CONGRESS HANDBOOK

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AUSTRALIAN INSTITUTE OF PHYSICS
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AUSTRALIAN OPTICAL SOCIETY

Australian National University

THE 21ST INTERNATIONAL

Congress of the Australian Institute of Physics

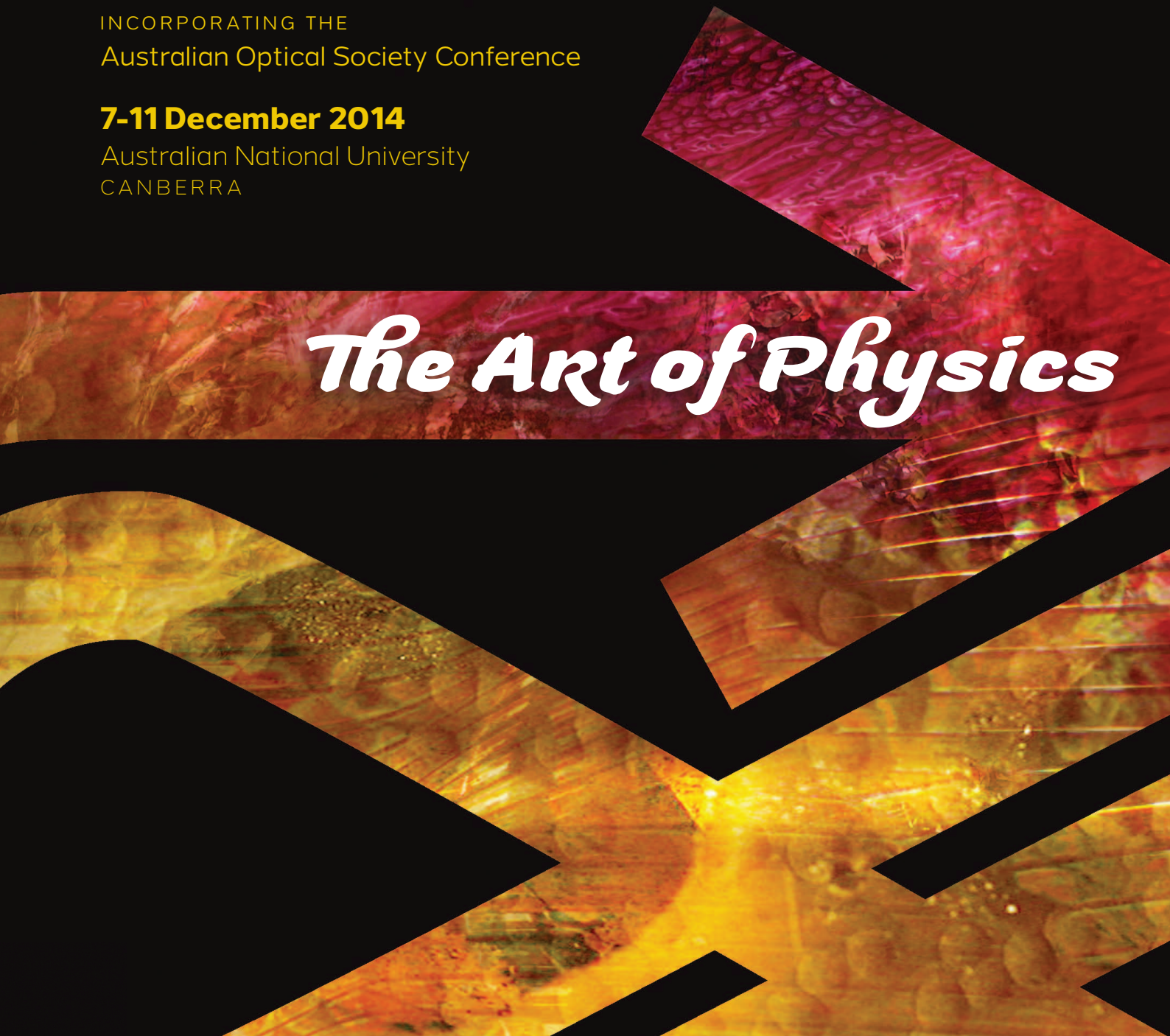
INCORPORATING THE

Australian Optical Society Conference

7-11 December 2014

Australian National University

CANBERRA



7-11 December 2014
Manning Clark Centre
Australian National University
CANBERRA

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The Art of Physics

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The Ian Potter Foundation — Professor Serge Haroche

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AIP President's welcome

On behalf of the Australian Institute of Physics, it is my pleasure to welcome you to the 21st Congress of the Australian Institute of Physics at the Australian National University in Canberra. As usual, the Congress is being held in partnership with the Australian Optical Society. This marks the third time the AIP Congress has been held in Canberra, the most recent being in 2005 and the first in 1982.

Our colleagues in the Australian Capital Territory have put together a very strong program, and I hope that you enjoy it to the full. This year (2014) is the United Nations **International Year of Crystallography** and 2015 will be the United Nations **International Year of Light and Light-based Technologies**. Of course, both fields feature prominently in the Congress program. As I write, it is particularly exciting that this year's Nobel Prizes in both Physics and Chemistry are in the area of "light and light-based technologies."

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: John Howard and his local organising committee; Joe Hope and his Scientific Program Committee; the host organisations (AIP and AOS); and Conference Logistics our conference organisers.

I sincerely wish all participants an enjoyable and productive Congress.

Dr Rob Robinson
PRESIDENT, AUSTRALIAN INSTITUTE OF PHYSICS

Congress Committee welcome

Welcome to the 21st Australian Institute of Physics Congress which is being held in Canberra at the Australian National University. The Congress incorporates the annual meeting of the Australian Optical Society as well as meetings of the many technical groups and discipline areas associated with the AIP. With approximately 700 delegates, the Congress is the largest professional meeting in the Australian physics calendar, and represents an important occasion for the community to keep up to date with breakthrough developments from around the world.

Our theme **The Art of Physics** allows us to explore the links between, and the beauty of physics and art. There is an art to doing physics, and our apparatus is often the work of artisans. Our scientific images are sometimes beautiful and intriguing. Some physicists are active in the art community, and some artists find inspiration in physics. To generate a creative and stimulating atmosphere, delegates, sponsors and exhibitors have been encouraged to be adventurous in working the theme into their presentations, posters and exhibits.

The four day program includes plenary lectures, parallel sessions, poster sessions, corporate exhibits and various activities associated with our theme. A highlight will be the special public forum with Steven Chu and Lawrence Krauss on Monday evening (participation free-of-charge for delegates). The meeting will offer a variety of settings and opportunities, such as the Welcome Reception, the Congress Dinner at the National Gallery and the Mount Stromlo tour, for delegates to catch up with old friends and colleagues.

We are extremely pleased to have assembled a stellar cast of plenary speakers, including two Nobel Prize winners, with leaders in many fields. We will hear about the latest developments in energy and climate, and learn more about basic physics from the quantum world through to cosmology.

A conference such as this would not be possible without the support of our sponsors, and in particular our major sponsors – the ANU, Griffith University, ANSTO and the Institute of Physics. In challenging economic times we have also been able to attract sponsors for each of our plenary speakers, and we thank them for their support. Our strong contingent of exhibitors highlights the importance of our sector to the business community and also underlines their ongoing support for our activities. The exhibition space has been designed to provide a friendly and relaxed space for interaction with our exhibitors, and I urge all delegates to take advantage of this opportunity.

The Congress venue at the ANU is within walking distance of the CBD and is in close proximity to national museums, galleries, landmarks and monuments. The natural beauty of the National Capital is an ideal backdrop for showcasing the work of our community, and reminding ourselves, and the public, of the beauty of physics. Our PR team will be working hard to make sure that your work is seen and heard across the community.

Lastly and importantly, we would like to thank the various committee members, and our professional conference organisers ConLog, who have worked hard to prepare the conference and social events for your enjoyment. We look forward to meeting you at the welcome reception at the ANU Drill Hall Gallery on Sunday evening!

John Howard CHAIR
Joseph Hope PROGRAM CHAIR
Craig Savage SECRETARY

Acknowledgments

Congress organising committee

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P 02 6281 6624
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For assistance during the conference please phone the Registration Desk on 0448 576 105.

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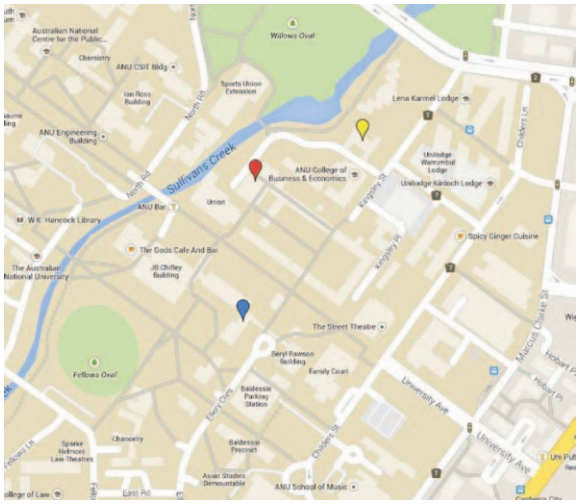


Congress registration

The registration desk is located in the entrance foyer of the Manning Clark Centre and will be open for the duration of the congress to serve as your main point of contact for all congress related enquiries. The registration desk can be contacted throughout the congress on mobile 0448 576 105. The registration desk is open at the following times:

Sunday 7 December 2014
3:00pm to 4:30pm *(at Manning Clark Centre)*
5:30pm to 7:00pm *(at the Welcome Reception)*

Monday 8 December 2014
8:00am to 6:00pm

Tuesday 9 December 2014
8:00am to 6:00pm

Wednesday 10 December 2014
8:00am to 6:00pm

Thursday 11 December 2014
8:00am to 6:00pm

Catering and dietary requirements

Morning, afternoon teas and lunches are held each day in the Exhibition Hall located in Melville Hall, a short walk from the Manning Clark Centre. Catering is served as an informal stand-up buffet. Dietary requirements noted on your registration have been passed on to the catering staff. Vegetarian options are available within the main catering options. A dedicated table is available for those delegates that advised of other specific dietary requirements. Please ask the catering staff to assist if required.

At the Congress Dinner, dietary meals will be provided as requested on your registration. Please advise the banquet staff of your request.

Congress app ▸ *bring your own device*

A new initiative for AIP 2014 is the congress app. We hope you will find this app a useful resource to navigate the congress. You will find the following resources on the app:

- Congress program
- Congress information such as venue, contact numbers
- Keynote Speaker biographies and abstracts
- List of speakers
- Option to take notes during each session, and email them to your inbox
- Option to create 'my schedule' with your favourite sessions
- Sponsor and exhibitor profiles
- Push notifications during the congress
- Feedback forms to have your say about the congress.

Download the App from the App store or Google Play store by searching 'AIP 2014'. For assistance on using the AIP2014 conference app please see the staff at the registration desk.

Delegate list

A delegate list with name, organisation and state is available to be viewed on the congress app. Alternatively a hard copy is available from the Registration Desk. Anyone who indicated on their registration form that they did not want their details to appear on the list has not been included.

Dress

The dress for all congress sessions and the welcome reception is smart casual.

Evaluation survey

An online evaluation survey is available on the congress app during the congress. It will also be emailed to all delegates following the congress. Delegates are encouraged to complete the congress evaluation as it assists us to plan for future congresses.

Exhibition hours (Melville Hall)

Monday 8 December 2014
10:30am to 4:30pm

Tuesday 9 December 2014
8:30am to 4:30pm

Wednesday 10 December 2014
8:30am to 4:30pm

Thursday 11 December 2014
8:30am to 1:30pm

Internet access

The AIP Congress 2014 and ANU are pleased to offer all congress delegates free wifi access for the duration of the congress. Network: ANU Secure Network.
Username: a186866
Password: TLCSS2014@

Lost and found

Please report any lost or found property to the Registration Desk.

Luggage storage

There will be a cloakroom available on Thursday for delegates to store their luggage. Please note that this room is not secure, so it is recommended that valuables are not left unattended. See the staff at the registration desk for directions.

Mobile phones

As a courtesy to other delegates and speakers, please ensure all mobile phones are turned off or in 'silent' mode during all sessions and social functions.

Name badges

Your official congress name badge must be worn at all times as it is your entry to all congress sessions, the exhibition hall and social functions. Entry may be refused to anyone not wearing their name badge.

Parking

The congress organisers have sourced a limited number of four-day permits at a special price. Please see the registration desk to purchase your permit at a cost of $17.60.

There is also 'Pay and Display' parking available on site at the Australian National University. Please visit http://facilities.anu.edu.au/services/transport/visitor-parking for rates and locations of on-site parking.

Social functions

Alternatively, there are several multi-storey public parking facilities located a short walk from the University. 121 Marcus Clarke (*http://www.secureparking.com.au/car-parks/australia/act/canberra/Canberra%20CBD/121-marcus-clarke*) offers early-bird parking from $10 per day* (conditions apply) and is just a 3 minute walk to the University. Visit *http://www.secureparking.com.au/car-parks/australia/act/canberra/121-marcus-clarke* for more information.

Posters

Posters are located in Melville Hall. There will be three poster sessions over lunch on Monday, Tuesday and Wednesday. The posters will be available for viewing on these days from 10:30am until 4:30pm. Delegates are encouraged to view the posters during these times. Posters will change each day.

Poster presenters will be available near their posters between 1:00pm to 1:50pm to answer any questions.

Speakers' preparation room

The speakers' preparation room is located in Room G009. Upon arrival at the congress, all speakers are required to submit their presentation to the audio visual technician in the speakers' preparation room. Presentations will then be pre-loaded and streamed to the appropriate session room.

All speakers should report to their allocated session room 15 minutes prior to the start of their session to meet with the session chair and to check their presentation and layout of the room.

Special requirements

Every effort has been made to ensure people with special needs are catered for. If you have not previously advised the secretariat of any special dietary or disability requirements, please see the staff at the Registration Desk as soon as possible.

Travel

Airlines

Qantas 13 13 13
Virgin 13 67 89
Corporate Traveller 07 3181 9675

Taxis

Canberra Elite Cabs 13 22 27

Research School of Physics and Engineering National Facilities tour

Sunday 7 December 2014
4:00pm to 5:00pm

Tours of the RSPE National Facilities will run from 4.00pm sharp. Meet at the Mills Rd entrance to the Oliphant building (building 60). Facilities include: the Australian National Fabrication Facility, the H-1 Australian Plasma Fusion Research Facility, and the Heavy Ion Accelerator Facility.

Welcome reception

Sunday 7 December 2014
5:30pm to 7:00pm

Drill Hall Gallery, Building 29 Australian National University

Dress: smart casual

One ticket included with full registration but numbers are limited and the function is now fully subscribed.

The Congress sponsored exhibition 'Velocity' may be viewed to the accompaniment of a String Quartet.

Following the Reception, at 7:30pm, there will be a screening of Merilyn Fairskye's film **Precarious** about Chernobyl. Merilyn also has a video installation in the 'Velocity' exhibition. The screening will be in the China in the World building auditorium, about 15 minutes walk from the Drill Hall Gallery. (Building 188)

Public event: When does science matter?

Monday 8 December 2014, 6:15-7:45pm
refreshments from 5:45pm

Llewelyn Hall, ANU School of Music, Childers Street, ANU

Four of the world's most eminent scientists come together at ANU to discuss and deliberate on the biggest challenges facing the science community today.

- **Professor Steven Chu** co-recipient of the 1997 Nobel Prize for Physics and former US Secretary of Energy
- **Professor Brian Schmidt** co-recipient of the 2011 Nobel Prize for Physics and astrophysicist at ANU
- **Professor Lawrence Krauss** theoretical physicist at ANU and Arizona State University
- **Professor Lisa Randall** theoretical particle physicist and cosmologist at Harvard University.

Tickets were offered to AIP delegates with a closing date of 24 November. There are still limited tickets available but be quick.

Please contact events@anu.edu.au with the subject line **AIP RSVP for 8 December** to secure your complimentary ticket.

Poster session

Monday 8 December, Tuesday 9 December, Wednesday 10 December

Melville Hall, Australian National University

Poster sessions will be held in Melville Hall during the Congress lunch breaks. Light lunches will be provided. Contributed art works will be on exhibition in the Hall.

Mount Stromlo tour

Tuesday 9 December 2014
7:00pm to 10:00pm

Mount Stromlo Observatory

Dress: smart casual

Join us for an evening at Mt Stromlo Observatory.

Tickets can be purchased at $70 per ticket.

Ticket price includes drinks and canapes for two hours plus bus transfers.

Women in Physics breakfast

Tuesday 9 December 2014
7:30am to 8:45am

Interested delegates of all genders are invited to attend the Women in Physics Breakfast at Teatro Vivaldi Restaurant (ANU Union Court – just a few minutes walk from the conference venue.) The event is an opportunity to both network with others in the community and to reconstitute the Women in Physics committee. Expression of interest will be sought for the positions of Women in Physics Chair, Vice-Chair, Secretary/Treasurer and state representatives. Please contact Jodie.Bradby@anu.edu.au for further information.

Numbers are limited, so please see staff at the registration desk if you would like to register.

Congress dinner

Wednesday 10 December 2014
7:00pm to 11:00pm

National Gallery of Australia

Dress: smart casual

The Congress dinner will be held in Gandel Hall at the National Gallery of Australia.

Tickets can be purchased at a cost of $95 per ticket. Places are limited.

The dinner will start with a private tour of the main gallery. There will be musical entertainment. Gandel Hall opens onto a garden featuring the **Turrell Skyspace**, providing a great opportunity to experience sunset from within it.

Coaches will be provided between the university and the National Gallery of Australia before and after the dinner. Meeting points and pick-up times will be advised as they become available.

Professor Steven Chu

Keynote speakers

Prof Steven Chu served as the Secretary of Energy from 21 January 2009, to 22 April 2013.

Prof Chu was charged with helping implement President Obama's ambitious agenda to invest in clean energy, reduce our dependence on foreign oil, address the global climate crisis, and create millions of new jobs.

Prof Chu is the co-recipient of the Nobel Prize for Physics (1997) and has received numerous other awards. He has devoted his recent scientific career to the search for new solutions to our energy and climate challenges – a mission he continues with even greater urgency as Secretary of Energy.

Prior to his appointment, Prof Chu was the Director of the Department of Energy's Lawrence Berkeley National Lab, where he led the lab in pursuit of alternative and renewable energy technologies. He also taught at the University of California as a Professor of Physics and Professor of Molecular and Cell Biology. Previously, he held positions at Stanford University and AT&T Bell Laboratories.

Prof Chu's research in atomic physics, quantum electronics, polymer and biophysics includes tests of fundamental theories in physics, the development of methods to laser cool and trap atoms, atom interferometry, and the study of polymers and biological systems at the single molecule level. While at Stanford, he helped start Bio-X, a multi-disciplinary initiative that brings together the physical and biological sciences with engineering and medicine.

ABSTRACT:

Microscopy 2.0

Stephen Chu

Stanford University, Stanford, CA 94305 United States of America

Although the genomes of many animals, from worms to humans, have been sequenced, much of the detailed molecular understanding of the biology of these genes and their proteins is unknown. One of the major problems is that we cannot currently see what a protein does, where it is, and how it moves. Thus, most functional conclusions about a protein are necessarily indirect.

The visualization of the structure of DNA by Watson and Crick led to a true understanding of the concept of genes, transcription, and translation. In recent years, the invention of new imaging technologies is having a profound impact on biological sciences. I will discuss how a revolution in optical and electron microscopy will provide the tools that can have a profound impact on biology, biomedicine and bioengineering.

Professor Paul Corkum

Prof Corkum started his career as a theoretical physicist but changed to experiment when he arrived as a Post doctoral Fellow at the National Research Council (NRC) in 1973. He could make the change because as a grad student, he learned to repair his car. When asked during an interview at the NRC 'what makes you think you can become an experimentalist?' he could reply, 'it's no problem, I can take the engine of a car completely apart, repair it, and put it back together so it will work.' So they hired him.

At the National Research Council he concentrated first on laser physics but with the revolution in laser technology, intense laser pulses are now being applied in every discipline. Prof Corkum anticipated their impact. He is best known for introducing many of the concepts in strong field atomic and molecular science.

Prof Corkum is the Director of the Attosecond Science Program at the National Research Council and a Professor in the Department of Physics at the University of Ottawa. He is a member of the Royal Societies of London and of Canada. Among his awards are the Canadian Association of Physicists' gold medal for lifetime achievement in Physics (1996), the Royal Society of Canada's Tory award (2003), the Optical Societies Charles H. Townes award (2005) and the Institute of Electrical and Electronics Engineers' (IEEE) Quantum Electronics award (2005). In 2006 he has received an honorary degree from Acadia University, the Killam award for natural sciences. He was awarded the American Physical Society's Arthur L. Schawlow prize for Quantum Electronics. In 2007, he was inducted as an Officer to the Order of Canada and received the Natural Sciences and the Engineering Research Council's prestigious Polanyi Award in 2008. He is currently Canada Research Chair in Attosecond Photonics and an elected member of the US Academy of Science.

