Hipparchos

The Hellenic Astronomical Society Newsletter

Hellenic Astronomical Society

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Message from the President

Monday 26 June 2000 will be remembered as the day when humankind discovered what it means to be human. According to scientists involved in the Human Genome Project, 97% of the human genome has been mapped and 85% has been sequenced. This means that in a few years we should be able to understand the basic instructions for building a human body. Some researchers claimed that the achievement could be compared to the discovery of the wheel. Others to the discovery of the heliocentric system or to the landing on the Moon. However big the impact of the achievement may be, it is, beyond any doubt, a technological victory and an inspirational human achievement.

The first task of the scientists working on the project is to create the huge database needed for cataloguing the genome and making it available to the public: a task that will need both hardware and software not yet available. Astronomers are well aware of the difficulties connected to the establishment of large databases, especially those working on large sets of data (e.g. HST, 2MASS, etc). It is expected that big and unexpected discoveries will be announced in the next 5-10 years. Biology has reached the stage of Physics breakthroughs towards the beginning of the 20th century or Astronomy towards the beginning of the 17th century (when Johannes Kepler used the data left behind by Tycho Brache and formulated, together with Isaac Newton, the basic laws governing the motion of celestial bodies). Lets hope that the implementation of the new discoveries in Biology will be as harmless and peaceful as those in Astronomy.

As this goes to print, astronauts are working hard some 300 km above our Earth, installing components and preparing the living quarters of the new International Space Station. The monumental construction will, I hope, give a robust platform for new, extended astronomical experiments.

Meanwhile the 2.3m telescope of the National Observatory of Athens is making good progress. The mirror has been cast and polished and the mounting is well into schedule. The road to the top of Mt. Chelmos has been evened and, if all goes according to plans, construction of the first building will start before the snow season.

The President of Hel.A.S.
J.H. Seiradakis

THE 5th HELLENIC ASTRONOMICAL SOCIETY MEETING

The fifth Hellenic Astronomical Society meet will be held between the 20-22 September 2001 at Crete. The conference will cover the basic fields of Astronomy and Astrophysics (Stellar Astronomy, Extragalactic Astronomy and Astrophysics, General Relativity, Cosmology, Solar Physics, History and Education of Astronomy, Astronomy infrastructure etc). The LOC is led by Prof. I. Ventura and comprises of N. Kylafis, K. Tsinganos, J. Papamastorakis, D. Hatzidimitriou, I. Papadakis and F. Mavromatakis. The SOC comprises of J.H. Seiradakis (President), S. Avgoloupis, J. Daglis, E. Kontizas, N. Kylafis, E. Livaniou-Rovithis, P. Niarchos, S. Persides, M. Plionis, K. Tsinganos and H. Varvoglis. The conference is open to all astronomers who would like to interact and exchange their scientific expertise with their colleagues. Web page: http://www.astro.auth.gr/helasmtg/2001/

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GENERAL ASSEMBLY AND ELECTIONS IN HEL.A.S.

During the 15th General Assembly of Hel.A.S., which took place on Friday, June 16, 2000 in the Laboratory of Astronomy of the University of Athens, the Report of the Council and the Treasurer's Accounts for the period June 1998 to June 2000 were received and adopted. Prior to the Assembly Professor Emeritus N. Economou, from the University of Thessaloniki, presented an excellent account on the ancient clockwork mechanism found, about a century ago, in a shipwreck ashore the island of Antikythera.

In the elections that took place during the General Assembly 89 members of Hel.A.S voted, either in person or by mail. Six ballots among those cast by mail were discarded, because the voting members had either forgotten to write their names on the (outside) envelope or they had not paid their dues. Therefore the valid ballots in the ballot box were 83. The results were as follows:

J.H. Seiradakis (University of Thessaloniki) was elected President by 73 votes. 9 blank ballots and 1 void were also found in the ballot box. The following candidates were elected in the governing council (number of votes in parentheses):
H. Varvoglis, University of Thessaloniki (41)
S. Avgoloupis, University of Thessaloniki (33)
P. Niarchos, University of Athens (32)
M. Plionis, National Observatory of Athens (32)
E. Livaniou-Rovithis, University of Athens (27) and
N. Kylafis, University of Crete (20)

From the rest of the candidates E. Kontizas got 14 votes, L. Zachilas 11 and M. Kontadakis 8. 3 void ballots were also found in the ballot box.

