

## 14th National Congress of the Australian Institute of Physics

Adelaide University, South Australia December 10 - 15, 2000

Driving Technology Through Discovery, Understanding and Innovation



in association with:

Computers in Physics Education (OzCUPE) Solar, Terrestrial & Space Physics (STSP) 7th Vacuum Society of Australia Congress (VSA) Atomic & Molecular Physics & Quantum Chemistry (AMPQC) Condensed Matter Physics (CMP) 18th AINSE Nuclear & Particle Physics Conference (AINSE/NUPP) Australian Conference for Teachers of Physics (SASTA) 13th Conference of the Australian Optical Society (AOS) Australian General Relativity Workshop - Australasian Society for General Relativity & Gravitation (ASGRG) Plasma2000 - 23rd AINSE Plasma Science & Technology Conference (AINSE)

Women in Physics (WIP) Medical Physics (MP)

Principal sponsor:



www.physics.adelaide.edu.au/aip-sa/aip2000

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## Welcome to the Congress

The 14th AIP National Congress promises to continue the fine tradition that goes back to the first such Congress, also held in Adelaide, back in 1974. The organisers under Tony Williams have done a fine job in making the arrangements for what promises to be a memorable physics-fest.

A special welcome is also extended to international visitors who will be in attendance. In particular, we will have as special guests representing the Institute of Physics, Sir Gareth Roberts FRS, who is currently President, and the Executive Director, Dr Alun Jones. Sir Gareth will present the Massey Medal.

Four of our Special Interest Groups, Nuclear and Particle Physics [NUPP], Women in Physics [WIP], Condensed Matter Physics [CMP] and Solar, Terrestrial and Space Physics [STSP] are arranging their own special programs or are participating with other organisations.

A special welcome is extended to three of our Cognate Societies, the Australasian Society for General Relativity and Gravitation [ASGRG], the Australian Optical Society [AOS], and the Vacuum Society of Australia [VSA]. We also welcome the Atomic and Molecular Physics and Quantum Chemistry Society [AMPQC], Computers in Physics Education [OzCUPE], the 18th AINSE Nuclear and Particle Physics Conference [AINSE/ NUPP] and the 23rd AINSE Plasma Science and Technology Conference [Plasma2000].

During the Congress it will be my pleasure to present the Bragg Medal for the best physics PhD thesis in 1999 to Dr Ping Koy Lam of the ANU.

I look forward to being with you all in Adelaide.

John Pilbrow President, Australian Institute of Physics

## Associated Conferences

These people have coordinated the Conference program for their associations.

OzCUPE	Dr Judith Pollard, Adelaide University
STSP	Dr Dick Thomas, DSTO
VSA	A/Prof John O'Connor, University of Newcastle
AMPQC	Prof Igor Bray, Flinders University of South Australia Dr Michael Brunger, Flinders University of South Australia
CMP	Dr Stephen Collocott, CSIRO Telecommunications and Industrial Physics Prof Jaan Oitmaa, University of New South Wales
AINSE/NUPP	Dr Andrew Stuchbery, Australian National University Dr Dennis Mather, Scientific Secretary, AINSE
SASTA	Mr Alan Pepper, Unley High School Dr Barbara Possingham Ms Susan Cockshell, South Australian Science Teachers Association
AOS	Dr Murray Hamilton, Adelaide University
ASGRG	Dr David Wiltshire, Adelaide University
Plasma2000	Prof Robin Storer, Flinders University of South Australia Dr Dennis Mather, Scientific Secretary, AINSE
WIP	Dr Margaret Law, Tenix Defence Systems
MP	Dr Eva Bezak, Royal Adelaide Hospital A/Prof Tim van Doorn, Royal Adelaide Hospital



# Organising Committee

Congress Chairman Associate Professor Anthony G Williams Centre for the Subatomic Structure of Matter (CSSM) Adelaide University

Associate Professor Reg Cahill School of Chemistry, Physics and Earth Sciences Flinders University of South Australia

Dr Margaret Law Tenix Defence Systems

Dr Derek Leinweber Department of Physics and Mathematical Physics Adelaide University

Professor Ian McCarthy Emeritus Professor, Flinders University

Associate Professor Robert Vincent Department of Physics and Mathematical Physics Adelaide University

Mr Alan Pepper Unley High School

Dr Barbara Possingham

Professor Tony Thomas Centre for the Subatomic Structure of Matter Adelaide University

Professor John Thomas Department of Applied Physics University of South Australia

## Sponsors

The Organising Committee gratefully acknowledges the support from the following:



South Australian Science Teachers Association

The Physicist

## Location & Venue Official Airline

The Congress will be held in Adelaide, capital city of South Australia, at the Adelaide University situated on North Terrace in the heart of Adelaide's business, commercial and entertainment district. A taxi fare is approx AUD\$15 from Adelaide Airport and travelling time by car is approximately 20 minutes.

Conferences will be held at various lecture theatres on Adelaide University grounds with the main plenary sessions to be held in Bonython Hall.

## Exhibition

The Exhibition is an integral part of the congress and is an ideal opportunity for companies and organisations to promote their products and services. If you wish to exhibit please telephone the secretariat on 08 8364 1005, as soon as possible to reserve a booth.

The Exhibition, located on Level 4 in the Upper Refectory will open on Sunday 10 December at 4:00pm.

#### Exhibition hours are as follows:

Mon 11 & Tues 12 Dec.	9:00 am to 5
Wed 13 Dec.	9:00 am to 1
Thur 14 & Fri 15 Dec.	9:00 am to 5

5:30 pm :00 pm 5:30 pm



## **ANSETTAUSTRALIA**

Masterfile number, helps to subsidise quest speakers to the Congress.

