



**INTERNATIONAL ASTRONOMICAL UNION
UNION ASTRONOMIQUE INTERNATIONALE**

**POST MEETING REPORTS
OF
IAU SYMPOSIA
IN 2007**

compiled by

Ian F. Corbett, IAU AGS

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IAU Symposium No 242, Post Meeting Report

1. IAU Symposium Number: 242

2. Title of meeting: Astrophysical Masers and their Environments

3. Dedicated to: Raymond James Cohen (died 01 November 2006)

4. Location: Alice Springs Convention Centre, Alice Springs ,
Australia

5. Date of meeting: 12 – 16 March 2007

6. Scientific Organising Committee:

| | |
|----------------------------|-------------|
| Jessica Chapman (co-Chair) | Australia |
| Philip Diamond (co-Chair) | UK |
| Willem Baan | Netherlands |
| Elizabeth Humphreys | USA |
| Hiroshi Imai | Japan |
| Athol Kemball | USA |
| Karl Menten | Germany |
| Luis Rodriguez | Mexico |
| Slava Slysh | Russia |
| Ji Yang | China |

7. Local Organising Committee:

| | |
|-------------------------|--|
| Jessica Chapman (Chair) | CSIRO Australia Telescope National Facility |
| Vicki Drazenovic | CSIRO Australia Telescope National Facility |
| Mark Wardle | Macquarie University |
| Anne Green | University of Sydney |
| Harvey Green | Financial adviser |

8. Number of participants: 125 (36 IAU Grant recipients)

9. Countries represented: 18

Australia (16), Chile (2), China (6), Germany (6), Italy (4), Japan (17), Korea (1), Mexico (6), Poland (3), Russia (2), South Africa (8), Spain (3), Sweden (1), Taiwan (3), Thailand (1) the Netherlands (7), UK (9), USA (30)

10. Report submitted by: Jessica Chapman, CSIRO Australia Telescope National Facility
Philip Diamond, Jodrell Bank Observatory, UK

Place & Date: Sydney, Australia, 18 May 2007

11. Summary of the scientific highlights of IAU Symposium No. 242

Masers originate in a variety of different environments and are associated with a wide variety of phenomena but they are all linked by common physics. By bringing together astronomers who observe masers and theoreticians who investigate the physics of the masers and their environments we were able to address a broad range of astrophysical problems.

The meeting was organised into 11 science topics:

1. Maser theory
2. Polarisation and magnetic fields
3. Masers and star formation
4. Galactic maser surveys
5. Stellar masers, circumstellar winds and supernova remnants
6. Galactic structure and the Galactic Centre
7. Masers in AGN environments
8. Megamaser and starburst activity
9. Diagnostics and interpretation in extragalactic environments
10. New mm and sub-mm masers
11. Future facilities

Each topic included a review talk, two or more invited talks and contributed talks. Time was also set for two poster sessions to discuss the 75 posters. It was evident from the many contributions that maser research is currently very active. Several new maser research directions have emerged over the last few years, and many outstanding results were shown. To highlight just some of these:

New discoveries of formaldehyde masers in the Galaxy have led to a much better understanding of this rare group of masers. These masers pin-point the dusty circumstellar disks around young protostellar objects, with scale sizes of 30 to 200 AU. These masers may show recurrent flares and/or long term variability, and from recent modelling appear to be collisionally excited.

Methanol masers continue to be an important tool for studying star formation regions. An intriguing and so-far unexplained result from a monitoring program in South Africa was that 10% of the observed methanol masers had quasi-periodic variations with Mira-like light curves over periods of several hundred days. This may indicate Mira like pulsations in pre-main sequence stars.

Magnetic fields play a critical role in star birth and star death. Masers provide an excellent means of studying the magnetic fields in the dense regions where they are located. Whilst the strong Zeeman effect has long been known from OH molecules, good progress has been made in the last few years in understanding the polarization properties of other maser transitions, in particular from H₂O and SiO molecules, where the Zeeman effect is much weaker. In evolved stars, magnetic fields always show ordered structures. From observations of the 22-GHz water transition, it has been shown that the bipolar outflows that turn on in post-asymptotic giant branch stars are highly likely to be magnetically collimated.

Masers also offer a powerful tool for studies of Galactic structure. Their positions and velocities can be measured with extremely high precision, while absolute positions can be determined from

parallaxes and proper motions. Micro-arcsec astrometry is now being obtained with the VLBA and this has been used to identify with great precision the position of SgrA* in the centre of the Galaxy. Galactic masers are being used to map out the spiral arm structure of the Milky Way, and to investigate the properties of the Galactic nuclear bar.

Of great interest is the recent detection of the Zeeman effect in at least four OH megamaser galaxies, including the archetype galaxy Arp 220. Very high resolution imaging has shown compact well separated maser components with milliGauss fields.

There has been a tremendous increase in the number of water masers detected from active galactic nuclei of external galaxies. In 2001, 22 such galaxies were known whilst by March 2007 this number had risen to 88. The masers allow high precision measurements of the galactic nuclei and disks, and in some cases can be used for cosmological distance estimates, with a goal of measuring H_0 to 3% within the next five years.

A whole new branch of maser research is now emerging with the first results from the Sub-Millimetre Array (SMA). Many new maser transitions can now be detected. As an example, there are now many water maser lines that can be observed that are at least as strong as the 22 GHz water maser line which has been studied now for many years, and is a prime maser transition observed in star formation regions, evolved stars and galaxies. These masers are likely to become as commonly observed as the centimetre masers have been.

Looking to the future, the new generation of telescopes, including ALMA and the SKA will allow increasingly sensitive surveys and use of masers for cosmological studies.

Proceedings:

J. M. Chapman & W. A Baan (eds.), 2007,
Astrophysical Masers and their Environments
Proc. IAU Symp. No. 242, Alice Springs, Australia, 12 – 16 March 2007,
(Cambridge: CUP) ISBN: 0-521-874645, due December 2007, e-book:
<http://journals.cambridge.org/action/displayJournal?jid=IAU>

12. Some general comments

The meeting was generally considered by the participants to very successful. We would like to mention:

- The strong contribution from younger scientists: 18 of the participants were PhD students. Seven of these students gave oral presentations, including one student, Estaban Araya who gave an excellent review talk on the recent discoveries and understanding of formaldehyde masers in the Galaxy. The presence of the younger scientists as well as the interaction between people of all ages, gave the meeting considerable vigour. Several of the students and postdocs commented that they had benefitted a great deal from meeting the more established scientists.
- The strong participation of women: Approximately 25% of the participants and 20% of the speakers were women. Several women with distinguished research careers were present as well as younger upcoming female scientists.

- Part of the success of the meeting was due to the level of attention given to all participants and assistance provided to them before and at the meeting. A strong social program was organised and much enjoyed and there were plenty of opportunities for people to hold informal discussions.
- For the meeting organisation – it was difficult to cover all of the meeting costs within the registration limit of US\$250, including the cost of the conference proceedings, required by the SOC. Some sponsorship was obtained as well as the IAU grant, but this was entirely used to support participants. To increase our income, a raffle of Australian products was held at the meeting and well supported. Whilst we have just managed to cover all expenses, I suggest that a somewhat higher registration fee of US\$250, **excluding** the cost of proceedings would be more appropriate.

IAU Symposium No 243, Post Meeting Report

1. IAU Symposium Number: 243

2. Title of meeting: Star-Disk Interaction in Young Stars

3. Dedicated to:

4. Location: Grenoble, France

5. Date of meeting: 21-25 May 2007

6. Scientific Organising Committee:

S. Alencar (Brazil)
R. Keppens (Netherlands)
I. Appenzeller (Germany)
O. Regev (Israel)
F. Bacciotti (Italy)
B. Reipurth (USA)
G. Basri (USA)
K. Shibata (Japan)
J. Bouvier (France – Chair)
S. Cabrit (France)
S. Edwards (USA)
M. Jardine (UK)

7. Local Organising Committee:

A. Blanc
F. Bouillet
J. Bouvier (Chair)
J. Ferreira
T. Montmerle
all at the Laboratoire Astrophysique Observatoire de Grenoble.

8. Number of participants: 141 (38 IAU Grant recipients)

9. Countries represented: 21

Armenia 2, Belgium 1, Brazil 6, Canada 2, Switzerland 7, Chile 1, Colombia 1, Germany 9, Spain 1, France 25, UK 7, Ireland 6, Israel 1, Italy 22, Japan 2, Portugal 3, Russia 6, Tadjikistan 1, China Taiwan 1, Ukraine 1, USA 36.

10. Report submitted by: Jerome Bouvier, Laboratoire Astrophysique
Observatoire de Grenoble

Place & Date: Grenoble, 11 June 2007

Scientific Program : 23 invited reviews, 17 contributed talks, 1 panel discussion, 88 posters

Scientific Highlights :

The many aspects of star-disk interaction in young stars have been presented and discussed during the symposium.

Session I reviewed the current knowledge we have of magnetic fields in young stars, with the presentation of a number of new results providing direct measurements of the magnetic field strength and geometry. The presentation and discussions that followed led to a consensus on the existence of two major magnetic components in young stars: i) a strong (a few kG), compact ($\leq R_{\text{star}}$) and multipolar surface field and ii) a weaker (a few 0.1 kG), large-scale ($\gg R_{\text{star}}$), low-order (dipolar or quadrupolar) component. The former is held mostly responsible for the X-ray properties of young stars, while the latter directly interacts with the inner disk at a few stellar radii thus giving rise to magnetospheric accretion onto the star.

Session II reported the latest observational evidence for magnetospheric accretion in young stars and reviewed of the state-of-the-art modelling of accretion columns, accretion shocks and inner disk structure. Radiative transfer models have undergone a spectacular development, allowing a direct comparison of predicted line profiles shapes and variability with high spectral resolution time series of young stars. The confrontation model predictions and synoptic observations globally support the magnetospheric accretion paradigm but also identify remaining open issues such as the temperature structure of the accretion funnel flows. Interferometric results were particularly highlighted, which are now able to probe the inner disk structure.

Session III specifically focussed on the relationship between the accretion and ejection processes in young stars. New results indicate that inner warm winds are ubiquitous in young accreting stars, with clear evidence that they originate close to the star, even though current observations cannot yet distinguish between stellar winds and/or inner disk winds. Various MHD jet launching mechanisms were presented and discussed in the framework of these observations.

Session IV started with review talks of new and mostly unpublished results on the angular momentum evolution of young stars, which provide clear observational evidence that at least a fraction of young stars and brown dwarfs are braked while accreting from their disk. The angular momentum regulation of young stars by magnetically-mediated disk accretion is one of the most fundamental challenge theoretical models have to face. Various classes of MHD models were presented, including the latest analytical developments and state-of-the-art numerical simulations, featuring spectacular 3D movies of non-axisymmetric accretion on inclined multipolar stellar fields. A lively, 2h-long panel discussion took place after this session and probably was the climax of the conference.

Session V broadened the scope of the meeting by extending the discussion of magnetospheric accretion to young binary systems, cataclysmic variables, intermediate-mass PMS stars and young brown dwarfs. The impact of magnetospheric accretion onto planet migration was also discussed, with the report of a peak in the orbital distribution of hot Jupiters at a period of about 3 days, puzzlingly coinciding with current estimates of the magnetospheric disk truncation radius in young stars.

Finally, I. Appenzeller summarized the conference by highlighting what we seem to know at this stage and what remains as open issues to be addressed in a near future.

This symposium was undoubtedly quite timely, with new results presented and vivid discussions ensuing between the participants. We include below the feedback we received from some of the participants:

“I very much enjoyed the meeting. I do not go to many conferences these days, and this one had a number of good discussions and a range from good reviews to the newest results.”

