



# EUROPEAN ASTRONOMICAL SOCIETY **NEWSLETTER**

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## EDITORIAL

The present newsletter continues the tradition of the December issues, which include small reports from the European Week of Astronomy and Space Science (EWASS) that takes place the previous summer. A total of 17 summaries from Special Sessions and Symposia, as well as the report from the president from the 2013 EWASS in Turku can be found in the pages that follow. These, along with the presentations of the speakers, which are in many cases available online, provide to all of us who could not be there a useful review of a successful and very well attended meeting.

We also include two brief book reviews of select publications that came to the attention of the EAS council. One is a book by Alfred Stöckli and Roland Müller on the legendary astrophysicist Fritz Zwicky, whose bold ideas had a profound influence in our understanding of the Universe. The second is a presentation of the 2012 and 2013 volumes of the successful series "Organizations, People and Strategies in Astronomy (OPSA)", which contain a variety of review articles, edited by Andre Heck the past decade. We will continue to include brief review of select books in future newsletter.

Finally, the reader may find the latest news from Opticon and RadioNet, a call for the Victor Ambartsumian Prize, as well as an update on the activities of the new EAS Council.

Vassilis Charmandaris  
University of Crete  
& National Observatory of Athens, Greece

## MESSAGE FROM THE PRESIDENT

The EAS is in a state of evolution. The Council met in Rolle, Switzerland in January 2013 and decided to focus its efforts towards some level of professionalization of the Society. This means that a renewed effort to gain new organizational members was initiated and that the financial means of the Society will be geared towards being able to recruit staff. This evolution is necessary for a number of reasons. First, at the present time, the Society benefits from the infrastructure and support of the ISDC in Geneva at a level that is beyond what it funds. This is unhealthy. Second, the society's meetings, EWASS, European Week of Astronomy and Space Science, as they are now called, gain in importance. More than 600 astronomers met in Rome last year and a similar number came in Turku in July. This evolution means that the EAS must take steps to control the organization in a tighter way than hitherto. This is also benefiting the Society in general, as it will establish itself as the pivot of these meetings, wherever they are taking

place. Third, last and possibly most important, the Society needs to express itself on the European science policy scene much more than it does now. This also requires efforts from dedicated staff.

A number of concrete actions were undertaken since January 2013 in order to transform this policy in deeds: The benefits available to organizational members were redefined, they are now described on the web site of the Society:

[http://eas.unige.ch/member\\_dir.jsp](http://eas.unige.ch/member_dir.jsp)

This discussion finished, EAS invited a number of European firms and institutes to join. We hope that this will bear fruits and encourage you to contribute to this effort by approaching your institute and your public or private partners to join. They will thus express their support for a lively and active European astronomical community, and take advantage of the benefits offered by the Society. We have no means of evaluating the potential income to the Society that organizational members may bring. However, there are certainly way over 1000 universities, institutes, public and private institutions and industries that are linked one way or another to astronomy in Europe. With members fees for these institutions upward of 1000.- Euros per year, EAS should find the means to support its activities at a reasonable level.

It was also decided that EWASS 2014 would be in Geneva, organized by the EAS. This gives the Society hands on experience in a familiar set up and will help us organize these meetings elsewhere in 2015 and later, but always under the umbrella of the EAS.

The presence of the EAS on the political scene is now through the preparation of a report on the usages in publishing in astronomy and the preparation of a set of recommendations. This is being finalized by an ad-hoc working group under the leadership of Prof. K. de Boer. The set up of further working groups was discussed by Council in July 2013. A professional support here is highly needed, but will have to wait until the financial resources of the EAS allow the hiring of dedicated staff.

The Rolle meeting was also the occasion of a lively exchange with our affiliated societies. It was clear that the direction taken by Council is strongly supported by the national astronomical societies. This is an important encouragement for us to continue actively on this path.

Thierry Courvoisier  
President of EAS

## NEWS

### NEWS FROM THE EAS COUNCIL

In addition to the General Assembly and Business Meeting that were held during the European Week in Astronomy & Space Science (EWASS) in Turku in July of 2013, the EAS Council met on the 9th and 11th of July. A report can be found below.

#### 1. EWASS 2014

EWASS 2014 will be held in Geneva. A professional agency, KUONI, will be organizing the conference and two of its representatives updated council on the preparations. Proposals for sessions at EWASS 2014 have now been received and are being discussed by the SOC, chaired by Andreas Burkert.

#### 2. Organizational Membership

The EAS has revised the benefits for our Organizational memberships. These are outlined in a document accessible on the EAS website at [http://eas.unige.ch/org\\_members.jsp](http://eas.unige.ch/org_members.jsp)

#### 3. EAS report on Open Access

EAS is sometimes asked to take a position on certain events, either by its members, by societies, by national or supranational institutions. At other times Council feels that the EAS needs to formulate an opinion on a particular topic. Lately, the following report was produced:

Open Access Report: The EAS established a working group on Open Access Publishing (OAP) chaired by Prof. Klaas S. de Boer. The working group has now produced a report and this will be published in due course on the EAS website.

#### 4. EWASS 2015 and the new status of EWASS

EWASS 2015 will be held in Tenerife in July 2015. Last year a working group to review the status and evolution of EWASS was set up – members of the working group were Anne Dutrey, Mary Kontizas, Juri Poutanen, Johan Knapen. Among the decisions made by the working group was the professionalization of EWASS, meaning that from now on it the practical organization will always be handled by a professional agency, most likely KUONI. Moreover the EAS will be in charge and be taking over the responsibilities of the organization of all future EWASS.

Serena Viti, Secretary of EAS

## NEWS FROM OPTICON

As the first year of the new OPTICON contract approaches a close, things are going smoothly with all of our activities having kicked-off and making progress. Several working groups had meetings at the EWASS meeting in Turku, which also saw a session on the mid-term updates to the ASTRONET roadmap. In the autumn we learned of a change in our project officer, Teodora Rusu has been replaced by Dr Sebastian Jester, an astronomer/astrophysicist who has had positions at MPA Heidelberg, the SDSS group at Fermilab, and Southampton. We look forward to working with Sebastian soon.

Following its meeting on deformable mirrors in Delft in January our innovation network held a road-mapping meeting at the UKATC in September 2013 which included representatives of ASTRONET, ESO and OPTICON. The output of the meeting was a prioritised list of technologies for the medium term in astronomy. This will form the basis of an update to the technology roadmap, a deliverable of this group.

A new OPTICON activity led by Lucasz Wyrzykowski from the University of Warsaw is the time domain astronomy network. This group's kick-off meeting and the 4th Gaia Science Alerts Workshop was held in Paris in June 2013. A time-domain follow up network of small telescopes (0.5-2m) has now been created and is under tests before the first Gaia alerts arrive in 2014.

The 11th NEON observing school at the telescope took place at the La Palma Observatory (Spain) between July 14 to 27th and September saw one of Michel Dennefeld's 'Hot Topics' conferences hosted by the observatory in Bucharest, Romania. About 50 young astronomers from the region attended and had both talks and practical sessions led by a number of leading European Astronomers.

On the interferometry side the Fizeau exchange programme is proceeding as planned, calls were issued and awarded in 2012B (for 2013 missions), 2013A and 2013B. An extra call awarded extra funding to VLTI school attendees. Details on

the funding are public at <http://www.european-interferometry.eu/fizeau-program/funding-results>. There was an interferometry school in 2013 in France (<http://www.european-interferometry.eu/training/2013-school>) and at least one other school is being planned.

The OPTICON Common Time Allocation Committee continued its work, with calls in February and August being adjudicated by meetings in Tenerife in April and Warsaw in September. The two calls attracted 71 and 55 proposals respectively, a healthy oversubscription factor. Julia de Leon left the panel to be replaced by Rene Dufard from Grenada and the year also marked the departure of the last two members of the ‘Magnificent Seven’ who had kicked off the process in 2010B when Laszlo Kiss and Herve Aussel stepped down. Laszlo was replaced by Maciej Konacki of Torun, who brings his exoplanet experience to the table. The next call will open in early February 2014.

Activities already announced for next year include an ELT/HTRA workshop “Speed and Sensitivity, Expanding Astronomical Horizons with ELTs” to be held at the National University of Ireland, Galway. Also underway are early plans for an E-ELT related school in 2015. This will cover three areas: (a) E-ELT Science, (b) Technology and (c) Data reduction & Simulations and will consist of lectures and hands-on “labs”.

For more information visit the OPTICON website at [www.astro-opticon.org](http://www.astro-opticon.org) or contact the project scientist John Davies ([john.davies@stfc.ac.uk](mailto:john.davies@stfc.ac.uk)), the PI, Prof Gerard ‘Gerry’ Gilmore ([gil@ast.cam.ac.uk](mailto:gil@ast.cam.ac.uk)) or

## NEWS FROM RADIO NET3

RadioNet3, an EC funded project, coordinates a partnership of Europe’s leading radio astronomy facilities. The project started on January 1<sup>st</sup>, 2012 and will continue till the end of 2015. It is motivated by the ambition to foster world-leading European research in radio astronomy and to create a coherent, innovative and accessible set of research facilities. Bringing together 27 partners, RadioNet3 is recognized by funding agencies and international project consortia as the European entity representing radio astronomy. The RadioNet3 work programme comprises three types of activities: 6 Networking Activities, 9 Transnational Access Programmes, and 4 Joint Research Activities. These are designed to pursue the general goals of RadioNet3, which are to:

- Provide and facilitate access to the complete range of Europe’s leading radio-astronomical facilities;
- Secure a long term perspective for scientific and technical developments in radio astronomy;
- Stimulate new Research and Development (R&D) activities for the radio infrastructures in synergy with ALMA and with the SKA;
- Contribute to the implementation of the vision developed in the ASTRONET Strategic Plan for European Astronomy.

