Scientific Summary
IAU Symposium 261
Relativity in Fundamental Astronomy:
Dynamics, Reference Frames, and Data Analysis
27 April -1 May, 2009, Virginia Beach, VA, USA

The symposium had the purpose of bringing together people from different areas of fundamental astronomy, metrology, physics, engineering, and space navigation, to review the current applications of the theory of relativity and to discuss the future requirements, tests, and applications of this theory.

The Past

Albert Einstein published his General Theory of Relativity in 1916. The theory became one of the cornerstones of the new physical thinking. In 1919, the theory was confirmed by the eclipse observations. In the 60s, relativity was started to be introduced into planetary ephemerides. In the 70s, the IAU started to introduce relativity into the reference systems and time scales. In 1985, an IAU colloquium, "Relativity in Celestial Mechanics: high precision dynamical theories and observational verifications", was held in Leningrad, USSR. In 1992, revisions of the reference systems were initiated, and in 2000 the reference systems were defined with specific relativistic metrics.

Since the last colloquium on this subject in 1985, Leningrad has become St. Petersburg, the USSR has separated into Russia and many other countries, and there have been significant improvements in accuracies in time scales, astrometry, observations, and reference systems. Now there are cesium fountains, Hipparcos star positions, VLBI based reference frame, GPS positioning and observations, extrasolar planets, Hubble Space telescope observations, and dark matter and dark energy.

The Present

All accurate Fundamental Astronomy programs are now using a relativistic theory. Currently, the data analysis for ephemerides, VLBI, lunar laser ranging, satellite laser ranging, Hipparcos, Gaia, time keeping and time transfer, pulsar timing, and GPS are all compatible with the IAU reference system resolutions and the theory of relativity.

There is a synergy between different fields and the application of general relativity. The ephemerides and pulsar timing, gravity waves and astrometry, mass measurements and binaries, time keeping and satellite navigation, to mention a few.

All these high-precision observations allow one to test routinely whether the Einsteinian theory of relativity is adequate, or whether one or another extension thereof should be considered.

The Future

Higher accuracy models are going to be required for improved accuracies for VLBI, radar ranging, lunar laser ranging, and satellite navigation systems. For the future accuracies, the PPN metric terms need to be expanded, as there emerges a need for a post-post-Newtonian approximation.

The BCRS definition needs to be expanded to meet the needs of cosmology.

Observations of the highest precision are needed to confirm or deny the Einstein's theory of relativity. Tests of relativity will come from Cassini, VLBI, LISA, SKA, and binary pulsars. Also the Gaia, BepiColombo, ACES, Microscope, and SIM space missions will test various aspects of the theory. However, the focus of testing theories of gravity in the 21st century will move towards strong-field gravity, gravitational waves, and extreme-range gravity.

Any violations of General Relativity will have to be confirmed by multiple techniques. No one will believe a single experiment that indicates a violation of general relativity. Only agreement of several experiments of different physical nature will do the job.

IAU SYMPOSIUM 262

"S*tellar Populations: Planning for the Next Decade"*

Rio de Janeiro, Brazil, August 3-7, 2009

Scientific Highlights

IAU Symposium 262 provided a stimulating environment for the presentation and discussion of the newest results in the various fields of study usually covered in stellar population meetings. The main scientific highlights of the meeting can be summarized as follows:

1) Inclusion of the latest results from atomic physics (e.g. opacities for different element mixtures) in the calculation of stellar evolution models, producing new generations of models that are in closer resemblance with observations than those previously available. The treatment of the TP-AGB phase, even if still far from understood, has reached levels of refinement that allow realistic interpretation of the role of these stars in stellar populations, especially in the Magellanic Clouds.
2) Important progress has been made on the study of the effects of alpha-enhancement on stellar evolution models, i.e. alpha-enhanced tracks have been computed for different alpha ratios. Parallel efforts developing model atmospheres for the same chemical mixtures have made it possible in the recent past to model self-consistently alpha-enhanced stellar populations.
3) Great progress in understanding the mass assembly history of the universe. Numerical simulations of galaxy formation including improved modeling of SN feedback and chemical evolution produce more realistic galaxies.
4) The study of resolved stellar populations in the Milky Way and nearby galaxies, using both imaging and spectroscopy, has reached a high level of sophistication, allowing in many cases the reconstruction of the star formation and chemical enrichment histories in these systems with considerable detail.
5) The availability of large databases of observations and theoretical models which can be queried and cross-linked provide flexible tools to study stellar populations in galaxies at all redshifts. Large surveys of galaxy spectra have been have been studied by means of simulations providing a clear view of the star formation history in these systems.
6) Extremely deep infrared spectra of very high redshift galaxies provide access to the rest-frame optical spectra of these systems, that can then be studied in terms of the stellar populations present in these galaxies.
7) A challenge for modelers of stellar populations is to develop well-calibrated and extensively tested models in the rest-UV and rest-NIR. This requires modeling the late phases of stellar evolution (BHB, TP-AGB) with the same degree of accuracy that is achieved for main sequence stars. Expected progress in the modeling of stellar populations with non-solar abundance ratio should allow to trace galaxy assembly from the chemical pattern observed in galaxies.
8) There is a consensus among modelers and model users that there is a need to study systematically the uncertainties in model predictions and how they translate into uncertainties in the inferred properties of stellar populations at various redshifts.
9) In the next decade the imaging and spectroscopic study of spatially resolved stellar populations will reach moderately distant galaxies thanks to instruments like GAIA, JWST, and ELT; the first generations of massive stars at the highest redshift will become observable; LMT, ALMA, EVLA, SKA will provide constrains on the gas content of galaxies at various redshifts. Models and tools to understand all these new developments are required.
10) Understanding the formation and survival of thin discs in cosmological simulations remains a major issue.

IAU SYMPOSIUM No. 263: Post-Meeting Report

1. **IAU symposium number:** 263

2. **Title of meeting:** Icy Bodies of the Solar System

3. **Location:** Rio de Janeiro, Brazil

4. **Date of meeting:** 3-7 August 2009

5. **Scientific Organizing Committee:**

Antonella Barucci (France)
Humberto Campins (USA)
Julio A. Fernández (co-chair, Uruguay)
Sylvio Ferraz-Mello (co-chair, Brazil)
Martha P. Haynes (IAU, ex-officio)
Zoran Knezevic (Serbia)
Karen Meech (USA)
Keith Noll (USA)
Dina Prialnik (Israel)
Hans Rickman (Sweden)
Rita Schulz (co-chair, Germany)
Imre Toth (Hungary)
Giovanni B. Valsecchi (Italy)
Jun-ichi Watanabe (Japan)

6. Number of participants: 130

7. Countries represented: 22
Argentina, Azerbaijan, Chile, Brazil, China, Czech Republic, France, Germany, Hungary, Israel, Italy, Japan, Russia, Serbia, Spain, Sweden, Tajikistan, Ukraine, United Kingdom, Uruguay, USA, Venezuela

8. Report submitted by: Julio A. Fernández
Departamento de Astronomía,
Facultad de Ciencias,
Montevideo, Uruguay

9. Scientific program summary: 1 key general review, 11 invited talks, 48 oral contributions, 72 poster presentations.

10. Scientific Highlights:
IAU Symposium 263 was approved as part of the scientific program of the XXVIIth IAU General Assembly. This was the only symposium fully devoted to planetary sciences, an area that has had a great development in the last decades, and that we wished to be due represented in this assembly. In particular, there are several groups of planetary scientists working in South America, so we wanted to attract them, taking advantage of this unique opportunity of a General Assembly being held in this part of the world. More in general, we wanted to attract scientists with a broad geographical distribution, as it is customary for

meetings organized by the IAU, which offers for this purpose a generous allotment of travel grants to assist colleagues with financial difficulties. We are happy with the result: we received about 190 registrations, from which about 130 finally attended the symposium from 22 different countries. We had 11 invited speakers, plus one key general review, we distributed 48 oral contributions in 15 scientific sessions, and 72 poster contributions in three poster sessions. We organized the scientific sessions according to the following 11 topics:

1. Formation conditions of icy bodies
2. Physical processes of ices
3. Dynamics of icy bodies and transport mechanisms
4. Delivery of water to the primitive Earth
5. Icy satellites, surface and interiors – Titan
6. Kuiper belt objects
7. Icy dwarf planets
8. Activity in comets
9. Transition objects
10. Observations and physical models of comets
11. Space missions to icy bodies. Projects and results

From the above list we can see that the topics addressed in the symposium covered different aspects of icy bodies, going from formation conditions in the protoplanetary disk, reservoirs and dynamical transport within the solar system, the influence of the early galactic environment on shaping the Oort cloud, physics, space missions with special focus on the upcoming Rosetta and New Horizons missions, and the comet-asteroid transition objects, the latter a hot topic given the observation of activity in some main-belt asteroids. The question on where the Earth's water comes from was also discussed, bearing in mind the discrepancy between the deuterium/hydrogen (D/H) ratio found in Earth and that found in comets. The outer part of the asteroid belt appears as a promising source of Earth's water, idea that has been strengthened by the discovery of activity in a few outer main belt asteroids, suggesting that they might be ice-rich. Deep Impact results and new ground-based observations of comets were presented, providing us a more refined view of their physical structure and size distribution. These results give new support to the view that comets are very fluffy, weakly consolidated structures (mean density ~ 0.5 g cm^{-3}). Last but not least, the relevance of icy bodies for life on Earth and elsewhere in the solar system was also addressed, in particular given the possibility that some large icy satellites of the Jovian planets might contain subsurface oceans. In this regard, the Cassini mission has uncovered geysers on Enceladus which points to a very active body powered by the energy released by tidal friction, and the real possibility that the ice in its interior has melted. The symposium was very fruitful to assess the state of the art of our knowledge in this field today, and what are the new problems that challenge us for the next few years.

International Astronomical Union
Union Astronomique Internationale

POST MEETING REPORT FORM

for meetings other than Joint Discussions and Special Sessions

Deadline for Submission: within 1 month after the meeting

the following information should be sent to the IAU Assistant General Secretary

1. Meeting Number: S 264

2. Meeting Title: **Solar and Stellar Variability Impact on Earth and Planets**

3. Dedication of meeting (if any): None

4. Location (city, country): Rio de Janeiro (Brazil)

5. Dates of meeting: 3 - 7 August 2009 (3.5 days)

6. Number of participants: 380

7. List of represented countries: Spain, France, Brazil, Japan, Russia, Italy, China, Germany, Denmark, USA, Argentina, Switzerland, Netherlands, Australia, Hungary, UK, Finland, Norway, Turkey, India, Czech Republic, Romania, Sweden, Bulgaria, Estonia, Canada, Peru, Korea, Hong Kong, Chile, Mexico, Poland, Puerto Rico, Ukraine

8. Report submitted by: A. Kosovichev, J.P. Rozelot and A.H. Andrei

9. Date and place: 9 September 2009, Stanford, CA, USA

Scientific rationale can be found at: http://www.on.br/iau-s264/scientific.html

***Topics*:**
The most critical aspects of the solar and stellar variability and its impact on the Earth and planets, have been considered during this symposium. These include:

- physical mechanisms of solar and stellar variability
- solar diameter and irradiance measurements
- helio- and asteroseismic inferences
- variability of spectral irradiance and energetic particles
- solar cycles and variability on century timescale
- effects on space weather and solar system planets
- implications for Earth's climate
- stellar magnetic activity and cycles
- brightness changes in solar-type stars and stellar surface structures

- effects of magnetic activity on planet formation and evolution
- space- and ground-based observational projects

Poster sessions:
Beside the posters displayed in the hall, a 1 to 2 min poster introductions were set up during the two 35-min sessions scheduled in the program, and were presented by the authors. This system worked very well and provided a good review of the poster session. The number of presented posters: 60.

IAU Newspaper: Four articles were written for the IAU newspaper on the symposium topics.

Comments: This symposium brought together a large scientific community, including solar and stellar physicists, and also some astrobiologists and specialists in climate and space weather effects. The science papers presented at the Symposium can be divided in four main groups.