ABSTRACT

Atto-Science: What we learn by converting many photons into one

P. B. Corkum

Joint Attosecond Science Lab, University of Ottawa and National Research Council of Canada, Ottawa, Canada

Attosecond and high harmonic pulses are generated when high intensity light irradiates atoms, molecules or solids. During this interaction an electron can be extracted from the bound state of the system. It then moves under the influence of the field first away from the atom and then it is driven beck where it recollides.

Attosecond pulse generation can be understood via quantum trajectories of this ionizing electron. A trajectory begins from a bound state and returns to the same state after an excursion in the continuum. Quantum trajectories, such as these, map onto an interferometer – an electron interferometer created by light [1]. This mapping suggests that weak fields can perturb attosecond pulse generation and thereby we can construct perturbative nonlinear optics on top of the non-perturbative process [2].

A (sheared) interferometer can measure most properties of light so we should be able to measure most properties of the electron. I will show how this allows us develop an all optical method to fully characterize the space-time structure of attosecond pulses [3]. I will also show how high harmonic or attosecond spectroscopy can image molecular orbitals [4] or follow chemical dynamics of small molecules [5, 6] and how it can be extended to condensed media [7].

References
[1] P. B. Corkum, *Physics Today*, 64, 36, (2011).
[2] J. B. Bertrand et al, *Phys. Rev. Lett.* 106, 023001 (2011).
[3] K. T. Kim et al, *Nature Physics*, 9, 159 (2013); *Nature Photonics*, 7, 958 (2013).
[4] J. Itatani et al. *Nature* 432, 867 (2004).
[5] H. J. Wörner et al. *Nature* 466, 604, (2010).
[6] H. J. Wörner et al. *Science* 334, 208 (2011).
[7] G Vampa et al, *Phys. Rev. Lett*, 113, 073901 (2014).

Professor Steven Cowley

Prof Cowley became Director at Culham in September 2008 and was appointed as Chief Executive Officer of the United Kingdom Atomic Energy Authority in November 2009. He received his BA from Oxford University and his PhD from Princeton University. Professor Cowley's post-doctoral work was at Culham and he returned to Princeton in 1987.

He joined the faculty at the University of California Los Angeles in 1993, rising to the rank of Full Professor in 2000. From 2001 to 2003 he led the plasma physics group at Imperial College, London. He remains a part-time professor at Imperial College. He has published over 100 papers and articles.

Prof Cowley co-chaired the US National Academy's decadal assessment of, and outlook for, plasma science, *Plasma Science: Advancing Knowledge in the National Interest* (National Academy Press 2007).

He is a Fellow of the American Physical Society and the Institute of Physics, and the recipient of the Institute of Physics' 2012 Glazebrook Medal for leadership in physics. In June 2011, Prof Cowley was appointed to the Prime Minister's Council for Science and Technology. He has also been appointed a Fellow of the Royal Society.

ABSTRACT:

Fusion Burn and the Science and Technology Challenges of Fusion Power

Steven Cowley

UK Atomic Energy Authority, Culham Science Centre Abingdon OX14 3DB United Kingdom

Department of Physics, Imperial College, London, United Kingdom

In a decade, the international fusion experiment ITER will start operating in the south of France. This historic experiment will generate up to 500 megawatts of fusion power and provide a proof of principle for fusion energy. Fusion has the potential to provide a large fraction of our energy for millions of years – if it can be harnessed. I will

Professor Serge Haroche

describe the scientific progress in fusion – from Sir Arthur Stanley Eddington's prophetic predictions in 1920 to the remarkable results that have lead to ITER.

Predictions of the fusion plasma performance have relied on empirical extrapolation from data. The difficulties facing first principles approaches lie largely in calculating the plasma turbulence. The turbulence has a wide range of scales in 5 of the 6 dimensions of phase space. However in the last decade new reduced models and computational techniques have enabled accurate simulations of the plasma turbulence. I will describe the advances and show the latest comparisons of theory and experiment from the UK's MAST device at Culham.

In 2017 we will again put tritium into the Joint European Torus at Culham. I will show that modeling predicts that JET will break its own record of 16MW of fusion power. This tritium campaign on JET will be the last chance to experiment in the fusion power regime before ITER's first tritium campaign in the late 2020s. I will show the latest predictions of ITER's performance – the first fusion "burning" plasma.

There are challenging problems beyond ITER that must be solved to make fusion power a commercial option. I will outline these problems and worldwide efforts to find their solution.

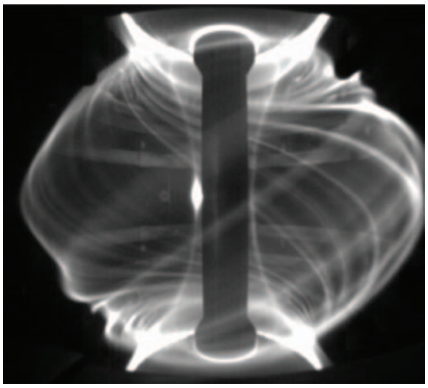


Figure 1: Plasma eruptions from the surface of the UK's MAST device.

Prof Haroche's main research activities have been in quantum optics and quantum information science. He has made important contributions to Cavity Quantum Electrodynamics (Cavity QED), the domain of quantum optics which studies the behaviour of atoms interacting strongly with the field confined in a high-Q cavity, a box made of highly reflecting mirrors. An atom-photon system isolated from the outside world by metallic walls realizes a very simple experimental model which Serge Haroche has used to test fundamental aspects of quantum physics such as state superposition, entanglement, complementarity and decoherence. Some of these experiments are actual realizations in the laboratory of the "thought experiments" imagined by the founding fathers of quantum mechanics. Serge Haroche's main achievements in cavity QED include the observation of single atom spontaneous emission enhancement in a cavity (1983), the direct monitoring of the decoherence of mesoscopic superpositions of states (so-called Schrödinger cat states) (1996) and the quantum-non-demolition counting of photons (2007). By manipulating atoms and photons in high-Q cavities, he has also demonstrated elementary steps of quantum information procedures such as the generation of atom-atom and atom-photon entanglement (1997) and the operation of quantum logic gates involving photons and atoms as "quantum bits" (1999).

Serge Haroche has received many prizes and awards, culminating in the 2012 Nobel Prize in physics, shared with David Wineland. He is a member of the French Academy of Sciences and a Foreign Member of the National Academy of Sciences of the United States, of the American Academy of Arts and Sciences and of the Brazilian Academy of Sciences.

ABSTRACT:

Juggling with photons in a box to explore the quantum world

Serge Haroche

Collège de France, Paris, France

Laboratoire Kastler Brossel, Ecole Normale Supérieure, Paris, France

The founders of quantum theory assumed in "thought experiments" that they were manipulating isolated quantum systems obeying the counterintuitive laws which they had just discovered. Technological advances have turned these virtual experiments into real ones by making possible the actual control of isolated quantum particles. Many laboratories are realizing such experiments, in a research field at the frontier between physics and information science. Fundamentally, these studies explore the transition between the microscopic world ruled by quantum laws and our macroscopic environment which appears "classical". Practically, physicists hope that these experiments will result in new technologies exploiting the strange quantum logic to compute, communicate or measure physical quantities better than was previously conceivable. In Paris, we perform such experiments by juggling with photons trapped between superconducting mirrors. I will give a simple description of these studies, compare them to similar ones performed on other systems and guess about possible applications.

Doctor Lisa Harvey-Smith

Dr Harvey-Smith is a CSIRO research astronomer who specialises in high resolution radio astronomy. Her research investigates the birth and death of stars in our Galaxy and the origins and nature of cosmic magnetic fields.

Dr Harvey-Smith is the project scientist for the Australian SKA Pathfinder (ASKAP), CSIRO's $188 million telescope facility in remote Western Australia. As well as being the world's fastest survey telescope at cm-wavelengths, ASKAP is a technology demonstrator and precursor for the $2 billion international Square Kilometre Array (SKA), which will be an order of magnitude more powerful than any existing radio telescope.

Dr Harvey-Smith contributes to science-engineering trade-off studies for the SKA and serves on a number of advisory panels including the international SKA science working group and the Australian government's science advisory committee for the SKA. She was also a primary authors of Australia-New Zealand's successful bid to host the SKA.

Dr Harvey-Smith is a keen advocate for astronomy in the media and gives a large number of public lectures at universities, research institutes, schools, colleges, museums, science festivals and astronomical societies every year. Dr Harvey-Smith is a mentor to students at the Pia Wadjarri remote community school in Western Australia and runs regular science classes at Leichhardt Public School in Sydney as part of CSIRO's 'Scientists in Schools' program.

ABSTRACT:

The Square Kilometre Array: Building the World's Largest Telescope

Dr Lisa Harvey-Smith
CSIRO Astronomy & Space Science, Epping, NSW Australia

The CSIRO is a leading member of an international science – industry collaboration charged with designing a radio telescope with revolutionary scientific capabilities. The Square Kilometre Array (SKA) will be a giant distributed radio telescope comprising over 1 million separate radio detectors with unprecedented sensitivity and panoramic imaging capability. By the end of this decade, the SKA will grace areas of outback Western Australian and the Karoo region of South Africa. The vast information-gathering surface area of the telescope, coupled with its wide-field vision, will transform our ability to study the universe.

Although smaller radio telescope networks have been built before, the sheer scale of the SKA telescope brings with it some enormous technological challenges. In real-time, the SKA will stream 100 times more data than the current global internet traffic through 80,000 km of dedicated underground fibre optic cables into a giant supercomputer with a processing power equivalent to the human brain. That's a processing power in excess of 1 Exaflops, or 1 000 000 000 000 000 000 floating-point operations per second. Rising to these challenges will require significant developments in data transport and processing. This is a rich area of academic-industry collaboration in which spin-off technologies will certainly follow.

In this talk, CSIRO astronomer Dr Lisa Harvey-Smith describes the cosmic mysteries the SKA will help to solve and the technological challenges facing this amazing global project.

Professor Anke Rita Kaysser-Pyzalla

Prof Kaysser-Pyzalla, born in 1966, studied at Bochum, graduated at Darmstadt and received a Doctorate in Engineering 1995 at Ruhr-Universität Bochum. As a postdoc she worked at the HMI Berlin and the TU Berlin as a group leader. From 2003 to 2005 she was a university professor at the Technical University Vienna. At the end of 2005 she became director and CEO of the Department of Materials Diagnostics and Steel Technology at the Max-Planck-Institut für Eisenforschung, Düsseldorf. Since October 2008, Kaysser-Pyzalla has been Scientific Director and Chief Executive of the Helmholtz-Zentrum Berlin (HZB) and chairperson of IGAFA.

As Chief Executive of HZB she is responsible for approximately 1,100 employees at two sites and, as Scientific Director in the field of neutron and synchrotron radiation, she represents two distinguished large scale facilities – the research reactor BER II and the synchrotron radiation source BESSY II. From her point of view, the main tasks of the HZB are the advancement of the complementary use of neutrons and photons, the investigation of renewable energies, the promotion of young scientists, the close networking with the universities, and a sustainable continuation of the success story in Berlin. The latest project: Europe's first and unique feasibility study of a new X-ray source, the Berlin Linac Project – BERLinPro.

Professor Lawrence M Krauss

Australian National University

ABSTRACT:

Understanding and Controlling Materials Properties for Energy Research

Prof Anke Rita Kaysser-Pyzalla
Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, 14109 Berlin, Germany

Functional materials are the key to new and optimized systems in a variety of applications in energy, information and medical technologies. Designing functional materials necessitates fundamental understanding of the structure and the often time-dependent processes at their surface, at interfaces and in the bulk material. Here photons and neutrons provide -often complementary- insights.

Examples will be presented with an emphasis on new analytical tools for materials research with soft X-rays and neutrons. Emphasis will be on new materials for energy applications, in particular photovoltaics, solar fuels, and electrochemical energy storage. Recent and upcoming new capabilities for in-situ and in-operando characterization of materials in these systems are discussed and an outlook is given on new perspectives with a variable pulse length synchrotron radiation source (BESSY-VSR concept).

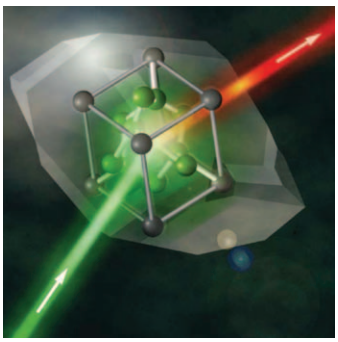


Figure 1: Stimulated X-ray emission for materials science. [1]

References
[1] M. Beye, S. Schreck, F. Sorgenfrei, C. Trabant, N. Pontius, C. Schüßler-Langeheine, W. Wurth & A. Föhlisch Nature 2013, DOI: 10.1038 / NATURE12449

Prof Krauss is an internationally known theoretical physicist with wide research interests, including the interface between elementary particle physics and cosmology, where his studies include the early universe, the nature of dark matter, general relativity and neutrino astrophysics. He has investigated questions ranging from the nature of exploding stars to issues of the origin of all mass in the universe. He was born in New York City and moved shortly thereafter to Toronto, Canada, where he grew up.

Prof Krauss is the author of over 300 scientific publications, as well as numerous popular articles on physics and astronomy. He is the recipient of numerous awards for his research and writing, including the Gravity Research Foundation First Prize Award (1984), and the Presidential Investigator Award (1986). In February 2000, in Washington D.C., Krauss was awarded the American Association for the Advancement of Science's1999-2000 Award for the Public Understanding of Science and Technology. In 2001 he was awarded the Julius Edgar Lilienfeld Prize of the American Physical Society. The citation reads 'For outstanding contributions to the understanding of the early universe, and extraordinary achievement in communicating the essence of physical science to the general public'.

Prof Krauss is one of the few prominent scientists today to have actively crossed the chasm between science and popular culture. For example, besides his radio and television work, Prof Krauss has performed with the Cleveland Orchestra, narrating Gustav Holst's The Planets at the Blossom Music Center in the most highly attended concert at that venue, and was nominated for a Grammy award for his liner notes for a Telarc CD of music from Star Trek. In 2005 he also served as a jury member at the Sundance Film Festival.

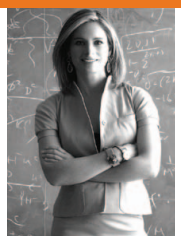
ABSTRACT:

Gravitational Waves from Inflation and Implications for Fundamental Physics

Lawrence Krauss
Arizona State University, Tempe, AZ United States of America

Gravitational Waves from Inflation may have been discovered, or may soon be discovered. If they are, this will push our empirical handle on the universe forward by 49 orders of magnitude, and will allow us to explore issues ranging from supersymmetry to grand unification, the quantum theory of gravity, and even the possible existence of other universes.

Professor Lisa Randall



Prof Randall studies theoretical particle physics and cosmology at Harvard University. Her research connects theoretical insights to puzzles in our current understanding of the properties and interactions of matter. She has developed and studied a wide variety of models to address these questions, the most prominent involving extra dimensions of space. Her work has involved improving our under-standing of the Standard Model of particle physics, supersymmetry, baryogenesis, cosmological inflation, and dark matter. Randall's research also explores ways to experimentally test and verify ideas and her current research focuses in large part on the Large Hadron Collider and dark matter searches and models.

Prof Randall has also had a public presence through her writing, lectures, and radio and TV appearances. Prof Randall's books, *Warped Passages: Unraveling the Mysteries of the Universe's Hidden Dimensions* and *Knocking on Heaven's Door: How Physics and Scientific Thinking Illuminate the Universe and the Modern World* were both on the New York Times' list of 100 Notable Books of the Year. *Higgs Discovery: The Power of Empty Space* was released as a Kindle Single in the summer of 2012 as an update with recent particle physics developments.

Prof Randall's studies have made her among the most cited and influential theoretical physicists and she has received numerous awards and honors for her scientific endeavors. She is a member of the National Academy of Sciences, the American Philosophical Society, the American Academy of Arts and Sciences, was a fellow of the American Physical Society, and is a past winner of an Alfred P. Sloan Foundation Research Fellowship, a National Science Foundation Young Investigator Award, a DOE Outstanding Junior Investigator Award, and the Westinghouse Science Talent Search. Randall is an Honorary Member of the Royal Irish Academy and an Honorary Fellow of the British Institute of Physics. In 2003, she received the Premio Caterina Tomassoni e Felice Pietro Chisesi Award, from the University of Rome, La Sapienza. In 2006, she received the Klopsteg Award from the American Society of Physics Teachers (AAPT) for her lectures and in 2007 she received the Julius Lilienfeld Prize from the American Physical Society for her work on elementary particle physics and cosmology and for communicating this work to the public.

Prof Randall has also pursued art-science connections, writing a libretto for Hypermusic: A Projective Opera in Seven Planes that premiered in the Pompidou Center in Paris and co-curating an art exhibit for the Los Angeles Arts Association, Measure for Measure, which was presented in Gallery 825 in Los Angeles, at the Guggenheim Gallery at Chapman University, and at Harvard's Carpenter Center. In 2012, she was the recipient of the Andrew Gemant Award from the American Institute of Physics, which is given annually for significant contributions to the cultural, artistic, or humanistic dimension of physics.

Professor Randall was on the list of Time Magazine's '100 Most Influential People' of 2007 and was one of 40 people featured in The Rolling Stone 40th Anniversary issue that year. Prof Randall was featured in Newsweek's 'Who's Next in 2006' as 'one of the most promising theoretical physicists of her generation' and in Seed Magazine's '2005 Year in Science Icons'. In 2008, Prof Randall was among Esquire Magazine's '75 Most Influential People.'

Professor Randall earned her PhD from Harvard University and held professorships at MIT and Princeton University before returning to Harvard in 2001. She is also the recipient of honorary degrees from Brown University, Duke University, Bard College, and the University of Antwerp.

Knocking on Heaven's Door: How Physics and Scientific Thinking Illuminate the Universe and the Modern World

Lisa Randall

Harvard University, Cambridge, MA United States of America

The latest developments in physics have the potential to radically revise our understanding of the world: its makeup, its evolution, and the fundamental forces that drive its operation. I will give an overview of current developments and describe the nature of scientific thinking, with emphasis on the role of scale. I will also discuss how experiments today are expanding the frontiers of knowledge.

Professor Steven Sherwood

Australian National University
CLIMATE CHANGE INSTITUTE

Prof Sherwood studies how the various processes in the atmosphere conspire to establish climate, how these processes might be expected to control the way climate changes, and how the atmosphere will ultimately interact with the oceans and other components of Earth.

Prof Sherwood leads a research group that applies basic physics and mathematics to complex problems by a combination of simple theoretical ideas and hypotheses and directed analyses of observations. Depending on requirements the group uses simple or advanced statistical techniques, bridging the gaps between these (where needed) by using state-of-the-art climate models as research tools. One practical goal of the group's work is to figure out how these models might be improved, as they are ultimately necessary for regional predictions of weather and climate. A more academic goal is just to unlock the secrets of our atmosphere.

ABSTRACT:

Understanding Moist Convection: A Grand Challenge

Steven Sherwood

Climate Change Research Centre and ARC Centre of Excellence for Climate System Science, UNSW, Kensington NSW

Convection in the atmosphere is made interesting, and difficult to understand, by the effects of condensation of water vapour in cooling portions of the turbulent flow. Moist convection gives rise to precipitation and clouds which dominate both local weather, and the overall radiation balance of the planet and therefore its global surface temperature.

1) Clouds and climate: Clouds play a key role in determining the sensitivity of mean surface temperature to a given sustained input of power into the planet (for example due to a change in the concentration of greenhouse gases or solar irradiance). Different climate models predict a wide range of values for this sensitivity (ranging by a factor of 2-3), and roughly 75% of the variance is explained by differences in cloud responses [1].

Recent work has identified a couple of robust warming responses simulated by models, understood on physical principles, and supported (to some extent) by observations. One is a poleward shift of clouds to latitudes where they reflect less sunlight to space; the other is a shift of clouds to greater altitude where they exert a stronger greenhouse effect [2]. Both responses act to amplify global temperature changes.

These responses, however, are fairly similar between global models and therefore do not account for the spread in predictions which instead comes from a widely varying tendency for cloud cover simulated near the ocean surface to dissipate in warmer climates. This tendency and the reasons for its variation were recently explained as resulting from qualitative differences in the overturning atmospheric circulation in different models [3].

2) Radiative convective equilibrium: The theoretical study of moist convection begins with the relatively simple notion of radiative-convective equilibrium (RCE), in which a system is heated at the surface, cools from the interior due to net radiative emission, and maintains a statistically steady state of upward convective heat transfer. Updrafts in moist RCE are much narrower and more intense than in dry convection.

Recent work revisiting RCE has found unexpected complexities. Numerically simulated convection will often spontaneously collapse into a small region such that individual locations are not in local equilibrium. This collapse is primarily driven by positive feedback between local radiative cooling of the air and local vertical motion, due to the radiative effects of water vapour and condensed water.

An important practical question about moist convection is what controls the intensity of updrafts, since this controls the severity of weather associated with storms in the real world. Ideas have been put forward based on the entropy budget of the fluid, but have been challenged. I will argue that the statistics of updraft intensity in RCE are governed by the kinetic energy budget. In moist convection, the dominant term in the kinetic energy budget turns out to be the dissipation of energy in flow around raindrops! This wholly unexpected result has cast a new light on RCE.

