Hipparchos

The Hellenic Astronomical Society Newsletter

Hellenic Astronomical Society

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Message from the President

Dear friends and colleagues,

These last months I feel a great elation, since my worries about the future of our Society have disappeared during and after the days of the 6th HelAS Conference in September. For the first time since I was elected in this position I found myself at Penteli in an environment scientifically serious and optimistic. This conference had a small number of first class and internationally recognized foreign invited speakers. The majority of the papers presented during the three days of the meeting was excellent and the dome of the Newall telescope was plastered with a variety of interesting poster papers. The Secretary Dr. K. Tsinganos with the help of the conveners of the eight sessions present elsewhere in this Newsletter a review of the scientific highlights of our conference.

The second reason that I feel happy these days is the fact that many promising young students attended the proceedings of this conference, and this put an end at the pessimism I expressed just one year ago from this column about the future of our Society. Many undergraduate and graduate students from Universities all over Greece, participated actively and shared their vitality with the rest of us lowering the age average of our Society. We have the moral obligation to help these young people that are so enthusiastic about Astronomy and Astrophysics to pursue their careers in Greece or abroad. We all know very well that there is not a promising job market in these Sciences, but I feel that this is true for any science! Thus, let them at least study what they are happy to do. Keep in contact with them and persuade them to become junior members of our Society. From our part, the Governing Council of HelAS is working together with the new National Committee for Astronomy (Chairman Professor John Seiradakis) for the benefit of Astronomy and Astrophysics in our country.

Finally, many members of HelAS paid their long dues to the Society or have arranged to do so in installments, giving us the means to fulfill our financial obligations for the coming year.

During this conference my proposition for the place of the next (7th) HelAS Conference (2005) has been unanimously accepted and Dr. N. Solomos will be responsible for the local organization of the conference in the historical and attractive Ionian island of Cefallonia.

It is clearly seen that our Newsletter, "Hipparchos", has changed a lot in the last issues increasing the number of pages and their appearance. But, as any scientific journal, it needs your articles. Articles that are dealing with Astronomical facilities and Institutions in Greece and their progress, as well as with breaking news on the recent development in Astronomy and Astrophysics. I urge you to come forward with your writings and to contact either our Secretary or our Editor, Dr. M. Plionis.

Also, our electronic Newsletter is e-mailed to our members at the beginning of each month with a brief update on short news, new appointments, research opportunities, awards, conferences in Greece, etc. Again, I urge you to contact its editors, Prof. K. Tsinganos and Dr V. Charmandaris, and send your announcements.

Wishing to you all the happiness for the coming Christmas and a healthy and scientifically productive New Year.

Professor Paul G. Laskarides

Inside this issue:

1. SIRTF is finally in space...

In the early morning hours of August 25, 2003, the Space InfraRed Telescope Facility (SIRTF), mounted at the top of a Delta II rocket, was successfully launched into space from Cape Canaveral. SIRTF follows Compton, Hubble, and Chandra as NASA's last *Great Observatory*. The telescope has a primary mirror 85cm in diameter and it is the largest infrared telescope ever placed into space. Its inception was triggered nearly 20 years ago when in 1983 IRAS, the Infrared Astronomical Satellite of NASA, revealed for the first time how essential the study of the infrared emission was in understanding the physics of most regions of the Universe. IRAS showed that due to the presence of dust the majority of the extragalactic sources as well as many Galactic sources emit a large fraction of their energy in the mid- and far-infrared. Up until that time it had not been fully appreciated that even though dust grains constitute less than one hundredth of the mass of the interstellar medium, they play a crucial role in heating the gas and selectively absorbing the emission of stellar light. After several years of planning and many modifications due to budget constrains the current design of SIRTF was finalized. SIRTF now houses three instruments; two cameras (IRAC and MIPS) and a spectrograph (IRS). IRAC is a mid-infrared camera built by Harvard University and it can provide imaging at 3.6, 4.5, 5.8 and 8 microns. MIPS is a far-infrared camera built by the Univ. of Arizona, and samples the 24, 70 and 160micron emission. IRS is the infrared spectrograph constructed by Cornell University, and it can be used for low and high resolution spectroscopy between 5 and 40 microns, as well as for 15 & 22 micron imaging.

One of the most important advantages of SIRTF, when compared with other infrared instrument that have been available to date, is its superb sensitivity. Observing from space provides a background nearly a million times lower in the infrared than from any ground observatory. Furthermore, improvements in infrared detectors of the past decade have made SIRTF nearly 100 times more sensitive than the Infrared Space Observatory (ISO), a similar mission of the European Space Agency which ended in 1998. Since the telescope and its instruments need to be cooled to ~5 degrees Kelvin by evaporating liquid He, the lifetime of the mission will be determined by the He supply. Nominal operations would result in a lifetime of 5 to 6yrs. As a comparison IRAS lasted less than a year and ISO just over 2. Unlike other satellites SIRTF is in heliocentric orbit, trailing the earth while it is revolving around the sun. Since it is slightly further away from the Sun than the Earth is, it is gradually left behind the Earth. In ~5yrs it will be 1AU away from the Earth and in ~60yrs, long after the end of the mission, the Earth will ''catch up'' again with the satellite. The advantage of this orbit is that the telescope does not pass in an out the van Allen belts where the effects of cosmic rays are stronger. Furthermore, since it is further away from the Earth it can perform continuous deep observations for longer periods than if it were in a geocentric orbit. For the first three months of the mission, the performance of the spacecraft and the telescope will be tested and characterized. Normal science operations are expected to begin at the end of November 2003.

The science objectives or SIRTF are diverse. From the formation of planets, debris disks and protostellar objects, to evidence for the presence of supermassive black holes in galaxies, as well as studies of the evolution of distant galaxies found in deep cosmological surveys. A number or guaranteed time observations of the three instrument teams, along with 6 large *Legacy* projects, have already been planned. However, open time observers from any country may also request to use the telescope during the first call of proposals, which is set for mid February 2004. The ability of the infrared radiation to probe through the most obscured regions of the Universe and to reveal the physical mechanisms that responsible for their properties, makes SIRTF an ideal tool for the astronomical community.

Dr. Vassilis Charmandaris, Cornell University

For more information visit the SIRTF web site at: http://sirtf.caltech.edu. Two more articles on SIRTF and the IR emission are available (only in Greek) in the online journal "Cosmic Pathways'' of the National Observatory of Athens.

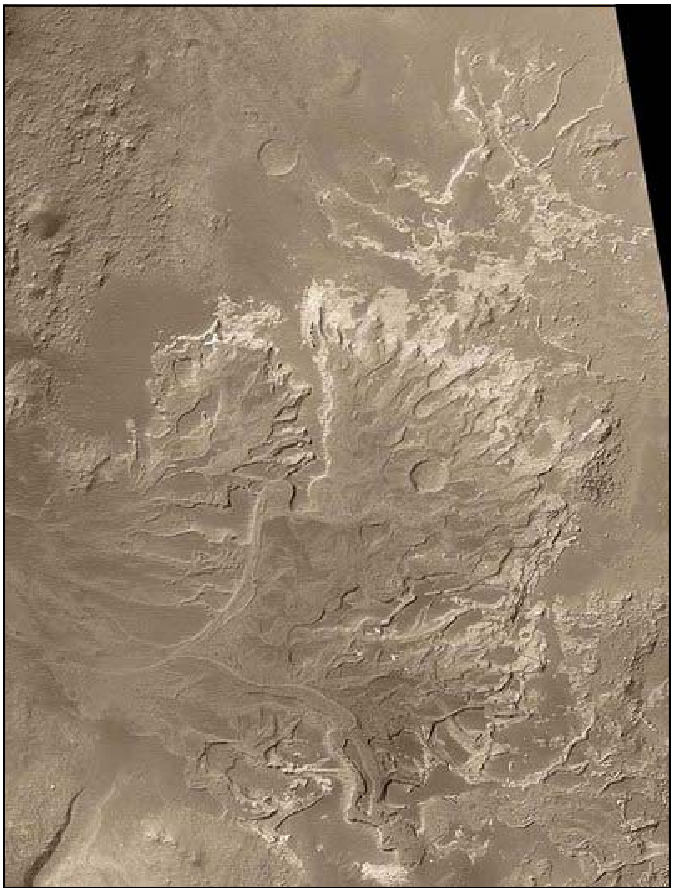
The launch of Delta II carrying SIRTF.

