EUROPEAN ASTRONOMICAL SOCIETY

NEWSLETTER

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Contents

EDITORIAL

After four years in Athens, the EAS Newsletter production changes its publishing host place and returns to Geneva. The council has considered that Geneva offers the following advantages:

1) the production, although it is going to cost as much as in Athens, will be handled at the base, where the Secretariat of the Society is located, so it does not depend on the country where the editor is living and
2) the distribution is less expensive from a private company in Geneva.

I will continue to serve as editor and I believe that this new arrangement is for the benefit of the Newsletter. Therefore this issue is the first one under the new conditions.

I hope you will enjoy its contents and particularly our special features. Continuing the new column of **Skeptic's Corner**, Dainis Dravins writes a provocative article on the future of optical CCD photometry. In all his arguments to my opinion what lies behind, is the fact that **astronomy is driving technology ahead at a great speed**.

Cosmophysics is a new term that Maurice Jacob initiates to us, showing how the New Physics and its most hot topics are closely related to astrophysical problems and its space laboratories.

Light pollution is a hot issue for astronomy revealing its environmental importance as is lively described by Andre Heck, on the occasion of an international meeting in La Serena (Chile).

From EU DG-Research, Panayotis Moschopoulos gives us briefly the main goals of the 6th Framework Programme.

The highlights from the European networks and organizations, a regular feature in our Newsletter will give you useful hints on what is going on in astronomy.

Finally I hope to see many many EAS members in Porto next September for JENAM 2002.
see http://www.sp-astronomia.pt/jenam2002/

Mary Kontizas

Message of the President

In my message this issue I want to report briefly on the first results of our collection of national planning documents. Since our last Newsletter I have contacted colleagues in many of our countries to enquire about the existence of formal national priorities in astronomy. I thank those who have responded in a timely manner with information and documents. I hope those who have not yet done so will be able to well before the Porto JENAM, where I would like to have a summary available. While not yet complete, the inventory is already revealing a number of interesting trends.

First and most important, there seems to be extraordinary consensus on the important areas of science that astronomers wish to address during the coming decade. Here is clearly scope for a European wide document setting out our overall scientific priorities. Of course, priorities for investment and for technological development are another matter, because these elements also have historical and economic dimensions. The national documents also reveal this diversity in their detailed conclusions and plans.

There is also consensus that the largest research infrastructures will be European in scope. The essential roles of ESO and ESA are evident and are emphasized by all countries. Both organizations are seen as generally effective in carrying out their missions as regards astronomical research and are highly valued across the continent. Discussion of possible projects having global scope is not yet evident except in radio astronomy, where ALMA and SKA are developing as priority projects in essentially all countries around the world that have programs in radio astronomy.

But a conclusion may also be emerging that the ground-based program is hindered by the lack of a coordinated program of technology development. Especially in the larger countries there is an appreciation that the success of ESA's space science program relies on long lead times and substantial investment for R&D, while the parallel program for ground-based activities is fragmented and not very coherent. There is as yet no consensus as to how such a program might be organized, in particular because our international organization for ground-based astronomy, ESO, is generally viewed as a facilities organization, which generally should obtain its technologies for new instruments and facilities from elsewhere. Several large countries do indicate the necessity of ensuring synergy with technology development for space research, but how this might happen in a structurally healthy way is not made evident.

The smaller countries clearly are experiencing difficulty in maintaining a healthy national program while also investing in and obtaining maximum benefit from their participation in ESO and ESA. The question has been asked explicitly in at least one case whether a community can remain healthy by only participating in large international projects, with the conclusion that it likely cannot.

And it will surprise no one that in essentially all countries there is concern about the wave of retirements of astronomical staff in the coming decade. Governments cannot but be aware of this problem by now.

It is interesting that some possible questions are not generally being asked in these national planning documents. Are the organizational structures available for cooperation adequate for optimising the attack on our scientific goals? Are we making the best use of planned technological and scientific developments in other fields? Should we be working more closely with physicists, with industry? Should Europe begin to take the lead in some areas to organize global projects?

Again, it is our intention to continue to gather such information on national priorities as is available, summarize it as seems appropriate, and to report to the community in Porto.

Harvey Butcher

Sceptic's Corner

The Post-CCD Era in Optical Astronomy

You have heard it from colleagues. You have read it in press releases. You have repeated it to your students. Yes, it is claimed that the latest optical detectors are «extremely capable», «enormously efficient», and the «ultimate in sensitivity». They have so many pixels, and they will give so much data. Are they? Do they? Will they?

Having been invited to comment on such issues from a «devil's advocate» point of view, the response is clear: No, of course not! Today's detectors actually are tiny, inefficient, and provide only minuscule amounts of data.

The serious side is that the community (and our sponsors) should not be fooled into believing that

today's detectors are good, and that there would perhaps not be much room for improvement.

Why do we need spectrometers?

Mainly because detectors are poor. The purpose of today's spectrometers is to disperse light, so that its different wavelengths fall upon different pixels of today's ordinary detectors.

Is this really required? Of course not! Already a number of detectors are being developed with intrinsic spectral segregation.

Energy-resolving detectors are common in X-ray and gamma astronomy, and related techniques are applied also for the optical and infrared. One option is *STJ's, superconducting tunnel junctions* (a photon generates a cloud of charge carriers in a superconductor, giving a measure of both the photon energy, and its arrival time), another is *transition edge sensors*.

Although those particular concepts offer only moderate spectral resolution, others are capable of a resolution approaching a million. This is possible with *spectral-hole-burning* devices, otherwise being developed for optical data storage. These exploit certain cooled organic molecules. The functioning is like that of a colour film with not three, but a very great number of dyes. While there are still issues about sensitivity, tests on the solar spectrum confirm a resolution inside the detector comparable to the highest resolution spectrometers ever used in astronomy.

Why do we need telescopes?

Mainly because detectors are poor. The purpose of a telescope is to collect light and to provide a spatial segregation, so that light arriving from different directions falls upon different pixels of today's ordinary detectors.

Is this really required? Of course not! Some concepts are already now planning to eliminate the telescope as such, at least at longer radio wavelengths. Take the planned Low-Frequency Array *LOFAR*. By directly recording the incoming electromagnetic wave in amplitude and phase, the selection of sources (corresponding to «telescope pointing») may be achieved in software either pre- or post-detection, enabling simultaneous observations in widely separated directions. True, already in radio the data rates become respectable: tens of TB (*terabyte* = 10^{12} bytes) per second, or a PB (*petabyte* = 10^{15} bytes) each minute. While the extension to the optical may not be simple, the limitation appears to be only practical, not fundamental.

Why do we need detector readouts?

Mainly because detectors are poor. The purpose of a readout is to accumulate a sensible signal, and to put a time-tag to it.