Finally the following three candidates were elected as auditors:
E. Theodosiou, University of Athens (41)
K. Kokkotas, University of Thessaloniki (39) and
N. Stergioulas, University of Thessaloniki (23).

D. Sinachopoulos (National Observatory of Athens) received 18 votes and 5 ballots were void.

The newly elected governing council of Hel.A.S. convened on July 3rd and appointed the officers of the Society for the term 2000-2002 as follows:

President: J.H. Seiradakis, University of Thessaloniki
Vice-President: N. Kylafis, University of Crete
Secretary: H. Varvoglis, University of Thessaloniki
Treasurer: P. Niarchos, University of Athens
Members: S. Avgoloupis, University of Thessaloniki
E. Livaniou-Rovithis, University of Athens
M. Plionis, National Observatory of Athens

THE NEW 0.4M TELESCOPE OF THE UNIVERSITY OF ATHENS

The rapid development of astronomy in the last decades and the necessity to observe always-fainter objects and reach high spatial and spectral resolutions has led to the construction of a large number of 8m or higher-class ground-based, optical telescopes in various countries. The access to those large observing facilities is possible only to a few professional astronomers and the observing time is allocated on a competitive basis. On the other hand, the diminishing availability of small (<1 m) telescopes at national facilities and the lack of smaller, public or private observatories pose serious threats to the quality of educational projects and research on specialized topics that can be undertaken in the 21st century. These facilities, which support research and education, are used mainly by faculty members and students (graduate and undergraduate) of University Astronomy Departments.

This is the reason why the whole Greek astronomical community joined recently (January 13th, 2000) the staff of the Physics Department of the University of Athens in inaugurating the "Gerostathopoulos' University Observatory" at the roof of the building of the Physics Department in Panepistimiopolis, Zografos. A 5m dome had been installed there for more than four years, expecting the opportunity of acquiring a modern telescope mainly for the use of students of the Department. The observatory, apart from the dome, includes a large office and a small apartment for overnight accommodation of the observer and for occasional accommodation of foreign visitors to the Department. Finally, a telescope donated by the chairman of the building company DYNAMIKI S.A. Mr. Gerostathopoulos, in loving memory of his mother, was installed in March 1998. The total cost of the telescope and the auxiliary instruments is estimated to be about U.S.$140.000.

During the festivities, apart from the speeches by the Chairman of the Physics Department Prof. P.G. Laskarides, the Director of the Section of Astrophysics, Astronomy and Mechanics, Prof. P.G. Niarchos and the vice-chancellor of Programming and Economic Development of the University of Athens, Prof. G. Philokyprou, a special commemorating plaque was presented to the donor, Mr.Gerostathopoulos. The ceremony ended with a small banquet and the public's visit to the observatory.

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Exploring the Web with Hipparchos

In this issue of Hipparchos we'll provide pointers to some astronomy related web pages, which could be of use for educational purposes. Only a few of those sites are included here but a more complete list is always kept up to date in the web pages of Hel.A.S.

1) http://imagine.gsfc.nasa.gov/
"Imagine the Universe!": Many answers and detailed presentations of still open questions in most areas of modern astrophysics.

2) http://www.solarviews.com/
Views of the Solar System -- is probably in one of the best online resources which includes detailed data, images, animations, and more information than one is expected to know about our solar system.

3) http://cfa-www.harvard.edu/planets/
There are solar systems other than our own in the Milky Way and the above Extrasolar Planets Encyclopaedia describes the current status on th subject.

4) http://antwrp.gsfc.nasa.gov/apod/astropix.html
The astronomy picture of the day search-able archive. Brief descriptions, and cross referenced links to hundreds of high quality astronomical images.

5) http://www.gettysburg.edu/academics/physics/clea/CLEAhome.html
Project CLEA -- Contemporary Laboratory Experiences in Astronomy -- develops laboratory exercises that illustrate modern astronomical techniques using digital data and color images. They are suitable for high-school and college classes at all levels.

