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# **INTERNATIONAL ASTRONOMICAL UNION**

## **UNION ASTRONOMIQUE INTERNATIONALE**

### **XXIVth GENERAL ASSEMBLY**

**August 7-18, 2000**

**The University of Manchester**

**Manchester**

**United Kingdom**

## PREFACE

The 24th IAU General Assembly will take place at The University of Manchester, Great Britain, during the days August 7-18, 2000. The IAU Executive Committee has met and selected the principal events of the scientific programme, and a great deal of preparatory work has been done by our British hosts. This is the time to inform our colleagues world-wide of the attractions awaiting you in Manchester next year.

Attendance at IAU General Assemblies is upon the invitation of the IAU President, which you will find first in this Special Issue of the Information Bulletin (IB). This IB will give you an overview of the scientific programme of the General Assembly as presently planned. It also contains all information necessary for you to register for the meeting and for planning your scientific presentations and your travel arrangements. Details on other IAU meetings in 2000 will appear in the next issue of the IB, but are already available at the IAU web site.

For easy reference, a brief summary of the main items is given on p. 5, while more detailed information is given in the following sections, and *Registration & Proceedings Pre-Order* and *Accommodation & Reservation Forms* are found in the middle of this IB. There, you will also find a welcome message by our hosts which will whet your appetite for the upcoming attractions and thoroughly dispel any historically-based prejudice that you might have about Manchester as a meeting venue!

Following the successful format of the last two General Assemblies, the 24th GA will feature a well-balanced scientific programme including five Symposia, three Invited Discourses, 14 Joint Discussions and a Special Session. The numerous meeting rooms available at the University make it possible to accommodate a significant number of additional events organised by individual Divisions, Commissions, or Working Groups. Proposals for such events will be collected by the Secretariat shortly.

Another attraction of The University of Manchester is the availability of a very large number of low-cost student accommodations, most of them modern and very convenient. To further assist qualified colleagues in attending the General Assembly, the IAU will again offer a limited number of Travel Grants to participants who plan to take active part in the scientific events, but cannot obtain the necessary funding from national sources. Guidelines and a form for applications for such grants are included in this IB; the deadline for submission is **February 15, 2000**.

This issue of the IB contains such information as is available at this time; it should be sufficient for you to plan your attendance. Any new and updated information will be given in IB 86 and IB 87 (January and June 2000). In parallel, a special Web site ([www.iau-ga2000.org](http://www.iau-ga2000.org)) has been set up for the 24th GA, with two-way links to the IAU page ([www.iau.org](http://www.iau.org)), where these IBs will also be

available on-line. This site will provide updated information on the scientific programme as well as on practical matters, and will also offer on-line registration and reservation services.

Our British hosts and we at the IAU Secretariat look forward to welcoming you to an exciting and enjoyable two weeks in Manchester next year!

Johannes Andersen  
General Secretary

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## **INVITATION BY THE IAU PRESIDENT**

The XXIVth General Assembly of the International Astronomical Union will be held at The University of Manchester, United Kingdom, August 7-18, 2000. Thus, the IAU returns to Great Britain for its third General Assembly there, 75 years after the second General Assembly in Cambridge in 1925 and 30 years after the XIVth General Assembly in Brighton in 1970. Having attended the second of these, I have no doubt that this will be an equally memorable event. I take great pleasure in inviting all IAU members and many other astronomers and students to join me there for two weeks of scientific adventure.

A full and exciting scientific programme is indeed the hallmark of the IAU General Assemblies, further enhanced in recent years by the addition of the year's IAU Symposia before and after the Assembly itself. The Executive Committee was gratified to receive a great many excellent proposals for the main events at next year's General Assembly. As you will see, the programme finally selected is scientifically wide ranging, from cosmology to planets to atomic physics, and is well balanced. The adjacent facilities of the University will allow for an additional menu of more specialised meetings in smaller groups, including the preparation of official matters within the responsibilities of the IAU.

In today's booming jungle of specialised topical meetings, the IAU General Assemblies are unique in offering not only a large variety of these, but also the freedom to drop in, at will, at meetings far from your own field to get a new perspective on our science. The Invited Discourses provide overviews of active scientific areas by some of the most distinguished scientists in these disciplines. Astronomers from different fields meet to discuss astronomy education in both developing and developed countries. And ideas are discussed, sometimes decades in advance, concerning scientific facilities of the future and the science to be done with them. With typically some 2,000 friends from the whole world around, there is never a dull moment!

Our Special Information Bulletin and special web pages give you the details of the programme, how to get your registration, and how to organise your trip to the General Assembly. I look forward to seeing a great many of you in Manchester next year.

Robert P. Kraft

President

## **HOST ORGANISATIONS**

Royal Society & Royal Astronomical Society

**NATIONAL ORGANISING COMMITTEE (NOC)**

<i>Chair</i> Professor C. Jordan	University of Oxford
Professor J.C. Brown	University of Glasgow
Professor R.D. Davies	University of Manchester
Mr. J.E.J. Lane	Royal Astronomical Society
Professor M.S. Longair	University of Cambridge
Professor Sir Bernard Lovell	University of Manchester
Dr. D. McNally	University College London
Dr. J. Mitton	Royal Astronomical Society
Dr. S.A. Mitton	Cambridge University Press
Dr. P.C.A. Moore	Royal Astronomical Society
Dr. M.J. Penston	University of Cambridge
Professor K.A. Pounds	University of Leicester
Professor Sir Martin Rees	University of Cambridge
Ms. M. Sarjeant	World Event Management Ltd.
Dr. D. Walsh	University of Manchester
Professor D.A. Williams	University College London

**LOCAL ORGANISING COMMITTEE (LOC)**

<i>Co-Chairmen</i> Professor R.D. Davies & Dr. D. Walsh	University of Manchester
Ms. C. Bolton	University of Manchester
Mr. J.E.J. Lane	Royal Astronomical Society
Professor J. Meaburn	University of Manchester
Professor T. Millar	UMIST

## WELCOME BY THE LOCAL ORGANIZING COMMITTEE

We look forward to seeing you in August 2000 for the General Assembly. Welcome to the United Kingdom, and welcome to Manchester.

We are confidently expecting a most successful XXIVth General Assembly following the recent assemblies in The Hague and Kyoto which had their own individual atmospheres and styles. We will be continuing the format, incorporating the Symposia, which has proved very popular; in the case of Manchester this will include 3 Symposia at the beginning and 2 at the end.

In moving with the times, electronic communication of housekeeping and scientific information will be a feature of this meeting. For this purpose, a General Assembly web site has been set up at [www.iau-ga2000.org](http://www.iau-ga2000.org), which will be fully developed by October 16, 1999. It will contain more information than is available now and printed in this issue, and will be updated from time to time.

The "housekeeping" information includes the accommodation, the programme of visits and information to help you move about Manchester. A wide selection of hotels and University accommodation to meet your choice is offered. Likewise, the programme of visits (the social programme) provides inexpensive outings to local places as well as more ambitious tours to distant attractions with an astronomical interest. Free trips to Jodrell Bank and the 250 ft radio telescope will also be offered.

Preliminary scientific programmes of the Symposia, Joint Discussions, and Special Session are given in this IB; regular updates will be available on the WWW. Abstracts of oral presentations and poster papers will also be posted on the web after they are selected by April 2000.

As an additional service, we are providing electronic registration and accommodation/tour reservation procedures. Should you register by the WWW or e-mail, only credit cards are acceptable, however. The LOC has selected *World Event Management* as conference organizers. They will be handling the registration and reservations.

The Whitworth Hall, a landmark Victorian building within The University of Manchester, will be the focal point of the General Assembly. It will accommodate the registration, travel and information desks, the mail boxes and exhibitions. The Symposia and Joint Discussions will be held in lecture halls of the University and auditoria of the adjacent Royal Northern College of Music; poster display areas are in nearby rooms.

A welcome reception is planned for the first week. The closing dinner will be held in the second week. More information about these events will be given later.

The UK astronomical community is pleased to be hosting the General Assembly. The Royal Society has charged the Royal Astronomical Society with setting up the National Organising Committee and the LOC. We hope all the participants will enjoy the General Assembly as well as its associated cultural and social events.

With best wishes

Rodney Davies  
Dennis Walsh Co-Chairmen of the LOC

## IMPORTANT DATES AND ADDRESSES

### MAIN DEADLINES

Submission of Abstracts (oral and poster papers) to Symposium & JD SOCs	February 15, 2000
Grant Applications to SOC Chairs (Symposia) or GS (others)	February 15, 2000
Deadline for Early Registration	May 1, 2000
Submission of Abstracts of Accepted Papers ( <i>NB:</i> <i>Registration required!</i> )	June 15, 2000
Closing Date for Pre-Registration	July 14, 2000
Deadline for Registration Refunds	July 21, 2000
On-site Registration Open From	Saturday August 5, 2000

### ADDRESSES

*For inquiries concerning the scientific programme of the Symposia and Joint Discussions held at the XXIVth General Assembly, please see the contact addresses given in this IB (pp. 10-39).*

*For inquiries concerning administrative matters and the general programme of scientific and other meetings held at the XXIVth General Assembly, please contact:*

Johannes Andersen, General Secretary	Tel: +33 1 43 25 8358
International Astronomical Union (IAU)	Fax: +33 1 43 25 2616
98bis, Bd Arago	E-mail: <a href="mailto:iau@iap.fr">iau@iap.fr</a>
F - 75014 Paris, France	WWW: <a href="http://www.iau.org">http://www.iau.org</a>

*For all inquiries concerning registration and local arrangements in Manchester, please contact:*

World Event Management (GA 24)	Tel: +44 1274 854116
Network House	Fax: +44 1274 854110
West 26	E-mail: <a href="mailto:enquiries@iau-ga2000.org">enquiries@iau-ga2000.org</a>
Cleckheaton	WWW: <a href="http://www.iau-ga2000.org">http://www.iau-ga2000.org</a>
West Yorkshire, BD19 4TT	
United Kingdom	

### UPDATED INFORMATION

Updated information on the General Assembly will be given in IB 86 and IB 87 (January and June 2000), and will be kept constantly updated at the special GA Web site:

<http://www.iau-ga2000.org>

This site and the permanent IAU Web site ([www.iau.org](http://www.iau.org)) will be linked together and also to web sites giving the updated scientific programmes of the individual events listed in this IB. Mirror web sites will be set up in the USA and Japan to facilitate access from those regions of the world.

## WHAT TO DO TO ATTEND THE XXIVth IAU GENERAL ASSEMBLY:

### A QUICK GUIDE

#### INVITATION

In principle, attendance at an IAU General Assembly is by invitation of the President. Members of the IAU are automatically invited (see p. 1). Authorization to extend this invitation to non-Members is given to the national Adhering Organizations, Presidents of IAU Divisions, and Commissions, and Chairpersons of the Scientific Organizing Committees of the Symposia, Joint Discussions and Special Session at the GA. Persons unable to use these channels should contact the IAU Secretariat in Paris (address on back cover). It should be noted, however, that an invitation to attend the General Assembly does not by itself imply any financial commitment towards the participant by the IAU or the Local Organizing Committee.

#### REGISTRATION

Registration is handled by the appointed Conference Organizer, *World Event Management Ltd.* (WEM). *Registrations* will be received beginning **October 18, 1999**; appropriate instructions and *forms* are provided in this IB; registration is also possible by e-mail and through the GA Web page, [www.iau-ga2000.org](http://www.iau-ga2000.org). The deadline for *Early Registration*, at the favourable rate, is **May 1, 2000**; for pre-registration in general it is **July 14, 2000**. *On-site registration* at the GA venue in Manchester will be open from **Saturday, August 5, 2000**. Note that decisions on approval of oral and poster contributions and on IAU Travel Grants will be provided in time for Early Registration to be made.

#### VISAS

As of August 1999 a Visa will be required by citizens of the following countries to enter the UK: Albania, Algeria, Angola, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, Benin, Bhutan, Bosnia & Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Rep, Chad, China, Columbia, Comores, Congo, Congo Dem. Rep, Cote Ivoire, Cuba, Djibouti, Dominican Rep, Ecuador, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Guinea, Guinea-Bissau, Guyana, Haiti, India, Indonesia, Iran, Iraq, Jordan, Kazakhstan, Kenya, Korea (North), Kuwait, Kyrgyzstan, Laos, Lebanon, Liberia, Libya, Macedonia, Madagascar, Maldives, Mali, Mauritania, Mauritius, Moldova, Mongolia,



Morocco, Mozambique, Myanmar, Nepal, Niger, Nigeria, Oman, Pakistan, Palestinian, Qatar, Romania, Russia, Rwanda, Sao Tome & Principe, Saudi Arabia, Senegal, Sierra Leone, Slovakia, Somalia, Sri Lanka, Sudan, Suriname, Syria, Taiwan, Turkey, Turkmenistan, United Arab Emirates, Uganda, Ukraine, Uzbekistan, Vatican City (service and Emergency Passports), Vietnam, Yemen, Yugoslavia (including passports issued by the former Socialist Federal Republic of Yugoslavia or those issued by the present Yugoslav authorities), and Zambia.