2. New Evidence Suggests Ancient Rivers in Mars were Present.

One of the long-standing debates regarding our neighboring planet Mars, is whether in its distant past it had long-lasting rivers or just brief, intense floods. New evidence from NASA's Mars Global Surveyor orbiter suggest that the former is the case. The careful analysis of photographs show the existence of eroded ancient deposits of sedimental rock in curved formations, appearing like river deltas. These curves are interpreted as traces of ancient meanders produced as flowing water changed its course over time and also suggest the existence of lakes to which the rivers would flow, producing delta-like formations.

"*Meanders are key, unequivocal evidence that some valleys on early Mars held persistent flows of water over considerable periods of time*," said Dr. Michael Malin, which supplied and operates the spacecraft's Mars Orbiter Camera. While, Dr. Jim Garvin, NASA's Lead Scientist for Mars Exploration, commented that "*This latest discovery by the intrepid Mars Global Surveyor is our first definitive evidence of persistent surface water*"

From NASA news



A photograph from Mars Global Surveyor camera showing the Delta-like formation.

3. Plasma Astrophysics Group PLATONS

The Plasma Astrophysics Group PLATONS (Plasma Astrophysics: Theory, Observations, Numerical Simulations (http://www.physics.uoc.gr/~tsingan/) at the section of Astrophysics, Astronomy and Mechanics (AAM) of the University of Athens, has been enlarged recently. Nektarios Vlahakis has been elected a faculty member in the Dept. and joined the Section of AAM in the spring of 2003 after spending three years as a Fermi/McCormick fellow at the Dept. of Astronomy and Astrophysics of the University of Chicago and the E. Fermi Institute. Also, the following foreign scientists have recently arrived :

Fabrice Portier-Fozzani, who was a a post-doc at the Max Planck Institut für Aeronomie in Lindau, Germany and is an expert on image processing and 3D Solar Physics, coronal MHD structures, the STEREO mission, SOHO/EIT and multi-instrument observations and analysis, joined the group in November 2003.

Darren O'Brien, who received his Physics diploma from the National University of Ireland Galway and is working for his PhD in the University of Porto in Portugal on the temperature and ionization state of T Tauri microjets and the astrophysics of young stars, joined the group in November 2003.

Jose Gracia, who was a postdoctoral fellow in the Theory Group at Landessternwarte Heidelberg, Germany and is an expert on the astrophysics of accretion in black holes, numerical simulations of bimodal accretion flows, quasi-periodic oscillations, spectral modeling of X-ray binaries, parallel computing and code development, joined the group in December 2003.

Prof. K.Tsinganos, University of Athens

4. Laboratory of Archaeometry

A laboratory of Archaeometry exists in the University of the Aegean, situated in the island of Rhodes. Active research is been pursued on the Archeoastronomical orientation of ancient and prehistoric temples in South-East Mediterranean, while the research interests extend on developing specialized software for astronomical orientation and on archeological verification of mythological accounts. Furthermore, archeoastronomy as well as the concept of time are taught, since 1999, in the Department of Mediterranean studies of the University of the Aegean.

Prof. Ioannis Lyritzis, Univ. of the Aegean

5. The BLAST test flight

The Balloon-borne Large Aperture Submillimetre Telescope (BLAST) is a NASA funded experiment that will conduct confusion-limited extragalactic and Galactic surveys at 250, 350 and 500 microns with a 2-m telesc-

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The 6th Hellenic Astronomical Society Conference, Penteli, September 11-15, 2003

During the period September 15-17th, 2003 the Hel.A.S organised its ***6th Hellenic Astronomical Conference*** at the National Observatory of Athens, in Penteli with the participation of 138 participants from Greece and other 10 countries. The President and Hon. President of HelAS, Prof. P. Laskarides and Academician G. Contopoulos, respectively, made some opening remarks, followed by the Vice-rector of the Univ. of Athens, Prof. D. Asimakopoulos who complemented the work of the Univ. of Athens members of HelAS and promised that the Un. of Athens will print the Proceedings of the conference. The HelAS invited speakers presented excellent review talks at the beginning of the corresponding session: E.N. Parker on MHD Discontinuities and X-ray Coronae in Astrophysics, S. Wagner on the variability of AGN and Quasars via multiwavelength observations, J. Kirk on relativistic flows and particle acceleration and P. Grosbol on what can we learn from near-infrared observations of spiral galaxies. The selected session main invited discourses were also characterized by originality, while most of the contributions and posters were at the cutting edge of research in modern Astronomy and Astrophysics. During the Conference a total of 163 papers were presented. The "HelAS Invited", "Session Main", "Contributed" and "Poster" papers were distributed among the various fields as follows:

- Sun and the Heliosphere (1, 3, 14, 15)
- Solar and Stellar Astrophysics (-, 2, 5, 16)
- Extragalactic Astronomy (1, 3, 10, 5)
- High Energy Astrophysics (1, 1, 10, 5)
- Cosmology, Relativity & Relativistic Astrophysics (-, 2, 10, -)
- Galactic Dynamics and Chaotic Dynamical Systems (-, 2, 4, 12)
- Astronomy Infrastructure in Greece (1, -, 12, 7)
- History and Teaching of Astronomy (-, 1, 9, 11)

Highlights of the Sessions:

The **Sun and Heliosphere** session had the honour to open with the plenary lecture of Prof. Eugene Parker, who addressed the role of magnetic discontinuities in the formation of Solar and Stellar coronae. His talk was followed by the three invited talks of the session. The first invited talk covered the observational constrains on nano-flare heating and the attempts to model the micro-flare activity. The second talk reviewed the ongoing efforts to develop reduced models of the magnetospheric dynamics, with the aim of achieving reliable numerical forecast models. The third invited talk addressed solar-planetary interaction in the specific case of the interaction between the solar wind and the Hermean magnetosphere, as studied by a newly developed hybrid model, in view of the upcoming cornerstone mission of ESA to Mercury. Several contributed talks covered a variety of topics ranging from umbra flashes, the role of spicules in the energy balance of the solar atmosphere, MHD modelling of coronal loops and their stability, to particle acceleration at the sun, in the interplanetary medium and in the terrestrial magnetosphere. The posters also touched many interesting topics, such as helicity diagnostics for solar activity, the properties of solar spicules, the Kelvin-Helmholtz instability of the vortex flows around the magnetic flux tubes, cosmic ray modulation in the heliosphere, interplanetary shock acceleration, etc.

Academician G.Contopoulos discussing with Prof. J.Ventura (Univ. of Crete) during one of the conference intervals. Prof. N.Spyrou (Univ. of Thessaloniki) and Dr. C.Chagas (Univ. of Cape Town) can be seen at a distance.

The session on **Stars and Stellar Systems** had two main session invited talks and four contributed talks. The first invited talk was on jets from young low mass stars as they evolve towards the main sequence and discussed various results obtained from different MHD solutions from disks and stellar jets, while the second discussed the technique of spectro-astrometry and high –spatial/spectral resolution spectroscopy on large telescopes. With this technique gaps in disks and new binaries have been discovered and evidence has been found which support fragmentation as a binary formation mechanism. The contributed talks covered theoretical (gravity distribution on Roche lobes) and observational (CCD photometry) work on close binary systems. In another paper the authors presented the work they have done in order to produce a reference-library colour-colour and colour –magnitude diagrams in the IR, which have been used to investigate the various stellar populations in galaxies.

The **Extragalactic Astronomy** session opened with a plenary talk by Stefan Wagner on the subject of

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International Conference "*Multiwavelength Cosmology*", Mykonos, June 17-20, 2003.

Cosmology, the science of dealing with the origin, nature and nowadays the evolution of the Universe, is as old as human civilization. It is to the human nature the search for an understanding and comprehension of the mysteries of the Universe within which we live and flourish, unfortunately however which we also destroy and kill for vanity and profit.

The recent scientific efforts have brought a revolution on our understanding of the *Cosmos*. Amazing results is the outcome of amazing experiments! The huge scientific, technological & financial effort that has gone into building the 10m class telescopes as well as many space and balloon observatories, essential to observe the multitude of cosmic phenomena in their manifestations at different wavelengths, from γ-rays to the millimetre and the radio, has given and is still giving its fruits of knowledge.

