



EUROPEAN ASTRONOMICAL SOCIETY **NEWSLETTER**

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EDITORIAL

Following the tradition of the December issues, we include in this Newsletter small reports from the European Week of Astronomy and Space Science that took place in Tenerife. A total of 15 summaries from Special Sessions, Meetings, and Symposia, as well as the message from the president presented at the General Assembly in Tenerife 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 meeting. It should be noted that EWASS 2015 broke the record in attendance, as the participants exceeded 1,100.

At the same time the preparation of the next EWASS, which will take place in Athens in July 2016, is well underway. By the time you read this Newsletter the abstract submission will have opened and we all look forward to hearing about the exciting science results of European astronomy in the historic city Athens, where several of the key ideas on astronomy and cosmology were developed 2500 years ago.

The present Newsletter also marks a transition on its Editor. After 10 years of service I am stepping down and hand over the responsibility of the EAS Newsletter to Maarten Baes, Professor of Astrophysics at the University of Ghent (Belgium). Furthermore, this is the last issue that will appear in print, since the EAS following a widely accepted trend, is moving towards an electronic only version of its Newsletter starting in 2016. It has been an honor and pleasure to be given the opportunity to serve the Society. Over the past decade, I observed the constant work and vision of the Council to improve all aspects of the Society in order to be able to address the growing needs of the members, as well as influence the development of the science of astronomy in Europe. I am certain that the dynamism and new ideas of Prof. Baes will further improve the content and style of the EAS Newsletter, making it a must read among all members.

Vassilis Charmandaris

Univ. of Crete & National Observatory of Athens, Greece

MESSAGE FROM THE PRESIDENT

The EAS is continuing its evolution towards becoming the strong representation of the European astronomical community that it should be and that is needed in order to strengthen astronomy in general on the European scene.

The organisation of the EWASS meetings is one important step in this process. We started last year in Geneva a way

of working together with a professional company, KUONI, for this organisation. This worked very well and is being continued here, in Tenerife, and for the coming years. This does not mean that the idiosyncrasies of the Swiss, Spanish, Greek, Czech and other communities do not colour the EWASS organisation strongly. This complexity requires yearly some quite substantial adaptation. This variety is a wonderful richness that costs quite a bit of sweat and work on the side of the EAS staff and EWASS organisers.

Council decided that it is important to improve on the way in which the venue of the EWASS meetings are selected. We therefore would like to obtain for the January Council meeting of year nnnn pre-proposals to host the meeting during the year nnnn+2. Council would then select the most appropriate venues and ask the corresponding proposers to prepare a full proposal including a description of the venue and a budget for the following June for selection by Council during the meetings it holds in the Summer. This will be exercised first now, with pre-proposals for EWASS2018 due in January 2016.

We mentioned last year the report written by our working group on publication regarding open access. This report includes a number of recommendations that Council thought should be made more widely known. We therefore issued a statement that includes the recommendations and a reference to the report that is now being sent to many stakeholders in this discussion.

We also mentioned last year that we intend to set up a working group on the ethics and culture of our work. This group is not yet quite productive. This is due to the many tasks undertaken by Council on one side, but also to the preparation of a set of non-discrimination recommendations that Council will issue shortly.

Progress was also made on the set up of a presence in Brussels. You will remember that this was, and it still is, seen as an important tool to make our voice heard on the European scene. Council set up a small group to work on this. The group made of A. Burkert, D. Southwood, M. Barstow and I met in November to prepare a way forward that was approved in January by Council and the affiliated societies. This includes the nomination of a strategy group to shape the work of the person representing us, and the nomination of this person. We met her in the last weeks and are convinced that she will be able to undertake the task we expect. All therefore seems ready to start this presence in January 2016.

I'm very aware that the evolution towards a stronger presence in Brussels fulfils only one part of our mandate towards the European community that extends to vast parts of Europe not close to the European commission. We are seeking ways to intensify our links with those European regions. But we are not quite where we want on this front.

Further work is done in communication with the preparation of a new leaflet and adaptations to the Newsletter for which a new editor in the person of Maarten Baes was found. Maarten Baes will shortly replace Vassilis Charmandaris whom we very warmly thank for his efforts over many years.

We did achieve in the last months to set up of a formal agreement to frame the work of the EAS at the university of Geneva. This agreement will become important when I disappear from the scene. It includes a memorandum of understanding valid for 5 years and yearly decisions on the level of work performed at the University and the financial counterpart of the Society. I'm glad to report that an agreement

was reached for 2015 and 2016 in a serene discussion. Prof. Georges Meynet will in the future act as the link between the EAS and the university of Geneva.

This leads me to the financial matters that will be reported in detail later. It must be stressed that the finances remain the bottleneck of our activities. Efforts to gain organizational members must be increased. Efforts to convince our colleagues to join the EAS as ordinary members must also be pursued. All members are invited to be active on these fronts.

We stressed during the opening ceremony, and here also, the huge variety in cultures and habits that characterize Europe, and the need to build a European identity for our community. The daily work of the society is strongly coloured by this variety. Martine Logossou, Marc Tuerler and Marie-Claude Dunand, the people at the heart of this work are those who live this challenge closest. I'm very grateful for the quality and quantity of work they invest throughout the year, and I think that we should all share this gratitude.

Thierry Courvoisier,
EAS President, Tenerife June 2015

NEWS

NEWS FROM THE EAS COUNCIL

In addition to the General Assembly and a lunch with the Affiliated Societies that were held during the European Week of Astronomy & Space Science (EWASS) in Tenerife on 22–26 June 2015, the EAS Council met on the 23rd and 25th of June. A report (with updates) can be found below.

OFFICIAL AGREEMENT BETWEEN THE EAS AND THE UNIVERSITY OF GENEVA

The Council reports that the EAS has formalized a long-standing agreement with the University of Geneva that will allow the EAS to continue to be hosted in Geneva for the coming years.

EWASS 2016 & 2017

EWASS 2016 will be held in Athens. The professional agency, KUONI, via a local agency, will help organize the conference as it has happened for the last two EWASS. Proposals for sessions at EWASS 2016 have now been selected and will be announced shortly in November. The SOC is co-chaired by Nikos Kylafis and Susanne Aalto. More details can be found in the dedicated article in this newsletter.

EWASS 2017 is foreseen to be held in Prague, again with the assistance of KUONI who will liaise with the national hosting committee, which will be chaired by Jan Palous.

AMENDMENTS TO THE EAS CONSTITUTION

In April 2015 a message was sent out to all EAS members with the proposal to change Article 12 of the EAS Constitution, namely to explicitly allow Council members to be re-elected for a second term, should they wish to. At the General Assembly in June 2015 this proposition was voted in.

EAS POLICY REGARDING DIVERSITY AND NON DISCRIMINATION

The Council agreed on a policy regarding diversity and non-discrimination. In this policy, the EAS recognizes that diversity among astronomers brings diversity of ideas, methods and sensitivity, which is beneficial to astronomy. In addition, it is critical for the future of astronomy, and science in general, that young people can see evidence that scientists can succeed regardless of, e.g., gender, nationality, ethnic origin, or social origin. The full text of this document is available at:

http://eas.unige.ch/documents/EAS_diversity_policy.pdf

Serena Viti
Secretary of EAS

TYCHO BRAHE PRIZE

The 2015 Tycho Brahe Prize was awarded to Prof. Michel Mayor in recognition of the development of instrumentation, which led to his discovery of the first extra-solar planet orbiting a solar-type star and to his leading role in this domain during the last twenty years.

The Tycho Brahe Prize is awarded in recognition of the development or exploitation of European instruments or major discoveries based largely on such instruments.

The Tycho Brahe Prize is funded by the **Klaus Tschira Stiftung**, a German foundation, which was established by the physicist Klaus Tschira in 1995 as a non-profit organisation. Its primary objective is to support projects in natural sciences, mathematics, and computer sciences, raising public awareness and appreciation for these fields.



The European Astronomical Society awards its 2015 Tycho Brahe Prize to Professor Michel Mayor in recognition of his lifelong quest to advance the precision, efficiency and scientific value of stellar radial velocity observations. His series of groundbreaking instruments have reduced velocity errors by an unprecedented ~3 orders of magnitude, down to 1 m/sec or lower. The vast scientific rewards include fundamental breakthroughs in binary and pulsating star properties, star cluster dynamics and Galactic evolution, culminating in the discovery of the first extra-solar planet 20 years ago and the birth of a new scientific discipline – with European leadership throughout. The exponential growth of exoplanetary science continues today with new theory and observations from the ground and space.