The six Networking Activities (NAs) aim at transforming the way radio astronomy science is managed in Europe. They provide an effective forum for new European collaborations, developing new ways to share ideas and results, preparing the researchers for new research opportunities through the future SKA telescope and its pathfinder telescopes.

In the first 18 months of RadioNet3, NAs supported the organization of 36 scientific and engineering events, providing travel grants to researchers, engineers and students to participate in these meetings. The meetings were of great in-

terest also for participants from non-EU countries. Most of the events addressed topics related to ALMA and SKA. The training schools were always oversubscribed, showing their attraction for young astronomers. Finally, interaction with the wider community of researchers and facility users, as well as with the ASTRONET road mapping process are established towards the goal of describing a vision and roadmap for evolving the coordination in the European radio astronomy.

The Transnational Access (TNA) programmes of RadioNet3 stimulate the full exploitation of the open skies policy that has been at the core of the operations philosophy of most radio astronomical facilities for decades. Facilities are open to research by all qualified researchers based on independent peer review.

The advent of LOFAR and ALMA currently offers even better opportunities to many more European astronomers, because of the new scientific capabilities these telescopes offer.

TNA provides support for European astronomers to use and visit world leading instruments and facilities from sub-mm to metre wavelengths. Nine facilities, including the European VLBI Network with 12 supported telescopes, are part of the TNA programmes, namely e-MERLIN, Effelsberg 100m, LOFAR, WSRT, IRAM Pico Veleta 30m and Plateau de Bure interferometer, Apex, and SRT 64m. All have well developed programmes to support TNA users. In the first 18 months these facilities delivered already 60% of the contracted access. Scientific results from these observations are already available. Several facilities have just been through major upgrades.

The value of RadioNet3 is demonstrated by the way in which the R&D activities have contributed to the upgraded and recently built facilities. A common element to all Joint Research Activities is that they address the effectiveness with which the existing radio telescopes can be operated in the next decade. New digital techniques, nano-circuits and software algorithms allow radio astronomers to make more efficient use of telescope hardware by increasing the observing bandwidth or the field of view of the telescopes. For example, the deployment of multi-pixel detectors will revolutionize single-dish astronomy by enhancing the large-scale imaging speed by many orders of magnitude. This offers the potential to keep European (mm and cm) interferometer arrays competitive alongside globally funded new arrays while key projects in the Southern hemisphere (ALMA and SKA pathfinders) are under construction. At the same time, European radio astronomers are also working on new software and modern parallel computing techniques that will be in high demand for new instruments. The JRA UniBoard2 is considered to be a serious contender for a new processing platform for the SKA AA-low beam former and correlator. Progress was made by JRA AETHER on W-band MMIC amplifiers, compact very wide-band 2SB SIS, quasi-optical mixers, and Nb-AlN-NbN SIS junctions. JRA Hilado delivered optimisation measures that enable ALMA and LOFAR users to go beyond the limitations of processing. DIVA has started development work for a feed plus Low Noise Amplifier with a bandwidth from 1 to 10GHz, impacting future SKA receivers. A 14GHz sampler was tested. The new digital backend combined with the upgraded 1GHz to 10GHz receiver will offer impressive new capabilities for VLBI.

### RadioNet3 Mid Term Review

RadioNet3 has been under review for the first 18 months of his activity. The Mid Term Review took place at the Max-Planck-Institut fuer Radioastronomie in Bonn on November 18, 2013. The aim of a technical review is to assess the work carried out under the project over the period and provide rec-

ommendations to the Commission. The RadioNet3 Reviewer was Prof. Richard Schilizzi, (Univ. of Manchester). The EC Commissioner Elena Righi-Steele attended the review session. The reviewer's task is to give external advice to the Commission on the project, with respect to the degree of fulfilment of the project work plan, the breakthrough potential with respect to the scientific state of the art, the resources planned and utilized, the management procedures, the beneficiaries contributions and integration, the expected potential impact in scientific, technological terms, and the plans for the use and dissemination of results. Rafael Bachiller, Chairman of the RadioNet3 Board, opened the meeting. The Coordinator Anton Zensus, the Project Manager Izabela Rottmann, the Project Scientist Franco Mantovani, the Transnational Access programme leader Simon Garrington, and the Joint Research Activities leaders (Arpad Szomoru, Michel Guelin, Marco de Vos, and Walter Alef) presented the activities done so far in the project. The review was closed by comments and recommendations by Prof. Schilizzi.

More information on the RadioNet3 project can be requested via e-mail at [rn3@mpifr.de](mailto:rn3@mpifr.de), or by visiting the web page <http://www.radionet-eu.org/>.

### 2013 GROTE REBER MEDAL



The Grote Reber Foundation has announced that Professor Jim Moran will be the recipient of the 2013 Grote Reber Gold Medal. The Grote Reber Medal is awarded annually for significant and innovative contributions to radio astronomy. Moran is being recognised for his pioneering work in the development and application of spectroscopic Very Long Baseline Interferometry.

Moran is the Donald H. Menzel Professor of Astrophysics at Harvard University and a Senior Radio Astronomer at the Smithsonian Astrophysical Observatory (SAO), where he has spent his entire career. He also holds a position as Concurrent Professor of Astronomy at Nanjing University and previously served as Chair of the Harvard Department of Astronomy and Associate Director of SAO.

Moran did his undergraduate work at the University of Notre Dame and received his PhD from the Massachusetts Institute of Technology (MIT) in 1968. He has previously received the American Astronomical Society's Newton Lacy Pierce Prize, was the joint recipient of the 1971 Rumford Medal of the American Academy of Arts and Science, and was the 1996 National Radio Astronomy Observatory (NRAO) Jansky Lecturer. He is a member of the US National Academy of Sciences and the American Academy of Arts and Sciences. He is a coauthor of a widely used reference book, *Interferometry and Synthesis in Radio Astronomy*.

Moran's interest in radio astronomy began while he was in high school, where he used his experience as an amateur radio operator to build a small radio telescope at 400 MHz to detect the Sun. He later participated in one of the earliest summer programs at NRAO in 1962, which permanently hooked him on radio astronomy as a career.

Moran also played a key role in the design and application of the NRAO Very Long Baseline Array (VLBA) for spectroscopic observations. In 1994, he led an international group of collaborators and students to use the VLBA to image the

masers in the Seyfert galaxy NGC4258, which convincingly demonstrated that the spots trace a nearly Keplerian accretion disk around a supermassive black hole.

This work provided definitive and direct evidence for the existence of supermassive black holes and the first direct geometric distance estimate to a galaxy independent of the traditional multi-step extragalactic distance ladder.

The VLBA estimate of the distance to NGC4258 of  $7.2 \pm 0.5$  megaparsecs was the most precise extragalactic distance measurement at that time, and has played an important role in the calibration of the Cepheid distance scale based on observations of Cepheid variables in NGC4258.

Accurate knowledge of extragalactic distances is a key factor in establishing the equation of state of dark matter as well as being an essential prerequisite for the determination of the age, energy density, geometry, and the evolution of the Universe. Moran was also the director of the Submillimeter Array (SMA) on Mauna Kea during its construction. Among other projects, he used the SMA to study the accretion flow in the black hole in the center of our galaxy, known as Sgr A\*.

The 2013 Grote Reber Medal was awarded to Moran on July 8 in Turku, Finland, during the European Week of Astronomy Space Science.

The Grote Reber Medal was established by the Trustees of the Grote Reber Foundation to honor the achievements of Grote Reber and is administered by the Queen Victoria Museum in Launceston, Tasmania. Nominations for the 2013 Medal may be sent to Martin George, Queen Victoria Museum, 2 Invermay Road, Launceston, Tasmania 7250, Australia or by e-mail to [Martin.George@launceston.tas.gov.au](mailto:Martin.George@launceston.tas.gov.au) to be received no later than October 15, 2012.

### VICTOR AMBARTSUMIAN INTERNATIONAL PRIZE 2014

The Viktor Ambartsumian Prize is one of the important awards in astronomy/astrophysics and related sciences. It is being awarded to outstanding scientists having significant contribution in physical-mathematical sciences from any country and nationality. The Prize totals USD 500,000 and is being awarded once every two years, starting with 2010.



To apply for the Prize, a work may be presented by an author or authors' group (not more than 3 persons). The cash award is being equally shared between the winners, and a diploma, a medal and a certificate are being awarded to each winner.

The right for the nomination of works is reserved to: Nobel Prize Winners, Presidiums of national academies of sciences, scientific councils of astronomical observatories, and councils of corresponding departments of universities

Nominations for Viktor Ambartsumian Prize are not allowed in case if the presented work has already won or at the same time has been presented for another international prize.