“And the real thanks are due to you- who put out a heroic effort to construct a highly successful meeting. It succeeded on all fronts- scientific, social, and 'atmosphere'! “

“En attendant, je voulais te remercier pour cette conférence que j’ai trouvée vraiment passionnante, super bien organisée (pauses, posters pres des pauses, etc.)”

“Congratulations for the very well organized conference”, “thanks again for a great meeting!!”

“I liked the meeting very, very much. For me it has been the most interesting meeting that I have attended in the last years. Thanks a lot!!”

“Let me thank you for such a nice and well organized conference. Scientifically it was a very important meeting, with a set of very interesting and relevant communications.”

“Thanks for inviting me. I enjoyed the conference and the hospitality thoroughly. Your masterful organizational skills are highly appreciated.”

Proceedings:

J. Bouvier & I. Appenzeller (eds.), 2007,

Star-Disk Interaction in Young Stars

Proc. IAU Symp. No. 243, Grenoble, France, 21-25 May 2007.

(Cambridge: CUP) ISBN: 0-521-874653, 12 November 2007,

e-book: <http://journals.cambridge.org/action/displayJournal?jid=IAU>

IAU Symposium No 244, Post Meeting Report

- 1. IAU Symposium Number:** 244
- 2. Title of meeting:** Dark Galaxies and Lost Baryons
- 3. Dedicated to:**
- 4. Location:** Cardiff, UK
- 5. Date of meeting:** 25-29 June 2007

6. Scientific Organising Committee:

Jonathan Davies (UK - Chair)
Ken Freeman (Australia – co-Chair)
Paolo Salucci (Italy)
Joop Schaye (Netherlands)
Carlos Frenk (UK)
Simon White (Germany)
Riccardo Giovanelli (USA)
Igor Karachentsev (Russia)
Chris Impey (USA)
Sabina Sabatini (Italy)
Pierre Magain (Belgium)
Ben Moore (Switzerland)
Jessica Rosenberg (USA)

7. Local Organising Committee:

Jonathan Davies
Mike Disney
Luca Cortese
Sue Hayward-Lewis
all at Cardiff University

- 8. Number of participants:** 96 (17 IAU grants awarded)

- 9. Countries represented:** 19

Australia (2), Belgium (1), Canada (2), China Taiwan(1), Finland (3), France (3), Germany (11), Italy (3), Korea (1), Mexico (1), Netherlands (4), Poland (1), Russia (6), South Africa (1), Spain (1), Sweden (2), Switzerland (3), UK (18), USA (31)

- 10. Report submitted by:** Jonathan Davies

Place & Date: Cardiff, UK, 20 July 2007

Scientific Highlights

IAU Symposium 244 took place as scheduled from the 25th – 29th June 2007. The weather was a little cloudy, cool and wet which took some of the delegates by surprise, but even so the feedback we obtained was all positive. Our eventual number of participants was 96 (target was 100) and we were really pleased with the range of experts in the field that we attracted along with the many young and up and coming researchers that attended. We also had a number of people from less fortunate countries that benefited from IAU grants. The social events (welcome buffet, dinner in Caerphilly Castle and a walk along the coastal cliff path) were all well attended and appeared to be enjoyed by all. They were hopefully a means of forming friendships and scientific collaborations. We have received a number of emails saying how much they enjoyed the symposium and how much they learnt.

The meeting both started and end with a theorist. Frenk did an excellent job of setting the scene and highlighting many of the most important issues and many speakers throughout the week referred back to this talk as a reference. Important issues were a comparison of the inventory of baryons at low redshift compared to that predicted from big bang nuclear synthesis and particularly what galaxy formation models have to say about this – it is clear that many baryons must be ‘lost’ to the warm inter-galactic regions. Moore concluded the symposium by questioning the existence of dark galaxies and suggesting that observations may now be indicating that cold dark matter is not the answer – invoking dark matter with other properties may provide a better solution to the observations.

Sandwiched between these two theoretical talks were numerous others and we will now highlight a few. Wyse described some of the very new and important work being carried out using the SDSS data to identify faint dwarf galaxies in the Local Group (this theme was later developed and expanded on by Grebel). The important issue is whether these galaxies can now account for the ‘missing satellites problem’ . The answer seemed to be ‘not yet’. Two very important results were that no matter what luminosity the dwarfs had they seemed to lie on a line of constant mass (later queried by Geha) and that this minimum mass for a dark matter halos placed constraints on the nature of dark matter – implying warm rather than cold dark matter.

A number of speakers (Dye, Koopmans, Courbin, Maccio) talked about strong lensing and what this told us about the nature of the lens. An important issue was the structure of the lens and whether this was well modelled by the numerical simulations – the jury still seems to be out on this one.

There was much debate about whether a dark halo with baryons could actually remain dark i.e. what are the conditions for star formation. In the models of Davies there appeared to be plenty of scope for dark galaxies while the models of Taylor predicted far fewer dark galaxies – the two predictions seemed to move closer together as the debate proceeded. Later in the week Schaye discussed in detail the conditions under which stars may and may not form, the issue is what the conditions are really like in the early Universe.

Blind 21cm surveys offer the opportunity to detect dark galaxies containing gas, but no stars. Results were presented from a number of surveys (ALFALFA, Giovanelli and Haynes, AGES, Minchin, THINGS, de Blok) and the findings were controversial and caused much heated discussion. In the main this was about the nature of the source VIRGOHI21 – is it a dark galaxy or just part of a long tidal stream pulled out via a gravitational interaction? There was also much debate about numerical models of VIRGOHI21 (Duc and Davies) and how well they matched up with the observations.

Tully showed some fascinating graphics of the distribution of galaxies in the Local Universe illustrating the groups, clusters, filaments and particularly the emptiness of the voids. Gonzalez and Zibetti both showed what can be found using deep imaging when they showed fascinating images of the structure between galaxies in clusters (structure in the intra-cluster light) this clearly illustrates the very different environments galaxies live in with the cluster environment clearly affecting and stripping material from the galaxies.

The symposium finished on the Friday afternoon with a 2 hour free discussion about issues that had come up during the week. Prominent amongst these was the issue of whether there might be dark matter halos with no stars, but detectable gas and the implications for a minimum dark matter halo mass. We certainly gave the delegates much to think about as they made their way home.

Proceedings:

J. I. Davies & M. D. Disney (eds.), 2007,
Dark Galaxies and Lost Baryons
Proc. IAU Symp. No. 243, Cardiff, UK, 25-29 June 2007
(Cambridge: CUP) ISBN: 0-521-874661, due November 2007,
e-book: <http://journals.cambridge.org/action/displayJournal?jid=IAU>

IAU Symposium No 245, Post Meeting Report

1. IAU Symposium Number: 245

2. Title of meeting: Formation and Evolution of Galaxy Bulges

3. Dedicated to:

4. Location: Oxford, UK

5. Date of meeting: 16 – 20 July 2007

6. Scientific Organising Committee:

Martin Bureau (United Kingdom – Chair)
Nobuo Arimoto (Japan)
Douglas Richstone (USA.)
Sandra Faber (USA)
Evagelia Athanassoula (France)
Rachel S. Somerville (Germany)
Barbuy Barbuy (Brazil)
Matthias Steinmetz (Germany)
Sukyoung K. Yi (South Korea)
Kenneth C. Freeman (Australia)
Guinevere Kauffmann (Germany)
Dante Minniti (Chile)

7. Local Organising Committee:

Martin Bureau
Vanessa Ferraro-Wood
Davor Krajinovic
Millicent Maier
all at Oxford, and
Marc Sarzi (University of Hertfordshire)

8. Number of participants: 174 (IAU Grants 31)

9. Countries represented: 27

Australia, Brazil, Canada, Chile, Croatia, Finland, France, Germany, India, Iran, Israel, Italy, Japan, Lebanon, Mexico, Netherlands, Nigeria, People's Republic of China, Poland, Russia, South Africa, South Korea, Spain, Sweden, Switzerland, United Kingdom, United States of America

10. Report submitted by: Martin Bureau

Place & Date: Oxford, UK, 9 August 2007.

Scientific Highlights:

Formation and Evolution of Bulges:

The meeting started with a brief overall review of various bulge-related issues by Freeman, where in addition to the hierarchical and secular topics discussed below it was stressed that bulgeless galaxies with halos do exist, implying first that bulges are not a pre-requisite for discs formation and second that halos and bulges must generally have different origins. This clearly set the theme for a meeting specifically dedicated to bulges. Emsellem then reported an important finding from the SAURON team, that local early-type galaxies can naturally be classified into slow and fast rotators based on their specific angular momentum content (rather than more classical morphology-based classifications), a distinction which may give greater insight into the physical processes leading to their formation.

In keeping with our plan to have the models presented early-on in the meeting, the first topic of the symposium followed with a discussion of so-called chemodynamical models, where the abundances of specific elements are traced over cosmic time together with the evolution in galaxy populations. Despite a lot of the baryonic physics being poorly understood, and the use of recipes to track star formation and chemical enrichment, a case was made by Gibson, Pipino, and Kobayashi that these models do a rather good job at reproducing observations. In fact, an enduring theme of the meeting was how well classic/closed-box passive evolution models still match observations, a fact which is not straightforward to reconcile with either hierarchical or secular evolution scenarios of bulge formation.

Hierarchical models were next, and surprisingly considering the last few years the so-called nuclear cusp slope and missing satellites problems did not take the front stage, no doubt because theorists have made great stride in explaining them. The talks focused mostly on the third problem, that of the formation of overly compact discs (compared to observations), or more appropriate here the hierarchical formation through mergers of spheroids which are also too compact. The hierarchical simulations still have fundamental problems in creating the vast numbers of galaxies with small bulge-to-disc ratios observed in nature. Many speakers (e.g. Steinmetz, Naab) made a clear case that gas and dissipation are required to explain many properties of spheroids, but too much associated star formation is also bad. Many talks thus addressed either directly or indirectly the possible feedback mechanisms which may allow to balance those conflicting requirements. But while ideas abound there is unfortunately still no consensus on the appropriate mechanism. Gas dynamics and feedback from star formation must play a key role in forming the right kinds of discs and spheroids, but feedback from a central black hole and active galactic nucleus (AGN) must also prevent subsequent gas infall. The objects created will then strongly depend on the exact merger history (e.g. epoch of the mergers in addition to mass ratios and gas fractions). Another recurrent but perhaps under appreciated comment during the symposium was that more attention should be paid to (possibly repetitive) minor, relatively quiet mergers to form bulges (as opposed to large violent nearly equal-mass mergers; e.g. Cox). An interesting point was also made the mechanisms responsible for colour and morphology evolution can not be identical (van der Wel).

Possible secular mechanisms to form bulges were discussed next, with Athanassoula, Martinez-Valpuesta, and Klypin all reviewing the now overwhelming evidence that bars can lead to the formation of boxy-shaped bulges thanks to buckling (and the subsequent strengthening of the bar through angular momentum exchange mediated by resonances). Kormendy also reviewed the evidence that some bulges are more akin to centrally concentrated discs (with often significant star formation and gas dissipation) than spheroidal bulges, while other speakers argued for an even greater variety of bulge types

(e.g. Erwin). As many bulges types with different formation mechanisms are now clearly recognised, a large discussion took place during the free afternoon to tackle the associated nomenclature problems. This is very important and timely as the quality of numerical simulations and higher redshift observations can now start to tackle those refinements as well. Important steps for an improved classification will be proposed in a proceeding paper emerging from that discussion. While the case of classical bulges (i.e. bulges formed rapidly, presumably through mergers) is clear, how to classify the different bulges formed secularly is proving more controversial, with some proponents arguing to label all of them as pseudo-bulges (e.g. Kormendy), other to make a few clearly-defined categories (e.g. Bureau).