With his background in Galactic evolution, Michel Mayor realized the need for drastic improvements in the efficiency and accuracy of stellar radial-velocity observations. Cross-correlation of an observed spectrum with a suitable template, first proposed by Fellgett in the 1950s and demonstrated in practice by Griffin in the 1960s, seemed to be the answer. However, an instrument was needed that would pack optical efficiency, mechanical stability and state-of-the-art computer control into the limited space available inside the fork of the 1-m Geneva telescope at the Observatoire de Haute-Provence (OHP). The result was CORAVEL, which functioned flawlessly from 1977 through 20 years of service (a second

CORAVEL was commissioned on La Silla in 1981) – a tribute to the thorough analysis and superb engineering behind this instrument. The huge gains in precision, zero-point stability and efficiency of the CORAVELs led to breakthroughs on fundamental studies of Solar-type binary stars, globular cluster dynamics, and local Galactic kinematics, structure and evolution. But also studies of the membership and binary populations of open clusters, precise mass and radius determinations of eclipsing binaries, the motions of field stars and Cepheids in both Magellanic Clouds, among many other topics received an enormous boost from these productive instruments.

At the end of the 1980's, Michel Mayor's interests moved towards the search of substellar companions of solar type stars. The completion in 1994 of the fibre-fed bench-mounted spectrograph ELODIE at the 2-m telescope at OHP, another joint French-Swiss achievement, was at the basis of the seminal discovery of the first exoplanet in 1995. The totally unexpected properties of this Jupiter-sized planet orbiting the star 51 Peg every 4 days overturned all theories on the formation of planetary systems overnight. Skeptics concerning the planetary origin of the observed velocity variations were silenced by the 2000 discovery of the first transiting exoplanet and the demonstration of the Rossiter-McLaughlin effect by this planet with ELODIE. The rest is history, and the exponential growth of exoplanet science – with new theory and observations from the ground and space – continues with no end in sight.

To remove the last source of instability in ELODIE – a variable atmospheric pressure – Michel Mayor initiated the construction of the ultimate instrument, HARPS, mounted in a vacuum vessel with temperature controlled at the mK level. The two HARPS instruments still hold the world record for velocity errors – an unprecedented 1 m/s or lower – and the goal of finding Earth-mass exoplanets is finally within reach. In summary, Michel Mayor's relentless pursuit of instrumental perfection and constantly vigilant eye for opportunities in a broad range of scientific fields led to the birth of a new scientific area with sustained European leadership exactly twenty years ago.



Michel Mayor is a Swiss astronomer born in 1942. He completed his studies at the University of Geneva in 1971 with a PhD on the kinematical and dynamical properties of stars in the solar vicinity. He has remained at this University ever since, rising to the rank of Professor and Director of the Observatory. He is first author or co-author of over 400 refereed papers on a wide range of subjects, with over 30,000 citations, and has received numerous honorary doctorates and prizes, including the Shaw, Balzan, and BBVA prizes.

EAS MERAC PRIZES

FONDATION MERAC (Mobilising European Research in Astrophysics and Cosmology) is a non-profit foundation started in 2012 with

MERAC

headquarters in Switzerland to recognize and support young European astronomers.

There are yearly three MERAC Prizes awarded by the European Astronomical Society. The prizes of 20,000 are for each of the three categories:

- Theoretical Astrophysics
- Observational Astrophysics
- New Technologies (Instrumental/Computational)

The prizes alternate by year for:

- Best Early Career Researcher Prizes (on odd years)
- Best Doctoral Thesis Prizes (on even years)

The awardees are also eligible for further support from the FOUNDATION MERAC.

The MERAC Prize Committee was impressed by the high quality of all the nominated candidates for the three MERAC Prizes of 2015.

Best Early Career Researcher in Theoretical Astrophysics

The 2015 MERAC Prize for the Early Career Researcher in Theoretical Astrophysics is awarded to **Dr. Michela Mapelli** for her theoretical and computational contributions to the dynamics of star clusters and galaxies, the reionization epoch, the Galactic centre, and the formation of massive stellar black holes.

Michela Mapelli studied Physics at the University of Milano Bicocca (1998-2002), where she received her Master degree in February 2003, with a Thesis on 'Four-body interactions in globular clusters'. In October 2006, she received her PhD at SISSA, with a Thesis on 'Relic signatures of reionization sources', for which she was awarded both the Gratton Prize 2007 and the Tacchini prize 2007. In 2007, she became postdoctoral fellow at the Institute for Theoretical Physics of the University of Zurich, Switzerland, where she studied the formation of giant low-surface brightness galaxies. She was awarded there the prestigious 'Forschungskredit' fellowship in 2008 before receiving an independent postdoctoral fellowship at the University of Milano Bicocca in 2009. In August 2011, she started a permanent research position at INAF - Padova Astronomical Observatory, where she created her independent research team.



Michela Mapelli's main scientific achievements of the last five years are her studies on the formation of massive stellar black holes from the collapse of metal-poor stars and her contribution to understanding star formation in the Galactic centre. In 2009, she proposed that black holes of more than 20 and up to 80 solar masses can form in the local universe from the direct collapse of metal-poor stars. This can explain why ultra-luminous X-ray sources (ULXs) occur more frequently in galaxies of low-metallicity, with considerable implications for high-energy astrophysics and the search of gravitational waves. In 2012, she simulated the disruption of a molecular cloud by the tidal shear of the super-massive black hole in the Galactic centre and showed that a gaseous disc forms and then fragments into proto-stellar clumps, thus explaining the presence of young, massive stars at the centre of our Galaxy.

The work of Michela Mapelli has been conducted entirely in Europe. After graduating in 2006 at SISSA (Trieste), she developed the model of massive stellar black holes during the post-doctoral fellowship at the University of Zurich, Switzerland, and then at the University of Milano Bicocca, Milan, Italy (2009-2011). Since 2011 she is Researcher at INAF - Padova Astronomical Observatory, Italy, where she has continued investigating massive stellar black holes, and started working on the Galactic centre.

Best Early Career Researcher in Observational Astrophysics

The 2015 MERAC Prize for the Best Early Career Researcher in Observational Astrophysics is awarded to **Dr. Saskia Hekker** for her ground-breaking contributions to the understanding of the internal structure of red-giant stars based on stellar oscillations measured by the CoRoT and Kepler satellites.

After receiving her PhD from the University of Leiden in the Netherlands in Sept. 2007, Saskia Hekker worked at the Royal Observatory of Belgium and the University of Birmingham. In 2011 she was awarded a personal 3-year Veni Fellowship from the Netherlands Organization for Scientific Research to conduct research at the Astronomical Institute 'Anton Pannekoek', University of Amsterdam. Since September 2013, she works in Göttingen at the Max Planck Institute for Solar System Research (MPS). In 2013 she obtained a European Research Council (ERC) Starting Grant to determine Stellar Ages through asteroseismology. In 2014, she was awarded a Max Planck Independent Research Group focusing on 'Asteroseismology and Galactic Evolution', which is an international node of the 'Stellar Astrophysics Centre', a Centre of excellence in research of the Sun, Stars and Extra-solar planets. Her career path and mobility is outstanding, particularly since Saskia is also a mother.



Saskia Hekker announced, already during her PhD, non-expected, non-radial oscillations in red-giant stars which she then confirmed using data of the CoRoT satellite. She was also heavily involved in the discovery, identification, and analysis of mixed oscillation modes, which allow to probe the core region of the stars, in particular to disentangle hydrogen-shell- from helium-core- burning red giants. She discovered the first red giant in an eclipsing binary and developed methods to determine global asteroseismic parameters, which she then applied to Kepler data of planet-hosting stars.

Saskia Hekker performed her work at the School of Physics and Astronomy, University of Birmingham, United Kingdom (2009-2011); Astronomical Institute 'Anton Pannekoek', University of Amsterdam, the Netherlands (2011-2013) and the Max Planck Institute for Solar System Research, Göttingen, Germany (2013-present).

Best Early Career Researcher in New Technology

The 2015 MERAC Prize for the Best Early Career Researcher in New Technology is awarded to **Dr. Sylvestre Lacour** for his development of pupil masking and pupil remapping observing techniques, which provide a unique combination of high contrast and high angular resolution to study the immediate environment of stars.

After his graduation from *Ecole Normale Supérieure* in electrical engineering, Sylvestre Lacour worked at *The Johns Hopkins University* from 2000 to 2002 as software engineer for the *FUSE* satellite. He pursued with a PhD in astrophysics on a project combining pupil remapping and long-baseline optical interferometry. It consisted partly in building a single-mode pupil remapping prototype instrument (*FIRST*), and partly in acquiring and interpreting observations from the *IOTA* interferometric array (*Mount Hopkins, Arizona*). After the successful defence of his PhD in 2007, he obtained a *Lavoisier* fellowship to pursue his research in high angular resolution instrumentation at the *University of Sydney*. He developed there a strong expertise in the emerging technique of pupil masking. Over the last years, he benefits from a *CNRS* tenured position at the *Observatory of Paris*, allowing him to work on the application of the pupil masking technique to the study of young stellar objects. As an expert in high precision astrometry, he is also deeply involved in the *GRAVITY* instrument for the *VLT Interferometer*.



