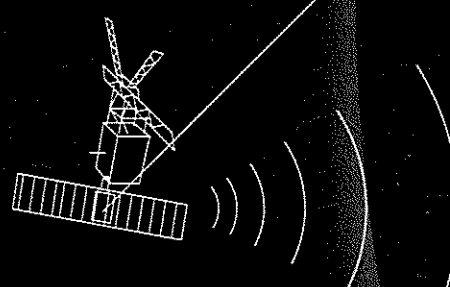
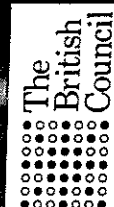


AUSTRALIAN INSTITUTE OF PHYSICS



# TENTH NATIONAL CONGRESS HANDBOOK

10-14 February 1992  
The University of Melbourne  
Parkville, Victoria



- Cellular Resonance Systems
- Frequency Management Systems
- Oblique and Backscatter Radars
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AUSTRALIAN INSTITUTE OF PHYSICS



**TENTH NATIONAL CONGRESS  
HANDBOOK**

**10-14 February 1992**

**The University of Melbourne  
Parkville, Victoria**



LA TROBE UNIVERSITY



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List of participants

available at Congress desk

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## WELCOME

to the

### 10th National Congress of the Australian Institute of Physics

This Congress is hosted by the Victorian Branch of the AIP, and on behalf of the Branch Chairperson (Assoc. Prof. J.D. Cashion) and the Organising Committee, a warm welcome is extended to all registrants attending and contributing to the Congress. Those who have given service to the necessary committee activity which underpins the staging of such a congress are detailed below, though special mention must be made of the efforts of the Chairperson of the Programme Committee (Professor A.G. Klein) and the group representatives who have structured the programme, and the efforts of the editorial sub-committee under Dr. J.G. Jenkin who have prepared this volume.

The physical content of the programme consists of plenary and keynote addresses, and contributed sessions and workshops of both oral and poster form. I would, however, particularly draw your attention to the sessions to be devoted to the development of the "Physics Strategy Plan" for Australia, on Monday afternoon and Tuesday evening. Your attendance and contribution to these sessions is strongly encouraged. Other ancillary Congress activities are amply outlined in what follows.

I would like to extend a special welcome to those who have travelled a very large distance to contribute to the Congress, including many of the Plenary and Keynote Speakers.

May I conclude by wishing you all a profitable and happy meeting.



Dr J Liesegang  
Chairperson, Organising Committee

### From Tony Klein, Chairman, Program Committee...

A large and enthusiastic Program Committee has worked very hard to make this an interesting and exciting Congress, which caters not only for the specialist interests of the various groups but also presents opportunities to hear about developments in other areas of physics. I wish to thank all the Section organisers for their excellent work and for their vital contributions to the success of the Congress.

I would also like to welcome all plenary and keynote speakers and to express the hope that they enjoy the Congress as well as their stay in Melbourne. A particular welcome to Professor C.N. (Frank) Yang, President of the Association of Asia-Pacific Physical Societies, to Professor Dan Walls, President of the New Zealand Institute of Physics, and to Professor Roger Blin-Stoyle, President of the Institute of Physics, London, in their ambassadorial capacities. The support of the A.I.P. Congress by its sister organisations is very gratifying.

Finally a word of thanks to our sponsors, whose logos are displayed on the cover; they have contributed significantly to the quality of our programme.

The Program Committee hopes that you will find interesting people to talk to, interesting talks to listen to, and interesting ideas to take home. Enjoy the Congress!

### And from John Jenkin, Handbook Editor...

The Congress Handbook now in front of you has been produced with the assistance of many people, particularly the Program Committee, the Section organisers, and administrative and secretarial staff in institutions all around Melbourne. My sincere thanks to them all.

The information contained in the Handbook was correct when we went to press in December, but things change; keep your eyes and ears open for alterations and additions.

And now, on with the show!

# USEFUL INFORMATION

**CONGRESS DESK:** Registration facilities will be available at Newman College, University of Melbourne, 5:00-9:00 p.m., on Sunday, 9 February. (See also "Informal Welcome" under "Special Events".) Thereafter, the Congress desk will be located in the foyer of the Hercus and Laby Theatres, adjacent to the Physics building, and will be open during the following hours:

Monday 8:00 a.m. - 5:00 p.m.  
 other days 8:30 a.m. - 5:00 p.m.