Is this really required? Of course not! Since light is quantized, photons are the units to be detected, together with their arrival times. Already classical photocathode devices can count photons at nanosecond resolution while, e.g., avalanche photodiodes do so with much higher efficiency. Again, the data rates may become significant: a modest (1024 x 1024) array with a 10 MHz count rate per diode may generate 10 TB per second, or 1 EB (*exabyte* = 10^{18} bytes) during a 3-night observing run.

What is a good detector?

Of course, the above spectral, spatial, temporal (and also polarization) capabilities should be combined in the detector. To measure all this might perhaps require a recycling of each photon during the detection process. This may be feasible with, e.g., entangled states of quantum optics, which allow for the repeated detection of a photon without its destruction.

As for data rates, a number being quoted in discussions on virtual observatories or GRID concepts of data handling is 100 TB, as required for one image of the whole sky with 0.1 arcsec resolution. Of course, this is only for one single wavelength (and polarization), and for each instant in time.

Aiming at a spectral resolution of 10^5, say, the celestial data rate becomes 10 EB per time resolution element. Setting that to 1 ms, say, we reach 10 ZB (*zettabyte* = 10^{21} bytes) per second or a few hundreds of yottabytes (YB = 10^{24} bytes) per observing night. Some of us are aiming for both higher spatial, spectral and temporal resolutions, but there are no greater prefixes among SI units...

Such numbers, then, may represent the data rates at which the Universe is trying to «talk» to us. But only once we get really efficient detectors will we be able to listen. And let's remember that, given the common hype in describing today's «efficient» detectors, there are still at least some twenty orders of magnitude of needed improvements left.

Dainis Dravins, Lund Observatory

Did you say Cosmophysics?

Introduction

Parts of the cosmos appear to be natural habitats for high-energy physics, and (astro)physicists are developing new cross-disciplinary techniques to the study of the Universe and its origin. In the spring of 2000, a workshop on «Fundamental Physics in Space and Related Topics» took place at CERN. Initiated by the Joint Astrophysics Division of the European Physical Society and the European Astronomical Society (JAD), it benefited from the sponsorship of ESA and CERN. The cosmos is rich in fascinating objects and questions, and also in high-energy accelerators and their study and understanding attract much attention. The word, which would cover all that, short of a long explanatory circumlocution – «cosmophysics» – was coined at that workshop, and soon picked up by the CERN Courier.

Cosmophysics, an overview

Cosmophysics is a multi-disciplinary field and it therefore resists at first sight any clear and simple definition. A practical definition, which is linked to present trends and which we shall use in our selection of topics, consists in focusing on astrophysics and space science domains which experience a big influx of particle physicists. Our purpose here is to convey the flavor of this new research domain rather than to try to cover everything. In particular, we suppose that studies of the background relict radiation and of the universal expansion parameters are well known to readers of the EAS Newsletter, and so will not be covered here despite the impressive recent results which have been obtained.

Particle physicists have come back to cosmic-ray research with new types of detectors sensitive to very rare events, whether associated with weakly interacting or highly energetic primaries. Among such penetrating particles one has in particular the neutrinos, whether of atmospheric, solar or cosmic origins, and the still elusive supersymmetric partners of the known particles. In the latter case, one searches for those particles, which would happen to be neutral and stable, and which are referred to as 'neutralinos'. Very large detectors have been built and are being built underground, under water and under the polar ice. Extensive arrays are also being constructed to study the showers associated with rare very high-energy events. Key questions originate from particle physics and astrophysics alike and lead into the mysteries of the nature of dark matter in the Universe and how particles can possibly achieve the highest energies observed.

For neutrinos, there is the fundamental question of oscillations between neutrino species as they travel from source to detector. This is possible if neutrinos have a tiny but non-zero mass and evidence for such oscillations brings the first observed departure from the standard model which assumes them to be massless. [Evidence for such oscillations is becoming more and more compelling]. The question came from particle physics but, on the astronomy side, neutrinos offer the possibility to study the deep interiors of stars and the collapse physics of supernovae.

A neutrino mass of a few eV would be enough to close the Universe. The Big Bang has left several billions of neutrinos for each proton, and neutrinos with even a very small mass could contribute in a significant manner to the hot dark matter density. With present information this is however unlikely. Whereas there are many tantalizing questions associated with neutrinos from a particle physics point of view, their study also connects much to that of the cosmos. It could also connect to the study of extreme energy events, when one can detect in significant numbers very high-energy neutrinos of cosmic origin. This should soon be possible with km-cube-detectors deep under the sea or under polar ice, or even with radio telescopes monitoring the surface of the Moon for emerging cm-wave pulses.

In the framework of a Grand Unified Theory (GUT), supersymmetric particles ('sparticles') are expected to provide needed cancellations among radiative corrections, without which the masses of the weak vector bosons and that of the still elusive Higgs boson could be driven up to exceedingly high values. In order to meet that task their masses should be between 100 GeV (the present lower experimental limit) and 1 TeV (a value where radiative corrections extending to the GUT scale should start becoming embarrassing). They are hard to avoid in attempts to bring gravitation together with the other forces, as it is the case with superstring theory. Observing sparticles would be a strong experimental encouragement to

superstring theorists who still cannot advance any prediction at the present experimental energy scale of a few hundreds GeV. In astrophysics sparticles would hardly interact with ordinary matter but their heavy masses could make them an important contender for the cold dark matter part of the Universe.

Extreme events are coming in a variety of ways. Cosmic photons of very high energies have been seen. They originate, some of the times, in bursts of gamma rays and they often come from well-localized sources. As a component of cosmic rays they are particularly interesting, since their voyage to the detector has been unaltered by galactic and intergalactic magnetic fields.

A few cosmic-ray events have been observed with energies above 10^{+11} GeV. None should be seen since the microwave radiation background is supposed to act as a wall for such energetic protons (if they are protons!). At such energies, protons interacting with the microwave background photons should produce (π-mesons with a large cross section and this should slow them down unless they come from «nearby» sources (i.e., sources closer than the Virgo cluster), but for which there is no clear candidate.

One also finds searches for antimatter in space. There seems to be none in the visible Universe, down to the 10^{-4} level at least, and this is what is expected from the Big Bang. However, this should not discourage more precise searches and the level of 10^{-9} should be reached by new projects in the search for antihelium.

The detection of gravitational waves also stands as an important facet of cosmophysics. Predicted by General Relativity, these waves come as ripples on the fabric of space-time and originate from the rapid changes of mass configurations. The sensitivity achieved by current detectors is still not enough for the estimated amplitude expected from frequent or stable signals, for example from a supernova in Virgo (a relative displacement of 10^{-22} only at a frequency around 10^{+3} Hz) or a rotating compact binary in the galaxy (with a similar signal around 10^{-3} Hz). Laser interferometry should allow one to reach the required sensitivity level and even exceed it by an order of magnitude. LIGO in America and VIRGO in Europe provide hope that a signal will be seen within a few years.

