 Timothy Nicholson*University Of Queensland QLD AUSTRALIA***Understanding the Processibility of Starch Polymers**

A multi-pass rheometer has been used to reliably measure the viscoelastic properties of starch plasticised by various combinations of water and glycerol.

133 Ranganathan Prabhakar*Monash University VIC AUSTRALIA***A Unified Microstructural Constitutive Model for Stresses in Unentangled Polymer Solutions**

A new model is proposed for stresses in polymer solutions that accounts for screening of intra- and intermolecular hydrodynamic and excluded-volume interactions when molecules elongate and overlap in strongly stretching flows.

134 Cindy September*University of Queensland QLD AUSTRALIA***Rheology And Flow Behaviour Of Thickened Infant Formulae**

This work investigates the rheological properties of thickened infant formulae [TIF] in order to improve the care of infants with dysphagia; a common symptom of being born prematurely or with developmental disorders.

Wednesday 12 December 2012

1700 - 1830**Poster Session 2***Room: Tyree Room / Leighton Hall in the John Niland Scientia Building*

Poster

Board No

1 Neil Broderick*University of Auckland NEW ZEALAND***Energy Scalable Giant Chirp Oscillator Mode-locked with a Nonlinear Amplifying Loop Mirror**

We report on an environmentally stable all-fiber all-PM giant chirp oscillator mode-locked with a nonlinear amplifying loop mirror. The oscillator delivers pulses with energies exceeding 10 nJ that can be recompressed below 500 fs.

2 Qiang Liu*Macquarie University NSW AUSTRALIA***Investigation of Laser Processing of Tb³⁺ doped Borosilicate Glasses**

For the first time we explore femtosecond laser writing in Tb³⁺ doped borosilicate glasses using athermal writing inscription. We present studies of single mode guidance and photodarkening effects.

3 Neil Broderick*University of Auckland NEW ZEALAND***Real-time Single-Shot and Coherence Measurement of Noise-like Pulses**

We present the first real-time single-shot and coherence measurement of noise-like pulses generated in Yb ANDi laser with Raman process.

-
- 4 Yanhua Luo**
University of New South Wales NSW AUSTRALIA
Developing Bi/Er/Al Codoped Optical Fibre with High Bi Concentration for Ultrabroadband Emission
We report the development of Bi/Er/Al codoped optical fibre with high Bi concentration with the in-situ modified chemical vapor deposition (MCVD) technique, which shows ultrabroadband emission from 1100-1570 nm pumped by different laser sources.
-
- 5 Jianzhong Zhang**
Harbin Engineering University CHINA
A new broadband light source based on Bismuth and Erbium co-doped fiber developed in UNSW
Here she would present the results of a new broadband source and the amplifier experiments based on Bi/Er codoped fiber by UNSW
-
- 6 Francis Bennet**
Australian National University ACT AUSTRALIA
Adaptive Optics Demonstrator for Precision Laser Tracking and Orbital Modification of Space Debris
We present the development of an adaptive optics demonstrator utilising a ground based laser to track and precisely range orbiting space debris, including a 10kW CW laser to modify the orbit of debris with photon- pressure
-
- 7 Allan Ernest**
Charles Sturt University NSW AUSTRALIA
Does Quantum Wavepacket Expansion Influence Cosmic Evolution?
Incorporating a universal quantum wavefunction into Einstein-de Sitter cosmology provides an explanation of dark energy that, using the observable mass of the universe as the only free parameter, predicts the observed behaviour of cosmic evolution.
-
- 8 Allan Ernest**
Charles Sturt University NSW AUSTRALIA
Quantum Overlap Integrals for Large n
We extend previous calculations of the overlap integrals for radial dipole decay rates involving large principal quantum numbers and examine trends in the behavior of these as a function of level spacing.
-
- 9 Dmitry Fursa**
Curtin University WA AUSTRALIA
Relativistic convergent close-coupling calculation of the spin polarization of electrons scattered elastically from cadmium, zinc, and mercury
We present spin asymmetry parameters (Sherman functions) for elastic electron scattering on cadmium, zinc, and mercury atocalculated using the relativistic convergent close-coupling (RCCC) method
-
- 10 Joseph Bulth-Williams**
Flinders University SA AUSTRALIA
Dynamical (e,2e) Studies of Bio-Molecules
Triply differential cross sections are presented for electron impact ionization of a number of bio-molecules including pyrimidine, tetrahydrofurfuryl alcohol and tetrahydropyran. Experimental results are compared with theoretical calculations performed using the M3DW model. Keywords-(e,2e); tetrahydrofurfuryl alcohol; pyrimidine; tetrahydropyran; tetrahydrofuran
-
- 11 Madalyn Casey**
James Cook University QLD AUSTRALIA
Positron Thermalisation in Atomic and Molecular Gases
A general numerical technique has been developed based on Boltzmann's kinetic theory for positron transport in gases. The technique has been applied to describe the temporal relaxation of positrons in atomic and molecular gases
-
- 12 Luca Chiari**
Flinders University SA AUSTRALIA
Electronic excitation cross sections for low-energy electron collisions with $\hat{1}\pm$ -tetrahydrofurfuryl alcohol
Differential cross sections for the electron-impact excitation of the important biological compound \pm -tetrahydrofurfuryl alcohol are reported. The experimental cross sections are measured for incident electron energies in the 15-50 eV range for scattering angles between 10-90°.

-
- 13** **Simon Haine**
University of Queensland QLD AUSTRALIA
Squeezing the most out of your atom interferometer: Information recycling for enhanced quantum sensing.
 Atom interferometry provides very sensitive measurements of rotations and accelerations. We investigate enhancing the sensitivity of atom interferometers via atom-light entanglement.
-
- 14** **Jacob Hughes**
Centre for Antimatter-Matter Studies ACT AUSTRALIA
A Magnetised Beam for Low Energy Electron Scattering Experiments
 A novel electron scattering technique has been developed to investigate low-energy electron interactions with atomic and molecular targets. This method has been developed from positron scattering techniques and uses strong magnetic fields to confine an electron beam.
-
- 15** **Alisher Kadyrov**
Curtin University WA AUSTRALIA
Fully Differential Study of Positron-Impact Ionisation of Hydrogen
 The fully differential cross section for positron-impact ionisation of hydrogen is calculated in a first-order perturbation approach using a three-body continuum wave function satisfying the correct asymptotic boundary conditions in all domains relevant to breakup.
-
- 16** **Dmitry Konovalov**
James Cook University QLD AUSTRALIA
S-wave e-He scattering below ionization threshold
 The electron-Helium S-wave scattering problem (below ionization threshold) is solved very accurately by describing both target electrons within the configuration-interaction model of helium.
-
- 17** **Alexander Kozlov**
University of New South Wales NSW AUSTRALIA
Dipole Moments and Extension of the Schiff Theorem to Ions and Molecules
 The possibility of observation of PT-odd nuclear moments in atoms and molecules is investigated. It is shown that in ions of experimental interest nuclear EDM effect exceeds the rest of the moments, while in molecules Schiff moment dominates.
-
- 18** **Prince Kurumthodathu Surendran**
Swinburne University of Technology VIC AUSTRALIA
Magnetic Lattices for Ultracold Atoms
 We report on the trapping and evaporative cooling of 87Rb $F=1$ atoms in a one-dimensional 10 micrometer-period magnetic lattice. Potential applications of sub-micron-period square, triangular and honeycomb lattices to simulate condensed matter systems are discussed.
-
- 19** **Jim Mitroy**
Charles Darwin University NT AUSTRALIA
Relativistic Description of Atomic Structure Using S-spinors and L-spinors
 A relativistic description of the structure of heavy atoms using L-spinors and S-spinors has been developed and applied to the description of alkali atoms and ions. The methodology will be described and results presented.
-
- 20** **Dennis Mueller**
University of Texas, UNITED STATES OF AMERICA
Development of a Positron Reaction Microscope
 We are developing a positron reaction microscope at the Centre for Antimatter/Matter Studies (CAMS) to make kinematically complete measurements of positron scattering from atoms and simple molecules. We will present some of the associated challenges.
-
- 21** **Ly Duong**
Australian National University ACT AUSTRALIA
Velocity-map imaging of O-photodetachment at wavelengths producing O(1D2) atoms
 The kinetic energy and angular distribution of electrons photodetached from O has been measured using the technique of velocity-map imaging, providing meV resolution. The energy dependent anisotropy parameter for detachment producing O(1) oxygen is similar to that for ground state oxygen atoms.
-
- 22** **Andrew Ong**
University of New South Wales NSW AUSTRALIA
Optical Transitions in Highly Charged Ions: New Clocks with Enhanced Effects of Variation of the Fundamental Constants
 We propose a new type of atomic clock based on optical transitions in highly charged ions. Such clocks would be extremely accurate and would have huge sensitivity to potential variation of the fine-structure constant.

-
- 23 Benjamin Roberts**
University of New South Wales NSW AUSTRALIA
Atomic Parity Violation as a Test of the Standard Model and Unification Theories
 Atomic parity violation calculations in cesium are improved and used to analyse measurements to test the Standard Model and unification theories.
-
- 24 Marianna Safronova**
University of Delaware UNITED STATES OF AMERICA
Precision Calculation of Blackbody Radiation Shifts for Optical Frequency Metrology
 We show that four group IIIB divalent ions, B, Al⁺, In⁺, and Tl⁺ have anomalously small blackbody radiation (BBR) shifts of the ns² 1S₀ – nsnp 3P₀ clock transitions.
-
- 25 Jeremy Savage**
Curtin University WA AUSTRALIA
Comparison of spherical and spheroidal expansions for the energies and oscillator strengths of H₂⁺
 We compare bound state energies and oscillator strengths of H₂⁺ calculated using configuration interaction expansions in both spherical and spheroidal coordinates. These convergence studies have important implications for applying the CCC methodology to molecular scattering.
-
- 26 Tapio Simula**
Monash University VIC AUSTRALIA
Majorana Boson and Seven Quantized Vortices
 We have found a Bose-Einstein condensate, in which the continuous rotation symmetry is broken by an array of seven quantized vortex lines, to be capable of supporting a zero energy Majorana boson quasi-particle mode.
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- 27 Wade Tattersall**
Australian National University ACT AUSTRALIA
Monte Carlo Simulations of Low Energy Swarm Transport in Soft-condensed Media
 We present a novel Monte Carlo code for simulation of electron and positron transport in soft-condensed media, utilising a static structure approach to account for material structural properties. The results of these simulations are compared with Boltzmann equation solutions and other Monte Carlo treatments of similar systems.
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- 28 Jim Williams**
University of Western Australia WA AUSTRALIA
Topological Phase in Electron Exchange Excitation with Dissociation in Simple Molecules
 Observations of the linear and circular polarizations of the Balmer-alpha radiation from hydrogen-containing molecules after spin-polarized electron exchange excitation-with-dissociation scattering indicate orientation and alignment of the electron charge cloud are searched for a topological phase
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- 29 Darren Alvares**
University of New South Wales CSIRO NSW AUSTRALIA
Ink-jet Printed Nanoparticle Film Tactile Sensors: Substrate Effect
 Tactile sensors in robotics and prosthetics require flexibility and fabrication via low cost large area techniques. In nanoparticle strain gauges the choice of substrate effects not only its manufacturability but also its performance. This paper aims to compare the characteristics of nanoparticle film tactile sensors on rubber and plastic substrates.
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- 30 Tina Gorjiara**
University of Sydney NSW AUSTRALIA
3D Dosimetry for Proton Cancer Therapy
 This study quantitatively evaluates a new system which shows promising potential for 3D dosimetry of heavy particles used in cancer hadrontherapy. The water and tissue equivalency and dose response of a novel 3D dosimeter were investigated using both Monte Carlo modeling and experimental approaches.
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- 31 Mushtaq Loan**
Jinan University ACT AUSTRALIA
Cell Response to Proton Radiation in the Low Energy Transfer Regime
 Using the Universal Model for growth of a cell system, we study the analytic behaviour of cell response to positively charged particles, protons. Our results indicate a near-quadratic survival trends in the low energy transfer regime.

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- 32 Dale Prokopovich**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Design and Characterisation of a Detector System for Imaging of I-125 in Freely Moving Mice
 An imaging system is being developed to image 125I tracer in animals free to move within a small burrow. The system consists of a high speed imaging detector coupled to a motion tracking system.
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- 33 Jason McLaren**
University of South Australia SA AUSTRALIA
Data Analysis Techniques in Imaging Photoplethysmography
 Imaging photoplethysmography determines human biometric information using video imagery. Heart rate is obtained from periodic components of the luminance of the colour video signals. Results obtained are compared with those recorded by a commercial oximeter.
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- 34 Liudmila Uvarova**
Moscow State University of Technology RUSSIAN FEDERATION
Discrete model of competition hematopoietic cells as basic factor of symptomblood oncology disease
 Mathematical modeling of hematopoietic system made it possible to comprehend the eritron system functioning mechanism and understand the reason of oscillating disease [1]. Hypothesis of competition between main hematopoietic cell and mutated cell can account for effects arising in some oncohematological disease.
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- 35 Alex Bukoski**
University of Missouri UNITED STATES OF AMERICA
Critical Slowing for Two Hodgkin-Huxley Neuron Models Near Spiking Threshold
 A neuron approaching spiking threshold exhibits nonlinearly increasing sensitivity to stimulus. We quantify susceptibility via stochastic analysis of type-I and -II Hodgkin-Huxley neurons, and demonstrate critically-slowed fluctuations on close approach to bifurcation in both.
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- 36 Ben Kent**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Probing Membrane Sugar Interactions with Neutron Membrane Diffraction
 Scattering length density profiles of DOPC and DOPC/glucose systems, reconstructed from neutron membrane diffraction measurements, reveal a preference for glucose molecules to accumulate away from the membrane lipid bilayer interface.
-
- 37 Jung-Ha Kim**
University of Sydney NSW AUSTRALIA
Motion Tracking Techniques for Motion Correction in Computed Tomography (CT)
 Patient head motion is a common source of image artifacts in clinical CT. We describe and validate a head motion tracking method intended to provide accurate pose data for use by a motion correction algorithm.
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- 38 Ehsan Negahbani**
University of Waikato NEW ZEALAND
A Three-neuron Thalamocortical Model Describes Sleep-Wake Transition of Brain
 Here we present a dynamically rich but computationally efficient model of thalamocortical loop describing the most prominent features of sleep-wake transitions of brain.
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- 39 Viktor Perunicic**
University of Melbourne VIC AUSTRALIA
Molecular Detection Using NV-centre in Diamond
 A method is developed for selective molecule detection within a biological environment based on a nuclear magnetic resonance signature of a chosen molecular species detected using NV-centre in diamond as a high resolution sensing probe.
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- 40 Kyle Wang**
University of Waikato NEW ZEALAND
Modelling of Non-Cognitive Cortical Dynamics and Its Analysis through Computerized Derivation of Amplitude Equations
 A cortical model exhibiting interacting Turing and Hopf instabilities is described. Computerized multiple-scale-expansion algorithm is presented to derive the amplitude equations for the analysis of the cortical nonlinearity at the onset of bifurcations.
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- 41 Martin Wong**
University of Sydney NSW AUSTRALIA
Identifying the origins of complex diseases through dynamical network modelling
 Defects in intracellular signal transduction pathways are implicated in complex diseases such as cancer and diabetes. Dynamical system modeling can be used to identify causes for diseased states and propose drug targets for their treatment.