In the first group, fundamental properties of the solar variability were discussed, including the total solar irradiance, the solar radius and shape, and solar abundances. The role of a shallow layer below the photosphere (the leptocline) was underlined as playing a key role in several physical mechanisms of the solar variability.

In the second group, the solar and stellar variabilities were discussed together through the common dynamo processes. In particular, the importance of the differential rotation and convective processes in the Sun and young Sun analogs was emphasized. It was recommended to further develop 3-D simulations for better understanding the structure and dynamics of the solar tachocline and also deep solar and stellar interiors. The unusually long declining solar cycle 23 was discussed in several papers, including a presentation of novel data assimilation methods for modelling and predicting solar activity cycles. The potential role of the interplanetary magnetic fields as a key indicator of activity was emphasized.

The third group of papers was devoted to solar and stellar magnetic energy release events: flares (nanoflares) and coronal mass ejections (CME), including their effects on space weather, space climate and related planets. It was emphasized that the observed variations of the total solar irradiance are not sufficient to explain the past correlation between solar activity and Earth climate. It was recommended to investigate long-term observing series of CME's to better establish their connections with terrestrial effects. This may justify the development of new detailed 3D atmospheric models.

The last part of the Symposium was devoted to discussions of the current and future observational programs. Among the highlights were presentations of new results on stellar variability from the COROT mission and the first results from the Kepler mission. Also, first images from the balloon-born observatory SUNRISE and a new heliometer from the Brazil National Observatory were presented.

Perhaps, the most significant highlight of the Symposium, which received coverage in science news, was the presentation of new results showing that compared to middle-aged stars like the Sun, newly formed stars spin faster generating strong magnetic fields that result in emission of more intense levels of X-rays, ultraviolet rays and charged particles — all of which affect the formation and evolution of planetary atmospheres and have a dramatic effect on the development of emerging life forms.

POST MEETING REPORT IAUS265

1. Meeting Number: IAU Symposium 265
2. Meeting Title: “Chemical Abundances in the Universe: Connecting First Stars to Planets”
3. Dedication of meeting (if any): None
4. Location (city, country): Rio de Janeiro, Brazil (IAU General Assembly)
5. Dates of meeting: 10 – 14 August 2009
6. Number of Participants: at least 160 participants (judging from talks and poster contributions)
7. List of represented countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, France, Germany, Great Britain, India, Italy, Japan, Latvia, Lithuania, Netherlands, New Zealand, Mexico, Portugal, Republic of Croatia, Romania, Russia, Spain, Sweden, Switzerland, United States of America
8. Report submitted by: Katia Cunha
9. Date and place: Tucson, Arizona
10. Signature: Katia Cunha

Summary of Scientific Highlights of IAUS265:

The science program of Symposium 265 was opened with a plenary lecture by Stan Woosley entitled "The Origins of the Elements", which was an excellent introduction to this broad field and set-the-stage for the following 5 days of the science sessions. This opening talk was well attended with a large audience. Some of the important topics noted in Woosley's lecture included the importance of stellar rotation in very low-metallicity stars, mass loss, the mystery of the exact physical mechanism which drives the r-process, and the general question of how massive stars die. The symposium that followed the opening lecture was organized into 5 broad science topics, consisting of Primordial Nucleosynthesis and the First Stars; First Stars in the Galaxy; Chemical Abundances in the High Redshift Universe; Chemical Constraints on Mass Assembly and Star Formation in Local Galaxies and the Milky Way; and Extrasolar Planets: The Chemical Abundance Connection.