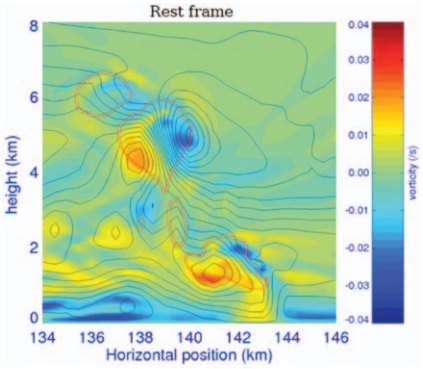


Figure 1: Snapshot of a numerical simulation of growing cumulus congestus. Colours indicate vorticity (scale at right), black contours are streamfunction, red countours indicate regions of condensed water content > 0.1 g/kg of air.

3) Cloud dynamics on small scales: RCE does not address behavior in a particular location and time, where the system is not in equilibrium. We have been examining the momentum budget of individual thermals rising in clouds to better understand how such clouds should be modelled. Air rising in cumulus clouds, often thought of as rising in plumes or columns, actually rises in compact thermals with toroidal internal circulations that significantly change their dynamics (Fig. 1). These thermals are much more weakly damped by friction or drag than has been assumed in global atmosphere models [4]. This error is likely to be significantly affecting the behaviour of these models.

4) A Grand Challenge: Many of the uncertainties in climate come down to fundamental problems in the physics of the atmosphere. The World Climate Research Programme has recently initiated a Grand Challenge initiative to study Clouds, Circulations and Climate Sensitivity (http://www.wcrp-climate.org/grand-challenges).

References
[1] Dufresne, J. L. and S. Bony, 2008, *J. Climate*, 21, 5135–5144.
[2] Boucher, O. et al., 2013, Chapter 7: Clouds and Aerosols, *IPCC WGI 5th Assessment Report*.
[3] Sherwood, S. C., S. Bony and J-L. Dufresne, 2014, *Nature*, 505, 37-42.
[4] Sherwood, S. C., D. Hernandez-Deckers, M. Colin and F. Robinson, 2013, *J. Atmos. Sci.*, 70, 2426-2442.

Program

Sunday 7 December

1500-1630	Conference registration	ROOM: MANNING CLARK CENTRE
1730-1900	Conference registration	ROOM: DRILL HALL GALLERY
1730-1900	Welcome Reception at the Drill Hall Gallery	

Monday 8 December

0730-1730	Registration	ROOM: MANNING CLARK FOYER			
0840-0900	Congress Opening	ROOM: MANNING CLARK 1			
0900-1030	**Plenary session**				
0900-0945	**Plenary 1: Steven Chu, *Microscopy 2.0*** CHAIR: JOE HOPE ROOM: MANNING CLARK 1				
0945-1030	**Plenary 2: Paul Corkum, *Atto-Science: What we learn by converting many photons into one*** CHAIR: DAVID KIELPINSKI ROOM: MANNING CLARK 1				
1030-1100	**MORNING TEA** ROOM: MELVILLE HALL				
1100-1230	**Concurrent session 1**				
	Optics 1: Laser Spectroscopy	**QUICC 1: Continuous variable quantum optics**	**Electronic Devices I**	**NUPP 1**	
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4	
CHAIR	TBC	PING KOY LAM	JENNY WONG-LEUNG	MAHANANDA DASGUPTA	
1100-1115	**Paolo De Natale**, Pushing the limits of precise spectroscopic sensing	**Saleh Rahimi-Keshari**, Quantum Correlations in Gaussian States with Gaussian Measurements	**Michelle Simmons**, Quantum Computing in Silicon with Donor Electron Spins	**Alexander Millar**, Asymmetric Dark Matter via Coannihilation	
1115-1130		**Rafael Alexander**, Quantum computation with scalable continuous-variable cluster states		**Kaitlin Cook**, Breakup following interactions with light targets: Investigating new methods to probe nuclear physics input to the cosmological lithium problem	
1130-1145	**Andre Luiten**, Accurate Thermometry with Atoms	**Mile Gu**, Discord Empowered Quantum Illumination	**Michael Stuiber**, Development of Silicon Nanowire Devices with Quantum Functionalities	**Cedric Simenel**, Effects of quantum shells in quasi-fission reactions	
1145-1200	**Carlo Bradac**, centimetre-scale coupling of a single NV spin to a dielectric microwave cavity		**Timothy Duty**, Time-resolved single charge transport in nano-structured chains of superconducting tunnel junctions		
1200-1215	**Richard White**, Frequency-Comb Spectrometer Based on a Virtually Imaged Phased Array	**Seiji Armstrong**, Multiplexing continuous-variable quantum information in optics	**Dane McCamey**, Improved electrically-detected spin-resonance techniques for investigating organic electronic devices	**Benjamin Owen**, Electromagnetic matrix elements for excited Nucleons	
1215-1230	**Nicolas Bourbeau-Hébert**, Dual Comb Interferometry	**Run Yan Teh**, Detecting genuine multipartite continuous variable entanglement	**Jackson Smith**, Modelling the electronic properties of phosphorus wires in silicon	**Boon Lee**, Realistic Radiation Spectra for Auger-electron Emitting Radionuclides	
1230-1400	**LUNCH AND POSTER SESSION 1** ROOM: MELVILLE HALL				
1400-1430	**Harry Massey Medal Winner** CHAIR: TBC ROOM: MANNING CLARK 1				

	Strong Optical Fields	Optics 13: Optomechanics	STSP 1	Relativity and Gravity 1
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	ROBERT SANG	TBC	TBC	DAVID MCCLELLAND
	David Kielpinski, Percent-level accuracy in strong-field measurements of photoionisation and laser intensity	**Eoin Sheridan**, Optomechanical Magnetometry: Detection of PicoTesla Fields at Room Temperature	**Andrew Sutton**, The GRACE Follow-On Laser Ranging Interferometer: An inter-spacecraft laser interferometry technology demonstrator	**Robert L. Ward**,Australia and the Advanced Laser Interferometer Gravitational Wave Observatory
	Igor Ivanov, Transverse electron momentum distribution in strong field atomic ionization	**James Bennett**, Comparing Feedback Damping and Sympathetic Cooling in a Remotely-Coupled Hybrid Atom-Optomechanical System		
	Alexander Kozlov, Polarizabilities of Actinides and Lanthanides	**Andrey Sukhorukov**, Slow phonon vortices and defect modes in periodic nano-waveguides	**Shasidran Raj**, Space Debris Tracking using Continuous Wave Lasers	**Chris Stevens**, Numerical evolution of plane gravitational waves in the Friedrich-Nagy gauge
	Kristian Fenech, Determination of the equation of state of a two-dimensional Fermi gas	**Harry Slatyer**, Enhancement of signal-to-noise ratio in nanomechanical systems	**Liam Twigger**, High Resolution Temperature and Wind Profiling of the Atmosphere from the Troposphere to the Mesosphere	**Peter Veitch**, Modelling of surface deformation in heated optics using elastodynamic reciprocity
	Xia-Ji Liu, Ultracold One-dimensional Atomic Fermi Gases	**David McAuslan**, Photothermal Cooling of Superfluid Helium Coupled to a Microtoroid	**Iain Reid**, MF and HF radar techniques for investigating the MLT region: A review	**Peter Veitch**, Hartmann wavefront sensors for advanced gravitational wave interferometers
	Hui Hu, Gapless topological Fulde-Ferrell superfluidity in spin-orbit coupled atomic Fermi gases	**Giovanni Guccione**, Towards optical levitation of a macroscopic mirror		

Monday 8 December

1430-1600 Concurrent session 2

	Optics 2: Nonlinear Optics	QUICC 2: Ultracold atoms	Electronic Devices II	NUPP 2
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	TBC	JOHN CLOSE	TBC	DEREK LEINWEBER
1430-1445	**Baohua Jia**, Negative refraction in nonlinear photonic bandgap materials	**Andrew Truscott**, Wheeler's delayed choice experiment with matter waves	**Adam Micolich**, Novel materials and methods for making wrap-gated nanowire transistors with multiple independent segments	**Matthew Reed**, Neutron-rich rhenium isotopes and the progression into triaxiality
1445-1500		**Russell Anderson**, A magnetic gradient tensor microscope using Bose-Einstein condensate interferometers		**Yevgeny Stadnik**, Axion dark matter-induced effects in atoms, molecules and nuclei, and tests of CPT and Lorentz symmetry
1500-1515	**Yan Sheng**, All-optical ferroelectric domain engineering for second-order nonlinear optics	**Chris Vale**, Fermi gases in 2 and 3 dimensions	**Robert Elliman**, Resistive Switching in Transition Metal Oxides for Nonvolatile Memory Applications	**Edward Simpson**, Transfer and breakup reactions near the fusion barrier
1515-1530	**Alexander Solntsev**, Dipole-like biphoton emission in waveguide arrays with nonlocal nonlinearity		**David Jamieson**, Precision placement of single donor atoms in silicon by ion implantation: ultimate precision limit	**Jason Yue**, Anomalous Top-Higgs Couplings and Top Polarisation in Single Top and Higgs Associated Production at the LHC
1530-1545	**Samuel Legge**, Matching discrete solitons to blue wavelengths in supercontinuum generation	**Karen Kheruntsyan**, Einstein-Podolsky-Rosen entanglement in spinor condensates and its tolerance to thermal seed	**John Bartholomew**, Towards solid-state quantum hardware using single rare-earth ions	**Phillip Urquijo**, The Belle II Super Flavour Factory Experiment
1545-1600	**Diana Antonosyan**, Quantum and classical parametric processes in PT-symmetric quadratic nonlinear couplers with loss	**Lincoln Turner**, Towards magnetic resonance imaging of a Bose-Einstein condensate	**Ardalan Armin**, Selective electron and hole mobility measurement in (organic) solar cells	

1600-1630 **AFTERNOON TEA** ROOM: MELVILLE HALL

1630-1800 Concurrent session 3

	Optics 3: Nanofabrication	QUICC 3: Atom-light interactions	Magnetic Materials	NUPP 3
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	SNJEZANA TOMLJENOVIC-HANIC	LINCOLN TURNER	PETER METAXAS	CSABA BALAZS
1630-1645	**Amit Sahu**, Focusing characterisation of photon sieve lesnes in graphene-oxide-dispersed photopolymers	**Randy Hulet**, Antiferromagnetism in the Hubbard Model with Ultracold Atoms	**Wayne Hutchison**, Investigations of magneto-structural transitions in Fe-doped MnCoGe	**Derek Leinweber**, Strange Matter Discovery: The Lambda 1405 is an anti-kaon--nucleon molecule
1645-1700	**Han Lin**, Controlling the surface profile of photo-reduced graphene oxide via managing the thermal effect		**Jamie Booth**, From band-insulating antiferromagnetism to Mott-insulating ferromagnetism in vanadium dioxide	
1700-1715	**Alexandra Djurisic**, Defects in ZnO nanostructures: effect on the optical properties and practical applications	**Jesse Everett**, A mirrorless optical resonator based on coherent atom-light interactions	**Kirrily Rule**, Luttinger-Liquid Behaviour in the Alternating Spin-Chain System Copper Nitrate	**Daniel Trewartha**, Centre Vortex Effects on the Quark Propagator in Lattice QCD
1715-1730		**Andrei Sidorov**, High-resolution RF spectroscopy of ultracold 87Rb2 molecules		**Alexander Chambers**, Hadron Spin Structure from Lattice QCD using the Feynman-Hellmann Theorem
1730-1745	**Qiming Zhang**, Enhancement of the melting threshold of gold-nanorod-dispersed organic modified ceramic nanocomposites	**Young-Wook Cho**, Engineering frequency-time quantum correlation of narrowband biphotons from cold atoms	**Sebastian Sambale**, Comparing under-and overdoped CeFeAsO1-xFx by 75As NMR	**Kevin Varvell**, Leptonic and semileptonic B-meson decays at the Belle and Belle II experiments
1745-1800	**Xiaorui Zheng**, Three-dimensional light concentration with graphene oxide thin film	**Lisa Bennie**, The fine art of wavefunction engineering: Precise manipulation of a Bose-Einstein condensate wavefunction using magnetic resonance control	**Shen V. Chong**, Doping dependence of Hc2 and Jc in polycrystalline CeFeAsO1 xFx superconductors	**Gayatri Mohanto**, Fission fragment mass distribution for 16O + 184W and 30Si + 170Er

1815-1945 **When Does Science Matter?**
Panel discussion: Steven Chu, Lawrence Krauss, Brian Schmidt and Lisa Randall ROOM: LLEWELYN HALL, ANU SCHOOL OF MUSIC

	ATMOP Theory	Optics 14: Quantum optics	TP 1	Relativity and Gravity 2
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	JOSHUA MACHACEK	TBC	MARGARET REID	SUSAN SCOTT
	Christopher Thomas Chantler, Recent Discrepancies of High-Accuracy Test of QED in Medium-Z Few-Electron Systems – What New Science Can We Learn?	**Syed Assad**, Experimental probabilistic coherent state quantum amplification and quantum cloning using a measurement based noiseless linear amplifier	**Natasha Devine**, Rogue waves of the Sasa-Satsuma equation in a chaotic wave field	**Ben Whale**, How charts and boundary constructions can live together happily ever after
		Joseph Ho, Experimental demonstration of a linear optical Fredkin gate		
	Bogdan Opanchuk, Fate of the false vacuum: towards realization with ultra-cold atoms	**Sahar Basiri-Esfahani**, An integrated low power quantum photonic sensor	**Joan Vaccaro**, Toying with quantum states in time and space	**Carl Blair**, Opto-mechanical interactions: instabilities and improving sensitivity in gravitational wave detectors
	Benjamin Roberts, Violations of fundamental symmetries in atoms and tests of unification theories	**Jing Yan Haw**, Maximisation of Extractable Randomness in Quantum Random Number Generator	**Michael Meehan**, Density Constraints on Early Universe Cosmology	**Nathan McMahon**, Emergent metric from discrete MERA AdS/CFT
	Jacinda Ginges, Spectra and polarizabilities for radium and element 120	**Ben Eggleton**, Photonic Crystal Waveguide Sources of Photons for Quantum Communication Applications	**Nail Akhmediev**, Dissipative solitons with energy and matter flows	**Boris Daszuta**, Numerical evolutions of (spinorial) tensorial fields on the 2-sphere using a spectral method based on spin-weighted spherical harmonics
	Sascha Hoinka, Low-momentum Bragg spectroscopy of a strongly interacting Fermi gas			**Leo Brewin**, Smooth Lattice methods for Numerical General Relativity

	Polariton and Vortices	Optics 15: Optical sensing	WIP 1	Relativity and Gravity 3
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	MAARTEN HOOGERLAND	TBC	TBC	LEO BREWIN
	Robert Dall, Exciton-polariton condensation within structured potentials	**Nicolas Mauranyapin**, Quantum limited nano-fibre trapping and sensing of dielectric particle for biophysics application.	**Robert Robinson**, Forty Years in Physics: some thoughts on Women in Science	**Ecaterina Howard**, Geometric aspects of extremal Kerr black hole entropy
		Taras Plakhotnik, Sensing temperature with NV-centres in diamond nanocrystals	**Joanna Sikora**, Young Australian women and their participation in physical sciences: a unique or worldwide pattern?	**Leon Escobar**, Numerical solution of the Cauchy problem for spacetimes with spatial topologies S3 or S1 x S2
	Tapio Simula, Two-dimensional superfluid turbulence: Emergence of supervortices	**Katie Chong**, Sensing with Fano resonances in all-dielectric nanodisk oligomers	**Frances Saunders**, Girls into Science	**Woei Chet Lim**, Spiky inhomogeneous exact solutions in general relativity
	Guangyao Li, Stability of Persistent Currents in Exciton-Polariton Condensates	**Ana Andres Arroyo**, Localised surface plasmon resonance spectroscopy combined with optical tweezers for nanoscale sensing applications		**Roland Fleddermann**, Gravity Recovery and Climate Experiment (GRACE) Follow-on Mission technology
	Andy Martin, Anisotropic and long-range vortex interactions in two dimensional dipolar Bose gases	**Tarquin Ralph**, Wave Front Sensing Using a Spatial Light Modulator	**Sharon Bell**, Women in the Science Research Workforce	**Ishwaree Neupane**, Constraints on different models for inflation after BICEP2 and PLANCK2014
		Ben Laws, The Velocity Map Imaging Story of Vinylidene		

Tuesday 9 December

0730-0900	Women in Physics breakfast at Teatro Vivaldi Restaurant (ANU Union Court)			
0855-0900	Housekeeping			
0900-1030	**Plenary session**			
0900-0945	**Plenary 3: Steve Sherwood, *Understanding Moist Convection: A Grand Challenge*** CHAIR: TBC ROOM: MANNING CLARK 1			
0945-1030	**Plenary 4: Lisa Randall, *Knocking on Heaven's Door: How Physics and Scientific Thinking Illuminate the Universe and the Modern World*** CHAIR: GEOFF TAYLOR ROOM: MANNING CLARK 1			
1030-1100	**MORNING TEA** ROOM: MELVILLE HALL			
1100-1230	**Concurrent session 4**			
	Optics 4: Periodic and bandgap photonic structures	**QUICC 12:Quantum Optomechanics**	**Magnetic Nanostructures**	**NUPP 4**
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	TBC	MICHAEL TOBAR	KIRRILY RULE	KEVIN VARVELL
1100-1115	**Prince Surendran**, Periodic array of Bose-Einstein condensates in a magnetic lattice	**Ray Simmonds**, Clearly witnessing the quantum fluctuations of a mechanical oscillator	**Peter Metaxas**, Towards nano-scale magnetic biosensors: demonstration of nanoparticle detection with a magnonic crystal	**Carl Suster**, Simultaneous cross-section measurements in dilepton events with the ATLAS detector at the LHC
1115-1130	**Daniel Leykam**, Observation of pseudospin 1 conical diffraction in a photonic Lieb lattice			**Finn Stokes**, Visualisations of coherent centre domains in local Polyakov loops
1130-1145	**Anton Desyatnikov**, Observation of pseudospin 1 conical diffraction in a photonic Lieb lattice	**Matthew Woolley**, Entangling mechanical oscillators: Measurement-based and coherent feedback approaches	**Lisa Willig**, Microwave magnetic dynamics in highly conducting magnetic nanostructures	**Antonio Limosani**, Upgrades to the ATLAS experiment in preparation for run 2 of the Large Hadron Collider and prospects for new discoveries
1145-1200	**Sergey Suchkov**, Whispering gallery modes in optical fibers with nanoscale radius variation based on reflectionless potentials	**Keyu Xia**, An opto-magneto-mechanical quantum interface between distant superconducting qubits	**Ivan Maksymov**, Microwave eddy-current shielding effect in conductive ferromagnetic nanostructures	**Adrian Kiratidis**, The Nucleon Spectrum with Multi-particle Operators
1200-1215	**Martijn de Sterke**, Light trapping for enhanced absorption for energy applications	**Casey Myers**, Quantum Noise on a Quantum Opto-Mechanical Limit Cycle	**Clemens Ulrich**, Element-Specific Depth Profile of Magnetism and Stoichiometry at the $La_{0.67}Sr_{0.33}MnO_3/BiFeO_3$ Interface	**Csaba Balazs**, Thermal dark matter implies new physics below PeV
1215-1230			**Alexey Pan**, Hybrid superlattices with technologically controlled properties governed by well-organised phase separation	
1230-1400	**LUNCH AND POSTER SESSION 2** ROOM: MELVILLE HALL			
1400-1430	**Alan Walsh Medal Winner: Ping Koy Lam** CHAIR: TBC ROOM: MANNING CLARK 1			

	High Harmonics and Clocks	PEG 1	Complex Systems, Computational and Mathematical Physics	NUPP 9
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	STEPHEN GIBSON	MANJU SHARMA	TBC	ANTON WALLNER
	Robert Sang, Ionisation of exotic atoms using few-cycle laser pulses	**Paul Francis**, Massive Open Online Courses (MOOCs): Lessons learned so far	**Alexander Kalloniatis**, Modelling the human in the machine: network synchronisation as a paradigm for decision-making in organisations	**Ian Carter**, Understanding weakly bound nuclei; combining new capabilities in breakup and radioactive beams?
			Mathew Zuparic, Analytically tractable density evolution models	**Asif Ahmed**, Time-Dependent Recoil in Vacuum using the ANU Plunger Device – Improved Sensitivity to Hyperfine Fields and Nuclear Moments
	Anatoli Kheifets, Attoclocks: Do we really know how accurate they are?	**Christine Creagh**, The Art of Engaging Students	**Simon Kiesewetter**, Parallel optimization of stochastic trajectories	**David Hinde**, Dynamics of fusion reactions forming heavy and super-heavy elements
	John McFerran, Spectroscopy on the 1S0 - 3P1 transition in magneto-optically trapped ytterbium	**Matthew Hill**, Promoting scientific representational fluency for first year physics students using weekly, online pre-lecture instruction	**Richard Taylor**, Finding Non-Zero Stable Fixed Points of the Weighted Kuramoto Model is NP-complete	
	Julian Berengut, Optical clocks based on highly charged ions with extremely high sensitivity to time-variation of the fine-structure constant	**Matthew Hill**, Exploring inquiry based learning in a university outreach program for senior high school physics students	**Peter Drummond**, Physics with higher order stochastic equations	**Elizabeth Williams**, Experimental study of capture barrier distributions for 58Ni+60Ni
	Patrick Everitt, Atom Optical Matter Wave Metamaterials	**John Debs**, Foundational Physics Teaching - Teaching Students to 'Think Like a Physicist'	**Samuel Eastwood**, Order Parameter Catastrophe Defects	**Shanka Hota**, Spectroscopy of high-spin K-isomers in neutron-rich Hf (Z = 72) isotopes