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- 42** **David Cortie**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Picosecond Electron-Hole Dynamics Leading To Terahertz Emission From Semiconductor Surfaces Visualised with a Computer Games Engine
 A 3D ensemble Monte Carlo transport simulation was used to model the photocurrent diffusion excited by a femtosecond laser pulse at a semiconductor surface leading to a plasma oscillation and emission of terahertz electromagnetic radiation.
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- 43** **Evgeny Galakhov**
Russian Peoples' Friendship University RUSSIAN FEDERATION
Situation of Blow-Up for Higher Order Differential Inequalities
 Many physical phenomena can be described by nonlinear inequalities with singular coefficients. In the present work, conditions of blow-up for solutions of such inequalities are established.
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- 44** **Ra Inta**
Australian National University ACT AUSTRALIA
Hardware Acceleration of Parallel Algorithms
 Researchers increasingly rely upon hardware accelerators such as the General Purpose Graphical Processor Unit (GPGPU) for parallel algorithms. We present a computing system that combines the benefits of the two most widely used hardware accelerators.
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- 45** **Hidetoshi Konno**
University of Tsukuba JAPAN
Characterization of Ventricular Fibrillation in 2D Beeler-Reuter Model by Stochastic Predator-Prey Dynamics
 Characterization of 2D Beeler-Reuter model under ventricular fibrillation is presented by using various stochastic predator-prey (PP) models with multiplicative noise. It is shown that the PP models can catch various features of fluctuations of BR model.
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- 46** **Laura Rosales-Zárate**
Swinburne University of Technology VIC AUSTRALIA
Applications of Fermionic Phase-Space Methods
 We will present two applications of the Gaussian phase representation for fermions. These include the evaluation of the linear entropy in phase-space and a construction of a fermionic many-body Q-function and observables.
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- 47** **Alexander Sukov**
Russian State Geological Prospecting University N.A.S. Ordzhonikidze RUSSIAN FEDERATION
Scattering of Waves by Metamaterial Coated Periodic Surface: Mathematical Modeling
 Scattering of a monochromatic plane electromagnetic $E[H]$ – polarized wave by dielectric coated an infinitely conducting periodic (corrugated) surface is investigated. It is assumed that the boundary of the configuration consists of two surfaces: a plane top dielectric surface and bottom surface which is periodic in one direction. A dielectric coating is medium with negative refractive index (metamaterial). The original problem is reduced to the solution of a system of integral equations. Some numerical results for surface with sinusoidal (cycloidal) profile are presented.
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- 48** **Luke Vandewater**
Defence Science and Technology Organisation VIC AUSTRALIA
Probability-of-Existence of High Energy-States for a Vibro-Impacting Vibration Energy Harvester
 The energy-state of a vibro-impacting vibration energy harvester strongly determines the available output power. Based on the Hyster-Hertz contact model, the probability-of-existence of high energy-states for a vibro-impacting harvester is examined.
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- 49** **Guochu Deng**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Simulation of an Energy Dispersive Mode for RITA-type Cold Neutron Triple Axis Spectrometer SIKA
 The energy dispersion mode of the triple axis spectrometer SIKA has been simulated for the multiplexing configuration. The energy resolutions at two different wavelengths are estimated.
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- 50** **Richard Mole**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Pelican: a multipurpose time-of-flight cold neutron spectrometer
 Pelican is the new cold neutron, time of flight spectrometer at the Bragg Institute.
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- 51** **Christine Rehm**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
The Kookaburra Ultra-Small-Angle Neutron Scattering (USANS) Instrument at ANSTO
 The new ultra-small-angle neutron scattering (USANS) instrument Kookaburra, currently under construction at the ANSTO OPAL reactor, will allow characterisation of microstructures covering length scales in the range of 0.1 micrometres to 10 micrometres.

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- 52 Anton Stampfl**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
A Be-Filter Based Neutron Spectrometer for Vibrational Spectroscopy: Simulations and Tests
 A Be-filter based neutron spectrometer being built at the Bragg Institute is described and some examples of its use given.
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- 53 Sudarshan Kathi**
Univerisity of Western Australia WA AUSTRALIA
Positron Re-emission Energy Spectroscopy of Thin Fe Filon W (100)
 Positron re-emission measurements from Fe filgrown on W(100) at very low positron incident energies gives insights into the mechanism of energetic positron re-emission.
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- 54 Sam Moore**
University of Western Australia WA AUSTRALIA
Characterisation of Nanostructured Thin Films
 The electronic and optical properties of thin filhave been investigated using Total Current Spectroscopy (TCS) and Ellipsometry. The focus has been on the exhibition of plasmonic effects by so called "metallic black" films.
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- 55 Jim Williams**
University of Western Australia WA AUSTRALIA
Plasmonic Structure in Thin Fil(e,2e) Spectra
 Plasmonic structures are explored in (e,2e) spectra from carbon, aluminium, polyvinyl formal and pyroxylin filusing asymmetric 3 keV coplanar scattering dynamics for transmission and reflection geometries. Characteristic multiple plasmon excitation and elastic scattering dominate.
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- 56 Andrew Charles**
Bureau of Meteorology VIC AUSTRALIA
The Liquid-Vapour Interface of a Pure Fluid Modelled with Smooth Particles
 A liquid-vapour system is modeled using a diffuse interface model, numerically solved using a smooth particle method. An artificial broadening of the interface has consequences for the accurate representation of density gradient forces.
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- 57 Paul Guagliardo**
University of Western Australia WA AUSTRALIA
Positron Annihilation Studies of Metal Oxide Systems
 Metal oxides are an important basis in thin film technology, catalysis, and solid-state devices. In this study, positron annihilation has been applied to study cation vacancy formations in a number of metal oxide systedue to doping.
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- 58 Anna Paradowska**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Distribution of the Residual Stress in Plates Treated by Iterative Laser Forming
 Iterative laser forming can be applied to reduce weld induced distortions. In laser forming, thermally induced strains transverse to the laser scan line vary with depth in the material and contribute most significantly to the desired deformation.
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- 59 Liudmila Uvarova**
Moscow State University of Technology RUSSIAN FEDERATION
Modeling of heat and mass transfer in systewith fractal surface
 The methods for constructing mathematical models of surface roughness in the probleof heat and mass transfer with moving and fixed boundaries, as well as the analysis of fractal and more general models of rough surfaces is investigated temperature field near a surface.
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- 60 Xanthe Croot**
University of Sydney NSW AUSTRALIA
Population Inversion and Spin Blockade in a Driven Double Quantum Dot
 We observe microwave-driven transitions between the ground and excited states of single and two-electron GaAs double quantum dots. Microwaves couple the qubit to its bosonic environment, resulting in a population inversion of the two level system.
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- 61 Sudarshan Kathi**
University of Western Australia WA AUSTRALIA
Low Energy Positron Beam Studies at UWA: Slow Positron Interactions with W(100) Surface
 Positron re-emission and scattering from a W(100) surface have been measured. At low incident energies the re-emission yield increased with energy but was very sensitive to competing channels like elastic scattering.

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- 62** **Emma Mitchell**
 CSIRO NSW AUSTRALIA
Nanofabricated Josephson Junctions for SQUID and Microwave Resonator Devices
 Nanojunction based SQUID sensors are developed for incorporation into the centre strip of a superconducting coplanar waveguide to make tuneable resonators. The current-voltage characteristics and magnetic field modulation of niobium nanobridge-based SQUIDs are presented and optimized using focused ion beam techniques.
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- 63** **Matthew Shortell**
 Queensland University of Technology QLD AUSTRALIA
Characterisation of ZnO QDs using Optical Methods.
 Dynamic light scattering was used to measure the size of ZnO QDs and compared to absorption spectroscopy. To account for the adsorbed acetate, the quasi-static approximation was applied and compared to standard Rayleigh scattering.
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- 64** **Jackson Smith**
 RMIT University VIC AUSTRALIA
Electronic Transport In Low-dimensional Nanostructures Using A Semi-empirical Green's Function Method
 We present a Green's function study of Silicon nanowires. A semi-empirical model combining Non-equilibrium Green's functions with tight binding and Density functional theory has been used to investigate the electronic transport properties of Si nanowires.
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- 65** **Chih-Hwan Henry Yang**
 University of New South Wales NSW AUSTRALIA
Spin lifetime in silicon quantum dots with tunable valley splitting
 We report on spin lifetimes of a silicon MOS quantum dot with tuneable valley splitting energy. Lifetimes as high as 2.6s are achieved. Significant perturbative effects of valley states on spin decay are observed.
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- 66** **Kelly Walker**
 RMIT University VIC AUSTRALIA
Correlated charge transport in linear and bilinear Josephson junction arrays
 We study linear and bilinear arrays of Josephson junctions theoretically. The electro-static potential landscape and the charge-charge interaction length depend on the circuit capacitances, which in turn influence transport and charge correlations within the array.
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- 67** **Boyuan Cai**
 Swinburne University of Technology VIC AUSTRALIA
Metallic nanodots for enhanced α -Si solar cells
 In this work, we integrate nanometer sized metallic particles on the top of amorphous silicon solar cells experimentally. The enhanced short circuit current and fill factor by 14.1% and 12.2% were achieved, respectively.
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- 68** **Neamul Hayet Khansur**
 University of New South Wales NSW AUSTRALIA
Combined X-ray and Neutron Structural Refinements of $(\text{Bi}_{0.5}\text{Na}_{0.5})_{0.94}\text{Ba}_{0.06}\text{TiO}_3$ Lead-free Piezoelectrics
 Combined structural refinements of BNT6BT for x-ray and neutron data showed better fit in cubic Pm-3m space group with additional lower symmetry (Triclinic P1) in anisotropic displacement parameters (ADPs) other than cubic symmetry alone.
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- 69** **Erich Kisi**
 University of Newcastle NSW AUSTRALIA
Preparation and Characterisation of LaB_6 Using a Novel and Simple Synthesis Route
 Rare-earth hexaborides have great potential as thermionic emitters to produce electricity. The main challenge is to synthesize these hexaborides at lower temperatures without any post-synthesis cleaning treatments. In this present work, we present simple synthesis techniques for high purity lanthanum hexaborides.
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- 70** **Erich Kisi**
 University of Newcastle NSW AUSTRALIA
Miscibility gap alloys for high thermal conductivity – high energy density thermal storage
 New thermal storage materials with high energy-density (0.2-2.3 MJ/L) and thermal conductivity (50-400W/m.K) are presented. These miscibility gap alloys operate through the latent heat of a fusible phase dispersed in a thermodynamically stable inverse microstructure.

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- 71 Erich Kisi**
The University Of Newcastle NSW AUSTRALIA
Self-Propagating High-Temperature Synthesis of Mn+1X_n and Mn+1AX_n Phases
 Mn+1AX_n phases such as Ti₃AlC₂ with interesting combinations of thermal, electrical and mechanical properties potentially useful in energy conversion applications have been synthesized from commercial grade starting powders using SHS.
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- 72 Heike Ebendorff-Heidepriem**
University of Adelaide SA AUSTRALIA
New Germanate Glasses For Infrared Fibre Applications
 We report new germanate glasses that are attractive materials for mid-infrared optical fibres with high nonlinearity, high gain and enhanced stability. We demonstrate basic properties and extruded fibre fabrication for the new glasses.
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- 73 Yanhua Luo**
University of New South Wales NSW AUSTRALIA
Investigation of POF Grating Spectrum Under Constant Tensile Stress
 We report the first observation of the time dependent evolution of spectrum profile of POF grating loaded constant tensile stress attributed to the combination effect of the viscoelasticity and the non-uniformity of POF grating.
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- 74 Muhammad Yusuf Mohd Noor**
University of New South Wales NSW AUSTRALIA
Wavelength Scanning of SOA Based Fiber Ring Laser for Gas Humidity Detection using Photonic Crystal Fiber
 A semiconductor optical amplifier (SOA) based fiber ring laser for humidity detection is demonstrated. Wavelength scanning is introduced into the ring using distributed feedback (DFB) laser and photonic crystal fiber acts as a sensing element.
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- 75 Eoin Sheridan**
University of Queensland QLD AUSTRALIA
Characterisation of Microfabricated Optical Fibre for Gas Sensing
 Microchannels drilled in standard and hollow core optical fibres are studied using a novel probing technique. This allows optimization of the interaction with the fibre core, enabling the demonstration of methane sensing.
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- 76 Graham Wild**
RMIT University VIC AUSTRALIA
Optimisation of Power Detection Interrogation Methods for Fibre Bragg Grating Sensors
 We present a method to optimise the performance of power detection interrogation system for fibre Bragg grating sensors. The performance of the different system can be optimised in terms of their sensitivity and/or dynamic range.
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- 77 Klaus-Dieter Liss**
Australian Nuclear Science and Technology Organisation NSW AUSTRALIA
Between X-ray optical effects, modulated structures and coherent phonons
 Both time-integrated and time-resolved X-ray diffraction has been applied to silicon crystals, modulated by static structures as in optical band-gap material, and by ultrasonic waves. On the one hand, the modulation fields can be characterized in space and time, on the other, multiple diffraction effects can be used for interesting optics in the X-ray regime.
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- 78 Douglas Little**
Macquarie University NSW AUSTRALIA
A New Method for Measuring Nanoparticle Sizes in the Optical Far Field
 We demonstrate a new method of measuring nanoparticle sizes using optical surface profilometry that is not constrained by traditional diffraction limits.
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- 79 Mingkai Liu**
Australian National University ACT AUSTRALIA
Light-driven chiral meta-atoms
 We study the opto-mechanical properties of chiral meta-atoms and find that twisted split-ring resonators can be used as a general prototype of subwavelength light-driven actuators over a wide range of frequencies.
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- 80 Aravindan Madhava Warrier**
Macquarie University NSW AUSTRALIA
Developing Ultrafast Raman Laser Sources
 We aim to develop ultrafast Raman laser sources to extend the wavelength accessibility of two important mode-locked lasers: Ti:Sapphire & VECSELS. These ultrafast Raman lasers generating new wavelengths can have significant application in biophotonics.