A Space-based detectors could detect and study gravitational waves at low frequencies (from 10^{-1} to 10^{-4} Hz). Such a frequency range is particularly interesting, since, beside compact binaries in the galaxy (which should number in the thousands), it also covers signals from very massive black holes (with millions of solar masses), which are known to exist at the centers of most galaxies. The achievable sensitivity is such that merging of such black holes could be detected anywhere in the Universe. LISA, an interferometer space antenna with 5 million-km long arms, should now fly at the end of the present decade as a joint ESA-NASA project.

New developments in cosmophysics and also in the fascinating question of extra solar planets were covered by a recent meeting in Garching (March 2002), which was the first ever jointly organized by ESO, CERN and ESA.

In its willingness to remain in close touch with the particle physicists now working in cosmophysics, CERN has implemented the concept of 'recognized experiments', whereby international collaborations working on approved cosmophysics experiments can use the laboratory as a base.

Readers interested in learning more about or becoming involved in Cosmophysics projects are invited to participate in the EPS-EAS Joint Astrophysics Division's meetings and workshops.

Contact me at: Maurice.Jacob@cern.cc

Further reading

Fundamental Physics in space and related topics, ESA-CERN workshop, April 2000. ESA-SP-460 (2001)

CERN Courier, 40, number 5 (2000). «Watch this space for cosmophysics», by G. Fraser and E. Sanders.

«Fundamental Physics in Space». Proceedings of the Alpach Summer School 1997-ESA-SP-420.

Roadmap-JPL 4000-808 4/1999: Cosmic Journeys, NASA Structure & Evolution of the Universe Roadmap 2003-2033; ESA's Report to the COSPAR assembly SP-1241 (2000).

Maurice Jacob, CERN/TH

Light Pollution

An international conference on light pollution was held in La Serena (Chile) from 5 to 7 March 2002 under the patronage of the large Chilean observatories, the International Astronomical Union and Chile's National Environmental Commission.

Orchestrated in practice by Hugo Schwarz from Cerro Tololo Interamerican Observatory and by CTIO's Director, Malcolm Smith, the conference gathered together over 130 participants, more than the double of what was initially expected.

Not only was the audience very international, but also quite varied: astronomers for sure, but also scientists from other disciplines (life sciences, environment, ...) without forgetting technical and administrative observatory managers, educators, association representatives, leading citizens, decision makers and takers, manufacturers of luminaries, related researchers, and so on.

The presence of Chile's Fourth Region Governor («Intendente») and of his predecessor at the opening ceremony showed how much official bodies take seriously the protection of the quality of the country skies.

An official framework

Chile seems actually to be the only country in the world to have passed, at the national level, a law regulating light pollution, the 1998 «Ley Luminica». CONAMA, depending from the Ministry of Economy, Development and Reconstruction, monitors its proper application.

Additionally, the Office for the Protection of the Sky Quality (OPCC) (Oficina de Proteccion de la Calidad del Cielo, http://www.opcc.cl) headed by Pedro Sanhueza, monitors the preservation of the quality of the night skies as a national heritage as well as an environmental one. During the inaugural ceremony, OPCC actually bestowed a number of prizes to people (leading citizens, manufacturers, ...) for their activities in favour of light pollution reduction.

Other cities and regions round the world (Tucson in Arizona, Canary Islands, ...) have efficient regulations protecting observational activities, but, to our knowledge, Chile is the only country that took measures at a national scale.

This is of course justified by the intrinsic quality of the Chilean skies, the presence of large observing facilities in the country and the projects to install additional ones, but the deliberate intention to develop astro-tourism is not extraneous either to the steps taken. Some public observatories, such as Mamalluca's.
See http://www.angelfire.com/wy/obsermamalluca/
in Vicuna, have very well understood the interest to surf on that «ecological» aspect of tourism.

Main Topics

The range of presentations was as varied as the audience:
— light pollution around the world,
— existing regulations,
— protection of specific astronomical sites,
— studies of efficient outdoor lighting,
— design of adapted luminaries,
— safety problems,
— impact on environment,
— physiological effects on living beings,
— prospects of advertising from space,
— educational campaigns and public awareness,
— future trends,
— and so on.
For details see at: http://
www.ctio.noao.edu/~emond/lpc/lpc-presentations.html

Goodies

Nowadays, magazines of all kinds offer composite photographs of our planet showing the density of lighting at night in various areas round the globe (Europe, Japan, Eastern part of the United States, California, and so on) while showing that light pollution exists also at sea (offshore drilling, intensive fishing, etc.).

Extrapolations of such maps for the future are really worrying, independently from the potential apparition of additional sources (new mines, etc.). The fact is that more and more ground-based observational facilities are threatened.

What is disturbing in astronomical observations in the optical range is the fraction of that light which is diffused through the atmosphere and which is thus increasing the night sky background. Since it is diffused by the atmosphere, that fraction of the light is not the one seen on most satellite night pictures. «Good» representations of the night sky brightness have been presented in La Serena and have been made available on line.
http://www.ctio.noao.edu/~emond/lpc/f-falchi.ppt

Tu quoque

The radio spectrum was also discussed, even if it is not properly part of the light pollution, but more generally of the electromagnetic one. Complex and detailed agreements do exist, with the blessing (and active participation!) of the International Telecommunications Union (ITU) regulating the usage of the radio range. It should however be stressed that there are no actual sanctions in case of infringement. The system works essentially by moral pressure and «account settlings» during international expert meetings.

Catastrophic scenarios could be conceived though. For instance, the Chilean site retained for ALMA is located at only some twenty kilometers from Bolivia and, in principle, could suffer from interferences from a radar or a hertzian relay put on an Andes summit on the other side of the border. In that context, it is not innocuous to remind that, following the Pacific War of 1879-1884, those two countries have still no diplomatic relationships. ALMA's strategists will then have to secure ad hoc guarantees through appropriate international bodies. This illustrates how far the protection of astronomical sites may have to go.

Sweeping our own doorsteps

Are astronomical observatories themselves the best examples in terms of fight against light pollution? Asking such a question is of course answering it: not always.

The concept of «self-pollution» has been discussed several times during the conference. There are countless observations ruined, or at least damaged or disturbed, by inopportune squirts of photons from badly used flashlights or uninhibited car reversing lights.

More importantly in our relationships with the public, and certainly before launching awareness campaigns, we should make sure not to put ourselves in the first row of criticizable institutions. Ideally each observatory, planetarium and astronomy-related body should check the quality of luminaries on its premises and negociate, with the authorities in charge, the adequate normalization of the surrounding public lighting.

Alliance-oriented strategies

It is unlikely that leading citizens and decision makers/takers react enthusiastically to astronomical arguments. But experience shows an immediately good ear to economic ones: to illuminate where necessary for less money with adapted luminaries. It does not take long for peoples' representatives to realise that lighting towards the sky is wasting taxpayers' money.