Tuesday 9 December

1430-1600 Concurrent session 5

	Optics 5: Specialty optical fibres	QUICC 5: Quantum communication	Nanowires	NUPP 5
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	TBC	BEN BUCHLER	OLEG SUSHKOV	GREG LANE
1430-1445	**John Love**, Ultra-High Capacity Optical Fibres	**Julien Laurat**, Sculpting the quantum light	**Chennupati Jagadish**, Semiconductor Nanowires for Optoelectronics and Energy Applications	**Martin Sevior**, Measurement of Branching Ratio and Direct CP violation of the B-> pi0 pi0 decay at Belle
1445-1500	**Yi Yu**, Broadband Mid-infrared Supercontinuum Generation in Suspended Core Chalcogenide Fibers			
1500-1515	**Bishnu P. Pal**, Specialty Optical Fibres and All-fibre Devices for Mid-IR Photonics	**Katherine Ferguson**, Development of an ensemble-based triggerable single photon source	**John Dobson**, van der Waals forces continue to surprise	**Thor Taylor**, A Search for a High-Mass Higgs Boson in the $H \rightarrow WW \rightarrow lvlv$ Channel using 21 fb^{-1} of pp collision data at $\sqrt{s} = 8$ TeV at the LHC
1515-1530		**Benjamin Bradshaw**, Correction of transverse magnet fields in a gradient echo memory	**Dhruv Saxena**, Design and optical characterisation of InP nanowire lasers	**Badriah Alshahrani**, Cascading g-ray measurements to determine the radiative width of the Hoyle state
1530-1545	**Douglas Little**, Spider silks for use as natural optical fibres	**Pierre Vernaz-Gris**, Cross-phase modulation in Gradient Echo Memory using stationary light	**Yanan Guo**, Polarity-driven inhomogeneity in InxGa1-xAs ternary nanowires	**Elisabetta Barberio**, Environmental and cosmic radioactivity and characterisation for an underground site in the Southern Hemisphere to host a Dark Matter experiment
1545-1600	**Daniele Pelliccia**, From the synchrotron to the lab: x-ray microscopy on a compact setup	**Markus Rambach**, Generating narrow-band single photon pairs suitable for quantum memories	**Philippe Caroff**, Facet-related growth anisotropy and radial heterostructures in free-standing semiconductor nanostructures	**Nyaladzi Palalani**, New multi-quasiparticle isomers in 182Ta and 183Ta

1600-1630 **AFTERNOON TEA** ROOM: MELVILLE HALL

1630-1800 Concurrent session 6

	Optics 6: Lasers	QUICC 6: Quantum communication	Novel Phases	NUPP 6
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	TBC	TIM RALPH	JODIE BRADBY	CEDRIC SIMENEL
1630-1645	**John Harvey**, Advances in Fibre Lasers for Chirped Pulse Generation	**Geoff Pryde**, Advances in photonic remote entanglement sharing	**Darren Goossens**, Patterns and Insights: The Crystallography of Local Order	**Pedro Allendes**, An alternative estimation of unknown perturbation coefficients in spacelike QCD observables
1645-1700				**Dominic Rafferty**, Investigating energy dissipation in cluster and nucleon transfer reactions
1700-1715	**Ori Henderson-Sapir**, Mid-infrared 3.5 um band Er3+:ZBLAN fibre laser	**Natasha Gabay**, Modelling Gaussian noise in linear optical measurement-based quantum computation as a loss channel	**Klaus-Dieter Liss**, Towards the materials oscilloscope: Observing metals at high temperature and during plastic deformation, in-situ and in real-time	**Sunil Kalkal**, Breakup reaction mechanisms for 6,7Li+64Zn reactions
1715-1730	**Barbara Wellmann**, Modelling of asynchronously pumped Ce:LiCAF lasers	**Marco Tomamichel**, Strong Converse Bounds for Quantum Communication	**Andrei Rode**, New Tetragonal Phases Formed in Silicon by Fs-Laser Induced Confined Microexplosion	**Dylan Harries**, Fine Tuning in U(1) Extended Supersymmetric Models
1730-1745	**Andrew Lee**, Continuous wave, wavelength-selectable emission from a Raman vortex laser	**Michael Hall**, Verifying entanglement in the absence of trust – with no Bell inequality violation	**Sherman Wong**, Hold time: A new parameter in the transformation of Si via nanoindentation	**Victor Flambaum**, New results on variation of fundamental constants and violation of fundamental symmetries (P, T, Lorentz invariance)
1745-1800	**Jipeng Lin**, Synchronously pumped femtosecond diamond Raman lasers	**Andrew Greentree**, Dark State Adiabatic Passage with Spin-One Particles	**Kiran Mangalampalli**, Temperature dependence of indentation-induced phase transformation behaviour of crystalline Si	

1900-2300 Stromlo Visit

	Interferometry	PEG 2	Art 1	QUICC 13: Quantum computation
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	Moran G008
	CHRISTOPHER CHANTLER	NICK ROBINS	BRIONY BARR	ANDREA MORELLO
	Gordon McDonald, Dispersionless Atom Interferometry	**Helen Georgiou**, Unweaving the rainbow: physics knowledge, its effects, and the consequences for teaching and learning	**Tim Brook**, Making art with a Markov chain (and a metaphor from physics)	**Matthew Wardrop**, Two-Qubit Exchange Gate for Resonant Exchange Qubits
	Mark Baker, A BEC apparatus for rotation sensing and atom interferometry		**Paul Thomas**, The probability diagram and parallel worlds	**Clemens Mueller**, Phonon-assisted gain and loss in a double quantum dot coupled to a microwave cavity
	Stuart Szigeti, Squeezed-light enhanced atom interferometry below the standard quantum limit	**Henry Gardner**, The Physics Playroom	**Dudley Creagh**, Physics in Art: a conservator's perspective on the use of physical techniques in the conservation of artworks	**Juan Pablo Dehollain**, Single donor qubits in isotopically purified 28Si: New benchmarks for solid-state qubits
	Alexander Wood, Spin-echo revival of coherent collisional dynamics in a Spinor Bose-Einstein condensate	**Vicky Tzioumis**, The Science & Mathematics Network of Australian University Educators	**Margaret Wegener**, The Physics of Art Jewellery	
	Carlos Claiton Noschang Kuhn, Increasing acceleration-sensitivity in atom interferometers	**Lachlan McGinness**, Development of the Action Concept Inventory	**Ben Swift**, Livecoding Physics Simulation as Performance	**Christopher Chubb**, A polynomial-time algorithm for finding degenerate ground states of gapped 1D quantum systems.
	Kyle Hardman, Development of an ultra-high precision atomic gravimeter	**Maria Parappilly**, LEGO Physics: A Constructive Introduction to the Scientific Method		**Menno Veldhorst**, An addressable quantum dot qubit with fault-tolerant control fidelity

	Fermi Gases	PEG 3	Art 2	QUICC 14: Quantum computing and simulation
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	MARGARET REID	DAVID HOXLEY	VANESSA ROBINS	ANDREW WHITE
	Dene Murphy, Space charge and disorder in ultra-cold ion bunches	**Manjula Sharma**, Lectures: Are they transmission style or are academics embracing active learning?	**Deb Kane**, Laser Diagnostics for Characterising Consolidants and Coatings on Samples of Australian Aboriginal Bark Paintings	**Thomas Stace**, Non-absorbing high-efficiency counter for itinerant microwave photons
	Paul Dyke, How 2D is a 2D Fermi gas	**John Furst**, The impact of on-line e-learning systems and student engagement		**Simon Burton**, Non-Abelian Anyons for Quantum Codes: a Phenomenological Model
	Philip Light, Laser Cooled Rubidium in Hollow Photonic Crystal Optical Fibres	**Les Kirkup**, Fostering research and practice connections: CSIRO solar technology inspires a first-year inquiry-oriented experiment	**Michael Bromley**, The art of wavefunction visualisation of amplitude and phase from 5-D information	**Stefan Filipp**, Exploring geometric phases and gates with superconducting quantum circuits
			Tristan Temple, Plasmonic dichroism: recreating the beauty of the Lycurgus Cup	
	Robert Henry, Negative Refraction of Excitations in the Bose-Hubbard Model	**Judith Pollard**, Early Intervention: Does it Maintain Student Engagement in Physics?	**Briony Barr**, Drawing on Complexity: far from equilibrium pattern formation in large-scale, rule-based, tape drawings enacted by human agents.	**Steven Flammia**, Pretty Good Sparse Quantum Subsystem Codes
	Marcus Lingham, Local Measurements on Ultracold Fermi Gases		**Lynden Stone**, Metaphors for the unvisualiseable: quantum mechanics and visual art	**Muhammad Ahmed**, Quantum transport in electrically and magnetically modulated one dimensional spin guides

Wednesday 10 December

0850-0900	IUPAP: Bruce McKellar			
0900-1030	**Plenary session**			
0900-0945	**Plenary 5: Steven Cowley, *Fusion Burn and the Science and Technology Challenges of Fusion Power*** CHAIR: JOHN HOWARD ROOM: MANNING CLARK 1			
0945-1030	**Plenary 6: Lisa Harvey-Smith, *The Square Kilometre Array: Building the World's Largest Telescope*** CHAIR: TBC ROOM: MANNING CLARK 1			
1030-1100	**MORNING TEA** ROOM: MELVILLE HALL			
1100-1230	**Concurrent session 7**			
	Optics 7: Plasmonics	**QUICC 7: Fundamentals of Quantum Mechanics**	**Semiconductors**	**NUPP 7**
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	TBC	ANDREW DOHERTY	ROBERT ELLIMAN	ANDREW STUCHBERY
1100-1115	**Kristy Vernon**, Optical coupling of gold nanoparticles on vertical graphenes for SERS	**Dominic Williamson**, MPO-injectivity and Topological Order in PEPS	**Brett Johnson**, Single defect spectroscopy in silicon carbide	**Takashi Kubota**, Integration status of the FTK system in the ATLAS experiment at the LHC
1115-1130		**Bryan Dalton**, Grassmann Phase Space Theory for Fermions	**Jennifer Wong-Leung**, Defects in high dose H implanted ZnO	**Edayillam Prasad**, Exploring quasifission in heavy ion reaction using ^{40}Ca projectiles
1130-1145	**Chamanei Perera**, Exciting bound plasmon mode in asymmetric stripe waveguides using grating	**Howard Wiseman**, 50 years of Bell's theorem: Why is its meaning still disputed, and is it possible to reach agreement?	**Jonathan Tollerud**, Isolating quantum coherence in semiconductor quantum wells with pathway selective multi-dimensional spectroscopy	**Anton Wallner**, Live 60Fe on Earth – do we see a signature of a recent supernova?
1145-1200	**Rui Guo**, Directional waveguide coupling with optical fano antennas		**Daniel Drumm**, Xe in diamond by probe-enhanced Raman spectroscopy	**Michael Tobar**, Laboratory Searches for Dark Sector Particles at The University of Western Australia
1200-1215	**Kenneth Crozier**, Quantum mechanical limit to plasmonic enhancement: observation by surface-enhanced Raman scattering	**Eric Cavalcanti**, On modifications of Reichenbach's principle of common cause in light of Bell's theorem	**Colin Campbell**, Investigation of defects in Ga implanted Ge using Positron Annihilation Lifetime Spectroscopy	**Mahananda Dasgupta**, Applying a New Technique for Precision Measurement of Fusion
1215-1230	**Andrey Miroshnichenko**, Topological edge states in zigzag chains of nanoparticles		**Adurafimihan Abiona**, Radioisotope Probing of Semiconductor Defects and Ife Bronze Head Sculpture	
1230-1400	**LUNCH AND POSTER SESSION 3** ROOM: MELVILLE HALL			
1400-1430	**Bragg Medal Winner** CHAIR: TBC ROOM: MANNING CLARK 1			

	Cold Techniques	PEG 4	Bio 1	QUICC 15: Continuous variable quantum optics
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	ROBERT DALL	JUDITH POLLARD	TBC	HANS BACHOR
	Steven Knoop, Ultracold mixture of metastable triplet 4He and 87Rb atoms	**Tim McIntyre**, Five-Minute Physics: Concise, Interactive Online Modules	**Abu S.M. Mohsin**, Cell uptake and aggregation dynamics study of gold nanoparticles using image correlation spectroscopy	**Akira Furusawa**, Squeezing and cubic phase gates and the related technologies
	Michael Hush, Cooling a thermal atomic vapour with feedback control to create long-range phase order		**Bronwyn Dolman**, The Physics of Hamstring Strain Injuries	
	Donald White, Anderson Localization of Matter Waves with Controllable Disorder and Interactions	**Denis Burchill**, Computer Simulations as an Aid to Learning Physics	**Sima Baghbanzadeh**, Optimal geometries for excitonic energy transfer in light-harvesting complexes	**Georgia Mansell**, In-vacuum glass-based squeezed light source
	Isaac Lenton, Optimisation of digital micromirror device patterns for optical trapping	**David Hoxley**, FARLabs: Providing Remote-Access Physics Labs to High-Schools Across Australia		**Austin Lund**, Boson Sampling with Gaussian states
	Maarten Hoogerland, Transport and Localisation in the Atom Optics Kicked Rotor with Phase Modulation	**Roy Tasker**, An OLT Senior Fellowship Program "Research into practice: evidence-informed, best practice visualisation for a deeper understanding of science"	**Itia Favre-Bulle**, Tightly focused laser beam scattering study in Zebrafish brain for optogenetics	**Oliver Thearle**, Experimental Demonstration of Continuous Variable One Sided Device Independence
		Joe Hope, What is face-to-face time for? Experiences giving a course without lectures	**Chiara Paviolo**, Probing and perturbing the lateral organization of cell-surface proteins with plasmonic nanoparticles	**Sara Hosseini**, Experimental verification of quantum discord in continuous-variable states

Wednesday 10 December

1430-1600 Concurrent session 8

	Optics 8: Emission and detection with semiconductor nanostructures	QUICC 8: Discrete variable quantum optics	Synchroton for materials	NUPP 8
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	TBC	STEPHEN BARTLETT	JENNY WONG-LEUNG	MARTIN SEVIOR
1430-1445	**Lan Fu**, GaAs/AlGaAs Single Nanowire Terahertz Detectors	**Peter Rohde**, Boson-sampling with non-Fock states	**Grant Van Riessen**, The development of soft X-ray spectro-ptychography for nanomaterial characterisation	**Chun-Ming Wu**, Taiwan's Cold Neutron Triple-Axis Spectrometer - SIKA
1445-1500		**Sam Roberts**, Symmetry Protection of the 3D Cluster Model Ground State		**Dongyun Jeung**, Dynamical approach to heavy ion-fission
1500-1515	**Ali Mirzaei**, Optimised Superscattering of Light and Cloaking by Multi-Layer Nanostructures	**Keith Motes**, How to bulid a Boson-sampling computer – the first post-classical non-universal quantum computer	**Geoffrey Cousland**, Yttria-stabilised zirconia: A trend study of structural, electronic and vibrational properties	**Geoffrey Taylor**, Future Colliders for High Energy Physics
1515-1530	**Fan Wang**, Evaluating the quantum efficiency, non-radiative lifetime and doping concentration of InP nanowires	**Laura Rosales-Zárate**, Quantum dynamical simulations of Bell violations	**Mathew Guenette**, Plasma-surface interactions of tungsten exposed to nuclear fusion-relevant plasma conditions in the MAGnetized Plasma Interaction Experiment	
1530-1545	**Yuerui Lu**, Extraordinary Photoluminescence and Strong Temperature/Angle-Dependent Raman Responses in Few-Layer Phosphorene	**Martin Ringbauer**, Measurements on the Reality of the Wavefunction	**Jay Bourke**, Experimental measurement of low energy inelastic electron scattering	**Lei Wu**, Probing Light Higgsinos in Natural SUSY from Monojet Signals at the LHC
1545-1600	**Ka Wu**, Self-pulsing and excited-state absorption in Tm:YAlO3		**Daniel Schauries**, Effects of heavy-ion irradiation in minerals studied by small angle scattering	**Laurence Spiller**, Constraints on the CKM matrix and on New Physics in Leptonic and Semileptonic Decays

1600-1630 **AFTERNOON TEA** ROOM: MELVILLE HALL

1630-1800 Concurrent session 9

	Optics 9: Light coupling effects	QUICC 9: Quantum memories and correlations	Synchroton	Plasma 1: Robin Storer Memorial Session on "MHD theory in laboratory, space and astrophysical plasmas"
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	TBC	GEOFF PRYDE	GRANT VAN RIESSEN	ROBERT DEWAR
1630-1645	**Nicholas Wyatt**, Technique for Assessing Plasmon Enhancement in Coupling Nanoelectromechanical Systems	**Zong-Quan Zhou**, Storing single photons emitted from a quantum dot in a solid-state quantum memory	**Wenge Yang**, Applications of Advanced X-ray Imaging Techniques to High Pressure Research	**Boyd Blackwell**, Scaling of Fluctuations in the MHD Range in the H-1NF Heliac
1645-1700	**Ben Hopkins**, The physics of chirality and circular dichroism			**Matthew Hole**, Resolving the 'wave-particle' plasma interaction
1700-1715	**Xavier Vidal**, Inducing circular dichroism in non-chiral samples using the angular momentum of light	**Julien Bernu**, An Ultra High Optical Depth Cold Atom Ensemble for Quantum Memories	**Anton Maksimenko**, Some 3D rendering from the computed tomography data obtained on the Imaging and Medical Beamline at the Australian synchrotron.	**Raffi Nazikian**, Recent Advances in the Understanding of Instability Suppression by 3D Magnetic Fields in Tokamaks and implications for ITER
1715-1730	**Stuart Earl**, A Plasmonic Thermally Controlled Polarisation Switch	**Nicholas Funai**, Modeling detector-field interactions with continuous tensor network methods	**Stéphanie Pradier**, Determination of nanoscale thickness and roughness distributions using broadband coherent diffractive X-ray imaging	
1730-1745	**Adam Taylor**, Geometry effects on the thermal stability of metallic nanoparticles	**Jan Jeske**, Spatially correlated decoherence: Understanding and exploiting spatial noise correlations in quantum systems	**Brian Abbey**, Spatially and temporally resolved materials characterization across the lenthscales via coherent x-ray diffraction	**Zhisong Qu**, The impact of anisotropic pressure on tokamak equilibria and stability
1745-1800	**Liudmila Uvarova**, The interaction of laser radiation with dispersion particles on wave surface of liquid at different temperature	**Nicolas Menicucci**, Fault-tolerant measurement-based quantum computing using continuous-variable cluster states		**Sebastian Cox**, Exploring the impact of resonant interactions between beam ions & MHD wave modes (fishbones) on plasma confinement

1900-2300 **CONFERENCE DINNER • NATIONAL GALLERY OF AUSTRALIA**

	BEC	Optics 17: Optical measurements and instrumentation	Bio 2	QUICC 16: Quantum optomechanics
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	PHILIP LIGHT	TBC	TBC	MICHAEL VANNER
	Margaret Reid, Leggett-Garg inequalities for two-well tunneling in Bose-Einstein condensates	**Lyle Roberts**, Optical Phased Array	**Shu Zhang**, Viscoelasticity Measurements inside Liposomes	**Peter Barker**, Levitated optomechanics with a hybrid electro-optical trap
		Scott Foster, Listening with light: Demonstration of an advanced fibre laser hydrophone array in Gulf St Vincent		
	Alexander Akulshin, Linear and nonlinear lensing effect in atomic media	**Su Fang**, Ultra-high spectral purity lasers for tests of relativity and atomic clocks	**Morteza Aramesh**, Highly Stable, Bio-compatible Nano-Porous Diamond-Like Carbon Membranes for DNA Sensing	**Michael Barson**, Mechanical and thermal properties of the NV centre in diamond
	Samuel Ruddell, Heat capacity of a Bose-Einstein condensate	**James Anstie**, A Dual Optical and Microwave Frequency Comb Optical Spectrum Analyser	**Christopher Hall**, Radioentomology – The art of imaging insects with x-ray light	**Marcus Doherty**, Spin-mechanical quantum technologies in diamond
	Nicholas McKay-Parry, Dual Component 87Rb and 41K Bose-Einstein condensates in configurable optical potentials	**Stephen Gensemer**, Compensation for Sag and Material Inhomogeneity for Gravitational-Wave Detector Optics	**Ziyad Alrowaili**, Magic Plate: A Two Dimensional Silicon Transmission Detector Array for Real Time MV Photon Treatment Verification in Vivo	**Christopher Bentley**, Detection-enhanced steady state entanglement with ions
	Chris Bradly, Coupled pair approach for strongly-interacting trapped fermionic atoms	**Francis Bennet**, Integrated optics for phasing the Giant Magellan Telescope	**Muhammad Waleed**, Optical Tweezers for Single-Cell Transfection	**Michael Taylor**, Subdiffraction-limited quantum imaging of a living cell