Star Formation and Nuclear Activity:

Secular evolution led naturally to the topic of star formation and nuclear activity. Combes, Schinnerer, and others emphasised the importance of angular momentum transfer through gravity torques to bring gas to the inner parts of discs, thus leading to bulge-like structures and possibly recurrent bar formation-destruction cycles. This simultaneously stresses the potential importance of external gas accretion to explain many of the structures seen today. Spectacular detailed evidence of gas inflow and associated star formation were shown across many wavelengths (e.g. CO: Young; Halpha, Falcon-Barroso). Interestingly, many red sequence early-type galaxies were found to have extended LINER-like emission, raising many questions about the ionisation mechanism (and pervasiveness) of the gas (Graves).

The topic of supermassive black holes in galaxies has without doubt been one of the most active in recent years, and occupied an important place at the symposium. The talk by Richstone set the tone, clearly reviewing the basic correlations between the black hole mass and bulge mass or velocity dispersion, and discussing their possible origins and consequences for galaxy evolution. More complicated relations were also discussed (Hopkins), as well as core-scouring by the black hole, but little evidence in support of the latter was found in the orbital distributions of a large sample of galaxies modelled in details (Cappellari). Ferrarese and van der Marel then presented exciting developments in the study of galaxy nuclei. Ferrarese questioned the dichotomy of galaxy nuclear cusp slopes and argued that, in any case, it is better viewed as a deficit or excess compared to a Sersic law fit. She also argued that galaxy nuclei follow the same black hole mass (or thus more generally central objects mass) – velocity dispersion relation as bulges, while van der Marel argued that nuclei are structurally different from bulges and have mixed stellar populations with significant recent star formation. They must also be formed in situ yet are very dense, posing puzzling questions about their formation.

Stellar Populations

Stellar populations offer stringent constraints for both hierarchical and secular bulge formation and evolution mechanisms, and Arimoto reviewed the latest developments for unresolved populations. The fact remains however that bulges appear old, metal-rich, and enhanced in alpha elements (although less so than early-type galaxies and with some central star formation), indicating a rapid formation epoch. Peletier and Silchenko however stressed the importance of using integral-field data rather than a simple central aperture as is usual. Peletier revealed a great variety in the stellar populations of bulges, with multiple superposed stellar populations and star formation in rings, nuclei, and messy structures, especially in later-type spirals (although many lenticulars also have young stars). From linestrength analyses, Thomas similarly argued that spiral bulges are rejuvenated, in agreement with the general "downsizing" trend for star formation in galaxies. Silchenko discussed chemically-decoupled cores, and stressed the difference between bulges and nuclei both dynamically and age-wise, although both show a steeper

[Mg/Fe] - velocity dispersion relation than ellipticals, suggesting different formation scenarios. Aragon-Salamanca made probably the most convincing case to date that SOs are dead/faded spiral galaxies, relying on arguments ranging from the Tully-Fisher relation to the globular cluster specific frequency.

Resolved stellar population studies of local galaxies, especially the Milky Way and Andromeda, probably provide the most detailed information we have on stellar populations in bulges. Minniti reviewed various efforts, and while all indications are indeed that the bulge stars formed rapidly (and a long time ago), this does not necessarily represent how those stars assembled into the bulge itself. Furthermore, while gradients in age and metallicity are clear, their origins are not and contamination by halo and disc stars (which also peak in the centre of galaxies) remain possible. The bulge chemical abundances further appear clearly distinct from those of the thin and thick discs, and are only similar to those of the bulge globular clusters (Lecureur). An exciting development for the dynamics of the Milky Way bulge is the recent measurement of radial velocities

(e.g. Rich) and proper motions (e.g. Soto, Vieira) for various samples of individual bulge stars, which means that up to 5 of the 6 phase-space parameters are now available for hundreds of stars (and possibly all 6 parameters in the more distant future, e.g. Gouda). These will without doubt provide the strongest constraints on bulge dynamical models. Evidence for triaxiality is already emerging.

Distant Bulges and Large Surveys

Large surveys of statistically meaningful numbers of galaxies play an increasingly important role in studying the evolution of galaxy populations. Koo discussed medium redshift observations from DEEP2 and AEGIS, which provide precise spatially-resolved kinematics of galaxies to medium redshifts. All bulges appear already red at $z \sim 1$, with little colour or number evolution since, although the bulges are brighter in the past which interestingly does require a small drizzle of star formation since. Another important result is that the scatter in the Tully-Fisher relation reduces when using the quantity $\sqrt{V^2/2 + \sigma^2}$ instead of simply σ , taking into account turbulent non-circular motions. Most importantly, no evolution in the relation is then seen to $z \sim 1$. Yi also argued for a drizzle of star formation in a large fraction of early-type galaxies (at least 15%) based on GALEX ultraviolet imaging, mostly at low mass, a result supported by a novel analysis technique applied to optical SDSS data (Nolan). The emission line ratios also correlate with the star formation, blue cloud galaxies being star forming, while green valley objects show transition or AGN-type spectra, and red sequence galaxies have no emission, suggesting an evolutionary sequence driven by AGN feedback and quenching. A critical black hole mass to shut down star formation is also suggested. Large datasets from SDSS, the Millennium Galaxy Catalogue, and instruments such as 6dF and AAOmega are also emerging, establishing the first local statistical benchmarks to compare with existing large surveys at higher redshifts. These all open rich data mining possibilities for the future. For example, the Millennium Galaxy Catalogue indicates that the blue-red dichotomy of galaxies is paralleled by a dichotomy in Sersic index n , and suggests an intriguingly large amount of dust in bulges.

The situation of medium and high redshift bulges was reviewed by Conselice. Assuming passive evolution, there are not enough red sequence galaxies at high z to account for today's bulges, so the red sequence must be growing with time. However, within a factor of 2 to 3, the massive galaxies do seem in place by a redshift of 1. Many early-type galaxies are disturbed at high z , and many massive galaxies are blue, suggesting that most of the evolution on the red sequence is due to downsizing in the star formation. Balcells also argued that just like locally, bulges at medium redshifts have the same colour as their discs, so some rejuvenation is needed and cessation of star

formation must be synchronised in both the disc and bulge. High quality spatially-resolved spectroscopy now also allows to target medium z bulges specifically for fundamental plane studies

(e.g. MacArthur). Yes more results are starting to appear at very high redshifts.

Scientific Summary:

Overall, the symposium did succeed to bring together researchers interested in hierarchical and secular formation mechanisms, one of the main aims set at the start. Modellers also took notice of the increasingly detailed and necessarily more complex view of bulges developed over the last 10-15 years (since the last full-scale meeting entirely dedicated to bulges), and are now trying to incorporate some of those ideas into their models, another stated goal of the meeting.

Unfortunately, the goal of bringing the low (zero) and high z communities was less successful, no doubt due to the meeting held in Heidelberg at the same time which attracted a large fraction of the latter community. The clash of schedules simply could not be prevented. However, the hope is that the representatives of the high z community we did have will spread the word!

Perhaps the most important achievement of the symposium is the clear implicit message that bulges are complex objects, and that the standard view of all bulges as pressure-dominated spheroidal objects (with old, metal-rich, alpha-enhanced stellar populations presumably formed in a rapid/violent event) is no longer accurate nor sufficient. The symposium clearly demonstrated that the classical ways of identifying bulges actually encompass a variety of objects, some no doubt formed rapidly but others dominated by secular processes, with galaxy nuclei having tantalisingly close properties to bulges as well. Some of these types of bulges emerged as fairly well understood and deserving of a name or class for themselves (e.g. boxy bulges related to bars), while others are just emerging from the shadows and still require much investigations to be fully understood. The symposium made much headway in clarifying all this, but no doubt that more work is needed (especially to communicate the message to non-experts). Nevertheless, the important first stone has been laid, and there will hopefully be no turning back.

While much of those different bulges types were identified through structural and dynamical studies of nearby bulges, both integrated and resolved stellar populations studies have and will prove crucial in disentangling and testing the different formation processes suggested, and higher redshift studies are essential to consistently insert those ideas in the dominant hierarchical structure formation scenarios. As both studies of the Milky Way/Andromeda bulges and medium/high redshift galaxies are making rapid progress and will surely continue to do so, the future is bright.

Except for a few minor hiccups, IAU Symposium 245 went very smoothly. The comments received either directly or indirectly were overwhelmingly positive, and there was great satisfaction with the venue, accommodation at St Anne's College, symposium dinner, and general logistical issues. The scientific programme was also perceived as being well-balanced, and the line-up of speakers was praised as being of the highest calibre. Posters were also of very high quality, and we awarded two prizes (symposium dinner and GBP 50 book voucher) to Katia Ganda from the Kapteyn Institute, Groningen University, and Daniel Ceverino from the Astronomy Department, New Mexico State University.

Public Outreach

In addition to the main scientific programme, there was a public lecture series consisting of three evening seminars focussing on the shared astronomical heritage of Middle-Eastern/Islamic and Western/Christian societies. The lectures attracted over 250 people in total, with many attending all three lectures. Given the limited advertisement we did, this is a resounding success by any account, and it highlighted a real demand for such lectures. The lectures were:

- Monday July 16: Mapping the Skies in Medieval Islam
Dr. Emilie Savage-Smith, Professor of the History of Islamic Science, Oriental Institute, University of Oxford
- Tuesday July 17: The Medieval Cosmos: Researching and Teaching Astronomy in the Medieval Universities of Europe
Dr. Allan Chapman, Faculty of Modern History, University of Oxford
- Wednesday July 18: The Astrolabe, East and West
Dr. Stephen Johnston, Assistant Keeper, Museum of the History of Science, University of Oxford

There was public viewing of the night sky following each lecture, but given the poor weather during the symposium we (somewhat fortunately) only attracted a limited number of people (about 50), with actual viewing only possible intermittently during one evening.

Proceedings:

M. Bureau, E. Athanassoula, & B. Barbuy (eds.), 2007,
Formation and Evolution of Galaxy Bulges
Proc. IAU Symp. No. 245, Oxford, UK, 16-20 July 2007
(Cambridge: CUP) ISBN: 0-521-87467X, due January 2008,
e-book: <http://journals.cambridge.org/action/displayJournal?jid=IAU>

IAU Symposium No 246, Post Meeting Report

1. IAU Symposium Number: 246

2. Title of meeting: Dynamical Evolution of Dense Stellar Systems

3. Dedicated to: Douglas Heggie

4. Location: Capri, Italy

5. Date of meeting: 5-9 September 2007

6. Scientific Organising Committee:

Enrico Vesperini (USA – Chair)
Sverre Aarseth (United Kingdom)
Steve McMillan (USA)
Holger Baumgardt (Germany)
Georges Meylan (Switzerland)
Christian Boily (France)
Seppo Mikkola (Finland)
Mirek Giersz (Poland)
Simon Portegies Zwart (Netherlands)
Douglas Heggie (United Kingdom)
Alison Sills (Canada)
Vicky Kalogera (USA)
Rainer Spurzem (Germany)
Jun Makino (Japan)
Michele Trenti (USA)
Rosemary Mardling (Australia)

7. Local Organising Committee:

Anna Pecoraro
Elena Ferraro (both from Palazzo Congressi Capri, Italy)
Michele Trenti (STScI)

8. Number of participants: 130 (39 IAU Grant recipients)

9. Countries represented: 22

Australia 2, Belgium 3, Canada 8, Chile 3, Finland 1, France 3, Germany 19, India 3, Israel 3, Italy 13, Japan 6, Korea 2, Netherlands 8, New Zealand 1, Poland 2, Portugal 1, Russia 2, Sweden 1, Switzerland 2, UK 13, USA 31.