Primordial Nucleosynthesis and the First Stars in the Universe: The topic of Big Bang Nucleosynthesis (BBN) was discussed and It was pointed out that among the elements H, D, He, and Li, it is deuterium that is the superior baryon density monitor. There were talks and subsequent lively discussions on the primordial 7Li abundance and whether measurable amounts of 6Li were synthesized (by undetermined processes) in the early universe. The quantitative abundances derived for the lithium isotopes depend on certain input physics, such as 3-D modelling or non-LTE calculations. One important topic in this session concerned the epoch of reionization, the first stars, and the mass function of these first, zero or near-zero metallicity stars. It was argued that the masses of these early objects were heavily biased towards very large masses. Of equal importance to the masses, was the nature of the nucleosynthesis that took place in these massive stars and by what mechanisms these new heavy elements were then returned to the interstellar medium of the young, rapidly evolving universe. Neutron captures via the s- and r-processes were reviewed in this session and it was emphasized how there are really two and only two distinct processes.

First Stars in the Galaxy: There was a lot of discussion, both in the talks and in the following question-and-answers, about important effects that take place in low-metallicity stars. One process is rotation whose effects becomes even more important in the early metal-poor environment. Rotational effects will lead to major changes in both nucleosynthesis and mass loss when compared to models with no rotation. Details of the physics of mixing were also covered, again with a connection to mixing. The carbon-enhanced metal-poor (CEMP) stars, whose fraction increases dramatically at extremely low iron abundances ([Fe/H]< -3), were an important topic that elicited considerable discussion. Various aspects of model atmospheres wrapped up the talks of this session, with questions about how realistic are the most current models, as well as detailed reviews of 3-D models of the solar photosphere.

Chemical Abundances in the High Redshift Universe: Gamma-ray bursts were an important topic in this session, where it was shown how these energetic events can be used to probe the chemistry of the ISM in the host galaxies at high redshift. Subsequent talks then covered other energetic objects, including chemical evolution in very luminous star-forming galaxies, using quasars to probe chemical abundances in the IGM, and rapid chemical enrichment in the regions around quasars.

Chemical Abundance Constraints on Mass Assembly and Star Formation in Local Galaxies and the Milky Way: This was a rather large session, with a number of talks detailing abundance patterns in a wide variety of galactic environments, and how the elemental abundance distributions can be used to trace star formation and chemical enrichment histories. The types of galaxies or galactic populations included dwarf galaxies (especially dwarf spheroidals), the recently discovered ultra faint dwarf galaxies, chemical structure in the Galactic halo, the bulge and Milky Way center, and an Omega Centauri tidal stream. Special emphasis was placed on discussions of the Galactic thin and thick disks, disk metallicity gradients, and models of Galactic chemical evolution. Modelling topics also included the s-process in a low-metallicity evironment and thermohaline mixing as a possible solution to the longstanding 3He problem.

Extrasolar Planets: The Chemical Abundance Connection: This session began with a review of how metallicity might influence planet formation in both the gravitational instability model and the core-accretion model. The discussion of theory was then followed by a review of observations of chemical abundances in stars, both with and without planets. There is a clear connection between chemistry and planetary architectures, but the exact connection remains elusive. Additional talks included the possibility that some Li-rich red giants may have accreted, or ingested, large planets leaving a chemical signature. The possible accretion of chemically fractionated material by our own Sun was the focus of one discussion item, with the suggestion that the presence of a solar system-like terrestrial planet family may be imprinted in the abundance pattern of the parent star.

IAU Symposium 265 concluded with a few talks on the next generation of large telescopes, such as the various Extremely Large Telescope (ELT) projects, and their instrumentation. Future large surveys and strategies for their implementation rounded out the end of "Chemical Abundances in the Universe: Connecting First Stars to Planets".

1. IAU Symposium No.: 266

2. Title of meeting: Star clusters: Basic galactic building blocks throughout time and space

3. Dedication of meeting: -

4. Location: Rio de Janeiro, Brazil (XVIIth IAU GA)

5. Dates of meeting: 11-14 August 2009-08-20

6. Scientific Organising Committee:

Richard de Grijs	(UK and China Nanjing, co-chair)
Jacques Lepine	(Brazil, co-chair)
Beatriz Barbuy	(Brazil, ex-officio)
Giovanni Carraro	(Italy)
Licai Deng	(China Nanjing)
Michael Dopita	(Australia)
Yu Gao	(China Nanjing)
Doug Geisler	(Chile)
Rosa M. Gonzalez Delgado	(Spain)
John Lattanzio	(Australia)
Stephen L. W. McMillan	(USA)
André Moitinho	(Portugal)
Anas Osman	(Egypt)
Philippe Prugniel	(France)
Ata Sarajedini	(USA)
Alison Sills	(Canada)