Killing the myth «more light = more security» takes barely more time: too intense a lighting creates indeed deep shadows where potential assaillants can easily hide. The ideal situation comes from moderate glareless lighting (no light directly aimed at the eyes) allowing the pupils to open sufficiently and the eyes to see all details in the shadow areas. Anyone who has handled a photographic camera should be able to understand that argument.

Surfing on the current environmental wave is certainly a sound strategy. The «Last Frontier» is not Alaska (as they say there), but the deep space. Dark starry skies are the best perception we can have from it. Then let us preserve them.

Developing ties with disciplines investigating physiological effects (such as circadian «spikes», disruptions of circadian cycles, sleep disorders, and so on) in living beings, including humans, is also strongly advisable. This has been well understood by the International Dark-Sky Association.

http://www.darksky.org

Economically and sociologically speaking, it seems now well established that not-well-rested populations are less productive and more unruly. This should be a concern for our policy setters in these times of global intensive economy and of increasing urban violence.

Final comments

Misunderstandings must of course be avoided: astronomers are not aiming at totally black nights on Earth, but at a better, safer, more efficient and glareless lighting, directed only where it should illuminate without releasing upwards in the atmosphere masses of photons in distress.

The activity against light pollution belongs to a more general framework of improving the quality of life (ours and that of our followers): respect of natural resources, proper handling of garbage and used fluids, reduction of nuisances of all kinds, and so on.

It is certainly a concern for all of us since we currently have no high-profile («cosmic Cousteau») to carry world-wide the good word on cosmic depths and wildlife. Therefore significant long-term efforts should be devoted to related information and education in order to secure appropriate public support. By no means should we be accused of a social deficit in this respect by the following generations.

Andre Heck

EU News

Research Infrastructures in the 6th Framework Programme

Standard Disclaimer

This document expresses solely the current views of unit RTD-B.4 of the European Commission's services. Readers should not regard these views as a statement of the official position of the European Commission nor indeed of its Directorate-General for Research.

Under the Fifth European Community framework programme for R&D, 1998-2002 (FP5), support to research infrastructures is made available in three ways: in order to provide transnational access to researchers (projects like the European VLBI Network and «Astrovirtel»), to perform co-operative research that can enhance such access (projects like «AVO» and «FARADAY»), as well as to set up co-operation networks (like «OPTICON» and «RADIONET») devoted to issues of common interest. Certain forms of support to research infrastructures are also available under the Thematic Programmes of FP5.

The next framework programme, 2002-2006 (FP6) will likely dedicate a budget of 665 million Euro[1] to go a step further and initiate an all-inclusive European approach to infrastructures involving, beyond the legacy of FP5 activities, the following ***novel schemes***:

– **Integrated infrastructure initiatives** (I3s) are expected to mobilise a large number of infrastructure operators and users in a given area with the aim to stimulate a long-term integrating and structuring effect on the way infrastructures operate and evolve. I3s will combine under a single and flexible envelope, several activities like ***networking*** (an enhanced, coherent, and strategy-led

co-operation network), ***transnational access*** (under a more collective and co-ordinated approach offering unified access, even a single «entry point», for instance, to a geographically dispersed group of complementary infrastructures, and including remote services like, e.g. provision of reference materials or samples, experiment-based consultancies, etc.), as well as ***joint research activities*** (aiming to the enhancement of access through the improvement of the infrastructure itself). These activities will necessitate an appropriate ***consortium management*** having a high degree of flexibility and autonomy to adapt its execution plan on an annual basis or to «recruit» new partners with few administrative constrains. On average, the Community financial contribution to an I3 may represent an amount of several million Euro per year.

– **Communication network development** will support, in conjunction with the ***thematic priority***[2] on Information Society Technologies (IST), especially the establishment of a high-capacity and -speed Gigabit European Academic communications Network (GEANT) or the implementation of specific high performance Grids and test-beds, as well as electronic publishing services.

– **Design studies**, which could fund either a feasibility study or a technical preparatory work for an infrastructure to be undertaken by one or a number of Member States, provided that it has a clear European dimension and interest. Design studies will have to systematically explore the possibilities of contributions from other sources, including the European Investment Bank or the Structural funds, for the future funding of these infrastructures. The Community contribution will be in the range of 1-10 million Euro for actual costs other than new capital investments.

– A contribution to **capital costs for the development** of new infrastructures to be undertaken by one or a number of Member States, by providing limited support that could have a critical catalysing effect in terms of European added value. Financing will be provided in cases where a decision to start developments has already been firmly established and will be typically dedicated to the development of technologically advanced elements of the future infrastructure e.g. critical components, an instrumentation suite, a connectivity system, etc., excluding the development of mundane elements like, e.g. standard constructions, buildings, logistics, etc. The Community contribution to actual costs, up to a maximum of 10% of the total budget, is likely to fall in the range of 5-15 million Euro and will be limited to the minimum necessary to optimise the whole infrastructure development in terms of European added value. The major part of construction and operation, on the other hand, and the long-term sustainability of the infrastructures in question shall be made available by other sources.

To complete the picture, research infrastructures interested in a sectoral, targeted, top-down approach, could gain support also through the main instruments widely available from the FP6 ***thematic priorities***[2]: the ***networks of excellence***[3] and the ***integrated projects***[4].

Moreover, thanks to the newly created ***European Strategy Forum on Research Infrastructures***, with representatives designated by all EU Member States, policy making on research infrastructures in Europe is expected to become more coherent and strategy-led. The Strategy Forum, scheduled to meet for a first time on 25 April, will hopefully facilitate multilateral initiatives leading to a better use and development of research infrastructures.

Therefore, according to the European Research Area initiative and the Commission's proposals, the way Research Infrastructures will be addressed by FP6 will change substantially, moving on ahead and beyond the simple, «access-centred» approach towards a more global, «oriented» method for structuring and integrating these resources of ever-increasing importance for research in Europe.

Panayotis MOSCHOPOULOS
European Commission - DG Research

1 Under the FP6 specific programme on «Structuring the European Research Area», and including 200 million Euro for communication network development (GEANT and Grids).

2 Under the FP6 specific programme on «Integrating and strengthening the European Research Area».

3 http://www.cordis.lu/fp6/eoi-instruments/networks.htm

4 http://www.cordis.lu/fp6/eoi-instruments/integrated_projects.htm

News from OPTICON

In this issue I will concentrate on developments in several areas of OPTICON activity which were not described in detail in the last issue of the newsletter.

The Astrophysical Virtual Observatory (AVO)

The AVO project is a three year long study to demonstrate the scientific requirements, methodologies and technologies necessary to develop a virtual observatory for European astronomy. The overall goal is to connect distributed astronomical data sets taken from ground and space-based observatories into a seamless, multi-wavelength, digital view of the Universe. Within this 'digital cosmos', astronomers can use software and hardware tools as virtual telescopes to answer fundamental questions in astronomy that cannot be addressed with conventional approaches.

