ANNUAL REPORTS
OF THE
ASTRONOMICAL INSTITUTES
OF GREECE
1978

PUBLISHED BY THE GREEK NATIONAL COMMITTEE
FOR ASTRONOMY

ATHENS
1979

CONTENTS

Annual Report for the Year 1978 of the:

NATIONAL OBSERVATORY OF ATHENS

ASTRONOMICAL INSTITUTE

ANNUAL REPORT 1978

Staff: Dr. E. Kontizas received his Ph. D. from Edinburgh University in June 1978.

Research.

1. **Moon and Planets:** D. Elias carried out photographic observations of the moon, especially during the total eclipse of the moon of 16.9.78. He made also optical observations of the eclipse of the moon of 27.3.78. The above work was done with the 25'' refractor of the Astronomical Station of Pentele.

C. Banos and E. Sarris continued their three colour photographic observations of Jupiter and especially of the Red Spot with the 1.2 m. telescope.

2. **Stars and nebulae:** P. Rovithis continued the photoelectric observations of 44i Boo, NGC 2024 and of the Cygnus loop with the 1.2 m telescope. He also continued the study of the light curve of u Her and 44i Boo and carried out studies on the nebulae IC 434, NGC 2024 and the Cygnus loop.

E. Kontizas carried out photographic observations of star clusters with a special camera for the 1.2 m. telescope. He started a program on the radial velocities of early type supergiants of the Large Magellanic Cloud in collaboration with Prof. Ch. Fehrenbach, Obselvatoire de Haute Provence, and M. Kontizas, University of Athens. He also continued a project for the determination of T_{eff} of early type stars combining ultraviolet data from the TD1 satellite and ground based observations, in collaboration with S. Theodossiou, University of Athens, and completed a

project on the determination of the luminosity function of star clusters of the Small Magellanic Cloud.

D. Elias carried out the following observations: a) Optical observations of variable stars, flare stars, novae and occultations of stars. b) Photoelectric observations of flare stars, novae and eclipsing variable stars. c. Photographic observations of stellar regions around novae.

Finally he studied the light curves of the eclipsing variables UCrB, BLEri and EROri.

Reports of these observations are sent to the following Centers:

1. Occultations of Stars: U.S. Naval Observatory, Nautical Almanac Office, Royal Obsercatory of Greenwich and I.O.I.A.

2. Variable stars: A.A.V.S.O.

3. Novae: Smithsonian Astrophysical Observatory.

Dr. Williams of the Royal Observatory of Edinburgh carried out infrared observations with the 1.2 m. telescope.

Mr. Kurt Locher carried out observations of eclipsing variable stars with the 25'' refractor of Pentele.

M. Kontizas, P. Niarchos, H. Livaniou - Rovithis, E. Antonopoulos of the University of Athens as well as V. Tsikoudi of the University of Ioannina carried out photoelectric photometry and infrared photometry observations using the equipment of the Astronomical Institute on the 1.2 m. telescope at Kryonerion.

3. **Comets:** D. Elias made optical and photographic observations of comets with the 25'' refractor of Pentele Station. He continued his work on the photometric parameters of comets Kohler (1977 m) and Meier (1978 f). He also investigated the influence of the solar wind on the absolute brightness H_0 and exponent n of comets.

Reports are sent to the Smithsonian Astrophysical Observatory.

4. **Sun:** Th. Prokakis and D. Dialetis continued their study of the 1966 Solar eclipse. They also studied, in collaboration with C. Alissandrakis of the University of Athens, a big solar flare of 19 September 1977 and prepared a paper for W.D.C.A. on this subject wich was accepted. The same group begun a study of the observations from the Razdow solar telescope in combination with the radio data and X rays data.

D. Dialetis examined the velocity distribution of spicules in the chromosphere. D. Elias studied the lifetime of sunspots' groups.

5. **Celestial mechanics:** E. Sarris continued his study of the 3 - dimensional elliptical restricted three body problem.

Routine Observations:

A. Lainas and P. Kannavos carried out routine solar observations with the Razdow solar telescope under the supervision of Th. Prokakis. Radiomonitoring of the Sun continued on 1415, 2695, 1000 and 8000 MHZ. D. Elias continued his daily observations of sunspots.

Reports of these observations are sent to the:

1. World Data Centers, «A» Boulder, «B» Moscow, and «C» Paris for flares and filaments.

2. Solar Division, AAVSO, World Data Centers «A» and «B», Zurich Observatory and Fraunhofer Institute for the sunspots.

Seeing: G. Dimou continued the ΔT observations for site testing at Kryonerion.