Many of the recent scientific achievements in Observational and Theoretical Cosmology were presented in our ``***Multiwavelength Cosmology'*** conference, that took place in the beautiful Mykonos island of the Aegean between the 17th and the 20th of June 2003. More than 185 Cosmologists from all over the world gathered for a four-day meeting of intense discussions and debates on the recent exciting results from large ground based surveys (AAT/2-df, SLOAN) and important space missions, as NASA's X-ray mission Chandra, the European Space Agency mission XMM and the amazing Wilkinson Microwave Anisotropy Probe (WMAP) as well as ISO and HST, providing a huge impetus on our knowledge of the *Cosmos*.

The conference was devoted mostly on the constraints on Cosmological models and galaxy formation theories that arise from the study of the high-redshift Universe, the physical processes that take place in the largest cosmic laboratories the clusters of galaxies and their evolution, of the cosmic microwave background, the large-scale structure and star-formation history.

An interesting and depressing fact regarding the organization of the conference is that we had no support whatsoever from the Greek state although we did apply for financial support to 3 different ministries. If it wasn't for the financial support of the Instituto Nacional de Astrofísica, Optica y Electrónica of Mèxico this meeting would not have had the success it had. Furthermore, the local financial and other support that we had from the municipality of Mykonos and its Mayor, Mr. Christos Veronis, gave us the opportunity to present Greece as a hospitable, friendly and enjoyable place.

I would like to end this brief account of the meeting by quoting a few sentences from the closing summary talk of Professor Jim Peebles.

"In the next ten years multi-wavelength observations, including (in the words of a participant) ``millimeter, submillimeter and FIR observations with the imaging fidelity currently enjoyed by X-ray, optical, IR and radio astronomers" will produce an enormous increase in our knowledge of cosmic structure, and that is going to drive the development of exceedingly detailed models to relate the theory to the observations. The theory of choice will continue to be Λ-CDM, unless or until the observations drive us to something better. While waiting to see whether that happens a assignment for model builders is to develop a convincing case for how far they have gone beyond curve fitting.

After a major advance in a physical science, such as we have seen in the past decade in cosmology, there is the tendency to ask whether the subject has now reached completion, requiring only the ``addition of decimal places." You don't hear this talk among astronomers, and I wouldn't expect it to be on astronomers' minds in the coming decades, because there is no practical limit to the layers of detail one may study about things like the populations of stars, planetary systems, and civilizations that are communicating by radio broadcasts in the Milky Way, in the Magellanic clouds, and on out. We have good reason to expect the first decade of the 21st century will be remembered as a golden time for cosmology, but we can be sure there will be room for productive applications of multi-wavelength cosmology for decades to come."

Manolis Plionis,
IAA, National Observatory of Athens

Review Article: The New Cosmological Paradigm

By Spyros Basilakos, National Observatory of Athens

In the past decade, cosmology has had one of the most exciting periods in the last century. The precision with which we have been able to measure cosmological parameters has increased tremendously. Here, I review the recent measurements of the expansion rate, geometry, age, large scale structure formation, dark matter and equation of state (dark energy) of the Universe, and discuss implications for our understanding of the Universe as a whole. A decade ago, the uncertainties in the measurement of cosmological parameters were such that few definitive statements could be made regarding the validity of the different cosmological models. That situation has changed drastically and today all observables have converged to a single cosmological model. The simple ``Einstein-de Sitter" model, the preferred model of the previous millennium, is now dead. The model that has survived the test of the recent high-quality observations is rather complicated and it poses many questions for fundamental Physics.

Introduction:

Recent advances in observational cosmology have strongly indicated that we are living in a flat, homogeneous and isotropic on large scales, composed of radiation, ordinary matter (electrons, protons, neutrons and neutrinos), accelerating Universe with low matter (baryonic and dark matter) density (Perlmutter et al. 1999; Efstathiou et al. 2002; Spergel et al. 2003; Tegmark et al. 2003 and references therein). Galaxies and large-scale structure grew gravitationally from tiny, nearly scale-invariant adiabatic Gaussian fluctuations. The available high quality cosmological data (Type Ia supernovae, CMB, large scale structure, age of the globular clusters, high redshift galaxies) are well fitted by an emerging "standard model", which except for a small baryonic component, it contains non-baryonic cold dark matter (CDM) to explain the clustering of extragalactic sources and an extra component with negative pressure (what has been dubbed as "dark energy"), usually named "quintessence", to explain the inflationary flatness prediction $\Omega_{tot}=1$ as well.

The last few years there have been many theoretical speculations regarding the nature of the above exotic dark energy. Most claim that a time varying cosmological Λ–parameter (Ozer & Taha 1987), a scalar field which rolls down the potential $V(\varphi)$ (Ratra & Peebles 1988; Frieman et al. 1995 and references therein) or an extra "matter" component, which is described by an equation of state $P_x=w\,\rho_x$ where $-1\leq w<0$, could be possible candidates for quintessence. As a particular limiting case, the Λ-model can be obtained from quintessence models for $w=-1$. A recent theoretical study of Christos Tsagas (2001) gave a different perspective to the problem claiming that the effects of primordial magnetic fields could resemble those of dark energy through the coupling between magnetism and the curvature of space-time. Note that a variety of observations indicate that $w<-0.6$ for a flat Universe (Ettori, Tozzi & Rosati 2002; Basilakos & Plionis 2003 and references therein).

Dynamics-Expansion in the Universe:

For homogeneous and isotropic cosmologies, driven by non relativistic matter and an exotic fluid (quintessence models) with equation of state, $P_x=w\rho_x$ (where $-1\leq w<0$), the Einstein field equations are given by (Friedmann-Lemaitre):

$$\left(\frac{\dot{\alpha}}{a}\right)^2=\frac{8\pi G}{3}(\rho_m+\rho_x+\rho_k) \qquad (1)$$

$$\frac{\ddot{\alpha}}{\alpha}=-4\pi G\left[\left(w+\frac{1}{3}\right)\rho_x+\frac{1}{3}\rho_m\right] \qquad (2)$$

where α(t) is the scale factor of the Universe, $\rho_m\propto(1+z)^3$ is the matter density, $\rho_x\propto(1+z)^{3(1+w)}$ is the dark energy density and $\rho_k=(-k/\alpha^2)\propto(1+z)^2$ is the curvature density with $k=-1,0,1$ for an open, flat or closed Universe, respectively. Owing to the fact that the scale factor evolves according to Friedmann equation: $H^2=\dot{\alpha}^2/\alpha^2$, we can obtain the following important cosmological parameters:

$$\Omega_m(t)=\frac{8\pi G\rho_m}{3H^2}$$ (density parameter),

$$\Omega_x(t)=\frac{8\pi G\rho_x}{3H^2}$$ (dark energy parameter) and

$$\Omega_k(t)=\frac{8\pi G\rho_k}{3H^2}$$ (curvature parameter).

It is convenient to write the later equations as a function of redshift:

$$\Omega_m(z)=\frac{\Omega_m(1+z)^3}{E^2(z)},\quad \Omega_x(z)=\frac{\Omega_x(1+z)^{3(1+w)}}{E^2(z)},\quad \Omega_k(z)=\frac{\Omega_k(1+z)^2}{E^2(z)}$$

with $E^2(z)=\Omega_m(1+z)^3+\Omega_k(1+z)^2+\Omega_x(1+z)^{3(1+w)}$

which satisfy: $\Omega_m+\Omega_x=1-\Omega_k=\Omega_{tot}$ (Ω_m, Ω_k and Ω_x are the appropriate values at the present time). Based on the above we can define the *critical density* which is the density necessary to obtain a flat Universe:

$$\rho_{cr}=\frac{3H_0^2}{8\pi G}=1.88x10^{-29}h^2grcm^{-3}$$

where $H_o=100\ h$ *km/sec/Mpc* is the Hubble constant.