7. Local Organising Committee: IAU GA NOC

8. Number of participants: 490 (registered)
231 (final abstract count)

9. Countries represented: 40
(taken from the registered participants list)

Argentina	Germany	Poland
Australia	India	Portugal
Austria	Iran	Puerto Rico
Belgium	Ireland	Russian Federation
Brazil	Israel	South Africa
Canada	Italy	Spain
Chile	Japan	Switzerland
China Nanjing	Korea	United Kingdom
China Taipei	Lithuania	United States of America
Colombia	Mexico	Uzbekistan
Czech Republic	The Netherlands	Venezuela
Denmark	New Zealand	Vietnam
Finland	Peru	Zambia
France		

10. Report submitted by: Richard de Grijs
Place and date: Sheffield (UK), 20/08/2009

11. Summary of the scientific highlights of IAU Symposium No. 266

IAU Symposium No. 266 in Rio de Janeiro (Brazil) was organised as one of six Symposia approved during the IAU's XXVIIth General Assembly (GA). It was scheduled in the second week of the GA, so that participants would have the chance to attend the complementary Symposium on Stellar Populations (No. 262) during the first week.

The registered participants, as well as those who opted to "dip in" on occasion, witnessed a broad scientific programme, covering seven distinct sessions in 48 review, invited and contributed talks, which were all of high quality and most contained significant new results, making the meeting scientifically outstanding. The seven sessions included:

1. Physics and modes of star cluster formation;
2. Massive star clusters: formation, evolution, feedback, destruction;
3. Star cluster systems in context;
4. Globular cluster chemical evolution;
5. Complementary insights from multi-wavelength coverage;
6. Dynamics; and
7. Star clusters as laboratories of stellar evolution.

Session 4 replaced the originally proposed session on stellar populations (given the complementarity of IAU Symposium No. 262), at the request of the IAU EC, and covered the scientific themes of a Joint Discussion proposal submitted by J. Lattanzio and J. Th. van Loon.

Star clusters are laboratories of stellar evolution and dynamics, as well as building blocks to study the properties of external galaxies, such as their cosmological formation and assembly, star-formation history (SFH) and chemical evolution.

Star clusters are ideal places where to study the formation of stars in a statistical way. Researchers at the meeting agreed that stars form out of dense CO cores inside molecular clouds. In addition, all stars form inside star clusters, and tend to group together in hierarchical structures. This model emerges from and seems to be confirmed by recent and ongoing extensive sub-mm, IR, optical and X-ray surveys. The major role that ALMA will play in this context was emphasized. The study of very young clusters or associations helps us to probe the first moments of the star-formation process and the complex interplay between stellar evolution and stellar feedback and interactions.

The discovery and characterisation of intriguing multiple stellar populations in Galactic globular and rich, old LMC/SMC clusters (the "standard" single stellar populations) through extensive photometric and spectroscopic campaigns is boosting major theoretical efforts. We need to understand how this complicated mix of populations formed, i.e., how a cluster could retain processed material from first generation stars to produce second- or even third-generation stars. The competing roles of rotating massive stars and evolved stars on the asymptotic giant branch were discussed, although without reaching a clear conclusion. In addition, a new scenario in which the gas necessary for the second generation is expelled from first-generation binary systems, was proposed. The enhanced/normal He-content debate as a possible explanation of secondary blue sequences in colour-magnitude diagrams is a clear example that there must be some missing ingredient in our current understanding of stellar evolution.

Studies of brown dwarfs in young clusters, He-burning stars in the horizontal-branch phase, blue stragglers and white dwarfs (WDs) in intermediate-age and old systems were presented. These may potentially change our understanding of aspects of stellar structure and evolution

(mass limits, lifetimes, role of binaries) in the very near future.