**MAPS:** A detailed map of the University of Melbourne and a map of the surrounding area are included in this Handbook. These are copyright Melway Publishing Pty Ltd and are reproduced from *Melway Street Directory (Edition 21)* with permission.

**PARKING:** It is not possible to offer parking facilities on the University of Melbourne campus to Congress participants; there are numerous all-day parking meters in the surrounding streets. Best of all, use public transport if you can.

**CONGRESS VENUES:** Please consult the detailed campus map; lecture theatres are as follows:

- Hercus Theatre adjacent to Physics building
- Laby Theatre adjacent to Physics building
- Latham Theatre Redmond Barry building
- Low Theatre Redmond Barry building
- Lyle Theatre Redmond Barry building
- Medley Theatre Redmond Barry building
- Prince Philip Theatre Architecture & Planning building
- Public Lecture Theatre Old Arts building
- Rivett Theatre Redmond Barry building (1st floor)

**FOOD OUTLETS:** The Congress will be supplying morning and afternoon teas only. On campus, meals are available at Union House and, for limited numbers, in University House. Melbourne is renowned for its restaurants, many of which can be found in the streets of Carlton adjacent to the University; for example, Lygon, Drummond, Elgin, Faraday and Grattan Streets, and further afield, Brunswick Street in Fitzroy.

**SMOKING:** Please note, the University of Melbourne does not permit smoking in any of its buildings.



18	1888 Building	F5	128 Conference Centre
19	Administration	F5	150 Law School & Library
20	116 Agriculture & Forestry	A4	115 Lyle Theatre
21	162 Alice Hoy Building	H6	160 Mathematical Sciences
22	160 Anatomy	D9	170 Mechanical Engineering
23	161 Animal House, Swanston Street	H4	178 Media & Publications
24	162 Arts Centre	H4	182 Medical Library
25	163 Arts Centre & Planning	H4	141 Melba Hall
26	149 Arts Faculty Office	D5	175 Engineering Workshops
27	191 Asian Languages & Anthropology	E8	169 Engineering Library
28	192 Audio Visual Services	J4	191 English
29	193 Babe (French, German, Italian, Russian)	C5	192 Enquiries
30	194 Bader, Spencer Building	F3	193 Fine Arts
31	101 Beaupre Centre	D2	116 Forestry
32	115 Biology	H3	169 Frank Tate Building
33	116 Biochemistry	H3	187 Gate Keepers Cottage
34	121 Bookroom	E5	194 Geography
35	122 Botany	E3	140 Guild Museum
36	123 Careers & Appointments Service	E3	130 Guild Theatre
37	161 Centre for the Study of Higher Education	E4	192 Hercus & Laby Theatres
38	130 Chaplains	G5	191 History
39	183 Chemistry	H6	148 History & Philosophy of Science
40	184 Chemistry East Wing	H6	160 Howard of History Institute & Elec Eng.
41	185 Chem Eng (Old Mining)	G7	162 International Students Office
42	174 Civil Engineering	F9	184 Philosophy
43	175 Classical & Near Eastern Studies	E8	191 John Medley Building
44	133 Commonwealth Bank	H4	136 Physics Annex
45	160 Computer Science	J6	192 Laby Theatre
46	191 Political Science	E8	191 Law School & Library
47	133 Post Office	H5	115 Lyle Theatre
48	133 Prince Philip Theatre	H4	155 Property & Buildings Dept.
49	156 Prospective & New Students Office	H6	178 Media & Publications
50	145 Public Security Theatre	H5	182 Medical Library
51	146 Public Security Theatre	H5	141 Melba Hall
52	166 Publications and Printing Services	G7	175 Engineering Workshops
53	152 Raymond Barry Building	F5	169 Engineering Library
54	115 Redmond Barry Building	H3	191 English
55	152 Richard Barry Annex	J5	192 Enquiries
56	155 Science Faculty Office	H5	193 Fine Arts
57	102 Sportcentre, Squash Courts	F2	116 Forestry
58	143 State Bank	G5	169 Frank Tate Building
59	163 Stationery Store	E9	187 Gate Keepers Cottage
60	160 Statistics	G8	194 Geography
61	175 Student Union	F9	140 Guild Museum
62	172 Student Union	F9	130 Guild Theatre
63	134 Television Studio	J4	192 Hercus & Laby Theatres
64	130 Union Theatre	E4	191 History
65	160 University Gallery, Museum of Art	H7	148 History & Philosophy of Science
66	162 University House	H6	160 Howard of History Institute & Elec Eng.
67	163 University House	G7	162 International Students Office
68	151 Wilson Hall	F9	184 Philosophy
69	147 Zoology	K3	191 John Medley Building
70		K5	136 Physics Annex
71		C8	133 Physiology