The documents that should accompany the nomination are:

1. Official letter of nomination signed and sealed by the corresponding body,

2. Statement of scientific results or achievements, which are being nominated,
3. Curriculum Vitae of the nominee(s),
4. List of refereed publications of the nominee(s),
5. General annotations with reports of three referees,
6. Published papers, books, CD/DVDs, or other works that are being nominated,
7. Other documents that might be important for the decision.

These documents should be submitted to: Viktor Ambartsumian Prize International Steering Committee, Presidium, National Academy of Sciences, Marshal Baghramyan ave. 24, Yerevan 0019, Republic of Armenia. Phone: +374-10-525505.

The Deadline for nominations is March 18, 2014. The decisions will be made before July 18, 2014 and the Award of Viktor Ambartsumian Prize will take place on September 18, 2014.

Past recipients of the Viktor Ambartsumian International Prize are:

- 2010: Michel Mayor (Switzerland), Garik Israelian (Spain) and Nuno Santos (Portugal) – *for their important contribution in the study of relation between planetary systems and their host stars.*
- 2012: Jaan Einasto (Estonia) – *for his fundamental contributions to the discovery of dark matter and the cosmic web* and Igor Novikov (Russia) – *for his pioneering formulation how to confirm observationally that our Universe started as a hot Universe, and for proposing the method for determination of quasar masses.*

For more information visit the web site of the prize at: <http://vapriize.sci.am>

Dr. A. Michaelian

## BOOK REVIEWS

### FRITZ ZWICKY: AN EXTRAORDINARY ASTROPHYSICIST

by Alfred Stöckli and Roland Müller

The Swiss astrophysicist Fritz Zwicky (1898-1974) is one of the most prolific sources of pioneering ideas in astronomy in the 20th century. He became Professor at the California Institute of Technology (Caltech), Pasadena, where he produced outstanding work as researcher, discoverer, and inventor. Astronomers regard him as the father of «dark matter», which he predicted as early as 1933. He also published fundamental studies in the field of gravitational lensing. He also produced theoretical investigations on the origin of supernovae, and with organized the first survey which allowed him to discover 123 supernovae. He was successful in the field of galaxy research and also acquired a great reputation as a rocket scientist. Under his leadership the Americans succeeded in launching the first object into space in 1957. Zwicky's personality was unconventional and occasionally he sparked controversy. When offered



American citizenship, he refused, remaining true to his Swiss roots, to Glarus and to the mountains he loved to climb. His ideas were generally brilliant and always unconventional. This biography is the only one available in English on this genuinely extraordinary astrophysicist.

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Prof. G. Meylan  
EPFL, Switzerland

## ORGANIZATIONS, PEOPLE AND STRATEGIES IN ASTRONOMY

Edited by A. Heck

Two more volumes of the successful series “Organizations and Strategies in Astronomy (OSA)”, which have been coordinated and edited by A. Heck since 2000, were made available in 2012 and 2013. The new volumes place more emphasis on people, as suggested by the modified title. Rather than being devoted to the publication of hard-science results, the refereed and validated contributions gathered in those books describe how astronomy research lives: how it is planned, funded, structured and organized, how it operates, how it interacts with other disciplines and the rest of the world, how it communicates, etc.

I became familiar with OSA/OPSA six years ago when I was asked to contribute an article describing the status of astrophysics in Greece. Preparing the article required substantial effort in collecting the information, cross checking its accuracy with colleagues and presenting it in an objective manner. In the current volumes of OPSA one can find similar articles on seven countries providing insightful information on their structure of astronomy research and infrastructure. The style of the articles follows the general OSA/OPSA approach, where scientists and non-scientists describe their experience and elaborate, often for the first time at such a level, on non-purely scientific matters, many of them of fundamental importance for the efficient conduct of their activities. The two new volumes cover a large range of fields and themes: in practice, one could say that all aspects of astronomy-related life and environment are considered in the spirit of sharing expertise and lessons learned. There are over forty additional articles on a variety of topics including the impact of ADS in astronomy research, the use of various metrics in estimating the quality of research, the effectiveness of lobbying, ethics in research and many more.

The books will very useful to wide range of audience including astronomy professional and administrators, as well as students who wish to pursue a career in astronomy or in related space sciences.

A detailed presentation of the volume contents as well as details on ordering can be found at [http://www.venngeist.org/opsas\\_pres.htm](http://www.venngeist.org/opsas_pres.htm)

Vassilis Charmandaris  
University of Crete  
& National Observatory of Athens, Greece

## NEWS FROM EWASS 2013

### PRESIDENT'S REPORT 2013

#### Thierry J.-L. Courvoisier July 14, 2013

Since we last met Council set up and worked through the first round of selection of the MERAC prizes that were announced last year. This year the prizes are given to young researchers at the post-doctoral level. The prizes have been given during the present meeting. Next year's prizes will be for excellent doctoral thesis. The MERAC prizes which benefit young astronomers are a very valuable addition to the already established EAS prizes. The MERAC prizes as well as the Tycho Brahe prize are selected by our Prize committee under the leadership of Councilor F. Palla to whom we are very thankful. Organizing the selections is an important responsibility and no small task. The Lodewijk Woltjer lecture is awarded directly by council. The interaction with the MERAC foundation were always easy and constructive. Thanks go there to Carl Stadelhofer who chairs the board of the foundation and to our colleague George Lake who makes the interface with the foundation.

The EAS Council had a very fruitful meeting in Rolle at the beginning of the year. It decided to put emphasis on stepping up the organizational structure of the Society. The present setting is that ISDC staff in Geneva performs a number of tasks for the Society. Their work for the EAS is being only funded partially by EAS. The increased level of activity of the EAS over the last years requires that our organization is firmed up, in particular to run the EWASS events, but also to increase our presence on the European science policy scene. Council will thus use the means of the society in this direction as a high priority in the coming years. This is already reflected in the budget approved by Council at the Turku meeting.

This line of action requires that we make a considerable effort to increase the membership of the society and in particular the number of organizational members. Council worked hard on this, preparing detailed lists of benefits and addressing a number of potential members. Members can see in the 2012 accounts the progress that these steps have already brought to the finances of the Society. We are, however, still far from the goal. The help of all members is solicited in this domain. Please do see with your institution as well as those public or private entities in your circles whether they would be interested to join.

The Council also discussed in depth the future of the EWASS meetings. These will be more closely led by EAS in future and their organization, as is the case here, will rest in professional hands. The society will exercise this next year in Geneva. Speaking of science policy, Council approved last summer the Space astronomy report prepared by a working group under the leadership of M. Watson of Leicester. This was then widely distributed. One remark we received is that the report should have had a broader remit and dealt with all space sciences. I take this as a strong encouragement, as it means that the opinions expressed in this way will carry some weight. Council is dealing this summer with a report on publishing habits of astronomers. The work was led first by Juan Zorec and then Klaas de Boer. The report will be brought to the attention of the members for comments in the coming weeks. Further working groups are being set up, in particular on Ethics. This one will be lead by Anne Dutrey.

We were furthermore made sensitive by Ionna Arka to the needs of our colleagues who finish a thesis and possibly one

or more postdoctoral stays and then leave the academic world to join other career paths. This seems to us to be of high importance. It was featured in our last Newsletter. I think that it is a richness to have colleagues in various paths of professional life and that we should make all we can to make that transition successful and smooth. The next line of action here is to create links between EAS and those who have experience in this direction. EAS councilor J. Fernandez will follow this point in the coming weeks and months.

Let me take the opportunity here to thank all those who invest time and effort for the society over the months and years. It is the ISDC staff that is actively involved in our activities, Martine Logossou, Marie-Claude Dunand and Marc Tuerler, those members of Council involved in very concrete actions and the revisors of the accounts Georges Meylan and Sandro Mereghetti.

EAS is steadily increasing its level of activity at the service of our community. The Council is taking its role with vigor and enthusiasm and I hope that the result is a source of satisfaction for the members.

### SYMPOSIUM 2: THE ASTROCHEMICAL UNIVERSE UNVEILED WITH HERSCHEL

Since its launch in 2009, the Herschel Space Observatory has unveiled the far-IR window with its high sensitive instrumentation, collecting spectra of important molecules towards a variety of different objects: from comets to protoplanetary disks; from the diffuse interstellar medium and photodissociation regions (PDRs) to dense cloud cores; from star forming regions to the circumstellar environment of evolved stars; from local to early-universe galaxies. In doing so, new molecular species have been discovered; unbiased spectral surveys have unveiled an extraordinary rich chemistry; high spectral resolution line profiles of hydrides and important coolants such as water and carbon monoxide have revealed complex chemical/physical processes and shocked material. In summary, Herschel has emphasized the crucial role of astrochemistry in the whole astrophysical community. The EWASS Symposium 2 has given us the opportunity to bring together different communities, compare the results obtained in different environments and to discuss their interpretation with the available models.