Sylvestre Lacour is the leading European specialist in the pupil masking and pupil remapping observing techniques. These two techniques provide a unique combination of high contrast and high angular resolution that is key to studying the immediate environment of stars in all evolutionary stages. He also developed a complete pipeline to reduce this kind of observations, which are now performed by major astronomical facilities. This effort led to an important result on scattering dust around evolved stars and opened a new observational window on the inner structure of transition disks, where extrasolar planets are expected to form.

Sylvestre Lacour started working in the field of interferometry since his PhD at the *Observatoire de Paris*. He then fully developed the field aperture masking during the *Lavoisier* Fellowship at *Sydney University* and a second post-doctoral position at the *Observatoire de Grenoble*. Since 2009 he is affiliated with the *Observatoire de Paris, France*.

EAS LODEWIJK WOLTJER LECTURE

The 2015 Lodewijk Woltjer Lecture was awarded to **Prof. Ewine F. van Dishoeck** for her outstanding career in molecular astrophysics, in particular in the domain of star and planet formation.



The Lodewijk Woltjer Lecture honours astronomers of outstanding scientific distinction.

Ewine F. van Dishoeck's research is at the boundary of astronomy, laboratory astrophysics and chemistry and uses ground- and space-based observatories in the infrared and sub-millimetre range. Her current scientific focus is on the physical and chemical evolution of material from interstellar clouds to planet-forming disks and the importance of molecules as diagnostics of the star-formation process.

The launch of ESA's *Infrared Space Observatory (ISO)* in 1995 offered Ewine van Dishoeck a first opportunity to detect from space – away from the contamination by Earth's atmosphere – the presence of water, carbon dioxide, methane and formic acids in the interstellar medium. By being part of a legacy programme of the *Spitzer Space Telescope* – NASA's successor to *ISO* launched in 2003 – she participated to the discovery of new-born stars enshrouded in dark molecular clouds.

The *Spitzer* observations of dusty disks rotating around nascent stars yielded discoveries of water, ammonium, and methane ices in these planet-forming disks. More interestingly, her research group found hydrogen cyanide (*HCN*) and acetylene (*C₂H₂*) gases, which are prebiotic molecules. The study of such building blocks for amino and nucleic acids became easier with the launch of ESA's *Herschel Space Telescope* in 2009, which is particularly suited for the study of water and its key role in interstellar chemistry. The recent completion by *ESO* of the *Atacama Large Millimetre Array (ALMA)* in *Chile* enables now Ewine van Dishoeck's group to study the subtle chemistry of proto-planetary disks with unprecedented angular resolution and sensitivity.

Ewine F. van Dishoeck is a Dutch astronomer and chemist born in 1955 in Leiden. Graduated at Leiden University, she held positions in the United States at Harvard, Princeton and Caltech from 1984 to 1990. She returned to the University of Leiden in 1990, where she became professor of molecular astrophysics in 1995. She is also an external scientific member of the Max Planck Institute for Extraterrestrial Physics in Garching. She authored or co-authored more than 450 refereed publications with over 25'000



citations and holds many national and international science policy functions, including scientific director of the Netherlands Research School for Astronomy (NOVA), president of Division H of the International Astronomical Union, former member of the Board of the Atacama Large Millimetre/submillimetre Array (ALMA), co-PI of the MIRI instrument on the James Webb Space Telescope (JWST) and co-I of the HIFI instrument on the Herschel Space Observatory. She has been fortunate to receive the Dutch Spinoza award, an ERC Advanced grant, and the Dutch Academy Prize. She is a Member of the Dutch Royal Academy of Sciences and the Leopoldina German Academy of Sciences, Foreign Associate of the US National Academy of Sciences, and Foreign Member of the American Academy of Arts and Sciences.

THE 2016 VIKTOR AMBARTSUMIAN INTERNATIONAL PRIZE

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
- 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.

Necessary documents for nomination

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.

The 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 the 2016 nominations is March 18, 2016. The decisions will be made before July 18, 2016 and Award of Viktor Ambartsumian Prize will take place on September 18, 2016.

More information is available at the official webpage of the Prize: <http://vapriize.sci.am>

Previous recipients of the Viktor Ambartsumian International Prize

- 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*
- 2014: Felix Aharonian (Germany) – *for his outstanding contributions to the field of high energy astrophysics and to the physics of cosmic accelerators, and leading role in the development of the stereoscopic system of Cherenkov telescopes* and Igor Karachentsev (Russia) and Brent Tully (USA) – *for their fundamental contribution in the cosmology of the Local Universe*

MAX PLANCK INSTITUTE FOR GRAVITATIONAL PHYSICS:
EAS ORGANIZATIONAL MEMBER

The Max Planck Institute for Gravitational Physics (Albert Einstein Institute; AEI) was founded in 1995 by the Max Planck Society for the purpose of pursuing research into

the fundamental laws of gravitation. In 2002 the Institute opened a branch in Hannover that closely collaborates with the Leibniz Universität Hannover. Scientists at the AEI do research into the entire spectrum of General Relativity and beyond – from the huge dimensions of the cosmos to the tiny scales of strings.

The division “Quantum Gravity and Unified Theories”, led by Hermann Nicolai, attends to the development of a theory that unifies quantum theory and general relativity – in the framework of superstring theory as well as canonical quantization.

The research carried out in the division “Astrophysical and Cosmological Relativity” which is led by Alessandra Buonanno aims at developing accurate analytical and numerical models of gravitational-wave sources, improving our ability to extract unique astrophysical and cosmological information from the observed waveforms, and testing Einstein’s theory of general relativity.

The department “Geometric Analysis and Gravitation” investigates physical models and mathematical methods relevant to gravitation, with emphasis on Einstein’s general relativity theory.

Bruce Allen leads the division “Observational Relativity and Cosmology” in Hannover that develops and implements data analysis algorithms for a wide spectrum of different gravitational-wave signals in data from the LIGO and Virgo detectors. These techniques have also been successfully adapted for searches in radio and gamma-ray data. For the complex data analysis the division operates the Atlas, the largest computer cluster in the world dedicated primarily to gravitational wave data analysis. The division plays a leading role in the distributed computing project Einstein@Home, which is supported by more than 400,000 volunteers worldwide.

Led by Karsten Danzmann, the Hannover division “Laser Interferometry and Gravitational Wave Astronomy” focuses on the development of gravitational-wave detectors on Earth as well as in space. The division operates the detector GEO600 near Hannover and plays an important role in the development of the “evolved Laser Interferometer Space Antenna” (eLISA) mission, a planned gravitational-wave observatory in space. The division is a major player in the LISA Pathfinder mission (launch in late 2015), a technology demonstrator for eLISA.

In addition to the research divisions, the AEI in Potsdam hosts two independent research groups that specialize in theoretical cosmology and geometric measure theory. An independent research group at AEI Hannover is devoted to pulsar science. These groups cooperate closely with the divisions at the AEI

JEAN-PAUL ZAHN (1935 - 2015)

Jean-Paul Zahn, past president of the EAS, astronomer at the Observatory of Paris, died on the 15th of July. He was 80 years old.

After entering the Ecole Normale Supérieure in Paris in 1955, he joined La Sorbonne and then the Institut d’Astrophysique de Paris (IAP), where he defended his PhD thesis under the

supervision of Prof. E. Shatzman in 1966. His thesis dealt with tides in binary stars. This study had a strong impact on that field of astrophysics. He was able to apply his results on tidal dissipation to many systems such as exoplanets and planets of the solar system.

Specialist in hydrodynamics, Jean-Paul Zahn played a central role in the understanding of stellar and solar internal dynamics. He developed theories on hydrodynamic instabilities in stellar interiors, demonstrating the key role played by rotation in shaping the evolution of stars. He made major contributions to the subjects of turbulent convection, angular momentum transport and the generation and excitation of internal gravity waves in stars. He made the first model explaining the existence of the solar tachocline, the thin intense shear layer at the base of the solar convection zone. He was an active supporter of helio- and asteroseismology space missions. He spent many years in USA (NASA Goddard Institute of Space Studies in New York, Columbia University, New York University, University of Colorado at Boulder), where he had long lasting and strong collaborations and long term friends.

Jean-Paul Zahn was also a great professor. He taught astrophysics and fluid dynamics at all levels. He supervised many PhDs and several of his young colleagues are now active in astrophysics and fluid dynamics. Their work and results continue his research and bear on subjects ranging from celestial bodies to laboratory experiments in fundamental fluid mechanics.