The study of star clusters in external galaxies is lively. Such star clusters are used as test particles. Quantities such as luminosity functions, age-mass relationships, mass functions and colour distributions are derived to determine the stellar initial mass function (IMF), the star-formation history and – more generally – the possible cosmological formation scenario (either monolithic or hierarchical) of the parent galaxy. Critical issues related to measurements of these quantities were discussed, such as limitations of the integrated photometry, proper filter selection and binning techniques. It was argued that better communication among researchers and data exchange can help solve unnecessary conflicts.

Feedback from massive stars and their interaction with the environment determine how long a cluster with a given initial mass can survive, and possibly when mass segregation occurs. The role of the IMF and its universality was discussed in this context, together with the never-sufficiently-stressed importance of binary stars, WDs and black holes.

N-body models are getting more and more complicated, and we heard that the coupling of stellar evolution with dynamics is progressing quickly, although significant differences in the results from different codes are sill present. However, *N*-body plus stellar evolution models for individual clusters already show an impressive level of detail and a remarkable similarity to actual observations.

Globular clusters are used to probe the formation of the Galactic halo, and increasingly detailed chemical studies attempt to clarify whether halo stars originate from globular clusters. Isotopic abundances are leading to very different opinions, which hopefully will converge when more data will become available.

The results presented during the conference triggered lively and important discussions and major progress in the various subfields discussed at the meeting seems imminent.

FINAL REPORT

1. *Number:* IAU Symposium 267
2. *Title:* "Co-evolution of supermassive black holes and their host galaxies"
3. *Dedication:* N/A
4. *Location:* Rio de Janeiro, Brazil
5. *Dates:* 10-14 August 2009
6. *Number of participants:* Indeterminant as this was part of the General Assembly. Head counts in a couple of sessions suggests 200-250.
7. *List of represented countries (speakers only):* United States (19 speakers), Germany (6), Brazil (4), Canada (3), Italy (3), United Kingdom (3), Australia (2), France (2), Israel (2), Japan (2), Korea (2), Finland (1), Greece (1), and the Netherlands (1).
8. *Report submitted by:* Bradley M. Peterson, chair, Scientific Organizing Committee
9. *Date and place:* 14 September 2009, Columbus, Ohio, USA.
10. *Signature of SOC chair:*

Scientific Highlights of IAUS 267

IAUS 267 was divided into seven topical sessions:

(1) The first galaxies and black holes;
(2) Multiwavelength properties of AGNs and their hosts;
(3) Black hole masses, scaling relationships and their evolution;
(4) Quasar and supermassive black hole demographics;
(5) Accretion and feeding;
(6) Outflows and feedback; and
(7) The Big Picture: large-scale effects of feedback on galaxies and their environments.

Each session featured review talk by a senior scientist who works in the relevant area, 3-4 invited talks, and typically 3-4 contributed talks. The well-attended plenary talk was given by Timothy Heckman (Johns Hopkins University, USA) and the summary talk was given on Friday by Roger Blandford (Stanford University, USA). Nearly 200 papers were accepted for poster display, and approximately 2/3 of these were actually displayed during the Symposium. Approximate counts indicated that the sessions were typically attended by about 200 to 250 individuals.

There were numerous scientific highlights. The overall tenor of the meeting reflected the increasing maturity of the field of active galactic nuclei (AGNs) both on the theoretical and observational fronts. There was limited discussion on the primary methods of measuring the masses of supermassive black holes (stellar and gas dynamics and reverberation mapping), but much discussion on secondary methods that allow large-scale demographics to be probed. The true focus of the meeting was how these black holes interact with their hosts: there is a broad consensus that AGNs do not simply trace the evolution of their host galaxies, but AGNs are agents of that evolution: massive direct and indirect evidence was presenting demonstrating that AGN activity inhibits star-formation and the AGN phase is what moves galaxies from the “blue cloud” (gas-rich star-forming galaxies) to the “red sequence” (gas poor galaxies without recent star formation). There was additional discussion about how the accretion and outflow processes occur, and it is clear that tremendous progress has been made over the last decade. Especially high impact factors have been the Great Observatories (Hubble, Chandra, and Spitzer, in this context), ground-based 8-m-class telescopes (VLT, Gemini, and Keck), and the Sloan Digital Sky Survey. Collectively, these resources have revolutionized AGN astronomy.

UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES
Département d'astronomie

Symposium IAU 268 « Light Elements in the Universe » - Post meeting report

IAU Symposium 268 « Light Elements in the Universe" was successfully held on November 9-13, 2009 in Geneva (Switzerland). 123 participants (36 women) from 22 countries attended the meeting. A total of 53 oral talks (15 given by wowen) and 35 posters were presented.

The meeting was organized in 5 sessions:

1) Production of the light elements in the first minutes of the Universe (day 1)
2) Abundances of D, 3He, and 4He - Observations (days 1 and 2)
3) Abundances of LiBeB - Observations (days 2 and 3)
4) Sources and sinks of light elements (day 4)
5) Evolution of light elements in the Universe (days 4 and 5)

Four discussions of 45 minutes each were organized:

1) What is the local ISM value of D? How can we explain the dispersion of extragalactic D values (leader Dr M.Tosi)
2) What is the 4He from HII regions? What needs to be done to better understand systematic effects? (leader Dr G.Ferland)
3) The stellar yields in 3He, 4He, and 7Li: Main sources, observational constraints, and problems (leader Prof. A.Maeder)
4) Observational problems with LiBeB: Did we really detect 6Li in stellar atmospheres? How do the LiBeB abundances vary with metallicity? Which mechanisms are responsible for the Li dip and the Li "plateau"? (leader Dr P.-E. Nissen).

Poster sessions were held during the coffee breaks, and on the evening of November 9 a Wind & Cheese Poster Viewing Session was organized in the poster room.
An "Historical perspective" was presented as the first review at the beginning of the Symposium by Dr D. Lambert and the "Concluding remarks" were presented by Dr R. T.Rood.

The Symposium was held in the Museum of Natural History of the City of Geneva, downtown Geneva. A welcome reception was held in the Musée d'Histoire des Sciences on the Geneva lakeshore on the afternoon of November 8. The conference was opened by the director of the Museum of Natural History, Dr Danielle Decrouez, and by the director of the Geneva Observatory, Prof. Gilbert Burki. On the evening of November 9, a Wind & Cheese Poster Viewing Session was organized in the poster room. The Recteur and the General Secretary of the University of Geneva, Prof. Jean-Dominique Vassalli and Dr Stéphane Berthet, presented a welcome address on the evening of November 10 before the cocktail offered by the University of Geneva. A Women Networking Lunch was organized on November 11, and was attended by 32 ladies (this lunch was completely financed by the University of Geneva). The Conference Dinner was held on November 12 at the Château de Penthes close from ONU.

On the evening of November 11 a public conference entitled "Deuterium, helium, lithium: From the Big Bang to the contemporary civilisation" was presented at the University of Geneva and was attended by about 600 persons. The speakers were Dr Hubert Reeves (The saga of the light elements), Prof. Johannes Geiss (The Apollo landings on the Moon: what did we learn?), Dr Guy Laval from the french Science Academy (Light elements and nuclear energy on Earth), and Dr Jean-Michel Aubry, psychiatrist from the Geneva Hospitals (Lithium and bipolar diseases).

On November 10 at lunch time Dr Francesca Primas and myself joined a "Women Lunch Egalité - Women Career Advancement » organized for the PhD students and postdocs of the Mentorat program of the University of Geneva.

In addition to travel grants from the IAU, the Local Organizing Committee received financial assistance from the Swiss National Foundation (travel grants for Senior Researchers), the University of Geneva (Commission Administrative, Rectorat, and Faculté des Sciences), the Observatory of the University of Geneva, the Société de Physique et de Sciences Naturelles (SPHN) of Geneva, the Swiss Society of Astronomy and Astrophysics (SSAA), and the Swiss Academy of Natural Sciences (SCNAT).

Overall the comments from the participants have been extremely positive and many expressed their thanks through emails send after the conference.

We wish to thank IAU for having provided us with the opportunity to organize what we think was a very successful and stimulating scientific Symposium.

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