	Spectroscopy	Optics 18: Nonlinear optical effects	Bio 3	QUICC 17: Quantum Control and Simulation
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	ANDREW HORSLEY	TBC	TBC	STEVE FLAMIA
	Brian Orr, Remote open-path sensing of agriculturally significant molecules at trace levels in air by fibre-coupled continuous-wave cavity-ringdown spectroscopy	**Wonkeun Chang**, Exploding solitons versus rogue waves in dissipative systems	**Ewa Goldys**, Mass-production, characterization and functionalization of nano-alumina Oral Presentation	**Allen Boston**, Qubit Purification with Weak Measurements and Quantum Control
	Ken Baldwin, Determining the tune-out wavelengths for metastable helium	**Deb Kane**, Mapping the Nonlinear Dynamics of a Semiconductor Laser with Frequency Shifted Feedback System	**David Carberry**, Chiral objects within optical fields as mimics for biological motion Oral Presentation	**Hakop Pashayan**, Simulating quantum circuits with quasiprobabilities
	Stephen Gibson, Photodetachment of O- yielding O(1D2,3P) atoms, viewed with velocity-map imaging	**Yue Sun**, Observation of nonlinear thermal optical dynamics in a chalcogenide nano-beam cavity	**Annemarie Nadort**, Quantifying Upconversion Nanoparticle Distribution in a Chick Embryo Tumour Model Oral Presentation	**Gavin Brennen**, Quantum simulation of quantum field theories using wavelets
	Josh Machacek, The Polarisation of Fluorescence from Excited Photofragments: Balmer α Emission from Molecular Hydrogen	**Adrian Ankiewicz**, Higher order nonlinear Schrodinger equations and their soliton and rogue wave solutions	**Chris Schroeder**, Extended Excitonic Delocalization Directs Absorption in Photosynthetic Purple Bacteria Oral Presentation	**Harrison Ball**, Walsh-synthesized noise-filtering quantum logic gates
	Jason Gascooke, New Insights into Methyl Rotors from High Resolution 2-Dimensional Laser Induced Fluorescence	**Joshua Toomey**, High resolution mapping of a photonic integrated chaotic laser with controllable complexity	**Christian Langton**, Ultrasound Transit Time Spectroscopy for Improved Tissue Characterisation and Imaging Oral Presentation	**Aroon O'Brien**, Numerical simulation of experimental signatures of long-range Ising interactions on the triangular lattice; an iDMRG study.
		Geoff Campbell, Electromagnetically induced transparency and four-wave-mixing in a cold atomic ensemble with large optical depth		

Thursday 11 December

0855-0900	Housekeeping				
0900-1030	**Plenary session**				
0900-0945	**Plenary 7: Anke Kaysser-Pyzalla, *Understanding and Controlling Materials Properties for Energy Research*** CHAIR: TBC ROOM: MANNING CLARK 1				
0945-1030	**Plenary 8: Serge Haroche, *Juggling with photons in a box to explore the quantum world*** CHAIR: TBC ROOM: MANNING CLARK 1				
1030-1100	**MORNING TEA** ROOM: MELVILLE HALL				
1100-1230	**Concurrent session 10**				
	Optics 10: Microstructured optical fibres and applications	**QUICC 10: Quantum Communication and Computation**	**Topological Insulators**	**Plasma 2: H-1**	
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4	
CHAIR	TBC	ANDREW GREENTREE	TBC	STEVE COWLEY	
1100-1115	**Philip Russell**, Gas, glass and light: controlling light-matter interactions in microstructured fibres	**Matthew Sellars**, Progress towards long-range quantum entanglement distribution utilizing rare-earth doped crystals	**Weizhe Liu**, Weak antilocalisation in topological insulators with strong spin-orbit scattering	**Clive Michael**, Turbulence and transport studies in the H-1 Heliac	
1115-1130			**Anthony Jacko**, Kagomene Lattice and Mo3S7(dmit)3, a spin-liquid candidate		
1130-1145	**Joel Corney**, Quantum squeezing in microstructured optical fibre	**Juan Loredo**, Solid-state source of n-fold indistinguishable single photons	**Jack Hellerstedt**, In-situ mobility and carrier density of topological insulator Bi$_2$Se$_3$ during molecular beam epitaxy	**Alex Thorman**, Radio-frequency wave dynamics in the H-1 Heliac	
1145-1200	**Christopher Perrella**, Fibre-Atom Optics: A Platform for Frequency Stabilization and Quantum Information Applications	**Adam Bennet**, Experimental Semi-Device-Independent Certification of Entangled Measurements	**Mark Edmonds**, Stability and Surface Reconstruction of Bi2Se3 on Exposure to Atmosphere	**Bernhard Seiwald**, Investigations of H-1NF neoclassical transport properties	
1200-1215	**Xiaohong Han**, Attosecond time resolved photoemission measurement	**Jayne Thompson**, Modular Quantum Computing	**Oleg Sushkov**, Topological Insulating States in Laterally Patterned Ordinary Semiconductors	**George Bowden**, Calculation of continuum damping of AlfvÃ©n waves in tokamaks and stellarators	
1215-1230	**Ashby Hilton**, Ultra-high stability cryocooled sapphire microwave oscillators			**Shaun Haskey**, Synchronous imaging and 3D tomography of Alfven waves on the H-1 stellarator	
1230-1330	**LUNCH** ROOM: MELVILLE HALL				

	Spectroscopy and Scattering	Optics 19: Plasmonics 2	Acoustics and History	QUICC 18: Quantum Metrology
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	JASON GASCOOKE	DRAGOMIR NESHEV	TBC	HOWARD WISEMAN
	Rory Speirs, Electron Diffraction from a Cold Atom Electron Source	**Ann Roberts**, Dark modes in high-aspect ratio plasmonic structures	**Joe Wolfe**, Circle of Fourths: an orchestral overture	**Simon Haine**, Entanglement between an Optical cavity and a Bose-Einstein Condensate for enhanced precision measurement and fundamental tests
	Mark Zammit, Dissociative processes of electron scattering from the molecular hydrogen ion and its isotopologues	**Wei Liu**, Geometric interpretations for the resonances of plasmonic nanoparticles		**Hossein Tavakoli Dinani**, Loss-resistant unambiguous phase measurement
	Andrew Horsley, High-Resolution Imaging of Microwave Fields and Atomic Relaxation Using Alkali Vapour Cells	**Isabelle Staude**, Hybrid Metal-Dielectric Nanoantennas	**Timo Nieminen**, Physics in World War One	**Ivonne Guevara**, Quantum State Smoothing
		Tim Davis, Mixing light in plasmonic circuits for all-optical modulation and switching	**Peter Kappen**, The Story of Research - A black & white photo-exploration at the Australian Synchrotron	**Angela Karanjai**, Classical Weak Value of Gaussian states
	Roisin Boadle, Kinematically Complete Studies of Positron Impact Ionisation	**Fangfang Ren**, High-order surface plasmons and their application in Ge photodetectors	**Neil Boucher**, Acoustics and Music A New Approach to Sound Recognition	**Andre Carvalho**, Ignorance is bliss: General and robust cancellation of decoherence via no-knowledge quantum feedback
		Tim Chow, Accuracy of image correlation spectroscopy on plasmonic random media: Quantum yield variation and compartmentalization		

Thursday 11 December

1330-1415	**Plenary 9: Lawrence Krauss, *Gravitational Waves from Inflation and Implications for Fundamental Physics*** CHAIR: MATTHEW COLLESS ROOM: MANNING CLARK 1			
1430-1600	**Concurrent session 11**			
	Optics 11: Optical forces and trapping	**QUICC 11: Quantum optomechanics**	**Materials Techniques**	**Plasma 3 and STSP 2**
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	TIMO NIEMINEN	MATTHEW WOOLLEY	TBC	RAFFI NAZIKIAN
1430-1445	**Kishan Dholakia**, Let nothing slow you down: optical angular momentum transfer to trapped particles in liquid, air and vacuum	**Michael Vanner**, Non-linear optomechanical measurement of mechanical motion	**Gary Bryant**, Differential dynamic microscopy: a new technique for measuring dynamics in soft matter and biological physics.	**Joe Khachan**, Progress in inertial electrostatic confinement fusion
1445-1500			**Vanessa Robins**, Geometry and topology of x-ray micro-CT images of porous and granular materials	
1500-1515	**Vincent Loke**, Circularly polarized laser beams, birefringent materials and torque	**Maxim Goryachev**, Ultrahigh Q Bulk Acoustic Wave Cavities at the Quantum Limit	**Maarten Vos**, RBS analysis using electrons: Fundamentals and applications	**Craig Bowie**, Characterising the time sequence of systemwide mass loss events in a sandpile model with variable driving
1515-1530	**Niko Eckerskorn**, Focusing a jet of particles with optically induced forces in a diverging vortex beam	**Michael Tobar**, Ultra-Strongly Coupled Hybridized Photon-Magnon interaction due to Cavity with Focused Resonant Magnetic Field	**Wai Tung Lee**, Polarised Neutrons for Material Science Research at the Australian Nuclear Science and Technology Organisation	**Teck Seng Ho**, Developing plasma thruster technologies at SP3
1530-1545	**Alexander Stilgoe**, Complementary information from optical traps	**Sean Hodgman**, Experimental Realisation of Negative Absolute Temperature for Motional Degrees of Freedom	**Dehong Yu**, PELICAN: a Multi-Purpose Time of Flight Cold Neutron Spectrometer	**Andrew Spargo**, Studies of momentum in the Earth's mesosphere using radar
1545-1600	**Mathieu Juan**, Optical levitation for metrology	**Daniel Lombardo**, Deterministic Creation of Macroscopic Cat States using Optomechanics	**Xinjun Liu**, A Memory Selector Element based on the Insulator-Metal Transition in NbO2	**Frederick Menk**, Expansion and capabilities of the TIGER over-the-horizon radar network
1600-1630	**AFTERNOON TEA** ROOM: MANNING CLARK CENTRE FOYER			
1630-1800	**Concurrent session 12**			
	Optics 12: Metamaterials	**QUICC 4: Quantum metrology**	**CMM 1**	**Plasma 4: From fusion to low temperature diagnostics**
ROOM	MANNING CLARK 1	MANNING CLARK 2	MANNING CLARK 3	MANNING CLARK 4
CHAIR	YURI KIVSHAR	DAVID KIELPINSKI	TBC	JOE KHACHAN
1630-1645	**Anatoly V. Zayats**, Nonlinear plasmonic metamaterials	**Rainer Blatt**, Quantum Information Science with Trapped Ca+ Ions	**Tushara Prakash**, Magnetic and magnetotransport study of permalloy pressed powders prepared by arc discharge	**Heinrich Hora**, 10 kilotesla magnetic field confinement combined with ultra-fast laser accelerated plasma blocks for initiating fusion flames
1645-1700			**Qudsia Arooj**, Rational design of photoactive molecules for the expansion of the UV-Vis spectra in DSSC applications	**Matt Thompson**, Helium-induced damage formation and its effect on hydrogen retention in mixed H-He plasma
1700-1715	**Manuel Decker**, All-dielectric Huygens' Metasurfaces for High-Efficient Wave Manipulation	**Valdis Blums**, Ion Fluorescence Collection And Diffraction Limited Imaging From A Microfabricated Ion Trap With Integrated Diffractive Mirrors	**Chin-Wei Wang**, Studies on the multiferroic Co3TeO6	**Ian Falconer**, Spectroscopic interferometric measurement of the temperature and velocity of ions ejected from arc cathode spots
1715-1730	**Boris Kuhlmey**, Sub-diffraction imaging using hyperlenses - correcting for artefacts	**Harrison Ball**, Precision quantum control with trapped 171Yb+ ions	**Merinda Nash**, Mineral structures and extraordinary mechanical properties of tropical coral reefs	**Romana Lester**, Ion distribution function in a helicon-wave generated plasma
1730-1745	**Liming Liu**, Tunable terahertz metamaterial based on mechanically post-processing approach	**Jarrah Sastrawan**, Improving frequency standard performance by optimised measurement feedback	**Jiabao Yi**, Ferromagnetism in Fe doped In2O3 films	**Solmaz Saboohi**, Study of Ethanol Plasma Polymers Deposited in Capacitively Coupled Plasmas
1745-1800	**Mingkai Liu**, Nonlinear symmetry transitions in magneto-elastically coupled meta-molecules		**Glen Harris**, Strong Mechanical Nonlinearity of Superfluid films	
1800	Conference Closing			

	Astro 1	Optics 20: Plasmonics and metamaterials	Industry 1	Optics 16: Holography and imaging
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	GAYANDHI DE SILVA	TBC	TBC	TBC
	Allan Ernest, The statistics of gravitational eigenstates in dark matter halos	**Sahar Tabrizi**, Silver C-shaped arrays fabricated via highly sensitive multifocal two-photon photoreduction	**Tim Senden**, A Physicist's Guide to Translation	**Toyohiko Yatagai**, Vector Wave Holography for Optical Mass Storage
	Richard Neo, Correcting vortex splitting in higher order vortex beams	**David Powell**, Modes in open metamaterial and nanophotonic systems		
	Chris Lidman, OzDES – A spectroscopic survey of the Dark Energy Survey fields with the Anglo-Australian Telescope	**Jianfa Zhang**, Strong light-matter interactions in all-dielectric metamaterials using split bar resonators as building blocks	**Adrian Carter**, Nufern: from three man tech start-up to global leader and fibre supplier to the stars	**Ivan Reid**, The Art of Digital Holography
	Andrew Melatos, Australia's contribution to the hunt for continuous gravitational waves with LIGO	**Jasper Cadusch**, Radiative decay rate enhancement of CdSe/CdS/ZnS core shell quantum dots with nano-imprinted plasmonic nanocavities.		**Dominic Berry**, The Heisenberg limit for a varying phase
	David Parkinson, Watching galaxies fall: testing theories of gravity using large galaxy redshift surveys	**Sergey Kruk**, Multipolar Nanoantennas for Photon-Spin Control of Quantum Emitters	**Dudley Creagh**, Developing standards for X-ray examination systems used at airports	**John Holdsworth**, A novel scanner for diffuse media imaging
		Pereverzev Nikita, Control of pseudoisocyanine J-aggregates fluorescence by exciton-plasmon interaction with gold nanoparticles		**Gabriel Molina-Terriza**, Emulation of gravitational waves with entangled photons

	Astro 2	Optics 21: Quantum light sources	Applied Physics and Industry	AOS
	MANNING CLARK 5	MANNING CLARK 6	MORAN G007	MORAN G008
	CHRIS LIDMAN	TBC	TBC	TBC
	Durga Mahapatra, Extended Red Emission: Simulating the Size Distribution of Possible Dust Carriers	**Alexander Buese**, Control of Temporal Correlations in Entangled Photon States Produced in Spontaneous Parametric Down-Conversion	**Carlos Lee**, The Photonics Industry: A European Perspective on Global Competitiveness	**Dylan Saunders**, Heralded single photon storage in a room-temperature broadband quantum memory
	Silvie Ngo, Digitally Enhanced Homodyne Interferometry fiber systems for Co-phasing Large Segmented Telescopes	**Sara Marzban**, Integrated Quantum Photonics using Rare-Earth Ion doped Planar Waveguides		**Natalia do Carmo Carvalho**, Reentrant cavities analysis, development and applications
	Gayandhi De Silva and **Sarah Martell**, Galactic Archaeology and the GALAH Survey	**Andrea Tabacchini**, 4-photon Spatially Entangled States for Control of Nanostructures	**Danielle Wuchenich**, Optical physics for remote sensing in the aerospace industry	**Samuel Francis**, A smaller, simpler laser interferometer for space-based gravity observation
		James Titchener, Integrated generation of photon pairs with all-optically reconfigurable quantum states		**Rozalina Zakaria**, Fabrication of Ag nanoflowers by electrochemically deposition technique related to plasmonic potential behaviour
	Baerbel Koribalski, 3D Visualisation of Gas and Stars in Galaxies	**Che Wen Wu**, Nonlinear adiabatic couplers for Bell state generation with spatial pump filtering		**Jochen Schroeder**, Geoff Opat Prize
	Yuri Levin, Thermoplastic waves in a magnetar's crust	**Morgan Weston**, High heralding efficiency single photon source in a factorable frequency mode		

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Contact: Professor Gerard J. Milburn, Centre Director, Centre for Engineered Quantum Systems, An Australian Research Council Centre of Excellence, The University of Queensland

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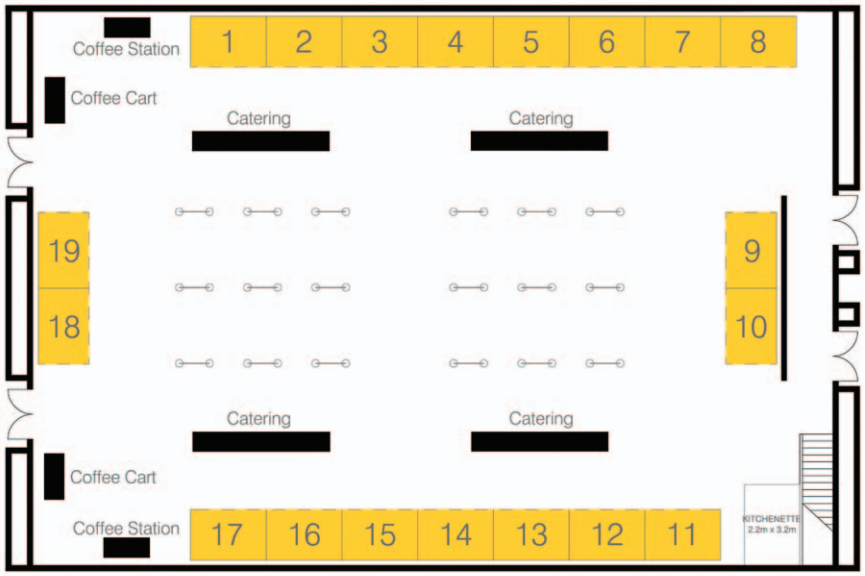
Exhibition

Exhibition floor plan



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Ampegnon	Booth 16
Art in Physics	Booths 11 & 12
Coherent Scientific	Booth 4
Dynapumps	Booth 5
Edutechnics	Booth 1
Ezzi Vision	Booth 2
IOP Publishing	Booth 17
JAVAC Pty Ltd	Booth 6
John Morris Scientific	Booth 14
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BOOTHS 11 & 12

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Presenting author and affiliation list