5) http://www.ipac.caltech.edu/Outreach/Edu/
A tutorial on Infrared Astronomy by NASA's Infrared Processing andAnalysis Center at Caltech.

6) http://nedwww.ipac.caltech.edu/level5/
A "Knowledgebase" for Extragalactic Astronomy and Cosmology. It mainly includes review articles, scanned catalogues and images on various topics of extragalactic astronomy.

Vassilis Charmandaris
(vassilis@astro.cornell.edu)

NEW MEMBERS OF HEL.A.S.

9 new members joined our Society during the General Assembly of June 16, 2000.

Ordinary Members:
Dr. Panagiotis Boumis, University of Crete
Dr. Constantin Caroubalos, University of Athens
Dr. Konstantinos Gontikakis, Academy of Athens
Dr. Nikos Prantzos, Institut d' Astrophysique de Paris, France

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Obituary

Polychronis Polymilis

Polychronis (Chronis) Polymilis, a founding members of our Society, passed away on August 13 this year, after a series of heart problems that kept him in hospital for several weeks.

Professor Polymilis was born in Athens 54 years ago. He received his degree in Surveying and Engineering from the Athens Polytechnic (Metsoveion) in 1977 and his Ph.D. from the Department of Physics of the University of Athens in 1985. Since 1986 he has been working as a member of staff at the same Department, where, besides his usual teaching duties, he became a kin researcher in Nonlinear Dynamics. He collaborated with colleagues from many countries, he was invited to give lectures at several Universities and supervised a large number of Ph.Ds.

As Academician Contopoulos mentioned during the funeral speech, "Chronis will always be remebered for his humor and the friendly atmosphere he created around him. He will also be remembered, by many of his colleagues, for the constructive conversations he held with them, that led either to agreements or to interesting disagreements".

The governing council of Hel.A.S. sent a wreath to his funeral and would like to extend the sympathy of the Society towards his family and loved ones.

J.H. Seiradakis

THE HEL.A.S. PRICE FOR THE BEST Ph.D. OF THE YEAR

During the meeting of the governing council of Hel.A.S. that took place on June 16, 2000, its members awarded unanimously the 1999 prize for the *best Ph.D. in Astronomy* to Dr. Manolis Xilouris. This is the second time that the prize has been awarded, after its establishment by our Society in November 1997.

Dr. Xilouris received his Ph.D. in February 1999 from the Department of Physics at the University of Athens under the supervision of Professors Mary Kontizas, Nikos Kylafis and Eleni Livaniou-Rovithis. His work involved the opacity of spiral galaxies (distribution of stars and dust in spiral galaxies). Presently he is serving in the Greek Army, keeping at the same time an active collaboration with the Astronomy group of the Department of Physics of the University of Crete.

I take the opportunity to remind all members of the Society that the prize is awarded annually to active junior members of the *Society,* who have successfully defended their PhD thesis during the calendar year of the award. For 2000, the Council of *Hel.A.S.* has decided

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PROGRESS OF THE PROJECT: "INSTALLATION OF THE 2.3-m ARISTARCHOS TELESCOPE OF N.O.A. ON CHELMOS"

The National Observatory of Athens is moving forward towards the installation of the 2.3-m ARISTARCHOS telescope on the top of Mount Chelmos at an altitude of 2340 meters above sea level. The new telescope will see its first light in 2001. The latest developments of the whole project and its parts are as follows:

- On **23 December 1999**, the General Secretariat of Research and Technology gave its final approval for the project "Building of the 2.3-m telescope" with Dr P. Hantzios as P.I. In the framework of this project the road from the base of the Ski centre to the top of the mountain has already been opened, the Institute of Geological and Mineral Studies (IGME) has performed the drillings of the ground, and the erection of the building will commence in October.
- On **17 January 2000**, the *"Committee of Operations and Equipment Development of the 2.3-m ARISTARCHOS Telescope"* was appointed by N.O.A. with Dr E. Harlaftis as chairman, with the aim to procure instrumentation for ARISTARCHOS and examine relevant collaborations. The Hellenic Astronomical Society kindly accepted to participate in this committee with two additional members.
- On **13 June 2000**, the new management of the Telescope project was appointed by the governing board of NOA (see article below).