By booking with Ansett Australia, this allows you to access special Conference Airfares, Discounted Airfares and Holiday Packages. The Ansett Australia Conference airfare offers discounts of up to 45 % off the full economy airfare. Unlike most discounted fares, this airfare is FULLY REFUNDABLE, OFFERS FLEXIBILITY AND CHANGES ARE PERMITTED SUBJECT TO SEAT AVAILABILITY.

Every booking made by

delegates, using the

To access the above airfares, it is imperative that you quote the AIP2000 Congress Masterfile Number MC06699 when calling Ansett Australia on 131300.

#### International Travel Service

With regard to international delegates Ansett Australia would recommend delegates fly with our international partners, Star Alliance Partners:

- Air New Zealand Mexicana
- ▶ All Nippon Airways ▶ Scandinavian Airlines
  - Singapore Airlines

Thai Airways

United Airlines

▶ Tyrolean

Variq

- Austrian Airlines
- British Midland
- Lauda
- Lufthansa

Air Canada

and Global Reward Partners:

- all of the above Malaysian Airlines
- South African Airways Virgin Atlantic

## **Optional Tours**

On Wednesday 13 December, the afternoon has been left free for delegates to enjoy an optional half day tour. Delegates will be required to meet at the University gates in Victoria Drive, near the University footbridge. All costs include GST (except the Physicsbased Industry Tour which is free to registered delegates).

#### 1.30 pm - 6.30 pm T1 **Discovering the Fleurieu Peninsula**

Nestled in the wide sandy arch of Encounter Bay lies Victor Harbor, a favourite seaside playground for generations of South Australians. Come and enjoy a stroll along the beach or take a horse drawn tram ride across. to Granite Island, home to many Fairy Penguins, who use the Island's protected nooks and crannies as nesting sites. Enjoy a seaside afternoon tea and finally view the Bay from The Bluff, which holds great significance in the Njurundjeri creation story, before you drive back along the spectacular coastline of the St Vincents Gulf. Also includes a short stop to enjoy a wine tasting in McLaren Vale on the way. Cost AUD\$60.50 per person.

#### 1.30 pm - 6.00 pm T2 Come Taste the Wines of McLaren Vale

Vineyards, almond orchards and olive groves all grown within sight of the sea. Come and taste the wines of one of the best kept secrets of South Australia, McLaren Vale. The tour will include a visit to a number of boutique wineries for informed tastings and the Olive Grove to enjoy the Fruits of the Vale. Cost AUD\$60.50 per person.

#### 1.30 pm - 6.30 pm T3 An Afternoon in the Adelaide Hills

Colonel William Light, founder of Adelaide, described the Mount Lofty Ranges that cradle Adelaide as the Enchanted Hills. Here you will discover the gardens, small village crafts and orchards that all lead to the enchantment. Includes a visit to The Cedars, home and studio of the late Sir Hans Heysen, well known Australian artist for a very well informed tour and time to browse in Hahndorf. Cost AUD\$60.50 per person.

#### 1.30 pm - 5.00 pm T4 A Visit to Cleland Wildlife Park

A visit to Cleland Wildlife Park set amongst the tall Australian gum trees is a truly Australian experience. Here you can walk amongst a wide variety of Australian animals and birds in their natural surroundings. Hand feed the kangaroos, see cuddly koalas and wallabies and catch a glimpse of a Tasmanian Devil! On the way back, stop at Mount Lofty Summit for a spectacular view of Adelaide and its environs and enjoy some refreshment. Cost AUD\$55 per person.

#### 1:30 pm - 5:00 pm Tours of Physics-based Industry in Adelaide (Limited numbers)

Several tours will be held of local physicsbased manufacturing industries in Adelaide. This will include firms like Atmospheric Radar Systems (ATRAD), Minelab, Lastek, Photon Engineering, Scan Optics and SOLA Optical. All tours will include Lastek where refreshments will be provided. Not all tours take in all firms. These tours will be free to registered delegates but numbers will be limited. Book early.

## Plenary Speakers

#### **Professor John Barrow**

#### The Origin of the Universe

John D Barrow is Professor of Mathematical Sciences at the University of Cambridge. His research is in the area of cosmology and gravitation theory. He is particularly interested in the very early history of the universe and the ways in which astronomical observations can be used to test theories of high-energy physics and the constancy of the constants of Nature. He is also the Director of the Millennium Mathematics Project, at Cambridge, a new program to raise public awareness of mathematics and its scientific applications. He is the recipient of the Locker Award for astronomy and the Kelvin Medal. He is a frequent lecturer to audiences of all sorts and the author of many books about science and mathematics for the general public, including 'Theories of Everything', 'Impossibility', 'Between Inner Space and Outer Space', 'The Origin of the Universe', and most recently, 'The Book of Nothing'.

#### **Professor Mike Kelley**

#### Exciting New Discoveries in Ionospheric Science

Professor Michael C Kelley has been deeply involved in ac/dc electric field experiments in space since 1966. He has played an important role in supplying electronics and/or analysing results for 70 rocket flights, 4 satellite missions and numerous balloon flights. Since moving to

Cornell in 1975, he has also performed experiments for neutral wind measurements using chemical tracers, for active experiments in space plasmas and for scatter radar measurements of turbulence and dc electric fields. He has published more than 200 papers in the refereed literature, several of which were review papers concerning ac electric field and plasma density fluctuation measurements in the ionosphere and along auroral zone magnetic field lines. He was an Associate Editor of the Journal of Geophysical Research, has served on a number of advisory panels for NSF and NASA, was Chairman of the NSF CEDAR Steering Committee, and served as Adjunct Director of Atmospheric Science at the National Astronomy and Ionospheric Center. Currently, Dr Kelley is Chair of the National Academy of Sciences Committee on Solar Terrestrial Research. serves as Adjunct Director of Atmospheric Science at the National Astronomy and Ionospheric Center, and is Associate Dean for Professional Development in the College of Engineering.