Note, that Λ-models can be described by quintessence models with w strictly equal to –1. While, if $w=0$ the equation of state behaves like that of pressureless matter. It is interesting to mention that different values of w could yield flat ($\Omega_k=0$) cosmological models for which there is not a one-to-one correspondence between the global geometry and the expansion of the Universe. Indeed, as an example, in a flat low Ω_m with $w=-1/3$ model, the functional form of the dark energy-density can be given by $\rho_x\propto(1+z)^2$. Therefore, the equation of state, $P_x=w\,\rho_x$, leads to the same expansion as in an

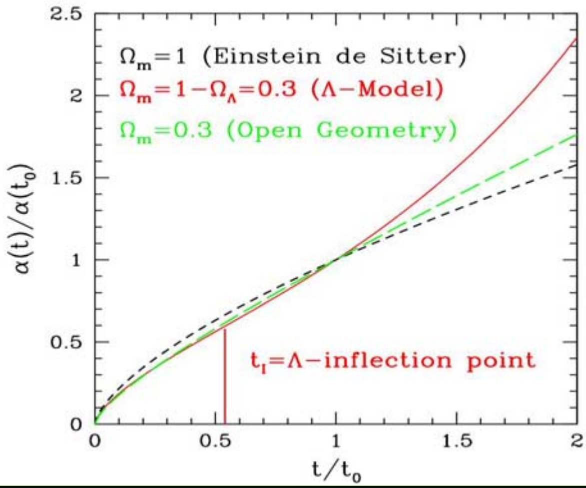

Figure 1: The expansion of the Universe in an Einstein de Sitter, in the preferred Λ-model and in on open Universe. We indicate the inflection point beyond which the expansion accelerates.

open Universe. In other words, the equation of state plays a similar role to the curvature, despite the fact that this quintessence model has a spatially flat geometry!! Also in the case of a flat low Ω_m model with $-1 \le w \le -1/3$ we have $\rho_x < \rho_m$, which means that the dark energy density falls off at a slower rate than cold dark matter. This is very important because the dark energy component starts to dominate the mass density in the Universe, especially at late times, thus creating an accelerating expansion. In these dark energy models (see Fig.1 for the Λ-case), there is an epoch which corresponds to a value of $\alpha=\alpha(t_I)$, where the expansion slows down and remains in a quasi-stationary phase for some time, expanding with $\ddot{a} > 0$. At the quasi-stationary epoch, called inflection point, we have $\ddot{\alpha}(t_I) = 0$. For epochs beyond the inflection point $t > t_I$, the expansion accelerates and the age of the Universe is larger than the Hubble time, H_o^{-1}.

The Cosmological Parameters:

The Geometry of the Universe and the value of Ω_{tot}:
The existence of the Cosmic Microwave Background (CMB) radiation, the relic radiation from the Big-Bang, was predicted by Gamow in the late 40's but it was eventually discovered by Penzias & Wilson in 1965. The CMB has a perfect black-body spectrum with a mean temperature of $T_o=2.728\pm0.004$ *K* and it is extremely isotropic, which means that the Cosmological principle has a concrete observational base. The temperature anisotropies of the CMB ($<\delta T/T> \sim 10^{-5}$) are quantified by expressing them as a spherical harmonic expansion and they play a key role in the determination of the curvature of the Universe. The basic idea is that a physical scale at the last-scattering surface will sustain a different angular scale on the observers plane, which depends on the curvature of space and involves straightforward physics. Indeed, up to the last scattering surface baryons were tightly coupled to photons; as they fell into the dark-matter potential wells the pressure of photons acted as a restoring force, which resulted in gravity driven acoustic oscillations (on sub-horizon scales). Only after recombination, at $z \approx 1100$, do the acoustic oscillations stop and the density fluctuations grow. The fluctuations emerging from the last scattering surface are a series of peaks and troughs and as the different wavelengths are projected to different angular scales on the last scattering surface (depending on the underlying cosmological model) they produce a characteristic structure of peaks on the CMB temperature fluctuation power spectrum. These oscillations can be decomposed into Fourier modes with $k \approx l H_o/2$, where k is the wave number and l is the corresponding multipole of the spherical harmonic expansion, which is related to angular scales by $\theta \sim l^{-1}$. Last scattering occurs over a short interval of time, and thus the CMB is a snapshot of the Universe when it was 300000 years old. We repeat that this method is in effect based in measuring the angular extent of a physical scale on the last scattering surface. The curvature of space enters through the angular distance to the last scattering surface. Therefore, the same physical scale will be projected to a smaller angular scale on the CMB

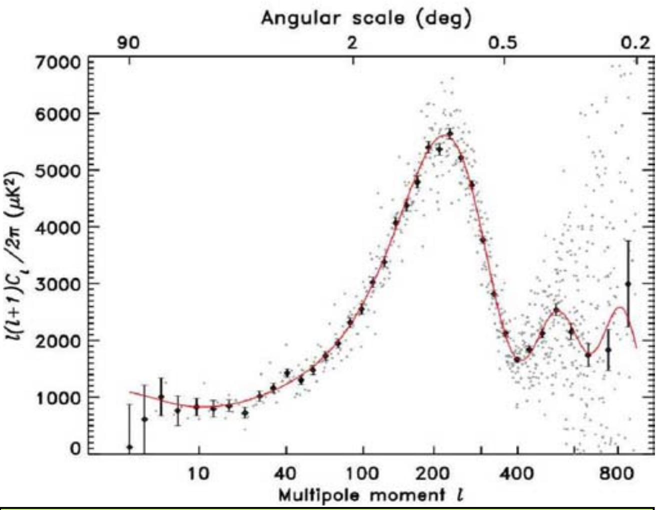

Figure 2: The comparison between the best fit Λ-model (red continuous line) to the WMAP temperature angular power spectrum. The gray dots are the unbinned data (figure from Spergel et al. 2003).

sky in a positively curved background, while it will be projected to a larger angular scale in a flat or to an even larger scale in a negatively curved background space. Based on this notion one can estimate the position of the first peak to be: $\vartheta^{-1}_{peak} \propto l_{peak} \cong 220\Omega_{tot}^{-1/2}$, which is insensitive to the composition of matter and energy in the Universe. The Wilkinson Microwave Anisotropy Probe (WMAP) observations provided the definitive answer on this issue. It has been found (Spergel et al. 2003; Fig.2) that $l_{peak} \approx 220$ therefore, the overall Ω_{tot} is equal to unity ($\Omega_{tot}=1.02 \pm 0.03$) meaning that the geometry of the Universe is spatially flat. Note that also the other cosmological parameters affect the structure of the peaks (especially the second and the third). Determining unambiguously the CMB spectrum at higher multipoles, in order to trace the other two peaks, we are able to put constraints on the many other cosmological parameter.

The value of Ω_m and the equation of state:

There are several completely independent routes to measuring the average matter density of the Universe. In the past decade, increasingly strong evidence for the existence of dark matter has emerged, from a wide variety of independent studies. Big bang nucleosynthesis (BBN) is one of the main tests for the hot big-bang cosmology and the route for the precise determination of the baryon density. Indeed, a comparison of the primeval abundances of *D*, ^3He, ^4He and ^7Li, with their big-bang predictions determine that about 5% of the Universe is made of ordinary baryons $\Omega_b=0.022h^{-2}\pm0.004$. It is interesting to mention that the later result is in agreement with the results coming from the study of the CMB Anisotropies (WMAP experiment). However, there is a strong consensus that the amount of dark matter falls well short of the critical density. In linear theory, adiabatic fluctuations grow linearly with the scale factor in an $\Omega_m=1$ (Einstein de Sitter model), but more slowly if $\Omega_m<1$. Therefore, if matter fluctuations of a certain size in $\Omega_m=1$ and an $\Omega_m<1$ theory are equal in amplitude at the present time (z=0), then at higher redshifts the fluctuations in the low Ω_m model must have had higher amplitude. Cosmic structures typically form earlier in low $\Omega_m<1$ models than in $\Omega_m=1$ model (for example see Basilakos 2003). Observers are now beginning to see at high redshifts significant numbers of what may be the central regions of galaxies in an early stage (the so called Lyman-a forest) of their formation (Steidel et al. 1998). Therefore, a new measurement $\Omega_m\approx0.3$ comes from the amplitude of the power spectrum of matter fluctuations at redshift $z=3$-4 (Weinberg et al. 1999). Also, recent estimates of the global matter density come from the use of clusters of galaxies as probes of the matter distribution, assuming that clusters are large enough to be representative of the overall average mass density. Galaxy clusters occupy a special position in the hierarchy of cosmic structure, being the largest cosmic structures in virial equilibrium (or nearly so) in the Universe, and thus they are ideal tools for studying large scale structure, testing theories of structure formation and therefore extracting cosmological information. A number of independent techniques have been used to estimate Ω_m: cluster mass -to- light ratios, the baryon density in clusters both from X-ray and Sunyaev-Zel'dovich measurements, the existence of very massive clusters at high redshifts.