The last part of the Symposium was dedicated to data interpretation and available models. Open questions, major problems and future developments for data interpretation techniques and chemical/physical models have been jointly discussed. From this discussion it emerged the need for a better understanding/appreciation of the parameters that are really important in the current physico-chemical models. Moreover, modelers should provide more observables as well as error bars/uncertainties on their results, to make major discriminations between the main parameters involved. The top 10 open questions / major problems identified were: (1) grain-surface and PAH chemistry - theory and laboratory work needed to interpret observations of: atmospheres of evolved stars, star forming regions, protoplanetary disks, galactic and extragalactic interstellar medium; (2) coupling chemistry with dynamics; (3) photoprocesses versus shocks along outflows driven by young stellar objects; (4) extrapolations of rate coefficients only measured in a limited range of temperatures; (5) missing collision rates (especially with H and electrons); (6) uncertainties on non-thermal desorption mechanisms in molecular

clouds; (7) the H<sub>2</sub> and H<sub>2</sub>O ortho-to-para ratio in cold environments; (8) binding energies of crucial surface reactants (e.g. O); (9) chemical processes during dust grain coagulation; (10) identification of molecular diagnostics to study the different components of the interstellar medium in external galaxies (shocked material, PDRs, XDRs, ionized gas).

The high sensitivity far-IR spectra provided by Herschel are a precious legacy which already started to challenge our current understanding of the chemical and physical processes in our solar system, in regions where stars and planets are currently forming, in the atmospheres of AGB stars, in the interstellar medium of the Milky Way and external galaxies. It is now up to us to decipher Herschel data and unveil our astrochemical universe. Thanks to Herschel, astrochemistry just entered a new exciting era.

Paola Caselli,  
Univ. of Leeds, UK

### SYMPOSIUM 3: SCIENCE WITH PLANCK DATA

The main scientific results of the Planck nominal mission, based on its 15.5 months of operation, were published in March 2013 by the Planck collaboration and at the same time the Planck data became publicly available. Thus by the time of EWASS 2013 the Planck results and data have been available to the general astronomical community for a few months. The EWASS Planck symposium was a great opportunity for the community to learn from the experts about the new scientific results obtained in each of the main research topics addressed by the Planck project.

The program of the symposium followed each of the main research topics addressed by the Planck project: Cosmic Microwave Background cosmology, Extragalactic sources, Galactic astrophysics, Clusters and Secondary Anisotropies. Each session started with review talk given by a Planck scientist, who summarized the Planck results during its nominal mission. The final session was dedicated to reviews talks on the Planck database - how to use it and what kind of information it contains. The last talk of the session presented the forthcoming ESA's Euclid mission.

A total 75 participants from more than 20 countries registered for the symposium. It contained 17 talks and the number of attendees in session varied between 20-50.

Pekka Heinämäki  
University of Turku, Tuorla Observatory, Finland

### SYMPOSIUM 7: STELLAR MAGNETIC ACTIVITY ACROSS THE HR DIAGRAM

The goal of this Symposium was to advance our understanding of magnetic fields, their origin, and the manifestations of magnetic activity in various types of stars. Starting from the still poorly understood solar magnetic cycle, reviewed by Prof. Dmitry Sokoloff from Moscow State University, the talks and posters presented in the symposium extended the discussion to the even more enigmatic cyclic magnetic activity seen in various other rapidly rotating cool stars. The aim was also cover the advances made in unveiling the magnetic topologies in various types of hot stars and degenerate objects. A

review talk by Dr. Svetlana Hubrig from Leibniz Institute for Astrophysics Potsdam gave an extensive review of magnetic field detections in hot massive objects, while Dr. Alfio Bonanno from Catania Observatory presented a review of the generation of magnetic fields in neutron stars.

The most important recent progress in these fields is due to the new generation of spectropolarimetric instruments on large telescopes, the more advanced data analysis methods, and numerical tools that permit direct simulations of these objects advancing theoretical understanding. Therefore, sessions where both novel observational techniques and theoretical models were discussed were held. Dr. Heidi Korhonen from University of Copenhagen gave a review talk on how magnetic cycles can be observationally studied in late-type stars, Dr. Thorsten Carroll reviewed the Zeeman-Doppler imaging technique, while Prof. Axel Brandenburg from Nordita, University of Stockholm/KTH described the recent advances made on the frontier of numerical modeling of active stars.

The science highlights of the symposium were summarized by Prof. Dmitry Sokoloff, who brought up the fact that an amazing variety of important topics are included in the stellar magnetic activity research, most of which were discussed during the symposium. As a general message, Prof. Sokoloff concluded that Doppler imaging, that allows for the construction of distributions of surface activity tracers from a point-like light source, was – and still is – a seminal achievement. With the simultaneous advancement of numerical simulations and dynamo models, we are at the verge of being able to use the data and time series obtained by Doppler imaging techniques in the context of dynamo models. As one important take-home message it was noted that in order to learn more on the Sun, we need to use ideas from the stellar community, and vice versa.

M. J. Mantere,  
Univ. of Helsinki, Finland

### SYMPOSIUM 8: DEATHS OF MASSIVE STARS AS SUPERNOVAE AND GAMMA-RAY BURSTS

Core-collapse supernovae mark the end-point of the evolution of massive stars, producing neutron stars and black holes, and in exceptional cases, long-duration gamma-ray bursts. These phenomena play a vital role in our understanding of stellar evolution, the synthesis of heavy elements, and through feedback processes also in galaxy evolution. The symposium (S8) on Deaths of massive stars as supernovae and gamma-ray bursts was held on 10-11 July. The programme consisted of a total of 13 invited and 10 contributed talks involving speakers from Denmark, Finland, Germany, Iceland, India, Israel, Italy, Sweden, Switzerland, and United Kingdom. In addition, five posters were presented by students.

The talks were organised in three sessions covering core-collapse supernova progenitors, supernova spectroscopy and interaction with circumstellar medium, long duration gamma-ray bursts and the supernova -- gamma-ray burst connection, and supernova surveys and rates. In addition to presenting the recent progress in research of these topics the symposium aimed at increasing the interaction between the supernova and gamma-ray burst communities. The covered topics ranged from well-observed nearby supernovae, supernova impostors and light echoes from historic supernovae to the supernovae associated with gamma-ray bursts, rare types of explosions discovered by the new wide-field supernova surveys, and us-

ing supernovae as tracers of the star formation rates. The discussion on the new and exciting results continued during the breaks and social dinners.

For more details, see the Symposium website:  
<http://users.utu.fi/sepmat/SNGRB.html>

Seppo Mattila,  
University of Turku, Finland  
Jesper Sollerman,  
Stockholm University, Sweden

## SYMPOSIUM 9: EXTREME PHYSICS OF NEUTRON STARS

The Symposium was devoted to the long-standing fundamental problem of superdense matter. This matter is available in the interiors of neutron stars. Its density exceeds the standard density of matter in atomic nuclei. Its properties are still uncertain because there is no strict practical theory to calculate them, and it is difficult to study them in laboratory. They are needed not only for astrophysics but for many branches of physics, first of all, for nuclear theory and physics of strong interactions. The main questions to be answered are: which properties of superdense matter can be studied from observations of neutron stars and how to do it? The symposium discussed the current state of the art in exploring the nature of superdense matter in neutron stars. It was a discussion of various approaches to solve the problem.

Session 1 was devoted to the equation of state of superdense matter, to calculations and measurements of neutron star masses and radii. P. Haensel reviewed current theories of superdense matter and stringent constraints imposed on these theories by recent discoveries of two neutron stars whose masses are around two solar masses. J. Poutanen described the results of measurements of neutron star masses and radii from observations of strong X-ray bursts accompanied by atmospheric radius expansion. He formulated the constraints on the equation of state of superdense matter derived from these measurements.

Session 2 addressed the phenomenon of X-ray bursts in surface layers of neutron stars. J. in 't Zand reviewed current status of observations of X-ray bursts. M. Linares analyzed the conditions for the occurrence of thermonuclear X-ray bursts in slowly and rapidly accreting neutron stars. Y. Cavocchi presented preliminary results of modeling the preparation of flames in neutron star surface layers during X-ray bursts. J. Nättilä studied the effect of accretion flow in atmospheres of cooling neutron stars after X-ray bursts with applications to neutron star mass and radius measurements.

Session 3 was devoted to X-ray and gamma-ray pulsars. S. Tsygankov reviewed power spectra of transient X-ray pulsars and the methods to estimate magnetic fields of these pulsars. A. Mushtukov presented an original model of reflection of cyclotron lines in the spectra of X-ray pulsars. M. Roberts discussed multiwavelength studies of the black widow and redback population. L. Kuiper considered the population of soft gamma-ray pulsars and its link to the Fermi LAT pulsar population.

In Session 4 the cooling of isolated and accreted neutron stars was discussed. A comprehensive review of the modern cooling theories was presented by P. Shternin. A. Kaminker presented 2D and 1D models of the thermal structure of magnetars as neutron stars with internal heat sources. V. Suleimanov described newly constructed models of carbon atmospheres of neutron stars. N. Kylafis put forward an original model of magnetars as neutron stars accreting from fallback disks.

Session 5 was devoted to magnetars (soft-gamma repeaters and anomalous X-ray pulsars) which are thought to be neutron stars with extremely strong magnetic fields. A. Watts outlined observations and theoretical models of magnetar outbursts. K. Parfrey reviewed current theories and numerical simulations of magnetospheric activities of magnetars associated with these outbursts. Y. Levin reviewed modern state of art in studying seismological activity of magnetars (eigenmodes of magnetar pulsations, propagation of these pulsations in the neutron star crust and core).