#### **Professor Michael Hough**

#### Physics Education in a Globalizing Economy where Knowledge and Information are Competitive Advantages

Professor Michael Hough holds Professorships in both Management in the Business School, and in Educational Leadership in the Faculty of Education at the University of Wollongong. He has been a Science Teacher and Head of a Science Department in NSW State High Schools. He lectures extensively on quality management, and the impact of technology on societal and business practices. He has just completed a 7 month period of sabbatical leave at the University of Texas at Austin and University of Georgia in the USA; and at the University of Portsmouth in the UK. During this time, he reviewed the scope and impacts of new technologies and updated his thinking on quality management and project management.

#### Professor Dean Zollman

## Teaching Quantum Mechanics to Everyone: Can it be done with Technology?

Professor Dean Zollman received his BS and MS from Indiana University, Bloomington and PhD in theoretical nuclear physics from the University of Maryland, College Park. In 1972 he was hired as an assistant professor by the Department of Physics at Kansas State University to begin a physics education research group. Since that time his research has been devoted exclusively to studying how students learn physics and to developing materials which improve that learning. He was promoted to Associate Professor in 1977 and to Professor in 1982. Dr Zollman also holds an appointment in Secondary Education and has graduate students in both Physics and Science Education.

Professor Zollman has twice been a Fulbright Fellow in Germany. In 1989 he worked at Ludwig-Maximilians University in Munich on development of measurement techniques for digital video. In 1988 he visited the Institute for Science Education at the University of Kiel where he investigated student understanding of quantum physics.

In 1996 the Carnegie Foundation for the Advancement of Teaching named him the Doctoral University Professor of the Year. In recent years, he has concentrated on research and development in the use of technology for teaching physics and on providing materials to physics teachers, particularly those teachers whose background does not include a significant amount of physics. He is co-author of six videodiscs for physics teaching, including 'Puzzle of the Tacoma Narrows Bridge Collapse' - the first commercially available interactive videodisc for physics teaching. He was the director of software development for the 'Physics InfoMall', a large database for high school physics teaching. At present Professor Zollman is leading the Visual Quantum Mechanics project to develop materials for teaching guantum physics to three different groups of students - non-science students, science and engineering students, and students interested in biology and medicine.

#### **Professor Victor Ninov**

#### Production and Structure of Super-Heavy Metals

Professor Victor Ninov achieved his BS in Physics in 1987 and his PhD in Nuclear Physics in 1992, from the University of Darmstadt. Present areas of research include heavy element isotope production by compound-nucleus formation; the study of the alpha-decay properties of Heavy Elements (Z > 100); the design and implementation of detector, target and data acquisition systems; software for ion optical design of magnetic spectrometers, ion traps and storage rings and he is also studying the nuclear decay properties of neutron deficient isotopes along the neutron shell at N=126 and 152.

#### **Professor Sajeev John**

#### Photonic Band Gap Materials: A New Frontier in Quantum and Nonlinear Optics

Saleev John is a professor of physics at the University of Toronto. He received his Bachelors degree in physics in 1979 from the Massachusetts Institute of Technology and his PhD in physics at Harvard University in 1984. His Ph.D. work at Harvard introduced the theory of classical wave localisation in disordered systems and in particular the localisation of light in strongly scattering dielectrics. From 1984 -1986 he was an NSERC postdoctoral fellow at the University of Pennsylvania as well as a laboratory consultant to the Corporate Research Science Laboratories of Exxon Research and Engineering from 1985-1989. From 1986-1989 he was an assistant professor of physics at Princeton University. While at Princeton, he co-invented (1987) the concept of photonic band gap materials. He was a laboratory consultant to Bell Communications Research (Red Bank, NJ) in 1989. In the fall of 1989 he joined the senior physics faculty at the University of Toronto. He is also a project leader for Photonics Research Ontario, a Canadian centre of excellence and is an associate member of the Canadian Institute for Advanced Research. His current research interests include light localisation, photonic band gap materials, applications of lasers in medicine, and high temperature superconductivity.

#### **Professor Jeffrey Harris**

#### Plasma Physics: Innovation in Energy and Industrial Technology

Professor Jeffrey Harris is the Director of the National Plasma Fusion Research Facility and the Head of the Plasma Research Laboratory in the Research School of Physical Sciences and Engineering in the Institute of Advanced Studies at the Australian National University. He was born in the US and educated at the Massachusetts Institute of Technology (MIT) and the University of Wisconsin. His research interests have centred on the physics of ionised gases - plasmas - and the development of fusion energy technology to produce electricity using the reactions that power the sun and the stars. He has also worked on technological applications in digital signal processing and wireless communications. He came to the ANU in 1997 after nearly twenty years of research at the Oak Ridge National Laboratory, during which time he worked on international research projects in Russia, Japan and France.

#### **Professor Roger Horn**

#### Surfaces Cover Everything

Roger Horn is Professor of Materials Science and Deputy Director of the lan Wark Research Institute at the University of South Australia at Mawson Lakes, Adelaide. He was originally trained as a physicist, gaining a Bachelors degree from Monash University, in 1971, and a PhD from the University of Cambridge, in 1976. Following a post-doctoral fellowship working on the physics of liquid crystals at the Université de Paris-Sud at Orsay, Horn spent ten years at the Australian National University in Canberra working on an area of colloid science involving measurements of forces acting between solid surfaces separated by very thin liquid films. After that he worked for five years at the US National Institute of Standards and Technology in Gaithersburg, Maryland, conducting research into the processing and mechanical properties of ceramic materials, before returning to Australia to take up his present position in 1992. There he continues his research into solid-solid, solid-liquid and liquid-liquid interfaces.