The AVO Proposal was submitted under the EC 5th Framework RTD scheme in February 2001 and a three year, four million Euro contract for a Phase A programme was signed in November 2001. This Phase A activity is lead by the European Southern Observatory (ESO) and includes the ESA operated Space Telescope European Coordinating Facility (ST-ECF), the UK ASTROGRID consortium, the Centre de Données Astronomiques de Strasbourg (CDS), the TERAPIX astronomical data centre at the Institut d'Astrophysique in Paris and the Jodrell Bank Observatory. The AVO team will define the scientific requirements for the AVO via the design of a science reference mission. They will then test software systems at partner archive sites to enable their archives to be used to implement that mission. In addition they will design and deploy prototypes of critical technological components for the AVO in the areas of GRID systems, scalable storage and computer systems and advanced databases. Recruitment of 9 AVO staff positions (hosted among the 6 project partners) started in December 2001.

The interoperability working group, chaired by CDS director Dr Francoise Genova, plays a key role in the preparations for the AVO. Its immediate objectives are to present the technical results of the early work on prototyping the AVO to European data managers and to increase awareness of interoperabiliy issues beyond the immediate AVO participants. At a technical level it is working with other Virtual Observatory projects around the world to establish a consensus on proposed standards. A definition of a virtual observatory tabular data format (VOTable) was discussed at an OPTICON sponsored meeting in Strasbourg during January 2002. The adoption of V1.0 of VOTable, which is foreseen before Summer 2002, is an important milestone for the international Virtual Observatory . The Strasbourg meeting was a fundamental step towards community approval of this standard. The next WG meeting is tentatively planned to be held in Garching, in June 2002. An international interoperability meeting, including participation of OPTICON WG members, is expected be held in Baltimore in October 2002.

The Strasbourg meeting was attended by some of the team from the US National Virtual Observatory project and representatives from Canada. Their presence exemplifies the worldwide interest in an international virtual observatory. There will be a major meeting on the virtual observatory effort in Munich from 10-14 June 2002.
See http://www.eso.org/vo2002 for details.

At this meeting a 'Roadmap' outlining strategic and agreed milestones for the VO effort over the next 3 years will be presented.

OPTICON Key Technologies Working Group

A kick-off meeting of this group, chaired by Prof. Rafeal Rebolo, was held at the Instituto d'Astrofisica de Canarias in La Laguna, Tenerife on 25 February, 2002.The goal of the working group is to identify key technologies needed for European telescopes and instruments in the next decade. Several areas of possible future collaboration were identified. These included new generation detectors, smart optics (including focal plane devices, adaptive optics and coronagraphy), innovative optical components and technology for optical and infrared interferometry. Four sub-groups were formed to consider these issues further and these groups are quite open to additional participation by other interested parties. Three of these groups met subsequently at the Astronomy Technology Centre in Edinburgh and at the Institute D' Astrophysics in Paris in order to consider what further joint activities might be desirable to identify possible proposals to the sixth framework programme. A summary of the Tenerife meeting is available on the OPTICON web site at

www.astro-opticon.org/technologies.html

and details of further activities will be posted there as they occur.

Extremely Large Telescopes (ELTS)

OPTICON has sponsored scientific workshops at both Edinburgh and Leiden to develop a scientific case for an extremely large telescope. This document, presently in its second draft, is accessible via www.astro-opticon.org\ELT.html and comments and contributions are invited before it is revised into a more complete version later this summer. In a parallel effort, work is underway to gather together the groups in Europe that are developing designs for Extremely Large Telescopes to define an OPTICON-sponsored request for a EU

commission RTD within Framework 6. The aim of the RTD is to realize a Phase A study for the next generation European telescope.

The details of this process are still being clarified and will be discussed and debated at a meeting at the Tuorla observatory in Finland in early May. This meeting will bring together both academic and industrial groups interested in ELTs. The intention is to define a number of work packages intended to study specific aspects of a future large telescope. Although the work packages remain to be formally agreed, they are expected to cover such issues as top level science requirements, optical designs and adaptive optics, mechanical design and control aspects. Potential operational issues, such as instrument requirements, site selection and day to day operations and maintenance will also be have to be considered to demonstrate the practicality of this exciting concept. The meeting is being organised by the OPTCION ELT working group which is chaired by Dr Roberto Gilmozzi of ESO.

Elite Fellowships

An EC contract to study the feasibility of an elite fellowship scheme was started last September under the leadership of Prof. Piero Benvenuti (pbenevnu@eso.org). At present the activity is concentrated on comparisons of existing fellowship schemes and considering the details of implementing such a scheme in the wider European context.

For up to date information on these meetings, or for details of any of the other OPTICON activities, please visit our web site or contact Dr John Davies at jkd@roe.ac.uk

John Davies

RadioNET News

The second annual General Meeting of the RadioNET partners was held at the Jodrell Bank Observatory near Manchester, UK on 23 November 2001. In an interesting and full day, delegates heard reports on the activities supported by RadioNET, and were given a presentation on the prospects for the 6th Framework Programme by Panayotis Moschopoulos (see elsewhere in this Newsletter). The RadioNET programme as a whole was presented in the last EAS Newsletter. Here is a brief summary of the main points discussed at the General Meeting.

i) *EVN reliability.* A summary of the co-ordinated activity across the EVN was given by the chairman of the EVN Technical and Operations Group, Michael Garrett. A very useful Workshop on tape recorder maintenance and check-out procedures had been held at the Effelsberg Telescope in Germany in July 2001. The concept of the EVN Reliability Index (ERI) was introduced for the first time; it provides a quantitative measure of the fraction of usable data going to the astronomer compared to the ideal situation. Comments on this report were made by the partners and by two Users, Maria Marcha and Andrea Tarchi who have been supported by the Access contract. Both showed exciting results obtained with the EVN.

ii) *EVN-2010.* Progress in developing concepts for next generation data transport systems for the EVN were reported. This included a short-term solution based on PC harddisks to directly replace the tape recorders and, on the longer term, the transport of radio astronomy data along the national and European optical fibre networks from the telescopes directly to the data processor in the Netherlands. This holds the exciting prospect of creating an «on-line telescope» as large as Europe.

iii) *EVN School 2001.* A report was given on the successful EVN School held in September in Italy and co-sponsored by the NATO Summer School programme. About 40 students and 15 lecturers spent 10 days examining the scientific and technical aspects of high angular resolution observations for astronomy and geodesy.

iv) *ALMA activities.* Reports were given on the Grenoble workshop on array configuration design. The European concept from one of the RadioNET partners, Onsala Space Observatory, has since been adopted by the project (see ALMA Memo 348 by John Conway).

v) *SKA activities.* A brief summary of the SKA science meeting in Berkeley (July 2001) was given
www.skatelescope.org/skaberkeley/
and preparations for the High Resolution SKA workshop (Bonn, December 2001) and the SKA science symposium in Bologna (January 2002) discussed.

vi) *Relations with OPTICON.* The first «Round Table» meeting held during the JENAM conference in Munich in September was judged to have been very useful in informing the wider astronomical community of the activities in both ICNs, and in particular the status and timescales of the major new instruments planned in the Radio and Optical/IR communities. It was decided to make these Round Tables an annual event.