10. Report submitted by: Enrico Vesperini

Place & Date: Philadelphia, USA, 8 October 2007

Scientific Program

Dense stellar systems are an interface between dynamics, stellar evolution, formation of galaxies and provide us with an ideal laboratory to understand many different aspects of these important fields as well as to explore the interplay between them. A wealth of observational data have now convincingly shown that the dynamical evolution of a star cluster, its structural and kinematical properties, the properties of its stellar population, the abundance of exotic objects such as pulsars, X-rays sources, blue stragglers are closely related to each other: a full understanding of the evolution of star clusters can not be reached without properly considering the interplay between stellar dynamics and stellar evolution. The role played by the host galaxy in the formation and evolution of star clusters is an important additional element along with the effects of stellar dynamics and stellar evolution.

The IAU Symposium 246 addressed all the aspects of the formation and evolution of star clusters and attracted both observers and theoreticians with expertise covering all the fields relevant for a complete understanding of star clusters: stellar dynamics, hydrodynamics and stellar evolution, galactic and extra-galactic astronomy as well as experts in the development of all the computational tools (special-purpose hardware, software, algorithms) needed to make progress toward more realistic simulations of the evolution of these objects.

The scientific program consisted of 24 Invited talks (25'+ 1 0' for question), 31 Contributed talks (15'+5') and 50 poster presentations. Many talks have been given by young researchers and post-docs and, in order to increase the impact of posters, all the poster presenters have been given the opportunity to give a short (2') talk to present the main results of their posters.

The Symposium started with a Session on Clusters Formation and Early Evolution (speakers: C. Clarke, R. Klessen, C. Roman Zuniga, S. McMillan, L. Smith, P. Kroupa, S. Schmeja, N. Bastian, H. Baumgardt, M. Gieles) during which theoretical and observational studies addressing the formation and the early stages of star clusters life, the evolution of their structure in hierarchical formation scenarios, the role of early gas expulsion on their lifetimes and the origin of early mass segregation have been presented.

The second session, Globular Cluster Systems (E. Grebel, P. Cote, M. Rejkuba, S. Zepf, M. Fall, G. Parmentier, O. Gnedin, A. Kundu, B. Harris), has been devoted to presentations on the properties of young and old cluster systems, to the results emerging from large observational surveys of extra-galactic cluster systems and to a number of theoretical studies aimed at understanding the role of evolution in determining the current properties of star cluster systems and their relationship with the properties of their host galaxies.

The Symposium continued with two sessions on Open Clusters (R. Mathieu, J. Hurley, M. Giersz) and Globular Clusters (I. King, G. De Marchi, D. Heggie, R. Spurzem, E. Vesperini, G. Piotto, F. D'Antona, J. Fiestas, S. Chatterjee, D. Mackey). Observational results on the internal structural properties of clusters and their correlations with their stellar content have been presented along with presentations on the observational evidence and the possible origin of multiple generations of stellar populations within individual star clusters. A number of talks covered many aspects of the theoretical and numerical study of star clusters ranging from the fundamental aspects of the dynamics of globular clusters to the most advanced numerical simulations. Results of numerical simulations aimed at modeling individual star clusters and at exploring the role of different processes and specific stellar populations on the dynamical evolution of globular clusters have been presented.

In the session on Few-body Systems, Binary Dynamics and its Interplay with Star Clusters Dynamical Evolution (M. Valtonen, R. Mardling, S. Mikkola, P. Eggleton, J. Fregeau, M. Trenti, S. Banerjee, A. Tanikawa) analytical and numerical studies of the dynamics of binary and triple systems as well as of the key role played by these systems in the internal dynamical evolution of star clusters and in determining their current structure have been presented.

In the talks presented in the session Exotic stellar populations (S. Ransom, N. Ivanova, C. Boily, F. Verbunt, F. Ferraro, N. Leigh, B. Lanzoni, C. Knigge, K. Gebhardt, T. Maccarone, E. Noyola, S. Umbreit), the properties of objects such as millisecond pulsars, blue stragglers, LMXBs, intermediate-mass black holes, the importance and the relation between their properties and the structural properties of the clusters and, in turn, their role in the dynamics of star clusters have been fully discussed.

In the last session on Computational Aspects (S. Aarseth, J. Makino, Y. Funato, M. Fujii, K. Nitadori, E. Mamikonyan, P. Rut, S. Portegies-Zwart) the current status of the next-generation special purpose board for N-body simulations, GRAPE-DR, the most recent advances in the development of codes and algorithms for the detailed numerical study of the internal evolution of dense stellar systems as well as of codes allowing to explore the interaction of clusters with their host galaxy have been presented. The development of software enabling remote collaborations and allowing researchers to share and discuss simulations results in a 3D virtual laboratory has also been presented.

Proceedings:

E. Vesperini, M. Giersz, & A. I. Sills (eds.), 2007,
Dynamical Evolution of Dense Stellar Matter
Proc. IAU Symp. No. 246, Capri, Italy, 5-9 September 2007
(Cambridge: CUP) ISBN: 0-521-874688, due March 2008,
e-book: <http://journals.cambridge.org/action/displayJournal?jid=IAU>

IAU Symposium No 247, Post Meeting Report

1. IAU Symposium Number: 247

2. Title of meeting: Waves and Oscillations in the Solar Atmosphere:
Heating and Magneto-seismology

3. Dedicated to:

4. Location: Isla de Margarita, Venezuela

5. Date of meeting: 17-22 September 2007

6. Scientific Organising Committee:

R. Erdelyi (UK co-Chair)
C. A. Mendoza-Briceno (Venezuela co-Chair)
J. L. Ballester (Spain)
F. Reale (Italy)
A. Benz (Switzerland)
R. Rutten (Netherlands)
P. Cally (Australia)
S. Solanki (Germany)
A. Stepanov (Russia)
S. Hasan (India)
T. Sakurai (Japan)
C. Mandrini (Argentina)
B. Schmieder (Japan)
J. Mariska (USA)
A Title (USA)
T.J. Wang (China Nanjing)

7. Local Organising Committee:

M. Ibanez
C. Mendoza-Briceno (Chair)
A. Parravano
L. Sigalotti
N. Anez
all from Venezuela, and
Kéray, Marianna (Secretary to IAUS 247), Sheffield, UK

8. Number of participants: 75 (28 IAU Grant recipients)

9. Countries represented: 18

Argentina 1, Australia 1, Belgium 2, Bulgaria 2, Egypt 1, Germany 2, India 3, Italy 1, Japan 4,
Norway 6, Romania 1, Russia 4, Slovakia 1, Spain 9, Switzerland 2, UK 19, USA 8, Venezuela 5.

10. Report submitted by: Cesar A. Mendoza-Briceno, and Robert Erdélyi

Place and date: Merida, Venezuela, 12 November 2007

Scientific Highlights

The goal of this symposium was to gather together specialists observationally studying solar and stellar lower atmospheric and coronal phenomena in the (E)UV, radio, visible light and X-ray bands and the theorists developing modelling (both analytical and numerical) of (magneto)hydrodynamic (MHD) waves and oscillations in structured media, lower atmospheric and coronal heating and atmospheric magnetoseismology, and to discuss the current trends and issues of research in the field both in the context of solar and stellar physics. The emphasis was on wave and oscillation observations in different observational bands, consolidation of the theory and the observational findings, observations with new and future solar mission, RHESSI, Solar B, STEREO and SDO.

The Symposium consisted of ten sessions:

1. Waves and oscillations in solar and stellar interior
2. Coupling of global solar and stellar motions into the lower atmosphere
3. Seismology of the lower solar atmosphere and stellar chromospheres
4. Seismology of open vs. closed magnetic structures
5. Prominence seismology
6. Dynamical processes and coupling in the magnetic atmosphere of sun and stars
7. Solar and stellar global coronal seismology
8. Fundamental physical processes in coroneae: waves, turbulence, reconnection
9. Waves and instabilities in atmospheric plasmas
10. Wave-particle interactions in magnetized plasmas

Each session included contributions by leading scientists in the form of Invited Reviews and contribution talks as well as presentations of new results. Among the many highlights we report here just a few, giving a flavour of IAUS 247:

- 1, Opening Lecture by Prof Roberts, the founder of coronal seismology; His talk was extremely well received, highlighting the current status and future of solar magnetoseismology
- 2, There were a number of announcements of Hinode observations, claiming the discovery (!) of solar atmospheric Alfvén waves in the solar chromosphere and in prominences; these announcements were followed by very lively discussions, some continued late night. The discoveries will be formally published on 3 December 2007 in a Special Issue devoted to the subject by Science. The Chair of SOC was solicited by Science's Senior Editor to comment on these discoveries, fuelling further the lively discussions.
- 3, There was an interesting and novel announcement about the role of magneto-acoustic gravity waves, in light of some new observations.
- 4, There were a number of very high quality talks highlighting particular aspects of the field (observations; analytical progress, numerical studies)
- 5, The open discussions, allowing extended and sometimes rather heated discussions of the subjects as well as whole talks - see the meeting programme for details- provided the audience a splendid opportunity to gain insights into the different fields of research. Numerous feedbacks received about these relatively informal discussion sessions, mostly chaired by a pair of senior scientists playing the role of devil's advocates posing provocative questions, suggest that such forum were very highly appreciated by participants. We highly recommend to other organizers this approach.

A further prime goal of the Symposium was to encourage world-wide participation of the scientific community. The symposium was attended by about 75 participants, including a number of national (and Latin) students, from 18 countries from all over the world: Argentina, Australia,

Belgium, Bulgaria, Egypt, Germany, India, Italy, Japan, Norway, Romania, Russia, Slovakia, Spain, Switzerland, UK, USA, and Venezuela. There were roughly 21 invited speakers, 30 contributed talks and 30 poster contributions.

We also would like to report our disappointment about the low turn out/high number of cancellations by US colleagues. We have learned that a number of US colleagues were advised not to come to this meeting (in particular from US Government funded institutions) because of the political disagreements and unrest between the host country and the US. These withdrawals and the low US turn-out has very seriously influenced our budget, even jeopardizing the publication of the conference proceedings.

Finally, we would like to state that we were only partially aware of some of the difficulties we had faced (unusual law constraints in the host country), LOC/SOC have tried to make the meeting as smooth and convenient as possible. Most participants acknowledged the enormous efforts, were aware of some of the difficulties, and were very sympathetic and understanding. At the end LOC (SOC) has delivered, to the best of their knowledge, what they have signed up to: a high-standard, and high-profile IAU meeting in the less economically favourable part of the world. From the response of the participants we feel confident that the IAU Symposium 247 was one of the most remarkable ones in the field held during the past years and that it will leave unforgettable memories.