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- 81** **Alireza Maleki**
Macquarie University NSW AUSTRALIA
Coupling light beam into planar surface plasmon structures
 Prisms are used for coupling incident light with plasmonic structures. We introduce nanoparticles onto a multilayer asymmetric plasmonic waveguide, scattering the propagating plasmons into localized resonances, to improve coupling and detection of surface plasmons.
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- 82** **Tim Mapperson**
University of Melbourne VIC AUSTRALIA
Template-Directed Assembly Of Plasmonic Nanostructures
 We present progress on fabrication of novel plasmonic elements by template-directed assembly. We show that position and orientation of nanostructures can be reliably controlled in a scalable wet-chemistry approach to produce plasmonic nanostructures.
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- 83** **Sara Marzban**
Australian National University ACT AUSTRALIA
Progress towards the development of rare-earth doped waveguides for quantum communications applications
 The suitability of rare-earth doped waveguides for quantum memory applications is investigated using the high resolution laser techniques, spectral holeburning and photon echo measurements.
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- 84** **Peter McGlynn**
RMIT University VIC AUSTRALIA
Stray Light Correction Method for a New Ozone Spectrophotometer
 Stray light effects set a limit to the accuracy of column ozone determinations made with a spectrophotometer. These effects can be reduced with optical filters, and a numerical subtraction algorithm using a correction matrix.
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- 85** **Muthavarapu Mallikharjuna Rao**
University of Wollongong NSW AUSTRALIA
Emissivity of Globar in T Hz Spectral Range
 A common form of source is a 'blackbody' such as the globar. The emissivity of such radiators in the terahertz range is not well known. Here we estimate it using combined theory and experiment approach.
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- 86** **A.S.M. Mohsin**
Swinburne University of Technology VIC AUSTRALIA
Plasmon Coupling of Gold Nanoparticles for Probing Membrane Proteins
 In this paper we present a feasibility study of the plasmon coupling of gold nanoparticles for its potential probe for image correlation spectroscopy. This technique will be applied to understand membrane protein aggregation.
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- 87** **Gabriel Molina-Terriza**
Macquarie University NSW AUSTRALIA
The role of symmetries in the interaction of light with nanoparticles
 In this presentation, we will show some of our latest results on the interaction of light with nanoparticles. We have found that using the fundamental role of the underlying symmetries or lack of symmetries of the system, allow for a powerful technique to understand the interaction.
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- 88** **Vincent Ng**
Macquarie University NSW AUSTRALIA
Nonlinear Plasmonics: Second-Harmonic Generation of Long Range Surface Plasmon Polaritons
 We investigate second-harmonic generation in a symmetric plasmonic waveguide by exploiting the dielectric nonlinearity of periodically-poled lithium niobate.
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- 89** **Timo Nieminen**
University of Queensland QLD AUSTRALIA
Dynamic Simulation for Efficient Modelling of Optical Tweezers with Many Degrees of Freedom
 Dynamical simulation of optical tweezers, including Brownian motion and viscous drag, allows efficient modelling when there are degrees of freedom, such as when nonspherical particles, or multiple particles, are trapped.
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- 90** **Timo Nieminen**
University of Queensland QLD AUSTRALIA
Modelling complex Optically-Driven Micromachines via Basic Building Blocks
 Complex optically-driven micromachines can be represented as built up from basic building blocks. This representation can be used to calculate the force and torque on the micromachine using a multiple scattering algorithm.

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- 91 Ana Andres Arroyo**
University of New South Wales NSW AUSTRALIA
Controlling Phase in Wide Photonic Band-gap Structures
 Gires-Tournois resonances modulate the phase of reflected light in one-dimensional photonic band gap structures. This can be used to fabricate novel photonic devices, such as wavelength selective wave plates and tunable optical filters.
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- 92 Alexander Sabella**
Defence Science and Technology Organisation SA AUSTRALIA
Impact of pump polarisation and linewidth on the 1064 nm Raman gain coefficient of diamond
 We present measurements on the Raman gain coefficient of diamond up to 12 cm/GW at 1064 nm. Maximum gain is achieved when pumping with polarization aligned with the <111> crystal axes and linewidths less than 1 cm-1.
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- 93 Juna Sathian**
Queensland University of Technology QLD AUSTRALIA
Temporal Phase Characteristics of the Amplitude Noise in Electro-optic Phase Modulator
 Our results demonstrate that both magnitude and phase of EOM amplitude noise vary temporally because of photorefractive self-defocusing. This is particularly important in low noise applications where high stability of residual amplitude modulation is essential.
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- 94 Arif M. Siddiquee**
Swinburne University of Technology VIC AUSTRALIA
Two-Photon Excited Luminescence from Gold Nanorods
 Combined effect of surface plasmon resonance and lightning rod factor will be analysed for gold nanorods due to two photon excited luminescence (TPL). Gold nanorods TPL intensity will be measured by varying excitation wavelength.
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- 95 Graham N Smith**
OptoFab, Macquarie University NSW AUSTRALIA
Advances in femtosecond laser micro-inscription of optical coherence tomography phantoms
 Demonstration of advances in femtosecond laser subsurface micro-inscription fabricating 3-dimensional point and line refractive index modifications (defects) to create optical coherence tomography (OCT) phantoms for calibration and validation of OCT system performance.
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- 96 Izabela Spaleniak**
Macquarie University NSW AUSTRALIA
Integrated Photonic Lanterns: Multimode to Single Mode Light Converters for Applications in Astronomy
 We are using a femtosecond laser to inscribe a series of integrated photonic lanterns that have a range of geometry parameters in order to determine the ideal format for optimising the single-mode to multimode transition efficiency.
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- 97 Sebastian Stark**
Macquarie University NSW AUSTRALIA
Widely tunable CW Lasers in the deep-UV
 We present CW lasing in Ce:LiCAF, tunable between 280 and 315 nm, when pumped by the resonant-enhanced second-harmonic of a diode-pumped solid-state laser
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- 98 Michael Steel**
Macquarie University NSW AUSTRALIA
Purcell Effect in Magnetodielectric Cylinders
 We show that the radiation dynamics of a source inside a composite magneto-dielectric cavity involves an interplay between Purcell and local-field effects which cannot be captured by the refractive index alone.
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- 99 Yue SUN**
Australian National University ACT AUSTRALIA
Oscillatory Instabilities in Two-mode Nano-cavities with Tailored Optomechanical Potentials
 We analyze nonlinear dynamics of coupled suspended nano-cavities where static optomechanical potentials can be engineered through the simultaneously excited two optical modes, and demonstrate that self-induced oscillations can appear even at the deep potential minima.
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- 100 Jason McLaren**
University of South Australia SA AUSTRALIA
Analysis of Scintillation Statistics from Atmospheric Turbulence
 We have investigated the ability of a number of probability density functions (PDFs) to model atmospheric scintillation statistics. We find that the log normal and the Beckmann PDFs best fit the experimental data.

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- 101** **Jason McLaren**
University of South Australia SA AUSTRALIA
Simultaneous Investigation of the Scintillation of UV, Visible and IR Wavebands
 Atmospheric turbulence induces intensity fluctuations in a propagating signal, and hence can affect the performance of a variety of optical systems. The scintillation of UV, Visible and IR wavebands were simultaneously investigated in this study.
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- 102** **Jonathan Tollerud**
Swinburne University VIC AUSTRALIA
Demonstration of a stable and flexible coherent multi-dimensional spectroscopy apparatus to study coherent coupling in asymmetric double quantum wells
 A flexible, stable coherent multi-dimensional spectroscopy apparatus using spatial light modulators to shape beatemporally and spatially is developed and used to characterize coherent coupling dynamics in asymmetric GaAs double quantum wells.
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- 103** **Liudmila Uvarova**
Moscow State University of Technology RUSSIAN FEDERATION
Interaction of electromagnetic waves with non-homogenous non-spherical disperse particles
 The principle of the Huygens "Poincare" methods for determination the inner electromagnetic field and the absorbed electromagnetic energy in non-homogenous non "spherical particles is used. The results were received for the dependences of complex dielectric permittivity and magnetic permeability on x (one from coordinates of considered system).
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- 104** **Priyamvada Venugopalan**
Swinburne University of Technology VIC AUSTRALIA
Dual-Wavelength Focusing by a Far-field Plasmonic Lens
 We report on the dual-wavelength far-field focusing by a plasmonic lens with an annular slit and a concentric groove. The far-field nano-focusing of two different wavelengths in such a plasmonic lens is studied numerically.
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- 105** **Thanh Phong Vo**
Macquarie University NSW AUSTRALIA
Surface Plasmon Propagation on Gold Striplines
 We report our study of surface plasmon propagation on gold stripe-lines with passive and active substrates using leakage radiation microscopy and near-field scanning optical microscopy
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- 106** **Wan Zakiah Wan Ismail**
Macquarie University NSW AUSTRALIA
Investigation of scattering and random lasing phenomena using dielectric and metal nanoparticles
 We investigate scattering and random lasing with dielectric and metal nanoparticles in terms of spectral narrowing and emission intensity.
-
- 107** **Thomas Woodley**
Queensland University of Technology QLD AUSTRALIA
Designing a Plasmonic EIT Array
 We are interested in using plasmonic nanoparticle arrays to achieve electromagnetically induced transparency hence have undertaken to explore the effect of the thickness (height from the substrate) of the nanoparticles on the induced dark mode.
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- 108** **Rui feng Kan**
Anhui Institute of Optics and Fine Mechanics CHINA
Fiber optic remote monitoring system for methane gas in the coal mining industry
 Fiber optic remote gas monitoring system based on tunable diode laser absorption spectroscopy (TDLAS) technology has been developed and demonstrated for remotely monitoring the concentration of mining methane gas at multiple locations.
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- 109** **Qiming Zhang**
Swinburne University of Technology VIC AUSTRALIA
Broad-band Nano-focusing with Aperture Larger than $\lambda/2$ in Air
 We report on the design and numerical study of nano-focusing by a photonic crystal immersion lens with aperture larger than $\lambda/2$ in air. A focus spot of lateral resolution $\lambda/3$ can be achieved in multiple normalised frequencies.
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- 110** **Lixin Zhang**
Macquarie University NSW AUSTRALIA
Time-resolved Spectrometry Characterization of Single Up-conversion Nanocrystals using a 32-Channel PMT Array
 We constructed a time-resolved spectroscope by a confocal scanning microscopy system and a 32-channel PMT device. This provides time-resolved spectra for quantitative characterization of single nanocrystals with different doping and morphological properties.

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- 111** **Barbara Zittermann**
Macquarie University NSW AUSTRALIA
Mode-Locked Deep UV Lasers Based on Ce:LiCAF
 Ce:LiCAF lasers, with their 35 nm gain bandwidth centered at 290 nm, have the potential to generate attosecond UV pulses. We will present our latest results, in experiment and modeling, in our effort to reach this goal.
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- 112** **Joss Bland-Hawthorn**
University of Sydney NSW AUSTRALIA
Measurements Techniques for Multi-core Fibre Bragg Gratings
 Multi-core fibre Bragg gratings are an attractive possibility for atmospheric hydroxyl (OH) suppression in astrophotonics but their characterization is very time intensive and cumbersome. We discuss the performance measurement techniques and propose an IR camera based technique.
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- 113** **Ginu Rajan**
University of New South Wales NSW AUSTRALIA
Etching and Its Effects On Gratings Inscribed In Singlemode Polymer Optical Fiber
 Etching and its effects on polymer optical fiber (POF) Bragg gratings are investigated from a sensing application perspective. Two processes of fabricating etched POF grating, namely, inscription after etching and etching after inscription, are compared.
-
- 114** **Kevin Cook**
University of Sydney NSW AUSTRALIA
Regenerating Gratings Under Strain
 Tens of nanometers of tunability in the Bragg wavelength of regenerated gratings within two different types of fibers have been investigated by applying a load of 3 gram at an annealing temperature of 1100 °C (exceeding 32 nm).
-
- 115** **Kevin Cook**
University of Sydney NSW AUSTRALIA
Temperature and strain characterisation of type I and regenerated gratings in boron-codoped germanosilicate fiber
 Temperature and strain characterisation of seed and regenerated gratings with and without post-annealing is reported. Results at high temperatures differ from those at lower temperatures.
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- 116** **Andrew Watts**
University of Sydney NSW AUSTRALIA
Characterisation of Photoinduced Chalcogenide (As₂S₃) Microfibre Resonators
 We report photosensitive tuning of chalcogenide microfibre resonators and compare with theoretical calculations to explain the transmission spectrum and modal properties. The photosensitive modification of the refractive index is shown to be strongly intensity dependent.
-
- 117** **Giovanni Guccione**
Australian National University ACT AUSTRALIA
Optomechanics of a Nanomechanical Oscillator Inside a High Finesse Cavity
 We study the interaction between intra-cavity optical field and a nano-mechanical oscillator placed inside an optical cavity. We will investigate possibility of laser cooling of a nanowire by tuning the cavity and the nanowire parameters.
-
- 118** **Michael Hush**
Australian National University ACT AUSTRALIA
Removing the Effect of Quantum Noise in a Bose Einstein Condensate with Active Feedback
 We find quantum noise produces previously unseen heating in BEC under active feedback. We perform the most complete simulation of the system to date and discover this additional heating can be removed with additional controls.
-
- 119** **Seiji Armstrong**
Australian National University ACT AUSTRALIA
Multi-mode Quantum Networks
 We report on the experimental preparation of various multi-mode entangled states, with the ability to switch between them in real-time. Up to 8-mode entanglement is measured with just one detector.
-
- 120** **Jan Jeske**
RMIT University VIC AUSTRALIA
Quantum Decoherence Due to Spatially Correlated Fluctuations in the Environment
 We present a general formalism to model quantum decoherence caused by environmental fluctuations with a certain spatial correlation length and present some resulting effects relative to the spatial extend of the quantum system.