Finally, Session 6 was devoted to the important issue of pulsar glitches, timing nose, and superfluidity in neutron star interiors. M. Gusakov reviewed a modern status of theories for superfluidity in neutron stars, described the nature of superfluidity and its possible observational manifestations. E. Kantor introduced a new scenario for the evolution of spinning neutron stars in low-mass X-ray binaries which allows to suppress the r-mode instability of these stars due to resonant interaction of non-superfluid and superfluid oscillation modes. P. Jerome presented new models of the force-free neutron star magnetosphere. D. Yakovlev formulated new self-similarity relations for cooling superfluid neutron stars which can simplify the interpretation of observations.

The discussion of extreme physics of neutron stars was detailed and on good level. The symposium seemed interesting, timely and successful.

D. Yakovlev

## SYMPOSIUM 10: THE CO-EVOLUTION OF BLACK HOLES AND GALAXIES

Observations in the last decades have shown that supermassive black holes (SMBHs) reside in the centers of all galaxies, with masses tightly correlated to the properties of their host bulges. Symposium 10@EWASS 2013, held on Wed-Thu 10-11 July, was dedicated to exploring observational and theoretical aspects of the joint evolution of black holes and galaxies. The symposium featured 8 invited talks, 17 contributed talks and 15 posters; with over 50 effective participants attending and contributing to the meeting.

The first Session was dedicated to Scaling Relations from Low to High  $z$ : Which are the really fundamental relations (MBH-Mbulge, MBH-sigma, MBH-Mhalo)? How were they established and how do we trace them back to early epochs?

The session opened with a review on methods of black hole mass determination (Kelly Denney) and on the observed scaling relations at low and high  $z$  (Roberto Decarli). Yohan Dubois presented recent advances in numerical simulations of AGN feedback; Francesco Shankar discussed scaling relations and the BH mass function from the cosmological point of view. Contributed talks in this Session addressed whether the fundamental relation is between BH and bulge or total galaxy or halo mass; the connection between SMBH and nu-

clear star clusters; the relation between BH mass, Eddington ratio and QSO luminosity; the physics of BH formation at very high redshift; and the role of observational biases in tracing the evolution of scaling relations.

The second Session was dedicated to the Properties of AGN Host Galaxies: What processes fuel and quench star formation and BH growth? How do AGN feedback and outflows impact the evolution of the host galaxy? What is the role of mergers and environment? What will the next generation European instruments (ALMA and E-ELT) imply for studies of AGN, feedback and host galaxies?

Vivienne Wild and Marcella Brusa reviewed observational results, in the optical and X-rays, on the relation between AGN activity, star formation and feedback; Pierluigi Monaco reviewed the role of AGN feedback in semi-analytical models of galaxy formation. Contributed talks in this session discussed direct observational evidence, from optical to radio wavelengths, of AGN induced outflows; the AGN population in galaxies of various masses and morphologies; the influence of mergers and environment on AGN activity at low and high  $z$ ; various recipes to implement AGN feedback in numerical and semi-analytical models.

The meeting ended with the concluding remarks by Knud Jahnke, who challenged the consensus that there is any real interplay between host galaxy and central black hole, and suggested that they merely undergo concurrent growth, whenever gas inflows fuel star formation and black hole accretion.

In our website, <http://users.utu.fi/lporti/EWASS2013/Galaxies/Main.html>, we also collected the PDF copies of the oral and poster presentations, as record and legacy of a fruitful meeting.

J. Kotilainen, P. Johansson, L. Portinari

## SYMPOSIUM 11: GAIA RESEARCH FOR EUROPEAN ASTRONOMY TRAINING

The GREAT (Gaia Research for European Astronomy Training – see <http://www.great-esf.eu> and <http://www.great-itn.eu>) initiative is a pan-European research network involving over 500 researchers in 20+ countries with a common interest in aiming to maximise the science potential of Gaia. This 6th GREAT network annual plenary meeting was co-located at the EAS 2013 EWASS, constituted as Science Symposium 11. It was organised in six sessions over the days 11-12 Jul 2013. In addition there was a related special session (SM5) on Weds 10 July 2013. Following the successful open model adopted at the 5th GREAT Plenary in 2012, the community was invited to submit their proposed talk titles and abstracts on the meeting wiki. The final meeting programme was then generated by the SOC based on those contributions. The symposium was attended by 60 to 90 people, and included the participation of a number of graduate students active in the GREAT-ITN. All sessions were well attended, with lively discussion after each presentation. Full details of the programme and the presentations for S11 and SM5 are available at: <http://great.ast.cam.ac.uk/Greatwiki/GreatMeet-PM6>.

Session 1 contained invited presentations covering the ESA Gaia project and related activities. Prusti provided an update on the Gaia mission, noting that it will be launching end 2013, and giving an overview of Gaia science performance and the plans for data releases. Brown discussed the activities of the

Gaia Data Processing Consortium and how it will generate the science data products from Gaia for the community. Walton provided an update on the GREAT network activities, highlighting the wide range of networking activities (exchanges and workshops) supported. Session 2 saw five presentations covering Gaia/GREAT surveys and instrumentation projects. There were talks describing the WEAVE (Dalton), MOONS (Cirasuolo) and 4MOST (Schnurr) instruments concepts, noting how all were now progressing to the build phase. Vallenari presented an update of the Gaia-ESO survey (GES), being carried out with the VLT over 5 years, presenting highlights of the first year of data. Cantat presented an example of GES science, where Open Clusters are being used to probe the outer disk of the Milky Way. Session 3 focussed on GREAT science in the area of Galactic structure. Blomme discussed the systematic study of massive stars via the GES. Palaversa presented a brief overview of the use of the LINEAR survey in exploring the variable sky. Just presented a model of the Galactic Disk. Kobayashi presented Chemodynamical simulations of a Milky Way like galaxy.

Session 4 was devoted to Gaia and The Solar System. This extended session contained talks from Tanga, Granvik, Cellino, Pentilla, Oszkiewicz, Durech, Wilkman and Muinonen. Many aspects of Solar System science were covered where Gaia will have significant impact – ranging from simulations of asteroid spectra to the recovery of asteroid geometries from their light-curves to a census of Earth mini-moons. Session 5 covered the Gaia science topic: Milky Ways Stars and Structure. Sozzetti reviewed the potential of Gaia for exoplanet discovery. McMillan discussed how Gaia will be able to accurately probe the Galactic potential. Czekaj noted recent developments in the Besançon model and how this can be used to test models of Galaxy formation. Corredoira presented an explanation of a number of structures seen in the Milky Way, whilst Molly showed the use of kinematic signatures to probe barred disk structure. Nardin presented a technique modeling the local phase space distribution function.

The final Session 6 was devoted to the topic of Gaia Data and Data Access. Here Luri presented the plans for the Gaia Data System and the related Archive, whilst Drazinos discussed the specific topic of data for extragalactic objects to be observed by Gaia. There followed a lively open discussion session, where a number of suggestions for inclusion in the archive design were made.

In addition to the two-day science symposium, there was a special session held on Wed 10 Jul 2013. This session was of a more informal nature, where organisers of GREAT supported workshops (see <http://great.ast.cam.ac.uk/Greatwiki/GaiaScienceMeetings>) reported on meetings held over the previous year. Thus presentations covered reports on two recent GREAT schools: ‘The Art of Observational Campaigns’, IAC, Tenerife, Spain, Sep 2012 and the ‘GREAT Astrostatistics School’, Alicante, Spain, Jun 2013. There was a conference report: First Results from the Gaia-ESO Survey, Nice, France, Apr 2013 and workshop reports on: ‘Stellar analyses in the Gaia-ESO Survey: towards the first Data Release’, AIP, Potsdam, Germany, Sep 2012 and ‘Gaia and Exoplanets: GREAT Synergies on the Horizon’, Nov 2012, Torino, Italy. Finally there was a GREAT working group update and notification of upcoming GREAT supported meetings.

### Convenors:

Nicholas Walton,  
Institute of Astronomy, University of Cambridge, UK  
Timo Prusti,  
ESTEC, ESA, Noordwijk, NL

## SYMPOSIUM 12: THE GAMMA-RAY SKY IN THE ERA OF FERMI AND CHERENKOV TELESCOPES

The Large Area Telescope (LAT) aboard the Fermi Gamma-Ray Space Telescope and the current generation of Imaging Air Cherenkov Telescopes (IACTs) have increased drastically the number of known high energy (HE) and very high energy (VHE,  $E > 100$  GeV) gamma-ray emitting sources. The sources are cosmic accelerators: supernova remnants, pulsars and pulsar wind nebulae, galactic binary systems, starburst galaxies and active galactic nuclei. Fermi-LAT has provided leap in sensitivity, almost continuous all-sky monitoring, and first well-sampled GeV light curves, providing several unexpected results. The observations with current VHE instruments have revealed many surprises; pulsed emission from pulsars at  $> 100$  GeV, detection of VHE gamma-rays from starburst galaxies and very fast variability of the emission from active galactic nuclei. Also the future of the gamma-ray astronomy is bright. Cherenkov Telescope Array (CTA) with its increased sensitivity and lower energy threshold will allow to detect and study order of magnitude more sources and allow for deep surveys as well as more detailed studies of fast variability in the VHE gamma-ray regime in a extent not possible with the current generation of instruments. In this symposium the following hot topics in gamma-ray astronomy were highlighted.