Complementary, one of the most promising methods for measuring a combination of the Ω_m and Ω_Λ is the use of Type Ia Supernovae (SN Ia) to trace the Hubble diagram (redshift-magnitude relation) out to large distances. SN Ia are the brightest supernovae, and the spread in their intrinsic brightness appears to be relatively small. It is thought that the maximum luminosity of such supernovae is a universal constant and since the intrinsic luminosity of a SN Ia is high, they can be seen out to cosmological distances. Different research groups using this distance indicator have found deviations from linearity of the Hubble diagram, a fact which points to the existence of the so-called dark-energy. The derived Hubble diagram is that expected from an accelerating expansion, with $\Omega_m\approx0.28$ (Riess 1998; Perlmutter et al. 1999; Tonry et al. 2003).

All the different methods, discussed previously, agree that the apparent matter density appears to fall in the range $\Omega_m=0.27\pm0.04$ which means that matter constitutes only 30% of the critical density required for a flat, $\Omega_m=1$ Universe (see Fig.3). These estimates for the different Ω's provide a consistent picture of a flat but not dominated by matter Universe. This is only

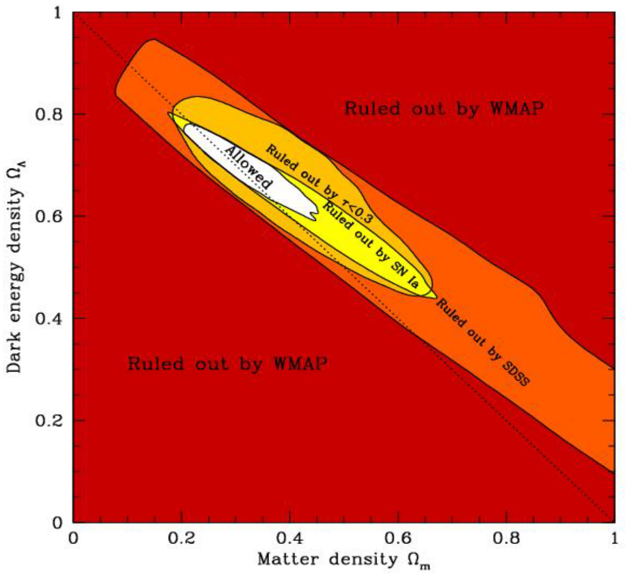

Figure 3: 95% constraints in the (Ω_m ,Ω_Λ) plane (from Tegmark et al. 2003).

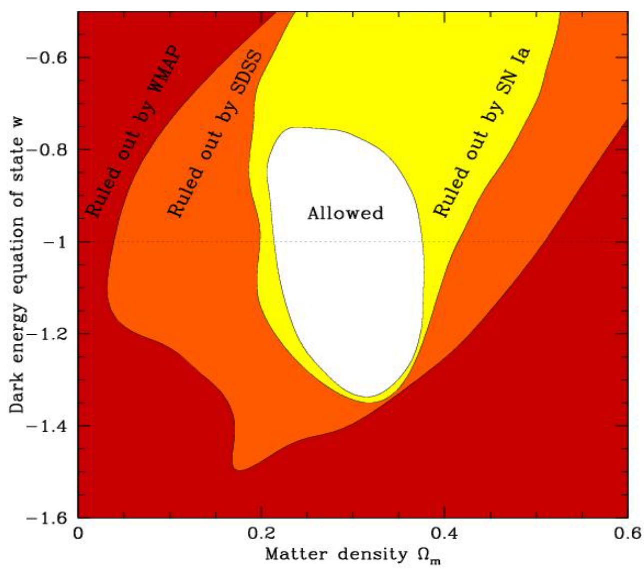

Figure 4: 95% constraints in the (Ω_m ,w) plane (from Tegmark et al. 2003).

possible if the dominant energy is the "quintessence", (recall that $w=-1$ for a cosmological constant). Based on the laborious analyses of the data discussed so far, the parameter of the equation of state results that it should be $w<-0.6$ (most probable $w=-1$, see Fig.4).

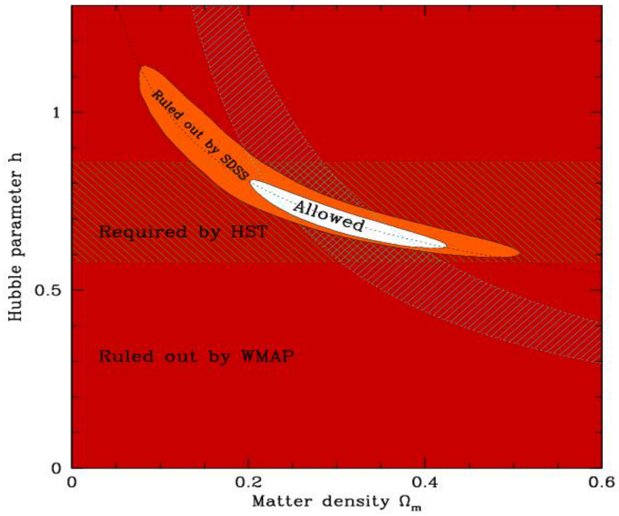

Figure 5: 95% constraints in the (Ω_m, h) plane (from Tegmark et al. 2003).

The Hubble constant and the age of the Universe:
The main issue that has been addressed so far is the values of Ω_m and Ω_Λ. Another very important parameter describing the physical Universe today is the Hubble constant. Since the discovery in 1929 that the Universe expands, the determination of the rate of the expansion dominated observational cosmology for many decades. The expansion rate, given by the Hubble constant, sets the overall scale for most other observables in cosmology. The Hubble Key Project (Freedman et al. 2001) has carried out an extensive program of using Cepheids to calibrate several different secondary distance indicators (Type Ia supernovae, Tully-Fisher, Type II supernovae and surface brightness fluctuations). With a distance modulus of 18.5 for the LMC, their combined estimate for the Hubble constant is $H_o=71\pm4$ *Km/sec Mpc* (see Fig.5). Therefore, combined with the values of Ω_m and Ω_Λ, we obtain an age of the Universe of $t_o=13.7\pm0.2$ *Gyr*. However, there are also useful astrophysical methods for measuring the age of the Universe, the most interesting of which is based on the theory of stellar evolution and the studies of globular clusters. The stars in these clusters are thought to have all formed at the same time and the fact that they are generally of low mass suggests that they are quite old. Because of their common formation time, a collection of these stars can be utilized to calculate for how long they have been evolving. This puts a lower limit to the age of the Universe, because there must have been some time between the big-bang and the formation of these clusters. A frequently quoted lower limit on the age of globular clusters is t_{gc} ~12 Gyr (Chaboyer et al. 1998), from which we get $t_o=t_{gc}+\Delta t$, with $\Delta t\geq0.5$Gyr the time from the big-bang until globular cluster formation (see Fig.6). The main uncertainty in the globular cluster age estimates comes from the uncertainties in their distance: a 0.25 magnitude error in the distance modulus translates to a 22% error in the derived cluster age.

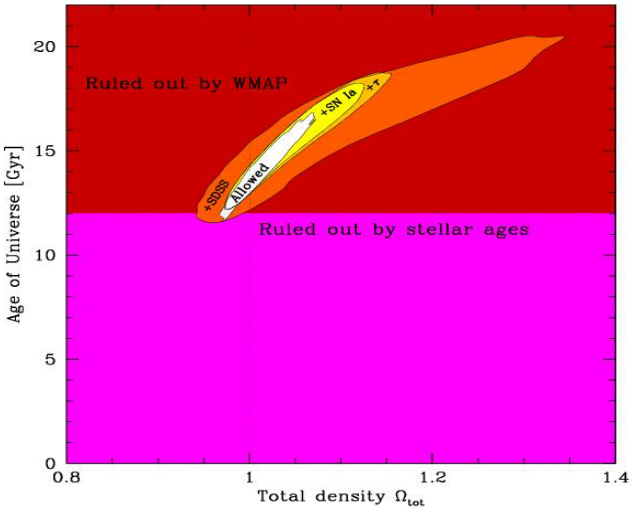

Figure 6: 95% constraints in the (Ω_{tot}, t_o) plane (from Tegmark el al. 2003).