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- 121 Alexander Judge**
University of Sydney NSW AUSTRALIA
Canonical Quantization of Macroscopic Electrodynamics in Magneto-Electric Media
 We present a Hamiltonian for electrodynamics in lossy, dispersive, magneto-electric media, and diagonalize its canonical quantum counterpart. Our results provide a rigorous framework for classical and quantum optics in negative-index materials.
-
- 122 Karen Kheruntsyan**
University of Queensland QLD AUSTRALIA
Hong-Ou-Manel Effect with Ultracold Atoms
 Using a pair of colliding Bose-Einstein condensates and a sequence of appropriately tuned Bragg pulses, we propose to realize a two-particle interferometry setup that exhibits a Hong-Ou-Mandel dip, demonstrating strong quantum correlations in matter waves.
-
- 123 Mirko Lobino**
Griffith University QLD AUSTRALIA
Quantum metrology on a biological sample
 We use an integrated opto-fluidic device that couples a waveguide interferometer with a microfluidic channel to measure the concentration of a blood protein in an aqueous buffer solution using two-photon entangled states.
-
- 124 Xiwang Luo**
University of Queensland QLD AUSTRALIA
Diffusion Effects in Gradient Echo Quantum Memory
 The diffusion effects in gradient echo quantum memory were studied. We present both the analytical and numerical results, and also suggest ways to reduce these effects to get higher memory efficiency for long storage time.
-
- 125 Tamara Martin**
University of Sydney NSW AUSTRALIA
Spin Resonance in Organic Light Emitting Diodes
 We investigate spin-dependent electronic processes in pi-conjugated polymers in a device architecture. We integrate magnetic resonance excitation capabilities into our device, for the purpose of performing electron-nuclear double resonance (ENDOR) measurements.
-
- 126 Nathan McMahon**
University of Queensland QLD AUSTRALIA
Optimisation of Quantum Noiseless Linear Amplifiers
 We investigated the optimisation of noiseless probabilistic quantum amplifiers, which have been achieved for weak signal coherent states. The current device was improved upon and similar devices were investigated for stronger signal states.
-
- 127 Peter Morrison**
Morrison Industrial Company NSW AUSTRALIA
Qubits, Qutrits: Quantum Computation and Control
 Links between time dependent matrix mechanics, the quantum brachistochrone and various finite quantum systems are explored using a novel systematic method. Various unitary operators are constructed for qubits, qutrits and biqubits to demonstrate the use of this technique.
-
- 128 Nicolas Menicucci**
University of Sydney NSW AUSTRALIA
Graphical Calculus for Gaussian Pure States
 We provide a simple graphical calculus for all Gaussian pure states, including graph transformation rules for all local Gaussian unitary operations and quadrature measurements.
-
- 129 Casey Myers**
Centre for Engineered Quantum Systems QLD AUSTRALIA
Enhanced Quantum Transport in an Opto-Mechanical System
 We investigate enhancing the quantum transport of a single photon along a linear array of coupled cavities by including time dependently driven mechanical resonators in each cavity via a radiation pressure coupling.
-
- 130 Matthew Palsson**
Griffith University QLD AUSTRALIA
Experimentally Demonstrating Reference Frame Free Bell Inequality Violations
 Experimental demonstration of Bell inequality violation with $39.7 \pm 0.1\%$ probability in a scenario where two parties share no reference direction in comparison with the theoretical expected value of 41.3% .

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- 131** **Saleh Rahimi-Keshari**
University of Queensland QLD AUSTRALIA
Verification of Quantum Discord
 We introduce an experimental method for verifying quantum discord of an unknown bipartite quantum state, which can be applied on discrete and continuous systems. We show that states with Gaussian discord have nonzero quantum discord.
-
- 132** **Jacopo Sabbatini**
University of Queensland QLD AUSTRALIA
Engineered topological defects in coupled binary Bose-Einstein condensates
 We use the miscible-immiscible phase transition in coupled binary Bose-Einstein condensates to engineer and manipulate topological defects. We investigate the possibility of creating non-local quantum superpositions of topological defects.
-
- 133** **Alexander Soare**
University of Sydney NSW AUSTRALIA
Agile microwave system for the implementation of robust quantum control protocols in $^{171}\text{Yb}^+$
 We present and discuss the design, construction, and characterization of an agile quasi-optical microwave system for quantum control of the 12.6 GHz hyperfine transition in trapped Ytterbium ions.
-
- 134** **William Soo**
University of Sydney NSW AUSTRALIA
Switching Phenomena in Nonlinear Oscillators
 We perform semiclassical simulations of switching in bistable microwave cavities as a model for qubit readout in recent experiments. Switching occurs via quantum activation and we investigate the regime in which it occurs.
-
- 135** **Ben Sparkes**
Australian National University ACT AUSTRALIA
Precision Spectral Manipulation Using a Coherent Optical Memory
 The ability to coherently spectrally manipulate quantum information has the potential to improve qubit rates across quantum channels and find applications in optical quantum computing. We present work demonstrating spectral manipulation using gradient echo memory
-
- 136** **Alex Szorkovszky**
University of Queensland QLD AUSTRALIA
Thermomechanical Squeezing Below 3dB
 We demonstrate 5 dB of thermomechanical squeezing of the motion of a cantilever, breaking the 3 dB limit to parametric squeezing for the first time. This is applicable to quantum squeezing at low temperatures.
-
- 137** **Nathan Walk**
University of Queensland QLD AUSTRALIA
Security of Continuous Variable Quantum Cryptography with Gaussian Post-selection
 We introduce a 'Gaussian' post selection and demonstrate that the security can be unconditionally bounded using only experimentally accessible quantities. We find improvements over all pre-existing continuous variable protocols in realistic regimes.
-
- 138** **Matthew Wardrop**
University of Sydney NSW AUSTRALIA
A Two-Qubit Exchange Gate Proposal for Singlet-Triplet Quantum Dot Qubits
 We propose a two-qubit exchange gate for singlet-triplet qubits that has high fidelities and short operation times comparable to the single qubit exchange gate operations now routinely performed.
-
- 139** **Till Weinhold**
University of Queensland QLD AUSTRALIA
Ultra-narrow single photons from atomic gradient echo memory storage
 Atomic quantum memories have bandwidths much narrower than single photons used in quantum communication making them incompatible. We use cavity-based parametric down-conversion to generate photons tailored for storage in gradient echo memories
-
- 140** **Morgan Weston**
Centre for Quantum Dynamics QLD AUSTRALIA
Experimental Investigation of a Quantum Joint Measurement Uncertainty Relation
 Using weak measurements of photonic quantum systems, we demonstrate that a generalized joint measurement uncertainty principle holds even for those cases that cannot be validly described by the well-known Arthurs-Kelly joint measurement relation.

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- 141** **Dominic Williamson**
University of Sydney NSW AUSTRALIA
Holonomic Quantum Computation within the Gapped Ground States of Spin Chains Possessing Symmetry Protected Topological Order
 We investigate the use of adiabatic holonomies on gapless boundary modes of spin chains which lie in nontrivial symmetry protected topological phases to achieve quantum computation.
-
- 142** **James Wood**
University of Melbourne VIC AUSTRALIA
Interaction Assisted Quantum Magnetometry
 Improved magnetometry sensitivity using a system of interacting Nitrogen Vacancy (NV) centers was investigated theoretically. Via optimised pulse sequences, sensitivity improvements were shown. Enabling detection at increased NV densities would lead to further sensitivity improvement.
-
- 143** **Keyu Xia**
Macquarie University NSW AUSTRALIA
Ground State Cooling of a Nanomechanical Resonator via Superconducting Qubit
 Via enabling the collective excitation, we propose a ground state cooling scheme, operating in the weak confinement regime, for a nanomechanical resonator by coupling it to two coupled flux qubits.
-
- 144** **Manjin Zhong**
Australian National University ACT AUSTRALIA
Hyperfine Decoherence Study of Europium-doped Crystals in High Magnetic Field
 We present here a study on hyperfine decoherence mechanism for europium doped crystals in high magnetic field. The aim of the study is maximizing the hyperfine coherence times for quantum memory applications.
-
- 145** **Yevgeny Stadnik**
University of New South Wales NSW AUSTRALIA
Dense spectrum of resonances, and scalar, spinor and vector particle capture in a near-black-hole metric
 We show that a dense spectrum of resonances emerges for massless scalar, spinor and vector particles incident on a body near the black hole limit, with black hole absorption properties borne out in the black hole limit. Thus quantum effects create black hole properties before the actual formation of the black hole.
-
- 146** **John Steele**
University of New South Wales NSW AUSTRALIA
Conformal Vectors in Surface Homogeneous Spacetimes
 The conformal vector equations in surface homogeneous space-times can be reduced to one equation in three unknowns. We examine earlier results on physically important solutions using this new approach.
-
- 147** **Geethaka Devendra**
RMIT University VIC AUSTRALIA
Comparative Analysis of Silicon-on-Insulator Waveguide Designs for Nonlinear Optic Applications
 We analyze four available silicon waveguide geometries as platform for self phase modulation, accounting for both linear and nonlinear two photon absorption losses. We find that each waveguide has merit depending on application constraints.
-
- 148** **Mr Andrew See**
University of New South Wales NSW AUSTRALIA
The Influence of Small-Angle Scattering on Ballistic Transport in Quantum Dots
 We show that the electrical characteristics of undoped quantum dots are remarkably robust to room temperature thermal cycling. Unlike conventional modulation-doped dots, we obtain magnetoconductance fluctuations that are reproducible under repeated thermal cycling.

Presenting Author Index

Last Name	First Name	Date	Session Start Time	Session End Time	Room	Session Description
Abdurakhmanov	Ilkhom	Tue 11 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 5D – Atomic and Molecular Physics 5: Scattering Dynamics
Adlong	Sarah	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Adlong	Sarah	Wed 12 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 9C – Quantum Information, Concepts and Coherence 9: Quantum Theory
Ahlefeldt	Rose	Mon 10 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 3C – Quantum Information, Concepts and Coherence 3: Optical Quantum Memories
Ahmed	Muhammad Hamid	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Ahmed	Asif	Tue 11 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 4E – Nuclear and Particle Physics 4
Akram	Uzma	Wed 12 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 8C – Quantum Information, Concepts and Coherence 8: Optomechanics
Albomoz	Andres	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Aldus	Bob	Thur 13 Dec	1530	1630	Central Lecture Block 8	Concurrent Session 12B – Condensed-Matter, Materials and Surface Physics 12: Spin Chains, Spin Ladders and Spin Ice
Alexander	Rafael	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Allwood	Gary	Wed 12 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 9G – Australian Conference on Optical Fibre Technology 9
Alshahrani	Badriah	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Alvares	Darren	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Anderson	Emma	Wed 12 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 7D – Atomic and Molecular Physics 7: Matter Interactions
Andres Arroyo	Ana	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Angove	Matthew	Mon 10 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 2H – Acoustic, Music and Ultrasonics and History of Physics
Arnison	Matthew	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Anstie	James	Thur 13 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 10H – Optics, Photonics and Lasers 15: Spectroscopy
Antonosyan	Diana	Wed 12 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 8A – Optics, Photonics and Lasers 8: Nonlinear Optics 1
Aramesh	Morteza	Mon 10 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 1B – Condensed-Matter, Materials and Surface Physics 1: Graphene and Diamond
Aramesh	Morteza	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Arie	Ady	Wed 12 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 8A – Optics, Photonics and Lasers 8: Nonlinear Optics 1
Arkwright	John	Tue 11 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 5G – Australian Conference on Optical Fibre Technology 5
Armitage	Simon	Mon 10 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 1D – Atomic and Molecular Physics 1: Anti-hydrogen / Positrons
Armstrong	Seiji	Mon 10 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 2C – Quantum Information, Concepts and Coherence 2: Optical Quantum Computing
Armstrong	Seiji	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Arnold	William	Mon 10 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 1A – Optics, Photonics and Lasers 1: Nanofabrication
Arnold	Matthew	Tue 11 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 5B – Condensed-Matter, Materials and Surface Physics 5: Optical & Meta-materials
Artlett	Christopher	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Aslanides	John	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Attygalle	Manik	Thur 13 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 10G – Australian Conference on Optical Fibre Technology 10
Avdeev	Maxim	Mon 10 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 2B – Condensed-Matter, Materials and Surface Physics 2: Bulk Magnetism
Avdeev	Maxim	Tue 11 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 5B – Condensed-Matter, Materials and Surface Physics 5: Optical & Meta-materials
Baker	Mark	Thur 13 Dec	1530	1630	Central Lecture Block 6	Concurrent Session 12C – Quantum Information, Concepts and Coherence 13: Cold Atoms 2
Balazs	Csaba	Mon 10 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 1E – Nuclear and Particle Physics 1
Baldes	Iason	Tue 11 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 5E – Nuclear and Particle Physics 5
Baldwin	Ken	Wed 12 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 9H – Optics, Photonics and Lasers 14: Ultra-precise Frequency Determination and Distribution
Ball	Harrison	Tue 11 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 4A – Optics, Photonics and Lasers 4: Lasers 1
Baltar	Henrique	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Bangert	Andrea	Tue 11 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 6H – Nuclear and Particle Physics 6
Barberio	Elisabetta	Thur 13 Dec	0945	1030	Central Lecture Block 7	Plenary 8
Barry	Richard	Thur 13 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 11E – Relativity & Gravitation 2
Basiri-Esfahani	Sahar	Wed 12 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 8C – Quantum Information, Concepts and Coherence 8: Optomechanics
Bastow	Tim	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Baynes	Fred	Thur 13 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 10H – Optics, Photonics and Lasers 15: Spectroscopy
Bayu Aji	Leonardus Bimo	Wed 12 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 9B – Condensed-Matter, Materials and Surface Physics 9: Semiconductors-II
Bedding	Tim	Wed 12 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 9E – Astronomy and Astrophysics 2: Science Session
Ben-Meir	Doron	Tue 11 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 5H – Industry 2
Benmessai	Karim	Tue 11 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 6D – Atomic and Molecular Physics 6: Theory
Bennet	Adam	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Bennet	Francis	Wed 12 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 8E – Astronomy and Astrophysics 1: Instrumentation Session
Bennet	Francis	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Bennett	James	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Bentley	Christopher	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1