***As Visa Regulations may change, it is strongly recommended that prospective participants check the rules applicable in their case with the British Embassy in their country of residence. This should be done well in advance of their travel, and in no case later than May 1, 2000.***

## SCIENTIFIC CONTRIBUTIONS

If you wish to make a scientific contribution, whether oral or poster, to the scientific events listed in this IB, please contact the appropriate person indicated in the Preliminary Detailed Programme below and provide an abstract of your paper. The Chairpersons of the Scientific Organising Committees will inform you whether your contributions have been accepted, and in which form (oral or poster). In order to have the abstract of your approved contribution included in the Abstract Book, and to have actual poster space allocated in case of posters, your final Abstract ***and your Registration, with payment***, should be submitted ***before June 15, 2000***.

## PROCEEDINGS OF MAIN SCIENTIFIC EVENTS

The Proceedings of the GA Symposia will be published in the regular IAU *Symposium Series*. Extended summaries of the Invited Discourses, Joint Discussions, and the Special Session will be published in the *Highlights of Astronomy, Vol. 12*. The IAU Publisher, the ***Astronomical Society of the Pacific***, offers participants the option to pre-order one or more of these volumes at the lowest available rate, with the extra bonus that surface mailing of the book(s) will be included in the prices. See the *Registration & Proceeding Pre-Order Form* for details.

## TRAVEL GRANTS

The IAU devotes a sizeable share of its own budget, with generous extra subventions by major astronomical organizations, to support a limited number of prospective participants intending to contribute actively to the scientific events of the General Assembly, but unable to obtain the necessary support from national sources. An *IAU Travel Grant Application Form* is included in this IB and is also available on the Web together with the Rules for IAU Scientific Meetings, with guidelines for the allocation of such grants. If you wish to apply for IAU support, the form should be submitted to the SOC Chair of the appropriate Symposium that you wish to attend. For all other events, your application should be submitted to the IAU General Secretary. ***The deadline for all IAU Travel Grant applications is February 15, 2000.***

Prospective applicants should be aware that, despite our commitment of both our own and externally contributed funds, it is only possible to cover a small part of the total justified needs. Only truly deserving applicants can therefore expect support from the IAU. Grant recommendations from all events are checked and coordinated before award letters are sent out so that, at most, a single grant will be awarded to each individual. Grants will normally be paid to the successful applicant, in cash and in British Pounds, upon arrival and check-in at the registration

desk.

## MORE INFORMATION

For more information, see the rest of this IB. Updated information will be provided in IB 86 and IB 87 (January and June 2000) and will be maintained at the web site listed above and through the standard IAU web site.

## OVERVIEW OF SCIENTIFIC PROGRAMME

### INVITED DISCOURSES

ID 1	An Accelerating Universe? Evidence from Supernovae	R.P.Kirshner
ID 2	Extrasolar Planetary Systems	M. Mayor
ID 3	The Three-Dimensional Structure of our Galaxy	M.A.C. Perryman

### SYMPOSIA

S 201	New Cosmological Data and the Values of the Fundamental Parameters
S 202	Planetary Systems in the Universe
S 203	Recent Insights into the Physics of the Sun and Heliosphere: Highlight from SOHO and other Space Missions
S 204	The Extragalactic Infrared Background and its Cosmological Implications
S 205	Galaxies and their Constituents at the Highest Angular Resolution

### JOINT DISCUSSIONS

JD 1	Atomic and Molecular Data for Astrophysics: New Developments, Case Studies and Future Needs
JD 2	Models and Constants for Sub-microarcsecond Astrometry
JD 3	Massive Star Birth
JD 4	The Transneptunian Population
JD 5	Mixing and Diffusion in Stars: Theoretical Predictions and Observational Constraints
JD 6	Applied Historical Astronomy
JD 7	The Sun and Space Weather

- JD 8 Oxygen Abundances in Old Stars and Implications to Nucleosynthesis  
and Cosmology
- JD 9 Cold Gas and Dust at High Redshift
- JD 10 Cluster Mergers and their Connection to Radio Sources
- JD 11 First Results from the FUSE Mission
- JD 12 Highlights of Planetary Exploration from Space and from Earth
- JD 13 HIPPARCOS and the Luminosity Calibration of the Nearer Stars
- JD 14 The Origins of Galactic Magnetic Fields

## SPECIAL SESSION

SPS Astronomy for Developing Countries

## PRELIMINARY DETAILED SCIENTIFIC PROGRAMME: SYMPOSIA

### S 201: NEW COSMOLOGICAL DATA AND THE VALUES OF THE FUNDAMENTAL PARAMETERS

*Organizing Commission:* 47 Cosmology

*Coordinating Division:* VIII Galaxies & the Universe

*Participating Commissions:* 9 Instruments  
28 Galaxies  
40 Radio Astronomy

*SOC:* J.R. Bond (Canada), I.W.A. Browne (UK), R.S. Ellis (UK), M.W. Feast (S. Africa), R.P. Kirshner (USA), A.N. Lasenby (UK, *Chair*), I.D. Novikov (Denmark), R.B. Partridge (USA), P.J.E. Peebles (USA), P. Schneider (Germany), V.L. Trimble (IAU, ex officio), N. Vittorio (Italy)

*Editors of Proceedings:* A.N. Lasenby (*Chief Editor*), A. W. Jones & A. Wilkinson

*Contact Address:* R.D. Davies, Nuffield Radio Astronomy Laboratories, Jodrell Bank, Macclesfield, Cheshire, SK11 9DL, UK

*Tel.:* +44 1477 571321; *Fax:* +44 1477 571618; *E-mail:* [rdd@jb.man.ac.uk](mailto:rdd@jb.man.ac.uk)

Each day there will be plenary review talks on topics of current interest and invited and contributed talks on specific areas. There will be space available for posters, and it is hoped to publish the poster abstracts. The broad distribution by subject and day is outlined below.

*Monday, August 7, afternoon* : **Session I**

Introductory review

Predictions from the early universe: Inflation, tensor components, CMB polarization, topological defect theories

Primordial CMB observations: Ground-based, balloon, satellite

*Tuesday, August 8, morning* : **Session II**

Primordial CMB observations (Cont.)

Future CMB instruments

Interpreting CMB data: Problems with foregrounds, spinning dust, polarization foregrounds

*Tuesday, August 8, afternoon* : **Session III**

Large scale structure: First results from large redshift surveys, comparison with numerical simulations, deriving the matter power spectrum, velocity flows, cluster evolution and abundances

*Wednesday, August 9, morning* : **Session IV**

Determination of  $H_0$ : New distance ladder results, physical methods (lensing, Sunyaev-Zeldovich)

Evidence for non-zero  $L$  : Supernovae results, constraints from lensing, equation of state of the universe

*Wednesday, August 9, afternoon*

Opening Ceremony and First Session of the General Assembly

*Thursday, August 10, morning : Session V*

Dark matter and  $W_0$ :

Theoretical progress: Weak and strong lensing, direct astrophysical searches, (MACHOs etc.), direct detection, neutrino mass,  $W_0$  via cluster abundances and blind Sunyaev-Zeldovich surveys

*Thursday, August 10, afternoon : Session VI*

Dark matter and  $W_0$  (Cont.)

Putting it all together: Problems of large dataset analysis, joint constraints using CMB, LSS, supernovae, lensing etc.; the values of the main cosmological parameters

*Friday, August 11, morning : Session VII*

Prospects for the future: New observational approaches, new theoretical insights and outstanding problems

Final review, poster reportage, concluding remarks/panel

**S 202: PLANETARY SYSTEMS IN THE UNIVERSE**

<i>Organizing Commission:</i>	16 Study of Planets & Satellites
<i>Coordinating Division:</i>	III Planetary Systems Sciences
<i>Participating Divisions:</i>	VI Interstellar Matter
	X Radio Astronomy
<i>Participating Commissions:</i>	9 Instruments
	51 Bioastronomy: Search for Extraterrestrial Life

*SOC:* R. Angel (USA), I. Appenzeller (IAU, exofficio), P. Artymowicz (Sweden), A. Boss (USA), A. Burrows (USA), D. Gautier (France), A.-M. Lagrange (France), M. Mayor (Switzerland), Y. Nakagawa (Japan), A.J. Penny, (UK, *Chair*), S. Russell (UK), P. Sackett (Netherlands) & G. Wuchterl (Austria)

*Editors of Proceedings:* A. Penny (*Chief Editor*), P. Artymowicz, A.-M. Lagrange & S. Russell

*Contact address:* A. Penny, Rutherford Appleton Laboratory, Chilton, Didcot OX11 0QX, UK

*Tel.:* +44 1235 445675; *Fax:* +44 1235 446667; *E-mail:* [alan.penny@rl.ac.uk](mailto:alan.penny@rl.ac.uk)

*Web site:* <http://ast.star.rl.ac.uk/symp202>

The number of talks is limited to give plenty of discussion time. The talks are in part reviews, and the session chairs will highlight the poster papers relevant to each session. So we hope both for many poster papers and that their presenters will take an active part in the discussions. Poster papers will be allocated space in the published proceedings, and the discussions will also be fully reported there. The schedule has some space for reports on discoveries, observations and theories made after this schedule was submitted on 1999 September 1.

*Monday, August 7, morning*

### **1. DISCOVERY AND STUDY OF EXTRASOLAR PLANETS - CURRENT**

Radial velocity searches - I	M. Mayor ( <i>Switzerland</i> )
Radial velocity searches - II	P. Butler ( <i>USA</i> )
Texas and ESO radial velocity programs - I	W. Cochran ( <i>USA</i> )
Radial velocity program - II	TBA
Microlensing searches	P. Sackett ( <i>Netherlands</i> )

*Monday, August 7, afternoon*

Transit searches	T. Brown ( <i>USA</i> )
Astrometric searches	TBA

### **2. PROGRESS IN THE THEORY OF PLANET FORMATION**

Constraints from solar system observations	F. Robert ( <i>France</i> )
Timescales in the early solar system	S. Russell ( <i>UK</i> )

*Tuesday, August 8, morning*

Modes of gaseous planet formation	A. Boss ( <i>USA</i> )
Growth and interactions of planets	P. Artymowicz ( <i>Sweden</i> )
Orbital evolution	W. Benz ( <i>Switzerland</i> )
Terrestrial planet formation	S. Ida ( <i>Japan</i> )

*Tuesday, August 8, afternoon*

Gas giant planet evolution	G. Wuchterl ( <i>Austria</i> )
Dust disk observation and theory	S. Dermott ( <i>USA</i> )

### **3. STRUCTURE AND ATMOSPHERES OF PLANETS**

Thermal spectra of giant planets	A. Burrows ( <i>USA</i> )
Composition of extrasolar giant planets	T. Guillot ( <i>France</i> )

*Wednesday, August 9, morning*

Albedos and reflection spectra of giant planets	M. Marley ( <i>USA</i> )
Terrestrial planet atmospheres and life	T. Owen ( <i>USA</i> )

**4. PROTOPLANETARY AND BETA PIC DISKS**

Nebula formation  
Dust in protoplanetary disks

Y. Nakagawa (*Japan*)  
S. Beckwith (*USA*)

*Wednesday, August 9, afternoon*

Opening Ceremony and First Session of the General Assembly

*Thursday, August 10, morning*

Disk imaging  
b Pic spectra

K. Stapelfeldt (*USA*)  
A.-M. Lagrange (*France*)

**5. DISCOVERY AND STUDY OF EXTRASOLAR PLANETS - FUTURE**

Ground and space imaging searches  
Ground interferometric searches

R. Angel (*USA*)  
A. Glindeman (*Germany*)

*Thursday, August 10, afternoon*

Space transit searches  
Space astrometric searches  
Space interferometric searches  
Exobiology implications of planetary work

A. Léger (*France*)  
M. Shao (*USA*)  
C. Beichman (*USA*)  
TBA

**S 203: RECENT INSIGHTS INTO THE PHYSICS****OF THE SUN AND HELIOSPHERE:****HIGHLIGHTS FROM SOHO AND OTHER SPACE MISSIONS**

<i>Organizing Commission:</i>	12 Solar Radiation & Structure
<i>Coordinating Division:</i>	II Sun & Heliosphere
<i>Participating Commissions:</i>	10 Solar Activity
	36 Theory of Stellar Atmospheres
	44 Space & High Energy Astrophysics
	49 The Interplanetary Plasma & the Heliosphere

*SOC:* B. Fleck (ESA, *Co-chair*), P. Foukal (USA), C. Froehlich (Switzerland). A. Gabriel (France), J. Gurman (USA, *Co-Chair*), R. Harrison (UK), E. Marsch (Germany), G. Poletto (Italy), V. Obridko (Russia), P. Scherrer (USA), K. Schrijver (USA), G.E Simnett (UK), T. Watanabe (Japan) & L. Woltjer (IAU, *ex officio*)

*Editors of Proceedings:* P. Brekke (*Chief Editor*), B. Fleck & J. Gurman

*Contact Address:* B. Fleck, ESA Space Science Department, Goddard Space Flight Center, Code 682.3, Greenbelt MD 20771, USA

Tel: +1 301 286 2455; Fax: +1 301 286 0264; E-Mail: [iau203@esa.nascom.nasa.gov](mailto:iau203@esa.nascom.nasa.gov)

Web site: [http://sohowww.nascom.nasa.gov/meetings/IAU\\_Symp203](http://sohowww.nascom.nasa.gov/meetings/IAU_Symp203)  
or: [http://sohowww.estec.esa.nl/meetings/IAU\\_Symp203](http://sohowww.estec.esa.nl/meetings/IAU_Symp203)