Proceedings:

C. Mendoza-Briceno & Robert Erdelyi (eds.), 2007,
Waves and Oscillations in the Solar Atmosphere: Heating and Magneto-Seismology
Proc. IAU Symp. No. 247, Isla de Margarita, Venezuela, 17-22 September 2007
(Cambridge: CUP) ISBN: 0-521-874696, due March 2008,
e-book: <http://journals.cambridge.org/action/displayJournal?jid=IAU>

IAU Symposium No 248, Post Meeting Report

1. IAU Symposium Number: 248

2. Title of meeting: A Giant Step: from Milli- to Micro-arcsecond Astronomy

3. Dedicated to:

4. Location: Shanghai, China Nanjing

5. Date of meeting: 15-19 October 2007

6. Scientific Organising Committee:

Michael Perryman (Netherlands co-Chair)
Shuhua Ye (China Nanjing co-Chair)
Ralf Launhardt (Germany)
Chunlin Lu (China Nanjing)
Alexandre Andrei (Brazil)
Francois Mignard (France)
Tim de Zeeuw (Netherlands)
Imants Platais (USA)
Dafydd Evans (UK)
Mark Reid (USA)
Wenjing Jin (China Nanjing)
David Schade (Canada)
Sergei Klioner (Germany)
Magda Stavinschi (Romania)
Irina Kumkova (Russia)
Catherine Turon (France)

7. Local Organising Committee:

Cheng Huang (Chair)
Li Chen Guoxuan Dong
Chenli Huang
Jinling Li
All at SHAO, Shanghai, China Nanjing

8. Number of participants: 182 (41 IAU Grant recipients)

9. Countries represented: 22

Australia 1, Belgium 1, Brazil 2, Canada 2, Chile 1, China Nanjing 44, Czech Republic 3, Denmark 1, France 22, Germany 16, Indonesia 1, Italy 9, Japan 18, Netherlands 5, Mexico 2, Romania 3, Russia 4, Spain 11, Sweden 2, UK 3, Ukraine 3, USA 28

10. Report submitted by: Wenjing Jin, Michael Perryman and Shuhua Ye

Place & Date: Shanghai, China Nanjing, 16 November 2007.

Scientific Highlights :

IAU Symposium No. 248, A Giant Step: From Milli- to Micro-arcsecond Astrometry, was held in Shanghai between 15–19 October 2007. Plans for the symposium had been initiated two years previously, and the meeting was the culmination of careful and lengthy preparation, both by the Scientific Organizing Committee (co-chaired by Michael Perryman of the European Space Agency and Shuhua Ye of the Shanghai Astronomical Observatory) and by the Local Organizing Committee (chaired by Huang Cheng of the Shanghai Astronomical Observatory). Nearly 200 participants attended the symposium, representing scientists from China and other Asian countries, Europe, North, Central and South America, and Australia.

The symposium intentionally addressed a very broad programme, in terms of wavelength coverage, instrumental techniques, and scientific objectives. This ensured a very wide scientific participation, a very high standard of invited and contributed presentations, many stimulating and productive discussions, and an excellent scientific atmosphere throughout.

The meeting was timed to coincide with the 10th anniversary of the Hipparcos and Tycho Catalogue released in 1997. It indeed marked a pivotal point in the remarkable and inexorable development of astrometry. It provided an opportunity for the scientific assessment of the notable successes of milli-arcsecond astrometry at both optical and radio wavelengths which have come to fruition over the past decade. The revolutionary technical successes of VLBI in the radio and the Hipparcos space astrometry mission in the optical have led to the International Celestial Reference Frame materialized almost simultaneously at the milli-arcsecond level at both radio and optical wavelengths. In the last few years, the Hubble Space Telescope Fine Guidance Sensor in the optical, and VLBA observations in the radio, have reached even higher astrometric precision. Many other projects, ranging from re-reductions within the Hipparcos reference frame of Schmidt plate measurements, UCAC and SDSS observations in the optical, and 2MASS in the infrared, have vastly extended the quantity of astrometric data at somewhat lower accuracy. Astrometric information is now available for around a billion objects, and growing rapidly in number and quality. What has made these technical successes so exciting is the astrophysical panorama which opens up as accuracies have broken through the milli-arcsecond level: with Hipparcos, geometric distance determinations to large numbers of objects out to 100 pc and beyond have become possible, studies of Galactic kinematics and dynamics in the solar neighborhood and beyond have been brought into much sharper focus, and these various programmes have provided a rich source of empirical data for the verification and refinement of models of star formation, stellar structure and evolution, and of Galactic formation and dynamical evolution. Motions of stars orbiting the Galactic center using adaptive optics imaging in the infrared, and accurate direct distance determinations to nearby star-forming regions using VLBA, are other remarkable examples of the information contained in high-quality astrometric data. As astrometry thus merges more firmly into astrophysics, the prospects for the future look even more remarkable. As prospects for parallaxes and proper motions for vast numbers of stars at the tens of micro-arcsecond level appear on the astronomical horizon, the symposium participants addressed the attendant scientific harvest that will flow from these data: an astonishingly precise picture of Galactic space motions will provide robust empirical evidence for the origin, formation and evolution of our Galaxy, while models of stellar structure and evolution will be further expanded to embrace the effects of rotation, chemical diffusion, magnetic fields, convection and internal mixing, seismology, and mass transfer. Early and late stages of stellar

evolution, dynamical and taxonomic studies of vast numbers of Solar System objects, the formation and evolution of exo-planets, unprecedented and detailed studies of the supermassive black hole at the Galactic center, precise studies of the applicability of General Relativity, and much more, will all become accessible. An even deeper understanding of the Milky Way's complex origin, evolution, and present-day structure will be directly tied to progress in observational astronomy at all wavelengths, and astrometry is now poised to take a leading role. Technical approaches for reaching these accuracies were presented, spanning the optical, infrared, and radio wavelength regimes. By the curious parallel development of disciplines so often witnessed in science, it appears that accuracies of tens of microarcseconds will become accessible almost simultaneously across this wavelength range, through developments of VLBI/VLBA, ALMA and SKA at radio frequencies, through the Gaia and SIM Planet Quest space missions in the optical, and through the accompanying development of theories of Earth rotation, of relativistic modelling, and through the supporting developments of data storage and data processing technologies at levels orders of magnitudes beyond the capabilities that existed only a decade or so ago.

Astrometric (infrared) instrumentation at the ESO VLTI and Keck interferometers and elsewhere will also contribute to these micro-arcsecond measurement capabilities. Massive ground-based surveys such as Pan-STARRS and LSST, where the data flows will be measured in Terabytes per night, should bear enormous astrometric harvest, although at a lower accuracy level. Many of these experiments and studies will be well under way within the coming decade.

The new and exciting opportunities that are opening up should also stimulate young scientists entering the field, and part of the symposium was devoted to highlighting the educational opportunities of modern astrometry based on the skills that will be required in the future.

The organizers express their gratitude for the active and constructive participation of the Scientific Organizing Committee throughout the preparation of the symposium. The symposium was sponsored and supported by IAU Divisions I (Fundamental Astronomy); and by the IAU Commissions No. 8 (Astrometry), No. 4 (Ephemerides), No. 19 (Rotation of the Earth), No. 26 (Double and Multiple Stars), No. 33 (Structure and Dynamics of the Galactic System), No. 35 (Stellar Constitution), No. 40 (Radio Astronomy), and by the following IAU Working Groups: General Relativity in Celestial Mechanics, Astrometry and Metrology; Natural Planetary Satellites, Nomenclature for Fundamental Astronomy; Optical/Infrared Interferometry; and Global VLBI.

All participants and their accompanying guests were pleased to express their collective gratitude to the Local Organizing Committee, comprised by Huang Cheng and his colleagues of the Shanghai Astronomical Observatory, who did so much to make the meeting run smoothly and efficiently, and to make it both enjoyable and highly memorable.

Funding for the meeting, including essential travel sponsorship, was kindly and generously provided by the International Astronomical Union, the Chinese Astronomical Society, the National Natural Science Foundation of China, the National Science Foundation of the USA, the Shanghai International Culture Association, the Science and Technology Commission of Shanghai Municipality, the National Astronomical Observatories, the Shanghai Astronomical Observatory, and the Chinese Academy of Sciences.

Proceedings:

Wenjing Jin, I. Platais & M. Perryman (eds.), 2007,
A Giant Step: from Milli- to Micro-arcsecond Astronomy
Proc. IAU Symp. No. 248, Shanghai, China Nanjing, 15-19 October 2007
(Cambridge: CUP) ISBN: 0-521-87470X, due March 2008,
e-book: <http://journals.cambridge.org/action/displayJournal?jid=IAU>

IAU Symposium No 249, Post Meeting Report

1. IAU Symposium Number: 249

2. Title of meeting: Exoplanets: Detection, Formation and Dynamics

3. Dedicated to:

4. Location: Suzhou, China Nanjing

5. Date of meeting: 22-26 October 2007

6. Scientific Organising Committee:

Sylvio Ferraz-Mello (Brazil co-chair)

Yi-Sui Sun (China Nanjing co-chair)

Renu Malhotra (USA)

Geoffrey W. Marcy (USA)

France Allard Ecole (France)

Michel Mayor (Switzerland)

Pierre Barge (France)

Victoria S. Meadows (USA)

Alan Boss (USA)

Karen Meech (USA)

Rudolf Dvorak (Austria)

Andrea Milani (Italy)

John D. Hadjidemetriou (Greece)

Richard P. Nelson (UK)

Douglas N.C. Lin (USA)

Penny Sackett (Australia)

7. Local Organising Committee:

Ji-Lin Zhou (chair, Nanjing University)

Li-Yong Zhou (Nanjing University)

Yong-Luo Cao (Suzhou University)

Jian-Zhen Wang (Suzhou University)

Guo-Xuan Dong (Natural Science Foundation of China)

8. Number of participants: 129 (31 IAU Grant recipients)

9. Countries represented:

Argentina 1, Australia 2, Austria 2, Brazil 2, Canada 1, Chile 2, China Nanjing 25, China Taiwan 1, Czech Republic 1, France 9, Germany 17, Greece 2, Italy 2, Iran 1, Japan 12, Poland 2, Portugal 1, Russia 2, Sweden 2, Switzerland 2, UK 4, USA 37.

10. Report submitted by: Sylvio Ferraz-Mello & Yi-Sui Sun
Date and place: 20 November 2007, Nanjing, China

Scientific Highlights

Seven years passed since the last IAU-sponsored symposium on planetary system (IAU Symposium 202, Planetary Systems in the Universe: observation, formation and evolution, Manchester, UK, August 7-10, 2000), and twelve years passed since the first discovery of extrasolar planets around main sequence (MS) stars (1995). We have accumulated so many years of observations of planets around MS stars. They are of a great diversity of types: radial velocities, transits, and, in a yet few cases, gravitational microlensing, astrometry, spectra, direct imaging, polarimetry, etc. It's in a good time to present the rapidly expanding field since 2000 and to present first results from the Corot transit photometry space mission, scheduled for launch in 2006. Moreover, it is already possible to consider the modelization of the planetary atmospheres and the internal structure of the planets.

From 2005, the organizing committee proposed to hold an IAU symposium on the topic of exoplanets in China in 2007. The proposal is supported by Division I, Commission 7, 16 and 51, and IAU Working Group on Extrasolar Planets. And the final approve was given by IAU Executive Committee on April 24, 2006.

IAU Symposium No. 249 was held on Oct 22-26 2007 at Suzhou university of China. 129 participants from 20 countries interacted and discussed the different aspects and facets of the hot field. The meeting included 15 invited review papers (30 minutes), 44 oral contributions (20minutes) and 73 poster presentations. The program of lectures and oral contributions were fully realized, i.e., programmed activities took place at the scheduled time, without absences or even delaying. And almost all participants join the lectures and posters during the whole conference. The topics of the conference cover: Terrestrial planet detection (CoRoT and Kepler); Transits of planets across the stars; Reduction techniques. Determination of orbits and physical parameters; Physical modelisation (atmosphere, structure, evolution); Star-Hot Jupiter interactions (tides, evaporation, magnetic fields); Planetary formation and migration; Disk-planet interaction: theory and simulations; Dynamics of multi-planet systems; Planets in binary stars; Planetary habitability.