Berengut	Julian	Tue 11 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 6D — Atomic and Molecular Physics 6: Theory
Bernu	Julien	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Berry	Dominic	Tue 11 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 6A — Joint: Quantum Information, Concepts + Optics, Photonics and Lasers : Trends in Quantum Optics
Bertinshaw	Joel	Mon 10 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 3B — Condensed-Matter, Materials and Surface Physics 3: Spintronics and Magnetic Films
Besters	Christopher	Mon 10 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 3G — Australian Conference on Optical Fibre Technology 3
Biercuk	Michael	Thur 13 Dec	1530	1630	Central Lecture Block 5	Concurrent Session 12D — Quantum Information, Concepts and Coherence 12: Trapped Ions
Bilson-Thompson	Sundance	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Birks	Tim	Mon 10 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 3G — Australian Conference on Optical Fibre Technology 3
Blake	Samuel	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Bland-Hawthorn	Joss	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Blanvillain	Sylvain	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Boadle	Roisin	Mon 10 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 1D — Atomic and Molecular Physics 1: Anti-hydrogen / Positrons
Boisson	Frederic	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Boisson	Frederic	Wed 12 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 9F — Complex Systems, Computational and Mathematical Physics 2
Bolt	Andrew	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Bonnie	Fadi	Wed 12 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 8H — Optics, Photonics and Lasers 13: Plasmonics (Fabrication)
Boston	Allen	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Bouya	Zahra	Tue 11 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 6E — Solar, Terrestrial and Space Physics 1
Bowen	Warwick	Wed 12 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 8C — Quantum Information, Concepts and Coherence 8: Optomechanics
Bowman	David	Wed 12 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 9H — Optics, Photonics and Lasers 14: Ultra-precise Frequency Determination and Distribution
Boyle	Gregory	Mon 10 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 1D — Atomic and Molecular Physics 1: Anti-hydrogen / Positrons
Brodac	Carlo	Thur 13 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 11H — Optics, Photonics and Lasers 16: Single Photon Sources
Brodby	Jodie	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Brodby	Jodie	Wed 12 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 9B — Condensed-Matter, Materials and Surface Physics 9: Semiconductors-II
Bradly	Chris	Tue 11 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 4D — Atomic and Molecular Physics 4: Cold Atoms / BEC
Branciard	Cyril	Tue 11 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 6C — Quantum Information, Concepts and Coherence 6: Quantum Foundations
Brawley	George	Mon 10 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 3A — Optics, Photonics and Lasers 3: Metamaterials and Nanoresonators
Brawley	George	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Bray	Igor	Mon 10 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 3D — Atomic and Molecular Physics 3: Positron Scattering Theory
Breen	Andrew	Tue 11 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 4B — Condensed-Matter, Materials and Surface Physics 4: Material Physics
Brell	Courtney	Tue 11 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 5C — Quantum Information, Concepts and Coherence 5: Quantum Information Theory
Brennan	Amelia	Tue 11 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 5E — Nuclear and Particle Physics 5
Brennen	Gavin	Tue 11 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 5C — Quantum Information, Concepts and Coherence 5: Quantum Information Theory
Bridgeman	Jacob	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Briggs	Adam	Mon 10 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 1F — Biomedical Physics 1
Broderick	Neil	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Bromley	Michael	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Broome	Matthew	Tue 11 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 6A — Joint: Quantum Information, Concepts + Optics, Photonics and Lasers: Trends in Quantum Optics
Brown	William	Tue 11 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 4F — Biophysics 2
Buckley	Craig	Thur 13 Dec	1530	1630	Central Lecture Block 3	Concurrent Session 12F — Energy, Energy Materials and Energy Systems
Bui	Ann	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Builth-Williams	Joseph	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Bujnowski	Bogusz	Thur 13 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 11B — Condensed-Matter, Materials and Surface Physics 11: Theoretical Condensed-Matter Physics
Bukaski	Alex	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Burke	Adam	Wed 12 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 8B — Condensed-Matter, Materials and Surface Physics 8: Semiconductors-I
Burke	Adam	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Byrne	Hilary	Mon 10 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 1F — Biomedical Physics 1
Byrne	Keal	Tue 11 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 5B — Condensed-Matter, Materials and Surface Physics 5: Optical & Meta-materials
Cai	Boyuan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Calvert	James	Tue 11 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 5D — Atomic and Molecular Physics 5: Scattering Dynamics
Campbell	Geoff	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Campbell	Laurence	Wed 12 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 7D — Atomic and Molecular Physics 7: Matter Interactions
Canning	John	Thur 13 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 11H — Optics, Photonics and Lasers 16: Single Photon Sources
Cao	Yaoyu	Wed 12 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 8H — Optics, Photonics and Lasers 13: Plasmonics (Fabrication)
Carroll	Aidan	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Carter	Ian	Tue 11 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 5E — Nuclear and Particle Physics 5
Carvalho	Andre	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Casas-Bedoya	Alvaro	Mon 10 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 2G — Australian Conference on Optical Fibre Technology 2
Casey	Madalyn	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Castelletto	Stefania	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1

Castelletto	Stefania	Thur 13 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 11H – Optics, Photonics and Lasers 16: Single Photon Sources
Catchpole	Kylie	Wed 12 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 8H – Optics, Photonics and Lasers 13: Plasmonics (Fabrication)
Ceguerra	Anna	Thur 13 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 10F – Condensed-Matter, Materials and Surface Physics 13: Instruments & Methods
Cereser	Alberto	Wed 12 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 7H – Joint: Optics, Photonics and Lasers + Condensed-Matter, Materials and Surface Physics (X-ray Optics)
Chapman	Robert	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Charles	Andrew	Mon 10 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 3H – Environmental Physics
Charles	Andrew	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Charlton	Mike	Mon 10 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 1D – Atomic and Molecular Physics 1: Anti-hydrogen / Positrons
Chelkowska	Elzbieta	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Chiarì	Luca	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Chiarì	Luca	Wed 12 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 7D – Atomic and Molecular Physics 7: Matter Interactions
Chiarì	Luca	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Chon	James	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Chow	Jong	Mon 10 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 3A – Optics, Photonics and Lasers 3: Metamaterials and Nanoresonators
Chow	Timothy TY	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Chrzanowski	Helen	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Chua	Sheon	Wed 12 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 7C – Quantum Information, Concepts and Coherence 7: Frontiers in Quantum Optics
Chung	Kelvin	Mon 10 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 3G – Australian Conference on Optical Fibre Technology 3
Cirio	Mauro	Tue 11 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 5C – Quantum Information, Concepts and Coherence 5: Quantum Information Theory
Clark	Alex	Mon 10 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 2G – Australian Conference on Optical Fibre Technology 2
Claven	Elliott	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Cleland	Andrew	Tue 11 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 4C – Quantum Information, Concepts and Coherence 4: Superconducting Quantum Devices
Cole	Robin	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Cole	Jared	Wed 12 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 7B – Condensed-Matter, Materials and Surface Physics 7: Superconductivity
Collins	Matthew	Thur 13 Dec	1530	1630	Central Lecture Block 2	Concurrent Session 12G – Australian Conference on Optical Fibre Technology 12
Cook	Kevin	Tue 11 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 5G – Australian Conference on Optical Fibre Technology 5
Cook	Kevin	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Cortie	David	Mon 10 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 3B – Condensed-Matter, Materials and Surface Physics 3: Spintronics and Magnetic Films
Cortie	Michael	Tue 11 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 4B – Condensed-Matter, Materials and Surface Physics 4: Material Physics
Cortie	David	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Cotton	Daniel	Wed 12 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 9E – Astronomy and Astrophysics 2: Science Session
Couch	Warrick	Wed 12 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 9E – Astronomy and Astrophysics 2: Science Session
Coughlan	Hannah	Wed 12 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 7H – Joint: Optics, Photonics and Lasers + Condensed-Matter, Materials and Surface Physics (X-ray Optics)
Coutts	David	Tue 11 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 4A – Optics, Photonics and Lasers 4: Lasers 1
Cranch	Geoffrey	Wed 12 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 9G – Australian Conference on Optical Fibre Technology 9
Crawford	Stephanie	Wed 12 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 7G – Australian Conference on Optical Fibre Technology 7
Creedon	Daniel	Mon 10 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 2H – Acoustic, Music and Ultrasonics and History of Physics
Cresser	James	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Croot	Xanthe	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Cumming	Benjamin	Mon 10 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 1A – Optics, Photonics and Lasers 1: Nanofabrication
Cunningham	Thomas	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Cuthbert	Cameron	Mon 10 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 3E – Nuclear and Particle Physics 3
Cvetojevic	Nick	Wed 12 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 8E – Astronomy and Astrophysics 1: Instrumentation Session
Dalla Pozza	Nicola	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Daniel	Scott	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Danos	Andrew	Wed 12 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 8D – Atomic and Molecular Physics 8: Spin
Darmawan	Andrew	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Davis	Tim	Mon 10 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 3A – Optics, Photonics and Lasers 3: Metamaterials and Nanoresonators
Davis	Tim	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Davis	Matthew	Thur 13 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 11C – Quantum Information, Concepts and Coherence 11: Cold Atoms 1
Dawson	Sophie	Mon 10 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 3E – Nuclear and Particle Physics 3
De Cesare	Mario	Mon 10 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 3H – Environmental Physics
De Luca	Sergio	Wed 12 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 7F – Rheology 2
Decker	Manuel	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Decker	Manuel	Wed 12 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 7A – Optics, Photonics and Lasers 7: Metamaterials
Dehollain	Juan Pablo	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Demarie	Tommaso	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Demarie	Tommaso	Thur 13 Dec	1530	1630	Central Lecture Block 4	Concurrent Session 12E – Relativity and Gravitation 3
Deng	Guochu	Wed 12 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 7B – Condensed-Matter, Materials and Surface Physics 7: Superconductivity
Deng	Guochu	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2

Dennis	Graham	Mon 10 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 3C – Quantum Information, Concepts and Coherence 3: Optical Quantum Memories
Dennis	Graham	Tue 11 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 6E – Solar, Terrestrial and Space Physics 1
Devendra	Geethaka	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Digonnet	Michel	Tue 11 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 5G – Australian Conference on Optical Fibre Technology 5
Djalalian-Assl	Amir	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Digath	Svetlana	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Doherty	Marcus	Thur 13 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 10C – Quantum Information, Concepts and Coherence 10: Spins in Solids
Dong	Jiahao	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Doshi	Chandni	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Dossou	Kokou B	Wed 12 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 7A – Optics, Photonics and Lasers 7: Metamaterials
Drumm	Daniel	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Drumm	Daniel	Wed 12 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 9B – Condensed-Matter, Materials and Surface Physics 9: Semiconductors-II
Drummond	Peter	Thur 13 Dec	1530	1630	Central Lecture Block 6	Concurrent Session 12C – Quantum Information, Concepts and Coherence 13: Cold Atoms 2
Duan	Yuwen	Wed 12 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 8G – Australian Conference on Optical Fibre Technology 8
Dubois	Timothy	Tue 11 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 4C – Quantum Information, Concepts and Coherence 4: Superconducting Quantum Devices
Duldig	Marc	Tue 11 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 6E – Solar, Terrestrial and Space Physics 1
Dumon	Pieter	Mon 10 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 2A – Optics, Photonics and Lasers 2: Classical Optics: From Fundamentals to Fabrication
Duong	Ly	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Dutta	Ranojit Kumar	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Duty	Timothy	Tue 11 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 4C – Quantum Information, Concepts and Coherence 4: Superconducting Quantum Devices
Earl	Stuart	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Ebendorff-Heidepriem	Heike	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Eckerskom	Niko	Thur 13 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 11A – Optics, Photonics and Lasers 11: Trapping and Beams
Edmonds	Andrew	Mon 10 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 2F – Biomedical Physics 2
Edwards	Lyndon	Tue 11 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 5H – Industry 2
Egami	Chikara	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Eggleton	Benjamin	Mon 10 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 1G – Australian Conference on Optical Fibre Technology 1
Egorov	Mikhail	Wed 12 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 8D – Atomic and Molecular Physics 8: Spin
Egorov	Mikhail	Thur 13 Dec	1530	1630	Central Lecture Block 6	Concurrent Session 12C – Quantum Information, Concepts and Coherence 13: Cold Atoms 2
Elbohouty	Maher	Tue 11 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 4F – Biophysics 2
Elliman	Robert	Mon 10 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 1B – Condensed-Matter, Materials and Surface Physics 1: Graphene and Diamond
Elliman	Robert	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Ellis	Andrew	Thur 13 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 10G – Australian Conference on Optical Fibre Technology 10
Ernest	Allan	Wed 12 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 9E – Astronomy and Astrophysics 2: Science Session
Ernest	Allan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Evans	Jacob	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Evans	Paul	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Evans	Denis	Wed 12 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 7F – Rheology 2
Fairchild	Barbara	Thur 13 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 10B – Condensed-Matter, Materials and Surface Physics 10: Semiconductors-III
Fan	Bixuan	Mon 10 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 1C – Quantum Information, Concepts and Coherence 1: Optical Quantum Information
Farr	Warrick	Tue 11 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 4C – Quantum Information, Concepts and Coherence 4: Superconducting Quantum Devices
Farrant	David	Wed 12 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 7E – Solar, Terrestrial and Space Physics 2
Ferguson	Kate	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Fernandez-Corbaton	Ivan	Mon 10 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 2A – Optics, Photonics and Lasers 2: Classical Optics: From Fundamentals to Fabrication
Ferreyrol	Franck	Mon 10 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 2C – Quantum Information, Concepts and Coherence 2: Optical Quantum Computing
Ferris	Peter	Tue 11 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 4G – Australian Conference on Optical Fibre Technology 4
Feteris	Susan	Wed 12 Dec	1230	1330	Central Lecture Block 8	Women in Physics Lunch Session
Fifield	Keith	Mon 10 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 2E – Nuclear and Particle Physics 2
Finlayson	Trevor	Tue 11 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 4B – Condensed-Matter, Materials and Surface Physics 4: Material Physics
Fisk	Peter	Tue 11 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 5H – Industry 2
Flambaum	Victor	Tue 11 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 6D – Atomic and Molecular Physics 6: Theory
Flambaum	Victor	Tue 11 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 6H – Nuclear and Particle Physics 6
Flambaum	Victor	Wed 12 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 9E – Astronomy and Astrophysics 2: Science Session
Fleddermann	Roland	Wed 12 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 9H – Optics, Photonics and Lasers 14: Ultra-precise Frequency Determination and Distribution
Forstner	Stefan	Thur 13 Dec	1530	1630	Central Lecture Block 7	Concurrent Session 12A – Optics, Photonics and Lasers 12: Nanomeasurement
Foster	Scott	Wed 12 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 9G – Australian Conference on Optical Fibre Technology 9
Francis	Matt	Wed 12 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 7E – Solar, Terrestrial and Space Physics 2