Since the construction of the telescope is now at its final stages, the new management undertook an inspection of the telescope progress at the factory of the constructing company Carl Zeiss Jena GmbH on the 18th-19th of September. A report will be presented in the next issue of Hipparchos. The factory acceptance tests of the telescope are scheduled for November 2000.

Panajiotis Hantzios,
IAA, NOA

UPGRADE OF THE 1.2m KRYONERION TELESCOPE

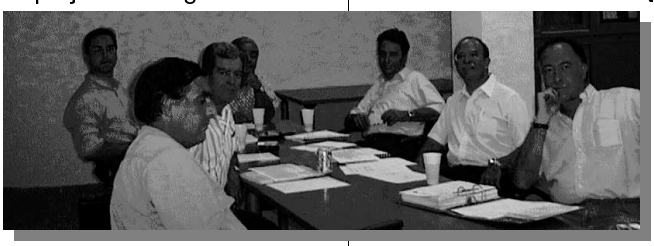
The 1.2m telescope at Kryonerion is now available for automated high-speed CCD time series with an overhead of less than 2 secs (time resolution of 4 secs) after an upgrade of the CCD observing system in summer 2000 (high-performance filter wheel, GPS system, automated observing macros).

The above observing mode was successfully tested during a 50-night campaign on the evolution of the accretion disc of the eclipsing cataclysmic variable EX Draconis (the mean seeing was 2.0±0.8 arcsecs during July-August 2000).

Emilios T. Harlaftis,
IAA, NOA

NEW MANAGEMENT OF THE ARISTARCHOS TELESCOPE PROJECT

On the 13th June 2000, Dr. P. Rovithis and Dr. E. Harlaftis (deputy) were appointed as the new Principal Investigators of the NOA project "Installation of the 2.3m telescope at Chelmos". The project manager is Dr. P. Hantzios. The legal representative of the international contract signed between Zeiss Jena and NOA (construction of telescope and enclosure) is the Director and Chairman of the Board of Directors of NOA. The "Building", where the telescope and enclosure will be placed, and "Related Equipment" projects is managed by Dr. P. Hantzios (Principal Investigator).



Dr. Rovithis, Dr. Harlaftis, Dr. Hantzios together with Dr. Dapergolas and Dr. Bellas-Vellidis comprise the Committee of Operations and Equipment Development which meets regularly (every 2 to 4 weeks) to discuss matters related to the new telescope. The Committee of Operations and Equipment Development was appointed by the Acting Director of the Institute of Astronomy and Astrophysics on 17th January 2000 with the aims to define the equipment still needed to complete the infrastructure, to prioritize the use of instrumentation, to plan the initial operation of the telescope, and to negotiate with potential partners. Since July 2000 the Committee has been enlarged to include 2 members of Hel.A.S., as representatives of the Greek astronomical community, namely Prof. J.H. Seiradakis (University of Thessaloniki) and Prof. P. Laskarides (University of Athens). The Committee is currently in contact with various European Institutions concerning the instrumentation and the future operation of the ARISTARCHOS telescope. NOA has hired two independent consultants, Mr. Martin Fisher and Ms. Sue Worswick (PPARC/UK), expert engineers on alt-azimuth telescopes, to assist with the telescope commissioning and acceptance tests.

Emilios T.Harlaftis

CALL OF INTEREST AGAINST PARTICIPATION IN THE 2.3M ARISTARCHOS TELESCOPE

It is desirable that the 2.3m remote-controlled altazimuth telescope, designed and built by CARL ZEISS JENA for the National Observatory of Athens, becomes part of an international consortium which will utilize the telescope either to support 10m-class telescopes and astronomical satellites or to pursue cutting-edge research using innovative instrumentation.

So far, the investment is 1,750 MGdr (5.206 MEuros) by the National Observatory of Athens for the telescope and site infrastructure (building etc) at the top of mountain Chelmos, a site maybe slightly better than Calar Alto, Spain. First light is expected by the end of 2001. Any contribution such as instrumentation, technical support or cash from an international or national partner would be exchanged with telescope time through negotiations.