#### Professor Chris Greene

#### Photoionization of Light Atoms and Molecules: A Window into Few-body and Many-body Dynamics

Chris H. Greene has held the position of Professor of Physics and Fellow of JILA at the University of Colorado since 1989. Prior to that he was on the physics department faculty at Louisiana State University from 1981 through 1988. Greene's undergraduate work was carried out at the University of Nebraska. His graduate research in theoretical atomic and molecular physics was guided by Ugo Fano at the University of Chicago, with the PhD degree awarded in 1980. The following year was spent in a postdoctoral stint with Richard Zare at Stanford University. Greene's current research interests include: multiple ionisation and fragmentation processes in fewelectron atoms and simple molecules; photoionization of atoms and molecules throughout the periodic table; collisions between two or three ultracold atoms: theoretical description of Bose-Einstein condensates.



# Special Congress Events

The following special congress events are included for all AIP2000 Congress delegates.

#### The Harrie Massey Medal Lecture by Professor Tony Thomas

#### Monday 11 December - 5.45pm to 6.45pm

The Massey Medal was proposed at the AIP Congress in 1988 and established in 1990 as a gift of the Institute of Physics, UK, to mark the 25th anniversary of the founding of the AIP in 1963 as a separate institution (previously physicists in Australia had belonged to the Australian Branch of the IOP).

The prize is awarded every two years for contributions to physics or its applications made by an Australian physicist working anywhere in the world, or by a non Australian resident in, and for work carried out in, Australia. A lecture on the work for which the Medal is awarded is presented at Congress in the year of the award, and an article published in The Physicist. The recipient must be a member of the Australian Institute of Physics or of the Institute of Physics. Previous winners have been:

- 1990 Professor R Dalitz
- 1992 Professor D H Briggs
- 1994 Professor R Baxter, ANU
- 1995 Professor A D Buckingham, University of Cambridge
- 1996 Professor A Snyder, ANU
- 1997 Professor D Pegge, Griffith University
- 1998 Professor D Melrose, University of Sydney

The Massey Award will be presented by IOP President, Professor Sir Gareth Roberts FRS CEng CPhys FInstP, followed by a lecture by the award recipient. All delegates are welcome to attend.

### Women in Physics Forum

#### Tuesday 12 December - 5.30pm to 7.15pm

The Women in Physics group will hold a forum in the North/South Dining Room, located on level 4 of the Adelaide University Union Building. For further details please contact Margaret Law on +61 8 8300 4464 or margaret.law@tenix.com

### **Public Lecture**

#### Tuesday 12 December - 7.30pm to 9.30pm

A lecture featuring Paul Davies, open to all delegates and the general public will be held in Bonython Hall.

Paul Davies was born in London in 1946, obtained a doctorate from University College London in 1970, and held academic appointments at Cambridge and London Universities until, at the age of 34, he was appointed Professor of Theoretical Physics at the University of Newcastle upon Tyne. He remained there until his emigration to Australia in 1990 to take the Chair of Mathematical Physics at the University of Adelaide. In May 1993 the University created a new position, Professor of Natural Philosophy, specially for him. In May 1997 he decided to take early retirement from the University. He currently holds Visiting Professor positions at Imperial College, London, and at the University of Queensland.

Paul Davies has published over 100 research papers in specialist journals, in the fields of cosmology, gravitation and quantum field theory, with particular emphasis on black holes and the origin of the universe. He is also interested in the nature of time, high energy particle physics, the foundations of quantum mechanics, chaos theory and the theory of complex systems. His former colleagues at the Adelaide University are investigating topics in quantum gravity including superstrings, higherdimensional black holes and quantum cosmology.

Paul Davies is well known as an author, broadcaster and public lecturer.

All delegates are welcome to attend.

### The Bragg Gold Medal for Excellence in Physics Lecture by Dr Ping Koy Lam

#### Wednesday 13 December - 10.15am to 10.45am

The Bragg Gold Medal for the best PhD thesis by a student from an Australian University was established in 1992 as an initiative of the South Australian Branch, to commemorate Sir Laurence Bragg and his father Sir William Bragg. The winners so far have been:

- 1992 Dr Stephen Bass, University of Adelaide
- 1993 Dr Henry Chapman, University of Melbourne
- 1994 Dr Wolodymyr Melnitchouk, University of Adelaide
- 1995 Dr Howard Wiseman, University of Queensland
- 1996 Dr Andre Luiten, University of Western Australia
- 1997 Dr Alexander Buryak, Australian National University
- 1998 Dr Tanya Munro, University of Sydney
- 1999 Dr Ping Koy Lam, Australian National University

The medal is awarded annually to the student who is judged to have completed the most outstanding PhD thesis in Physics under the auspices of an Australian University, whose degree has been approved but not necessarily conferred in the previous thir teen months. No candidate can be nominated more than once.

The Bragg Award will be presented by AIP President, Prof John Pilbrow, followed by a lecture by the award recipient.

All delegates are welcome to attend.

### **Special Plenary 1**

#### Monday 11 December - 11.00am to 11.45am

"Sagacity and Significant Stretch for Survival" by Professor Sir Gareth Roberts FRS CEng CPhys FInstP

#### Abstract

Properly implemented, a strategic planning process, where the emphasis is clearly on innovation and creativity, can help an organisation do more than plan for the future; it can help to create its future.

This lecture describes how simple visual planning tools can be useful in identifying strategic issues of importance and help to provide a consistent discipline for decision and policy matters. Examples are taken from industry and academe to illustrate this theme.