Jean-Paul Zahn has held major administrative positions. He was the director of the Observatory of Nice from 1972 to 1981; from 1981 to 1988 he led the Observatories of Pic du Midi and Toulouse (now Midi-Pyrénées). He also was one of the founders of Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique (CERFACS). Jean-Paul Zahn joined the Observatory of Paris in 1993, becoming Emeritus in 2003 and actively pursuing his research on stellar dynamics and tides.

Jean-Paul Zahn was president of the European Astronomical Society (EAS) from 1997 to 2001. He maintained a keen interest in the progress of the Society and led the EAS publication series until the spring of 2015. He was convinced of the necessity to build a strong European astronomical community, a goal to which he contributed for many years and that is slowly becoming a reality.

Jean-Paul was an enthusiastic, generous, kind and warm personality, ready to discuss, share and contribute to the progress of scientific projects as well as of that of the astronomical community in France and in Europe. It was a pleasure to spend time with him, often together with Suzy Collin-Zahn. Many colleagues and friends will keep a lively and thankful memory of Jean-Paul.

Thierry Courvoisier
President of EAS

EWASS 2016 IN ATHENS

In 2016, the European Week for Astronomy and Space Science will take place in Athens, Greece, between 4 and 8 of July. The scientific program of 17 Symposia and 12 Special Session, listed below has been recently finalized and it is very rich.

EWASS2016 Symposia

1. On the Threshold of 1st Gaia Data - the Gaia Research for European Astronomy Training (GREAT) Network Science Symposium
2. Understanding CMB Polarization Foregrounds - Clearing the Path to Inflationary B-modes
3. MUSE first year science and beyond
4. Future Prospects for the Far-Infrared Space Astrophysics
5. How galaxies live and die: the onset and end of star formation across cosmic time
6. Exploring the outskirts of galaxy clusters
7. X-rays from AGN: looking into the central engine
8. Interstellar dust and gas coupling: linking observations, models and laboratory astrophysics
9. The dynamics of star and planet formation
10. Probing the New Frontiers with Cluster Lenses
11. Gamma-ray bursts: recent theoretical models and observations
12. Stellar and AGN feedback in galaxies: a multi-wavelength perspective of outflows
13. High and Very-High Energy Gamma-ray Astronomy: status and future
14. New Classes and Unique Events in Time Domain Astronomy
15. Exploring pulsar formation, evolution, and magnetic field: from low-mass X-ray binaries and millisecond pulsars to magnetars
16. Frontiers of massive-star evolution and core-collapse supernovae
17. Magnetic Helicity in Sun and Stars: From Dynamo Action to Eruptive Phenomena

EWASS2016 Special Sessions

1. The Square Kilometre Array Observatory: Current Status and Science Program
2. Solar-Terrestrial Coupling and Space Weather: State-of-the-Art and Future Prospects
3. Evolved stars at high angular resolution
4. Planning the large spectroscopic surveys with the next generation of European high-multiplex spectroscopic survey instruments
5. A multi-messenger view of mergers and multiple supermassive black holes
6. The life and times of the Milky Way bulge
7. The effects of solar and stellar magnetic activity on planets
8. The challenges of multiple stellar populations in globular clusters
9. Episodic accretion in star formation
10. Nanoradians on the sky: VLBI across the Mediterranean and beyond
11. The interplay between turbulence and micro-physical processes
12. Promoting Diversity in Astronomy

Following on the success of EWASS2015, where over 1100 participants from all over the world came to Tenerife, a similar turnout is expected next year in Athens. In addition to the science sessions a number of side visits and activities will offer to the conference participants the opportunity to sample some of the rich cultural history of Athens and surrounding areas.

For more details on the program and registration deadlines please visit <http://eas.unige.ch/EWASS2016/>

SCIENCE AT EWASS 2015

SYMPOSIUM 1: UNDERSTANDING THE GROWTH OF THE FIRST SUPERMASSIVE BLACK HOLES

The discovery of more and more numerous quasars at redshift above 6, powered by BHs with masses similar to that of their local counterparts emphasizes the urgent need to better understand how such massive objects grow, what is the strength of their impact on the evolution of their host galaxies and what are the main physical processes driving and regulating this co-evolution. The current challenge for theoretical models and numerical simulations is to predict the formation path to the first $z \sim 6$ quasars starting from seed black holes, while producing a population in agreement with constraints at lower redshift, including the local Universe. At the same time, observations are tackling the difficult task of detecting the rare, faint and elusive signatures of the first collapsing and merging black holes, such as the highest redshift emission of gamma-ray bursts, X-rays and, perhaps, gravitational waves.

The EWASS 2015 Symposium 1, held on 22-23 July, has been an opportunity to review the most recent theoretical and observational results and foster discussion on the relevant processes operating on different scales and in different physical regimes relevant to BHs. We hosted 11 invited reviews, 16 contributed talks and 14 posters.

The first part of the Symposium was dedicated to the formation of BH seeds and the early growth of the first super massive BHs. Andrea Ferrara opened the session with a review on the first BHs in the reionization era. Formation mechanisms and relevant processes in the direct collapse scenario have been introduced by Kazuyuki Omukai, Muhammad Latif and Jarrett Johnson while Francesco Haardt reviewed limits and problems in the early growth of the first massive BHs. From reviews and contributed talks it emerged that massive BH seeds, forming from the direct collapse of gas in metal-poor halos exposed to a strong UV background flux, currently represent the most popular scenario among the community working on the first stars.

In the second part of the Symposium, Xiaohui Fan and Roberto Maiolino presented recent results on the physical properties of the first quasars. Invited and contributed talks underlined the importance of high-resolution sub-mm/mm observations (e.g. with ALMA). Tiziana Di Matteo and Yohan Dubois introduced the current advances in numerical simulations aimed to study the rapid growth of BHs at high redshift and their co-evolution with the host galaxy. It appears clear from discussions and talks that there is still no consensus on whether black hole growth precedes galaxy assembly or vice-versa. An important aspect explored during the meeting has been the role of AGN feedback in quenching (negative feedback) or triggering (positive feedback) star formation in the host galaxy.

The final part of the meeting has been devoted to the discussion of the best observational signatures to constrain the origin and properties of black holes with reviews presented by Amy Reines and Andrea Comastri. Optical, IR, X-ray and radio searches for black holes in dwarf galaxies and the observations of distant X-ray loud and radio galaxies have been proposed as some of the most promising tools. Concluding remarks at the end of the meeting have been presented by Rosa Valiante

in the form of a series of open question emerging from talks, posters and discussions.

Oral and poster presentations of the Symposium can be found at this link:

http://www.oe-roma.inaf.it/FIRST/?page_id=448

Rosa Valiante
(INAF/Osservatorio Astronomico di Roma, Italy)

SYMPOSIUM 9: FIRST SCIENCE FROM GAIA - THE GREAT NETWORK SCIENCE SYMPOSIUM

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 8th GREAT network annual plenary meeting was co-located at the EAS 2015 EWASS, constituted as Science Symposium 9. It was organised in six sessions, with 36 presentations, over the days 23-24 Jun 2015. Following the successful open model adopted at the 5th GREAT Plenary in 2012, the community were 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 80 to 110 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 S9 are available at: <http://great.ast.cam.ac.uk/Greatwiki/GreatMeet-PM8>.

Session 1 contained invited presentations covering the ESA Gaia project and related activities. Prusti provided an update on the Gaia mission, describing the completion of commissioning of Gaia, giving an overview of Gaia science performance, and examples of data collected during operations and the current plans for data releases. Brown discussed the activities of the Gaia Data Processing Consortium, describing highlights of Gaia processing systems one year into the mission. He noted that some 225 billion astrometric CCD transits had been successfully processed as of end May 2015. Sahlmann discussed the ‘Science with Gaia observations of naked-eye stars’, noting how Gaia has now been tuned to observe all bright stars, upto $G \sim 3$ mag routinely, and brighter stars via a special observational mode. He gave examples where Gaia bright star observations will have impact, e.g. for exoplanet discovery. Walton provided an update on the GREAT network activities, highlighting the wide range of networking activities (exchanges and workshops) supported. He introduced the plans to continue the GREAT network through for instance the GREAT2Net initiative.

Session 2 saw six presentations covering Gaia Performance Evaluation & First Gaia Data. There were talks describing the Gaia CCD detector system in-orbit performance evaluation (Kohley) and the Gaia Photometric Processing: general principles, first results and validation activities (D W Evans). Gaia Variability Analysis of the Operation Rehearsal with EPSL data (Eyer) and Gaia’s Radial Velocity Spectrometer Performance (Seabroke) were also addressed. The ALL differential Astrometric Reference Frame was presented by Abbas, whilst Frouard noted how Variability Induced Motion impacts Kepler astrometry, but probably will not be an issue in the case of Gaia.