# SPECIAL EVENTS

**INFORMAL WELCOME:** Sunday evening, February 9, 6:00-9:00 p.m., Newman College, University of Melbourne.

**PLenary LECTURES** (8.30 and 9.20 a.m. each day):  
 Monday **C.N.Yang and M.Berry** Prince Philip Theatre  
 Tuesday **D.B.Meirose and D.F.Walls** Prince Philip Theatre  
 Wednesday **H.Walther and P.Hariharan** Prince Philip Theatre  
 Thursday **B.H.Briggs and R.J.Blin-Stoyle** Public Lecture Theatre  
 Friday **M.Hart, R.Landauer and M. Gore** Public Lecture Theatre

**SCIENCE POLICY:** Discussions of the *Physics Strategy Plan* will be held on Monday afternoon (2:00 p.m., Prince Philip Theatre), and on Tuesday evening (8:00 p.m., Prince Philip Theatre).

**STATE RECEPTION:** Monday evening; by restricted invitation only.

**CONGRESS DINNER:** Wednesday evening, 8:00 p.m., Newman College, University of Melbourne; limited to the first 200 applicants. The after-dinner speaker will be **Bob Gifkins** - "Metals Makyth Musick (Molto Scherzando)", and choral interludes will be provided by the *Faye Dumont Singers*.

**PUBLIC LECTURE:** Paul Davies, "Worm Holes and Time Machines" Thursday evening, 8:00 p.m., Public Lecture Theatre.

**MEDALS & PRIZES:** The Thomas Young and Walter Boas Medals will be presented to Dr P. Hariharan during the Plenary Lectures on Wednesday morning. The Massey Prize will be presented to Dr B.H. Briggs during the Plenary Lectures on Thursday morning.

**YOUTH LECTURE:** David Blair, "Black Holes and Gravity Waves" Friday evening, 8:00 p.m., Public Lecture Theatre.

**COMPANIONS' PROGRAM:** Details may be obtained from the Congress desk - see "Useful Information".

# SECTIONS

The 10th National Congress of the AIP is organised around a series of fifteen Sections, each of which has its own program of invited and contributed papers. In addition, each morning the Congress begins (at 8:30 a.m.) with two plenary lectures, which will be given by especially notable physicists and be of general appeal to everyone attending the Congress.

The Sections are listed below; the respective numbers are important to the detailed information in the following pages:

1. Applied & Industrial Physics
2. Astrophysics
3. Optical, Laser and Atomic & Molecular Physics, Millimetre Waves
4. X-ray & Synchrotron Physics
5. Vacuum Society of Australia - First Conference: Electronics Materials Processing, Surface Science, Thin Films and Vacuum Science
6. 5th Gaseous Electronics Meeting and Plasma Processing Workshop
7. Gravitation
8. History of Physics in Australia & New Zealand
9. Medical Physics and Radiation Protection
10. 14th AINSE Nuclear & Particle Physics Conference
11. 1992 Physics Teachers Conference
12. Plasma Physics
13. 3rd Australasian Conference on the Physics of Remote Sensing of Atmosphere & Oceans
14. South Pacific STEP Workshop: Solar-Terrestrial & Space Physics
15. Condensed Matter & Materials Physics

# DAILY PROGRAM

On any given day, Sections have both morning and afternoon sessions unless stated otherwise. Normal session times are:

Plenary lectures: 8:30 - 10:15  
 Morning tea: 10:15 - 10:40  
 Sections: 10:40 - 12:45  
 Lunch: 12:45 - 2:00  
 Sections: 2:00 - 5:30