#### Biography

A native of North Wales, Gareth Roberts began his academic career at The University College of North Wales, Bangor where he obtained a first class honours degree in physics and a doctorate. He has also held Chairs at The New University of Ulster, The University of Durham and The University of Oxford.

He is currently involved with the following national organisations and institutions: President of the Institute of Physics; Board member of the Higher Education Funding Council for England; Board member of the Regional Development Agency for Yorkshire and the Humber; Director of the Universities Superannuation Scheme Ltd; Chairman of the DTI / CVCP Research Careers Initiative; Chairman of the Genome Valley Steering Group; and Chairman of Medical Solutions plc.

Sir Gareth was appointed Vice-Chancellor of the University of Sheffield in January 1991. He will be leaving Sheffield on 1 April 2001 to take up the Presidency of Wolfson College, University of Oxford.

He is a former Chairman of the CVCP and was knighted in 1997 for his services to higher education.

### **Special Plenary 2**

Tuesday 12 December - 9.00am to 9.45am

" Developments in Science/Physics Policy and Funding in the UK" by Dr Alun Jones, Chief Executive IOP

#### Abstract

The past two years have seen significant improvements in funding for Physics in the United Kingdom, with a commensurate enhancement in the public and governmental appreciation of the benefits of Physics research. The Institute of Physics has been particularly active in lobbying Government and "decision makers" through a series of "Vision Papers" which highlight the importance to knowledge, wealth creation and quality of life of various aspects of physics research. A series of seminars was organised aimed at bringing to a wider audience news of developments in our subject and also an intensive campaign to increase press coverage. This has happened at a time when the Institute's membership has increased apace and it now stands at over 30,000 - more than double what it was in 1990.

#### Biography

Dr Jones obtained his DPhil in nuclear physics at the University of Oxford. He then went to the USA to carry on his work at the Lockheed Missile and Space Laboratories in Palo Alto. He returned to the UK and, after a brief period in Oxford, joined *Nature* where in 1973 he became Acting Editor before joining British Steel in London. He became Assistant Director of the Technical Change Centre in 1981 and Deputy Director of the Wolfson Foundation (an endowed grant-giving charity) in 1986. He was made Director of the Foundation in 1987 and in 1990 he was appointed Chief Executive of the Institute of Physics.



Program

					5					
Sunday 10	December	2000								
4:00pm		Registration opens on Level 2 (ground floor) Wills Room in the Adelaide University Union Building. Exhibition Opens								
6:30pm - 8:00pm Welcome Reception hosted by the Institute of Physics, UK in The Cloisters, Adelaide University. Included in the							n the registration	fee. Enter from Vi	ctoria Drive.	
Monday 11	December	2000								
7.45am		Registration desk	open							
8.30am - 9.00am		Introduction by A Official Opening I	IP President, Profe by His Excellency S	essor John Pilbrov Sir Eric Neal AC	w; Welcome by Ian C CVO, Governor of S	Chessell, Directo South Australia	or Electronics & Sur	veillance Research	Laboratory, DST	0;
9.00am - 9.45am	Plenary	Prof John Barrow	(ASGRG) - "The	Origin of the Un	iverse"					
9.45am - 10.30am	Plenary	Prof Mike Kelley (	(STSP) - "Exciting	New Discoveries	in Ionospheric Scier	nce"				
10.30am - 11.00am	Morning Tea									
11.00am - 11.45am	Plenary	Sir Gareth Rober	ts FRS, President I	OP - "Sagacity an	nd Significant Stretch	for Survival"				
11.45am - 12.30pm	Plenary	Prof Michael Hou	gh (SASTA) - "Phy	vsics Education in	a Globalizing Econo	omy where Kno	wledge & Information	on are Competiti	ve Advantages"	
12.30pm - 2.00pm	Lunch									
2.00pm - 3.30pm	Parallel	AMPQC			CMP	SASTA	AINSE/NUPP	STSP	OzCUPE	ASGRG
3.30pm - 4.00pm	Afternoon Tea									
4.00pm - 5.30pm	Parallel	AMPQC			CMP	SASTA	AINSE/NUPP	STSP	OzCUPE	ASGRG
5.30pm		Sessions Conclud	e							
5.45pm - 6.45pm		Massey Award Pr	esentation by IOP	President and Le	ecture by Massey Aw	vard Winner				
7.00pm - 9.00pm		AINSE/NUPP Red	ception							
Tuesday 12	December	r 2000								
8.30am		Registration desk	open							
9.00am - 9.45am	Plenary	Dr Alun Jones, Ch	nief Executive, IOP	- "Development	s in Science/Physics	Policy & Fundir	ng in the UK"			
9.45am - 10.30am	Plenary	Professor Dean Z	ollman (OzCUPE)	- "Teaching Qua	antum Mechanics to	Everyone: Can	it be done with Tec	hnology?"		
10.30am - 11.00am	Morning Tea									
11.00am - 12.30pm	Parallel	AMPQC	AOS	AOS	CMP	SASTA	AINSE/NUPP	STSP	OzCUPE	ASGRG
12.30pm - 2.00pm	Lunch									
2.00pm - 3.30pm	Parallel	AMPQC	AOS Plen	ary session	CMP	SASTA	AINSE/NUPP	STSP	OzCUPE	ASGRG
3.30pm - 4.00pm	Afternoon Tea									
4.00pm - 5.30pm	Parallel	AMPQC	AOS	AOS	CMP Posters		AINSE/NUPP	STSP Posters	OzCUPE	ASGRG
5.30pm		Sessions conclude	2							
5.30pm - 7.15pm		Women in Physic	s Forum (and Din	ner - to be held	in North/South Dini	ng Room)				
7.30pm - 9.30pm		Public Lecture: Pa	ul Davies (Bonythe	on Hall)						

Public Lecture: Paul Davies (Bonython Hall)