Conclusions:
We have presented the most recent observational methods and results, based on which a new *Standard Cosmological Paradigm* has emerged. This new paradigm poses important questions of both physical and philosophical nature. For one, it demonstrates that the Geometry and the Expansion of the Universe are no longer linked at a one-to-one basis. It also appears that if our Universe is in fact dominated by a cosmological constant, the future for life is rather uncertain because the Universe will eventually become cold, dark and thus uninhabitable, but more on such issues in a future communication.

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Important Basic Necessities for the Development of Astrophysical Research in Greece

With this contribution, I would like to initiate a discussion within the Community of Greek Astronomers on three topics referring mainly to the future of young Astronomers in Greece

A. Postdoctoral Research in Greece

When I applied for one of the four post-doc positions at the Institute of Astronomy and Astrophysics of the National Observatory of Athens under the "*Research Centres of Excellence*" action of the 3rd Community Support Framework Programme for "*Competitiveness*", I knew that these positions were offered in a one-off basis due to the nature of the funding for this project, which is expected to terminate in a few years time with the introduction of new EU member countries that will be in greater need of the European support. What I did not know, having not worked in Greece after my undergraduate studies, was the fact that apart from the IKY post-doctoral fellowships, there are no regular positions for post-doctoral researchers in research/teaching institutes in Greece.

However, there is not even one IKY postdoctoral fellowship in Astronomy guaranteed per year, as the 70 or so post-doc positions that are offered in total by IKY annually, are not allocated to specific disciplines. Moreover, this fellowship runs for just one year and provides very little money, facts that make it totally unattractive, especially for the case of older scientists with families. Furthermore, this fellowship covers no additional benefits such as medical expenses and contributions towards pension. The Greek National Committee for Astronomy (GNCA) has already initiated a discussion with the managerial board of IKY on the status of this fellowship, having made a series of proposals on the number of fellowships offered every year, their duration and the amounts of salary and benefits provided, expecting a reply from IKY.

The fact is that the IKY fellowships were introduced decades ago with laws that are now outdated. It may well be that the managerial board of IKY has very little power to improve their services under the legislation governing the operation of the institute. Moreover, there is no legislative framework covering the issue of the employment of the very few post-doctoral researchers funded occasionally by other state and/or EU driven projects. A consequence of this is the fact that public service agencies do not know how to deal with the paperwork required for the beginning of the employment, resulting to a bureaucratic chaos. The fact that the four post-docs at the Institute of Astronomy and Astrophysics made four different arrangements with our local tax and social security offices is indicative.

It is very promising that the last couple of years the General Secretariat for Research and Development has announced projects for the collaboration of Greek institutes with international organizations, such as ESA, that include the employment of post-doctoral researchers. It is the first time state driven projects offer post-doc salaries. However, a lot of effort is required in getting funded under such programmes, especially if they eventually become a regular financial getaway for Greek Astronomy research institutes.

On the other hand, foreign potential postdoctoral researchers through the mobility actions of all European Framework Programmes so far, have not appeared to be keen in coming to Greece. In particular, I am aware of only 4 or 5 European post-docs having worked in Astronomy in Greece over the last decade. This may well be due to professional reasons in addition to the obvious sociological reason of the different language, which is objectively a major issue for teaching institutes. The fact that perspective foreign post-docs have to face the bureaucratic chaos mentioned above, just upon arrival, may have also played a role. In this respect, it is promising that a new national information centre for arriving European researchers is under way.

Therefore, it appears that different national agencies are taking steps towards the "formal" introduction of the employment of postdoctoral researchers. The aim of this small contribution is to start a discussion within the astronomical community about this, so that we can specify the needs of the community in postdoctoral positions and perhaps lead the way in requesting the introduction of new laws governing the employment of post-docs. It is clearly going to be a long process before new laws are passed through the parliament and before that, we have to make sure that we approach the government through the right channels, e.g. through the GNCA in collaboration with the corresponding committees for other scientific disciplines. It is beyond any doubt that postdoctoral researchers are those that concentrate purely on science and constitute the core of research projects. They have the experience not only to give momentum to projects without requiring much training for themselves, but also to transfer their expertise to younger members of the research teams, i.e. offering even educational assistance. Moreover, they are familiar with the latest technological developments (e.g. for astronomy, how to use archival data, new data reduction software, various numerical techniques etc.) that would have been very difficult to be introduced otherwise in our everyday science habits. Furthermore, one can argue that if Greece will continue to have a limited budget for pure science in the following years, an investment in salary money for a few postdoctoral researchers per institute will be profitable for disciplines like astronomy at a minimum cost for the government.

A detailed technical report presenting the expected financial cost of such a network of post-doc positions should be part of the portfolio presented to the government.

B. Travel Support for Students

It is not our generation (30-40 years old) that will benefit from the formal introduction of the employment of post-docs but mainly the younger generation, e.g. the large group of undergraduate students that took part in the recent Hellenic Astronomical Conference, students that are expected to be finishing a PhD within the following 5-6 years.

This younger generation is studying for PhDs in Astronomy in Greece without any official provision for travel money. I know that the Hellenic Astronomical Society has been awarding small amounts of travel support to PhD students (I have received such support myself in the past) but it is beyond its scope and financial abilities to provide travel support for all PhD students in Greece. Nevertheless, a PhD student should take part in at least a couple of international conferences as part of his training especially students that would like to continue their careers abroad.

The issue could be addressed by introducing one (or more) PhD student fund(s) that will be holding enough money annually to support the travel expenses of all PhD students. This fund could take different forms depending on the aegis of which institution/organisation it will be put under: there could be different funds for all PhD students (of all disciplines) at each Physics department (in the form of the student care fund of NTUA), or an Astronomy only fund under the aegis of either the GNCA or the HelAS.

Travel support (together with support for other expenses like computing, books etc.) will be the least that can be done for PhD students in Greece, where it appears to be very difficult to cover all students financially through the limited number of PhD projects funded through IKY, EPEAEK or PENED. It is no surprise that most students only study part-time having to spend a considerable amount of their time to make their living.

C. Mobility funds

Having taken part in the last 3 Hellenic Astronomical Conferences, I have realised that all participants are mostly enjoying the increased potential for interaction with colleagues of similar expertise that is given during such conferences. It is a fact that interaction in the form of visits from one institute to another within Greece for the time interval between the HelAS conferences is almost forbidden due to the poor finances of all Astronomy sections/groups in Greece.

I wonder if a fund similar to that described above for student travel could be introduced to fund the mobility of Astronomers within Greece. If the conference session conveners continue to serve as organisers of discussion groups during the two year period between conferences (as it was proposed in the last General Assembly of HelAS), they could also be awarding money from this "mobility" fund. Money can be awarded on the basis of interesting work that has fallen into their attention and needs to be communicated in institutes where there are interested research groups.

This fund will be very easily negotiated with the government, as the amounts paid to each researcher will be minimal (enough to cover a return plane/train ticket and in some cases a stay overnight). Hopefully, there may be a greater flexibility in the national science budget after the Olympics.

With a fund like this it will be possible for all Astronomy sections/groups to hold a regular seminar series that is also very important for the PhD student education.

Spyros Kitsionas,

IAA, National Observatory o Athens

The author with two fellow young Astronomers during the 6th Hellenic Astronomical Society Conference dinner.

Are you a member of the Hellenic Astronomical Society ? Have you paid your membership fee ?

Colleagues, participate and express your views !