Session 3 began with a focus on Gaia Transients. Wyrzykowski presented results from the first year of the Gaia Transient Search programme, whilst Fraser discussed the operations and early results of the ground based programme following up the Gaia photometric flux alerts. Vergani showed that Gaia may be able to have a role in detecting the orphan afterglows from GRBs, whilst Wevers suggested how it will be possible to alert on objects which rapidly brighten whilst transiting across the Gaia focal plane. The Gaia observations of asteroids, alert management and perspectives for scientific exploitation offered by the 1st intermediate data release, was presented by Tanga. The session concluded with de Leon describing the Primitive Asteroids Spectroscopic Survey (PRIMASS), a ground based survey in support of the Gaia asteroid observations.

Session 4 was devoted to preparing for exploitation of the first Gaia data release. Pancino discussed the potential of Gaia in the study of Globular clusters, noting that Gaia will provide insights into GCs at distances of 20kpc. Cantat-Gaudin discussed the cluster census with Gaia, whilst Muraveva noted how Gaia, through its observations of RR Lyraes in the Magellanic Clouds will be able to improve the calibrations of these as distance estimators. The Cepheid distance scale in the Gaia era was presented by Breielfelder, noting how the Gaia information will enable a studies of the physics of the pulsation of the Cepheids. Mor discussed a set of investigations of the Initial Mass Function at intermediate masses from Galactic Cepheids. This session closed with Di Matteo presenting a new Galactic model for orbit computations, reflecting the new understanding of the Milky Way, where a significant percentage of the mass is within the thick disk.

Session 5 returned to Gaia Milky Way surveys and instruments. Just presented a Chemodynamical Model of the Milky Way Disc, noting where precise Gaia parallaxes and kinematics up to 5 kpc will enable direct measures of Galactic density profiles. Antoja showed new insights into the signatures of the Galactic Bar on the Thick Disk from the RAVE survey. The structure and dynamics of the inner 5 kpc of the Milky Way was discussed by Wegg, this revealing a multicomponent thin and super thin bar in the inner regions of the Galaxy. Simion discussed the 3D density distribution of the MW stellar bulge. Gaia has the capability to disentangle between one or two bars, as shown by Romero-Gomez. The first results of the Open Cluster Chemical Abundances from Spanish Observatories survey (OCCASO) were presented by Jordi. The Gaia Utility for Analysis and knowledge discovery based on Self Organizing Maps (GUASOM), and results from its use on the SDSS spectroscopic archive, were presented by Manteiga. Closing the session, Garzon provided an update on EMIR, the NIR MOS and imager for the GTC: verification status and observing plans.

Session 6 was devoted to Gaia science highlights from the GREAT working groups. Sans Fuentes presented the OPTICS clustering algorithm, and how this can explore the Halo building blocks in the Milky Way. Sacco provided an update on the Gaia-ESO survey and in particular results of young clusters. Frouard discussed radio-optical offsets of VLBI sources in Pan-STARRS. The performance of Gaia in detecting Ultra Faint Dwarf Galaxies was noted by Antoja. The session closed with Jonker highlighting the unique ability of Gaia in discovering intermediate-mass black holes.

During the closing remarks for Symposium 9, Walton summarised highlights from the symposium, noting that each GREAT symposium has attracted a larger number of talks and attendees. In addition to the main speaker programme,

there were thirteen posters for Symposium 9. The next GREAT plenary would be proposed as a symposium at the 2016 EWASS in Athens, Greece.

Nicholas Walton,
Institute of Astronomy, University of Cambridge, UK
Timo Prusti,
ESTEC, ESA, Noordwijk, NL
Anthony Brown,
Leiden Observatory, Leiden, NL

SPECIAL SESSION 2: OBSERVATIONAL ANOMALIES CHALLENGING THE LAMBDA-CDM COSMOLOGICAL MODEL

In the current paradigm of the concordance Lambda-CDM cosmology, the fundamental properties of the Universe are believed to be well understood, with only minor adjustment of the basic model are left to be done. The global picture of an expanding Universe originating during a singularity at Big Bang is now taken for granted, and some basic properties of the Universe are known with amazing accuracy. For instance, according to Lambda-CDM concordance cosmology, the age of the Universe is 13.798 ± 0.037 Gyr, quoted with a precision higher than the one with which we know the age of our planet.

In spite of this “optimism”, there are several observations that do not fit well into the current model. These observations, while representing a problem, are dismissed as peculiarities that will soon be fixed within the framework of an otherwise correct model. The present Special Session has given room and visibility to some of those investigators who present and discuss observations not explained, or apparently at odds, with the current paradigm of the standard Lambda-CDM models. In total, there were 14 presentations.

Deviations from Newtonian gravity, rotation curves of spiral galaxies, anomalies in dwarf galaxies in the Local Group and other observations that cast some doubt on the existence of non-baryonic dark matter, were some of the topics. Pavel Kroupa and Riccardo Scarpa presented the most controversial arguments against the dark matter paradigm, and the topic of rotation curves was also discussed by Ekaterina Karukes, Henry Lin and Federico Lelli.

The need to change the usual metric of the cosmology with the standard cosmological parameters were expressed by Fulvio Melia and Esra Russell, with their claims that other models such zero active mass or anisotropic and homogeneous Bianchi type I model respectively give better fits to the data.

Even some fundamental elements of the standard cosmological model such as the expansion can be tested critically, as said in the talk by myself: I did not reject the standard picture of expansion but showed however that some observations are not well understood within this scenario. Eric Lerner was several steps beyond that and claimed however to have definitive proofs against the expansion.

Christoph Saulder talked about systematic variations of the Hubble flow. Luciano Lorenzi talked about cosmic dipole of the expansion center universe. Other analyses were presented by Irène Balmès, about the measurement of the Hubble constant with strong lenses, the correlation between voids and CMB radiation by Andras Kovacs, and the redshifts of quasars by Jacques Moret-Bailly.

The global picture of this session gives the impression that there are still many observations which cast from moderate to hard doubts on the standard model, at least in some aspects, and, far from the general consensus which is sold in the dominant propaganda about the concordance model, some discussions are still alive within small circles like this.

Martín López-Corredoira
(IAC, Spain)

SPECIAL SESSION 4: GALAXY STUDIES IN THE MID- INFRARED FROM SPACE AND GROUND

Mid-infrared observations have marked a before and an after for extragalactic astronomy, both at high-redshift and in the local universe. The Spitzer Space Telescope and the Wide-field Infrared Survey Explorer have seen through dust clouds in our galaxy and beyond and largely increased our understanding of star formation and nuclear activity in galaxies. Furthermore, upcoming facilities such as MIRI on the James Webb Space Telescope and METIS on the 40 m European Extremely Large Telescope will be leading extragalactic research during the next decades.

The aim of the meeting was to bright together the mid-infrared extragalactic astronomy community to present some of the most salient observational and theoretical results of galaxy evolution of the last years. The main topics discussed were: high spatial resolution observations of nearby galaxies, the correlation between AGN activity and star formation on nuclear and galaxy-wide scales, and the spectral energy distribution of AGN hosts and star-forming galaxies. These topics were introduced by 6 invited speakers and discussed further in 11 contributed talks and 3 poster presentations.

Our expectations were fulfilled with more than 40 people attending the meeting. While the schedule was too tight for debate, interest was high and the breaks were abuzz with discussion.

The organizers would like to thank all speakers and participants for a very successful meeting and the EWASS organizers for providing the opportunity to make this session.

The program and all the presentations are available on the EWASS2015 website at: <http://cas.unige.ch/EWASS2015/session.jsp?id=Sp4>

Cristina Ramos Almeida, (IAC, Spain)
and Antonio Hernán Caballero, (IFCA, Spain)

SPECIAL SESSION 7: SCIENCE WITH LARGE SPECTROSCOPIC SURVEYS OF GALACTIC OB STARS: GETTING READY FOR GAIA

In the last decade, several spectroscopic surveys of Galactic OB stars have been conducted independently by different groups (GOSSS, OWN, IACOB, CAFE-BEANS, NoMaDs, GES, MiMeS, BOB). The scientific exploitation of this unique

observational material, using the most modern tools, is currently under way and will without any doubt quantitatively change our view of the properties (temperature, gravities, abundances...) and evolution of massive stars. However, the picture will not be complete until we have access to accurate distances (hence being able to compute luminosities, stellar radii, masses, and ages).

The Gaia mission will provide the needed key to open the frontiers of a new era in the study of Galactic OB stars. Successfully launched in 2013 December 19, the first data release (not yet including distances) is planned for summer 2016.

This special session of the EWASS2015, held on Monday 22 June, joined together experts in observations, analysis, and modeling of massive OB stars with four main purposes: (a) establish synergies between the various on-going spectroscopic surveys of Galactic OB stars; (b) discuss the best strategy to share all available observational information about Galactic OB stars in preparation for the Gaia era; (c) identify the best tools to extract information about rotation, stellar and wind parameters and abundances from large samples of Galactic OB stars; and (d) identify the interplay between current spectroscopic surveys and Gaia in the context of the understanding of massive stars properties and evolution.