Potential users of the 2.3m ARISTARCHOS telescope are invite to fill in a questionnaire in order to advise us with our instrument planning and help us to accommodate scientific interests. The questionnaire and related information can be acquired from the author (see also our web page : *http://www.astro.noa.gr).*

Emilios T.Harlaftis,
for the Committee of Operations and Equipment Development of the 2.3m ARISTARCHOS telescope

STUDYING THE 3D SUN: THE STEREO MISSION

Last December I wrote a very brief article concerning the two spacecrafts which will be launched in 2004 to study the Sun in three dimensions. I feel like presenting the mission more extensively. The basic questions, which will hopefully be answered, even partially, by solar physicists with the help of this mission are:

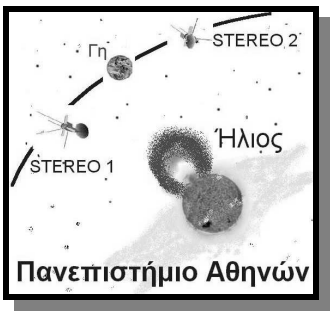
a) how and why does the Sun vary?
b) how is the Earth and the planets affected?
c) what are the impacts for humanity?

The mission, I believe, will help to predict precisely the space weather which affects every day life on this planet.

The main scientific objectives of the Solar Stereo Mission are the study of coronal structure and its evolution, the solar activity build-up in solar active regions, the study of transient phenomena such as the Coronal Mass Ejections and the Corrotating Interaction Regions of the interplanetary medium, which are caused by fast solar wind streams and which originate from the coronal holes of the Sun and dominate the solar wind and the inner heliosphere. The study of all these phenomena will lead to a better understanding of the heliosphere and in particular the changes, which are responsible for the space weather variations, that affect the Earth and humanity.

The two spacecrafts will follow trajectories around the Sun, one going faster than the Earth (leading by 15 degrees every year) and the other lagging behind (by 30 degrees every year). These trajectories are designed to provide several simultaneous views of the Sun obtained from different angles of view, so that stereoscopic images will be produced for the first time. The two STEREO spacecrafts will be built by APL of Johns Hopkins University at a cost of $86 million. The instruments will cost $64 million and Mission operations and data analysis $45 million. Goddard Space Flight Center will provide mission management and control of the mission. The total power used will be ~50 Watts, and the total weight of the instruments ~50 kgr. Both spacecraft will be equipped with four **investigations** each with various experiments. These four investigations are:

SECCHI (Sun Earth Connection Coronal and Heliospheric Investigation consists of four experiments: a) the Extreme Ultraviolet Imager (EUVI), b and c) two white-light chronographs (COR1 and COR2) and d) the Heliospheric Imager (HI). The principal investigator of this investigation is Dr. R. Howard (Naval Research Laboratory, Washington, D.C.). A member of Hel.A.S., Dr Angelos Vourlidas, also at the U.S. Naval Research Laboratory, participates in the experiment. SECCHI is designed to follow the three dimensional evolution of coronal structures which produce the coronal mass ejections (CMEs), from their initial appearance almost at the base of the corona to the interplanetary medium, as they travel producing disturbances in the interplanetary medium, which, when they hit the Earth, can cause severe variations of the Earth's magnetic field and magnetosphere. SECCHI will help to predict in a better way the space weather.



SWAVES(STEREO/WAVES) is a radio receiver measuring the emission at various frequencies which will act as an interplanetary radio burst tracker to study the generation and evolution of traveling radio disturbances, almost from the base of the corona to 1AU. SWAVES will follow the CMEs from their birth in the corona and their interplanetary travel by tracking the shock wave which is produced by CMEs having speeds much faster than the solar wind. In this way the velocity and evolution of CMEs can be followed. Type II and type III radio bursts will be measured remotely and in situ in the Interplanetary medium. The principal investigator of SWAVES is Dr. J.-L. Bougeret (DESPA, Observatoire de Paris) and Dr. Michael Kaiser (GSFC) is the chief U.S. co-investigator.