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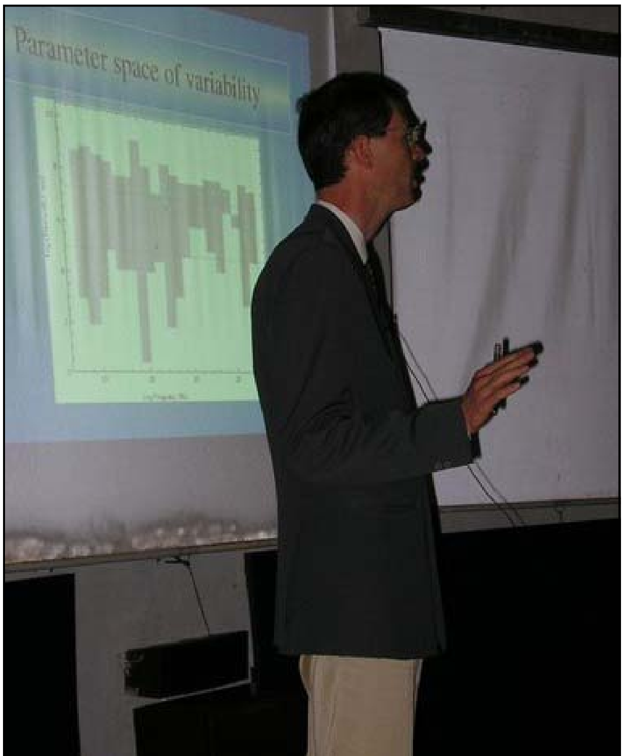
the variability observed in Active Galactic Nuclei and Quasars via multiwavelength observations with particular emphasis on intraday variability in time scales of

Professor Eugene Parker, one of our invited speakers, has been awarded the 2003 Kyoto Prize for lifetime achievement in Basic Science. Considered among the world's leading awards for lifetime achievement, the $400,000 Kyoto Prizes recognize significant contributions to the scientific, cultural and spiritual development of mankind. Parker, 76, the S. Chandrasekhar Distinguished Service Professor in Physics and Astronomy & Astrophysics of the University of Chicago, is cited for establishing a new perspective on astrophysics by elucidating the solar wind and other cosmic phenomena.

100.000 secs (~1 day) corresponding to hundreds of AU around enigmatic supermassive black holes where very high photon densities are inferred. The three main session talks discussed (a) a review of our current knowledge on the dust properties of luminous active galaxies from observations with IRAS and ISO, as well as what we would expect from the recently launched SIRTF, (b) observational indications for the existence of accretion disks around AGN and (c) results of the search and properties derived for the population of star-forming galaxies in dense environments in groups and clusters where strong environmental effects are expected. The contributed talks covered the following topics: MHD models and shock formation in relativistic jets associated with AGN, active and non-active spiral galaxies, morphological evolution of the magellanic clouds and effects on star formation, pc-scale asymmetries in kpc-scale radio galaxies, dark matter in galaxies, determination of accurate distances in nearby galaxies and galaxies in the XMM/2dF survey.

The **High Energy Astrophysics** session opened with a plenary talk by John Kirk on the subject of particle acceleration, a subject that is very topical as observations reveal all the time new classes of objects which are capable of accelerating particles to very high energies. The contributed talks covered three main categories: Galactic compact sources, Active Galactic Nuclei and Gamma Ray Bursts. In the first category talks included radio pulsars, accretion disks and high energy emission from X-ray binaries. The AGN talks addressed the production and propagation of TeV gamma-ray photons from blazars and the deceleration of the large scale jets of powerful quasars. In the only invited talk of the session, an update was given of GRBs, a fascinating subject that continues to evolve rapidly. Other talks on these phenomena addressed

The 2.3m Aristarchos Telescope (at Zeiss)



Dr. Stefan Wagner during his invited talk on Variability in AGNs and Quasars via Multiwavelength observations.

The dome of the Aristarchos telescope at Chelmos.

The 1.3m Telescope, at Skinakas, Crete

a magnetohydrodynamic way of accelerating the flow to the high bulk Lorentz factors inferred from the observations and the role gravitational waves might play in these mysterious explosions. The session closed with a talk informing us of the Greek participation in the Pierre Auger project, a very important experiment which is set to measure the Ultra High Energy Cosmic Rays and hopefully answer one of the biggest puzzles of the field which is the origin of these particles.

In the session **Galactic Dynamics & Chaotic Dynamical Systems,** in addition to the plenary talk by P. Grosbol on what can we learn from near-infrared observations of spiral galaxies, two other main subjects of great current interest for the research in this field have been reviewed. The first one was about the homoclinic tangles, a fundamental tool in understanding the chaotic structure of the phase space. There has been a presentation in detail of the way the lobes are created by the asymptotic curves in some characteristic cases. The second review talk referred to the formation and evolution of galaxies with bars and the exchange of angular momentum between their parts (bar, disk, halo, central black hole). The importance of the phenomenon of secular evolution in galaxies was emphasized also in another talk, which discussed the secular evolution of galaxies under the presence of a central black hole and their mass in chaotic motion. There have been three more very interesting talks which referred to the origin of short lived asteroids in the 7/3 Kirkwood gap, the nature of inner rings in barred galaxies and the non-integrability in galactic potentials.

An interesting variety of research themes were presented in the **Cosmology, Relativity & Relativistic Astrophysics** session. The Relativity & Theoretical Cosmology part of the session was dominated by novel suggestions for the cause of the observed accelerating expansion of the Universe, such as cosmic magnetic fields and vibrating extra dimensions. Furthermore, interesting alternatives for the solution of the classical dark matter problem were presented using isentropic hydro-dynamical flows in a bounded, gravitating perfect-fluid source, also issues related to the interpretation of Cosmological models as well as a study that showed that tilted perfect fluid Bianchi class A cosmological models are not self-similar. On the observational Cosmology part, a number of studies were presented regarding the statistical characterization of the large-scale structure, using clusters of galaxies as tracers of the underlying mass distribution of the Universe, and of the Cosmic Microwave Background fluctuations. Finally, in the Relativistic Astrophysics part of the session the focus was in the numerical study of sources of gravitational waves. Gravitational waves are about to open a new observation window into the Universe. The presentations focused in the progress made recently in the area of numerical relativity. The new results for black hole formation and the oscillations and instabilities of uniformly or differentially rotating neutron stars were presented and shown the need for this type of calculation. Furthermore, a more concise treatment of the space-time structure of two black-holes was also presented. This treatment of space-time structure does fit better for numerical evolution of binary black holes systems, which is probably the best source of gravitational waves.

The session on the **Infrastructure of Astronomy in Greece** was dedicated to an overview of the astronomical facilities in Greece that are either currently

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operational, or under construction, or planned for the future. First, the activities and facilities of the Institute of Astronomy and Astrophysics of the National Observatory of Athens were presented, with the focus on the progress of the Aristarchos project. The installation of the Aristarchos 2.3m Telescope at the Helmos Astronomical Station is currently underway. First light will be attained in early Summer 2004. The Aristarchos telescope, will be equipped with a suite of instruments which will be available for guest observers from 2005: Aback-illuminated 1kx1k CCD camera, a low/medium dispersion spectrometer, the Manchester echelle spectrograph (MES; R=10^5 for 30 micron pixel) and a fast 3-CCD camera (ULTRACAM). Subsequently, the facilities and research activities of the Skinakas Observatory were presented**.** The Observatory is operated jointly by the University of Crete, the Foundation for Research and Technology-Hellas and

The new generation of Greek Astronomers. Are we doing what we really should and could for their future and the future of Greek Astronomy ?

the Max-Planck Institute for Extraterrestrial Physics in Garching, Germany. The operational instrumentation of the 1.3m Telescope includes an auto-guider, three CCD cameras and a focal reducer, which more than doubles the field of view of the telescope and which also allows low-resolution spectroscopic measurements.

An adaptive optics system and a high resolution echelle spectrograph are under construction. Closing the discussion on the optical astronomy infrastructure, the European project OPTICON project was described. Within the framework of OPTICON, Greek astronomers can be financially supported to conduct observations with any of the telescopes belonging to the consortium. Greece participates in the Managerial Board and in the Access Project (Aristarchos Telescope). The importance, usefulness and necessity of the installation of a radiotelescope in Greece were subsequently discussed. The advantages and disadvantages of such a project were investigated from several perspectives: operating frequency, location, compatibility with existing facilities, technological aspects, multidisciplinarity of the project, cost effectiveness etc.