From observation to theoretical study, IAU Symposium 249 kept its topic very hot and exciting. Doppler measures has reached a precision of 1 meter/sec, with planet mass as low as 5 Earth-mass. At the mean time, more methods (gravitational microlensing, astrometry, transit, direct imaging, X-ray emission et al.) has been used to locate exoplanets around stars from dwarf stars to giants stars. Many new exoplanets are reported to be detected : a substellar companion was detected in Intermediate-Mass giant star 11 Com (G8 III) with Radio velocity by Chinese group; MOA-II by Japan group has detected two of three events (MOA-2007-BLG-192,197 and 308) with the lens star is orbited by a planet of around 10 Earth masses; the first observation of planet_Induce X-ray Emission are report by Cambridge group in the HD~179949 system with Chandra / ACIS-S; etc...

As a highlight of the IAUS249, the status of the mission COROT was described during the conference. Led by the French space agency, CNES, the CoRoT mission is born from a joint effort by France, Austria, Belgium, Brazil, Germany, Spain and ESA. In orbit around the Earth, CoRoT (Convection Rotation and planetary Transits) started its first observations a few months ago and is, now, regularly producing thousands of light-curves with a very high precision. Performances are better than expected and some Hot Jupiters have already been detected in the raw data.

The development status and schedule of Kepler Mission was also reviewed. The Kepler Mission is a photometric space mission with a combined differential photometric precision of 20 parts per million (at $V=12$ and 6.5 hours integration). The primary goal of the mission is to monitor more than 100,000 stars for transits and thereby detect Earth-size and smaller planets in the habitable zone of solar-like stars. Asteroseismology results are also expected for 1-2000 dwarf stars observed at one-minute cadence and perhaps an additional 1000 giants observed at a thirty-minute cadence for a year or more.

As the progress made by exoplanets detection, more and more statistical and physical properties of exoplanets are known, which greatly simulated the analytical and numerical simulation on planet formation and dynamics. During the planet formation stage, Type I migration is constituted hitherto a bottleneck for the theory of the gas giant formation. However, Monte Carlo simulations with a deterministic planet-formation model shown that both Type-I and type-II migration speed must be an order of magnitude slower than that given by the linear theory a conventional analytical formula. This result may be useful for retention of terrestrial planet in Habitable zone. The physics of Hot Jupiter under the star radiation are also modeled, with their internal structure, oscillation wave mode and the affection of tidal dynamics.

Terrestrial planets formation and tidal migration was another active topic of the conference. During planet formation, some embryos inside the snowline were merged and survived. Due to the secular interaction between hot gas giant and super Earth planets, effective migration will occur, which may results hot super Earth. The formation and dynamics of multiple planets are investigated, from different points of view: secular dynamics, mean motion resonance, secular resonance. The formation and dynamics of Trojans System are reported. Terrestrial planets in habitable planets was also a key point of the Symposium.

On the evolution of debris disks, it was reported that, from the cratering record, we can infer that its dust mass has decayed with time, and that there was at least one major spike in the past during the Late Heavy Bombardment. This offers a unique opportunity to use extra-solar debris disks to shed some light in how the Solar System might have looked in the past.

During the conference, 31 younger scientist and students from 13 countries has received the financial support of IAU. The conference has also managed to cover 20 students for their local accommodation. During the conference, the local organizing committee arranged a serials of excursions including visiting Suzhou Garden, enjoying a Chinese traditional music performance, boat on river and a tour outside city after conference. These activities relax the intensive scientific discussion and were warmly received by all participants.

We are glad that this meeting proved to be a forum for the discussion of the latest technique and results on the exoplanet detection, simulation and theoretical studies. As most of the participants give us a high evaluation, we believe this conference was a great success. Prof David Koch, PI of Kepler mission, wrote to us after conference: "That was a terrific symposium in Suzhou. I found it sad that it had to end – so many good talks and posters. The field is really growing and maturing, with an abundance of new results and on a very broad international scale." "So I'd like to suggest that there be an IAU Exoplanet symposium on an annual basis. Exoplanet II, Exoplanet III, Exoplanet IV, etc."

Proceedings:

Y.S.Sun, S.Ferraz-Mello & J.L.Zhou (eds.), 2007,
Exoplanet: Detection, Formation and Dynamics,
Proc. IAU Symp. No. 249, Suzhou, China, 22-26 October 2007,

(Cambridge: CUP) ISBN: 0-521-874718, due April 2008,
e-book: <http://journals.cambridge.org/action/displayJournal?jid=IAU>

IAU Symposium No 250, Post Meeting Report

- 1. IAU Symposium Number:** 250
- 2. Title of meeting:** Massive Stars as Cosmic Engines
- 3. Dedicated to:**
- 4. Location:** Kauai, Hawaii, USA
- 5. Date of meeting:** 10-14 December 2007

6. Scientific Organising Committee:

Paul Crowther (UK – co-Chair)
Joachim Puls (Germany – co-Chair)
Norbert Langer (Netherlands)
Mike Dopita (Australia)
Andrew MacFadyen (USA)
Johan Fynbo (Denmark)
Francesca Matteucci (Italy)
Eva Grebel (Switzerland)
Georges Meynet (Switzerland)
Tim Heckman (USA)
Tony Moffat (Canada)
Deidre Hunter (USA)
Ken'ichi Nomoto (Japan)
Gloria Koenigsberger (Mexico)
Max Pettini (UK)
Rolf Kudritzki (USA)

7. Local Organising Committee:

Fabio Bresolin
Laurie Clark
Miguel Urbaneja
Kart Uyehara
Karen Teramuna
All from IfA, Hawaii

- 8. Number of participants:** 194 (32 IAU Grant recipients)

9. Countries represented:

Australia, Belgium, Brazil, Canada, Chile, Denmark, France, Germany, Israel, Italy, Japan, Mexico, Netherlands, South Korea, Spain, Switzerland, UK, USA 36.

- 10. Report submitted by:** Paul Crowther

Place & Date: Sheffield, UK, 2 January 2008

Scientific Highlights :

The Symposium involved the role played by massive stars in the universe, such as the source of ionizing photons in star-forming galaxies, progenitors of core-collapse supernovae and some gamma-ray bursts, plus their diagnostic power in high-redshift star forming galaxies and predictions that massive population III stars were responsible for the re-ionization of the intergalactic medium. The Symposium follows in a long line of successful meetings, held between 1971 (IAU Symposium 49, Argentina) and 2002 (IAU Symposium 212, Spain) – see Appendix for participation. IAU Symposium 250 was held at the Grand Hyatt hotel in Kauai, Hawaii. The Institute for Astronomy provided an excellent Local Organising Committee, composed of Fabio Bresolin (chair), Laurie Clark, Louise Good, Emily Levesque, Karen Teramura, Karen Toyama, Vivian U, Miguel Urbaneja, Karl Uyehara and Gareth Wynn-Williams.

The meeting consisted of 24 invited review papers, 33 oral contributions and 130 poster presentations. The SOC divided the programme into five broad themes:

- (a) Atmospheres of Massive Stars;
- (b) Physics and evolution of massive stars;
- (c) Massive star populations in the nearby Universe;
- (d) Hydrodynamics and feedback from massive stars in galaxies;
- (e) Massive stars as probes of the early Universe.

Scheduled time in the programme was made available for general discussions after each scientific session, plus a poster competition was held, in which prizes were awarded for each session, who were invited to present a brief oral summary of their poster. In addition, two well-attended specialist discussion sessions were held on Sunday 9 Dec, with topics of 'massive stars at low metallicity' and 'magnetic massive stars'. A well-attended reception took place on the evening of Sunday 9 Dec, while an open-air banquet (luau) took place on the evening of Thu 13 Dec.

Notable advances with respect to IAU Symposium 212 included the following highlights. The effective temperature scale for OB-stars (as a function of spectral type and luminosity class) has become significantly cooler, due to the (routine) inclusion of line- and wind blanketing in state-of-the art, NLTE atmospheric modelling. The theoretically expected weaker wind strengths in OB stars at low metallicity were empirically confirmed, although the degree of wind clumping remains unclear, as well as the role of wind porosity regarding the X-ray emission from hot stars. Stellar pulsations have been identified to be of potential influence on mass-loss and mixing, and models for *continuum*-driven mass-loss for super-Eddington stars have been presented.

For luminous cool supergiants, agreement has now been reached with respect to evolutionary predictions due to revisions to the spectral-type temperature calibration for red supergiants. A consensus was reached that hydrogen-rich luminous WN stars, with an upper limit of ~150 solar masses, represent the most massive stars known, and represent extensions of O supergiants to higher wind density. Either rotation or close binary evolution seems responsible for the observed variation in nitrogen enrichment observed in B-type stars (new results have been lively discussed), and possible relations to magnetic fields have been debated.

Theoretical and observational improvements have brought consistent models for core-collapse supernova explosions one step closer, plus established that red supergiants are progenitors of the most common type of supernova, although curiosities remain such as SN 2006gy (Type II_n) which apparently exploded during an Luminous Blue Variable phase. In addition, a massive

progenitor origin for highly magnetized neutron stars (magnetars) was identified, plus the association between cosmological gamma-ray bursts and broad-lined Type Ic supernovae.

Regarding nearby stellar populations, several massive young, compact clusters have been identified within the Milky Way (e.g. Westerlund 1, RSGC 1-2) where none were known a decade ago. 8-10 m telescopes provide routine observation of individual massive stars at distances of up to 5-10 Mpc, enabling chemical abundance determinations of alpha- and iron-peak elements, plus extend WR distributions from Local Group galaxies to a wider range of host galaxies. The role of feedback from massive stars and supernova was investigated, indicating for example that revisions to the spectral type-temperature calibration for O stars now suggesting few Lyman continuum ionizing photons escape from HII regions. In addition, significant progress has been made with modelling the dynamics of wind-blown bubbles.

A major advance in the number and quality of UV-selected high-redshift star forming galaxies was reported, in which comparisons with local Sloan Digitized Sky Survey galaxies suggests systematically lower metallicities for Lyman break galaxies at comparable stellar mass. High-redshift star-forming galaxies are now known to $z=7$, with cosmological gamma ray bursts also seen beyond $z=6$, the latter also enabling direct studies of their host galaxies. New theoretical predictions for the first and second generation stars were presented, suggesting typical masses in the range 10-100 M_{\odot} , enabling the first simulations of their associated H II regions. Evolutionary calculations at zero metallicity have been discussed, which might allow for significant mass-loss to avoid pair-instability supernovae.

The scientific programme finished with two presentations on upcoming space- and ground-based facilities, JWST and E-ELT/TMT, whilst C. Leitherer provided a comprehensive summary of the meeting.

Note: The 3 month post-meeting deadline for submission to CUP sadly prevented the inclusion of extended general discussion contributions in the proceedings.