Since the Manchester meeting, the two SKA workshops mentioned above have been held, the first in Bonn to set out the science case for high angular resolution with the SKA (www.EUSKA.org), and a wider SKA science meeting in Bologna (www.ira.bo.cnr.it/~skawork/) at which the case was further refined. It is expected that a revised science document on the SKA will be issued during the year. In addition the European SKA Consortium is preparing a strawman technical design based on the flat phased-array panels developed by ASTRON in The Netherlands for consideration by the International SKA Steering Committee in August. Finally, funding has been allocated within RadioNET for configuration studies of the SKA.

RadioNET supported the travel of a number of participants in a meeting in Paris in February 2002 to discuss European coordination of a Regional Support Centre (RSC) for ALMA, i.e. a centre to assist users of ALMA in the generation of their proposals, the reduction of the data, and to provide access to the ALMA archive. The conclusion was that an RSC was required to enable full European exploitation of ALMA. A call for proposals for hosting an RSC will be issued in mid-2002.

Richard Schilizzi, RadioNET Coordinator

News from ESO

Major developments are taking place at ESO on many fronts. The United Kingdom will become the tenth member on 1 July 2002, pending ratification by the British parliament, and exploratory talks are underway with other potential new members.

The VLT is now producing a stream of exciting new science results. All four of the 8-metre unit telescopes are operational, and the VLT's suite of instruments is rapidly being expanded from the original four, with NAOS/CONICA, VIMOS and FLAMES all in or near commissioning and several more still to come. There have already been extensive discussions about the second generation of VLT instruments. Installation and commissioning of the VLT interferometer (VLTI) have been similarly successful, using the test camera VINCI and now incorporating two of the 8-meter telescopes themselves. Development of the 1.8m Auxiliary Telescopes and the two new VLTI instruments AMBER and MIDI is well advanced. The innovative end-to-end mode of operations of the VLT has also proven successful, with well over half of all proposals requesting service observations.

More new instruments are also arriving at La Silla. The SEST has been equipped with a bolometer array SIMBA that has proved greatly in demand, and a new instrument (HARPS) will be installed on the 3.6m to pursue the search for extra-solar planets. Upgrades of current facilities continue to keep La Silla at the state of the art.

The new Residencia at Paranal Observatory has now been completed, relieving astronomers and workers from the containers they had used for years. The Residencia is a symbol of innovative architecture, blending into the unique landscape of Paranal. In Santiago the scientific life at the Vitacura centre has been reinvigorated, and a new office complex has been completed.

In the area of new projects, it is hoped that the construction phase of the Atacama Large Millimeter Array (ALMA), will be approved by the ESO Council at its meeting in early July. This will be ESO's next major project, following the VLT/VLTI, and is due for completion in 2011, with first scientific operations using a limited array planned for 2007.
Already being constructed for the 5000-meter high ALMA site Chajnantor is the Atacama Pathfinder Experiment (APEX), a 12-meter diameter submillimetre telescope that will be installed next year. It is a joint project with the Max-Planck-Institut fuer Radioastronomie (project leader) and the Onsala Space Observatory.

The VLT Survey Telescope (VST) is under construction and will be installed at Paranal within a year, along with its optical wide-field imager OmegaCAM. An infrared survey telescope VISTA is also being developed for Paranal and is due to be delivered in 2007.

For the longer term, ESO is carrying out a concept study for a revolutionary 100-meter diameter optical/infrared telescope, the «Overwhelmingly Large Telescope» (OWL). Much work is currently being done on the new technologies for this giant facility of the future. Another major project in which ESO is currently playing a leading role is the development of the Virtual Observatory concept.

Details on all of the above developments and much more can be found on the ESO website http://www.eso.org, in ESO's quarterly publication The Messenger, and in numerous press releases.

Peter Shaver

JAD gathers momentum

The European Physical Society and the European Astronomical Society are together home for their Joint Astrophysics Division (JAD), a forum for bringing astronomers and physicists together to discuss their separate and joint studies of the astrophysical Universe. The JAD is still in its building stage, despite some clear open manifestations which have attracted attention such as the ESA-CERN workshop on «Fundamental physics in Space and related topics» in April 2000, and the preparation of the special issue of EuroPhysics News on «Physics and the Universe» which came out as 32/6 in 2001.

The JAD board met twice in 2001, in May at Gran Sasso, and in December at ESO (Garching). It is trying to put JAD on the map, The Board meets at the different large facilities in the multidisciplinary field covered by the Division, with each time a colloquium on an adjacent day. Our 2002 meeting will be in Pisa at the **VIRGO** offices in September.

The board (still constituted by co-option!) has faithful and active members but some others have manifested no interest during the past three years. Three of the latter ones have been removed and two new members have been co-opted (solar physics and astroparticle physics). We have recently removed one and co-opted three more in order to get a good participation from the UK, which disappeared with one of the members moving from the UK to Germany. Current board members are: Daniel Enard, Aurelio Grillo, Martin Huber, Maurice Jacob (Chairman), Hinrich Meyer, Alvaro de Rujula, Gerhard Schaefer, Bernard Schutz, Jean-Pierre Swings (Secretary), Martial Ducloy (President EPS), Harvey Butcher (President EAS), both ex officio, Jan Kuijpers, Eckart Lorenz, Michel Spiro, Gustav Tammann, Juan Perez-Mercader, B. Fleck, J. Silk and D. Wark.

The JAD has now two active Sections

The Solar Physics Section (Chair, Jan Kuijpers) has been active for many years and does not need any

introduction. It held a conference in Prague in June 2000 and is prepares its next conference in 2002.

The Gravitational Physics Section was created in 2001. It now already counts close to 90 registered members (who were encouraged to become a member of either the EPS or the EAS if not yet the case). A board meeting was organized during the JENAM 2001 conference in Munich. This saw the election of the Chairman (Chair G. Schäfer) and the secretary (K. Kokkotas). A home page now exists and reports are planned for forthcoming EuroPhysics News and EAS Newsletters. The board is considering conferences in 2002 and 2003.

We are trying to set up in 2002 an Astroparticle Physics Section. H. Meyer is contacting possible board members.

Once three sections are operating on a regular basis (let us hope by 2004) we would propose that the formative stage should be considered as completed and the regular renewal of the JAD board could then proceed accordingly through the standard procedure.

JAD will participate in EPS-12 with one plenary talk on Gravitation Physics (G.Shäfer) and a 3 hour symposium. In the latter, three themes will be addressed: The microwave radiation background, X-Ray astronomy and Astroseismology. They are respectively under the responsability of J.P. Swings, M. Huber and J. Kuijpers.