AUTHOR	AFFILIATION
Abbey, Brian	ARC Centre of Excellence For Advanced Molecular Imaging, La Trobe University & Melbourne Centre For Nanofabrication
Abiona, Adurafimihan	The University of New South Wales, UNSW Canberra, ACT
Ahmed, Asif	Department of Nuclear Physics, Australian National University, Canberra ACT
Ahmed, Muhammad H.	School of Applied Sciences, RMIT University, VIC
Akhmediev, Nail	Optical Sciences Group, Research School of Physics and Engineering, AUSTRALIAN NATIONAL UNIVERSITY & Department of Physics, University of Bayreuth, 95440 Bayreuth, Germany
Akulshin, Alexander	Centre for Quantum and Optical Science, Swinburne University of Technology, Hawthorn, VIC
Alexander, Rafael	School of Physics, The University of Sydney, Sydney NSW
Allendes, Pedro	Department of Physics, Universidad Tecnica Federico Santa Maria (UTFSM)
Alrowaili, Ziyad	Centre for Medical Radiation Physics (CMRP), University of Wollongong, Australia & Physics department, Aljouf University, Aljouf, Saudi Arabia.
Alshahrani, Badriah	Dep. of Nuclear Physics, Australian National University & Dep. of Physics, King Khaled University
Anderson, Russell	School of Physics, Monash University, Victoria
Andres Arroyo, Ana	School of Physics, The University of New South Wales, Sydney, NSW
Ankiewicz, Adrian	Optical Sciences Group, Research School of Physics and Engineering, The Australian National University
Anstie, James	IPAS and The School of Chemistry and Physics, The University of Adelaide
Antonosyan, Diana	Nonlinear Physics Centre, Research School of Physics and Engineering, Australian National University
Aramesh, Morteza	Physics Department, the University of Melbourne, Melbourne, VIC
Armin, Ardalan	University of Queensland
Armstrong, Seiji	CQC2T, Department of Quantum Science, The Australian National University & Department of Applied Physics, School of Engineering, The University of Tokyo
Arooj, Qudsia	Swinburne University of Technology
Assad, Syed	CQC2T, Dept of Quantum Science, The Australian National University
Baghbanzadeh, Sima	School of Mathematics and Physics, The University of Queensland & Department of Physics, Sharif University of Technology, Tehran, Iran
Baker, Mark	School of Mathematics and Physics, University of Queensland
Balazs, Csaba	Monash University
Baldwin, Ken	Research School of Physics and Engineering, The Australian National University
Ball, Harrison	ARC Centre for Engineered Quantum Systems, The University of Sydney & National Measurement Institute, West Lindfield, NSW
Barberio, Elisabetta	The University of Melbourne
Barker Peter	Department of Physics and Astronomy, University College London, Gower Street, London, WC1E 6BT United Kingdom
Barr, Briony	Scale Free Network: Art-Science Collaborative
Barson, Michael	Australian National University
Bartholomew, John	Centre for Quantum Computation and Communication Technology, LPC, RSPE, Australian National University
Basiri-Esfahani, Sahar	EQuS, School of Math and Physics, The University of Queensland
Bell, Sharon	Professorial Fellow, University of Melbourne
Bennet, Adam	Centre for Quantum Dynamics, Griffith University, Brisbane, QLD
Bennet, Francis	Research of Astronomy and Astrophysics, The Australian National University
Bennett, James	ARC Centre of Excellence for Engineered Quantum Systems (EQuS)
Bennie, Lisa	School of Physics, Monash University, VIC
Bentley, Christopher	Department of Quantum Science, Australian National University
Berengut, Julian	UNSW
Bernu, Julien	Center for Quantum Computation and Communication Thecnology - Australian National University
Berry, Dominic	Macquarie University
Blackwell, Boyd	Plasma Research Laboratory, RSPE, Australian National University
Blair, Carl	Australian International Gravitational Research Centre, University of Western Australia
Blatt, Rainer	Institute for Experimental Physics, University of Innsbruck, Technikerstrasse 25, & Institute for Quantum Optics and Quantum Information, Austrian Academy of Sciences, Otto-Hittmair-Platz 1, A-6020 Innsbruck, Austria
Blums, Valdis	Centre for Quantum Dynamics, Griffith University, Brisbane, QLD
Boadle, Roisin	Atomic and Molecular Physics Laboratories, RSPE, Australian National University
Booth, Jamie	Chemical and Quantum Physics, School of Applied Sciences, RMIT University, Melbourne, VIC & CSIRO Materials Science and Engineering, Clayton VIC
Boston, Allen	Centre for Quantum Dynamics, Griffith University
Boucher, Neil	SoundID, Maleny, Queensland
Bourke, Jay	The University of Melbourne
Bowden, George	The Australian National University
Bowie, Craig	Research School of Physics and Engineering, The Australian National University
Bradac, Carlo	Department of Physics & Astronomy, Macquarie University, NSW & ARC Centre for Engineered Quantum System
Bradly, Chris	School of Physics, The University of Melbourne
Bradshaw, Benjamin	Australian National University
Brennen, Gavin	Department of Physics and Astronomy, Macquarie University
Brewin, Leo	Monash University
Bromley, Michael	The University of Queensland
Brook, Tim	School of Art & Research School of Computer Science, The Australian National University, Canberra, ACT
Bryant, Gary	Centre for Molecular and Nanoscale Physics, Applied Sciences, RMIT University
Buese, Alexander	Department of Physics & Astronomy & ARC Center for Engineered Quantum Systems, Macquarie University, Sydney
Burchill, Denis	School of Curriculum and Pedagogy & Dept of Physics, University of Auckland, NZ
Burton, Simon	The University of Sydney
Cadusch, Jasper	The University of Melbourne
Campbell, Geoff	Department of Quantum Science, The Australian National University
Campbell, Colin	Atomic Molecular Physics Laboratories, RSPE, Australian National University, Canberra, ACT
Carberry, David	School of Mathematics and Physics, The University of Queensland, St Lucia, QLD
Caroff, Philippe	EME Department, Research School of Physics and Engineering, The Australian National University, Canberra
Carter, Ian	Department of Nuclear Physics, Research School of Physics and Engineering, Australian National University
Carter, Adrian	Nufern, East Granby, Connecticut, USA
Carvalho, André	Department of Quantum Science, Research School of Physics and Engineering & ARC Centre for Quantum Computation and Communication Technology, The Australian National University
Cavalcanti, Eric	The University of Sydney & University of Oxford
Chambers, Alexander	University of Adelaide, Adelaide SA
Chang, Wonkeun	Australian National University
Chantler, Christopher Thomas	University of Melbourne
Cho, Young-Wook	The Australian National University & Pohang University of Science and Technology (POSTECH)
Chong, Shen V.	Robinson Research Institute, Victoria University of Wellington & MacDiarmid Institute for Advanced Materials and Nanotechnology, VUW
Chong, Katie	Nonlinear Physics Centre, Research School of Physics and Engineering, Australia
Chow, Timothy T. Y.	Swinburne University of Technology
Chu, Steven	Stanford University, Stanford, CA 94305, United States of America
Chubb, Christopher	Centre for Engineered Quantum Systems, School of Physics, University of Sydney
Cook, Kaitlin	Research School of Physics and Engineering, The Australian National University
Corkum, Paul	Joint Attosecond Science Lab, University of Ottawa and National Research Council of Canada
Corney, Joel	The University of Queensland
Cousland, Geoffrey	School of Physics, The University of Sydney, Camperdown, NSW 2006, Australia & Bragg Institute, Australian Nuclear Science and Technology Organisation, Lucas Heights, NSW
Cowley, Steven	UK Atomic Energy Authority, Culham Science Centre Abingdon OX14 3DB United Kingdom & Department of Physics, Imperial College, London, United Kingdom
Cox, Sebastian	Research School of Physics and Engineering, The Australian National University
Creagh, Christine	Murdoch University & Australian Government Office of Learning & Teaching
Creagh, Dudley	University of Canberra
Crozier, Kenneth	School of Engineering and Applied Sciences, Harvard University, Cambridge, USA, School of Physics & Department of Electrical and Electronic Engineering, University of Melbourne, VIC
Dall, Robert	Research School of Physics and Engineering, The Australian National University
Dalton, Bryan	Centre for Quantum & Optical Science, Swinburne University of Technology
Dasgupta, Mahananda	Department of Nuclear Physics, Research School of Physics and Engineering, The Australian National University, Canberra, ACT
Daszuta, Boris	Department of Mathematics and Statistics, University of Otago
Davis, Tim	CSIRO Manufacturing Flagship
De Natale, Paolo	Istituto Nazionale di Ottica (INO)-CNR, via Campi Flegrei 34 - Comprensorio A.Olivetti, 80078 Pozzuoli (Naples), Italy
De Silva, Gayandhi	Australian Astronomical Observatory
De Sterke, C. Martijn	CUDOS, and School of Physics, University of Sydney, Sydney
Debs, John	Dept. of Quantum Science, The Australian National University
Decker, Manuel	Nonlinear Physics Centre, Australian National University, Canberra, ACT
Dehollain, Juan Pablo	CQC2T, School of EE&T, University of New South Wales, Sydney, NSW
Desyatnikov, Anton	The Australian National University
Devi, Sunil	Research School of Physics and Engineering, The Australian National University,
Devine, Natasha	Optical Sciences Group, RSPE, Australian National University, ACT
Dholakia, Kishan	School of Physics and Astronomy, University of St Andrews, North Haugh, Fife KY16 9SS, UK
Djurisic, Aleksandra	Dept. of Physics, The University of Hong Kong
do Carmo Carvalho, Natalia	School of Physics, The University of Western Australia & ARC Centre of Excellence for Engineered Quantum Systems (EQuS)
Dobson, John	Queensland Micro and Nano Technology Centre, Griffith University
Doherty, Marcus	Research School of Physics and Engineering, The Australian National University
Dolman, Bronwyn	ATRAD Pty Ltd, Adelaide, Australia & School of Chemistry and Physics, University of Adelaide, Australia
Drumm, Daniel	Theoretical Chemical & Quantum Physics, Sch. Applied Sciences, RMIT University & School of Physics, The University of Melbourne
Drummond, Peter	Swinburne University of Technology
Duty, Timothy	ARC Centre for Engineered Quantum Systems & The University of New South Wales

AUTHOR	AFFILIATION
Dyke, Paul	Centre for Quantum and Optical Science, Swinburne University of Technology
Earl, Stuart	School of Physics, The University of Melbourne, Victoria & Melbourne Centre for Nanofabrication (MCN), Australian National Fabrication Facility, VIC
Eastwood, Samuel	School of Physics, Monash University, Clayton, VIC
Eckerskorn, Niko	Laser Physics Centre, RSPE, Australian National University, Canberra, ACT
Edayillam, Prasad	Australian National University
Edmonds, Mark	School of Physics, Monash University, Clayton, VIC
Eggleton, Ben	Centre For Ultrahigh Bandwidth Devices For Optical Systems (CUDOS), The Institute of Photonics and Optical Science (IPOS), School of Physics, University of Sydney, NSW
Elliman, Robert	EME,RSPE,The Australian National University, Canberra, ACT
Ernest, Allan	Charles Sturt University
Escobar Diaz, Leon	University of Otago
Everett, Jesse	Department of Quantum Science, Australian National University & Centre for Quantum Computation and Communication Technology
Everitt, Patrick	Quantum Sensors Lab, Department of Quantum Science, Australian National University
Falconer, Ian	School of Physics, University of Sydney
Fang, Su	Institute for Photonics and Advanced Sensing and School of Chemistry and Physics, University of Adelaide, SA
Favre-Bulle, Itia	School of Mathematics and Physics, University of Queensland, QLD
Fenech, Kristian	Swinburne University of Technology
Ferguson, Katherine	CQC2T, Laser Physics Centre, RSPE, Australian National University, Canberra, ACT
Filipp, Stefan	IBM T.J. Watson Research Center, Yorktown Heights, NY 10598 United States
Flambaum, Victor	University of New South Wales, Sydney
Flammia, Steven	Centre for Engineered Quantum Systems, School of Physics, University of Sydney
Fleddermann, Roland	Australian National University, Department of Quantum Science, 2 Science Rd, Acton, ACT
Foster, Scott	Defence Science and Technology Organisation
Francis, Samuel	The Australian National University
Francis, Paul	Physics Education Centre & Research School of Astronomy and Astrophysics, Australian National University
Fu, Lan	The Australian National University
Funai, Nicholas	School of Physics, The University of Sydney, Sydney NSW
Furst, John	University of Newcastle
Furusawa, Akira	Department of Applied Physics, School of Engineering, The University of Tokyo, Japan
Gabay, Natasha C.	The University of Sydney
Gardner, Henry	Australian National University
Gascooke, Jason	Flinders University
Genest, Jerome	Centre D'optique Photonique Et Laser, Universite Laval, Quebec, Canada G1P 7PK
Gensemer, Stephen	Commonwealth Scientific and Industrial Research Organisation
Georgiou, Helen	School of Physics, The University of Sydney
Gibson, Stephen	Research School of Physics and Engineering, The Australian National University
Ginges, Jacinda	University of New South Wales
Goldys, Ewa	MQ Biofocus Research Centre, Macquarie University, Sydney, NSW
Goossens, Darren	The Australian National University
Goryachev, Maxim	University of Western Australia
Greentree, Andrew	Chemical and Quantum Physics, School of Applied Sciences, RMIT University
Gu, Mile	Centre for Quantum Information, Institute for Interdisciplinary Information Sciences, Tsinghua University, Beijing China & Centre for Quantum Technologies, National University of Singapore, Singapore
Guccione, Giovanni	Centre for Quantum Computation and Communication Technology
Guenette, Mathew	Australian Nuclear Science and Technology Organisation
Guevara, Ivonne A.	Centre for Quantum Dynamics, Griffith University & Centre for Quantum Computation and Communication Technology, Brisbane, QLD

AUTHOR	AFFILIATION
Guo, Rui	Nonlinear Physics Centre and CUDOS, Australian National University, Canberra, ACT
Guo, Yanan	The Australian National University & The University of Queensland
Haine, Simon	School of Mathematics and Physics, The University of Queensland
Hall, Michael	Centre for Quantum Dynamics, Griffith University
Hall, Christopher	Australian Synchrotron, Clayton, Victoria
Han, Xiaohong	Griffith University
Hardman, Kyle S	Quantum Sensors and Atom Laser Laboratory, Department of Quantum Science, Australian National University
Haroche, Serge	Collège de France, Paris, France & Laboratoire Kastler Brossel, Ecole Normale Supérieure, Paris, France
Harries, Dylan	The University of Adelaide
Harris, Glen	Centre for Engineered Quantum Systems, School of Mathematics and Physics, University of Queensland, St Lucia, QLD
Harvey, John	Physics Dept, University of AUckland Private Bag 92019 Auckland NZ
Harvey-Smith, Lisa	CSIRO Astronomy & Space Science, Epping NSW
Haskey, Shaun	Research School of Physics and Engineering, The Australian National University
Haw, Jing Yan	Centre for Quantum Computation and Communication Technology, Department of Quantum Science, The Australian National University
Hellerstedt, Jack	School of Physics, Monash University, Victoria & Center for Nanophysics and Advanced Materials, University of Maryland, MD, USA
Henderson-Sapir, Ori	Department of Physics, and Institute for Photonics & Advanced Sensing (IPAS),
Henry, Robert	School of Physics, University of Melbourne, Parkville, Victoria
Hill, Matthew	School of Physics, The University of Sydney, Sydney, NSW
Hilton, Ashby	School of Physics, the University of Western Australia, Crawley, WA & IPAS and the School of Chemistry and Physics, the University of Adelaide, Adelaide, SA
Hinde, David	Australia National University
Ho, Joseph	Centre for Quantum Dynamics, Griffith University, Brisbane, QLD
Ho, Teck Seng	Space Plasma, Power and Propulsion Laboratory, Research School of Physics and Engineering, The Australian National University, Canberra, ACT
Hodgman, Sean	LudwigMaximilians-University, Munich, Germany & Max-Planck-Institut for Quantum Optics, Garching, Germany
Hoinka, Sascha	Centre for Quantum and Optical Science, Swinburne University of Technology
Holdsworth, John	School of Mathematical and Physical Sciences, University of Newcastle, Callaghan, NSW
Hole, Matthew	Research School of Phyiscs and Engineering, Australian National University
Hoogerland, Maarten	University of Auckland, New Zealand
Hope, Joe	Australian National University
Hopkins, Ben	Nonlinear Physics Centre, Research School of Physics and Engineering (Australian National University)
Hora, Heinrich	Department of Theoretical Physics, UNSW, Sydney
Horsley, Andrew	Departement Physik, Universität Basel, Switzerland
Hosseini, Sara	Department of Quantum Science, The Australian National University, Canberra, ACT
Hota, Sankha	Australian National University
Howard, Ecaterina	Macquarie University, Department of Physics and Astronomy
Hoxley, David	Department of Physics, La Trobe University, Bundoora, VIC
Hu, Hui	Centre for Quantum and Optical Science, Swinburne University of Technology
Hulet, Randall	Department of Physics and Astronomy, Rice University
Hush, Michael	School of Physics and Astronomy, University of Nottingham, Nottingham, NG7 2RD, United Kingdom
Hutchison, Wayne	The University of New South Wales
Ivanov, Igor	Australian National University
Jacko, Anthony	School of Mathematics and Physics, The University of Queensland, Brisbane, QLD

AUTHOR	AFFILIATION
Jagadish, Chennupati	Electronic Materials Engineering Department, Research School of Physics and Engineering, The Australian National University
Jamieson, David	CQC2T, School of Physics, University of Melbourne
Jarratt, Marie Claire	The University of Sydney
Jeske, Jan	RMIT University
Jeung, Dongyun	Department of Nuclear Physics, Research School of Physics and Engineering, The Australian National University, Canberra, ACT
Jia, Baohua	Centre for Micro-Photonics and CUDOS, Faculty of Science, Engineering and Technology, Swinburne University of Technology, Hawthorn, VIC
Johnson, Brett	Centre for Quantum Computation and Communication Technology, School of Physics, University of Melbourne
Juan, Mathieu	Department of Physics & Astronomy, Macquarie University, NSW 2109, Australia & ARC Centre for Engineered Quantum Systems, Macquarie University, NSW
Kalloniatis, Alexander	Defence Science & Technology Organisation, Joint & Operations Analysis Division
Kane, Deb	Macquarie University
Kappen, Peter	Australian Synchrotron
Karanjai, Angela	School of Physics, The University of Sydney, Sydney, New South Wales
Kaysser-Pyzalla, Anke Rita	Helmholtz-Zentrum Berlin Für Materialien Und Energie GmbH, 14109 Berlin, Germany
Khachan, Joe	University of Sydney
Kheifets, Anatoli	Research School of Physics, Australian National University
Kheruntsyan, Karen	University of Queensland
Kielpinski, David	ARC Centre of Excellence for Coherent X-Ray Science, Griffith University
Kiesewetter, Simon	Centre for Quantum Atom Optics, Swinburne Unviersity of Technology, Melbourne
Kiratidis, Adrian	Centre for the Subatomic Structure of Matter (CSSM), University of Adelaide
Kirkup, Les	Faculty of Science, University of Technology, Sydney
Knoop, Steven	LaserLaB, Department of Physics and Astronomy, VU University, Amsterdam, The Netherlands
Koribalski, Baerbel	Australia Telescope National Facility, CSIRO Astronomy and Space Science
Kozlov, Alexander	University of NSW, Sydney, NSW
Krauss, Lawrence	Arizona State University, Tempe, AZ United States of America
Kruk, Sergey	Australian National University
Kubota, Takashi	The University of Melbourne
Kuhlmey, Boris	Institute of Photonics and Optical Science and School of Physics & Centre for Ultrahigh bandwidth Devices for Optical Systems (CUDOS), The University of Sydney, NSW
Langton, Christian	Biomedical Engineering & Medical Physics Discipline, Science & Engineering Faculty and Institute of Health & Biomedical Innovation, Queensland University of Technology, Brisbane, QLD
Laurat, Julien	Laboratoire Kastler Brossel, Université P. Et M. Curie, Ecole Normale Supérieure||and CNRS, 4 Place Jussieu, 75005 Paris, France
Laws, Ben	Research School of Physics and Engineering, The Australian National University, Canberra ACT
Lee, Andrew	Department of Physics and Astronomy, Macquarie University
Lee, Boon	Department of Nuclear Physics, The Australian National University, Canberra, ACT
Lee, Wai Tung	Australian Nuclear Science and Technology Organisation
Lee, Carlos	
Legge, Samuel	School of Mathematical and Physical Sciences, University of Newcastle
Leinweber, Derek	Centre for the Subatomic Structure of Matter (CSSM), University of Adelaide
Lenton, Isaac	School of Mathematics and Physics & ARC Centre of Excellence for Engineered Quantum Systems, The University of Queensland, St Lucia, QLD
Lester, Romana	Research School of Astronomy and Astrophysics, Australian National University
Levin, Yuri	Monash University
Leykam, Daniel	Australian National University

AUTHOR	AFFILIATION
Li, Guangyao	Nonlinear Physics Centre, Research School of Physics and Engineering, The Australian National University
Lidman, Chris	Australian Astronomical Observatory & ARC Centre of Excellence for All-sky Astrophysics (CAASTRO)
Light, Philip	Institute for Photonics and Advanced Sensing and School of Chemistry and Physics
Lim, Woei Chet	Department of Mathematics, University of Waikato, Hamilton, New Zealand.
Limosani, Antonio	ARC Centre of Excellence for Particle Physics at the Terascale, School of Physics A28, The University of Sydney, NSW & CERN, Geneva, Switzerland
Lin, Jipeng	MQ Photonics, Department of Physics and Astronomy, Macquarie University, Sydney, NSW
Lin, Han	Centre for Micro-Photonics, Swinburne University of Technology
Lingham, Marcus	Centre for Quantum and Optical Science, Swinburne University of Technology
Liss, Klaus-Dieter	Australian Nuclear Science and Technology Organisation
Little, Douglas	MQ Photonics Research Centre, Macquarie University.\
Liu, Wei	National University of Defense Technology, China, Nonlinear Physics Centre, Australian National University & The Blackett Laboratory, Department of Physics, Imperial College London
Liu, Mingkai	Nonlinear Physics Centre, RSPE, Australian National University
Liu, Xinjun	Department of Electronic Material Engineering, The Australian National University
Liu, Xia-Ji	Center for Quantum and Optical Science, Swinburne University of Technology
Liu, Weizhe	School of Physics, The University of New South Wales, Sydney
Liu, Liming	University of New South Wales
Loke, Vincent	School of Mathematics and Physics, The University of Queensland
Lombardo, Daniel	Centre for Engineered Quantum Systems, Department of Physics, MQ University
Loredo, Juan	The University of Queensland, Australia.
Love, John	Australian National University
Lu, Yureui	Research School of Engineering, The Australian National University, Canberra, ACT
Luiten, Andre	IPAS and School of Chemistry and Physics, University of Adelaide & School of Physics, University of Western Australia
Lund, Austin	Centre for Quantum Computation and Communication Technology & School of Mathematics and Physics, University of Queensland
Machacek, Josh	Department of Physics and Astronomy, University of Nebraska-Lincoln, USA & Research School of Physics and Engineering, The Australian National University
Mahapatra, Durga	Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California & CETMS, SOA University, Bhubaneswar 751030, India
Maksimenko, Anton	Australian Synchrotron, Clayton, Victoria
Maksymov, Ivan	School of Physics, The University of Western Australia, Crawley, WA
Mangalampalli, Kiran	Department of EME, RSPE, Australian National University, Canberra
Mansell, Georgia	Australian National University
Martin, Andy	School of Physics, University of Melbourne, Victoria
Marzban, Sara	Laser Physics Centre, RSPE, Australian National University & CQC2T,Australian Research Council
Mauranyapin, Nicolas	School of Mathematics and Physics, University of Queensland, St. Lucia, QLD
McAuslan, David	Centre for Engineered Quantum Systems, University of Queensland, Brisbane
McCamey, Dane	School of Physics, UNSW
McDonald, Gordon	Quantum Sensors and Atom Laser Lab, Department of Quantum Science, Australian National University, Canberra
McFerran, John	University of Western Australia
McGinness, Lachlan	Research School of Physics and Engineering, Australian National University
McIntyre, Tim	School of Mathematics and Physics, The University of Queensland