*Monday, August 7, morning (11:00)*

### **GLOBAL STRUCTURE AND EVOLUTION OF THE SOLAR INTERIOR**

- |   |   |                                   |
|---|---|-----------------------------------|
| R | The new era in helioseismology                | Douglas Gough ( <i>UK</i> )       |
| R | A new class of solar oscillation measurements | J. Schou ( <i>USA</i> )           |
| R | Recent progress in solar interior modeling    | S. Turck-Chièze ( <i>France</i> ) |

*Monday, August 7, afternoon*

- |   |                                     |  |
|---|-------------------------------------|--|
| R | Recent progress in asteroseismology | J. Christensen-Dalsgaard* ( <i>Denmark</i> ) |
| R | Solar irradiance variability        | J. Lean ( <i>USA</i> )                       |
| C | Spectral irradiance variations      | S. Solanki ( <i>Switzerland</i> )            |
| R | Stellar irradiance variations       | R. Radick* ( <i>USA</i> )                    |

*Tuesday, August 8, morning*

### **CONVECTION ZONE AND LOCAL AREA HELIOSEISMOLOGY**

- |   |  |   |
|---|--|---|
| R | Simulations of turbulent convection            | J. Toomre* ( <i>USA</i> )                                     |
| R | The solar and astrophysical dynamos            | A. Brandenburg ( <i>UK</i> )                                  |
| R | New developments in Local Area Helioseismology | T. Duvall ( <i>NASA/GSFC</i> ) & A. Kosovichev ( <i>USA</i> ) |

*Tuesday, August 8, afternoon*

### **ACTIVE REGION STRUCTURE AND DYNAMICS**

- |   |   |   |
|---|---|---|
| R | The new picture of solar magnetic field dynamics from TRACE | A. Title ( <i>USA</i> ) & K. Schrijver ( <i>USA</i> ) |
| R | One solar cycle of soft X-ray observations by Yohkoh/SXT    | H. Hara ( <i>Japan</i> )                              |
| R | Spectroscopy of active stars and stellar prominences        | A. Collier-Cameron* ( <i>UK</i> )                     |
| C | One solar cycle of Yohkoh/HXT flare observations            | T. Sakao ( <i>Japan</i> )                             |

*Wednesday, August 9, morning*

### **STRUCTURE AND DYNAMICS OF THE TRANSITION REGION AND CORONA**

- |   |                                    |                                    |
|---|------------------------------------|------------------------------------|
| R | The time variable solar atmosphere | O. Kjeldseth Moe ( <i>Norway</i> ) |
| R | Element abundances                 | H. Mason* ( <i>UK</i> )            |
| R | Coronal Mass Ejections             | C. St. Cyr ( <i>USA</i> )          |

*Wednesday, August 9, afternoon*



## Opening Ceremony and First Session of the General Assembly

*Thursday, August 10, morning***CORONAL HEATING AND SOLAR WIND ACCELERATION**

- |   |                                |
|---|--------------------------------|
| R Observations and Models of the fast and slow solar wind | E. Marsch ( <i>Germany</i> )   |
| R Observations and Models of Coronal Heating              | M. Velli ( <i>Italy</i> )      |
| R Stellar Coronae and Stellar Winds                       | J. Schmitt* ( <i>Germany</i> ) |

*Thursday, August 10, afternoon***THE SOLAR WIND AND HELIOSPHERE**

- |  |                                    |
|--|------------------------------------|
| R Highlight Results from Ulysses                                   | R. Marsden<br>( <i>ESA/ESTEC</i> ) |
| R Element, isotopic and charge state composition of the solar wind | A. Galvin ( <i>USA</i> )           |
| R Heliospheric signatures of coronal mass ejections                | J.-L. Bougeret ( <i>France</i> )   |

*Friday, August 11, morning***ENERGETIC PARTICLES AND THE LOCAL INTERSTELLAR MEDIUM**

- |   |                                |
|---|--------------------------------|
| R Particle acceleration on the Sun and in the heliosphere | E. Roelof* ( <i>USA</i> )      |
| R Particle acceleration in the universe                   | J. Arons ( <i>USA</i> )        |
| C The heliospheric magnetic field and its coronal origin  | T. Zurbuchen ( <i>USA</i> )    |
| C The local interstellar medium                           | R. Lallement ( <i>France</i> ) |

- R Invited Review: 45 min including discussion  
 C Solicited Contributed Paper: 30 min including discussion  
 \* Speaker subject to confirmation

**S 204: THE EXTRAGALACTIC INFRARED BACKGROUND  
 AND ITS COSMOLOGICAL IMPLICATIONS**

*Organizing Commission:* 21 Light of the Night Sky  
*Coordinating Division:* VIII Galaxies and the Universe  
*Participating Commissions:* 47 Cosmology  
 28 Galaxies

*SOC:* C.S. Bowyer (USA), C. Cesarsky (IAU, ex officio), A. Franceschini (Italy), M. Hauser (USA), M. Harwit (USA, *Chair*), D. Lemke (Germany), T. Matsumoto (Japan), P.J.E. Peebles (USA), M. Rowan-Robinson (UK), P. Shaver (USA), A. Szalay (USA) & R. Sunyaev (Russia)  
*Editors of Proceedings:* M. Harwit (*Chief Editor*) & M. Hauser

*Contact address:* Martin Harwit, 511 H Street SW, Washington DC 20024-2725, USA  
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Web site: <http://www.iau.org/symp204>

There will be five-minute summaries of selected posters at the end of each main session.

*Tuesday, August 15, morning : Session 1*

**INTRODUCTORY OVERVIEW OF OUR UNIVERSE**

Keeping Book on the Universe - Where We Stand at the Start of this Symposium (50 min) P. J. E. Peebles (USA)

**OBSERVING AND MODELING THE FOREGROUND EMISSION (20 min/talk)**

Modeling the Zodiacal Dust Cloud L. Ozernoy (USA)  
 The Diffuse Near- and Mid-Infrared Emission from the Galaxy M. Cohen (USA)  
 The Diffuse Far-Infrared Emission from the Galaxy F. Boulanger (France)  
 Dust in Clusters of Galaxies and the Sunyaev - Zel'dovich Effect M. Giard (France)

*Tuesday, August 15, afternoon : Session 2*

**THE OBSERVED DIFFUSE EXTRAGALACTIC BACKGROUND (20 min/talk)**

The Most Distant Galaxies: Colors, Number Counts and Fluxes L. Pozzetti (Italy)  
 Observations of the Near-Infrared Background Radiation T. Matsumoto (Japan)  
 The Far-Infrared and Submillimeter Diffuse Extragalactic Background M. Hauser (USA)  
 The Extragalactic Background at UV, X-ray and  $\gamma$ -ray Energies C.S. Bowyer (USA)  
 The Evidence from TeV Gamma Radiation F. Stecker (USA)

*Wednesday, August 16, morning : Session 3*

**TODAY'S GALAXIES AND THEIR APPARENT EVOLUTION (20 min/talk)**

The Relation between Damped Ly- $\gamma$  Systems and Today's Galaxies P. Salucci (Italy)  
 The Nature of Normal Galaxies in the Infrared G. Helou (USA)  
 The Nature of Ultraluminous Galaxies R. Genzel (Germany)  
 Evolving Galaxies & Their Contribution to Background Radiation A. Franceschini (Italy)

**OBSERVED EXTRAGALACTIC SOURCE COUNTS (20 min/talk)**

2MASS Survey: Contributions of Discrete Sources to the Background M. Skrutskie (USA)  
 The Sloan Survey A. Szalay (USA)  
 Deep Near-Infrared Surveys and Source Counts C. Cesarsky (France/ESO)

*Thursday, August 17, morning : Session 4*

Gravitational Lensing and Deep Infrared Surveys L. Metcalf (Ireland/ESA)

Far-Infrared Source Counts and the Diffuse IR Background	J.-L. Puget ( <i>France</i> )
Serendipitous IR Surveys and the Extragalactic Background	D. Lemke ( <i>Germany</i> )
SCUBA SMM Surveys: Source Contributions to the Background	M. Rowan-Robinson ( <i>UK</i> )
Galaxy Evolution in the Optical Through the Submillimeter:	S. Lilly ( <i>Canada</i> )

*Thursday, August 17, afternoon : Session 5*

**THE EVIDENCE FROM CHEMICAL EVOLUTION AND METALLICITIES** (20 min/talk)

Heavy Element Production Rates at Different Cosmological Epochs	M. Pettini ( <i>UK</i> )
Abundances of Light Elements through Si, at Substantial Redshifts	L. Cowie ( <i>USA</i> )
The Oldest Stars as Tracers of Heavy Element Formation at Early Epochs	J. Truran ( <i>USA</i> )
Elemental Abundances from Intracluster X-ray Emission	R. Mushotzky ( <i>USA</i> )

**GALAXY & STAR FORMATION: EPOCHS AND RATES** (20 min/talk)

The Nature of the Most Distant Galaxies and Quasars	C. Steidel ( <i>USA</i> )
Deep Surveys and Star Formation Rates at Different Cosmological Epochs	P. Madau ( <i>UK</i> )
The Background Radiation Resulting from the Global History of Gas Consumption, and Metal and Dust Production in Galaxies	M. Fall ( <i>USA</i> )

*Friday, August 18, morning : Session 6*

**THEORETICAL PREDICTIONS** (20 min/talk)

The Role of Dust in Producing the Extragalactic Diffuse Background	E. Dwek ( <i>USA</i> )
The Role of Relativistic Processes in Producing the Background	P. Biermann ( <i>Germany</i> )
The Reionization Epoch and its Detectability	P. Shaver ( <i>Germany</i> )
Far-Infrared and Submillimeter Sources and their Effects on Attempts to Derive Cosmological Information from Fluctuations in the Background	J. Silk ( <i>USA</i> )

**THE DECADE AHEAD: CONTRIBUTIONS FROM NEW OBSERVATORIES** (15 min)

IRTF Mission	M. Werner ( <i>USA</i> )
An Advanced All-Sky Survey with the IRIS Mission	H. Shibai ( <i>Japan</i> )
The NGST Mission	J. Mather ( <i>USA</i> )

*Friday, August 18, afternoon : Session 7*

The MAP Mission	E.L. Wright ( <i>USA</i> )
The FIRST Mission	G. Pilbratt ( <i>Netherlands</i> )
The Planck Mission	J. Tauber ( <i>Netherlands</i> )
<b>SUMMARY OF THE CONFERENCE</b> (50 min)	M. Longair ( <i>UK</i> )

**S 205: GALAXIES AND THEIR CONSTITUENTS  
AT THE HIGHEST ANGULAR RESOLUTIONS**

<i>Organizing Commission:</i>	40 Radio Astronomy
<i>Coordinating Division:</i>	X Radio Astronomy
<i>Supporting Commissions:</i>	28 Galaxies
	34 Interstellar Matter
	44 Space & High Energy Astrophysics

*SOC:* W.A. Baan (Netherlands), S.A. Baum (USA), M. Dopita (Australia), N. Duric (USA), M. Elvis (USA), H. Hirabayashi (Japan), N. Kardashev (IUA, ex officio), F. Paresce (Italy), R. Schilizzi (Netherlands, *Chair*), P. Shaver (Germany), S. Vogel (USA), P. von Ballmoos (France) & P.N. Wilkinson (UK)

*Editor of Proceedings:* R.T. Schilizzi (*Chief Editor*), S. Vogel, F. Paresce & M. Elvis

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*Web site:* <http://www.nfra.nl/jive/iausymp.htm>

With comparable sub-arcsecond angular resolution data across most of the electromagnetic spectrum, astronomers now have access to complementary high angular resolution data on a broad range of astronomical targets including young stars, jets and protoplanetary disks; evolved stars and winds; binary stars; micro-quasars; novae; supernovae; galactic and extragalactic masers and megamasers; starburst and the many other types of galaxies.

We plan to take a high angular resolution cut through observational parameter space to explore the relationships amongst the various constituents and physical processes in galaxies throughout the observable universe. We will also consider the prospects for future high angular resolution instrumentation for imaging and astrometry across the spectrum. Each session will have at least one review or invited talk with the remainder of the time available for contributed papers on sub-arcsecond observations, theory, and instrumental developments.