Proceedings:

F. Bresolin, P. A. Crowther & J. Puls (eds.), 2007,
Massive Stars as Cosmic Engines
Proc. IAU Symp. No. 250, Kauai, Hawaii, USA, 10-14 December 2007
(Cambridge: CUP) ISBN: 0-521-874726, due June 2008,
e-book:<http://journals.cambridge.org/action/displayJournal?jid=IAU>

Appendix: Attendance at IAU Symposia on massive stars from 1981-2007

| IAU Symposium | 99 | 116 | 143 | 163 | 193 | 212 | 250 |
|---------------|-----------------|--------------------|------------------|-------------|-------------------------|------------------|------------|
| Location | Cozumel, Mexico | Porto Heli, Greece | Sanur, Indonesia | Elba, Italy | Puerto Vallarta, Mexico | Lanzarote, Spain | Kauai, USA |
| Year | 1981 | 1985 | 1990 | 1994 | 1998 | 2002 | 2007 |
| | | | | | | | |
| Belgium | 6 | 6 | 3 | 4 | 6 | 6 | 8 |
| Denmark | | | | | | | 4 |
| France | 4 | 3 | 8 | 3 | 8 | 12 | 4 |
| Germany | 6 | 9 | 6 | 11 | 15 | 11 | 11 |
| Greece | | 12 (host) | | | | | |
| Italy | 7 | 10 | 6 | 9 (host) | 5 | 4 | 3 |
| Ireland | | | | | | 1 | |
| Netherlands | 2 | 2 | 3 | 4 | 9 | 10 | 7 |
| Norway | | | | 1 | 1 | 1 | |
| Spain | | | 3 | 2 | 12 | 24 (host) | 12 |
| Sweden | 2 | | | | | 1 | |
| Switzerland | 3 | 1 | 1 | 7 | 9 | 2 | 5 |
| UK | 3 | 10 | 14 | 15 | 12 | 22 | 21 |
| | | | | | | | |
| Israel | | | | 4 | 4 | | 1 |
| Lebanon | | | | | | 1 | |
| | | | | | | | |
| Armenia | | | | 1 | | | |
| Bulgaria | | 4 | 1 | 2 | 2 | | |
| Estonia | | | | 2 | 2 | | |
| Hungary | | 1 | | | | | |
| Poland | | 1 | | 3 | 2 | | |
| Russia | | | | 4 | 1 | | |
| Ukraine | | | | 2 | 1 | 3 | |
| USSR | 2 | 2 | 5 | | | | |
| | | | | | | | |
| S. Africa | | 1 | | | | | |
| | | | | | | | |
| China | | | | | | | |
| India | | | 1 | | 1 | | |
| Indonesia | | | 28 (host) | | | | |
| Japan | | | 2 | 1 | 2 | 1 | 3 |
| S. Korea | | | | | | | 1 |
| | | | | | | | |
| Australia | 2 | 2 | 2 | 1 | 2 | 1 | 5 |
| | | | | | | | |
| Canada | 4 | 3 | 7 | 7 | 10 | 6 | 9 |
| Mexico | 21 (host) | | 1 | 3 | 28 (host) | 2 | 5 |
| USA | 21 | 23 | 25 | 19 | 43 | 50 | 85 (host) |
| | | | | | | | |
| Argentina | 2 | 1 | 1 | 2 | 3 | 3 | |
| Brazil | | | | 2 | 6 | 8 | 3 |
| Chile | 1 | 1 | 1 | 1 | 2 | 2 | 5 |
| | | | | | | | |
| TOTAL | 86 | 93 | 118 | 111 | 186 | 171 | 194 |

IAU Regional Meeting LARIM 2007, Post Meeting Report

1. Meeting Number: 12th Latin American IAU Regional Meeting
 2. Meeting Title: Reunión Regional Latinoamericana de Astronomía de la IAU or Latin American Regional IAU Meeting (LARIM)
 3. Dedication of meeting: None
 4. Location (city, country): Isla Margarita, Venezuela
 5. Dates of meeting: Monday October 22nd, 2007 to Friday October 26th, 2007
 6. **Scientific Organising Committee**
 - Gustavo Bruzual, CIDA, Venezuela
 - César Briceño, CIDA, Venezuela
 - César Mendoza, ULA, Venezuela
 - Ignacio Ferrín, ULA, Venezuela
 - Miguel Ibañez, ULA, Venezuela
 - Manuel Bautista, IVIC, Venezuela
 - Patricia Tissera, IAFE, Argentina
 - Hernán Muriel, OAC, Argentina
 - Claudia Mendes, USP, Brasil
 - Basilio Santiago, UFRGS, Brasil
 - René Méndez, UChile, Chile
 - Marcio Catelán, PUC, Chile
 - Leticia Carigi, IAUNAM, México
 - Esperanza Carrasco, INAOE, México
 - Alberto Bolato, Uruguay
 - Tabaré Gallardo, UdelaR, Uruguay
 7. **Local Organising Committee**
 - Gladis Magris, CIDA, Venezuela.
 - Kathy Vivas, CIDA, Venezuela.
 - Eloy Sira, CIDA, Venezuela
 - Carlos Abad, CIDA, Venezuela.
 - Patricia Rosenzweig, ULA, Venezuela
 - Orlando Naranjo, ULA, Venezuela
 - Claudio Mendoza, IVIC, Venezuela.
 - Jeanette Stock, La Universidad del Zulia
 8. Number of participants: 254 (48 IAU grants awardees)
 7. List of represented countries: Argentina, Brazil, Chile, Colombia, Cuba, France, Germany, Honduras, Italy, México, Nicaragua, Perú, Puerto Rico, Spain, United States, United Kingdom, Uruguay and Venezuela.
 8. Report submitted by: Gustavo Bruzual, Chair of Scientific Organizing Committee
- Date and place: Mérida, Venezuela, November 16th, 2007

The meeting was organized in 29 sessions covering different topics, some of them overlapping in scope. A total of 140 talks were given in these sessions. More than 90 posters were exhibited during the meeting. The title of the different sessions are listed here in chronological order:

1. Cosmology/The Galactic Bulge(Chair: Silvia Torres-Peimbert)
2. Stars & Chemistry (Chair: Roberto Cid Fernandes)
3. Astrometry & Galactic Structure (Chair: Julio Fernández)
4. Structure formation in Galaxies (Chair: Manuel Bautista)
5. Black Holes & Active Galaxies (Chair: Itziar Aretxaga)
6. Galactic Structure (Chair: René Méndez)
7. Galaxies: Kinematics & Star Formation (Chair: César Mendoza)
8. The Sun, Planetary Nebulae & IYA2009 (Chair: Nuria Calvet)
9. Planetary Nebulae (Chair: Miriam Peña)
10. Galaxies: Chemical Evolution & Dynamics (Chair: Vladimir Avila-Reese)
11. Education in Astronomy (Chair: Eloy Sira)
12. Gas & Stars in Galaxies (Chair: Claudio Mendoza)
13. Cosmology & the Physical Universe (Chair: Paula Coelho)
14. Education in Astronomy (Chair: Francisco Diego)
15. The origin and fate of Stars (Chair: Beatriz Barbuy)
16. The Distance Scale & Supernovae (Chair: Mario Hamuy)
17. Astrophysical Plasmas (Chair: Andreas Reisenegger)
18. Galaxy Clusters (Chair: Nelson Falcón)
19. Planetary Science, Instrumentation & Public Outreach (Chair: Esperanza Carrasco)
20. Large Astronomical Facilities (Chair: David Hughes)
21. Star Formation (Chair: César Briceño)
22. Comets & the Solar System (Chair: Gonzalo Tancredi)
23. Instrumentation & Data Analysis (Chair: Ramón García López)
24. Circumstellar Disks & Brown Dwarfs (Chair: Lee Hartmann)
25. Stellar Population Synthesis (Chair: Miriani Pastoriza)
26. Galaxies & Cosmology (Chair: Gustavo Bruzual)
27. Solar System (Chair: Daniela Lazzaro)
28. Massive Stars (Chair: Horacio Dottori)
29. Variable Stars (Chair: Adriana Silva)

A total of 17 invited talks were presented, covering a large number of fields of current research in astronomy. The invited talks are listed here in chronological order:

1. Mario Hamuy (Chile) – Measuring the Universe with Supernovae
2. Emilio Falco (USA) – Doing Cosmology with Gravitational Lenses
3. Vladimir Avila-Reese (México) - Gamma-ray Bursts: new cosmological lighthouses
4. Manuela Zoccali (Chile) - The formation and Evolution of the Galactic Bulge
5. César Mendoza (Venezuela) – Heating and Oscillations of the Solar Corona
6. Manuel Bautista (Venezuela) – Atomic Processes in HII Regions and Planetary Nebulae
7. Andreas Reisenegger (Chile) – Neutron star magnetic fields: attempt at a complete scenario
8. Paola D'Alessio (México) – Agujeros en discos en torno a estrellas jóvenes
9. César Briceño (Venezuela) – 25 Orionis: discovery of a populous 10 Myr old cluster in the Orion OB1 association
10. Julieta Fierro (México) - La Educación Informal en Ciencia
11. Daniela Lazzaro (Brazil) – Basaltic asteroids: a new look on the differentiation process in

the Main Belt

12. Adriana Silva (Brasil) – Starspot detection from planetary transits observed by CoRoT
13. David Hughes (México) – El Gran Telescopio Milimétrico: estatus y sendero a la primera ciencia
14. Mario Abadi (Chile) – La formación de las galaxias en el modelo cosmológico L-CDM
15. Itziar Aretxaga (México) – El Censo de medio grado cuadrado de SCUBA
16. Roberto Cid Fernandes (Brasil) – Star formation and mass-assembly evolution of galaxies
17. Paula Coelho (France) – Stellar Population Models with Synthetic Stellar Libraries: Pros and Cons

The following discussion sessions on topics suggested by the participants were organized:

1. Plans for a collaboration to build a Large Latin American Telescope.
2. Integration of graduate study programs in Astronomy in Latin American Countries
3. Situation of women astronomers in the region
4. The International Year of Astronomy 2009

The conclusions of each discussion group were presented to the General Assembly. The General Assembly accepted the invitation presented by México to hold the 13th LARIM in México in 2010.

Special emphasis was given to Public Outreach during the meeting. A total of 15 public outreach talks were given in different locations in Isla Margarita, listed here in chronological order:

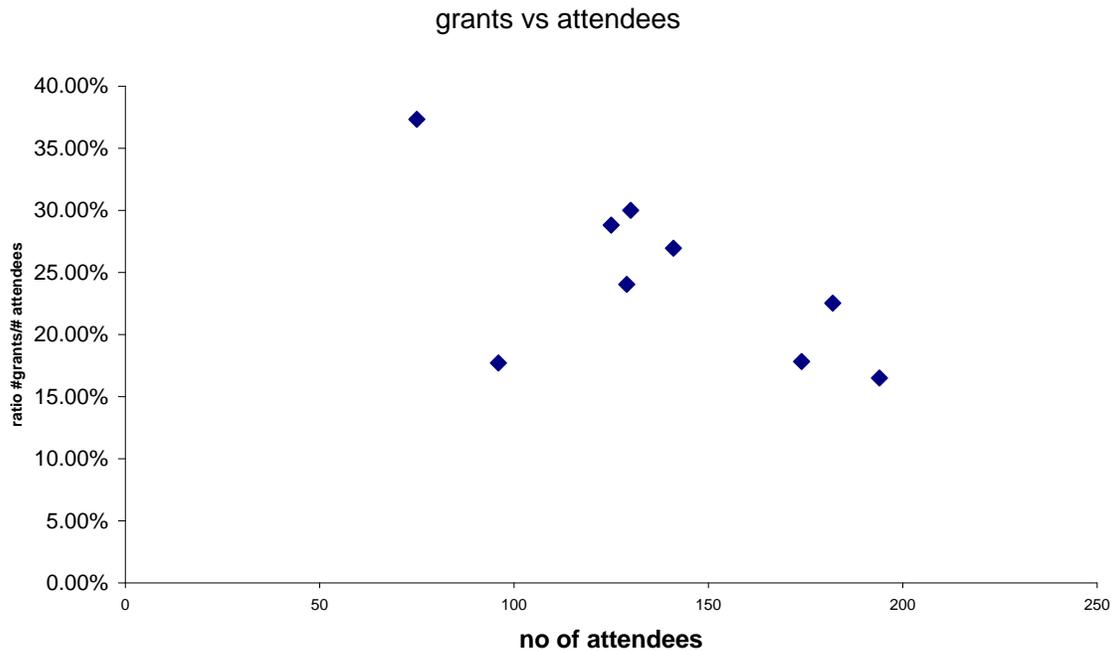
1. J. M. Rodríguez Espinoza – GTC: El mayor telescopio óptico del mundo
2. Javier Ballesteros - En búsqueda de vida extraterrestre
3. Miriam Rengel – Impactando a un Cometa: La Misión Impacto Profundo
4. Félix Mirabel - Agujeros Negros en el Universo
5. Daniel Altschuler - Ciencia y Pseudociencia: Vida extraterrestre y extraterrestres
6. Francisco Diego - Influencia de las estrellas en la vida humana: de la Astrología a la Astronomía
7. Nuria Calvet - Formación de estrellas y planetas: ¿qué nos ha enseñado Spitzer?
8. Nelson Falcón - Crónicas del Cosmos: Curiosidades de Astronomía y Astrofísica
9. Katherine Vieira - Danza de las Estrellas: Historias del Sistema Solar y la Vía Láctea
10. Carlos Abad – Perdiendo el tiempo
11. Gerardo Sánchez – CCDs: ojos electrónicos de la astronomía moderna
12. Julieta Fierro – El Origen del Universo (PO)
13. Ramón García López - ¿Qué nos enseña la física estelar?
14. Néstor Sánchez - Fractales en la Naturaleza
15. Franco Della Prugna – La Contaminación Lumínica