## Wednesday 13 December 2000

8.00am		Registration desk open
8.45am - 9.30am	Plenary	CMP Plenary Speaker To be advised
9.30am - 10.15am	Plenary	Professor Victor Ninov (NUPP) - "Production and Structure of Super-Heavy Elements"
10.15am - 10.45am	Plenary	Bragg Award Presentation by AIP President, Prof John Pilbrow. Lecture by Bragg Medal Winner
10.45am - 11.15am	Morning Tea	
11.15am - 12.00pm	Plenary	Professor Janet Conrad (WIP) - "Navigating the World of Neutrino Oscillations"
12.00pm - 12.45pm	Plenary	AIP General Meeting - Chair: Professor John Pilbrow, President, Australian Institute of Physics
12.45pm		Sessions conclude
1.00pm - 7.00pm		Optional Tours (refer page 3)

## Thursday 14 December 2000

8.15am		Registration desk of	open							
9.00am - 9.45am	Plenary	Professor Sajeev Jo	ohn (AOS) - "Pho	otonic Band Gap N	1aterials: A New F	rontier in Quantu	m and Nonlinear	Optics"		
9.45am - 10.30am	Plenary	Professor Jeffrey H	larris (Plasma) - "	Plasma Physics: Inr	novation in Energy	and Industrial Teo	chnology"			
10.30am - 11.00am	Morning Tea									
11.00am - 12.30pm	Parallel	AMPQC	AOS	AOS	CMP	Plasma	AINSE/NUPP	STSP	VSA	MP
12.30pm - 2.00pm	Lunch									
2.00pm - 3.30pm	Parallel	AMPQC	AOS Pler	nary session	CMP	STSP/Plasma	AINSE/NUPP	STSP/Plasma	VSA	MP
3.30pm - 4.00pm	Afternoon Tea					juint session		joint session		
4.00pm - 5.30pm	Parallel	AMPQC	AOS	AOS	CMP Posters	Plasma 2000	AINSE/NUPP	STSP	VSA	MP
5.30pm		Sessions conclude								
7.00pm - 11.30pm		Conference Dinne Dress: Smart casu	r, Hyatt Regency al	Adelaide (Optiona	al extra – all inclu	sive cost: Delegate	e AUD\$40, extra ti	ckets AUD\$75)		

## Friday 15 December 2000

8.15am		Registration desk of	open							
9.00am - 9.45am	Plenary	Professor Roger H	ofessor Roger Horn (VSA) - "Surfaces Cover Everything"							
9.45am - 10.30am	Plenary	Professor Chris Gr	ofessor Chris Greene (AMPQC) - "Photoionization of Light Atoms and Molecules: A Window into Few-body and Many-body Dynamics"							
10.30am - 11.00am	Morning Tea									
11.00am - 12.30pm	Parallel	AMPQC	AOS	AOS	CMP	Plasma2000	AINSE/NUPP	STSP	VSA	
12.30pm - 2.00pm	Lunch									
2.00pm - 3.30pm	Parallel	AMPQC	AOS	AOS		Plasma2000		STSP	VSA	
3.30pm - 4.00pm	Afternoon Tea									
4.00pm - 5.30pm	Parallel	AMPQC	AOS	AOS		Plasma2000		STSP	VSA	
5.30pm		Congress and Exhi	bition conclude							

## Registrations

### AIP2000 Congress Registration

Congress registration fee includes morning and afternoon teas, lunches, program, book of abstracts, satchel and attendance at the Welcome Reception on Sunday 10 December. Please note the Congress Dinner is not included, although subsidised, and tickets are available at AUD\$40 per registered delegate. Additional tickets can be purchased at a cost of AUD\$75 per guest.

## Teacher Registration (Monday and Tuesday)

The South Australian Science Teachers Association will be holding "The Australian Conference for Teachers of Physics" within the AIP2000 Congress on Monday 11 and Tuesday 12 December.

The teacher registration entitles attendance on Monday and Tuesday only and includes morning and afternoon teas, lunches, program, book of abstracts and a satchel.

## Student Registration

Student registrations must include proof of full time student status. A signed letter of authority from the Head of Department of the relevant institution must be attached. Registrations without this information will not be accepted.

Student registration fee entitles attendance from Monday to Friday and includes morning and afternoon teas, lunches, program book of abstracts, satchel and attendance at the Welcome Reception on Sunday 10 December.

## **Registration Desk Hours**

Mon 11 December	7:45 am to 5:30 pm
Tues 12 December	8:30 am to 5:30 pm
Wed 13 December	8:00 am to 1:00 pm
Thurs 14 December	8:15 am to 5:30 pm
Fri 15 December	8:15 am to 5:30 pm

## **Registration Fees**

All fees quoted in Australian dollars and include GST. The confirmation receipt will be in the form of a tax invoice. The ABN for the AIP2000 Congress is 81 004 566 509.

Payable	Early bird on or before 13 October	Regular on or after 14 October
Congress:	AUD	AUD
Congress AIP Member	\$395	\$495
Congress Non Membe	er \$425	\$525
Student	\$225	\$275
Teacher (Mon & Tue)	\$150	\$150
Dinner:	\$40	\$40
(This quality event is su	bsidised by the	Congress).
Additional Dinner Tick	ets \$75	\$75
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NOTE: "AIP Member" means a Member of the AIP or one of its Cognate Societies.

### Payment of Fees

All prices quoted in this brochure are given in Australian dollars and include GST. All payments must be made in Australian dollars. Payments should include registration fees, hotel deposit (one night's tariff), optional social functions and/or optional tours.

#### **Overseas Delegates**

Payment may be made by Visa, Mastercard, American Express, or Bank Draft in AUD\$ made payable to "AIP2000 Congress" (Personal or company cheques not accepted.)