The response of the Greek scientific community to the proposal has been very positive. On the X-ray and Gamma-ray astronomy front, the specifications and capabilities of current missions were described (XMM-Newton, Chandra, INTEGRAL). It was remarked that any astronomer, regardless of nationality, can obtain observing time with these instruments. The potential of such observations for Greek astronomy, as well as ways of accessing and analysing the data, were presented. Finally, Astroparticle Physics is becoming an integral part of Astrophysics. Neutrino astronomy is part of it. The current status of the NESTOR (Neutrino Extended Submarine Telescope with Oceanographic Research) experiment at Pylos was presented, with the emphasis on the ability of NESTOR to detect neutrinos of astrophysical origin.

The Session **History and Teaching of Astronomy** opened with a main session invited talk on "the development of Astronomy by the Serbs from the beginning of the XVII century up to 1st world war". The contributed talks covered two main categories: History of Astronomy and Teaching of Astronomy. The speakers referred to different research subjects of particular interest in History and Teaching of Astronomy, covering a variety of topics from "some statistics on women in Greek astronomy" to "the astronomical and arithmetic mystery of the pyramids". An interesting talk was on "ancient celestial spheres from Thessaly" with findings during excavations at the temple of Athena Itonia near Philia in Thessaly, which could be ancient celestial spheres as the ones described by Plato, or the first celestial sphere constructed by Chiron to be used by the Argonautes. The Session closed with a talk on the educational aspects of the Eudoxos Telescope with the title: "advent and future of the EUDOXOS observatories complex- III: teaching science with Eudoxos" which presented some new elements of the Eudoxos Telescope.

Kanaris Tsinganos

and the Conveners of the sessions

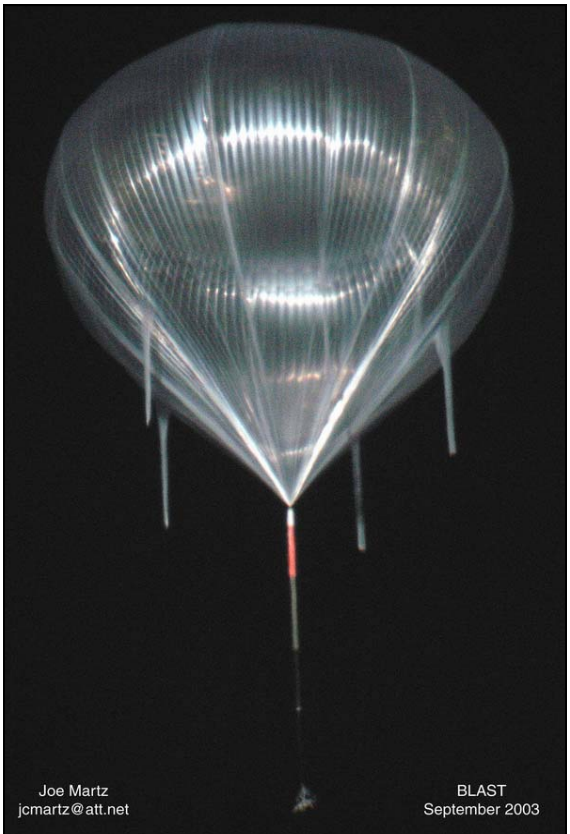
(I.Daglis, L.Vlahos, E.Antonopoulou, M.Mathioudakis, M.Kontiza, N.Kylafis, A. Mastichiadis, S.Persidis, M.Plionis, K.Kokkotas, N.Voglis, P.Patsis, C.Goudis, D.Hadjidimitriou, E.Theodossiou and E.Danezis)

Continued from page 3

-ope from a long-duration balloon-borne platform. The detector arrays, that provide simultaneous images in all three bands over an 86 sq. arcminute field of view, and are prototypes of the SPIRE arrays, under development at the Jet Propulsion Laboratory (JPL, Pasadena) for the future Herschel satellite mission. The integration and preparation for the test-flight of BLAST took place at the NASA/NSBF (National Science Balloon Facility) in Fort Sumner, New Mexico (USA) during August and September 2003. The primary goal of the test-flight was to prove the engineering capabilities of BLAST to NASA/NSBF, and to demonstrate the readiness for a future long-duration (10-15 day) flight from McMurdo Base, Antarctica. After declaring "flight-ready" in early September 2003, BLAST waited for suitable weather conditions and was finally launched from Fort Sumner at 9.30am, Sunday 28th September. BLAST reached a float altitude of 39km at approximately 11.30am, and conducted a series of engineering tests during the 26 hour flight. BLAST landed upright in the Four Corners area of New Mexico, approximately 260 miles NW from the launch-site, and suffered only minor damage. The BLAST consortium is led by Prof. Mark Devlin (Univ. of Pennsylvania) and Prof. Barth Netterfield (Univ. of Toronto). For further information check the following web-page:

http://chile1.physics.upenn.edu/blastpublic

Dr. David Hughes, INAOE-Mexico



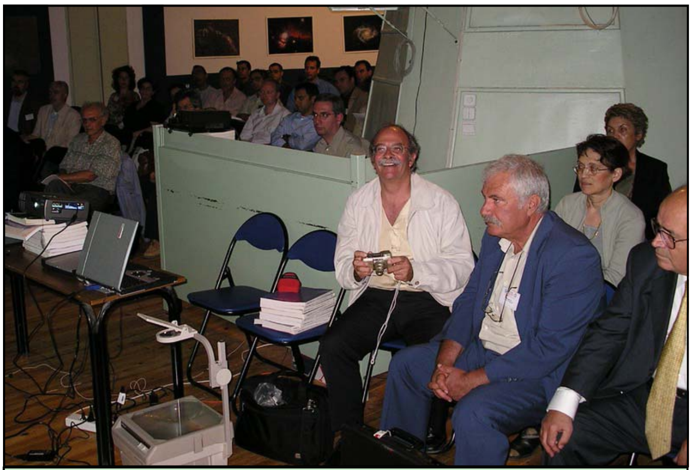
BLAST at a height of about 40 km from the ground.

EDITOR'S COMMENT

In this Editor's Comment I will take the opportunity to address an issue regarding the Greek state policies towards its research institutions and in particular the latest financial policies of the government related to the salaries of the University teachers and researchers. Briefly, I would like to remind our readers that a few years ago there was no distinction between researchers and university teachers. However, when minister of Development was the present minister of economics, this situation changed. He put forward a policy of differentiating between the two classes of colleagues and today we are at the unacceptable situation by which the researchers of state institutions are paid much less than the University teachers of the same professional level. The difference is not only due to the "teaching" allowance that the University teachers rightfully get, but it is also due to the fact that the basic salary of researchers is lower and also due to the amazing and extremely provocative novelty of this discriminative policy, which is that the "research" allowance for the researchers of state Institutes is lower than that of the University teachers, while their main duty is to pursue pure and applied research. This latest addition to the governments financial policies towards researchers invalidates the logic under which it gives the different allowances (επιδόματα) to the University teachers and to researchers of state institutions. The logic behind it is that University teachers divide their activities and duties between teaching and research. Therefore, rightfully they get their "teaching" allowance, while no such allowance is given to researchers (rightfully so since they do not perform such an activity). Similarly, researchers divide their activities and duties between research and those related to public outreach, consultancy towards the state regarding public health, natural disasters etc (for which however there is no specific allowance allocated). The correct retribution of the state towards the researchers would have been a "research" allowance at the same level as the "teaching" allowance of the University teachers and a further allowance for the rest of their activities, mentioned above, and of course the same basic salary.

This unjust policy of the government, or rather of specific components of the government, towards its own research institutions is unexplainable. It is essential that we all should oppose this discriminative policy which not only is unfair and unjust for the existing scientific personnel of the state institutions, but it also undermines any attempt to develop the scientific base of the state Institutes and of our country as a whole, since the most active and successful scientists will not be attracted by their poor paying conditions and will probably seek employment elsewhere.

Moments from the 6th Hellenic Astronomical Society Conference



A University of Thessaloniki “stronghold”

Part of the Governing board of HelAS

Professor Loukas Vlahos of the University of Thessaloniki

Hot debates during the Cosmology / Relativistic Astrophysics session.

An enjoyable break after the sessions

Nikos Matsopoulos of the National Observatory of Athens