## MONDAY

Plenary lectures: Prince Philip Theatre  
 8:30 Prof. C.N. Yang  
 9:25 Prof. M. Berry  
 Chair: Dr J. Liesegang & Prof. A.G. Klein

Sections:

3. Atomic & Molecular - Laby
5. Vacuum Society - Latham
6. Gaseous Electronics - Medley
7. Gravitation - Lowe
10. Nuclear & Particle - Hercus
13. Remote Sensing - Rivett
14. STEP Workshop - Lyle

2:00 p.m. Science Policy - Prince Phillip Theatre  
 7:30 p.m. Business Meeting, ST&SP Group

## TUESDAY

Plenary lectures: Prince Philip Theatre  
 8:30 Prof. D.B. Melrose  
 9:25 Prof. D.F. Walls  
 Chair: Prof. A.W. Thomas & Dr P. Hannaford

Sections:

2. Astrophysics (incl. posters) - Lowe
3. Atomic & Molecular - Laby
5. Vacuum Society (incl. posters) - Latham
6. Gaseous Electronics - Medley
9. Medical & Radiation - Old Pathology, Theatre 1
10. Nuclear & Particle - Hercus
- 13&14. Remote Sensing & STEP Workshop - Lyle or Rivett - joint session

Evening: 8:00 p.m. Science Policy Forum - Prince Phillip Theatre

DAILY PROGRAM (CONTINUED)

WEDNESDAY

Plenary lectures: Prince Philip Theatre  
 8:30 Prof. H. Walther  
 9:25 Dr P. Hariharan (Young & Boas Medals)  
 Chair: Prof. R.J. Blin-Stoyle & Prof. J.D. Cashion

Sections:  
 1. Applied & Industrial - Latham  
 4. X-ray & Synchrotron - Old Pathology, Theatre 1  
 5. Vacuum Society - Laby  
 6. Gaseous Electronics - Medley  
 7. Gravitation - Room 360, Physics - p.m. only  
 10. Nuclear & Particle (incl. posters) - Hercus  
 12. Plasma Physics - Lowe - a.m. only  
 13. Remote Sensing (incl. posters) - Rivett  
 14. STEP Workshop (incl. posters) - Lyle

4:30 p.m. General Meeting, Vacuum Society - Laby

8:00 p.m. Congress Dinner - Newman College

THURSDAY

Plenary lectures: Public Lecture Theatre  
 8:30 Dr B.H. Briggs (Massey Prize)  
 9:25 Prof. R.J. Blin-Stoyle *(Lecture read by Alan Jones)*  
 Chair: Prof. R.W. Crompton & Prof. B.H.J. McKellar *(Exec Sec. IOP)*

Sections:  
 1. Applied & Industrial - Latham  
 2. Astrophysics - Lowe - a.m. only  
 3. Atomic & Molecular - Laby  
 8. History of Physics - Lowe - p.m. only  
 10. Nuclear & Particle - Hercus  
 11. Physics Teachers (incl. posters) - Public Lecture Theatre  
 13. Remote Sensing - Rivett  
 14. STEP Workshop - Lyle  
 15. Condensed Matter (incl. posters) - Medley

8:00 p.m. Prof. P.C.W. Davies, "Worm Holes & Time Machines" - Public Lecture Theatre

DAILY PROGRAM (CONTINUED)

FRIDAY

Plenary lectures: Public Lecture Theatre  
 8:30 Prof. M. Hart  
 9:25 Dr R. Landauer  
 Chair: Prof. T.F. Smith & Dr M. Gore  
 10:45 Dr M. Gore  
 Chair: Prof. G.I. Opat & Dr J.G. Jenkin

Sections:  
 1. Applied & Industrial (incl. posters) - Latham  
 9. Medical & Radiation - Hercus  
 11. Physics Teachers - Public Lecture Theatre  
 13. Remote Sensing - Rivett  
 14. STEP Workshop - Lyle  
 15. Condensed Matter (incl. posters) - Medley

Evening:  
 8:00 p.m., Dr D. Blair, "Black Holes & Gravity Waves" - Public Lecture Theatre