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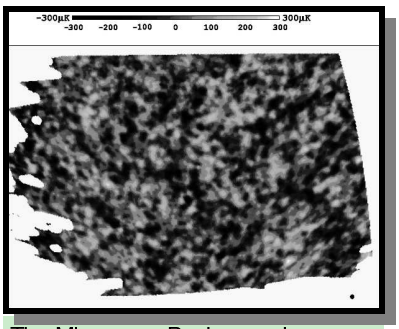
EDITOR'S COMMENT

The recent BOOMERanG balloon experiment produced exciting results that solved definitively a long-awaiting cosmological problem; i.e., that of the curvature of the Universe. Due to the fact that different Space-Time geometries give different angular-size temperature fluctuations in the cosmic microwave background, the shape of the angular power-spectrum provides an extremely sensitive test of the different geometries. A definite prediction of the Flat, Euclidian model with cosmological parameter Ω equal to 1 is that the first Doppler (acoustic) peak should occur at the harmonic multipole 200. This is exactly the value that the BOOMERanG experiment provided with an extremely small margin of error. **We are now almost certain that we live in a flat Universe,** what we still don't know is whether what constitutes the total cosmological density parameter is baryonic and dark matter or whether some significant part of it is due to the effects of the cosmological constant. The favorable model is that matter (baryonic and some sort of dark matter) constitutes only 30% of the closure density while the rest is provided by the cosmological constant, a view supported by the Supernova-Cosmology project. However, the results of the BOOMERanG experiment show that we still have some missing link in our understanding of the constituents of the Universe. The shape of the cosmic microwave background angular-power spectrum, beyond the first peak, was unexpected and it is my view that we will have to revise our fashionable models in order to accommodate these and the future results coming from similar balloon and ESA's PLANCK satellite experiment which will provide the CMB angular power spectrum up to very high harmonic multipoles.



The Microwave Background temperature fluctuations as seen by BOOMERanG.

Manolis Plionis

The balloon that carried the BOOMERanG experiment prior to its launch.

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Prof C. Caroumbalos is co-investigator and the author of this article is a team member.

IMPACT (In situ Measurements of Particles and CME Transients) is designed and built to study the three dimensional distribution of Solar Energetic Particles (SEP). This experiment will measure electrons from 0.02 to 6 MeV, protons from 0.02 to 100 MeV, Helium ions from 0.03 to 100 MeV/nucleon and heavier ions from 0.03 to 40 MeV/nucleon. The SW (Solar Wind) experiment will measure solar wind electrons up to 100 keV. The magnetometer (MAG) experiment will measure the interplanetary vector magnetic field in two modes up to 65,536 nT and 500 nT. The principal investigator of IMPACT is Dr. Janet G. Luhmann, University of California, Berkeley. Close collaboration with SWAVES will help to study in more detail important traveling interplanetary disturbances caused by CMEs and shocks.

PLASTIC (PLAsma and SupraThermal Ion and Composition) investigation will provide the solar wind plasma measurements for protons, alpha particles and heavy ions in the energy-per-charge range of 0.2 to 100 keV/e. PLASTIC measures a) the distribution of solar wind protons and alphas, giving density, velocity, kinetic temperature and anisotropy every minute. b) the elemental composition, charge state, kinetic temperature, and velocity of the heavy solar wind ions, such as C, O, Ne, Mg, Si, and Fe, every five minutes. c) distributions of the suprathermal ions, from hydrogen up to Fe, with a relatively large geometrical factor that allows the study of suprathermal particles, to study shock-accelerated particles and pick up ions. This experiment will provide significant measurements of the form of mass and charge state composition of heavy ions and characterize the CME plasma from ambient coronal plasma.

The principal investigator is Dr. Antoinette Galvin, University of New Hampshire.

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to offer the sum of 120.000 drachmas. All members of the *Society* and other colleagues (PhD supervisors in particular) are strongly encouraged to bring to the attention of the Council of *Hel.A.S.* any candidate of this year's prize, by sending details to the Secretary of *Hel. A.S.*

Harry Varvoglis
Secretary of Hel.A.S.