The Special Session featured 6 invited talks, 9 contributed talks and 8 posters. The talks were organized in three sessions covering the following topics: (1) Past, on-going, and future surveys of Galactic OB stars: getting ready for Gaia, (2) Modern tools and techniques for the investigation of Galactic OB stars, (3) Open questions in our knowledge of Galactic OB stars in the Gaia context

Over 50 effective participants from many different countries were attending the meeting. In particular the meeting counted on speakers from Belgium, Spain, Chile, Austria, Germany, United Kingdom, and Switzerland.

As a record and legacy of a fruitful meeting, we have stored the PDF copies of the oral presentations in the webpage of the IACOB project: <http://www.iac.es/proyecto/iacob/pages/sp7ewass2015.php>

S. Simón-Díaz, (IAC/ULL, Spain)
and F. Martins, (LUMP, France)

SPECIAL SESSION 8: THE PHYSICS OF FOSSIL STELLAR MAGNETISM

In recent years observations and theory have revealed that magnetic fields are key factors in the evolution of massive and intermediate-mass stars and their environments, through their ability to influence the angular momentum evolution, internal mixing or mass-loss of stars, and to shape their winds. Fossil magnetic fields present a unique opportunity to connect main sequence stars with their evolved descendants (e.g. post-main sequence stars, white dwarfs, neutron stars), while also providing a window into the earlier phases of star formation (e.g. proto-stars, pre-main sequence stars).

This one day meeting aimed at offering a synthetic view of recent observational and theoretical progresses in the

domain of magnetism of early-type stars. The day was split into two sessions: one dedicated to understanding the origin and evolution of magnetic fields in massive and intermediate-mass stars and their descendants; and the other dedicated to understanding the impact of magnetic fields on their circumstellar environments. The meeting was well attended and featured 4 invited speakers (Stéphane Mathis, Thierry Morel, Mary Oksala, and Gregg Wade) and 11 contributed talks from various experts in the field of fossil stellar magnetism. The talks spawned interesting and lively discussions.

In the first session, key overviews of recent large surveys (Magnetism in Massive Stars (MiMeS) – Gregg Wade, Binarity and Magnetic Interactions in various classes of Stars (BinaMIcS) – Aurore Blazère, and B fields in OB stars (BOB) – Thierry Morel), which have served as the driving force behind the rapid advancement in this field, were presented. This session also included a detailed presentation discussing the origin and evolution of magnetic fields in these stars (Stéphane Mathis). Summaries of other survey programmes (Bram Buysschaert, Evgeny Semenko), detailed studies of individual stars (James Silvester, Natallia Sudnik), and the observational techniques used to search and characterise the fields in these stars (Oleg Kochukhov) rounded out this session.

The highlight of the last session was an overview talk by Mary Oksala describing recent theoretical and observational (across the electromagnetic spectrum) advancements in our understanding of the behaviour of the circumstellar environment around these magnetic stars. The session also included contributed talks that focused on the X-ray properties of massive stars with magnetically confined winds (Lidia Oskinova, Asif ud-Doula).

The organisers would like to thank all speakers and participants for a fruitful meeting and the EWASS organisers for their support.

Jason Grunhut, (ESO, Germany)

SPECIAL SESSION 13: ERUPTIONS AND EXPLOSIONS: THE LIVES AND DEATHS OF MASSIVE STARS

Core-collapse supernovae mark the deaths of massive stars. With the advent of recent surveys (Pan-STARRS1, iPTF, PESSTO, etc.) the true diversity of these events is being fully explored, in particular with a view to understanding the dependence of the properties of the supernovae on their progenitors. Mass loss and binarity, for example, can significantly alter the evolution of a massive star, and sets the initial conditions for the eventual supernova. At the heart of each event is an explosion mechanism, to which we are currently observationally ignorant.

The aim of this special session was to explore the evolution of massive stars, in the years leading up to explosion, and the supernova itself as a single narrative. This session was focused on massive stars and core-collapse supernovae, with the specific intention of bringing together observers and theorists to explore these extreme events.

The invited speakers were Nancy Elias-Rosa (Institute of Space Sciences, Spain) who described current state of the art

in the search for the progenitors of core-collapse supernovae; and Stacey Habergham (Astrophysics Research Institute, Liverpool John Moores University, UK) who presented the relationships between the different supernova types and their host environments.

In total 20 talks and 14 posters were presented to an audience of around 50 participants. The contributed talks and posters covered a wide range of subjects including: Wolf-Rayet stars, supernova impostors, superluminous supernovae, spectropolarimetry of supernovae, gamma ray bursts and the current ongoing searches for supernovae.

The organisers are grateful to Cosimo Inserra, Steve Schulze and Christa Gall, who so kindly chaired the oral sessions.

More information is available at the special session website:

http://jmaund.staff.shef.ac.uk/EWASS2015_SP13/

Justyn R. Maund
(University of Sheffield, UK)
Rubina Kotak
(Queen's University Belfast, UK)

SPECIAL SESSION 14: LOW-ACCRETION PHYSICS IN THE UNIVERSE

This Special Session on low-accretion physics convened two major communities that address this topic, each focusing on the extreme sides of the black hole mass distribution: X-ray binaries on one hand and active galactic nuclei, including Sgr A*, on the other.

The low-accretion state is the characteristic mode of supermassive low-luminosity galactic centres, including Sgr A*, and is the often state of Galactic low black hole mass sources.

A unification scheme arises thus naturally for low accretion systems. The fundamental plane of black hole activity describes how different black holes, across ten orders of magnitude in mass, regulate their radiative and mechanical luminosity using a common mechanism: the disk-jet coupling. From X-ray binaries to powerful radio galaxies, including Sgr A* in the Galactic centre, all share a common set of properties: variability, similar continuum spectra and jet activity among others. Accordingly, the interpretation of the accretion physics given by both communities is becoming largely unified, sharing similar models and observational objectives. This Special Session joined both communities in an effort to probe these unifying mechanism and processes across the whole range of masses.

The session started with a review on “Parallel lives: AGN and X-ray binaries” given by Elmar Körding. There were three more invited talks on “How do jets quench?”, “The interplay of inflow/outflow in weakly accreting black holes”, “Elusive accretion disks in active galactic nuclei” and “Sgr A* in the near-infrared” given by Dave Russell, Sera Markoff, Almudena Prieto and Stefan Gillessen, respectively, which were followed by 11 contributed talks.

The topic of low accretion was covered both from an observational and theoretical (simulations) point of view. A

balanced discussion between these two approaches ended the session.

More details on the programme and some of the presentations are available on the EWASS2015 website: <http://eas.unige.ch/EWASS2015/session.jsp?id=Sp14>

Mar Mezcua, (CfA/Harvard, USA)

SPECIAL SESSION 16: THE OUTSKIRTS OF GALAXIES: PRESENT STATUS AND FUTURE CHALLENGES

This Special Session was dedicated to the outskirts of galaxies. In recent years it has become clear that studying the outskirts of galaxies is a particularly sensitive way to probe the evolution of galaxies in general. This is evident by the large number and the high quality of the contributions to the Session. As is normal in this kind of work the presentations were representative of the latest work in observations, in modelling, and in the confrontation of the two.

The observations included detailed results of surface brightness profiles of disc galaxies at both low and intermediate redshift. It is now accepted that the most convenient way to classify these profiles is using three broad classes: type I, where the disc profile is a single exponential, out to the limits of observation (in some cases out as far as 10 scale-lengths), type II, where the profile is a double exponential, where the outer exponential is steeper than the inner, and with a well-defined break radius (these profiles are often referred to for brevity as truncations), and type III, where the profile is a double exponential with the outer exponential shallower than the inner (often referred to for brevity as antitruncations). As well as new results going to increasingly lower surface brightness limits, and with new methodology to separate the different components, we were given a warning that the limits are reaching the point where a very careful treatment of the point spread function of the telescope is essential if we are to avoid contaminating the outer profiles with light from the brighter inner zones (bulge, and in some cases AGN). This is of particular importance if the outer part of the profile is not strictly exponential, but has a steadily decreasing slope, which has been interpreted as due to the domination of light from a stellar halo over the disc light at large radii. This may indeed be the case, but the observational material must be treated with extreme care. Profiles are now being derived for galaxies at intermediate redshift using HST fields and Stripe-82 of the SDSS, and we were given results from these studies. The topic of one dimensional profiles was enriched by presentations of more detailed morphological studies such as those of rings, and flares, and of components such as globular clusters and planetary nebulae in the outskirts, which give particularly useful dynamical information. In addition we heard about evidence for star formation conditions in the outer parts of galaxies, as exemplified by UV observations of both stars and ionized gas.