The Fermi-LAT observations of gamma-ray pulsars have revolutionized our view of them. Since the LAT began operating in 2008, the number of pulsars known to emit gamma rays has increased from fewer than ten to over 120 making them the dominant class of galactic GeV emitters. Fermi has turned out to be especially powerful in finding previously unknown millisecond pulsars, increasing the known population by 50%. The current data suggests that the gamma-rays are emitted from the outer magnetosphere. Pulsar Wind Nebulae (PWNe) on the other hand represent the most numerous population of TeV Galactic sources. More than 20 PWNe have been detected at very-high-energies by Cherenkov telescopes, mainly in the H.E.S.S. Galactic Plane Survey, which covers the inner part of the Galaxy where the majority of these objects are located.

The interstellar Galactic gamma-ray emission originates from high-energy cosmic rays (CRs) interacting with the interstellar matter and radiation. It is a unique tracer of CR density outside of the solar system and provides valuable information on the properties of the interstellar gas and radiation fields. Detailed observations of the interstellar Galactic emission with Fermi-LAT provide wealth of information on the CR environment throughout the Galaxy. The current gamma-ray observations of Supernova remnants allow one to probe shock-accelerated particles at energies close to the cosmic ray knee. However, there is, in most cases, no conclusive proof of whether the gamma-ray emission arises from leptons or hadrons, and hence, what is the CR efficiency. Detailed spectro-imaging analyses of the brightest TeV SNRs (RX J1713.7-3946 and Vela Jr) at the arcmin scale and population studies through the discovery of many more SNRs in the Galactic Plane are the next steps forward in order to address the paradigm of the SNRs at the origin of Galactic CRs. This is one of the prime objectives of the next generation of IACTs, the Cherenkov Telescope Array (CTA), thanks to a 10-fold improvement of the sensitivity above 100 GeV, substantially better angular and spectral resolutions and wider field-of-view in comparison with currently operational experiments.

Of the hundreds of known X-ray binaries within our galaxy only five have been identified to emit at energies above 100

MeV. These binaries exhibit a wide range of behaviors and are still not well understood; indeed the nature of the compact object is only known in one of the systems, PSR B1259-63. Additionally the LAT has discovered high-energy emission from a number of other binary systems including microquasars and classical novae. The latest high-energy Fermi observations of this object class were presented in the context of our current understanding of this mysterious population of natural particle accelerators.

Active galactic nuclei dominate the extragalactic gamma-ray sky. These highly variable objects emit brightly over the entire electromagnetic spectrum. Current gamma-ray instruments cannot resolve the emission site and therefore it is unclear whether the gamma-ray emission originates very close to the black hole, inside the broad line region or further downstream in the jet. Recent studies combining data from the Fermi-LAT, IACTs and other wavebands show evidence for both types of behavior suggesting that there may be multiple gamma-ray emission sites. During the symposium several studies presented on how multi-wavelength observations can be used to study the location of the gamma-ray emission site. Additionally the possible signatures of hadronic processes were discussed. These included novel predictions of X-ray and gamma-ray polarization properties in different models.

The horizon in the gamma-ray band is limited by the extragalactic background light. During the symposium it was highlighted how the Fermi-LAT and Cherenkov Telescopes have added our understanding on the density and spectrum Extragalactic background light.

T. Savolainen and E. Lindfors

## SPECIAL SESSION 2: THE ROLE OF MODERN RADIO OBSERVATORIES IN BLACK HOLE AND JET STUDIES

A long-standing goal in relativistic astrophysics is to directly observe the immediate environment of a black hole with angular resolution comparable to the event horizon. Upcoming mm-VLBI arrays as well as the currently flying RadioAstron space-VLBI mission are bringing us closer to that goal. At EWASS2013 the latest developments of this endeavor has been discussed in the RadioNet special session.

Intimately linked to the accreting supermassive black holes are powerful jets of magnetized plasma – a spectacular and still in many ways enigmatic phenomenon. Understanding their launching, acceleration and collimation is both a major theoretical and observational challenge, being a field where polarimetric radio/mm imaging plays a central role. Another major topic in the jet studies is related to the energy dissipation in them and especially to the production of high energy gamma-rays. Again here radio astronomy with its unsurpassed angular resolution and its ability to image the non-thermal particle population provides an important complement to the high energy observations. The recent advances in understanding the relativistic outflows from black holes and what has been learned from for example combining radio and gamma-ray studies during the past few years were reviewed and discussed in the special session.

The invited speakers were Prof. Andreas Eckart (University of Cologne), who presented an “*Overall view of SgrA\**”; Prof. Heino Falcke (IMAPP, Radboud Universiteit, Nijmegen) who presented the “*Event Horizon Telescope*”; Dr. Mikhail Popov

(Astro Space Centre, Moscow) who illustrated the “*Science with RadioAstron*”; and Prof. Eduardo Ros (University of Valencia, MPIfR, Bonn) who told the audience about “*Supermassive BHs and powerful jets in AGN*”. Four more talks were given to an audience of about 40 people, mainly non-radio astronomers.

One of the aims of the Special Session was to inform a wider astronomical community about the RadioNet3 project. This was addressed in a talk by Franco Mantovani, the RadioNet3 Project Scientist. RadioNet3 is a program funded by EC to support the astronomers in their research by providing a wide access to Europe’s radio astronomical facilities, pooling expertise, and stimulating technology development. The European astronomical community has an access to a wide range of modern and versatile radio astronomical instruments to address the above open questions discussed in the special session.

The RadioNet Special Session Sp2 has received funding from the European Commission Seventh Framework Programme (FP/2007-2013) under grant agreement No 283393 (RadioNet3)

#### **Organizers:**

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### SPECIAL SESSION 3: FUNDAMENTAL STELLAR PARAMETERS

Extensive high precision surveys of stellar populations in our Galaxy are a major investment of the European astronomical Community for the next few years. To make best use of them, it is urgent to pin down the fundamental scale that translates stellar observables into physical parameters.

This meeting aimed to present the latest results on fundamental stellar parameters from different methods: spectroscopy, photometry, interferometry, asteroseismology; review their current precision and uncertainties; highlight remaining discrepancies and ways to settle them.

The meeting gathered experts to review the latest results on fundamental stellar parameters from various techniques, in view of application to existing and upcoming Galactic surveys. The first segment of the meeting discussed Interferometry (invited speakers: Pierre Kervella and Orlagh Creevey) and Asteroseismology (invited speaker: William Chaplin). The second segment presented the status of Photometric and Spectroscopic Scales (invited speaker: Andreas Korn). The third segment discussed Galactic Surveys and Reddening (invited speaker: Tomaz Zwitter). The meeting ended with a Conference Summary and Final Discussion led by Bengt Gustafsson (invited).

The major highlight of the meeting was a much raised awareness of the current achievements and limitations in the various methods and techniques; where progress is to be expected and what impedes it in the various approaches. Determining fundamental stellar parameters at a 1 per cent accuracy appears within reach, but that will prompt us with new chal-

lenges for additional physical effects come into play at such level of accuracy.

With more than 30 scientists attending and contributing, the participation to the meeting fulfilled our expectations. We received very positive feedback from our colleagues about both the scope and the quality of the meeting. Although there will be no proceedings, we collected and made available on our website the PDF copies of the oral and poster presentations, as record and legacy of a fruitful meeting. The sponsorship of the GREAT program of the European Science Foundation is acknowledged.

L. Casagrande & L. Portinari

### SPECIAL SESSION 5: THICK DISCS: CLUES FOR GALAXY FORMATION AND EVOLUTION

The session started with a review by Thomas Bensby, who put the focus on the properties of the Milky Way thick disc based on statistical studies of the properties of stars (phase space distribution, chemistry...) thanks to recent surveys such like the SDSS. He showed how these studies indicate that the thick disc seems to have a significantly shorter scalelength than the thin disc. He also reviewed the highlights of the recent controversy on whether the thin and the thick disc are distinct components or the galaxy discs are made of a succession of discs with an increasing scaleheight and different chemical properties.

Then, Ralph Schönrich described how the outward radial migration of stars from the inner disc could be one of the mechanisms of thick disc formation. Indeed, stars that migrate from the inner disc feel a reduced restoring force when moving outwards, which causes their vertical oscillations to increase their amplitude. The speaker told that the exact amount of disc thickening caused by this mechanism and whether it is sufficient to explain the presence of a thick disc are still a matter of study and debate.

Stefano Pasetto explained how he used data from the RAdial Velocity Experiment (RAVE) to study the properties of both the thin and thick discs of the Milky Way. Thanks to statistical methods, he has been able to disentangle the kinematic properties of the discs and he has presented well-constrained values of the solar motion relative to the local standard of rest and the thick disc lag.

Misha Haywood exposed results on the chemistry of stars of the thin and the thick disc. He presented data suggesting that the thick disc developed first in starburst mode and then on a more quiescent way for a few Gyrs. He also explained a model for the formation of the thin disc under the influence of the thick disc.

Chris Brook reviewed how thick discs are formed in hydrodynamical simulations. The most recent simulations of the Milky Way manage to qualitatively reproduce the observations. In his models, the thick disc is formed at high redshift in a short time-scale due to the merger of gas-rich clumps. A dynamically hot thick disc arises from those mergers. The stars formed at that epoch are the ones forming present-day thick discs. In these models, a thin disc is formed later on in a more quiescent way.