AUTHOR	AFFILIATION
McKay-Parry, Nicholas	School of Mathematics and Physics, University of Queensland, Brisbane, QLD & ARC Centre of Excellence for Engineered Quantum Systems, University of Queensland
McMahon, Nathan	Equs, University of Queensland, St. Lucia
Meehan, Michael	School of Engineering and Physical Sciences, James Cook University
Melatos, Andrew	University of Melbourne
Menicucci, Nicolas	School of Physics, University of Sydney, NSW
Menk, Frederick	School of Mathematical & Physical Sciences, the University of Newcastle
Metaxas, Peter	School of Physics, University of Western Australia, Crawley, WA
Michael, Clive	Research School of Physics and Engineering, The Australian National University, Canberra, ACT
Micolich, Adam	School of Physics, The University of New South Wales, Sydney NSW
Millar, Alexander	ARC Centre of Excellence for Particle Physics at the Terascale, School of Physics, The University of Melbourne, VIC
Miroshnichenko, Andrey	Nonlinear Physics Centre, Research School of Physics and Engineering, The Australian National University
Mirzaei, Ali	The Australian National University
Mohanto, Gayatri	Research School of Physics and Engineering, Australian National University
Mohsin, Abu S.M.	Centre for Micro Photonics,FSET, Swinburne University of Technology
Molina-Terriza, Gabriel	ARC Center for Engineered Quantum Systems and Department of Physics & Astronomy, Macquarie University, NSW
Motes, Keith	Centre for Engineered Quantum Systems, Department of Physics and Astronomy, Macquarie University, NSW
Mueller, Clemens	ARC Centre for Engineered Quantum Systems, The University of Queensland
Murphy, Dene	School of Physics, The University of Melbourne, Parkville, VIC
Myers, Casey	Centre for Engineered Quantum Systems, The University of Queensland
Nadort, Annemarie	Department of Physics and Astronomy, BioFocus Reserch Centre, Macquarie Universty & Department of Biomedical Engineering and Physics, University of Amsterdam, Amsterdam
Nash, Merinda	Research School of Physics and Engineering, The Australian National University, Canberra, ACT
Nazikian, Raffi	Princeton Plasma Physics Lab., Princeton NJ, USA
Neo, Richard	Institute of Photonics and Optical Science (IPOS)
Neupane, Ishwaree	CERN Theory Division, Christchurch, New Zealand
Ngo, Silvie	Centre for Gravitational Physics, The Australian National University, Canberra, ACT
Nieminen, Timo	The University of Queensland
Nikita, Pereverzev	Institute for Scintillation Materials, STC "Institute for Single Crystals", NAS of Ukraine, Kharkov, Ukraine
Noschang Kuhn, Carlos Claiton	Australian National University
Opanchuk, Bogdan	CQOS, Swinburne University of Technology, Melbourne,
Orr, Brian	MQ Photonics, Dept of Physics & Astronomy, Macquarie University, Sydney
Owen, Benjamin	Centre for the Subatomic Structure of Matter (CSSM), University of Adelaide
Pal, Bishnu P.	School of Natural Science, Mahindra Ecole Centrale, Tech Mahindra Technology Park, Bahadurpally, Hyderabad 500043, INDIA
Palalani, Nyaladzi	Australian National University
Pan, Alexey	Institute for Superconducting and Electronic Materials, University of Wollongong
Parappilly, Maria	Flinders University
Parkinson, David	University of Queensland
Pashayan, Hakop	Centre for Engineered Quantum Systems, School of Physics, University of Sydney
Paviolo, Chiara	Swinburne University of Technology
Pelliccia, Daniele	School of Physics, Monash University, Victoria
Perera, Chamanei	Queensland University of Technology, Australia & Institute for future Environments, Queensland University of Technology
Perrella, Christopher	The University of Adelaide, Adelaide, South Australia

AUTHOR	AFFILIATION
Plakhotnik, Taras	School of Mathematics and Physics, The University of Queensland
Pollard, Judith	Department of Physics, University of Adelaide
Powell, David	Nonlinear Physics Centre, Tha Australian National University
Pradier, Stephanie	School of Physics, The University of Melbourne, Victoria
Prakash, Tushara	The MacDiarmid Institute, GNS Science
Pryde, Geoff	Centre For Quantum Computation and Communication Technology and Centre For Quantum Dynamics, Griffith University, Brisbane, QLD
Qu, Zhisong	Research School of Physics and Engineering, The Australian National University, Canberra ACT
Rafferty, Dominic	Department of Nuclear Physics, Australian National University
Rahimi-Keshari, Saleh	CQC2T, School of Mathematics and Physics, University of Queensland, St Lucia, QLD
Raj, Shasidran	Department of Quantum Science, Australian National University
Ralph, Tarquin	Research School of Physics and Engineering, The Australian National University
Rambach, Markus	ARC Centre for Engineered Quantum Systems, ARC Centre for Quantum Computation & Communication Technology & School of Mathematics and Physics, University of Queensland, Brisbane, QLD
Randall, Lisa	Harvard University, Cambridge, MA, USA
Reed, Matthew	Department of Nuclear Physics, RSPE, Australian National University
Reid, Ivan	School of Engineering and Design, Brunel University, Uxbridge Ub8 3PH, UK
Reid, Margaret	Swinburne University of Technology
Reid, Iain	School of Chemistry and Physics, University of Adelaide
Ren, Fang-Fang	The Australian National University & Nanjing University, China
Ringbauer, Martin	ARC EQuS & ARC CQC2T, The University of Queensland, QLD
Roberts, Benjamin	The University of New South Wales, Sydney, NSW
Roberts, Lyle	Department of Quantum Science, The Australian National University, Canberra, ACT
Roberts, Sam	Centre for Engineered Quantum Systems, School of Physics, Sydney University
Roberts, Ann	The University of Melbourne
Robins, Vanessa	Research School of Physics and Engineering, The Australian National University
Robinson, Robert	Australian Institute of Physics
Rode, Andrei	Laser Physics Centre, RSPE, The Australian National University
Rohde, Peter	Macquarie University
Rosales-Zárate, Laura	Centre for Quantum and Optical Science, Swinburne University of Technology
Ruddell, Samuel	Department of Physics, University of Auckland, Auckland, New Zealand
Rule, Kirrily	Bragg Institute, ANSTO, Lucas Heights, NSW & Helmholtz Centre Berlin for Materials and Energy, Berlin, Germany
Russell, Philip	Max Planck Institute For The Science of Light, Guenther-Scharowsky Str. 1, 91058 Erlangen, Germany
Saboohi, Solmaz	Mawson Institute, University of South Australia, Mawson Lakes, Adelaide, SA
Sahu, Amit	Centre for Micro-Photonics,Swinburne University of Technology, Hawthorn, Melboure
Sambale, Sebastian	School of Chemical and Physical Sciences, Victoria University of Wellington, Faculty for Physics and Geoscience, University Leipzig, Germany & Robinson Research Institute, Victoria University of Wellington, New Zealand
Sang, Robert.	Australian Attosecond Science Facility and Centre of Quantum Dynamics, Griffith University, Brisbane
Sastrawan, Jarrah	ARC Centre for Engineered Quantum Systems, University of Sydney
Saunders, Dylan	Clarendon Laboratory, Department of Physics, University of Oxford
Saunders, Frances	Institute of Physics, London, UK
Saxena, Dhruv	Australian National University
Schauries, Daniel	Research School of Physics and Engineering, The Australian National University

AUTHOR	AFFILIATION
Schröder, Jochen	The School of Electrical and Computer Engineering, RMIT University, Melbourne Australia & CUDOS, The University of Sydney, Sydney
Schroeder, Chris	Institute of Theoretical Physics, Ulm University
Seiwald, Bernhard	Plasma Research Lab, Research School of Physics and Engineering, Australian National University
Sellars, Matthew	Australian National University
Senden, Tim	Dept Applied Mathematics, Research School of Physics and Engineering, Australian National University
Sevior, Martin	University of Melbourne
Sharma, Manjula	The Univesity of Sydney
Sheng, Yan	Research School of Physics and Engineering, The Australian National University
Sheridan, Eoin	School of Mathematics and Physics, University of Queensland
Sherwood, Steven	Climate Change Research Centre and ARC Centre of Excellence For Climate System Science, UNSW, Kensington NSW
Sidorov, Andrei	Centre for Quantum and Optical Science, Swinburne University of Technology, Melbourne
Sikora, Joanna	Australian National University
Simenel, Cedric	Department of Nuclear Physics, RSPE, The Australian National University
Simmonds, Raymond	National Institute of Standards & Technology, Quantum Electronics & Photonics Division, 325 Broadway Street, Boulder, CO 80305 USA
Simmons, Michelle	ARC Centre of Excellence For Quantum Computation & Communication Technology
Simpson, Edward	Australian National University
Simula, Tapio	Monash University
Slatyer, Harry	Research School of Physics and Engineering
Smith, Jackson	Chemical and Quantum Physics, School of Applied Sciences, RMIT University
Solntsev, Alexander	Nonlinear Physics Centre, Australian National University
Spargo, Andrew	School of Chemistry and Physics, The University of Adelaide, Adelaide, SA
Speirs, Rory	School of Physics, The University of Melbourne, Melbourne, VIC
Spiller, Laurence	The University of Melbourne
Stace, Thomas	School of Mathematics and Physics, University of Queensland
Stadnik, Yevgeny	School of Physics, University of New South Wales, Sydney
Staude, Isabelle	Nonlinear Physics Centre, Australian National University
Stevens, Chris	University of Otago, New Zealand
Stilgoe, Alexander	The University of Queensland
Stokes, Finn	Center for the Subatomic Structure of Matter, University of Adelaide
Stone, Lynden	Research School of Engineering, The Australian National University, Canberra, ACT
Stuiber, Michael	Center of Excellence for Quantum Computation and Communication Technology & School of Physics, The University of Melbourne, Parkville, VIC
Suchkov, Sergey	Nonlinear Physics Centre, Research School of Physics and Engineering, Australian National University
Sukhorukov, Andrey	Nonlinear Physics Centre, Research School of Physics and Engineering, the Australian National University
Sun, Yue	Nonlinear Physics Centre & Laser Physics Centre, Research School of Physics and Engineering, The Australian National University
Surendran, Prince	Centre for Quantum and Optical Science, Swinburne University of Technology
Sushkov, Oleg	School of Physics, University of New South Wales, Sydney
Suster, Carl	ARC Centre of Excellence for Particle Physics, School of Physics, University of Sydney
Sutton, Andrew	Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA
Swift, Ben	Australian National University
Szigeti, Stuart	School of Mathematics and Physics, University of Queensland, Brisbane & ARC Centre for Engineered Quantum Systems
Tabacchini, Andrea	ARC Centre for Engineered Quantum Systems & Department of Physics and Astronomy - Macquarie University, NSW
Tabrizi, Sahar	Centre for Micro-Photonics and CUDOS, Faculty of Science, Engineering and Technology, Swinburne University of Technology, Melbourne, VIC
Tasker, Roy	University of Western Sydney
Tavakoli Dinani, Hossein	Department of Physics and Astronomy, Macquarie University, Sydney, NSW
Taylor, Geoffrey	ARC Centre of Excellence for Particle Physics at the Terascale, School of Physics, The University of Melbourne, Victoria
Taylor, Michael	Centre for Engineered Quantum Systems, University of Queensland, St Lucia, QLD
Taylor, Richard	Defence Science and Technology Organisation
Taylor, Thor	University of Melbourne
Taylor, Adam	Centre For Micro-Photonics, Swinburne University
Teh, Run Yan	Centre for Quantum and Optical Science, Swinburne University of Technology
Temple, Tristan	Macquarie University & CSIRO
Thearle, Oliver	Centre for Quantum Computation and Communication Technology & Department of Quantum Science, The Australian National University, Australia
Thomas, Paul	UNSW
Thompson, Matt	Research School of Physics and Engineering, The Australian National University
Thompson, Jayne	Centre for Quantum Technologies, National University of Singapore, Singapore
Thorman, Alex	Australian National University
Titchener, James	Nonlinear Physics Centre, Research School Of Physics And Engineering, Australian National University
Tobar, Michael	ARC Centre of Excellence for Engineered Quantum Systems, School of Physics, University of Western Australia, WA
Tollerud, Jonathan	Centre for Quantum and Optical Science, Swinburne University of Technology
Tomamichel, Marco	National University of Singapore & The University of Sydney
Toomey, Joshua	Macquarie University
Trewartha, Daniel	Centre for the Subatomic Structure of Matter (CSSM), University of Adelaide
Truscott, Andrew	Research School of Physics and Engineering, The Australian National University,
Turner, Lincoln	School of Physics, Monash University, Victoria
Twigger, Liam	School of Chemistry & Physics and IPAS, University of Adelaide, SA
Tzioumis, Vicky	School of Physics, The University of Sydney, Sydney, NSW
Ulrich, Clemens	School of Physics, University of New South Wales, Sydney, NSW & Australian Nuclear Science and Technology Organisation, Lucas Heights, NSW
Urquijo, Phillip	The University of Melbourne
Uvarova, Liudmila	Moscow State University of Technology 'Stankin', Department of Appl. Math.
Vaccaro, Joan	Centre for Quantum Dynamics, Griffith University, Nathan
Vale, Chris	Swinburne University of Technology
Van Riessen, Grant	ARC CoE for Coherent X-ray Science, Department of Physics, La Trobe University
Vanner, Michael	School of Mathematics and Physics, The University of Queensland
Varvell, Kevin	School of Physics, The University of Sydney
Veitch, Peter	University of Adelaide
Veldhorst, Menno	Centre for Quantum Computation and Communication Technology, School of Electrical Engineering and Telecommunications, The University of New South Wales, Sydney, NSW
Vernaz-Gris, Pierre	Centre for Quantum Computation and Communication Technology, Australian National University
Vernon, Kristy	School of Physics & Institute of Future Environments, Queensland University of Technology, Brisbane
Vidal, Xavier	Department of Physics & Astronomy, Macquarie University, NSW
Vos, Maarten	Research School of Physics and Engineering, The Australian National University
Waleed, Muhammad	Gwangju Institute of Science and Technology
Wallner, Anton	Research School of Physics and Engineering, The Australian National University, Canberra, ACT
Wang, Fan	Department of Electronic Materials Engineering, RSPE Australian National University
Wang, Chin-Wei	Neutron group, National Synchrotron Radiation Research Center, Taiwan
Ward, Robert	Australian National University
Wardrop, Matthew	Centre for Engineered Quantum Systems, School of Physics, University of Sydney
Wegener, Margaret	Physics, The University of Queensland
Wellmann, Barbara	MQ Photonics Research Centre, Department of Physics and Astronomy, Macquarie University
Weston, Morgan	Centre for Qauntum Dynamics, Griffith University, Brisbane, QLD
Whale, Ben	Department of Mathematics and Statistics, University of Otago, New Zealand
White, Donald	Department of Physics, University of Auckland
White, Richard	Institute for Photonics & Advanced Sending (IPAS), The University of Adelaide
Williams, Elizabeth	Research School of Physics and Engineering, The Australian National University
Williamson, Dominic	University of Vienna
Willig, Lisa	School of Physics, The University of Western Australia, Crawley, WA, Australia & Institut für Physik und Astronomie, Universität Potsdam, Potsdam, Germany
Wiseman, Howard	Centre for Quantum Dynamics, Griffith University
Wolfe, Joe	School of Physics, UNSW, Sydney, Australia
Wong, Sherman	Research School of Physics and Engineering, The Australian National University
Wong-Leung, Jennifer	Dept. of Electronic Materials Engineering, RSPE & Centre for Advanced Microscopy, The Australian National University
Wood, Alexander	School of Physics, Monash University, Victoria
Woolley, Matthew	School of Engineering and Information Technology, UNSW Canberra
Wu, Lei	The University of Sydney
Wu, Che Wen	Nonlinear Physics Centre, Australian National University, Taiwan
Wu, Ka	Department of Physics, and Institute for Photonics & Advanced Sensing (IPAS), The University of Adelaide, Adelaide, SA
Wu, Chun-Ming	National Synchrotron Radiation Research Center, Taiwan
Wuchenich, Danielle M. R.	Lockhead Martin Space Systems Company, Advanced Technology Center, Paolo Alto, CA 94304 USA
Wyatt, Nicholas	Centre for Engineered Quantum Systems, The University of Queensland
Xia, Keyu	ARC Centre for Engineered Quantum Systems, Macquarie University
Yang, Wenge	Center for High Pressure Science & Technology Advanced Research, Shanghai,China & High Pressure Synergetic Consortium, Carnegie Institution, Argonne, IL, USA
Yatagai, Toyohiko	Centre For Optical Research and Education, Utsunomiya University, Utsunomiya, Tochigi 321-8585, Japan
Yi, Jiabao	School of Materials Science and Engineering, UNSW, Kensignton, NSW
Yu, Dehong	Bragg Institute, Australian Nuclear Science and Technology Organisation, New Illawarra Road, Lucas Heights
Yu, Yi	CUDOS, Laser Physics Centre, Research School of Physics and Engineering, Australian National University, Canberra, ACT
Yue, Jason	The University of Sydney
Zakaria, Rozalina	Photonics Research Centre, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia
Zammit, Mark	ARC Centre for Antimatter-Matter Studies, Curtin University
Zayats, Anatoly V	Department of Physics, King's College London, Strand, London WC2R 2LS, United Kingdom
Zhang, Jianfa	National University of Defense Technology, China
Zhang, Shu	School of Mathematics and Physics, The University of Queensland, Brisbane, QLD
Zhang, Qiming	Swinburne University of Technology
Zheng, Xiaorui	Centre for Micro-Photonics and CUDOS, Swinburne University of Technology
Zhou, Zong-Quan	Key lab of quantum information, CAS, University of Science and Technology of China, Hefei, 230026, China
Zuparic, Mathew	DSTO