Francis	Sam	Wed 12 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 9H – Optics, Photonics and Lasers 14: Ultra-precise Frequency Determination and Distribution
Fulcher	Rachael	Thur 13 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 11A – Optics, Photonics and Lasers 11: Trapping and Beams
Fursa	Dmity	Mon 10 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 3D – Atomic and Molecular Physics 3: Positron Scattering Theory
Fursa	Dmity	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Gabay	Natasha C.	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Goebel	Torsten	Thur 13 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 11D – Joint: Quantum Information, Concepts and Condensed-Matter, Materials and Surface Physics
Gai	Xin	Mon 10 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 1G – Australian Conference on Optical Fibre Technology 1
Gai	Xin	Tue 11 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 6G – Australian Conference on Optical Fibre Technology 6
Galakhov	Evgeny	Wed 12 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 8F – Complex Systems, Computational and Mathematical Physics 1
Galakhov	Evgeny	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Gamaly	Eugene	Wed 12 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 9A – Optics, Photonics and Lasers 9: Non-linear Optics 2
Gangat	Adil	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Ganija	Miftar	Tue 11 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 4A – Optics, Photonics and Lasers 4: Lasers 1
Garvey	Chris	Mon 10 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 2F – Biomedical Physics 2
Garvey	Chris	Tue 11 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 6B – Condensed-Matter, Materials and Surface Physics 6: Positrons and Nanoscience
Gensemer	Stephen	Tue 11 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 4D – Atomic and Molecular Physics 4: Cold Atoms / BEC
Gervinskas	Gediminas	Thur 13 Dec	1530	1630	Central Lecture Block 1	Concurrent Session 12H – Optics, Photonics and Lasers 17: Novel Techniques in Optical Measurement
Ghatreh-Samani	Sajad	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Gibson	Stephen	Mon 10 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 2D – Atomic and Molecular Physics 2: Chemical Physics
Gibson	Brant	Thur 13 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 10C – Quantum Information, Concepts and Coherence 10: Spins in Solids
Gilbert	Elliot Paul	Wed 12 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 7F – Rheology 2
Goldys	Ewa	Thur 13 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 10A – Optics, Photonics and Lasers 10: Plasmonics 2
Gomez	Daniel	Wed 12 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 8H – Optics, Photonics and Lasers 13: Plasmonics (Fabrication)
Gontchar	Igor	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Gorjara	Tina	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Gossel	Graeme	Thur 13 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 10E – Relativity and Gravitation 1
Grant	Ken	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Green	Todd	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Greentree	Andrew	Thur 13 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 11D – Joint: Quantum Information, Concepts and Condensed-Matter, Materials and Surface Physics
Grineviciute	Janina	Mon 10 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 1D – Atomic and Molecular Physics 1: Anti-hydrogen / Positrons
Grineviciute	Janina	Mon 10 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 3E – Nuclear and Particle Physics 3
Guagliardo	Paul	Tue 11 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 6B – Condensed-Matter, Materials and Surface Physics 6: Positrons and Nanoscience
Guagliardo	Paul	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Guccione	Giovanni	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Haberl	Bianca	Wed 12 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 8B – Condensed-Matter, Materials and Surface Physics 8: Semiconductors-I
Haine	Simon	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Hajizadeh	Elnaz	Tue 11 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 6F – Rheology 1
Hall	Nathan	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Hall	Michael	Tue 11 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 6C – Quantum Information, Concepts and Coherence 6: Quantum Foundations
Hall	Michael	Wed 12 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 9C – Quantum Information, Concepts and Coherence 9: Quantum Theory
Hamilton	Murray	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Hamilton	Alex	Wed 12 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 8B – Condensed-Matter, Materials and Surface Physics 8: Semiconductors-I
Hanna	Noel	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Hannam	Kirsty	Mon 10 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 3A – Optics, Photonics and Lasers 3: Metamaterials and Nanoresonators
Harabati	Celal	Mon 10 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 3D – Atomic and Molecular Physics 3: Positron Scattering Theory
Harris	Glen	Wed 12 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 8C – Quantum Information, Concepts and Coherence 8: Optomechanics
Harvey-Smith	Lisa	Wed 12 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 8E – Astronomy and Astrophysics 1: Instrumentation Session
Hawkings	Christopher	Mon 10 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 2H – Acoustic, Music and Ultrasonics and History of Physics
Hayward	Andrew	Thur 13 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 11B – Condensed-Matter, Materials and Surface Physics 11: Theoretical Condensed-Matter Physics
He	Jiakun	Tue 11 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 6G – Australian Conference on Optical Fibre Technology 6
Heckenberg	Norman	Mon 10 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 2H – Acoustic, Music and Ultrasonics and History of Physics
Heckenberg	Norman	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Henry	Bruce	Wed 12 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 9F – Complex Systems, Computational and Mathematical Physics 2
Herrman	Jan	Thur 13 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 10F – Condensed-Matter, Materials and Surface Physics 13: Instruments & Methods
Hill	Anita	Tue 11 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 6B – Condensed-Matter, Materials and Surface Physics 6: Positrons and Nanoscience
Hill	Matthew	Wed 12 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 9D – Physics Education 1
Hinckley	Steven	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Hinckley	Steven	Wed 12 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 9D – Physics Education 1
Hinde	David	Mon 10 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 2E – Nuclear and Particle Physics 2
Ho	Joseph	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1

Hole	Matthew	Mon 10 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 1H – Plasma Physics
Hollenberg	Lloyd	Thur 13 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 10C – Quantum Information, Concepts and Coherence 10: Spins in Solids
Hope	Anthony	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Hamibrook	John	Tue 11 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 4C – Quantum Information, Concepts and Coherence 4: Superconducting Quantum Devices
Horowitz	Gary	Wed 12 Dec	945	1030	Central Lecture Block 7	Plenary 6
Horsley	Andrew	Tue 11 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 4D – Atomic and Molecular Physics 4: Cold Atoms / BEC
Hoschke	Nigel	Mon 10 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 3G – Australian Conference on Optical Fibre Technology 3
Hoxley	David	Mon 10 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 1B – Condensed-Matter, Materials and Surface Physics 1: Graphene and Diamond
Hu	Tomonori	Thur 13 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 11G – Australian Conference on Optical Fibre Technology 11
Hudson	Darren	Thur 13 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 11G – Australian Conference on Optical Fibre Technology 11
Hughes	Jacob	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Humble	John	Tue 11 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 6E – Solar, Terrestrial and Space Physics 1
Hush	Michael	Mon 10 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 3C – Quantum Information, Concepts and Coherence 3: Optical Quantum Memories
Hush	Michael	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Hutchison	Wayne	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Inam	Faraz	Thur 13 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 11H – Optics, Photonics and Lasers 16: Single Photon Sources
Inta	Ra	Thur 13 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 11E – Relativity & Gravitation 2
Inta	Ra	Wed 12 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 8F – Complex Systems, Computational and Mathematical Physics 1
Inta	Ra	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Izdebskaya	Yana	Wed 12 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 9A – Optics, Photonics and Lasers 9: Non-linear Optics 2
Jamieson	David	Thur 13 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 11D – Joint: Quantum Information, Concepts and Condensed-Matter, Materials and Surface Physics
Jelezko	Fedor	Thur 13 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 10C – Quantum Information, Concepts and Coherence 10: Spins in Solids
Jeng	Geng-Yuan	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Jeske	Jan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Jia	Baohua	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Jin	Dayong	Mon 10 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 3F – Biophysics 1
Joly	Nicolas	Mon 10 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 2G – Australian Conference on Optical Fibre Technology 2
Jones	Darryl	Wed 12 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 8D – Atomic and Molecular Physics 8: Spin
Judge	Alexander	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kabakova	Irina	Thur 13 Dec	1530	1630	Central Lecture Block 2	Concurrent Session 12G – Australian Conference on Optical Fibre Technology 12
Kabakova	Irina	Thur 13 Dec	1530	1630	Central Lecture Block 2	Concurrent Session 12G – Australian Conference on Optical Fibre Technology 12
Kadyrov	Alisher	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kalra	Rachpon	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Kan	Rui feng	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kandasamy	Ramachandran	Mon 10 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 2E – Nuclear and Particle Physics 2
Karle	Timothy	Thur 13 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 11H – Optics, Photonics and Lasers 16: Single Photon Sources
Kathi	Sudarshan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Keevers	Thomas	Thur 13 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 10C – Quantum Information, Concepts and Coherence 10: Spins in Solids
Kennedy	Shane	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Kennedy	Shane	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Kennedy	Shane	Thur 13 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 11F – Condensed-Matter, Materials and Surface Physics 14
Kennedy	Brendan	Tue 11 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 5G – Australian Conference on Optical Fibre Technology 5
Kent	Ben	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Khalid	Asma	Mon 10 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 3F – Biophysics 1
Khansur	Neamul Hayet	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kheruntsyan	Karen	Thur 13 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 11C – Quantum Information, Concepts and Coherence 11: Cold Atoms 1
Kheruntsyan	Karen	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kibedi	Tibor	Tue 11 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 4E – Nuclear and Particle Physics 4
Kim	Jung-Ha	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kinsler	Paul	Wed 12 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 7A – Optics, Photonics and Lasers 7: Metamaterials
Kirkup	Les	Wed 12 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 9D – Physics Education 1
Kisi	Erich	Tue 11 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 4B – Condensed-Matter, Materials and Surface Physics 4: Material Physics
Kisi	Erich	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kitzler	Ondrej	Tue 11 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 5A – Optics, Photonics and Lasers 5: Lasers 2 and Laser Applications
Klemradt	Uwe	Wed 12 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 7H – Joint: Optics, Photonics and Lasers + Condensed-Matter, Materials and Surface Physics (X-ray Optics)
Klose	Frank	Mon 10 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 3B – Condensed-Matter, Materials and Surface Physics 3: Spintronics and Magnetic Films
Knight	Peter	Tue 11 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 6A – Joint: Quantum Information, Concepts + Optics, Photonics and Lasers: Trends in Quantum Optics
Kobakhidze	Archil	Tue 11 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 5E – Nuclear and Particle Physics 5
Kocsis	Sacha	Mon 10 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 1C – Quantum Information, Concepts and Coherence 1: Optical Quantum Information
Konigsberg	David	Tue 11 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 6F – Rheology 1

Konno	Hidetoshi	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kono	Mitsu	Mon 10 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 2D – Atomic and Molecular Physics 2: Chemical Physics
Kononov	Dmitry	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kostecki	Roman	Tue 11 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 5G – Australian Conference on Optical Fibre Technology 5
Kostylev	Nikita	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Kou	Shan Shan	Mon 10 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 3F – Biophysics 1
Kozlov	Alexander	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Kruk	Sergey	Mon 10 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 3A – Optics, Photonics and Lasers 3: Metamaterials and Nanoresonators
Kuchiev	Michael	Mon 10 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 2E – Nuclear and Particle Physics 2
Kuhlmeiy	Boris	Tue 11 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 6G – Australian Conference on Optical Fibre Technology 6
Kunic	Zdenka	Tue 11 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 4F – Biophysics 2
Kurumthodathu Surendran	Prince	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Lal	Rajeev	Mon 10 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 3H – Environmental Physics
Lam	Ping Koy	Mon 10 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 3C – Quantum Information, Concepts and Coherence 3: Optical Quantum Memories
Lam	Ping Koy	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Lam	Timothy	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Lancaster	David	Thur 13 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 11G – Australian Conference on Optical Fibre Technology 11
Lane	Greg	Mon 10 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 1E – Nuclear and Particle Physics 1
Lapine	Mikhail	Tue 11 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 5B – Condensed-Matter, Materials and Surface Physics 5: Optical & Meta-materials
Large	Maryanne	Tue 11 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 4H – Industry 1
Lau	Desmond	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Lawrance	Warren	Mon 10 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 2D – Atomic and Molecular Physics 2: Chemical Physics
Lee	Boon	Mon 10 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 3E – Nuclear and Particle Physics 3
Lee	Andrew	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Lee	Wai Tung Hal	Thur 13 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 11F – Condensed-Matter, Materials and Surface Physics 14
Lee	Michael	Tue 11 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 4A – Optics, Photonics and Lasers 4: Lasers 1
Legge	Samuel	Mon 10 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 2G – Australian Conference on Optical Fibre Technology 2
Lerch	Michael	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Lerch	Michael	Tue 11 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 5F – Biophysics 3
Lewis	Benjamin	Thur 13 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 11E – Relativity & Gravitation 2
Leykam	Daniel	Wed 12 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 9A – Optics, Photonics and Lasers 9: Non-linear Optics 2
Li	Xiangping	Mon 10 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 1A – Optics, Photonics and Lasers 1: Nanofabrication
Li	Bo	Wed 12 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 7E – Solar, Terrestrial and Space Physics 2
Light	Philip	Tue 11 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 4D – Atomic and Molecular Physics 4: Cold Atoms / BEC
Lin	Jipeng	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Liss	Klaus-Dieter	Tue 11 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 4B – Condensed-Matter, Materials and Surface Physics 4: Material Physics
Liss	Klaus-Dieter	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Little	Douglas	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Litvinyuk	Igor	Wed 12 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 8D – Atomic and Molecular Physics 8: Spin
Liu	Mingkai	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Liu	Qiang	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Loan	Mushtaq	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Loan	Mushtaq	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Lobino	Mirko	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Loke	Vincent	Mon 10 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 2A – Optics, Photonics and Lasers 2: Classical Optics: From Fundamentals to Fabrication
Love	John	Mon 10 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 3G – Australian Conference on Optical Fibre Technology 3
Luiten	Andre	Tue 11 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 4G – Australian Conference on Optical Fibre Technology 4
Lund	Austin	Mon 10 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 2C – Quantum Information, Concepts and Coherence 2: Optical Quantum Computing
Luo	Xiwang	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Luo	Yanhua	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Luther-Davies	Barry	Mon 10 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 2G – Australian Conference on Optical Fibre Technology 2
Luther-Davies	Barry	Wed 12 Dec	1230	1250	Central Lecture Block 7	2012 AOS W.H. (Beattie) Steel Medal Winner
Machacek	Joshua	Tue 11 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 5D – Atomic and Molecular Physics 5: Scattering Dynamics
Madden	Steve	Tue 11 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 6G – Australian Conference on Optical Fibre Technology 6
Madhava Warrior	Aravindan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Mahoney	Alice	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Majumder	Mainak	Tue 11 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 6F – Rheology 1
Maksymov	Ivan	Thur 13 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 10A – Optics, Photonics and Lasers 10: Plasmonics 2
Maleki	Alireza	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Malikharjuna Rao	Muthavarapu	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Mangalampalli	Kiran	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Mapperson	Tim	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2

Martin	Scott	Tue 11 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 4H – Industry 1
Martin	Andrew	Tue 11 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 8D – Atomic and Molecular Physics 8: Spin
Martin	Aiden	Wed 12 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 9E – Astronomy and Astrophysics 2: Science Session
Martin	Tamara	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Marzban	Sara	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Mason	Thomas	Mon 10 Dec	900	945	Clancy Auditorium	Plenary 1
McAuslan	David	Wed 12 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 8C – Quantum Information, Concepts and Coherence 8: Optomechanics
McCamey	Dane	Thur 13 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 10B – Condensed-Matter, Materials and Surface Physics 10: Semiconductors-III
McClelland	David	Thur 13 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 10E – Relativity and Gravitation 1
McFerran	John	Tue 11 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 4D – Atomic and Molecular Physics 4: Cold Atoms / BEC
McGlynn	Peter	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
McInTyree Roome	Garry	Thur 13 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 10F – Condensed-Matter, Materials and Surface Physics 13: Instruments & Methods
McKay	Aaron	Tue 11 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 5A – Optics, Photonics and Lasers 5: Lasers 2 and Laser Applications
McKenzie	Warren	Tue 11 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 4H – Industry 1
McLaren	Jason	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
McLean	Russell	Mon 10 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 2D – Atomic and Molecular Physics 2: Chemical Physics
McMahon	Nathan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
McNamara	Aimee	Mon 10 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 1F – Biomedical Physics 1
McNamara	Aimee	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Meikle	Steve	Mon 10 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 3F – Biophysics 1
Menicucci	Nicolas	Tue 11 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 5C – Quantum Information, Concepts and Coherence 5: Quantum Information Theory
Menicucci	Nicolas	Tue 11 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 6D – Atomic and Molecular Physics 6: Theory
Menicucci	Nicolas	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Micolich	Adam	Thur 13 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 10B – Condensed-Matter, Materials and Surface Physics 10: Semiconductors-III
Micolich	Adam	Wed 12 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 9B – Condensed-Matter, Materials and Surface Physics 9: Semiconductors-II
Mildren	Richard	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Miller	Nicholas	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Mills	James	Wed 12 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 9A – Optics, Photonics and Lasers 9: Non-linear Optics 2
Minovich	Alexander	Thur 13 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 10A – Optics, Photonics and Lasers 10: Plasmonics 2
Mitchell	Emma	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Mitroy	Jim	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Mohammadi	Narges	Thur 13 Dec	1530	1630	Central Lecture Block 3	Concurrent Session 12F – Energy, Energy Materials and Energy Systems
Mohd Noor	Muhammad Yusuf	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Mohiyaddin	Fahd	Thur 13 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 11F – Condensed-Matter, Materials and Surface Physics 14
Mohsin	A.S.M.	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Mole	Richard	Mon 10 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 2B – Condensed-Matter, Materials and Surface Physics 2: Bulk Magnetism
Mole	Richard	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Mole	Richard	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Molina-Terriza	Gabriel	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Monks	Will	Tue 11 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 4H – Industry 1
Moore	Sam	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Morello	Andrea	Thur 13 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 11D – Joint: Quantum Information, Concepts and Condensed-Matter, Materials and Surface Physics
Morrison	Peter	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Moss	David	Wed 12 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 7G – ACOFT 7 Lasers 1
Moss	David	Tue 11 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 6G – Australian Conference on Optical Fibre Technology 6
Mueller	Dennis	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Muhonen	Juha	Wed 12 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 9B – Condensed-Matter, Materials and Surface Physics 9: Semiconductors-II
Mulders	Annemieke	Mon 10 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 2B – Condensed-Matter, Materials and Surface Physics 2: Bulk Magnetism
Murphy	Tony	Mon 10 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 1H – Plasma Physics
Murray	Alan	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Myers	Casey	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Naqshbandi	Masood	Wed 12 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 8G – Australian Conference on Optical Fibre Technology 8
Neely	Tyler	Thur 13 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 10H – Optics, Photonics and Lasers 15: Spectroscopy
Neely	Tyler	Thur 13 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 11C – Quantum Information, Concepts and Coherence 11: Cold Atoms 1
Negahbani	Ehsan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Neo	Richard	Wed 12 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 8A – Optics, Photonics and Lasers 8: Nonlinear Optics 1
Neshev	Dragomir	Wed 12 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 7A – Optics, Photonics and Lasers 7: Metamaterials
Netherway	David	Tue 11 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 6E – Solar, Terrestrial and Space Physics 1
Neudegg	Dave	Wed 12 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 7E – Solar, Terrestrial and Space Physics 2
Ng	Jin Aun	Mon 10 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 2F – Biomedical Physics 2
Ng	Sebastian	Thur 13 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 11G – Australian Conference on Optical Fibre Technology 11
Ng	Vincent	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2