Proceedings:

The Proceedings of the meeting will be published in the Conference Series of the Revista Mexicana de Astronomía y Astrofísica.

| Meeting | Number of attendees | From countries | Total IAU grant awarded (CHF) | Number of IAU grant recipients | From countries | grants as fraction of number of attendees |
|----------------|---------------------|----------------|-------------------------------|--------------------------------|----------------|---|
| IAUS 242 | 125 | 18 | 25,000 | 36 | 11 | 28.80% |
| IAUS 243 | 141 | 21 | 25,000 | 38 | 12 | 26.95% |
| IAUS 244 | 96 | 19 | 25,000 | 17 | 11 | 17.71% |
| IAUS 245 | 174 | 27 | 25,000 | 31 | 16 | 17.82% |
| IAUS 246 | 130 | 22 | 25,000 | 39 | 13 | 30.00% |
| IAUS 247 | 75 | 18 | 25,000 | 28 | 13 | 37.33% |
| IAUS 248 | 182 | 22 | 25,000 | 41 | 19 | 22.52% |
| IAUS 249 | 129 | 21 | 25,000 | 31 | 13 | 24.03% |
| IAUS 250 | 194 | 18 | 25,000 | 32 | 13 | 16.50% |
| Symposia Total | 1246 | 43 | 225,000 | 293 | 38 | 23.51% |
| LARIM 2007 | 254 | 18 | 25,000 | 48 | 18 | 18.90% |
| Totals | 1500 | 47 | 250,000 | 341 | 43 | 22.73% |

Table 1 2007 Meetings – attendance and grants

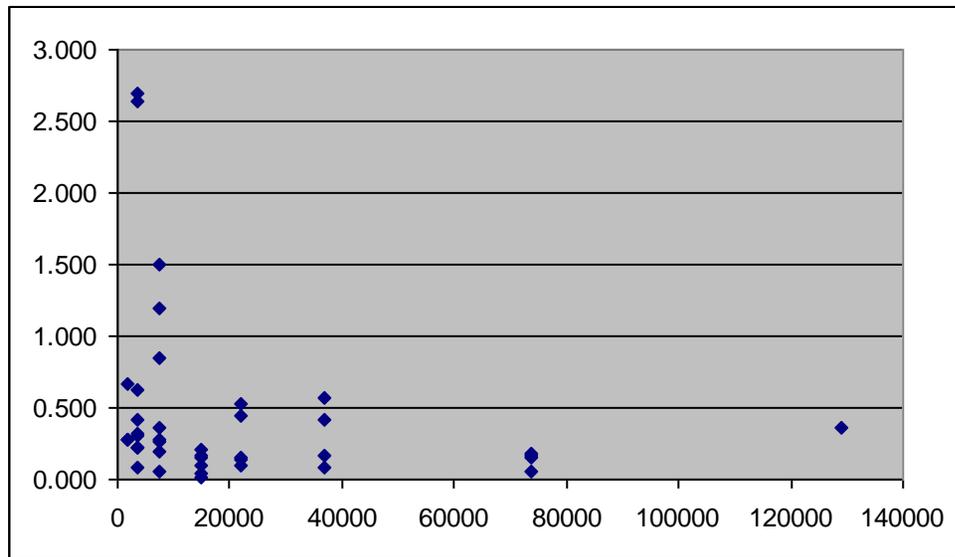


| Meeting | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | LARIM |
|-------------------|------------------------|--------------|----------|----------------|----------------|-----------|---------------|----------------|---------------|-----------|
| Host Country | Australia | France | UK | UK | Italy | Venezuela | China Nanjing | China Nanjing | USA | Venezuela |
| Attendees Country | Value of Grants in CHF | | | | | | | | | |
| Algeria | | | | | | | | | | |
| Argentina | | | | | | 320 | | 2800 | | 6*520 |
| Armenia | | 808 | | | | | | | | |
| Australia | 3*400 | | 1250+738 | 1220+295 | 1600+1425+850 | 1500 | 645 | 1000 | | |
| Belgium | | | | | 550+420 | 320 | 645+290 | | 1000 | |
| Brazil | | 3*1373+3*275 | | 1170+295 | | | 2*645 | | 750 | 5*520 |
| Bulgaria | | | | | | | | | | |
| Canada | | | | | 1000+3*500+400 | | 645 | 650 | 3*575 | |
| Chile | 800 | 485 | | 1515 | | | 1170 | | 750 | 10*520 |
| China – Nanjing | 1200+700 | | | | | | 290 | | 750 | |
| China – Taipei | 800 | | | | | | | | | |
| Colombia | | 969 | | | | | | | | 3*520 |
| Croatia | | | | | | | | | | |
| Cuba | | | | | | | | | | 520 |
| Czech Republic | | | | | | | 645 | 800 | | |
| Denmark | | | | | | | 290 | | | |
| Egypt | | | | | | | | | | |
| Finland | | | 1650 | | 310 | | | | | |
| France | | 8*275 | | 1220+3*880+295 | | | 2*820+5*290 | 800+600 | | 520 |
| Georgia | | | | | | | | | | |
| Germany | | | | 295 | 950+3*400 | | 3*820+290 | 600+2*800+1000 | 1491+1350+575 | |
| Greece | | | | | | | | 600 | | |
| Honduras | | | | | | | | | | 520 |
| India | | 808 | 2082 | 2*1515+1170 | 2*615 | 1500 | | | | |

| | | | | | | | | | | |
|-------------------|------------------------|---------------------|---------------------|---------------------|--|---------------------------|----------------------|---|-------------------------|------------------|
| Indonesia | | | | | | | 820+290 | | | |
| Israel | | | | | 400 | | | | | |
| Iran | | | | 1170 | | | | | | |
| Meeting | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | LARIM |
| Host Country | Australia | France | UK | UK | Italy | Venezuela | China Nanjing | China Nanjing | USA | Venezuela |
| Attendees Country | Value CHF | | | | | | | | | |
| Italy | 1000 | 6*485+ 2*323 | 1625 | 2*880 | 650+400+ 350+175 | 1500 | 2*645 | 800 | 1491 | 520 |
| Japan | | 808 | | 295 | | 1500+320 | 2*645+290 | | | |
| Kenya (South) | | | | 2*880+295 | | | | | | |
| Lebanon | | | | 1220 | | | | | | |
| Mexico | 1400+800+ 600+400 | | | | | | 645 | | 750 | 8*520 |
| Netherlands | 800+400 | | | | | | | | 3*575 | |
| Nicaragua | | | | | | | | | | 520 |
| Peru | | | | | | | | | | 520 |
| Poland | 1000 | | 1650 | | | | | 500 | | |
| Romania | | | | | | 700 | 935+645 | | | |
| Russia | 1400+ 2*1000 | 2*808+ 3*485+275 | 1320+ 3*1055 | 2*1515 | 1000+600 | 2*700 | 2*820+645 | 1000+500 | | |
| Slovakia | | | | | | 320 | | | | |
| South Africa | 3*800 | | | | | | | | | |
| Spain | | | | | | 320 | 820 | | 2*575 | |
| Sweden | | | 1650 | | | | | 600 | | |
| Switzerland | | | 810 | | | | | | 575 | |
| UK | | | | | 2*400+350 | 2000+1960+ 2*700+4*320 | | 1000+500 | 907.5+5*575 | 520 |
| Ukraine | | 808 | | | | | 2*935 | | | |
| Uruguay | | | | | | | | | | 3*520 |
| USA | 1200+800+ 700+7*400 | 969+2*808+ 606 | 1260+ 5*1210+484 | 3*880+780+ 2*295 | 1500+900+ 4*750+2*625+ 500+2*400 +240 | 2*320 | 2*645+ 2*290 | 1200+ 2*1000+800 +700+650 +5*600+500 | 1804+1491+ 5*575+505 | |
| Venezuela | | | | | | 6*1100 | | | | 6*520 |

| Attendees Country | Total Grant | IAU Dues 2007 – from EC83 | Total Grants/Dues |
|-------------------|-------------|---------------------------|-------------------|
| Argentina | 6240 | 7370 | 0.847 |
| Armenia | 808 | 3685 (almost suspended) | 0.219 |
| Australia | 11723 | 22110 | 0.530 |
| Belgium | 3225 | 22110 | 0.146 |
| Brazil | 11049 | 7370 | 1.499 |
| Canada | 5920 | 36850 | 0.161 |
| Chile | 9920 | 3685 | 2.692 |
| China – Nanjing | 2940 | 36850 | 0.080 |
| China – Taipei | 800 | 3685 | 0.217 |
| Colombia | 2529 | Not member | |
| Cuba | 520 | Suspended 1843 | 0.282 |
| Czech Republic | 1445 | 7370 | 0.196 |
| Denmark | 290 | 14740 | 0.020 |
| Finland | 1960 | 7370 | 0.266 |
| France | 11365 | 73700 | 0.154 |
| Germany | 11811 | 73700 | 0.160 |
| Greece | 600 | 14740 | 0.041 |
| Honduras | 520 | Not member | |
| India | 9820 | 22110 | 0.444 |
| Indonesia | 1110 | 3685 | 0.301 |
| Israel | 400 | 7370 | 0.054 |
| Iran | 1170 | 3685 | 0.318 |
| Italy | 15117 | 36850 | 0.410 |
| Japan | 4503 | 73700 | 0.061 |
| Korea (South) | 2055 | 7370 | 0.279 |
| Lebanon | 1220 | Interim 1843 | 0.662 |
| Mexico | 8755 | 7370 | 1.188 |
| Netherlands | 2925 | 22110 | 0.132 |
| Nicaragua | 520 | Not member | |
| Peru | 520 | Interim 1843 | 0.282 |
| Poland | 3150 | 14740 | 0.214 |
| Romania | 2280 | 3685 | 0.619 |
| Russia | 21046 | 36850 | 0.571 |

| | | | |
|--------------|-------|----------------|-------|
| Slovakia | 320 | 3685 | 0.087 |
| South Africa | 2400 | 14740 | 0.163 |
| Spain | 2290 | 22110 | 0.104 |
| Sweden | 2250 | 14740 | 0.153 |
| Switzerland | 1385 | 14740 | 0.094 |
| UK | 13593 | 73700 | 0.184 |
| Ukraine | 2678 | 7370 | 0.363 |
| Uruguay | 1560 | Suspended 3685 | 0.423 |
| USA | 46720 | 128975 | 0.362 |
| Venezuela | 9720 | 3685 | 2.638 |



| Category | Average G/D |
|----------|-------------|
| Interim | 0.409 |
| I | 0.835 |
| II | 0.587 |
| III | 0.114 |
| IV | 0.271 |
| V | 0.305 |
| VI | 0.140 |
| VII | 0.362 |