Poster session program

MONDAY 8 DECEMBER 1300-1350

	PRESENTER	POSTER TITLE
1	**Ula Alexander** Flinders University	Quantum Conversations - The Art of Fluorescence
2	**Ardalan Armin** University of Queensland	Electro-optics of organic photodiodes
3	**Chathura Bandutunga** Australian National University	Acoustics Meets Optics: Photonic Microphones
4	**John Bartholomew** CQC2T, Australian National University	Nanoscopy in rare-earth-ion crystals
5	**Christopher Thomas Chantler** University Of Melbourne	Recent Advances in Atomic and Condensed Interactions of X-rays with matter
6	**Christopher Thomas Chantler** University Of Melbourne	XFELs but not imaging! - how structure can probe detailed plasma dynamics in extreme systems.
7	**Shen V. Chong** Robinson Research Institute, Victoria University Of Wellington	Oxygen vacancy engineering - the key to controlling the magnetic properties of thin films, bulk and nanostructural TiO2
8	**Md Amdadul Huq Chowdury** Australian National University	Localised solutions of higher-order Manakov-type continuous and discrete equations
9	**Jessica Eastman** Australian National University	Generating pseudo random quantum circuits with quantum trajectories
10	**Jesse Everett** Australian National University	An optical memory exploiting time reversal symmetries in atom-light interactions
11	**Zhi-Da Gao** Northeastern University	PbS Modified TiO2 Nanotubes for Visible-Light-Activated Photoelectrochemical Sensing Trace Amount of Ag+
12	**Bahman Ghadirian** University of Western Sydney	A predicted force in NMR restricted diffusion experiments
13	**Lisa Harvey-Smith** CSIRO Astronomy & Space Science	The Australian SKA Pathfinder telescope
14	**Jacob Hughes** Australian National University	Implementation of a digital Doppler spectroscopy system for material characterisation
15	**Larissa Huston** Australian National University	Stability of pressure-induced phases in Germanium
16	**Jiri Janousek** Australian National University	Highly Tunable Miniaturised Parametric Monolithic Optical Cavity
17	**Hadiya Jasbeer** Macquarie University	Characterization of defect induced stress birefringence in CVD grown diamond
18	**Harry-Dean Kenchington Goldsmith** Australian National University	Breakup dynamics of 8Li
19	**Alexander Kozlov** University of NSW	Precise optical atomic clocks with suppressed BBR shift
20	**Katanya Kuntz** University of New South Wales	Frequency response measurement of optical cavities using an intensity modulated laser beam and direct power measurement
21	**Jean-Michel Le Floch** The University Of Western Australia	3D Microwave Cavity for strong coupling to nitrogen-vacancy centre in diamond
22	**Boon Lee** Australian National University	KLL Auger spectra following inner-shell ionization of Rubidium by nuclear decay using Multiconfiguration Dirac-Fock Method
23	**Tommy Li** University of New South Wales	Confinement due to the spin-orbit interaction in quantum point contacts
24	**Aravindan M Warrier** Macquarie University	Developing Ultrfast Raman Lasers
25	**Lars Skovgaard Madsen** University Of Queensland	Atom-mechanical coupling in a tapered fibre trap
26	**Nicolas Mauranyapin** University of Queensland	Quantum limited nano-fibre trapping and sensing of dielectric particle for biophysics application.
27	**Dane McCamey** University of New South Wales	Improved electrically-detected spin-resonance techniques for spin-based organic electronic devices
28	**Nathan McMahon** University of Queensland	Closed Form Solutions to General Gaussian Master Equations: Applications to Classical Channel Gravitational Decoherence
29	**Adam Micolich** UNSW	Comparison of mobility and carrier density in wurtzite and zinc blende InAs nanowire FETs
30	**Adam Micolich** UNSW	Using light and heat to controllably switch and reset disorder configuration in nanoscale devices
31	**Anita Milroy** Central Queensland University	'Labpunk'- Creating Art with Physics
32	**Peter Norman** Monash University	Symmetric Nuclear Bond Models
33	**Bogdan Opanchuk** Swinburne University of Technology	Multipartite simulations of 60-qubit Schrödinger Cat states
34	**Bogdan Opanchuk** Swinburne University of Technology	Art from the start of Time
35	**Eliza-Jane Pearsall** Australian National University	Quantifying physical stimulation of Arabidopsis thaliana using nanoindentation
36	**Prithvi Reddy** Australian National University	Ab initio calculations of fine structure of the NV- centre in diamond.
37	**Iain Reid** University of Adelaide	Long term observations of the MLT region at Adelaide (35Â°S)
38	**Benjamin Roberts** University of New South Wales	Limits on P-odd interactions of cosmic fields with electrons, protons and neutrons
39	**Vivian Robinson** ETP Semra Pty Ltd	The Gravitational Redshift in an Infinite Static Universe makes it Stable and Fits Properties of the Observed Universe Better than the Expanding Universe Model.
40	**Vivian Robinson** ETP Semra Pty Ltd	Treating Spin as Angular Momentum can Explain Quantum Superposition and Neutrino Properties
41	**Kirrily Rule** ANSTO	Recent developments for the thermal triple axis spectrometer, TAIPAN at ANSTO
44	**Sebastian Sambale** Victoria University of Wellington	Large negative magnetoresistance in FeSr2Y2-xCexCu2O8+y
45	**Richard Scalzo** Australian National University	A Bayesian Toolkit for Analyzing the Bolometric Light Curves of Supernovae
46	**Harley Scammell** University of New South Wales	Violation of the Spin Statistics Theorem and the Bose-Einstein Condensation of Particles with Half Integer Spin
47	**Eoin Sheridan** University of Queensland	Integrated Cavity Opto-Electromechanical System: Towards Phononic Circuits
48	**Soumya Soumya** Macquarie University	Impact of Cascading on Efficiency of CW External Cavity Raman Lasers
49	**Yuxin Sun** UNSW	Silicon-based charge pumping devices for single-electron counting
50	**Christopher Tanner** Department Of Nuclear Physics, Australian National University	Quasifission Timescales in the 64Ni + 238U Reaction
51	**Richard Taylor** Australian National University	Nanoscale vector force sensing using nitrogen-vacancy centres in diamond
52	**Alexander Buese** Macquarie University	Quantum interference of photon pairs beyond the conventional Hong-Ou-Mandel dip as a function of path length difference
53	**Joshua Torrance** University of Melbourne	Polarisation Spectroscopy: Phase Lead, Bandwidth and Linewidth
54	**Jesse Vaitkus** RMIT University	Waveguide structures for digital adiabatic passage
55	**Kirsten Vo-Phuoc** Australian National University	Comparing fusion barrier distributions to barrier heights from Hartree--Fock calculations
56	**Lei Wang** Nonlinear Physics Center	Polarisation encoded hologram based on a reflective metasurface
57	**Samuel Wilkinson** RMIT	Energetics of the Quantum Graphity Universe
58	**Jim F Williams** University of Western Australia	Correlated electron spin and vortex motion
61	**Jim F Williams** University of Western Australia	Validation of e+ trapping in PVC-EVA (C=O) and PVC-SAN (Câ‰¡N) polymer blends
62	**Sara Wilson** Australian National University	Supercode Extension to Digital Interferometry
64	**Min Jet Yap** Australian National University	Wavelength Conversion of Quantum States with an Opto-mechanical System
65	**Yair Zarate** Australian National University	Tuned Chirality in Auxetic Metamaterials
66	**Yong Zhang** Nanjing University	Phase superposition in second-harmonic Talbot self-imaging
67	**Ruichen Zhao** University Of New South Wales	Modelling of electrostatic confinement in a single-electron pump based on a silicon quantum dot
68	**Matthew Sellars** Australian National University	Demonstration of long coherence times in Eu3+:Y2SiO5
115	**Lisa Harvey-Smith** CSIRO Astronomy And Space Science	Two views of the sky - Indigenous art and astronomy
203	**Paul Fraser** Curtin University	A new programme for theoretical nuclear scattering studies.
204	**Paul Fraser** Curtin University	Describing scattering of α-particles and nuclei with a multichannel model.
205	**Stephen Lonsdale** The University of Melbourne	Unification of visible and dark matter

TUESDAY 9 DECEMBER 1300-1350

	PRESENTER	POSTER TITLE
59	**Jim F Williams** University of Western Australia	A topological phase from atom, to molecule, to surface
69	**Julian Berengut** University of New South Wales	Limits on the dependence of the fine-structure constant on gravitational potential from white-dwarf spectra
70	**Michael Brown** James Cook University	Symmetry Improvement of 3-Particle Irreducible Effective Actions for O(N) Scalar Field Theories
71	**Ann Bui** University of Queensland	Escape force calibration of optical tweezers
72	**Ann Bui** University of Queensland	Chromosome escape force calibration with optical tweezers
73	**Haitao Chen** Australian National University	Synchronous coherence imaging of drift waves in MagPIE
74	**Michael Bromley** The University Of Queensland	Beam-shaping and stabilisation of vortices in laser beams and superfluids
75	**Kenneth Grant** DSTO	Demonstration of Asymmetric Lasercomm with Forward Error Correction
76	**Christine Creagh** Murdoch University	Dr. C's First Year Physics Demos. On YouTube
77	**Martin Cyster** RMIT University	Josephson Junction formation at experimental pressures using iterative molecular dynamics
78	**Shakib Daryanoosh** Griffith University	Quantum jumps are more quantum than quantum diffusion
79	**Robert Dewar** Australian National University	Plasma Relaxation Dynamics Moderated by Current Sheets
80	**Jacquelene Drinkall** College Of Fine Arts, University Of New South Wales	Aesthetics of Quantum Action at a Distance in Transdisciplinary Art and Theory
81	**Victor Flambaum** University of New South Wales	Statistical theory for finite systems (atoms, molecules, nuclei) based on properties of chaotic eigenstates: enhancement of || weak interactions, electron recombination and Raman photon scattering, || suppression of photoionization
82	**Victor Flambaum** University of New South Wales	Exchange-assisted tunneling and enhancement of positron annihilation with inner-shell electrons
83	**Victor Flambaum** University of New South Wales	Highly-charged ions for atomic clocks, quantum information, and search for alpha-variation
84	**Victor Flambaum** University of New South Wales	Periodic table of positronic atoms
86	**Todd Green** University of Sydney	Phase-modulated of qubit-oscillator systems
87	**Swaantje Grunefeld** University of Queensland	Non-linear optics of gaseous alkali-metal atoms
88	**Michael Hall** Griffith University	Paying Heisenberg's toll: the cost of gaining quantum information
89	**Kyle Hardman** Australian National University	Development of an ultra-high precision atomic gravimeter
90	**John Holdsworth** University of Newcastle	The figure of eight laser as a student experiment in advanced optics
91	**Sophie Hollitt** University of Adelaide	Comparison of diode pumping efficiency of an Er:YAG laser at 300 K and 77 K for Gravitational Wave Interferometry

	PRESENTER	POSTER TITLE
93	**Mahmoud Khaki** University of Malaya	Electrical resistivity survey for investigation of shallow subsurface structure in Selangor State, Malaysia
94	**Simon Kiesewetter** Swinburne University of Technology	Scalable quantum simulation of pulsed entanglement and Einstein-Podolsky-Rosen steering in optomechanics
97	**Peter Lamb** Deakin University	Fighting the Dark Arts of Dark Matter and Dark Energy
98	**Brett Layden** Australian National University	Wave-particle interactions in anisotropic plasmas
99	**Andrew Lee** Macquarie University	Design and application of intracavity continuous wave THz polariton lasers
101	**Ivan Maksymov** University of Western Australia	All-magneto-dielectric subwavelength nanophotonics for 3D imaging and magnonics
102	**Nikita Kostylev** University of Western Australia	Spectroscopy of the 1S0-3P1 line in laser cooled Yb with an injection-locked diode laser
103	**Russell McLean** Swinburne University	Collimation and coherence of frequency-converted cw infrared and blue radiation in Rb vapour
104	**Peter Metaxas** University of Western Australia	Capture of sub-micron magnetic particles with ferromagnetic discs and routes for their electronic detection
105	**Michael Hush** University of Nottingham	Quantum Observer-based Control Design for Linear Quantum Stochastic Systems
106	**Andreas Naesby** EQuS	Ultra strong optomechanical coupling between a toroidal resonator and a nanomechanical system using plasmonic enhancement
107	**Samuel Nolan** University of Queensland	Quantum Enhanced Measurement of Rotations with Spinor Bose-Einstein Condensates
108	**Chandani Palshetkar** Australian National University	Effects of dissipation on the decay of the compound nucleus 164Yb
109	**Steven Pederson** Australian National University	Does God play dice?
110	**Jen-Chih Peng** National Synchrotron Radiation Research Center	Implementation of SIKA instrument control system
111	**Karsten Pyka** University of Sydney	Experimental apparatus for quantum simulation with two-dimensional 9Be+ Coulomb crystals
112	**Milos Rancic** Reseach School of Physics & Engineering	Investigating the nuclear coherence properties of 167Er:YSO in large magnetic fields
113	**Ivan Reid** Brunel University London	Upgrade of the outer silicon tracking detector of the Compact Muon Solenoid experiment at the Large Hadron Collider
114	**Chin Chin Gan** Australian National University	Optomechanical tests of the Schrodinger-Newton equation
116	**Lachlan Smillie** Australian National University	Morphology of subsurface modification of Si by nanosecond laser exposure
117	**Tim Stait-Gardner** University of Western Sydney	The art of NMR and MRI, from applications to theory

	PRESENTER	POSTER TITLE
118	**Glen Alan Stewart** The University of New South Wales	Revisiting the Crystal Field Transitions for Er3+ in ErNiAl4 Using Polarised Inelastic Neutron Scattering
119	**Daiqin Su** University of Queensland	Quantum communication in the presence of a horizon
120	**Stuart Szigeti** University of Queensland	Realisable supersolid, Haldane insulating and charge-density wave phases in one-dimensional Josephson junction arrays
121	**Jodie Bradby** The Australian National University	Structural properties of Southern Ocean pteropods
122	**John Tran** University of Melbourne	Simulating liquidity stress in an interbank network
123	**Tuan Tran** Australian National University	Ion Beam Induced Epitaxial Crystallisation of Amorphous Germanium
124	**Li Huey Tuen** Australian National University	Stability of a two-volume MRxMHD model in slab geometry
125	**Joanna Turner** University of Southern Queensland	From Art to Science: Measuring the action spectrum of the cyanotype reaction due to ultraviolet radiation.
126	**Joanna Turner** University of Southern Queensland	Using an artistic technique to educate the public in the physical measurement of UV radiation exposure
128	**Peter Vouza** Australian National University	A dissipative soliton resonance described by the complex cubic-quintic Ginzburg-Landau equation in the normal dispersion regime
129	**Kelly Walker** RMIT	Competition between charge carriers in superconducting Josephson junction arrays
130	**Matthew Woolley** UNSW Canberra	Photon-assisted tunnelling with non-classical light
131	**Adelle Wright** Australian National University	A Rotating, Streaming Model for MAGPIE Plasmas
133	**Changqiu Yu** University of Queensland	Optomechanical Magnetometry: Macroscale CaF2 Resonator for Ultrasensitive Magnetic Field Detection
134	**Jie Zhao** Australian National University	Deterministic Multicopy Entanglement Concentration
206	**Matthew Wardrop** Quantum Information, Concepts and Coherence	Is Quantum Computation Using Resonant Exchange Qubits Feasible?
207	**Bhadra Thotath** Victoria University	Optimising refractive index sensitivity using tilted fibre Bragg gratings
208	**Andreas Magerl** FAU Erlangen-Nürnberg	Microsecond resolved SAXS/WAXS in-situ measurements on the formation of quantum dots using synchrotron radiation
209	**Anton Tadich** Australian Synchrotron	Developments in methods for characterising the electronic properties of novel materials at the Soft X-ray beamline, Australian Synchrotron
211	**Erik Streed** Griffith University	Progress towards confining large biomolecules in an ion trap

WEDNESDAY 10 DECEMBER 1300-1350

	PRESENTER	POSTER TITLE
60	**Jim F Williams** University of Western Australia	Turn-key GaAs polarized electron source and its applications
135	**Ziyad Alrowaili** University of Wollongong	Magic Plate: 2D Silicon Diode Array for Quality Assurance during Patent Treatment
136	**Ziyad Alrowaili** University of Wollongong	Characterisation of Magic Plate as a Transmission Detector for radiotherapy Quality Assurance during Patient Treatment
137	**Christopher Artlett** Macquarie University	Remote Sensing of water temperature and salinity using Raman spectroscopy: From principles to field trials
138	**Ken Baldwin** Australian National University	RF transfer by laser over optical fibre: a frequency reference for radio astronomy
139	**Francis Bennet** Australian National University	Ground based adaptive optic enhanced LIDAR for space environment management
140	**Boyd Blackwell** Australian National University	New Capabilities of the Australian Plasma Fusion Research Facility
141	**Tamara Babij** Flinders University	Absolute Elastic Differential Cross Sections for Positron Scattering from Argon
142	**Juan Francisco Caneses** Australian National University	Investigating the effects of hydrogen Lower Hybrid resonance in the MAGnetized Plasma Interaction experiment (MAGPIE)
143	**Eric Cavalcanti** University of Sydney	Bounding the reality of the quantum state
144	**Elliott Claven** Queensland University of Technology	Fabrication of Ellipsoidal Nanowires: control and application
145	**Ewa Goldys** Macquarie University	Singlet oxygen generation by photosensitisers conjugated to CeF3 nanoparticles: towards photodynamic therapy in deep tissues.
146	**Joel Corney** University of Queensland	NonGaussian correlations and entanglement in Kerr media
147	**Toshio Croucher** Griffith University	Fluctuations in the Cost of Erasing Information
148	**Bryan Dalton** Swinburne University of Technology	Spin Squeezing and other Entanglement Tests: Two Mode Systems of Identical Bosons
149	**Nithila Dediyagala** Victoria University	Comparison of experimental, theoretical and Finite Element Analysis on fibre Bragg grating pressure sensitivity
150	**Matthew Guenette** ANSTO	Diamond, graphite and their ion-damaged forms in fusion-relevant plasma
151	**Ruben Dilanian** The University of Melbourne	Coherent diffractive imaging in protein nanocrystallography
152	**Svetlana Dligatch** CSIRO	Post-deposition shape correction of a large coated optical flat
153	**Marcus Doherty** Australian National University	Diamond spintronics: spin polarization, transport and readout via defects
154	**Bronwyn Dolman** ATRAD Pty Ltd	The Australian Operational Wind Profiler Network
155	**Stuart Earl** University of Melbourne	Coupling single optical antennas to subwavelength sized quantum dot aggregates
156	**Allan Ernest** Charles Sturt University	Radiative decay trends of Rydberg-type states in electric and gravitational fields and their application to astrophysical cross sections and dark matter
159	**Stephen Gensemer** CSIRO Manufacturing	Fabrication and metrology of lithium niobate narrowband optical filters for the solar orbiter
160	**Parth Girdhar** University of Sydney	Towards an Information-Theoretic Understanding of the Failure of Peres' Conjecture
161	**Andrew Groszek** Monash University	Regular and chaotic vortex dynamics in two-dimensional Bose-Einstein condensates
162	**Sean Hodgman** Max-Planck-Institute for Quantum Optics	Emergence of Coherence and Out-of-Equilibrium Dynamics in Optical Lattices
163	**Heinrich Hora** University of NSW	Double Layer Ultrahigh Acceleration Of Plasma By Laser Pulses And Multistaged PIC Evaluation*
164	**Andrew Horsley** University of Basel	High-Resolution Imaging of Microwave Fields and Atomic Relaxation Using Alkali Vapour Cells
165	**David Ing** Royal Melbourne Institute of Technology	The effects of spatial correlations in two-dimensional electronic spectroscopy
166	**Pekko Kuopanportti** Monash University	Ground-state multiquantum vortices in two-species Bose-Einstein condensates
167	**Brian Le** University of Melbourne	A multivariate approach to the search for the Higgs boson decaying to τ pair in the associated production mode in proton-proton collisions with ATLAS
168	**Wai Tung Lee** Australian Nuclear Science And Technology Organisation	Hyper-Polarised 3He and 129Xe Polarising Station for Magnetic Resonance Functional Lung Imaging Research
169	**Kenny Li** Griffith University	Markovian Hierarchy of Open Quantum System Dynamics
170	**Wei Liu** National University Of Defence Technology	Ultra-directional forward scattering by individual core-shell nanoparticles
171	**Xinjun Liu** Australian National University	Finite Element Modelling of Resistive Switching in Nb2O5
172	**Daniel Lombardo** Macquarie University	Enhanced Optical Coupling Between Distant Spins in Whispering Gallery Resonators
173	**Nicolas Menicucci** University of Sydney	Ultra-Large-Scale Continuous-Variable Cluster States Multiplexed in the Time Domain
174	**Nicolas Menicucci** University of Sydney	Experimental realization of multipartite entanglement of 60 modes of a quantum optical frequency comb
175	**Nicolas Menicucci** University of Sydney	Detecting Topological Entanglement Entropy in a Lattice of Quantum Harmonic Oscillators
176	**Clive Michael** Australian National University	H1 Mode Analysis via Tomographic Inversion of Helium Line Ratios
177	**Gabriel Molina-Terriza** Macquarie University	Probing nanostructures with the angular momentum and the helicity of light
178	**Thanh Nguyen** Australian National University	Thermal noise of silicon flexure
179	**Timo Nieminen** University of Queensland	Computational modelling of pulsed-beam optical tweezers
180	**Timo Nieminen** University of Queensland	Rainbows on alien worlds
181	**Stuart Nulty** Australian National University	Charged particle dynamics across a magnetic filter in an inductively coupled hydrogen plasma discharge
182	**Brian Orr** Macquarie University	Sub-Doppler two-photon-excitation Rydberg spectroscopy of atomic xenon: mass-selective studies of isotopic hyperfine structure
183	**Robert Pfeifer** Macquarie University	Improving efficiency of variational tensor network algorithms
184	**Tushara Prakash** MacDiarmid Institute	Magnetotransport properties of iron oxide prepared by arc discharge
185	**Ludovic Arnaud** Swinburne University of Technology	One-sided device-independent quantum security using the continuous variable Einstein-Podolsky-Rosen steering paradox
186	**Qiongyi He** Swinburne University of Technology	Continuous variable quantum teleportation and the Einstein-Podolsky-Rosen steering paradox
187	**Margaret Reid** Swinburne University of Technology	The 'elements of reality' of a Schrodinger cat
188	**Margaret Reid** Swinburne University of Technology	Artistic portrayal of the Elements of Reality of a Schrodinger cat
189	**Laura Rosales-Zárate** Swinburne University of Technology	Fermionic Majorana Q-function
190	**Jesse Santoso** Australian National University	Negative Ion Production in the MAGPIE Helicon Source
191	**Bernhard Seiwald** Australian National University	Investigations of H-1NF neoclassical transport properties
192	**Bernhard Seiwald** Australian National University	Accurate mapping of magnetic field lines
193	**Drew Sheppard** Curtin University	Cost Reduction of Metal Hydrides for Concentrated Solar Thermal Energy Storage
194	**Bram Slagmolen** Australian National University	Dual Torsion Bar Gravitational Force Sensor
195	**Andrew Bolt** The University of Queensland	Foliated Quantum Turbo Codes
196	**Salmaan Rashid Syed** Swinburne University of Technology	Measurement of the third order non-linearity of gold nanorods and nanosheets
197	**Michael Tobar** The University of Western Australia	Constraining violations of Lorentz invariance with rotating cryogenic sapphire oscillators
198	**Maarten Vos** Australian National University	Dielectric function of HfOS_2S : the importance of k-dependence modelling
199	**Scott Williams** University of Melbourne	Precise alignment of Double Sided Strip Detectors for the Belle II Silicon Vertex Detector using readily available optical cameras
200	**Sophie Williams** University of Melbourne	Towards solving membrane protein structures using hard X-ray free-electron laser sources
201	**Dominic Williamson** University of Vienna	Symmetry-Protected Adiabatic Quantum Transistors
202	**Andreas Magerl** University Of Erlangen-Nürnberg	Pseudorotational Epitaxy of Self-Assembled Octadecyltrichlorosilane Monolayers on Sapphire (0001)
210	**Rebecca Ryan** University of Melbourne	A proof-of-principle experiment for imaging electronically damaged biomolecules at XFELs