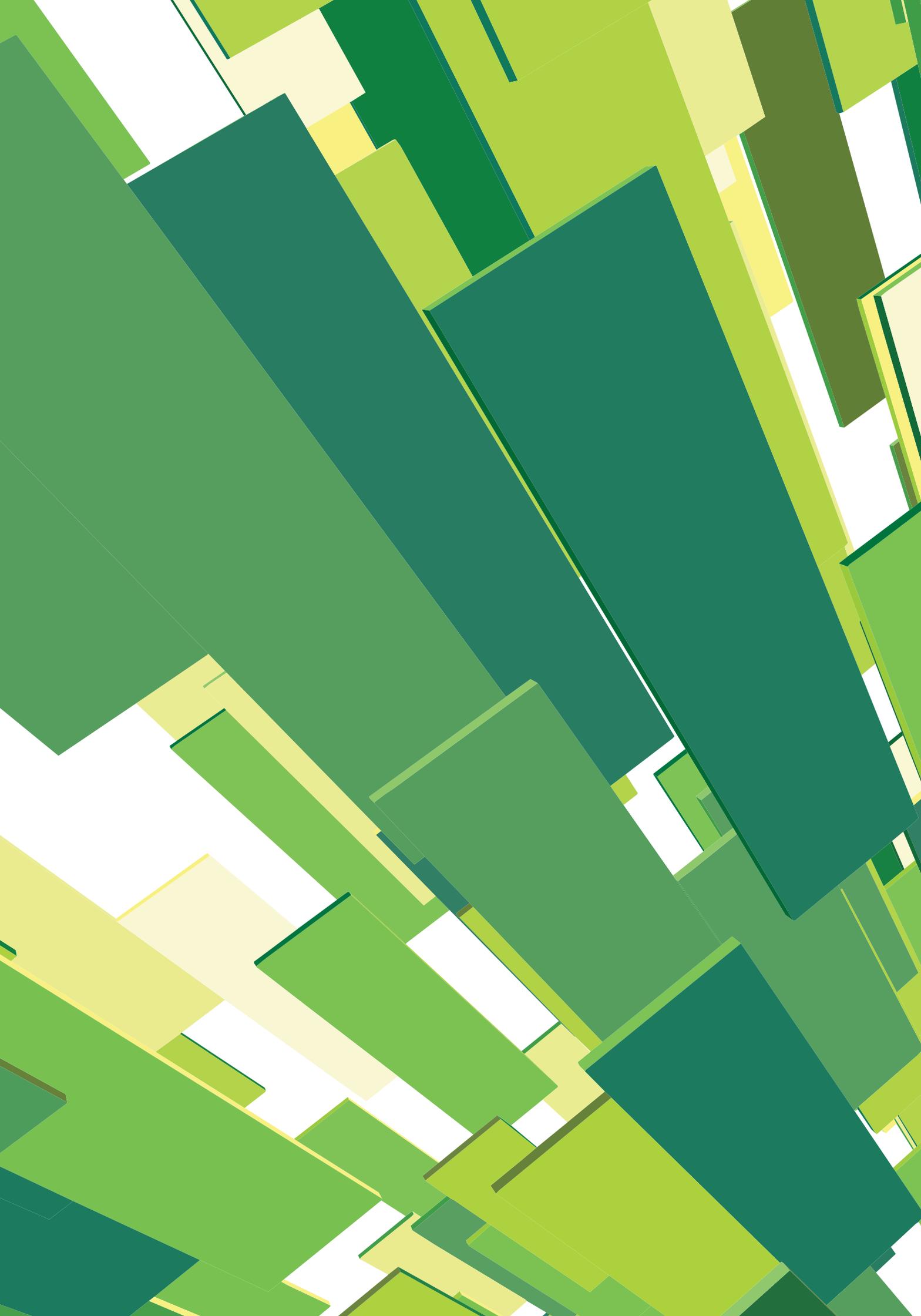
Ng Zhe Hui	Mapril	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Ngo	Silvie	Wed 12 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 8E – Astronomy and Astrophysics 1: Instrumentation Session
Nguyen	Thanh	Thur 13 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 11E – Relativity & Gravitation 2
Nicholson	Timothy	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Nicholson	Timothy	Tue 11 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 6F – Rheology 1
Nieminen	Timo	Mon 10 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 2H – Acoustic, Music and Ultrasonics and History of Physics
Nieminen	Timo	Wed 12 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 9D – Physics Education 1
Nieminen	Timo	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Norton	Benjamin	Thur 13 Dec	1530	1630	Central Lecture Block 5	Concurrent Session 12D – Quantum Information, Concepts and Coherence 12: Trapped Ions
Nugent	Keith	Wed 12 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 7H – Joint: Optics, Photonics and Lasers + Condensed-Matter, Materials and Surface Physics (X-ray Optics)
Nunes Haninger	Guilherme	Mon 10 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 2E – Nuclear and Particle Physics 2
Nuti	Francesco	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
O'Brien	Aroon	Thur 13 Dec	1530	1630	Central Lecture Block 8	Concurrent Session 12B – Condensed-Matter, Materials and Surface Physics 12: Spin Chains, Spin Ladders and Spin Ice
O'Byrne	John	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Oermann	Michael	Wed 12 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 7G – Australian Conference on Optical Fibre Technology 7
Oitmaa	Jaan	Thur 13 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 11B – Condensed-Matter, Materials and Surface Physics 11: Theoretical Condensed-Matter Physics
Oitmaa	Jaan	Thur 13 Dec	1530	1630	Central Lecture Block 8	Concurrent Session 12B – Condensed-Matter, Materials and Surface Physics 12: Spin Chains, Spin Ladders and Spin Ice
Ong	Andrew	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Opanchuk	Bogdan	Thur 13 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 11B – Condensed-Matter, Materials and Surface Physics 11: Theoretical Condensed-Matter Physics
Orr	Brian	Thur 13 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 10H – Optics, Photonics and Lasers 15: Spectroscopy
Özyilmaz	Barbaros	Mon 10 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 1B – Condensed-Matter, Materials and Surface Physics 1: Graphene and Diamond
Palalani	Nyaladzi	Tue 11 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 5E – Nuclear and Particle Physics 5
Paliawadana	Prasanga	Tue 11 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 5D – Atomic and Molecular Physics 5: Scattering Dynamics
Palsson	Matthew	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Pan	Alexey V	Wed 12 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 7B – Condensed-Matter, Materials and Surface Physics 7: Superconductivity
Paquot	Yvan	Mon 10 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 1G – Australian Conference on Optical Fibre Technology 1
Paradowska	Anna	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Parappilly	Maria	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Paviolo	Chiara	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Paviolo	Chiara	Tue 11 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 5F – Biophysics 3
Pelusi	Mark	Mon 10 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 1G – Australian Conference on Optical Fibre Technology 1
Pereira De Almeida	Marcelo	Tue 11 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 6C – Quantum Information, Concepts and Coherence 6: Quantum Foundations
Perrella	Christopher	Thur 13 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 10H – Optics, Photonics and Lasers 15: Spectroscopy
Perunicic	Viktor	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Petrasiunas	Matthew	Thur 13 Dec	1530	1630	Central Lecture Block 1	Concurrent Session 12H – Optics, Photonics and Lasers 17: Novel Techniques in Optical Measurement
Pienaar	Jacques	Wed 12 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 9C – Quantum Information, Concepts and Coherence 9: Quantum Theory
Pivrikas	Almantas	Thur 13 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 10B – Condensed-Matter, Materials and Surface Physics 10: Semiconductors-III
Pla	Jarryd	Thur 13 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 11D – Joint: Quantum Information, Concepts and Condensed-Matter, Materials and Surface Physics
Pollard	Judith	Thur 13 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 10D – Physics Education 2
Poulton	Christopher	Wed 12 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 8G – Australian Conference on Optical Fibre Technology 8
Poznic	Dominic	Mon 10 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 1H – Plasma Physics
Prabhakar	Ranganathan	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Prabhakar	Ranganathan	Tue 11 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 5F – Biophysics 3
Prabhakar	Ranganathan	Wed 12 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 7F – Rheology 2
Preece	Daryl	Thur 13 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 11A – Optics, Photonics and Lasers 11: Trapping and Beams
Price	Don	Tue 11 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 4B – Condensed-Matter, Materials and Surface Physics 4: Material Physics
Prokopovich	Dale	Mon 10 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 1F – Biomedical Physics 1
Prokopovich	Dale	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Prokopovich	Dale	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Pryde	Geoff	Mon 10 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 1C – Quantum Information, Concepts and Coherence 1: Optical Quantum Information
Puikkasenil	Cibby	Thur 13 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 10G – Australian Conference on Optical Fibre Technology 10
Pullen	Michael	Mon 10 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 2D – Atomic and Molecular Physics 2: Chemical Physics
Rados	Pere	Tue 11 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 4E – Nuclear and Particle Physics 4
Rahimi-Keshari	Saleh	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Rajan	Puvanesvari	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Rajan	Genu	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Rajasekharan Unnithan	Ranjith	Wed 12 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 8G – Australian Conference on Optical Fibre Technology 8

Rayner	Anton	Thur 13 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 10D – Physics Education 2
Reed	Matthew	Tue 11 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 6H – Nuclear and Particle Physics 6
Rehm	Christine	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Reid	Margaret	Wed 12 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 9C – Quantum Information, Concepts and Coherence 9: Quantum Theory
Rej	Ewa	Mon 10 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 1B – Condensed-Matter, Materials and Surface Physics 1: Graphene and Diamond
Reshitnyk	Yarema	Wed 12 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 7B – Condensed-Matter, Materials and Surface Physics 7: Superconductivity
Reynoso	Andres Alejandro	Thur 13 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 11B – Condensed-Matter, Materials and Surface Physics 11: Theoretical Condensed-Matter Physics
Rider	Amanda	Mon 10 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 1H – Plasma Physics
Riesen	Nicolas	Thur 13 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 10G – Australian Conference on Optical Fibre Technology 10
Ringbauer	Martin	Tue 11 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 6C – Quantum Information, Concepts and Coherence 6: Quantum Foundations
Ringsmuth	Andrew	Thur 13 Dec	1530	1630	Central Lecture Block 3	Concurrent Session 12F – Energy, Energy Materials and Energy Systems
Roberts	Ann	Thur 13 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 10A – Optics, Photonics and Lasers 10: Plasmonics 2
Roberts	Benjamin	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Robinson	Peter	Wed 12 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 8F – Complex Systems, Computational and Mathematical Physics 1
Robson	Robert	Thur 13 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 10B – Condensed-Matter, Materials and Surface Physics 10: Semiconductors-III
Robson	Brian	Tue 11 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 6H – Nuclear and Particle Physics 6
Roda	Chiara	Mon 10 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 1E – Nuclear and Particle Physics 1
Rode	Andrei	Thur 13 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 11F – Condensed-Matter, Materials and Surface Physics 14
Rohde	Peter	Tue 11 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 5C – Quantum Information, Concepts and Coherence 5: Quantum Information Theory
Rosales-Zarate	Laura	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Rowell	Gavin	Wed 12 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 8E – Astronomy and Astrophysics 1: Instrumentation Session
Rozenfeld	Anatoly	Mon 10 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 2F – Biomedical Physics 2
Rudolf	Petra	Wed 12 Dec	900	945	Central Lecture Block 7	Plenary 5
Rule	Kirily	Thur 13 Dec	1530	1630	Central Lecture Block 8	Concurrent Session 12B – Condensed-Matter, Materials and Surface Physics 12: Spin Chains, Spin Ladders and Spin Ice
Sabbatini	Jacopo	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Sabella	Alexander	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Safronova	Marianna	Tue 11 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 6D – Atomic and Molecular Physics 6: Theory
Safronova	Marianna	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Salfi	Joseph	Thur 13 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 11F – Condensed-Matter, Materials and Surface Physics 14
Samarin	Sergey	Mon 10 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 3B – Condensed-Matter, Materials and Surface Physics 3: Spintronics and Magnetic Films
Sambale	Sebastian	Mon 10 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 2B – Condensed-Matter, Materials and Surface Physics 2: Bulk Magnetism
Sathian	Juna	Wed 12 Dec	1230	1330	Central Lecture Block 7	Women in Physics Lunch Session
Sathian	Juna	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Saunders	Dylan	Tue 11 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 6C – Quantum Information, Concepts and Coherence 6: Quantum Foundations
Savage	Jeremy	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Say	Jana	Tue 11 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 5F – Biophysics 3
Schediwy	Sascha	Wed 12 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 9H – Optics, Photonics and Lasers 14: Ultra-precise Frequency Determination and Distribution
Schmidt	Brian	Thur 13 Dec	900	945	Central Lecture Block 7	Plenary 7
Schouten	Peter	Mon 10 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 3H – Environmental Physics
See	Andrew	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
September	Cindy	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Sevior	Martin	Mon 10 Dec	1530	1700	Central Lecture Block 4	Concurrent Session 3E – Nuclear and Particle Physics 3
Shaddock	Daniel	Tue 11 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 4G – Australian Conference on Optical Fibre Technology 4
Shadrivov	Ilya	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Shadrivov	Ilya	Tue 11 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 5B – Condensed-Matter, Materials and Surface Physics 5: Optical & Meta-materials
Sheng	Yan	Wed 12 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 8A – Optics, Photonics and Lasers 8: Nonlinear Optics 1
Sheridan	Eoin	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Sherrill	Bradley	Tue 11 Dec	0945	1030	Central Lecture Block 7	Plenary 4
Shin	Heedeuk	Wed 12 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 9A – Optics, Photonics and Lasers 9: Non-linear Optics 2
Shoko	Elvis	Thur 13 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 11B – Condensed-Matter, Materials and Surface Physics 11: Theoretical Condensed-Matter Physics
Shortell	Matthew	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Shvedov	Vladlen	Thur 13 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 11A – Optics, Photonics and Lasers 11: Trapping and Beams
Siddiquee	Arif M.	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Simmons	Michelle	Wed 12 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 8B – Condensed-Matter, Materials and Surface Physics 8: Semiconductors-I
Simpson	David	Mon 10 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 3F – Biophysics 1
Simula	Tapio	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Sjoberg	Svein	Mon 10 Dec	945	1030	Clancy Auditorium	Plenary 2
Slagmolen	Bram	Thur 13 Dec	1530	1630	Central Lecture Block 4	Concurrent Session 12E – Relativity & Gravitation 3
Smith	Shaun	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Smith	Graham N	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2