#### Australian Delegates

Payment may be made by Visa, Mastercard, Bankcard, American Express, or cheques made payable to "AIP2000 Congress".

## **Confirmation of Bookings**

A confirmation of your registration and a tax invoice/receipt will be forwarded as soon as possible after receipt. Please contact the Secretariat if you have not received this letter within a reasonable time frame.

## Cancellations

Substitute delegates are welcome, however, please notify Staffords Conference Management of such changes. It is a condition of the acceptance of registration that cancellations should be notified in writing to Staffords Conference Management. Note the accommodation section, on page 13, for cancellation information.

### Refunds

- a) A fee of AUD\$100 (Teachers AUD\$50) will be charged for cancellations received by Wednesday 6 December.
- b) Refunds for cancellations received on or after Thursday 7 December, 2000 will be made at the discretion of the Organising Committee.

## Liability

The Conference and its organisers accepts no responsibility for losses incurred by delegates as a result of industrial disruption. The program is correct at the time of printing, but the organisers reserve the right to alter the program as necessary. All prices quoted are in Australian dollars and include GST.

## **Conference Secretariat**

Staffords Conference Management 1st Floor, 128 Fullarton Road Norwood SA 5067 Telephone: +61 8 8364 1005 Fax: +61 8 8332 8810 Email: aip@staffords.on.net



## **Registration Form**

### AIP2000 Congress ABN: 81 004 566 509

Title	First Name		Surname	
Position				
Affiliation/organisatio	n			
City		State	Postcode	
Country		Tel		
Fax	Email			
Name for Name Bac (if different to First Nam	lge e above)			

#### **Accompanying Person Details**

First Name	Surname

#### **Dietary Requirements**

	Delegate	Accompanying	Person
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#### **Registration Fees**

80

Payable	Early bird on or before 13 Octo	Regular ober on or after 14 October		
AIP (or Cognate) Member	AUD\$395	AUD\$495	\$	
Non Member	AUD\$425	AUD\$525	\$	
Student	AUD\$225	AUD\$275	\$	
Teacher (Mon & Tue)	AUD\$150	AUD\$150	\$	
Welcome Cocktail Reception (included in registration fee) Please indicate with a ✔ if you will be attending				
Women in Physics Forum Please indicate with a ✔ if ye	<b>m</b> (refer to page 6 for four the set of the	fur ther details)		
Conference Dinner (optional extra)		1 ticket @ AUD\$40	\$	
Additional tickets required		No of tickets@ AUD\$75	\$	
Optional Tours (refer page	e 3 for details)			
T1 Fleurieu Peninsula		No of tickets@ AUD\$60.50	\$	
T2 McLaren Vale		No of tickets@ AUD\$60.50	\$	
T3 Adelaide Hills		No of tickets@ AUD\$60.50	\$	
T4 Cleland Wildlife Park		No of tickets@ AUD\$55.00	\$	

Please indicate with a 🗸 if you will be attending						
Accommodation						
Please include a deposit of one nig	ght's tariff. (No	ote the Accom	modation secti	on for GST information.)		
Hotels	Single	Double	Twin*			
Stamford Plaza Adelaide	<b>1</b> \$165	<b>1</b> \$165	<b>1</b> \$165	Deposit = \$		
Adelaide Paringa Motel	<b>\</b> \$ 70	<b>\</b> \$85	n/a	Deposit = \$		
Apartments	One bedroom		Two bedroom*			
Adelaide Ritz All-Suites	<b>1</b> \$154		<b>\</b> \$198	Deposit = \$		
Budget	Single		Breakfast			
Lincoln College	□\$36		included	Deposit = \$		
St Mark's College	<b>□</b> \$36		included	Deposit = \$		
Royal Adelaide Hospital	<b>1</b> \$ 18		<b>\</b> \$ 4	Deposit = \$		
Arriving:	. Departing:	Dav	Dato			
Smoking Non smokin	g 🗖 Late	e check-in (afte	r 6pm)			
*Name of person if sharing with a	a delegate/s					
Payment - MUST accompany	registration		TUTA	LFEE3 ]		
I enclose my cheque made pa	vable to "AIP2(	• )00 Congress"				
$\square$ Lereby authorise my credit card to be debited with the above fees						
Mastercard Visa	🖵 Ban	kcard	Amex			
Credit card holder's name			Expirv	y date		
Signature				,		
Credit card number						
Sena to: AIP2000 Congress c/- Staffords Conference Management						
128 Fullarton Road, Norwood SA 5067 AUSTRALIA						
Fax: +61 8 8332 8810 Email <sup>,</sup> enquiries@staff	Fax: +61 8 8332 8810 Tel: +61 8 8364 1005 Email: enquiries@staffords.on.net					

Tours of Physics-based Industry in Adelaide (included in registration fee)

www.physics.adelaide.edu.au/aip-sa/aip2000

#### Registrations on-line available after 18 September: www.physics.adelaide.edu.au/aip-sa/aip2000

...continued Image

Delegate Name: .....