The evolutionary aspect was mostly concerned to test models of inside-out growth of galaxies, where colour profiles, and spectral profiles were added to the surface brightness structure. It is interesting to pick out a contribution on the LMC, where evidence was given for outside-in evolutionary growth. As the observations of this object are among the most detailed possible, involving resolved stellar populations, it is intriguing to ask how representative they are.

Presentations dedicated strictly to modelling included consideration of how mergers could produce the observed profiles, and how the effects of stellar migration induced by dynamical asymmetries could also influence them. Models of this kind also predict age and metallicity distributions, and some new measurements of these parameters were presented by the observers.

Towards the end of the session we were offered considerations of future observational challenges, directed above all to obtaining reliable measurements at increasingly faint surface brightness, so that we will be able to separate out very faint inputs such as those of stellar streams and tidal tails at increasing redshift, and in general to distinguish between different evolutionary models using the best observations.

J. Beckman, (IAS, Spain)

SPECIAL SESSION 17: HUNTING DOWN THE ELUSIVE PROGENITORS AND EXPLOSION MECHANISMS OF TYPE IA SUPERNOVAE

Type Ia supernovae (SNe Ia) are important for modern astrophysics for various reasons. For instance, they have been key in discovering that the present day Universe undergoes an accelerated expansion and they play a crucial role in the chemical enrichment of galaxies. A limiting factor in this context is the lack in our theoretical understanding of SN Ia explosions: their progenitor stars and the exact explosion mechanisms are still elusive. In the past decade a wealth of new data has been collected by large synoptic surveys (e.g. PESSTO, Pan-STARRS, iPTF), and two recent nearby SNe Ia have allowed to place deeper limits on progenitor systems than ever before. At the same time, advances in numerical modelling, namely fully 3D hydrodynamic simulations that capture the explosion dynamics in a more realistic way, and sophisticated radiative transfer calculations that allow to connect the models to observational data, have become available.

This special session aimed at bringing together theorists and observers to give an overview about the current observational state of the art, present recent theoretical progress and discuss the open problems in SNe Ia. The programme consisted of a total of 3 invited talks, 15 contributed talks and 9 posters with participants coming from Australia, Chile, Denmark, Germany, Japan, Netherlands, Russia, Slovakia, Spain, Sweden, Turkey and the United Kingdom. Also included was a social dinner together with participants from the special session on massive star explosions SP13.

The programme was divided in three blocks covering multi-wavelength observations (invited speaker: Assaf Sternberg); binary population synthesis, rates and progenitor searches (invited speaker: Silvia Toonen); and theoretical explosion models and their comparison to observational data (invited speaker: Pablo Loren Aguilar). Highlights of the meeting were presentations on the first gamma-ray detection of a SN Ia, radio constraints on the progenitor of SN 2014J, the discovery of a potential SN Ia progenitor system in a planetary nebula and first synthetic spectropolarimetry for 3D merger models. The meeting showed that multi-wavelength observations of nearby SNe Ia such as SN 2014J have great potential in constraining the progenitor stars and explosion mechanisms of SNe Ia.

With over 50 scientists attending, the session has reached a large audience. We received very positive feedback about both the scope and the quality of the programme. We would like to thank all our speakers and the EWASS organizers who helped making this meeting a success.

Markus Kromer
(Stockholm University, Sweden)

SPECIAL SESSION 18: CHEMICAL ABUNDANCES AND GRADIENTS IN SPATIALLY RESOLVED LATE-TYPE GALAXIES IN THE LOCAL UNIVERSE

The principal aim of Sp18 was to bring together observers and theorists who work on characterizing and understanding chemical abundance gradients in disc galaxies. In this context the special session was a great success since it led to a better understanding of what was needed by both observers and modelers to make progress in the field.

Invited speaker Brad Gibson gave a comprehensive overview of chemodynamical models of disc galaxies with a particular focus on abundance gradients. A take away message from his review was that the behaviour of radial gradients in models depends sensitively on the implementation of star formation feedback. In this context Filippo Fraternali discussed the impact of galactic fountains in disc growth. Marie Martig (also Madier Miranda, Anaëlle Hallé) showed that radial migration strongly affects the radial profile, but with minimal influence on the vertical structure of the disc. The influence of bars must also be considered (Inma Martínez Valpuesta).

Invited speaker Laura Magrini reviewed in some detail the present observational situation. The current consensus is that most massive discs exhibit mildly negative present day metallicity gradients (also, Laura Toribio showed that $[C/H]$ gradients are steeper than $[O/H]$ gradients in M31 and M33). Flatter gradients have been seen in the outer regions of discs (José Vilchez).

Regarding temporal evolution of metallicity gradients, observations are thin on the ground and the situation somewhat confused. Some find that gradients become flatter with time (Patricia Sánchez-Blázquez with CALIFA, Lorenzo Morelli with IFU data, Mike Beasley with M33 star clusters) others see little evolution from HII regions and PNe (Magrini). Matteo Monelli showed that the LMC is a particularly interesting case study, with hints of “outside-in” evolution and radial migration. In general, the degree of disc gradient evolution, whether this is in agreement with high-redshift measurements, and the also importance of “inside-out” disc formation (Misha Heywood) remains to be determined and requires more data.

Chris Brook gave a good summary of the special session and also brought up some useful talking points. From the perspective of the simulators, accurate measurements of abundance gradients provide a route to constraining feedback recipes in numerical models. Additional uncertainties in the modelling include stellar yields, mixing timescales in the ISM and the importance of stellar migration. From the observational side, there remain systematic difference between metallicity measurements of population tracers (HII regions, PNe, star clusters ...). Large samples with well-defined metallicities, ages and distances are required for

progress in the understanding of metallicity gradients and their time-evolution.

Mike Beasley (IAC, Spain), Chris Brook (UAM, Spain),
Christina Chiappini (AIP, Germany), Jorge García-Rojas
(IAC, Spain), Patricia Sánchez-Blázquez (UAM, Spain)

SPECIAL SESSION 21: SCIENCE WITH PANCHROMATIC LARGE SURVEYS IN THE SKA ERA

During this EWASS 2015 Special Session on “Science with Panchromatic Large Surveys in the SKA era”, there were several presentations about the science that will be done in the future with SKA and the synergies with other instruments. Special emphasis was made on the fact that SKA will be a survey instrument and, in that way, it will be complementary to other initiatives like the LSST, EUCLID or ALMA. With its superb sensitivity, planned to be about two orders of magnitude better than existing radio astronomical facilities, SKA will be an excellent deep and wide survey machine for astronomical objects from the local to the most distant universe up to redshifts larger than 10. All these details were shown by Robert Braun, Scientific Director of SKA. This will allow for unprecedented cosmological studies up to the Epoch or Re-ionization (Leon Koopmans, on behalf of the EoR SKA Scientific Working Group), the detection of thousands of new pulsar systems to test the theory of general relativity with precisions far better than 1% (Rob Fender, on behalf of the Pulsar and Transients Working Groups), studies of the first AGN and galaxies, and mapping the magnetic field structure from the larger scales in the universe down to the relevant turbulent scales of galaxies in the local vicinity (Isabella Prandoni, on behalf of the Radio Continuum and Magnetism Working Groups). During the workshop, the transformational scientific of future SKA surveys and their synergies with current complementary multi-spectral-range facilities were presented and discussed (e.g. ALMA –presented by Francoise Combes-) and other future projects like the LSST –presented by David Bacon-, Euclid –presented by Roberto Scaramella-, or eROSITA. For example, using synoptic observations from SKA, LSST, and Euclid, it will be possible to perform large scale structure and very high redshift cosmology (up to $z \sim 10$ and beyond) studies. In the field of Galaxy Evolution, SKA will accurately determine the Star Formation history over cosmic time while LSST will provide redshifts and stellar masses. Moreover, it will be possible to trace the pathway from neutral gas (HI with SKA), to molecular gas (with ALMA) to star formation (with SKA radio continuum). In fact, radio continuum surveys with SKA1 will be probing galaxies with Star Formation Rates of up to 10 solar masses per year up to redshifts of around 3-4. There were additional presentations about the studies of AGNs with SKA (Iván Agudo) and the possibility of using the SKA for VLBI observations (Antxon Alberdi). The synergies between SKA and the cosmological experiment J-PAS were discussed by Miguel Ángel Pérez-Torres.