The board has now link persons with the Plasma Physics Division (J.Kuijpers) and with the Atomic, Molecular and Optical Physics Division (J.P. Swings and B. Schutz) of the EPS.

JAD would like to establish a prize in the domain which it covers and which would be attributed every other year. We have already a name «the Auger prize», and are still looking for a sponsor.

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Maurice Jacob, JAD Chairman
Harvey Butcher, EAS President

WHO IS WHO IN THE EAS COUNCIL

Anatol Cherepashchuk
Vice-President of EAS

Prof. Dr., Corresponding Member of the Russian Academy of Science Anatol Cherepashchuk graduated from the Moscow State University (MSU), department of physics, in 1964. He received his Ph.D. in 1967 from MSU. Since 1976 he has been the head of the Stellar Astrophysics department in Sternberg Astronomical Institute (SAI), and since 1986 he has been the SAI director. His areas of expertise are stellar astrophysics and close binary stars.

EAS AND EAAS

As a vice-president of the European Astronomical Society (EAS) I am fully supporting the activity program published by our President Prof. Harvey Butcher in the latest issue of EAS Newsletter (Issue 22, December 2001). I would like only to supplement the part which covers improving the flow of information across the continent. This part is especially important for the countries of the former Soviet Union. In the result of complicated political and economical processes, astronomers in these countries have found themselves in a very difficult condition. Under these conditions, EAS maintenance would be higly urgent and helpful for them.

10 years ago there was a constituent congress of the Euro-Asian Astronomical Society (EAAS) at the Lomonosov Moscow University. This society counts over 800 members from all countries of the former Soviet Union and cooperates tightly with EAS. The society takes an active part in holding scientific conferences at different levels, including JENAM-2000 that was conducted in Moscow. The society provides information that supports astronomers from Russia and all countries of the former USSR, is involved in active science popularization work. Questions as to how to teach astronomy at schools and universities are discussed, problems connected with preparation of specialists in astronomy are considered with the assistance of the society.

Relations between EAAS and EAS enrich and enlarge the scope of astronomers in the former Soviet Union. I consider enlargement and intensification of these relations to be among the basic goals for me to work for.

Anatol Cherepashchuk

ESO-CERN-ESA Symposium

There have been joint CERN-ESO symposiums in the past and, two years ago, the first ESA-CERN workshop took place. This year saw the first symposium jointly organized by the three organizations, ESO, CERN and ESA. It took place in Garching/Munich on 4-7 March and brought together about 200 participants. The proceedings will be published by Springer-Verlag. In this report I present a few of the highlights.

In the first talk, N. Turok proposed a universe with a succession of big bangs and big crunches. After presenting the different contributions to Omega, with a global value of one (a flat universe) implied by the recent observation of the first three acoustic peaks in the angular analysis of the CMB, Turok stressed that each particular measurement has little value by itself unless it is assessed within a particular theoretical framework, a framework which we should keep challenging despite the impressive convergence of the values found for all the global parameters.

P. de Bernardis reviewed the experimental properties of the CMB. Whereas the key result is the flatness of the universe, the second and third acoustic peaks allow one to pin down the baryonic density (5%) and the scale independence property of the temperature fluctuations. It was however stressed that present measurements were made with very limited sky coverage only. This will much extend with MAP and culminate with PLANCK, the polarization of the CMB being also measured.

B. Leibundgut showed how the observation of 27 type Ia supernovae at low redshift (z) builds confidence that they are reliable distance indicators, but that 54 distant supernovae (0.3 <z <1) look fainter than they should according to the standard Hubble expansion, and this by 2.5 standard deviations. If taken at face value, this could result from a vacuum energy density of 0.7, which, taken as a cosmological constant, now accelerates the expansion but, in the distant past, when the matter density was higher, one should have had a deceleration.

Y. Mellier reviewed the matter density, finding good agreement among six different teams with a relation between matter and vacuum densities. When combined with the other relation coming independently from the analysis of the CMB, the value of the matter density is pinned down around 0.3 whereas that of the vacuum density is found to be around 0.7.

L. Krauss and later A. Vilenkin also noted that the global parameters with different measurements are in good agreement, but why are all these parameters that way? Why has the cosmological constant such a «peculiar» value (so tiny as compared to the Planck scale), with a vacuum energy density now so close to the matter density? Vilenkin raised the possibility that our visible universe, where the initial inflation has long stopped, could be but a tiny piece of a super large universe where inflation is still going strong in some other regions!

Direct searches for dark matter were reviewed by C. Tao. After recalling the evidence provided by the rotation curves of galaxies, she explained how gravitational lensing has found insufficient MACHOs to provide what was needed. WHIMPs (predicted by SUSY as stable neutralinos) have been extensively looked for in underground experiments but so far to no clear avail. An axion search at CERN using an LHC magnet (CAST) was described by G. Raffelt. And whereas neutrinos are now known to have non-zero mass, they are no longer considered as providing an appreciable contribution to dark matter (P. Hernandez).

E.P.G. van den Heuvel reviewed Gamma ray bursts, now known as the most powerful of cosmic explosions and which occur at a rate of one per day with the energy output (usually beamed) may reach that of a million supernovae. A. Watson reviewed the rare, highest energy cosmic rays, where the key question is the observation of a few events (AGASA) above 10**11 GeV, an energy where they should be stopped by the CMB (GZK cutoff). Their occurrence is very puzzling and one can but hope that more experimental results will provide clues, possibly with the AUGER project on the ground and, later, with the EUSO project on the ISS. If the flux continues to only gently drop with increasing energies, several thousands of events should thus be seen. For high-energy neutrinos, non-negligible rates call for very large detectors such as the ICE CUBE (1 Km cube) neutrino detector deep under the south pole ice. It will extend by a factor 1000 the detection rate of the AMANDA experiment. Large present projects, deep under water (such as ANTARES), are complementary.

Gravitational waves (reviewed by B. Schutz) carry huge energies but interact very weakly, crossing the universe while almost unperturbed. The merging of two black holes of a million solar masses at z=1 would give an amplitude 5 orders of magnitude higher than the detection threshold of LISA. There is complementarity between planned detectors on the ground (frequencies above 10 Hz) and detectors in space (set at frequencies below 0.1 Hz).

The Symposium also addressed the study of planets and planet formation. E. van Dishoeck discussed the formation of a star and planetary system and M. Mayor reported that more than 80 extra solar planets have already been seen, including one with no more than about 50 times the mass of the earth. M. Perryman showed how missions under study could make it possible to search for Earth-like planets. One could tentatively expect one Earth-like planet for a thousand stars but many conditions are needed to make life possible on it. He defined a «habitable zone» but also stressing its needed continuity over a few billions of years, this implying the protection of a «Jupiter» against big collisions.