Please indicate with a  $\checkmark$  which conference/s you are likely to attend:

Monday	AMPQC		СМР	SASTA	□ AINSE/NUPP	STSP	Ozcupe	ASGRG
Tuesday	AMPQC	AOS	CMP	SASTA	□ AINSE/NUPP	STSP	OzCUPE	ASGRG
Thursday	AMPQC	AOS	CMP	Delasma2000	□ AINSE/NUPP	STSP	UVSA	D MP
Friday	AMPQC	aos	CMP	Delasma2000	□ AINSE/NUPP	STSP	USA VSA	

### Reference

OzCUPE	Computers in Physics Education
STSP	Solar, Terrestrial and Space Physics
VSA	7th Vacuum Society of Australia Congress
AMPQC	Atomic and Molecular Physics and Quantum Chemistry
СМР	Condensed Matter Physics
AINSE/NUPP	18th AINSE Nuclear and Particle Physics Conference
SASTA	Australian Conference for Teachers of Physics
AOS	AOS2000 – 13th Conference of the Australian Optical Society
ASGRG	Australian General Relativity Workshop – Australasian Society for General Relativity and Gravitation
Plasma2000	Plasma2000 – 23rd AINSE Plasma Science and Technology Conference
MP	Medical Physics



## General Information

### Welcome Reception

The AIP2000 Congress Welcome Reception will be held in The Cloisters, located at the Adelaide University, commencing at 6:30 pm and concluding at 8:00 pm.

Cost: Delegates - included in registration fee

## **Conference Dinner**

The AIP2000 Congress Dinner will be held at the Hyatt Regency Adelaide, located on North Terrace in the City of Adelaide. Delegates will make their own way to the Hyatt, with dinner commencing at 7:30 pm. This will be an evening to relax and enjoy South Australian cuisine, wines and hospitality. A quality event subsidised by the Congress. Numbers are limited so delegates are encouraged to book early.

Dress: smart casual

Cost: Delegates - AUD\$40

Accompanying Persons/Guests: AUD\$75

## Travel

Delegates make their own travel arrangements with Ansett or their travel agent (refer to the Official Airline section on page 3 for information). International delegates should ensure they have a valid passport with a minimum of 6 months validity at the date of departure from Australia. A visa is required by visitors from many countries and delegates should consult with their Australian Embassy or Consulate for details.

## Accompanying Persons

Accompanying Persons may attend the Conference Dinner by purchasing tickets on the booking form. The Secretariat will be able to assist you with touring, shopping or entertainment recommendations available during the Congress.

### General

A completed registration form by all participants, including speakers, is essential to ensure your name is included in the list of congress participants. Forms with fees must be returned to the organisers, Staffords Conference Management.

The Congress will commence with a Welcome Reception on Sunday 10 December at The Cloisters, located at the Adelaide University, and the Official Opening of the formal program will be on Monday 11 December in Bonython Hall.

### Accommodation

Bookings for accommodation must be booked on the registration form. All rates are per room per night and INCLUDE GST. The GST component will be shown on your accommodation invoice provided at the conclusion of your stay and will not be included in the GST total of the Congress invoice.

Each reservation must be accompanied by a deposit of one night's accommodation, which is deducted from your room account by the venue. To guarantee a room, reservations must be made by 10 November. Reservations after this date cannot be guaranteed. Any alterations to bookings must be NOTIFIED TO THE SECRETARIAT, not the venue. **Cancellations** - The room deposit may be forfeited for cancellations received after 10 November if the Congress or the venues are not able to rebook the room. No shows will attract a cancellation penalty of the first night's accommodation and subsequent nights will be cancelled without notice and resold.

### Hotels

#### Stamford Plaza Adelaide

An international hotel located in the heart of Adelaide, on North Terrace, featuring a combination of restaurants and entertainment areas.

150 North Terrace, Adelaide SA 5000 Tel: +61 8 8461 1111 Fax: +61 8 8231 7572 Single, Double, Twin: AUD\$165 per room (1 or 2 persons)

#### Adelaide Paringa Motel

A 3 1/2 star motel located in the inner city with 24 hour reception, a café and breakfast room service is available.

15 Hindley Street, Adelaide SA 5000 Tel: +61 8 8231 1000 Fax: +61 8 8231 6807 Single: AUD\$70 per room Double: AUD\$85 per room (1 or 2 persons)

## Apartments

#### Adelaide Ritz All Suites

Adelaide's newest hotel, the Adelaide Ritz offers one and two bedroom apartments for up to 4 persons and is located a short walk from the University.

82 Frome Street, Adelaide SA 5000 Tel: +61 8 8223 9000 Fax: +61 8 8223 9099

One bedroom: AUD\$154 (1 to 2persons) Two bedroom: AUD\$198 (1 to 4 persons)

## Budget

#### Lincoln College

College-style accommodation located in picturesque North Adelaide, just a short taxi ride from the University or a 15 minute walk. Single study bedrooms with share facilities.

45 Brougham Place, North Adelaide SA 5006 Tel: +61 8 8290 6000 Fax: +61 8 8267 2942

Single bed and breakfast: AUD\$36 per person

#### St Mark's College

College-style accommodation in close proximity to the University, either a short taxi ride or a 15 minute walk. Single study bedrooms with share facilities.

46 Pennington Terrace, North Adelaide SA 5006 Tel: +61 8 8334 5600 Fax: +61 8 8267 4694

Single bed and breakfast: AUD\$36 per person

#### **Royal Adelaide Hospital**

Located in the Residential Wing of the RAH. Budget college-style accommodation with communal lounge, located about 5 minutes walk from the University. Basic, unserviced single rooms with share unisex bathrooms.

North Terrace, Adelaide SA 5000 Tel: +61 8 8222 5169 (messages for guests only)

Single: AUD\$18.00 per night (non-students) AUD\$12.50 per night (students)

Additional cost: Self-serve continental breakfast AUD\$4 per head



Principal Sponsor

DEPARTMENT OF DEFENCE DEFENCE SCIENCE & TECHNOLOGY ORGANISATION





## Institute of **Physics**









Photon Engineering

**Tenix Defence Systems** 

South Australian Science Teachers Association

The Physicist

Staffords Conference Management 1st Floor, 128 Fullarton Road Norwood SA 5067 Telephone: +61 8 8364 1005 Fax: +61 8 8332 8810 Email: aip@staffords.on.net www.physics.adelaide.edu.au/aip-sa/aip2000