*Tuesday, August 15, morning*

**THE CENTRAL PARSEC OF GALAXIES**

R Energy release and transport processes in the centres of galaxies

I The centre of our own galaxy

*Tuesday, August 15, afternoon*

**STAR FORMATION REGIONS AND OUTFLOW PROCESSES**

- R Energy release and transport processes in and around stars
- I Small-scale structure in galactic objects deduced from X- and g -ray timing measurements

*Wednesday, August 16, morning*

**THE CENTRAL KILOPARSEC OF GALAXIES**

- R The central kiloparsec of external galaxies
- I Gas and dust in the environment of the central engine

*Wednesday, August 16, afternoon*

Second Session of the General Assembly and Closing Ceremony

*Thursday, August 17, morning*

**PROSPECTS FOR HIGH ANGULAR RESOLUTION INSTRUMENTATION**

- R The power of multi-wavelength studies of the universe
- I Metre and centimetre wavelengths
- I Millimetre and sub-millimetre wavelengths
- I Infrared
- I Optical
- I X-ray
- I Gamma ray
- I Astrometry

*Thursday, August 17, afternoon*

**SUPERNOVAE, PULSARS, AND THE INTERSTELLAR MEDIUM**

- I Extragalactic supernovae and the star formation rate
- I Chandra imaging of galactic objects

Poster session *Friday, August 18, morning*

**MOLECULES IN EXTERNAL GALAXIES**

- I Megamasers and their host galaxies
- I High resolution studies of molecules in external galaxies

*Friday, August 18, afternoon*

**STARS AND STELLAR ATMOSPHERES**

- R High resolution studies of stellar atmospheres
- R Review
- I Invited talk

**PRELIMINARY DETAILED SCIENTIFIC PROGRAMME:**

**JOINT DISCUSSIONS**

**JD1: ATOMIC AND MOLECULAR DATA FOR ASTROPHYSICS:  
NEW DEVELOPMENTS, CASE STUDIES AND FUTURE NEEDS**

<i>Organizing Commission:</i>	14 Atomic & Molecular Data
<i>Participating Division:</i>	III Planetary Systems Sciences
	VI Interstellar Matter/Commission 34
	X Radio Astronomy/Commission 40
	XI Space & High Energy Astrophysics/Commission 44
<i>Participating Commissions:</i>	15 Physical Study of Comets, Minor Planets & Meteorites
	16 Physical Study of Planets & Satellites
	29 Stellar Spectra
	36 Theory of Stellar Atmospheres

*SOC:* S.K. Atreya (USA), K.A. Berrington (UK), J. Cernicharo (Spain), Th. Henning (Germany), S. Johansson (Sweden), T. Millar (UK), F. Rostas (France, *Chair*), S. Saito (Japan), D. Schultz (USA), P. Smith (USA, *Co-Chair*), W.-U. L. Tchang-Brillet (France), E. van Dishoeck (Netherlands)

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*Wednesday, August 9, morning*

**GRAINS**

Grains in Astronomy: Overview	A. Witt (USA)
Theory of formation	A. Jones (France)
Laboratory simulations	H. Mutschke (Germany)
"GEMS"	J. Bradley (USA)

**ISO // SOFIA // SIRTf**

Ices	E. Dartois (France)
PAHs	TBA
Silicates	R. Waters (Netherlands)
Gas-phase atomic and molecular species	J. Lacy (USA)
<b>CARBON CHAIN MOLECULES</b>	TBA

*Wednesday, August 9, afternoon*

Opening Ceremony and First Session of the General Assembly

*Thursday, August 10, morning***GAS-SURFACE REACTIONS**

Influence on ISM and cometary models

Theory

Laboratory studies

**H<sub>2</sub> IN SPACE**E. Herbst (*USA*)J. Takahashi (*Japan*)W. Schutte (*Netherlands*)D.R. Flower (*UK*)**WATER**H<sub>2</sub>O in Young Stellar ObjectsH<sub>2</sub>O in the sun and starsH<sub>2</sub>O in cometsR. Liseau (*Sweden*)P. Bernath (*Canada*)J. Crovisier (*France*)T. Oka (*USA*)**ASTRONOMY, PHYSICS AND CHEMISTRY OF H<sub>3</sub><sup>+</sup>***Thursday, August 10, afternoon***THE FUSE SPACE MISSION**

Atomic and Molecular Data, Needs and Availability

K. Sembach (*USA*)**THE CHANDRA, ASTRO-E AND XMM SPACE MISSIONS**

Atomic Data Needs and Availability for X-Ray Astronomy

N. Brickhouse (*USA*)**THE FERRUM PROJECT**S. Johansson (*Sweden*)**SOLAR SYSTEM MISSIONS**

Laboratory UV spectroscopy and kinetics for Titan and exobiology

Laboratory chemical kinetics and outer planets

IR spectroscopy and Jupiter

Chemistry and clouds

Atmospheric evolution

F. Raulin (*France*)R. Kaiser (*China*)G. Orton (*USA*)S. Atreya (*USA*)T. Owen (*USA*)**JD2: MODELS AND CONSTANTS FOR****SUB-MICROARCSECOND ASTROMETRY***Organizing**Division:**Participating**Divisions:**Participating**Commissions:*

I Fundamental Astronomy

VIII Galaxies &amp; the Universe

X Radio Astronomy

4 Ephemerides

8 Positional Astronomy

19 Rotation of the Earth

24 Photographic Astrometry  
31 Time

*SOC:* V. Brumberg (Russia), N. Capitaine (France), V. Dehant (Belgium), T. Fukushima (Japan), W. Jin (China), K.J. Johnston (USA, *Chair*), J. Kovalevsky (France), F. Mignard (France), G. Petit (France), M. Soffel (Germany), E. Myles Standish (USA), D. McCarthy (USA), P.K. Seidelmann (USA) & J. Vondrak (Czech R)

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*Thursday, August 10, morning*

9:00	Presentations of Resolutions	K. Johnston (USA)
9:15	Report of IAU Working Group on the International Celestial Reference System	F. Mignard (France)
9:30	Report of IAU Working Group on General Relativity for Space-Time Reference Systems and Metrology	G. Petit (France)
9:45	Report of IAU Working Group on Relativity for Celestial Mechanics and Astrometry	M. Soffel (Germany)
10:00	Report of IAU Working Group on Astronomical Constants	T. Fukushima (Japan)
10:15	Comments/Questions	
11:00	Report of IAU Working Group on Non-Rigid Earth Nutation Theory	V. Dehant (Belgium)
11:20	Definition of the Celestial Ephemeris Pole and the Celestial Ephemeris Origin	N. Capitaine (France)
11:40	Future Coordinated Universal Time	D. McCarthy (USA)
12:00	Summary	K. Johnston (USA)

*Thursday, August 10, afternoon*

14:00	Review of Resolutions/Comments	K. Johnston (USA)
15:30	Adoption of Resolutions	K. Johnston (USA)

### JD3: MASSIVE STAR BIRTH

*Organizing Commission:* 29 Stellar Spectra



<i>Coordinating Division:</i>	IV Stars
<i>Participating Divisions:</i>	VI Interstellar Matter
	X Radio Astronomy
<i>Participating Commissions:</i>	34 Interstellar Matter
	40 Radio Astronomy

*SOC:* E. Churchwell (USA, *Co-Chair*), P. Conti (USA, *Co-Chair*), E. van Dishoeck (Netherlands), J. Dyson (UK), G. Garay (Chile), J. Lequeux (France), K Menten (Germany) & M. Walmsley (Italy).

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*Tel.:* +1 608 262 4909; *Fax:* +1 608 263 6386; *E-mail:* [churchwell@astro.wisc.edu](mailto:churchwell@astro.wisc.edu)

*Thursday, August 10, morning*

### **1. THE NATAL ENVIRONMENT: MOLECULAR CLOUDS AND ENVELOPES**

Structure and conditions in GMCs forming massive stars	J. Williams(USA)
The circumstellar environment of embedded massive stars	L. Mundy (USA)
Chemical variations in the envelopes around massive young stars	E. van Dishoeck (Netherlands)

### **2. THE NON-SPHERICAL ENVIRONMENT: DISCS AND JETS**

MHD ionization fronts	J. Dyson (UK)
Jets and outflows from massive protostars	K. Menten (Germany)
Disks and flows in high-mass Young Stellar Objects	R. Cesaroni (Italy)

*Thursday, August 10, afternoon*

### **3. THE IONIZED ENVIRONMENT: UC HII AND HII REGIONS**

UC HII regions and massive star formation	S. Lizano (Mexico)
UC HII Regions and the earliest stages of massive star evolution	E. Churchwell (USA)
Dust in and around HII regions	Pierre Cox (France)

#### 4. THE STELLAR ENVIRONMENT: EVOLUTION AND OBSERVATIONS

Spectroscopy of the ionizing sources in UC HII regions	M. Hanson (USA)
Formation of massive stars by growing accretion	A. Maeder (Switzerland)
Summary and "Where do we go from here?"	P. Conti (USA)

#### JD4: THE TRANSNEPTUNIAN POPULATION

**(Relations to the Early Evolution of the Solar System, the Origin of Comets  
and the Formation of Circumstellar Disks)**

<i>Organizing Division:</i>	I Fundamental Astronomy
<i>Participating Division:</i>	III Planetary Systems Sciences
<i>Participating Commissions:</i>	7 Celestial Mechanics & Dynamical Astronomy
	15 Physical Study of Comets, Minor Planets & Meteorites
	20 Position & Motions of Minor Planets, Comets & Satellites

*SOC:* P. Artymowicz (Sweden), D.R. Davis (USA), C. Froeschlé (France, *Chair*), D. Jewitt (USA), J.C. Muzzio (Argentina), A. Milani (Italy), B.G. Marsden (USA), H. Rickman (Sweden, *Chair*), R.M. West (ESO) & V. Zappala (Italy)

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[anne.lemaitre@fundp.ac.be](mailto:anne.lemaitre@fundp.ac.be)

*Friday, August 11, morning*

The exploration of the Trans-Neptunian population	B. Marsden (USA)
Dynamical shaping of the Edgeworth-Kuiper Belt	A. Morbidelli (France)
2 contributed papers	
Timescales for planet formation: Constraints from the Kuiper Belt	R. Malhotra (USA)
Dynamical aspects of the accretion of the outer solar system	A. Brunini (Argentina)

*Friday, August 11, afternoon*

Collisional evolution in the Edgeworth-Kuiper Belt	P. Farinella ( <i>Italy</i> )
Dust dynamics of transplanetary disks	B.A.S. Gustafson ( <i>USA</i> )
2 contributed papers	
Scattering of comets from transplanetary disks: the case of the Solar System	H.F. Levison ( <i>USA</i> )
Scattering of comets from transplanetary disks: Application to the bPic System	H. Beust ( <i>France</i> )
Pluto: an Edgeworth-Kuiper Belt object and/or a planet?	M. A'Hearn ( <i>USA</i> )

*Saturday, August 12, morning*

Occurrence rate and lifetime of circumstellar dust disks	P. Artymowicz ( <i>Sweden</i> )
Composition of comets and interstellar dust	P. Ehrenfreund ( <i>Netherlands</i> )
Comets and Circumstellar dust	C. Waelkens ( <i>Belgium</i> )
Physical characteristics of Trans-Neptunian and related objects	Jewitt ( <i>USA</i> )
Observations of Trans-Neptunian objects	A. Fitzsimmons ( <i>UK</i> )
2 contributed papers	

#### **JD5: MIXING AND DIFFUSION IN STARS:**

##### **THEORETICAL PREDICTIONS AND OBSERVATIONAL CONSTRAINTS**

<i>Organizing Commission:</i>	35 Stellar Constitution
<i>Coordinating Division:</i>	IV Stars
<i>Participating Commissions:</i>	26 Double & Multiple Stars
	29 Stellar Spectra
	36 Theory of Stellar Atmospheres
	37 Star Clusters & Associations
	45 Stellar Classification

SOC: G. Da Costa (Australia), R. Mathieu (USA), G. Michaud (Canada), P. North (Switzerland), M. Spite (France), D. Vandenberg (Canada, *Chair*) & J.-P. Zahn (France, *Chair*)

*Editors of Proceedings:* D. Vandenberg (*Chief Editor*) & J.-P. Zahn

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*Friday, August 11, all day*

## **Introduction**

D. Vandenberg (*Canada*)

### **1. OBSERVATIONS OF THE CHEMICAL ABUNDANCES IN STARS**

Population I Main-Sequence Stars	J. Landstreet ( <i>Canada</i> )
Highly Evolved Field Stars	D. Lambert ( <i>USA</i> )
LiBeB in Open Clusters	S. Balachandran ( <i>USA</i> )
Globular Cluster Stars	R.P. Kraft ( <i>USA</i> )
The special case of $\omega$ Centauri	J. Norris ( <i>Australia</i> )
Photometric Evidence for Abundance Anomalies	F. Grundahl ( <i>Canada</i> )

### **2. THEORETICAL PROGRESS TOWARDS UNDERSTANDING THE OBSERVED ABUNDANCES**

Main-Sequence Stars	G. Michaud ( <i>Canada</i> )
Mixing on the Red-Giant Branch	C. Charbonnel ( <i>France</i> )
Rotationally-Mixed Stellar Models	M. Pinsonneault ( <i>USA</i> )
Horizontal Branch Models as a Test of Mixing on the RGB	A. Sweigart ( <i>USA</i> )
Rotation and Mixing in Massive Stars	G. Meynet ( <i>Switzerland</i> )

### **3. THE THEORETICAL UNDERPINNING**

Theoretical Basis for Convective Overshooting	V. Canuto ( <i>USA</i> )
Hydrodynamical Simulations of Mixing	B. Freytag ( <i>Denmark</i> )
Mixing in Magnetized Stellar Radiative Zones	P. Charbonneau ( <i>USA</i> )
Mixing in the Solar Tachocline	S. Brun ( <i>USA</i> )

### **4. GENERAL DISCUSSION AND CONCLUDING REMARKS**

J.-P. Zahn (*France*)

**JD6: APPLIED HISTORICAL ASTRONOMY**

<i>Organizing Commission:</i>	41 History of Astronomy
<i>Participating Divisions:</i>	I Fundamental Astronomy
	II Sun & Heliosphere
	III Planetary Systems Sciences
<i>Participating Commissions</i>	4 Ephemerides
	19 Rotation of the Earth
	20 Position & Motions of Minor Planets, Comets & Satellites

*SOC:* S. Ansari (India), S. Débarbat (France), S. Dick (USA), O. Gingerich (USA), M. Hoskin (UK), Nha Il-Seong (South Korea), W. Orchiston (New Zealand), M. Standish (USA), F.R. Stephenson (UK, Chair), W.T. Sullivan (USA) & D. Yeomans (USA)