Smith	Jackson	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Soare	Alexander	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Solov'yov	Andrey V.	Mon 10 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 1F – Biomedical Physics 1
Soni	Nitesh	Mon 10 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 1E – Nuclear and Particle Physics 1
Soo	William	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Spaleniak	Izabela	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Sparkes	Ben	Mon 10 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 3C – Quantum Information, Concepts and Coherence 3: Optical Quantum Memories
Sparkes	Ben	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Sprouster	David	Tue 11 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 6B – Condensed-Matter, Materials and Surface Physics 6: Positrons and Nanoscience
Srnck	Michaela	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Stace	Tom	Wed 12 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 8D – Atomic and Molecular Physics 8: Spin
Stadnik	Yevgeny	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Stampfl	Anton	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Stampfl	Anton	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Stark	Sebastian	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Startsev	Michael	Tue 11 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 4F – Biophysics 2
Staude	Isabelle	Mon 10 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 1A – Optics, Photonics and Lasers 1: Nanofabrication
Staude	Isabelle	Wed 12 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 8H – Optics, Photonics and Lasers 13: Plasmonics (Fabrication)
Steel	Michael	Wed 12 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 7C – Quantum Information, Concepts and Coherence 7: Frontiers in Quantum Optics
Steel	Michael	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Steele	John	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Stening	Robert	Wed 12 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 7E – Solar, Terrestrial and Space Physics 2
Stevens-Kalceff	Marion	Thur 13 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 10F – Condensed-Matter, Materials and Surface Physics 13: Instruments & Methods
Stevenson	Robin	Mon 10 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 2C – Quantum Information, Concepts and Coherence 2: Optical Quantum Computing
Stewart	Glen	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Steyn-Ross	Alistair	Wed 12 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 9F – Complex Systems, Computational and Mathematical Physics 2
Stickland	Anthony	Wed 12 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 7F – Rheology 2
Stilgoe	Alexander	Thur 13 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 11A – Optics, Photonics and Lasers 11: Trapping and Beams
Storbeboom	Jelle	Thur 13 Dec	1530	1630	Central Lecture Block 1	Concurrent Session 12H – Optics, Photonics and Lasers 17: Novel Techniques in Optical Measurement
Streed	Erik	Thur 13 Dec	1530	1630	Central Lecture Block 5	Concurrent Session 12D – Quantum Information, Concepts and Coherence 12: Trapped Ions
Streed	Erik	Tue 11 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 4F – Biophysics 2
Strickland	Donna	Tue 11 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 5A – Optics, Photonics and Lasers 5: Lasers 2 and Laser Applications
Stuchbery	Andrew	Tue 11 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 4E – Nuclear and Particle Physics 4
Sukhorukov	Andrey	Mon 10 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 2A – Optics, Photonics and Lasers 2: Classical Optics: From Fundamentals to Fabrication
Sukhorukov	Andrey	Wed 12 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 8A – Optics, Photonics and Lasers 8: Nonlinear Optics 1
Sukov	Alexander	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
SUN	Yue	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Sushkov	Oleg	Mon 10 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 3B – Condensed-Matter, Materials and Surface Physics 3: Spintronics and Magnetic Films
Sushkov	Oleg	Thur 13 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 10E – Relativity and Gravitation 1
Sutton	Andrew	Thur 13 Dec	1530	1630	Central Lecture Block 7	Concurrent Session 12A – Optics, Photonics and Lasers 12: Nanomeasurement
Swaim	Jon	Thur 13 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 10A – Optics, Photonics and Lasers 10: Plasmonics 2
Swan	Geoff	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Syarif	Rizki	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Szigeti	Stuart	Tue 11 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 4D – Atomic and Molecular Physics 4: Cold Atoms / BEC
Szarkovszky	Alex	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Tam	Eugene	Mon 10 Dec	1100	1230	Central Lecture Block 1	Concurrent Session 1H – Plasma Physics
Tanner	Roger	Tue 11 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 6F – Rheology 1
Tattersall	Wade	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Taylor	Adam	Mon 10 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 1A – Optics, Photonics and Lasers 1: Nanofabrication
Taylor	Michael	Wed 12 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 7C – Quantum Information, Concepts and Coherence 7: Frontiers in Quantum Optics
Teniswood	Clara	Mon 10 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 2F – Biomedical Physics 2
Teo	Edward	Thur 13 Dec	1530	1630	Central Lecture Block 4	Concurrent Session 12E – Relativity & Gravitation 3
Terno	Daniel	Wed 12 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 9C – Quantum Information, Concepts and Coherence 9: Quantum Theory
Terno	Daniel	Thur 13 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 10E – Relativity and Gravitation 1
Terno	Daniel	Thur 13 Dec	1530	1630	Central Lecture Block 4	Concurrent Session 12E – Relativity & Gravitation 3
Tettamanzi	Giuseppe Carlo	Thur 13 Dec	1100	1230	Central Lecture Block 3	Concurrent Session 10F – Condensed-Matter, Materials and Surface Physics 13: Instruments & Methods
Thomson	Robert	Wed 12 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 8G – Australian Conference on Optical Fibre Technology 8
Threlfall	Philip	Thur 13 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 10E – Relativity and Gravitation 1
Tikhomirov	Alexei	Wed 12 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 7G – Australian Conference on Optical Fibre Technology 7
Tims	Stephen	Mon 10 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 3H – Environmental Physics
Tischler	Nora	Thur 13 Dec	1530	1630	Central Lecture Block 7	Concurrent Session 12A – Optics, Photonics and Lasers 12: Nanomeasurement
Tobar	Michael	Thur 13 Dec	1330	1500	Central Lecture Block 4	Concurrent Session 11E – Relativity & Gravitation 2
Tobar	Michael	Tue 11 Dec	1100	1230	Central Lecture Block 4	Concurrent Session 4E – Nuclear and Particle Physics 4

Toe	Wen Jun	Thur 13 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 11A – Optics, Photonics and Lasers 11: Trapping and Beams
Tollerud	Jonathan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Tomljenovic-Hanic	Snjezana	Thur 13 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 11H – Optics, Photonics and Lasers 16: Single Photon Sources
Toomey	Joshua	Tue 11 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 5A – Optics, Photonics and Lasers 5: Lasers 2 and Laser Applications
Tourell	Manique	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Tourell	Manique	Tue 11 Dec	1330	1500	Central Lecture Block 3	Concurrent Session 5F – Biophysics 3
Town	Graham	Thur 13 Dec	1100	1230	Central Lecture Block 2	Concurrent Session 10G – Australian Conference on Optical Fibre Technology 10
Town	Graham	Wed 12 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 9G – Australian Conference on Optical Fibre Technology 9
Truscott	Andrew	Thur 13 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 11C – Quantum Information, Concepts and Coherence 11: Cold Atoms 1
Uchiyama	Yusuke	Wed 12 Dec	1530	1700	Central Lecture Block 3	Concurrent Session 9F – Complex Systems, Computational and Mathematical Physics 2
Utamuratov	Ravshanbek	Wed 12 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 7D – Atomic and Molecular Physics 7: Matter Interactions
Uvarova	Liudmila	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Uvarova	Liudmila	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Van Dao	Lap	Tue 11 Dec	1100	1230	Central Lecture Block 7	Concurrent Session 4A – Optics, Photonics and Lasers 4: Lasers 1
Van Der Laan	Timothy	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Vance	Eric	Tue 11 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 6B – Condensed-Matter, Materials and Surface Physics 6: Positrons and Nanoscience
Vandewater	Luke	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Venugopalan	Priyamvada	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Vidal	Xavier	Mon 10 Dec	1330	1500	Central Lecture Block 7	Concurrent Session 2A – Optics, Photonics and Lasers 2: Classical Optics: From Fundamentals to Fabrication
Vo	Thanh Phong	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Vu	Khu	Thur 13 Dec	1330	1500	Central Lecture Block 2	Concurrent Session 11G – Australian Conference on Optical Fibre Technology 11
Vu	Khu	Thur 13 Dec	1530	1630	Central Lecture Block 2	Concurrent Session 12G – Australian Conference on Optical Fibre Technology 12
Vuckovic	Jelena	Tue 11 Dec	0900	0945	Central Lecture Block 7	Plenary 3
Wade	Andrew	Mon 10 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 1C – Quantum Information, Concepts and Coherence 1: Optical Quantum Information
Walden	Sarah	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Walden	Sarah	Thur 13 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 10D – Physics Education 2
Walk	Nathan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Walker	Kelly	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Wallman	Joel	Tue 11 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 6C – Quantum Information, Concepts and Coherence 6: Quantum Foundations
Wallner	Anton	Tue 11 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 6H – Nuclear and Particle Physics 6
Wan Ismail	Wan Zakiah	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Wang	Feng	Mon 10 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 3D – Atomic and Molecular Physics 3: Positron Scattering Theory
Wang	Feng	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Wang	Anna	Thur 13 Dec	1530	1630	Central Lecture Block 7	Concurrent Session 12A – Optics, Photonics and Lasers 12: Nanomeasurement
Wang	Xiaolin	Wed 12 Dec	1100	1230	Central Lecture Block 8	Concurrent Session 7B – Condensed-Matter, Materials and Surface Physics 7: Superconductivity
Wang	Daisy	Wed 12 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 8B – Condensed-Matter, Materials and Surface Physics 8: Semiconductors-I
Wang	Kyle	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Wardrop	Matthew	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Watts	Andrew	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Wegener	Margaret	Thur 13 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 10D – Physics Education 2
Wegener	Margaret	Wed 12 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 9D – Physics Education 1
Weinhold	Till	Mon 10 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 1C – Quantum Information, Concepts and Coherence 1: Optical Quantum Information
Weinhold	Till	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Weng	Wenle	Wed 12 Dec	1530	1700	Central Lecture Block 1	Concurrent Session 9H – Optics, Photonics and Lasers 14: Ultra-precise Frequency Determination and Distribution
Weston	Morgan	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Whale	Ben	Thur 13 Dec	1530	1630	Central Lecture Block 4	Concurrent Session 12E – Relativity & Gravitation 3
Wheatley	Brad	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
White	Andrew	Wed 12 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 7C – Quantum Information, Concepts and Coherence 7: Frontiers in Quantum Optics
White	Ronald	Wed 12 Dec	1100	1230	Central Lecture Block 5	Concurrent Session 7D – Atomic and Molecular Physics 7: Matter Interactions
Wild	Graham	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Williams	Jim	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Williams	Jim	Tue 11 Dec	1330	1500	Central Lecture Block 5	Concurrent Session 5D – Atomic and Molecular Physics 5: Scattering Dynamics
Williams	Jim	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Williamson	Dominic	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Willowson	Kathy	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Wiseman	Howard	Wed 12 Dec	1100	1230	Central Lecture Block 6	Concurrent Session 7C – Quantum Information, Concepts and Coherence 7: Frontiers in Quantum Optics
Wolfe	Joe	Mon 10 Dec	1330	1500	Central Lecture Block 1	Concurrent Session 2H – Acoustic, Music and Ultrasonics and History of Physics
Wong	Sherman	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Wong	Martin	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Wood	James	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Woodley	Thomas	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Wright	Tod	Thur 13 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 11C – Quantum Information, Concepts and Coherence 11: Cold Atoms 1

Xia	Keyu	Mon 10 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 2C – Quantum Information, Concepts and Coherence 2: Optical Quantum Computing
Xia	Keyu	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Xie	Shouyi	Tue 11 Dec	1330	1500	Central Lecture Block 8	Concurrent Session 5B – Condensed-Matter, Materials and Surface Physics 5: Optical & Meta-materials
Yan	Zhizhong	Mon 10 Dec	1330	1500	Central Lecture Block 6	Concurrent Session 2C – Quantum Information, Concepts and Coherence 2: Optical Quantum Computing
Yang	Changyi	Wed 12 Dec	1530	1700	Central Lecture Block 8	Concurrent Session 9B – Condensed-Matter, Materials and Surface Physics 9: Semiconductors-II
Yang	Chih-Hwan Henry	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Yue	Jason	Mon 10 Dec	1700	1830	Tyree Room	Poster Session 1
Zambrana-Puyalto	Xavier	Mon 10 Dec	1530	1700	Central Lecture Block 7	Concurrent Session 3A – Optics, Photonics and Lasers 3: Metamaterials and Nanoresonators
Zammit	Mark	Mon 10 Dec	1530	1700	Central Lecture Block 5	Concurrent Session 3D – Atomic and Molecular Physics 3: Positron Scattering Theory
Zeller	Eike	Wed 12 Dec	1530	1700	Central Lecture Block 2	Concurrent Session 9G – Australian Conference on Optical Fibre Technology 9
Zhang	Yinan	Thur 13 Dec	1530	1630	Central Lecture Block 3	Concurrent Session 12F – Energy, Energy Materials and Energy Systems
Zhang	Jianzhong	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Zhang	Lixin	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Zhang	Qiming	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Zhang	Manjin	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Zill	Jan	Thur 13 Dec	1530	1630	Central Lecture Block 6	Concurrent Session 12C – Quantum Information, Concepts and Coherence 13: Cold Atoms 2
Zittermann	Barbara	Wed 12 Dec	1700	1830	Tyree Room	Poster Session 2
Zwierz	Marcin	Wed 12 Dec	1530	1700	Central Lecture Block 6	Concurrent Session 9C – Quantum Information, Concepts and Coherence 9: Quantum Theory



For further information contact;

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