There were several presentations about the work that is already in progress making use of the SKA precursors: James Allison presented first results of ASKAP on the detection of a neutral gas outflow in a young radio galaxy; Madusha Gunawardhana reported about the Star Formation History of the Local Universe, focusing on the project GAMA (Galaxy and Mass Assembly) which makes use of ASKAP data; Jose Sabater showed the difficulties of the calibration, in particular

the ionospheric contribution to the interferometric phase, when imaging large fields with LOFAR; Fatemeh Tabatabaei and Rubén Herrero-Illana described complementary methods to discriminate between the thermal and non-thermal contributions to the total emission of nearby radio galaxies (with JVLA and Effelsberg observations); Joeri van Leeuwen described the Apertif surveys for the detections of Pulsars and Transients and their future implications for SKA; Michael Wise described different studies of the AGN feedback in the ISM and the contribution that SKA will do in this field. There was also a presentation by Enrique Solano about the European projects ASTERICS that deals with “The Virtual Observatory and the ESFRI infrastructures”, discussing the basic requirement that the SKA data should be VO-compliant. There were also two technical presentations about direct shear mapping based on the uv-visibilitys (Michael Tarr) and a new tool to unveil the kinematics of star-forming galaxies (Enrico di Teodoro).

The final presentation (Lourdes Verdes-Montenegro) described all the steps that have been followed in order to incorporate Spain to the SKA Project. The “Spanish SKA White Book” has been recently published; moreover, several Spanish universities and industries are taking part in the industrial consortia; and several Spanish astronomers belong to the different scientific SKA Working groups (WG).

Antxon Alberdi (IAA-CSIC, Spain)

SPECIAL SESSION 23: MHD-MODELING OF ACTIVE SOLAR STRUCTURES

A special session entitled ‘MHD-modeling of active solar structures’ was held on Wed 24 June 2014. This session was divided into three sub-sessions: Photospheric and chromospheric dynamics - Solar coronal dynamics - CME/space weather

The aim of this session was to bring together theoreticians in order to improve our understanding of contemporary issues of magnetohydrodynamic (MHD) waves (their propagation, dissipation, conversion) in the solar atmosphere. In particular, the presented talks focused on complex magnetic fields of the solar atmosphere which is the source of MHD waves and nascent fast solar wind. Realistic numerical models are required to understand the role of these waves on localized heating of the chromosphere as well as on driving the plasma ejecta (e.g., chromospheric spicules) that may further supply mass to upper layers of the solar atmosphere and contribute to the solar wind formation. These are the contemporary and most significant issues that solar community is facing to solve, and which were also the objectives of this session. Apart from this, the propagation and attenuation/dissipation properties of MHD waves were explored within the framework of the realistic models of coronal magnetic regions, and it was studied how plasma and magnetic field affects these waves in higher layers of the corona. In particular, the following issues were discussed: waves in the solar flux-tubes (Elena Khomenko, Sergiy Shelyag); development of sophisticated numerical and analytical multi-fluid models of the solar atmosphere which realistically model prominences weakly ionized bottom layers of the solar atmosphere (Juan Martinez-Sykora, Roberto Soler); spicules and other solar coronal dynamics (Teimuraz Zaqarashvili); waves in the solar coronal loops (David Pascoe, Ramon Oliver, Ding Yuan, Irantzu

C. Santamaria); prominence dynamics (Andrew Hillier); evolution of CMEs in the inner heliosphere (Stefaan Poedts, Francesco Zuccarello).

This session improved our understanding of the above mentioned significant and timely scientific issues of heliophysics, and shed some light on solving the paradox of coronal heating and supersonic wind acceleration which still remain the cardinal issues of solar physics.

Prof. K. Murawski
(Marie Curie-Sklodowska University, Poland)

SPECIAL MEETING 4: DATABASES FOR THE CHARACTERIZATION OF ASTRONOMICAL OBSERVATORIES

The characterization of the atmosphere above astronomical observatories has become more and more important during the last few decades. The appropriate and rigorous determination of parameters such as seeing, useful observing time, extinction, sky brightness, water vapor content, etc., is essential for getting the most from an observing site. The need for comparison among locations -together with ever more demanding conditions for a site to host important infrastructures - have lead to major instrument developments.

Extensive databases are now available from instruments on satellites and ground-based facilities operated by national meteorological agencies. Parameters compiled by global climatic models are also ready for use. A number of parameters needed for studying existing and potential observing sites can now be accessed and analyzed through public databases.

The aim of the Meeting was, i) discussing results that validate databases useful for site characterization, and their use for long term statistical, ii) exploring the possibility to forecast for telescope operation and iii) consider the use of numerical models for determining parameters such as water vapor and seeing.

These topics were successfully covered and also results on particular sites through the use of databases and forecasting tools were specifically addressed in one session of the workshop.

A selected group of international experts have join together in La Laguna – Tenerife for two days during which their knowledge, data and techniques were shared and future strategies planned. Some of the most recent results obtained at particular astronomical locations, such as the Canarian or Chilean sites, were presented. There was also an important participation from sites in North Africa (Morocco and Algeria), Uzbekistan, Tibet and China. From the meeting collaborations among different countries were promoted and expertise and techniques were exchanged. The diversity of the needs and infrastructures lead to specifically discuss on the need for following standards both in instrumentation and data analysis.

The most recent developments in numerical models to retrieve parameters like water vapor content or seeing or meteorological parameters were presented; their future use in astronomical sites is a mayor breakthrough in site testing. The conference was a unique opportunity to put together complementary skills in astronomy, meteorology, atmospheric physics, statistics, or mathematics for the characterization of the atmosphere of Astronomical Sites.

The scientific organizers were Casiana Muñoz-Tuñón-chair (IAC, Spain), Jean Vernin (Univ Nice-France), Sergio Ortolani (Univ Padova-Italy) and Marc Sarazin (ESO-Germany). The members of IAC Sky Team were extremely helpful in the organization of the meeting. The presentations are accessible at <http://www.iac.es//site-testing/>

Casiana Muñoz-Tuñón (IAC, Spain).

SPECIAL MEETING 7: ASTRONET 2015 – 2025: THE NEXT DECADE

ASTRONET was formed in 2005 as an EU-supported ERANET by the major funding agencies for European astronomy. The aim was to establish a common, comprehensive science-based strategic planning procedure, formulated in the Science Vision and Infrastructure Roadmap reports, which have been published and recently updated. So, after ten years as an EU-funded activity, EWASS 2015 was a good occasion to reflect on how to carry the task forward in the future.

As the partners know, ASTRONET is not a decision-making body: Funds can only be committed by the agencies themselves or by such intergovernmental organisations as ESA and ESO. Yet, these comprehensive joint planning reports have been agreed and are followed in practice by the relevant decision makers: The ESO Council has launched the European Extremely Large Telescope (E-ELT) project; the next major ESA missions have been selected; the SKA and CTA projects are off to a firm start, etc. Thus, the major future facilities for European astronomy have de facto been approved for construction as foreseen in the Science Vision and Infrastructure Roadmap. On this track record, all ASTRONET partners have agreed that this experiment in strategic coordination has been a success and should continue on a permanent basis.

The progress of ASTRONET was discussed at earlier EWASS meetings during the update of the Science Vision and Infrastructure Roadmap. The task until ~2025 is now to prepare the successful deployment of these mega-facilities in concert with those defining the state of the art. As outlined

in the introduction by Ronald Stark (NWO, NL), Chair of the ASTRONET Board, this year's meeting (<http://eas.unige.ch/EWASS2015/session.jsp?id=SM7>) therefore focused on this task:

Joint developments and synergies between astrophysics and astroparticle physics in the era of Big Data and multi-messenger facilities, presented by Michael Garrett (ASTRON, NL), are conducted within the ASTERICS project, with EU support. The new Roadmap for European radio astronomy (which is highly advanced, but still has no ESO-type host) was reviewed by Jason Hessels (Univ. of Amsterdam, NL), and a future strategy for European OIR astronomy, including a more integrated synergy with ESA missions as just agreed, was outlined by Bruno Leibundgut (ESO). This served as a prelude to a review by Xavier Barcons (Univ. de Cantabria, ES) of scientific areas where such ground-space and multi-messenger synergy will be particularly beneficial.

Preparations for the permanent successor to ASTRONET were reviewed by Colin Vincent (STFC, UK). They are well advanced: All major participants have submitted Letters of Intent, and signature of a corresponding MoU is foreseen for early 2016. The ASTRONET Coordinator, Denis Mourard (CNRS, France, with this organiser acting as a proxy), outlined the challenges and balances facing ASTRONET us and our strategic objectives for the mid-term future, leading into a lively discussion that will help us define the priorities for our future programme. A generous wine donation marked a festive end to an initiative that has changed European astronomy for good.

This summary of what Europe intends to achieve in the future was also particularly timely before Focus Meeting 11, "Global Coordination of Ground and Space Astrophysics and Heliophysics", at the IAU General Assembly in Honolulu in August: Meeting the challenges of cultural diversity and overcoming the contrast between the "haves" and the "have-nots" that truly global coordination of astronomical projects will face has already been prototyped on the European scale. In summary, Europe is well prepared to meet our global partners over the next couple of decades!

Johannes Andersen
NOTSA and ASTRONET

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