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*Friday, August 11, morning*

*Chair:* S.J. Dick (USA)

9:00 Overview	R. Stephenson (UK)
9:20 Babylonian observations	C. Walker (UK)
9:40 East Asian observations	R. Stephenson (UK)
10:00 Arab observations	L. Fatoohi (UK)
10:20 Discussion	
11:00 European observations	M. Hoskin (UK)
11:20 Southern Hemisphere Observations	W. Orchiston (New Zealand)
11:40 Practical astronomy in Indo-Persian sources	S.M.R. Ansari (India)
12:00 Early observations and modern ephemerides	M. Standish (USA)
12:20 Discussion	

*Friday, August 11, afternoon*

*Chair:* F. R. Stephenson (UK)

14:00 Ancient eclipses and Earth's rotation	L. Morrison (UK)
14:20 Earth orientation since AD 1600	D. McCarthy (USA)
14:40 Ancient Chinese observations and modern cometary models	D. Yeomans (USA)
15:00 Historical variability of the interplanetary complex	M. Bailey (UK)
15:20 Discussion	
16:00 Frequency of ancient cometary meteoroid observations	D. Hughes (UK)
16:20 Early telescopic sunspot records	K. Schatten (USA)
16:40 The historical record of aurorae	D. Willis (UK)
17:00 Historical supernovae and their remnants	D. Green (UK)
17:20 Discussion	

**JD7: THE SUN AND SPACE WEATHER**

*Organizing Division:* II Sun & Heliosphere  
*Participating Division:* XI Space & High Energy Astrophysics  
*Participating Commissions:* 10 Solar Activity  
 12 Solar Radiation & Structure  
 49 The Interplanetary Plasma & the Heliosphere

*SOC:* G. Ai (China, *Chair*), A. Benz (Switzerland), O. Engvold (Norway), C. Fang (China, Beijing), P. Foukal (USA, *Co-Chair*), M. Huber (ESA), M. Kundu (USA), E. Priest (UK), T. Sakurai (Japan), B. Schmieder (France) & F. Verheest (Belgium, *Co-Chair*)  
*Editors of Proceedings:* O. Engvold (*Chief Editor*), H.N. Wang & Y. Yan

*Contact address:* Ai Guo-Xiang, Beijing Astronomical Observatory, Datun Rd # 20A, Chaoyang District, Beijing 100012, China  
*Tel.:* +86 10 648 88769; *Fax:* +86 10 648 88716; *E-mail:* [aigx@sun10.bao.ac.cn](mailto:aigx@sun10.bao.ac.cn)

*Friday, August 11, afternoon*

**1. SOLAR SURFACE MAGNETISM AND ACTIVITY**

Highlights of TRACE Observation  
 The Driving Layer of Solar Activity

**2. MAGNETIC EJECTION**

Observation and Theory of X-ray Jets  
 Reconnection Theory in Solar Physics

*Chair:* T. Sakurai (*Japan*)  
 A. M. Title (*USA*)  
 J.-X. Wang (*China*)  
*Chair:* C. Fang (*China*)  
 K. Shibata (*Japan*)  
 E. R. Priest (*UK*)

*Saturday, August 12, morning*

**3a. DYNAMICAL RESPONSE OF THE CORONA AND THE HELIOSPHERE**

Coronal Radio Observations  
 Solar Eruptions--the effects on the Earth's environment

**3b. DYNAMICAL RESPONSE OF THE CORONA AND THE HELIOSPHERE**

Space Weather  
 Open Discussion

*Chair:* O. Engvold (*Norway*)  
 M. Kundu (*USA*)  
 P. Brekke (*Norway*)  
*Chair:* B. Schmieder (*France*)  
 V. Pizzo (*USA*)  
 All Participants

**JD8 : OXYGEN ABUNDANCES IN OLD STARS AND IMPLICATIONS  
TO NUCLEOSYNTHESIS AND COSMOLOGY**

*Organizing Commissions:* 29 Stellar Spectra  
14 Atomic & Molecular Data

*Coordinating Division:* IV Stars

*Participating Division:* VIII Galaxies & the Universe

*Participating Commissions:* 35 Stellar Constitution  
36 Theory of Stellar Atmospheres  
47 Cosmology

*SOC:* B. Barbuy (Brazil, *Chair*), M. Bessell (Australia), F. Rostas (France), F. Matteucci (Italy), K. Nomoto (Japan), P. Nissen (Denmark), R. Peterson (USA), C. Sneden (USA), F. Spite (France) & D. VandenBerg (Canada)

*Editors of Proceedings:* B. Barbuy (*Chief Editor*), P. Nissen, R. Peterson & F. Spite

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*Tel.:* +55 11 577 8599 ext. 230; *Fax:* +55 11 577 0270;

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*Monday, August 14, morning*

**OXYGEN ABUNDANCES IN OLD STARS**

Problems of Obtaining Definitive Oxygen Abundances in Metal-Poor Stars	R. Kraft ( <i>USA</i> )
Oxygen Abundances: New Results from [OI] Lines	C. Sneden ( <i>USA</i> )
Oxygen Abundances from permitted vs. forbidden lines	TBA
Oxygen Abundances derived from UV OH lines	M. Bessell ( <i>Australia</i> )
Oxygen Abundances derived from IR OH lines	TBA
Analysis of Oxygen Lines: Effects of Temperature Inhomogeneities	R. Cayrel ( <i>France</i> )

*Monday, August 14, afternoon*

**MODEL ATMOSPHERES, CHEMICAL EVOLUTION, AGES OF GLOBULAR CLUSTERS,  
LiBeB AND COSMIC RAYS vs. OXYGEN ABUNDANCES**

The Status of Oxygen Abundances in Metal-Poor Stars	R. Peterson (USA)
Model Atmospheres and formation of oxygen lines	B. Gustafsson (Sweden)
Oxygen Line Formation in 3D, Time-Dependent, Inhomogeneous Model Atmospheres	M. Asplund (Sweden)
NLTE Effects on Oxygen Lines	D. Kiselman (Sweden)
Chemical Evolution at Early Times and Oxygen Abundances	F. Matteucci (Italy)
The Impact of Varying [O/Fe] on the Morphology of C-M Diagrams and the Ages of Globular Clusters and Field Population II Stars	D. Vandenberg (Canada)
Nucleosynthesis Predictions on Oxygen Abundances	K. Nomoto (Japan)
LiBeB Enrichment in the Early Galaxy vs. Oxygen Abundances	TBA
<b>Summary</b>	D. Lambert (USA)

**JD9: COLD GAS AND DUST AT HIGH REDSHIFT**

*Organizing* X Radio Astronomy/Commission 40  
*Division:*  
*Participating* VIII Galaxies & the Universe  
*Division*

*SOC:* M. Dickinson (USA), R. Ivison (UK), R. Kawabe (Japan), K. Menten (Germany), N. Scoville (USA), T. Wiklund (Sweden) & D. Wilner (USA, *Chair*)

*Editor of Proceedings:* D. Wilner

*Contact address:* D. Wilner, Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA

*Tel.:* +1 617 496 7623; *Fax:* +1 617 495 7345; *E-mail:*

[dwilner@cfa.harvard.edu](mailto:dwilner@cfa.harvard.edu)

*Web site:* <http://cfa-www.harvard.edu/~dwilner/jd.html>



The first detections of cosmologically distant objects are taking place through dust continuum emission, in molecular lines, and in atomic lines, both in emission and absorption. This Joint Discussion will assess the impact of these early observations in the context of our picture of cosmic evolution. The discussion will help set the stage for advances expected from new international observational facilities now planned or under construction.

*Monday, August 14, morning*

- Origin of Dust and Chemical Evolution
- Molecular Gas in Emission and Absorption at High Redshift
- Submillimeter Surveys and Dust Content at High Redshift

*Monday, August 14, afternoon*

- Atomic Gas at High Redshift
- Galaxy Evolution: the Optical/IR Perspective
- Lessons from the Low Redshift Universe
- Instrumental Developments and Future Prospects

#### **JD10: CLUSTER MERGERS AND THEIR CONNECTION TO RADIO SOURCES**

*Organizing Division:* X Radio Astronomy  
*Participating Divisions:* VIII Galaxies & the Universe  
 XI Space & High Energy Astrophysics

*SOC:* M. Arnaud (France), H. Böhringer (Germany), J. Eilek (USA), L. Feretti (Italy, *Chair*), G. Giovannini (Italy), D. Harris (USA), R.W. Hunstead (Australia), S. Maurogordato (France) & K. Roettiger (USA)

*Editors of Proceedings:* L. Feretti

*Contact address:* L. Feretti, Istituto di Radioastronomia, Via Gobetti 101, I 40129 Bologna, Italy

*Tel.:* +39 051 6399412; *Fax:* +39 051 6399431; *E-mail:*

[lferetti@astbo1.bo.cnr.it](mailto:lferetti@astbo1.bo.cnr.it)

Because of the time limitation, some important topics could not be included. To broaden the scope of the JD, there will be a poster session connected to it. A poster review could be included in the oral session.

*Monday, August 14, morning*

**CLUSTERS AND MERGERS: OBSERVATIONS AND SIMULATIONS**

Optical Observations	TBA
X-ray Cluster mergers	D. Buote ( <i>UK</i> )
New results with CHANDRA	W. Forman ( <i>USA</i> )
New results with XMM	M. Arnaud ( <i>France</i> )
Optical-Xray analysis	S. Maurogordato ( <i>France</i> )
Simulation of merging clusters of galaxies	S. Schindler ( <i>UK</i> )
Cluster formation and evolution	TBA

*Monday, August 14, afternoon*

**RADIO OBSERVATIONS AND CONNECTION TO MERGERS**

Statistical studies of cluster radio sources	M. Ledlow ( <i>USA</i> )
Radio sources and their environment	F. Owen ( <i>USA</i> )
Diffuse radio sources in cluster	R. Hunstead ( <i>Australia</i> )
Radio halos in merging clusters	G. Giovannini ( <i>Italy</i> )
Large scale magnetic fields	J. Eilek ( <i>USA</i> )
Numerical simulations of radio halo/relics in merging clusters	K. Röttiger ( <i>USA</i> )
Particle diffusion in clusters	T. Ensslin ( <i>Germany</i> )

**JD11: FIRST RESULTS FROM THE FUSE MISSION**

<i>Organizing</i>	VI Interstellar Matter
<i>Division:</i>	
<i>Participating</i>	XI Space & High Energy Astrophysics
<i>Division:</i>	

*SOC:* K. DeBoer (*Germany*), M. Dopita (*Australia*), J. Hutchings (*Canada*), E.B. Jenkins (*USA*), H.W. Moos (*USA*), B.D. Savage (*USA*), G. Sonneborn (*USA, Chair*), A. Vidal-Madjar (*France*) & A. Willis (*USA*)

*Editors of Proceedings:* G. Sonneborn (*Chief Editor*) & H.W. Moos

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20771, USA

Tel.: +1 301 286 3665; Fax: +1 301 286 1753; E-mail:

[sonneborn@stars.gsfc.nasa.gov](mailto:sonneborn@stars.gsfc.nasa.gov)

FUSE Web sites: <http://fuse.pha.jhu.edu> and  
<http://fusewww.gsfc.nasa.gov/fuse/>

Monday, August 14, morning

9:00	FUSE mission overview and status	G. Sonneborn (USA)
9:30	Deuterium studies in the Milky Way	W. Moos (USA)
10:00	Neutral envelopes of planetary nebulae	R. Ferlet (France)
11:00	Hot gas in the Magellanic Clouds	D. York (USA)
11:30	The Scutum supershell	B. Savage (USA)
12:00	Molecular hydrogen and molecular clouds	T. Snow (USA)

August 14, afternoon

14:00	The halo sightline toward Mrk 509	K. Sembach (USA)
14:30	Far UV energy distributions of QSOs	A. Koratkar (USA)
15:00	FUV spectroscopy of AGNs	G. Kriss (USA)
16:00	FUSE observations of BY Cam	M. Mouchet (France)
16:30	FUV spectra massive hot stars	J. Hutchings (Canada)
17:00	FUSE observations of stellar coronae and late-type stars	A. Dupree (USA)

## JD12: HIGHLIGHTS OF PLANETARY EXPLORATION FROM SPACE AND FROM EARTH

*Organizing Commission:* 16 Physical Study of Planets & Satellites  
*Coordinating Division:* III Planetary Systems Sciences

SOC: A. Albee (USA), M. Belton (USA), B. Bezard (France, *Chair*), A. Coradini (Italy), C. de Bergh (France), T. Johnson (USA), M. Marov (Russia), K. Noll (USA), T. Owen (USA), J. Spencer, (USA, *Chair*), N. Thomas (Germany) & R. Zurek (USA)

*Editors of Proceedings:* B. Bezard (*Chief Editor*) & J. Spencer

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Tel.: +33 1 45 07 77 17; Fax: +33 1 45 07 74 69; E-mail:  
[Bruno.Bezard@obspm.fr](mailto:Bruno.Bezard@obspm.fr)

Tuesday, August 15, full day & Wednesday, August 16, morning

## 1. JUPITER'S ATMOSPHERE

Dynamics of Jupiter's atmosphere from Galileo SSI  
 Cloud structure of Jupiter's atmosphere from Galileo measurements  
 Composition of Jupiter's atmosphere from Galileo measurements  
 Recent results on the Jovian aurorae  
 Oxygen compounds in the upper atmospheres of the Jovian planets