Finally, Sébastien Comerón reviewed several models that have been used to explain the formation of thick discs and put

them in the context of the observation of extragalactic thick discs. He argued that secular evolution mechanisms may account for most of the mass of thick discs in massive galaxies, but that the much more massive thick discs (relative to the thin disc mass) in low-mass galaxies can only be explained if they have formed in a short time-scale at high redshift. He also pointed a disagreement between the observations of extragalactic thick discs and the Milky Way thick disc, namely that in extragalactic objects the thick disc scalelength is almost always longer than that of the thin disc, but the opposite is seen in the Milky Way.

Sébastien Comerón

#### SPECIAL SESSION 7: SCIENCE WITH PRESENT AND FUTURE INTERFEROMETRIC INSTRUMENTS

The main goal and achievement of SS7 were to bring together Europe's scientists using the openly available interferometric facilities (such as VLTI and CHARA) to hear about the current results, but also to discuss the future of this technique in the light of the upcoming ELTs and other future facilities (ie. GAIA, ALMA, SKA).

The excellent list of speakers responded enthusiastically to the challenge of summarizing their work and highlight scientific results to a wider audience. The breadth of science being exploited by modern optical arrays is impressively long, and extended from rather classical domains (instigation of stellar diameters and binarity) to high angular resolution images of stellar surfaces, resolving the origins of planet formation in young stellar disks, solving some of the mysteries of enigmatic, rare and complex sources, learning about fundamental parameters of black hole feeding. Clearly, in the age of gigantic all-sky surveys, optical and infrared interferometry plays the complementary role of a giant night sky microscope, capable of resolving very fine details in a considerable number of astronomical key objects.

The invited speakers reported several examples of those incremental sensitivity improvements of modern interferometers over the last years. These have now allowed conducting sample studies of statistical sizes leading to transformational insights in the areas of star formation and feeding of active black holes in galactic nuclei.

At the end of the session, a detailed review of the scientific productivity of the VLTI was given as a start to discuss ways into the future. The well attended session showed the interest of the wider astronomical community in the technique, in particular where long baselines, and high spectral resolution of spectro-interferometry allow access to new observables of physical processes in and around stars and black holes. The last decades of technological groundwork has lead to a maturity, which in the short term future will give the upcoming commissioning of the next generation of VLTI and CHARA instruments a higher scientific impact.

In addition, for the longer-term future, we are now in a position to plan on robust technological grounds for a new or significantly enhanced facility, which would include about 10 laser-guide star adaptive optics assisted 4m class telescopes with several 100m long baselines. Such a new facility, responding to the astronomers demand for even higher dynamic range interferometric imaging and improved sky coverage than offered today, will critically rely on the international community and community networks such as the EAS.

The organizers wish to thank all speakers for making this special session a great success.

The complete list of talks is available as pdf and video files via the webpage <http://www.ss7.ulg.ac.be/programme.php> (If necessary at all, username: ss7 pwd: EWASS2013)

J. Surdej, J.-U. Pott, O. Chesneau

#### SPECIAL SESSION 8: GALACTIC MOLECULAR CLOUDS AND THEIR CHEMISTRY

Special session 8 concentrated on the chemistry of dense interstellar medium, especially in connection with the star formation process. The goal of the meeting was to seek connections between the evolution of molecular clouds and their chemistry and between the gas and dust components of the clouds. Thus the topic was not limited to issues of gas phase chemistry but many general questions regarding molecular clouds, star formation, and interstellar dust were also discussed.

The special session included five invited talks that set the scene for the meeting, reviewing different aspects of observational, numerical, and laboratory studies. The meeting was opened by Gösta Gahm who discussed the circulation of matter in star forming regions and presented new observations of the small compact clouds (globulets) found in many HII regions. Michiel Hogerheijde gave a detailed overview on the numerical modelling of chemistry and radiative transfer, with an outlook to the challenges of interpreting ALMA data. Molecular line studies were discussed by Laurent Pagani and Charlotte Vastel. Pagani gave a review on DCO<sup>+</sup> and N<sub>2</sub>D<sup>+</sup> observations in dark clouds, and how these can be used to measure the depletion of CO and N<sub>2</sub>. Vastel discussed observations of water in star forming regions, with a special reference to recent results from the Herschel satellite. On the second day, Wolf Geppert gave a detailed review on laboratory work and its contribution to the understanding of ion chemistry in space.

The program included further six contributed talks and two poster presentations. All presentations are available at [http://www.helsinki.fi/~mjuvela/ewass\\_sp8.html](http://www.helsinki.fi/~mjuvela/ewass_sp8.html). The sessions were attended by approximately 30 people who took active part in the discussions that followed each presentation.

M. Juvela, University of Helsinki, Finland

J. Harju, FINCA, Finland

#### SPECIAL SESSION 9: STELLAR DYNAMICS AND CELESTIAL MECHANICS IN MODERN ASTROPHYSICS

The meeting was successfully followed by about 30 people, with a peak of presences in the Session 2.

Each presentation was allowed 5 minutes discussion after it. Most of the participants contributed to discussion. The main outcome of the Sp9 was the awareness of the very high level of reliability and performance reached by the stellar dynamics and celestial mechanics algorithms and codes, tested at a level of confidence enormously larger than in other fields of astrophysics.

Three 30 minutes invited review talks (S. Mikkola, R. Capuzzo-Dolcetta and R. Spurzem) were programmed, together with 9

shorter (20 minutes) oral presentations and 3 posters. The oral contributions were distributed over 3 sessions (sessions 1 and 2 on Wednesday July 10 and session 3 on Thursday July 11). The first session, chaired by P. Berczik started with an invited talk by S. Mikkola, who gave an exhaustive review of the regularization method employed since first studies by Levi Civita, and their implementations in the context of celestial mechanics and stellar dynamics.

The following 20 minutes talk, given by F. Feng, was about the numerical study of the role of the Sun on the Oort's comet belt. After this, I. Jiang spoke of how accretion disks around massive black holes favor the capture of stars around it.

The second session, still chaired by P. Berczik, began with the review by R. Capuzzo-Dolcetta on the modern topic of the interpretation of the existence of compact massive objects in the center of galaxies over the whole set of spectral types. After presenting the state of the art knowledge in this field he discussed the 2 main accepted explanations for the formation of Nuclear Star Clusters, presenting some analytic and numerical evidence in favor of the dissipationless globular cluster migration origin.

M. Spera presented and discussed performance of HiGPUs, a 6th order direct summation code and its results about the phenomenon of mass segregation of violently relaxing stellar systems.

Peter Berczik spoke of Galactic star cluster dissolution, studied by mean of a direct summation code. A. Just continued in this line presenting a work in collaboration with Berczik.

On Thursday, due to the absence of R. Spurzem for important personal reasons, the first talk was given by a Beijing PhD student of Spurzem's, M. X. Tsai, who explained in more detail the contents of his poster, concerned with the introduction of the NBODY6++ code into the AMUSE frame and its bridge to the MERCURY code, already running there, and their future applications to solar-like planetary systems.

Y. Meiron referred of his implementation of a multipolar expansion technique to quasi spherical systems originally proposed by S. White. S. Banerjee talked of his collaboration with P. Kroupa in the interpretation of some observed clusters as stellar systems revirialized after rapid gas expulsion. Finally, C. Boily discussed how a tidal field affects the binary population of small star clusters, with interesting hints towards a weakening of intermediate-large binaries.

The 2 posters (A. Ulubay Siddiki and L. Yeh) outlined, respectively, results of simulations of young stellar disk at the Galactic centre and the existence of equilibrium points of Galactic Systems with binary black holes.

**R. Capuzzo-Dolcetta, S. Mikkola, R. Spurzem**

#### SPECIAL SESSION 12: A FRESH LOOK AT THE STELLAR INITIAL MASS FUNCTION

The distribution of stellar masses at birth in star forming regions (the initial mass function, IMF) is a powerful diagnostic of the physical conditions of galaxy formation as the stellar component is being formed. Recent advances on spectroscopic and dynamical analyses of the IMF have revealed a systematic variation with respect to galaxy mass, with important implica-

tions in several areas of astrophysics: Does this trend reveal a qualitatively different mode of star formation and feedback in massive galaxies?; How does it affect the stellar mass function of galaxies?; Do changes in the IMF imply a revision of the dark matter contribution in the central regions of galaxies?

The latest results were presented and discussed during special session 12 within the EWASS 2013 in Turku, Finland. The opening talk by Kroupa discussed some of the relevant issues when deriving a mass function at birth from finite sets of evolved populations. At the low mass end, brown dwarves follow a different mass function, representing a discontinuity with respect to low-mass stars, and illustrating the complexity of the problem. Starbursting systems are found to follow a top-heavy trend, in contrast with the claims of a bottom-heavy IMF in massive early-type galaxies, requiring more detailed work to solve this paradox.

Updates to the latest results on constraints to the low-mass end of the IMF in massive galaxies were presented, with an intriguing connection with compact massive galaxies (Laesker). A proposal for a chemical enrichment scenario was presented, that could solve the riddle between bottom-heavy massive ellipticals and top-heavy starburst galaxies (Weidner). The use of gravitational lensing provides an independent test on IMF studies via comparisons of M/L (Spiniello). The non-universality of the IMF can affect our understanding of the dark matter present in the central regions of galaxies (Tortora).