`LARGE SCALE STRUCTURE IN THE X-RAY UNIVERSE' meeting (Santorini 20-22 September 1999)

The Institute of Astronomy & Astrophysics and NASA's Goddard Space Flight Center organized an X-ray Astronomy and Cosmology workshop in Santorini last September. About 140 astrophysicists met to discuss the latest developments on X-ray Astronomy and Observational Cosmology. This was a unique meeting as it was the first "X-ray Cosmology" workshop, with a broad range of themes covered, ever held.

THE CONFERENCE PHOTO

It was also a very timely meeting since within 2000 there will be eight X-ray astronomy missions in space, initiating a golden era for High Energy Astrophysics and in particular X-ray Astronomy and Observational Cosmology. Although there is not a long X-ray Cosmology tradition in Greece, the Greek participation was quite strong, with about 15 scientists from the National Observatory of Athens, the University of Crete and from abroad presenting numerous papers.

The conference topics revolved around a) cosmological parameters as derived from observations of the mass and temperature of clusters as well as the luminosity function of clusters of galaxies b) the large scale structure of the diffuse extragalactic X-ray light, the X-ray background and its use as a cosmological probe c) the nature of the objects which comprise this extragalactic light.

We were privileged to have some of the very first Chandra results (one of NASA's Great Observatories - launched in July 1999) reported in this conference. There were also numerous important discoveries based on the ROSAT, ASCA and Beppo-SAX X-ray missions as well as on N-body simulations. We summarize below a few of the most exciting results.

There has been an enormous progress on the X-ray surveys of high redshift clusters mainly with ROSAT. These have important consequences for Cosmology as their number is a steep function of the cosmic density of the Universe and of the Cosmological constant. In particular the results from the ROSAT NEP cluster survey demonstrated the advantages of X-ray surveys over traditional optical samples: the first detections of filaments, traced by the gas, which connect clusters were reported. At best there are only hints of such filaments in optical surveys and their detection is extremely important as they are good tracers of the distribution of "dark matter" on large cosmic scales.

ASCA with its superb spectral resolution measured the temperatures for a large number of clusters of galaxies and hence determined very accurately the temperature-luminosity relation.

The large scale structure in the local Universe has been studied in detail with ROSAT. The ROSAT all-sky survey with over 50,000 sources (mostly Active Galactic Nuclei - AGN) provided the most stringent constraints yet on the clustering of X-ray sources. Their spatial distribution is consistent with a "comoving" model for clustering evolution where the mass fluctuations are small enough so that they still expand with the Hubble flow. The theoretical modeling of clustering in the Universe is another area where great progress was made. The present simulations use not only dark matter but also gas physics and models of star formation and metal enrichment. Due to the spectacular increase in computing power, the numerical resolution has reached 5 kpc in detailed cluster simulations while coarser cluster simulations of the whole Universe are now available.

In hard X-ray energies (2-10 keV) the detectors on board the X-ray missions ASCA and BeppoSAX are detecting the first examples of a highly obscured AGN population at high redshift. These objects have huge amounts of gas and dust. Therefore it has been very difficult so far to detect these in either optical surveys or in soft X-ray surveys. However, as the hard X-rays can penetrate large columns of gas, this elusive population of high redshift AGN can be detected at last. It was estimated that as much as two thirds of AGN can be missed in optical surveys.

Chandra gave some spectacular images of the high redshift X-ray Universe resolving practically all the extragalactic X-ray light. Although the exact identification of the X-ray sources is still under progress, it is believed that the vast majority of the sources in the deep Chandra fields are highly obscured AGN at high redshift.

In the next few months both Chandra, with its unprecedented spatial resolution, and its European counterpart XMM, carrying the largest X-ray telescope ever constructed, are expected to shed new light on the physics of clusters of galaxies and the nature of the sources which comprise the extragalactic X-ray Universe.