## 2. NEPTUNE'S ATMOSPHERE

HST observations of Neptune  
 Ground-based adaptive optics observations of Neptune

## 3. RINGS

Recent observations of planetary rings

## 4. JUPITER'S SATELLITES

*Coordinator: T. Johnson*

NIMS/Galileo observations of Io's surface  
 Ground-based, HST, and Galileo observations of Io's volcanoes  
 HST observations of the Galilean satellites  
 Geology of Europa's surface from Galileo GEM  
 Composition of Europa's surface from NIMS and SSI Galileo measurements  
 Galileo observations of Ganymede and Callisto

## 5. TITAN

The surface of Titan from HST observations  
 The surface of Titan from adaptive optics observations  
 The atmosphere of Titan (clouds and composition): New results

## 6. PLUTO

Pluto's atmosphere from stellar occultations and spectroscopic measurements  
 Pluto's surface from ISO, HST and ground-based observations

## 7. MARS

*Coordinators: A. Albee & R. Zurek*

Mars Global Surveyor: Overview and status  
 Surface of Mars from MGS/MOC  
 Topography of Mars from MGS/MOLA  
 Thermal structure/circulation of Mars' atmosphere from MGS/TES  
 Surface composition/atmospheric dust from MGS/TES  
 Mars Surveyor '98, overview and status  
 Mars Polar Lander: Results from the Landed Mission  
 Mars Climate Orbiter: Results from the Early Mapping Mission

## Future exploration of Mars

**JD13: HIPPARCOS AND THE LUMINOSITY CALIBRATION OF THE NEARER STARS**

*Organizing Division:* IVStars  
*Participating Divisions:* IFundamental Astronomy  
 VVariable Stars  
 VIIGalactic System  
*Participating Commissions:* 8Positional Astronomy  
 24Photographic Astrometry  
 26Double & Multiple Stars  
 27Variable Stars  
 29Stellar Spectra  
 35Stellar Constitution  
 37Star Clusters & Associations  
 45Stellar Classification

SOC: B. Barbuy (Brazil), T. Bedding (Australia), C. Corbally (USA), A. Gomez (France), J. Kovalevsky (France), J.-C. Mermilliod (Switzerland, *Chair*), D. Soderblom (USA), D. VandenBerg (Canada) & F. van Leeuwen (UK)

*Editors of Proceedings:* T. Lloyd Evans

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 or M. Gerbaldi, Institut d'Astrophysique, 98bis, bd Arago, F 75014 Paris, France  
*Tel.:* 33 1 44 32 8041; *Fax:* 33 1 44 32 6001; *E-mail:* [gerbaldi@iap.fr](mailto:gerbaldi@iap.fr)

*Tuesday, August 15, morning*

**1. ASTROMETRY AND MATHEMATICAL METHODS** (20 min/talk)

Hipparcos data validation

F. van Leeuwen (*UK*)

Validation of statistical methods

F. Arenou (*France*)

Associations and open clusters

T. de Zeeuw (*Netherlands*)

Theoretical point of view

Y. Lebreton\* (*France*)**2. LUMINOSITY CALIBRATION FROM SPECTROSCOPIC CLASSIFICATION** (30 min/talk)

Hipparcos and the MK standards

R. Garrison (*Canada*)

High resolution spectroscopy

A. Boesgaard\* (*USA*)

Discussion of results presented on posters (moderated)

*Tuesday, August 15, afternoon***3. PHOTOMETRY CALIBRATIONS: CAPABILITIES AND LIMITATIONS** (30 min/talk)

Hipparcos and calibrations of photometric systems

M. Grenon (*Switzerland*)

The luminosity calibration of the uvby-beta photometry

C. Jordi\* (*Spain*)

Discussion of results presented on posters (moderated)

**4. APPLICATIONS** (20 min/talk)

Clump red giants as cosmic distance indicators

K.Z. Stanek\*  
(*Poland*)

Theoretical expectations for clump red giants as cosmic distance indicators

L. Girardi (*Italy*)

Hipparcos luminosities and asteroseismology

T. Bedding  
(*Australia*)

Discussion of results presented on posters (moderated)

Oral talks are planned that will concentrate on methods and problems, and ample time will be provided for discussion of results presented on posters in each session.

\* Speaker subject to confirmation

**JD14: THE ORIGINS OF GALACTIC MAGNETIC FIELDS***Organizing*

VI Interstellar Matter

*Division:**Participating*

VII Galactic System

*Divisions:*

X Radio Astronomy

*Participating*

28 Galaxies

*Commission:*

SOC: R. Beck (Germany), D. Elstner (Germany), G. Field (USA), C. Heiles (USA), Ph.P. Kronberg (Canada), R. Kulsrud (USA), D. Moss (UK), A. Shukurov (UK, *Chair*), D.D. Sokoloff (Russia) & K. Subramanian (India)

*Editors of Proceedings:* D. Moss (*Chief Editor*), R. Beck & A. Shukurov

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*E-mail:* [moss@ma.man.ac.uk](mailto:moss@ma.man.ac.uk)

*Tuesday August 16, morning*

### 1. EXTRAGALACTIC AND PREGALACTIC MAGNETIC FIELDS

9:00	Review	P.P. Kronberg ( <i>Canada</i> )
9:25	Magnetic fields in the early Universe	M. Rees ( <i>UK</i> )
9:40	Magnetic fields in young galaxies	TBA
9:55	Intergalactic magnetic fields and structure formation	J. Stone ( <i>USA</i> )
10:10	Summary and Discussion	<i>Reviewer/Moderator:</i> H. Lesch ( <i>Germany</i> )

### 2. OBSERVATIONS OF GALACTIC MAGNETIC FIELDS

11:00	Review	R. Beck ( <i>Germany</i> )
11:20	Observations of interstellar MHD turbulence	C. Heiles ( <i>USA</i> )
11:35	Magnetic fields in elliptical galaxies	TBA
11:50	Magnetic fields in irregular galaxies	M. Urbanik ( <i>Poland</i> )
12:00	Magnetic fields in the Milky Way	TBA
12:15	Summary and Discussion	<i>Reviewer/Moderator:</i> E.M. Berkhuijsen ( <i>Germany</i> )

*Tuesday August 16, afternoon*

### 3. GALACTIC MAGNETOHYDRODYNAMICS

14:00	Galactic dynamos	A. Shukurov ( <i>UK</i> )
14:15	Numerical models of galactic dynamos	D. Elstner ( <i>Germany</i> )
14:30	Magnetic fields, spiral arms and resonances: theory	D. Moss ( <i>UK</i> )

14:45 Spiral arms and interstellar hydrodynamics: TBA  
 observations  
 15:00 Models of interstellar turbulence TBA  
 15:15 Summary and Discussion *Reviewer/Moderator:*  
 TBA

#### 4. TURBULENT MAGNETIC FIELDS, TURBULENT DIFFUSION AND DIFFICULTIES OF DYNAMO THEORY

16:00 Turbulent magnetic diffusion - I. TBA  
 16:15 Saturation of mean-field dynamos G. Field (USA) or E. Blackman (USA)  
 16:30 The fluctuation dynamo K. Subramanian (India)  
 16:45 Turbulent magnetic diffusion - II. TBA  
 17:00 Numerical simulations of turbulent dynamos A. Brandenburg (UK)  
 17:15 Summary and Discussion *Reviewer/Moderator:* D.D. Sokoloff  
 (Russia)

#### SPS: ASTRONOMY FOR DEVELOPING COUNTRIES

*Organizing Working Group:* Working Group for the Worldwide Development of Astronomy  
*Participating Commissions:* 5 Documentation & Astronomical Data  
 38 Exchange of Astronomers  
 46 Teaching of Astronomy

SOC: A.H. Batten (Canada, *Chair*), O. Dluzhnevskaya (Russia), J. Fierro (Mexico), J.B. Hearnshaw (New Zealand), R. Kochhar (India), Y. Kozai (Japan), Li QiBin (China), P. Martinez (South Africa), D. McNally (UK), L.I. Onuora (UK/Nigeria) & M.C. Pineda de Carias (Honduras)

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Monday, August 14, morning

#### OPENING TALKS

Astronomy for Developing Countries

A.H. Batten (Canada)



Research in Developing Countries: Critical Factors for a  
Successful Astronomical Research Programme

J. B. Hearnshaw (*New  
Zealand*)

#### **ASTRONOMY EDUCATION: THE SITUATION**

Astronomy in Zambia  
The Central American Master's Programme  
TAD in Vietnam

G. Munyeme (*Zambia*)  
M.C. Pineda de Carias (*Honduras*)  
D.G. Wentzel (*USA*)

#### **ASTRONOMY EDUCATION: WHAT CAN WE DO?**

What should an Astronomy Education and Awareness  
Programme aim for in a Country without a Scientific Tradition?  
The Role of Distance Learning in Developing Countries  
Teaching Astronomy by TV

M. Othman (*Malaysia*)  
B.W. Jones (*UK*)  
J. Fierro (*Mexico*)

*Monday, August 14, afternoon*

Courses for Astronomy Degrees  
University Education in China  
Initiatives in Astronomy Education in South Africa  
Vatican Observatory Summer Schools

D. McNally (*UK*)  
Chang Feng (*China*)  
C. Rijdsdijk (*South Africa*)  
C. Corbally S.J. (*Vatican*)

#### **ASTRONOMY RESEARCH: THE SITUATION**

Astronomical Research in China  
Revitalizing Astronomy in The Philippines  
The Egyptian 1.8m Telescope  
Work at Bosscha Observatory

Weng JinXian (*China, Beijing*)  
C. Celebre (*The Philippines*)  
A.M. Osman (*Egypt*)  
M. Roharto (*Indonesia*)

*Tuesday, August 15, morning*

Astronomy in Algeria  
Astronomy in Venezuela

TBA  
P. Rosenzweig (*Venezuela*)

#### **ASTRONOMY RESEARCH: WHAT CAN WE DO?**

What Can be Done With Small Telescopes?  
Simple Radio Astronomy Equipment  
Choice of Small Telescopes  
Do Astronomers in Developing Countries Need  
Telescopes?  
Security of Equipment  
China's LAMOST Project

B. Soonthornthum  
(*Thailand*)  
N. Q. Rieu (*France/Vietnam*)  
D. Crawford (*USA*)  
M. Snowden (*Sri Lanka*)  
L. Onuora (*UK/Nigeria*)  
Chu Yuquan (*China*)

*Tuesday, August 15, afternoon*

#### **CONTINUING SUPPORT**

The Role of Catalogues in Modern Theory and  
Observation

O. Malkov & A. Tutukov (*Russia*)

Can Data Archives be Made Available to  
Astronomers in Developing Countries?  
Electronic Access to Journals  
Does Electronic Access work for Developing  
Countries?  
Third-World Networking  
Mediterranean Collaboration

G. Helou (*USA*) and K. Ratnatunga  
(*USA/Sri Lanka*)  
H.A. Abt (*USA*)  
K. Chamcham (*Morocco*)  
J.V. Narlikar (*India*)  
F. Ferrini (*Italy*)

*Wednesday August 16 morning*

African Collaboration: Potentials of SALT  
Libraries in Developing Countries  
Preservation of Library Collections  
**PANEL DISCUSSION**

P. Martinez (*South Africa*)  
P.D. Hingley (*UK*)  
E. Lastovica (*South Africa*)  
*Moderator: R. Kochhar (India)*

Problems as Astronomers in Developing Countries see them.

The members of the panel are still to be selected. Advance questions in writing are welcome and may be submitted to the Chairman of the SOC at the address given above.

## INFORMATION ON SCIENTIFIC PRESENTATIONS

### SELECTION OF ORAL PRESENTATIONS & POSTERS

Selection of oral and poster presentations will be made by the Scientific Organizing Committees (SOCs) of the Symposia and Joint Discussions on the basis of abstracts received by February 15, 2000 (see contact addresses in this Bulletin). Abstracts of all accepted contributions (oral and posters) will be printed in the Abstract Book. *However, to manage resources efficiently, poster space will only be allocated and the abstract printed in the Abstract Book and made available on the WWW if the first author of the paper has also registered and paid the registration fee **no later than June 15, 2000.***

### FACILITIES FOR ORAL PRESENTATIONS

Overhead and slide projectors will be available in all the rooms used for scientific sessions. Microphones will be available in the larger lecture halls. Video presentations can be made available in the larger lecture halls, *but require booking in advance.*

## POSTERS

Two rooms adjacent to the lecture halls have been reserved for posters accepted by the SOC of the GA Symposia, JDs and the Special Session. It is expected that 200 poster spaces in format of approx. 90 cm x 90 cm will be available for each Symposium, and 50 for each Joint Discussion. Posters at the Symposia may have to be changed halfway through. Each poster will be assigned a reference number indicating the poster board and display room.

## VIDEO POSTER PRESENTATIONS

A number of video monitors will be available for lecture and poster presentations. They will be provided in the main lecture theatres and the poster rooms. Authors wanting to use them should add the line, "Video presentation planned" and their e-mail address at the end of the abstract. Only videos on normal-sized VHS (not S-VHS) cassettes recorded to PAL standard can be displayed.