Cappellari gave a review of the constraints that can be imposed on the IMF from dynamical modelling. The universality of the IMF was considered necessary unless the dark matter distribution closely follows the luminous distribution, or a drastic, and unknown, problem with the population models is present. This session was followed by an overview of the latest analysis of IMF-sensitive line strengths applied to SDSS spectra of early-type galaxies (La Barbera); a presentation of a tentative radial trend of the IMF slope that scales with the local velocity dispersion (Martin-Navarro) and the implications of IMF variations on the derivation of star formation histories from galaxy spectra (Ferre-Mateu). Recent and upcoming surveys based on medium-band photometry were explored as a tool to constrain IMF variations (Diaz-Garcia).

Schiavon gave an insightful presentation of the advantages and limitations of line strength analyses to constrain the contribution of low-mass stars from integrated spectra. The latest population synthesis models of the IAC group were presented (Vazdekis), which include variations in the IMF and element abundance ratios. The latest *ab initio* numerical simulations of star formation are, at present, not capable of explaining the observed trends in the IMF (Bertelli-Motta).

The full programme of the meeting, including PDFs of the talks can be found at [http://www.mssl.ucl.ac.uk/~ipf/Sp12\\_prog.html](http://www.mssl.ucl.ac.uk/~ipf/Sp12_prog.html)

**I. Ferreras (UCL), F. La Barbera (INAF/OAC),  
A. Vazdekis (IAC)**

#### SPECIAL SESSION 13: STARBURST GALAXIES NOW AND THEN WITH ALMA

The Atacama Large Millimeter/submillimeter Array (ALMA) provides unprecedented sensitivity, angular resolution and frequency range at millimeter and submillimeter wavelengths

that will revolutionize the study of dusty star forming galaxies at low and high redshift.

Starbursts at various levels of star formation are common in various types of galaxies, both locally and at high redshift, where they are thought to have a significant impact on galaxy evolution. At high redshift, the progenitors of present-day “normal” galaxies are undergoing violent gravitational interactions, and/or experiencing extreme global star formation.

In the local Universe, small-scale starbursts in dwarf galaxies are very frequent, while powerful starbursts are relatively rare. They often reside in (Ultra)Luminous Infrared Galaxies [(U)LIRGs], the majority of which are triggered by the strong interaction between or merger of large gas-rich spirals. (U)LIRGs are considered to be the nearby analogues to the actively star forming galaxies at high redshifts.

This Special Session brought together observers and theoreticians to discuss and exchange ideas on the starburst phenomenon at all redshifts and its impact on galaxy evolution. In particular, the goal was to search connections between the local Universe and high redshift, based on results emerging from ALMA Cycle 0 and Cycle 1 observations, supported by results from other facilities. The Special Session featured 3 invited talks and 6 contributed talks, with over 20 active participants attending and contributing to the meeting.

The first session was focused on local starbursts, feedback, regulation, and merger-induced star formation. It included reviews on the state and mass of the dense molecular gas in starburst galaxies, and possibilities to infer their star-formation mode across cosmic epochs and to constrain their stellar IMF (Papadopoulos), and on observational study of star formation laws as a central tool to reveal the key physical processes that determine the efficiency of the star-formation phenomenon in different populations of starburst galaxies (Garcia-Burillo). In contributing talks, results were presented on the star formation, stellar and super star cluster populations, metallicity gradients, and ISM inflow and outflow kinematics of nearby LIRGs (Vaisanen), and on recent 1D and 3D PDR models as well as star forming gas chemical models and their applications to starburst galaxies (Viti).

The second session was dedicated to star formation at high redshift. It included a review on high- $z$  star formation as traced by cool molecular gas and dust, highlighting recent results from current interferometers and future prospects with the full ALMA (Hodge). Contributed talks presented: high-resolution UV restframe HST/ACS imaging of  $z \sim 2$  ULIRGs, with an accepted ALMA Cycle 1 program (Pannella); the FIR luminosities, dust temperatures and total SFRs of Lyman break galaxies at  $z > 3$ , showing that LBGs are “typical” galaxies, rather than unusual unobscured starbursts (Bremer); a study of the forbidden side of high- $z$  galaxies, including the first survey of [NII]205 $\mu$ m and the detection of [CII]158 $\mu$ m in the most distant quasar at  $z = 7.1$  (Decarli); and the effect of the Cosmic Microwave Background in (sub-)millimeter observations of cool gas and dust in high- $z$  galaxies, providing both an additional source of heating and a non-negligible background (da Cunha).

The meeting web site is at: [http://users.utu.fi/jarkot/EWASS2013/SB\\_ALMA.html](http://users.utu.fi/jarkot/EWASS2013/SB_ALMA.html)

J. Kotilainen,  
Finnish Centre for Astronomy with ESO (FINCA),  
Univ. of Turku, Finland

## SPECIAL SESSION 14: LOFT, THE LARGE OBSERVATORY FOR X-RAY TIMING

LOFT, the Large Observatory For X-ray Timing, is a newly proposed space mission intended to answer fundamental questions about the motion of matter orbiting close to the event horizon of a black hole, and the state of matter in neutron stars. LOFT was selected by ESA in February 2011 as one of the four M3 space missions concepts of the Cosmic Vision program. LOFT is presently in the assessment phase, and is competing for a launch opportunity at the start of the 2020s together with the other M3 mission candidates. LOFT is being specifically designed to answer two fundamental questions of ESA’s Cosmic Vision Theme “Matter under extreme conditions”, namely: “Does matter orbiting close to the event horizon follow the predictions of general relativity?” and “What is the equation of state of matter in neutron stars?”.

The breakthrough that LOFT will provide in the study of “Matter under extreme conditions” is granted by its revolutionary solid-state design that enables both a huge effective area (more than 15 times that of any previous X-ray mission) and its good energy resolution (so far only found in instruments with less than 1% its effective area). The unique combination of sensitivity, spectral resolution and field of view of the instruments on-board LOFT also guarantees that the mission will be a powerful discovery machine for many classes of X-ray emitting sources in the Universe.

The special session of LOFT at EWASS provided the LOFT team a precious opportunity to present the mission to a very wide scientific community, including not only X-ray astronomers but also experts from many different fields of Astronomy and Astrophysics. The invited and contributed talks were selected ahead of the session in order to provide the audience with an exhaustive overview of the LOFT capabilities and clarify its role as a precious partner for other large-scale facilities across the “multi-messenger” spectrum that will be available in the 2020s (e.g., SKA, LSST, ELTs, CTA, ground and space-based gravitational wave interferometers and neutrino telescopes).

The session included a few technical presentations on the on-board instruments and the key science goals of the mission (measuring the neutron star equation of state and probing General Relativity in the strong-field regime by measuring the motions of plasma close to black holes and neutron stars). The other talks provided the audience a summary of many of the field of research in which LOFT can provide dramatic improvements in the next future. Among these it is worth mentioning the study of Gamma-ray Bursts, the physics of relativistic acceleration in cosmological sources (e.g. Blazars), the fundamental physics of thermonuclear explosions and tidal disruption events, occurring at different scales in the local and remote Universe.

The scientific community is very enthusiastic about the mission, and the LOFT special session at EWASS 2013 was very lively populated from the beginning to the very end. Some of the available time was devoted to critical discussions on how to improve the mission design and exploit the exceptional mission capabilities in view of the next selection stage of the M3 missions foreseen for February 2014.

The topics discussed during the session and the abstracts of all talks remain publicly available for consultation at: <http://www.isdc.unige.ch/loft/index.php/meetings/loft-at-ewass-2013>

The PI of the LOFT special session is grateful to the invited and contributed speakers, for having presented their results, and to all participants, for their effort in joining this event and the useful comments and suggestions during the discussions. Particular thanks go to the organizers of the EWASS 2013 for having made this event possible.

**Enrico Bozzo,**  
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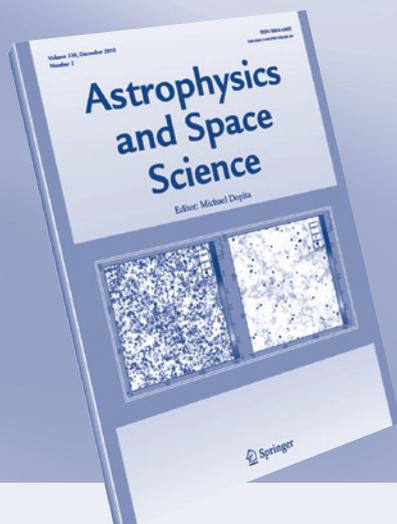
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## Editor-in-Chief position of Astrophysics and Space Science (Ap&SS)

### To become vacant in 2014

Editor-in-Chief: **Michael A. Dopita**

The position of the current Editor-in-Chief, Prof. Michael A. Dopita, will become vacant in summer 2014. During Prof. Dopita's term the journal has steadily grown both in numbers of submissions per year and at the same time in impact and reputation. To support further healthy development of the journal, the position of the Editor-in-Chief will be split into two positions of equal authority.

A detailed call for applications will be published in the journal and posted on the journal website [springer.com/apss](http://springer.com/apss), which also provides the aims and scope and more information about the journal. Interested candidates are invited to subscribe to the journal's table of content alert.

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