Ioannis Georgantopoulos & Manolis Plionis,
IAA, NOA

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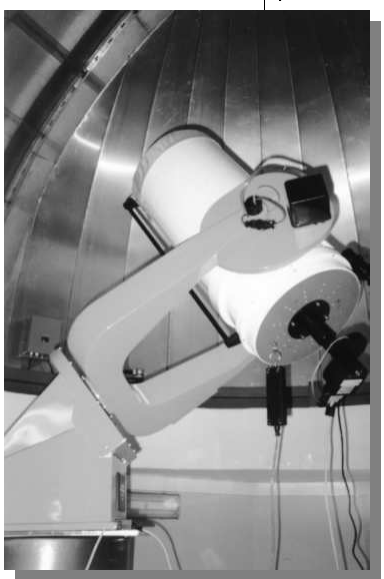
The main optics of the new telescope consist of a Cassegrain reflector (CCT-16, DFM ENGINEERING, INC., USA) with a primary mirror diameter of 40 cm and a focal ratio F/3 (effective ratio of F/8 or F/12). Both primary and secondary mirrors have a Pyrex substrate and are aluminized with a silicon monoxide overcoat. The focal plane position is between 0 and 20 cm from the instrument-mounting surface. The focus may be either manually controlled or commanded by the control system. The finderscope is one of 9 x 60 with illuminated reticle. The optics are operated even at low temperatures (-40 C) and the focus is 2-speed motorized..



The telescope has an equatorial fork mounting, where the Right Ascension and Declination axes are driven by DC servo motor/encoders for fast response and low power consumption. The combination of steel and aluminum construction guarantees responsive and long lasting performance and a tracking accuracy of ± 2.0 arc sec in 2 minutes, ±20.0 arc sec in 1 hour. The pointing accuracy (with refraction and alignment correction) is better than 1 arc minute RMS. The optical incremental position encoder drives are independent of the motor drives to provide excellent pointing. The motors provide cool operation - very low heat generation at telescope (less than 10 watts average), 4 deg/sec slew rate and high acceleration and deceleration rates for fast object acquisition. There is a variable set of guide and tracking rates from 0 to 4 deg/sec and a pedestal allowing elevation and azimuth adjustments for polar alignment. The telescope supports 20 kg instrument load with CG 18 cm behind mounting surface

The telescope has a remote control system, which provides a user-friendly interface to the telescope. Utilizing an IBM-compatible PC we have continual position display, status reporting, and an easy-to-use, menu driven command set. The pointing model corrects for precession, nutation, aberration, atmospheric refraction and mount misalignments (28 commands provide complete control). The flexure control electronics may be located up to 50 m from the telescope for remote control. The operating system is DOS 6.0, the development and application software plus source code is licensed to user for long-term maintainability and there is a built- in library of astronomical objects. There is an extensive system protection via computer-calculated limits. The hand-paddle functions include guide, set, slew, focus and dome right-left, while a limits switch enhances system safety by preventing telescope over-travel. Remote dome monitor and keyboard in the office for public night viewing and instruction where direct access to telescope is required.

Mr. Gerostathopoulos' gift included some very useful auxiliary instruments. Among them is an SPP photon-counting photometer, a CCD camera ST-8 (SBIG) and a solar filter.

Astronomy and Astrophysics courses in both Physics and Mathematics Departments include practical exercises in making astronomical observations and reducing them. The goal of a modern course in Observational Astronomy is to provide for each student the possibility to work at the telescope, obtaining data while using the telescope with a modern detector (photometer or CCD camera). In addition the student should learn how to use modern reduction packages on workstations at the university in order to reduce and analyze the data he obtained. Some of the students, who are interested more in astronomy, can do their final-year essay or master theses on observational subjects.

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Junior Members:
Mr. Athanasios Akylas, N.O.A.
Miss. Olga Bitzaraki, University of Athens
Mr. Kosmas Gazeas, University of Athens
Miss. MariLiza Koukouli, Oxford University

Associate Member:
Mr. Antonios Antoniou, Lyceum of Chalkida

Finally the General Assembly changed the status of Mr. Stylianos Argyropoulos, from Junior to Associate.

Taking into account the new members and the unexpected loss of our colleague, Prof. Chronis Polymilis, who passed away on August 14, 2000, our Society has presently 221 members (176 Ordinary, 41 Junior and 4 Associate). The postal and E-mail addresses of all members are available in the on-line directory that can be found in the web pages of Hel.A.S. (http://www.astro.auth.gr/elaset). In the same pages one can find also the past issues of Hipparchos, all the issues of the monthly electronic newsletter of our Society as well as interesting statistical facts concerning our members and Astronomy in Greece and abroad.