The last afternoon started with instructive and authoritative presentations of future perspectives at ESA, CERN and ESO. The concept of «recognized experiments» has been introduced at CERN, through which collaborations with approved experiments in astroparticle physics can use CERN as a base. The first ones were AMS, AUGER and LISA and several have followed. C. Cesarsky, DG of ESO, described new projects in the visible and in the infrared, with the ALMA array coming up as an ESO-US project and OWL, a 100 metre optical/infrared telescope, being designed.

M. Rees provided a brilliant finale for this very interesting symposium. First discussing the great recent findings and, in particular, the measurement of the «Big Bang numbers», he could not avoid wondering who ordered that mixture? It would be impossible to properly summarize all the challenges (in theoretical physics, in astrophysics and in the formation of early structures in the universe) that he masterly surveyed. Was there only one Big Bang and why that one?

Thanks to the symposium secretariat (B. Skörberg and Ch. Stoffer) and to H. Kuntschner and his team.

M. Jacob, Chairman of JAD

Message from the Treasury

EAS Travel Grants 2001

The Grant programme of EAS has been a great success and we are happy that we can help at least some of our younger colleagues to attend our meetings in various countries. As in previous years, EAS gave a number of travel grants to participants of the JENAM 2001 in Munich. We got many more grant applications than we were able to accomodate, so unfortunately we had to disappoint several, who could not attend because of financial reasons.

A total of 8.000 CHF was given to participants after selection by the Scientific Organisers of the Mini-symposia and Joint Discussions. EAS does its best to give the grants to a variety of nationalities, and finds it important that a balance in gender distribution is respected. Part of the grant money is earmarked for participants from Eastern Europe.

We are pleased to announce that support could be given to the following 15 colleagues:

Stéphanie Charpinet	France
Svitlana Chornogor	Ukraine
Miguel de Avillez	Portugal
Olga Ezhkova	Uzbekistan
Vera Godunova	Ukraine
Dana Kovaleva	Russia
Valery Kryvodubskyj	Ukraine
Pierre Maxted	UK
Alla Miroshnichenko	Ukraine
Davis Montes	Spain
Eduard Pittich	Slovakia
Nina Solovaya	Slovak Rep.
Vladimir Tarady	Ukraine
Oleg Verkhodanov	Russia
Natalia Verkhodanova	Russia

In connection with the announcement of JENAM2002 we will publish the detailed rules for how EAS grants are given as well as the application form.

Birgitta Nordstrøm, EAS Treasurer

The EAS Affiliated Societies

The Portuguese Astronomical Society

The Portuguese Astronomical Society (SPA) was created in December 1999. It is a Scientific Society founded with the central goal of uniting the young and still small community of Portuguese Astronomers. It presently includes 75 members, of which 66 are effective members, that is, those who actively do research in the field of Astronomy. About 90% of SPA's effective members are below 40 years old, which clearly shows how young is the Portuguese astronomical community. The society is still growing very fast, with new effective members joining every year.

Portugal has a long history in Astronomy, in particular as a result of the importance that this science had for the navigators. In modern times, however, only very recently has Astrophysics started its development in the country. As a sign of the changes over the last 15 years, the community has grown over this period from a few (less than ten) to more than 60 researchers with a Ph.D. in Astronomy. This development happened mainly as a consequence of the Portuguese participation in international institutions, namely the European Southern Observatory (a cooperation agreement was signed in 1990, and Portugal became a full member in 2000), and more recently, the European Space Agency (in 2001). The root of this development was a strong national investment, since the late eighties, in training young graduates in Astronomy. Many of these graduates have conducted their doctoral work abroad, in other European countries. Some of these are still working abroad (about 30% work outside Portugal), but most of the members of SPA are now integrated in one of the research centres created in Portugal in the last 15 years. The financial effort was directly provided by the portuguese government who had the will to build a competitive community, at the international level, in this field.

In 1991 the first National Meeting for Astronomy and Astrophysics was organized in Porto. Since then the task of organizing this Meeting rotates through the different institutions interested in Astronomy and Astrophysics research. The 2002 edition will be the 12th. SPA has inherited the task of ensuring that the National Meeting is organized every year, by working in close collaboration with the host institute. This annual meeting has grown in size every year, with the scientific importance also steadily increasing.

As a result of the way in which the community has grown, portuguese astronomers have very strong links to many institutions in Europe and in the United States, with whom they maintain strong collaborations. A sustained investment by Portugal in Science in general, and in Astronomy in particular, will hopefully allow Portugal to reach the european level in the numbers of Astronomers per active population. That would correspond to a further growth of about 100% relatively to the present numbers.

The SPA has joined the European Astronomical Society (EAS) in 2001, as an affiliated society, in a move to further strengthen our links with european colleagues. For a small community such as ours it is important to reinforce the visibility and the institutional links. After joining the EAS, and following the proposal by its president at the time – Prof. Jean-Paul Zahn – the SPA has accepted the task of organizing the Joint European and National Astronomical Meeting for 2002. In spite of SPA's small size, such an opportunity provides a unique way to present ourselves to our european colleagues, and hopefully mark a new phase of maturity for Portuguese Astronomy.

Mario Monteiro
SPA, Portugal

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Joint European and National Astronomical Meeting for 2002

J E N A M – 2002

11^{th} European and 12^{th} National Meeting for Astronomy and Astrophysics

2002 September 2-7, Porto, Portugal

Second Announcement

The Unsolved Universe: Challenges for the Future

The 11^{th} *Meeting of the European Astronomical Society* (**EAS**) will take place in Porto, Portugal, jointly with the 12^{th} *National Meeting for Astronomy and Astrophysics of the Portuguese Astronomical Society* (**SPA**). The Centre for Astrophysics of the University of Porto (**CAUP**) hosts the meeting.

Programme:

- Plenary Sessions: Reviews + Highlight Talks
- Workshops:

  WS-VLTI: **The Very Large Telescope Interferometer: Challenges for the Future**

  WS-HRD: **GAIA and DIVA Photometry: Towards the Fine Structure of the HR-Diagram?**

  WS-JETS: **Jets 2002: Theory and Observations in YSOs**

  WS-ISM: **From Observations to Self-Consistent Modelling of the ISM in Galaxies**

  WS-GD: **Galactic Dynamics**

  WS-GE: **Galaxy Evolution in groups and Clusters**

  WS-HCP: **3K, SN's, Clusters: Hunting the Cosmological Parameters with Precision Cosmology**

  WS-VFC: **The Cosmology of Extra Dimensions and Varying Fundamental Constants**
- General Assemblies: EAS + SPA

Important Deadlines:

Submission of Abstracts:	May 31 (Oral Contributions)	and	June 15 (Posters)
Application for support:	May 31		
Registration:	June 15 (early)	and	August 15 (late)
Hotel Reservation:	June 15		
Optional Social Programme:	July 15		

Contact address:

Please visit the website of the JENAM for the details and the registration forms.

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See you in Porto!