## PREPARATION &amp; PUBLICATION OF ABSTRACTS

An Abstract Book containing the abstracts of all oral contributions and posters accepted for the GA Symposia, Joint Discussions, and Special Session, and containing a floor plan of the poster areas, will be distributed to participants upon arrival and registration at the General Assembly. Abstracts will also be made available on the WWW.

Abstracts must include the title, author name(s), institute(s), e-mail address(es) and the main text. In order to keep the Abstract Book to a manageable size, each abstract must be shorter than 160 words; each page will contain 6 abstracts. The text of an Abstract should be sent by **e-mail to the Chairperson of the SOC** for the relevant Symposium, Joint Discussion or Special Session *as two files in the following formats*: A LaTeX file for inclusion in the Abstract book, and a plain ASCII file for display on the WWW. The actual format required and a template will be available on the WEM site: [www.iau-ga2000.org](http://www.iau-ga2000.org) from January 15, 2000. The LOC will send instructions to SOC chairpersons via the General Secretary on the production of camera-ready copy.

**PRACTICAL INFORMATION**

**CONFERENCE ORGANIZER**

The Local Organizing Committee has appointed *World Event Management Ltd. (WEM)* as the Conference Organiser. Thus, WEM will handle GA registrations as well as accommodation, lunch and tour reservations. WEM is also a fully licensed operator of group and business travel and holds IATA and ATOL bonds, which allows them to also arrange and issue air, train, and ferry tickets and all other travel documents. You may contact them at the following address:

World Event Management (IAU GA 24)  
 Network House  
 West 26  
 Cleckheaton  
 West Yorkshire BD19 4TT, UK

Telephone: +44 1274 854116  
 Fax: +44 1274 854110  
 E-mail: [enquiries@iau-ga2000.org](mailto:enquiries@iau-ga2000.org)

**BEFORE YOU GET TO MANCHESTER**

## PARTICIPATION

Attendance at the XXIVth General Assembly is, in principle, by invitation of the President. See p. 5 for details on how to obtain an invitation. In addition, each participant, whether IAU Member or Invited Participant, may register one adult and one or more dependent children as Registered Guest(s). *Guests may not attend the scientific meetings (except for the Invited Discourses), but otherwise have the same privileges as participants.*

## HOW TO REGISTER?

Participants should complete the *Registration & Proceedings Pre-Order Form* attached in this bulletin and return it to World Event Management no later than **Friday July 14, 2000**. Note that a reduced rate is applied for early registrations, **before May 1, 2000**. Registrations can be made by *regular mail, facsimile, and e-mail* and through our web site, [www.iau-ga2000.org](http://www.iau-ga2000.org). After that date, advance registration will no longer be accepted. Late registration will still be possible from August 5, 2000 at the Registration Desk in the Whitworth Hall, University of Manchester. **Registrations by telephone are not accepted.**

<i>Fees (All in £):</i>	<i>Registration received before May 1, 2000</i>	<i>May 1, 2000 or later</i>
IAU Member/Invited Participant	195	240

Registered Guest(s) (Above  
age 11)

70

70

Registration should be accompanied by a payment covering the registration fee. *No registration will be confirmed until this payment has been received*(See *Payment Possibilities*, below).

#### *Confirmation*

Registrations will be confirmed via E-Mail/facsimile/mail by the WEM office within two weeks after receipt of the *Registration & Proceedings Pre-Order Form* and payment. If no confirmation has arrived four weeks after your sending the payment, please contact WEM.

### **Cancellation & Refunds Policy**

100% payment of the fee at the time of registration is requested. In the event of cancellation, a full refund will be given up to May 1, 2000 less a £25 administration charge. Between May 1, and July 21, 2000 a 50 % refund will be given less the administration charge of £25. After this date no refund will be made. Guest fees will be refunded in full.

#### PAYMENT POSSIBILITES

All payments must be made in Pounds Sterling. Payments should be in one of the following forms (in the case of E-Mail/WWW registration, only credit cards may be used):

- A bankers draft (certified cheque) with all charges payable by the payee prior to sending. This draft **must** be enclosed with your registration and sent to World Event Management (GA 24)
- A bank transfer to World Event Management Ltd to the following account:

Barclays Bank Plc, Halifax Business Centre, PO Box 327,  
Halifax, West Yorkshire, HX1 1YX, UK, Account Number: 70 17  
12 71, Sort Code: 20 35 84

*Registration and subsequent services will only be effective when accompanied with a copy of the bank transfer,*

- Credit Cards: Visa, MasterCard, Diners and American Express
- A Personal Cheque drawn on a UK Bank **only**

#### FINANCIAL SUPPORT TO ATTEND THE GENERAL ASSEMBLY

A limited number of travel grants will be available for

participants who cannot obtain necessary travel funds from national sources, but wish to contribute actively to one of the Symposia, Joint Discussions or the Special Session, or in the meetings of the Divisions, Commissions, and Working Groups. Prospective participants primarily interested in a Symposium should send their *IAU Grant Application Form* to the corresponding Scientific Organizing Committee (See contact address under the *Individual Scientific Programmes* in this bulletin). All others should send their grant application to the IAU General Secretary. *The deadline for all grant applications is **Tuesday February 15, 2000.***

#### TRAVELLING TO MANCHESTER

**By air** (Inquiries, Manchester Airport: +44 161 489 3000)

Manchester is the busiest airport in the North of England and has recently opened its second runway and third terminal. The airport is approximately 10 miles from the city centre and connected by a convenient train service to the city. Trains run approximately every ten minutes, and the journey takes twenty-five minutes. Approximate return cost is £5.

#### **By sea**

Ferries travel daily into Hull on the East Coast of England from mainland Europe and Scandinavia. Hull is 100 miles from Manchester and is on a direct rail route.

**By train** (National Enquiries: +44 345 484950)

Trains in the UK run regularly and usually efficiently, and Manchester is well connected to all parts of the UK. From London Euston, trains run every hour into Manchester Piccadilly. The average cost per ticket varies between £50-£130 depending on travel class. Tickets are more expensive during the peak times 06:00-09:30 and 16:00-18:00 Monday-Thursday and all day on Friday; Saturday and Sunday are the most economical days to travel. WEM can supply train tickets for travel in the UK (please complete the *Travel Booking Request Form*).

#### ACCOMMODATION RESERVATIONS

Accommodation has been reserved for General Assembly participants in The University of Manchester's Halls of Residence or in a variety of local hotels. Booking will be available on-line via e-mail or using the *Accommodation Reservation & Tour Reservation Form* provided here. More details on the Hotels and the Residence Halls may be found on the Web site: [www.iau-ga2000.org](http://www.iau-ga2000.org). The range code which is listed in the tables of University Halls of Residence and of Hotels corresponds to the following prices:

Range 1	Range 2	Range 3	Range 4	Range 5
< £50	£50-£65	£65-£75	£75-£100	£100-£160

The ID code in the last column of the same tables corresponds for the hotels in the city centre to their location on the enclosed map. For hotels not on the map, the distance indicated is relative to the main campus of the University. The ID code is also used for making accommodation reservations. *Please note that discounted rates have been negotiated for GA participants. To obtain these, all accommodation should be booked through World Event Management.*

### Halls of Residence

A large number of low-cost rooms have been reserved in The University of Manchester's Halls of Residence. These are student accommodations with single occupancy (no child care available). They range from modern units (Richmond Park and Sheavyn House) with en-suite facilities (private toilet and shower) to more classical settings with shared bathroom facilities. Buses run every few minutes from early morning to midnight between the Residence Halls, the University, and the city centre (vouchers on sale at the Travel Desk). To secure your reservation a **100% deposit** of your total room allocation is required by **Monday July 3, 2000**. Your deposit will act as a guarantee of your reservation and is non-returnable upon booking accommodation.

<i>(Prices in £)*</i>	Range	Single Occupancy	Single Room/ Location	ID Code
Owens Park (standard)	1	22	2.5km S	Q
Allen Hall (standard)	1	22	2.5km S	R
Woolton Hall (standard)	1	22	2.5km S	S
Ashburne Hall (standard)	1	22	2.5km S	T
Sheavyn House (en-suite)	1	34	2.5km S	U
Richmond Park (en-suite)	1	34	2.5km S	V

\* Breakfast included (No VAT for Halls of Residence)

*50% refund less a £5 administration charge for cancellation before May 3, 2000; 25% refund less a £5 administration charge for cancellation between May 3, 2000 and Monday July 3, 2000; no refund after Monday July 3, 2000*

### Hotels

The hotels listed below have been selected on the basis of their distance from the University and Bridgewater Hall, and on their price. When filling the *Accommodation & Tour Reservation Form*, please indicate the required price range of accommodation and name of your chosen hotel. Every attempt will be made to meet

your choice, but due to the large numbers of attendees anticipated, it is recommended that you name a second choice range and hotel. Rooms will be allocated on a first come, first served basis.

To secure your reservation a **50% deposit** of your total room allocation must be received by World Event Management (IAU GA 24) by **July 3, 2000**.

(Prices in £)*	Single Room/		Double Room/		Location	ID Code
	Range	Single Occupancy	Double	Double Occupancy		
Renaissance	3	65	75		City Centre	A
Britannia Sachas	4	50	60		City Centre	B
Gardens Piccadilly	3	65	80		City Centre	C
Portland Thistle	5	135	153		City Centre	D
Jarvis Piccadilly	5	100	120		City Centre	E
Britannia	4	55	60		City Centre	F
Midland Crowne Plaza	5	105	105		City Centre	G
The Princess	2	60	67.50		City Centre	H
Jury's Inn	3	66	73		City Centre	I
The Palace	4	85	95		City Centre	J
Meridien Victoria	5	140	150		City Centre	K
The Copthorne	4	75	95		3.5km W	L
Quality Hotel	3	65	80		3.5km W	M
The Avant	3	65	80		10km NE	N
The Novotel	3	60	70		14km W	O
Comfort Friendly	1	40	50		2.5km E	P

\* Standard hotel breakfast included - VAT at the current rate of 17.5% included

*Full refund less an administration charge of £25 per room reservation for cancellation before July 3, 2000; no refund after Monday July 3, 2000*

As no child care facilities are available at the General Assembly venues, please inquire at your hotel for assistance.

#### CLOSING DINNER

The Closing Dinner will be held in a city centre hotel after the closing ceremony of the General Assembly on Wednesday August 16. The cost will be £30 and **full payment** is required. Please tick the section on the *Closing Dinner & Meal Voucher Order Form* to reserve a seat for this dinner. Places are limited and therefore will be sold on a first come, first served basis.

*Full refund for cancellation before July 3, 2000; no refund after Monday July 3, 2000*



## MEAL ARRANGEMENTS

The most convenient venue for daytime meals is the University of Manchester Refectory, located next to the Whitworth Hall on Oxford Road. It will be open Monday 7<sup>th</sup> - Friday 18<sup>th</sup> August for Lunch (12:00-15:00) and for Dinner (17:30-20:00). There are also numerous restaurants within walking distance of the GA events.

In addition to the evening meal service, the Refectory will operate a bar between 17:30 - 23:00. It can also offer function rooms or private dining rooms for receptions or dinners.

Meal vouchers can be purchased in advance through the *Closing Dinner & Meal Voucher Order Form* and also on site at the Registration Desk (but **not** at the Refectory itself). It will be advantageous to purchase the meal vouchers in advance, as this will prevent queues at the registration desk and reduce the cost of your meals for the duration of your stay at the General Assembly. The more vouchers purchased, the less expensive the meals. **Full payment** is requested for Meal Vouchers orders (See *Payment Possibilities*). Pre-paid lunch and dinner vouchers will be delivered with the registration packs.

Prices are as follows:	sandwiches	£5 meals	£7 meals
Package of 3 vouchers	£7.50	£15.00	£21.00
Package of 7 vouchers	£15.50	£31.50	£44.00
Package of 10 vouchers	£22.00	£44.00	£62.50

A sandwich voucher will include a sandwich, a piece of fruit and a beverage.

A £5 voucher will cover a main course, dessert and beverage and will be self-service. The food will be served in the food-court in the University Refectory. A good choice of dishes will be available, and vegetarian requirements will be catered for.

A £7 voucher will cover a main course, dessert/cheese and beverage. This voucher will provide dining in a separate room and includes table service.

*Full refund for cancellation before July 3, 2000; no refund after Monday July 3, 2000*

## EXHIBITION

Exhibition areas are provided in the Whitworth Hall and the Royal Northern College of Music. If you are interested in displaying an exhibit, please contact WEM as early as possible.

**AFTER YOU ARRIVE IN MANCHESTER**

## VENUE OF THE GENERAL ASSEMBLY

The venue for most of the scientific meetings of the General Assembly will be the recently renovated Roscoe A Lecture Theatre and the new Crawford House Lecture Theatre in The University of Manchester and the nearby concert halls of the Royal Northern College of Music. In addition, the science departments on campus offer a virtually unlimited supply of larger and smaller lecture halls and meeting rooms suitable for Joint Discussions as well as meetings of Divisions, Commissions and Working Groups. The formal sessions of the General Assembly and the Invited Discourses will take place in the recently opened Bridgewater Hall in the centre of Manchester.

## REGISTRATION DESK &amp; GENERAL INFORMATION

The registration desk will be located in the Whitworth Hall, in the centre of the campus of The University of Manchester on Oxford Road and will open from Saturday, August 5, (afternoon) to Friday, August 18 (all day). Throughout the General Assembly, the Registration and Information Desk will be open all day. All participants, including those who already registered by mail, e-mail or WWW, must first report to the registration desk and collect their registration package containing the final program, badges, the Abstract Book, etc.

***Important Note: Badges will be required for all General Assembly meetings and events and also for entering the Bridgewater Hall.***

## TRAVEL DESK

Further travel information about the tours will be available at the Travel Desk. Guided walking tours of central Manchester, the Bridgewater Hall, the canals and Manchester United Stadium can also be booked. WEM, the Conference Organizers, are a fully licenced travel operator and can arrange and issue travel tickets. They can also supply special rate tickets for the Manchester buses plying between the Halls of Residence, the University and the City Centre.

## BANKING FACILITIES

All the major UK banks are to be found in Manchester, many with branches near the University. It will be possible to exchange travellers cheques at all major banks and travel bureau. Opening times are generally 09:00-17:00 Monday to Friday with limited Saturday opening. There are many cash machines from which currency may be drawn. Networks such as Cirrus are well supported. Nearly every store will accept credit cards for purchases of more than a few pounds (VISA, MasterCard, American

Express, etc). Travellers cheques are not normally accepted in ordinary stores.

#### MAIL, PHONE, FACSIMILE & ELECTRONIC MAIL

Each participant will have his/her own labelled mail box in the Whitworth Hall. **The postal address** of participants during the XXIVth General Assembly will be:

Name **Registration number** (See registration confirmation)  
IAU XXIV General Assembly  
Whitworth Hall  
University of Manchester      *Note that this address is only valid during the General Assembly*  
Oxford Road  
Manchester  
M13 9PL, UK

There are phone boxes within the campus adjacent to the Whitworth Hall. A fax transmission service will be available in the Whitworth Hall for a charge. The **telephone** and **fax** numbers of the registration desk will be published in Information Bulletin 87. Note that they are only for receiving urgent messages to participants.

Throughout the General Assembly, computers with access to the Internet and to **e-mail** will be available on the 3<sup>rd</sup> floor of the Schuster Building (Department of Physics and Astronomy).

#### PHOTOCOPIER

Photocopying machines will be available at the Whitworth Hall. There will be a charge for using this service.

#### DAILY NEWSPAPER

A newspaper of the General Assembly will be produced daily. It will carry articles of general interest to the astronomical community, reports on scientific and social programme for the days to come. The editors of the daily newspaper will be Drs. John Mason and Patrick Moore.

#### COFFEE & TEA BREAKS

Tea, coffee, and cold water will be served near the lecture halls.

#### CHILD CARE

No child care facilities are available at any of the General Assembly venues. Please inquire at your hotel for assistance if needed.

## MEDICAL AID

First Aid will be available in the Whitworth Hall. Citizens of the EU can obtain free basic medical and hospital care if they are in possession of an E111 form. All visitors to the UK are reminded that it is advisable to purchase medical insurance in their home country. Both tetanus and polio vaccinations are recommended.

## TRAVELLING WITHIN MANCHESTER

### **By tram and bus**

The most efficient and reliable mode of transport within Manchester is by tram and bus. Tram tickets can be purchased from automatic tellers at the tram stops. Although there are no inspectors permanently on the trams, it is prohibited to board the trams without a ticket, and heavy fines are issued if you fail to produce a ticket on request. A bus service operates every few minutes from early morning until midnight between the University, the Residence Halls, and the city centre; vouchers will be available at the Travel Desk. Note that the G-Mex tram station is close to the Bridgewater Hall, the venue for the larger conference events.

### **By taxis**

Taxis (black cabs) are readily available, as are also private hire cars. Telephone numbers of recommended companies will be available at your accommodation venue.

## ELECTRICITY

Within the UK, electricity is 230 volt, 50 Hz. Most plugs are of the 3-pin, 13-amp UK variety. It is advisable to buy travel adapters before arriving in the UK.

## WEATHER & CLOTHING

The weather in Manchester can be variable. Average temperatures will be in the range 20-25 degrees Celsius. Rain showers are possible, so it is advisable to bring light waterproof clothing and an umbrella. Light casual clothing will be suitable for daytime use. The evenings may get cooler, and a sweater, cardigan or jacket is recommended.

## **TOURS, VISITS AND EXCURSIONS**

Tours for participants have been planned throughout the General Assembly as outlined below. If you want to go on any of the tours, the *Accommodation Reservation & Tour Registration Form* should be completed and sent with your registration to the

Conference Organizer. All tours must be paid for, in full, to secure a place (See *Payment Possibilities*). Reservation will occur on a first come, first served basis. A **100% payment** is required on booking. A 50% refund will be made up to Monday July 3, 2000 for any cancellations. After this date no refunds will be made. Tours are subject to cancellation in the event an insufficient number of participants show interest, when a full refund will be made.

The following summaries are deliberately brief. For more details on what is included in the indicated cost, visit the web site [www.iau-ga2000.org](http://www.iau-ga2000.org).

#### HALF DAY TOURS

#### **Nuffield Radio Astronomy Laboratories & Jodrell Bank Science Centre (Ref. JDR)**

Free

The main centre for astronomical research at The University of Manchester is at Jodrell Bank, approximately 30km (20 miles) south of the University. The National Facility MERLIN is also based at Jodrell Bank. The adjoining Science Centre is one of the world's most visited. Free half day tours will be offered throughout the General Assembly. These will be of two kinds:

- *For professional astronomers only*, a guided tour of the scientific laboratories. If time permits, participants will be free to visit the public Science Centre.
- *For registered guests*, a visit to the Science Centre, including the planetarium, and the Tree Park.

The dates of these tours will be available at the Registration Desk, where all registered persons may sign up for their preferred date. In order to match the number of tours to the demand in a realistic manner, please indicate on the form if you intend to make this visit.

#### **Gawsworth Hall, Macclesfield**

**Monday 7 (Ref. GAW1), Friday 11 (Ref. GAW2), Monday 14 August (Ref. GAW3)**

Depart 13:00. Cost £17

A beautiful Cheshire manor house with a legendary Shakespearean connection in a very English setting.

**Little Moreton Hall, Cheshire****Sunday 13** (Ref. LMH1), **Thursday 17 August** (Ref. LMH2)

Depart 13:00. Cost £15

Britain's most famous, and arguably finest, timber framed manor house. A dazzling jigsaw of dark timber and light plaster surrounded by a moat.

**Tatton Park - Mansion and Garden****Tuesday 8 August** (Ref. TPK)

Depart 13:00. Cost £18

One of the most complete historic estates open to visitors.

Early 19<sup>th</sup> century Mansion and beautiful gardens in a landscaped deer park that spreads over 50 acres (20 hectares).

## ONE-DAY TRIPS

**Quarry Bank Mill, Styal, Cheshire****Tuesday 8** (Ref. QBM1), **Sunday 13 August** (Ref. QBM2)

Depart 10:00. Cost £16

Founded in 1784, one of the first water-powered cotton mills, now an award winning museum in a beautiful Country Park. See 19<sup>th</sup> century textile machines at work; the world's most powerful working water wheel; Apprentice House, once home to 100 pauper children; Styal village, purpose built for the mill workers. Enjoy riverside and woodland walks. **Liverpool, Sunday 13 August** (Ref. LIV)

Depart 09:30. Cost £29

Famous for the Beatles, Liverpool has something for everyone: Two magnificent Cathedrals, a cruise on the River Mersey, walk around the Albert dock area and visit the Beatles Story, the Tate Gallery and the Merseyside Maritime Museum with its new gallery on Transatlantic slavery **Ironbridge, Tuesday 15 August** (Ref. IRN)

Depart 08:30. Cost £30

Ironbridge, on a gorge of the River Severn, played a leading role in the Industrial Revolution of the 18<sup>th</sup> century and is a UNESCO-designated World Heritage Site. The Iron Bridge over the gorge is generally considered to be the very first cast-iron

bridge. Artistic endeavour also flourished. Eight exciting museums deal with all aspects of the industry that sprang up here. **York, Saturday 12** (Ref. YRK1), **Thursday 17 August** (Ref. YRK2)

Depart 08:30. Cost £24

York was ruled successively by the Romans, the Anglo-Saxons and the Danes (Vikings). The tour includes the Jorvik centre, re-creating life in the Viking era. The city is surrounded by 14<sup>th</sup> century walls and boasts many fine medieval buildings, including the magnificent York Minster, the largest Gothic Cathedral in northern Europe. York also offers the National Railway

Museum. **Chatsworth House,**

**Saturday 12** (Ref. CHA1), **Friday 18 August** (Ref. CHA2)

Depart 09:30. Cost £22

Palatial home, largely 17<sup>th</sup> century, in the grandest of landscaped grounds. Inside are 175 richly furnished and decorated rooms with outstanding works of art, outside are secluded walks, 290 ft jet of Emperor Fountain and Cascade staircase of flowing water. Also attractions for children. **Bronte Parsonage Museum and Worth**

**Valley Steam Railway**

**Friday 11** (Ref. BRO1), **Tuesday 15 August** (Ref. BRO2)

Depart 09:30. Cost £23

The Bronte sisters, Charlotte, Emily, and Anne, grew up in the Parsonage of the isolated village of Haworth in the lonely beauty of the Pennine moorlands. A visit to the Parsonage, now a museum, helps to understand the background for the literary world of the early 19<sup>th</sup> century being startled by a series of novels, such as Emily's "Wuthering Heights", by three young sisters. The tour will include the scenic journey through the Pennines, taking in small villages on its way, and a short ride on a steam railway from Oxenhope to Keighley. **North Wales, Monday 7 August** (Ref. NW)

Depart 08:30. Cost £25

Travel through the spectacular scenery of the Conwy valley to the Llechwedd slate caverns where the workings of the slate industry will be explained. The tour continues via the Llanberis pass over the shoulder of Mt. Snowdon (the highest mountain in Wales) to visit the city of Caernarfon and its 13<sup>th</sup> century motte and bailey castle, where the Queen invested the Prince of Wales.

**The Lake District - Wordsworth Country**

**Thursday 10** (Ref. LD1), **Monday 14 August** (Ref. LD2)

Depart. 08:30. Cost £31

Widely regarded as the area with the most beautiful scenery in England, and the inspiration of artist and poets. We start with a steam-boat cruise the length of Lake Windermere, the longest lake in England, take a picnic lunch at Rydal Water, then a short walk to Rydal Mount, home of William Wordsworth from 1813 to 1850. The house has changed little since then, and the garden is much as Wordsworth designed it. In mid-afternoon travel through the heart of the mountains to Keswick, an attractive market town, where you

may enjoy spectacular views of Derwentwater from Friar's Crag, and sample tea and souvenir shops.

TWO-DAY TRIPS FROM SATURDAY 12<sup>th</sup> TO SUNDAY 13<sup>th</sup> AUGUST **Cambridge and Warwick Castle**

Depart 08:00. £161 single occupancy (Ref. CAM1)

£138/person/double occupancy (Ref. CAM2)

Travel to Cambridge; overnight in a 4 star hotel. The rest of the day will be free for sightseeing and shopping and an evening meal in one of the many restaurants. The following morning there will be a short visit to the University of Cambridge's radio astronomy observatory at Lord's Bridge, where Nobel Laureate Prof. Tony Hewish will talk about the discovery of Pulsars. There will also be a chance to look at the new radio telescopes on the site. The rest of the day will be spent visiting the majestic Warwick Castle, the finest medieval castle in England. **Stratford-upon**

**Avon, Stonehenge, Lacock and Avebury**

Depart 08:00. £180 single occupancy (Ref. STR1)

£170/person/double occupancy (Ref. STR2)

Travel to Stratford-upon-Avon, birth place and home town of William Shakespeare. The morning will be free for sightseeing and shopping; in the afternoon there will be a performance by the Royal Shakespeare Company. After the performance you travel to your hotel in Salisbury for evening dinner, followed by a walk around the old town and a visit to the Cathedral.

Sunday morning offers a visit to Stonehenge, most famous of all the henges in N. Europe. Then travel on to the beautifully preserved, ancient village of Lacock with a visit to the Abbey and the Fox Talbot Museum of Photography. The late afternoon will be spent exploring Avebury Henge, the most extensive henge and possibly the oldest, and nearby Silbury Hill. **Dublin, Newgrange**

**and Birr Castle**

Depart 07:00. £328 single occupancy (Ref. DUB1)

£300/person/double occupancy (Ref. DUB2)

By plane over the Irish Sea to Dublin, capital of Ireland, and from there a short coach journey to the Boyne Valley, scene of the famous battle of 1690. At Newgrange you will see the Neolithic passage tomb, a World Heritage site, then back to Dublin to enjoy lunch and spend the rest of the day sightseeing, shopping, and no doubt try a Guinness at a traditional Irish pub. On Sunday morning, a coach ride to the Irish National Stud Farm, where so many champion horses have been bred. You can walk round the farm and visit the Japanese Gardens in the grounds. For the rest of the day you will be the guest of the 7<sup>th</sup> Earl of Rosse at Birr Castle. After a buffet reception, the Earl will guide the



party round the recently restored telescope constructed by the 3<sup>rd</sup> Earl of Rosse in 1845. With its 6 foot diameter mirror, the "Leviathan of Parsonstown" was the most powerful telescope of the 19<sup>th</sup> century. There will be time to visit the recently completed exhibition centre and the 100 acre arboretum and formal gardens.

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Page last modified by the [IAU Secretariat](#) on 2001-03-27.