Time Service: Routine work was carried out by D. Elias at Pentele and J. Zacharopoulos in Athens.

Equipment: The Coudé mirrors for the 1.2 m. telescope were delivered in December 1978. An order was placed at the Edinburgh Observatory for the construction of a photoelectric spectrum scanner.

Workshop: E. Sigalas, J. Zacharopoulos, Ch. Bourdas and A. Vouzas carried out the technical and electronic work of the Astronomical Institute and its Stations of Pentele and Kryonerion. They also installed a 30 cm. coelostat in the Astronomical Station of Pentele for solar observations and carried out all the work of maintenance for the instruments.

Internation cooperation: Th. Prokakis and D. Dialetis in collaboration with C. Alissandrakis visited Maudon Observatory during the first days of November and discussed problems of the design of the proposed solar

telescope - spectrograph with Z. Mouradian. They also had different contacts with optical Companies for the construction of the optical parts of the instrument.

E. Kontizas spent 40 days at the Haute Provence Observatory, France, where he worked with Prof. Ch. Fehrenbach on radial velocities of early type supergiants of the Large Magellanic Cloud. Dr. Cannon of the Royal Observatory of Edinburgh visited the Kryonerion Station.

Meetings: P. Rovithis participated in the «Workshop on Supernovae and Supernovae Remnants» from 16 - 27 May 1978 at Erice, Italy.

E. Kontizas participated in the 4th European Astronomical Meeting in Uppsala, Sweden during August 1978.

Th. Prokakis, E. Kontizas and D. Dialetis participated in the 7th week of Physics at the Nuclear Research Center «Demokritos» Athens, from 11 to 15 December where they presented the papers: «Photoelectric measurements during the annular solar eclipse of April 29, 1976» (Prokakis, Dialetis) and «Photoelectric spectrum scanner» (Kontizas).

Publications:

A. **Research:**

1. E, Kontizas: Photoelectric spectrophotometry of early type stars, Thesis, Edinburgh University 1978.

2. E. Kontizas and M. Kontizas: Atmospheric extinction at the Kryonerion Site, Praktika of the Academy of Athens 53, 79, 1978 (in Greek).

3. P. Rovithis: The atmospheric extinction in the Astronomical Stations of Pentele and Kryonerion, Praktika of the Academy of Athens 53, 72, 1978 (in Greek).

4. P. Rovithis and H. Livaniou - Rovithis: Observations of 44i Boo with the new 45 inch refractor of the National Observatory of Athens at Kryonerion, Greece, I.B.V.S., No. 1501. 1978.

B. **Reports, etc.**

1. E. Kontizas: Determination of T_{eff} of early type stars by comparison of observations with theoretical models. Proceedings of the A' Panhellenic Physics Symposium, 1977, p. 102, (in Greek).

2. Th. Prokakis, D. Dialetis. K, Stamoula, J. Douros: Observations and research on the Sun at the Astronomical Institute of the National Observatory of Athens. Proceedings of the A' Panhellenic Physics Symposium, 1977, p. 100 (in Greek).

3. P. Rovithis: Deconvolution, Publications of the Geographical Service of the Army, **111 - 112,** p. 15, 1978 (in Greek).

4. P. Rovithis: Mars the Red Planet, Athens 1978 (book in Greek).

The activities of G. Contopoulos are described in the report of the Department of Astronomy of the University of Athens.

The Director of the Institute
Professor G. CONTOPOULOS

DEPARTMENT OF ASTPONOMY

UNIVERSITY OF ATHENS

ANNUAL REPORT 1978

Staff: Prof. G. Contopoulos was a visiting professor at the Astronomy Program, University of Maryland, during June 1978.

Ass. Prof. M. Moutsoulas was appointed Chairman of the Working Group 1 (Figuge and Motion of the Moon) of Commission 17 of the I.A.U. He was also elected a Corresponding Member of the International Academy of Astronautics and a Council Member of the International Foundation of the Pic-du-Midi Observatory.

Dr. P. Niarchos was appointed chief-assistant on 15 September 1978.

Dr. M. Kontizas was appointed chief-assistant of the Chair of Astrophysics on 31 July 1978.

Miss J. Manoussoyannaki joined the Department as assistant on 1 July 1978.

Mr. J. Deliyannis, on leave of absence from this Department, worked on solar spectroscopy in Meudon, France, during January - June and October - November 1978.

Miss E. Antonopoulou, on leave of absence from this Department, continued her postgraduate studies in Edinburgh University from January to April 1978.

Dr. C. E. Alissandrakis continued to work as research associate, supported by the Hellenic National Science Foundation, till 30 November 1978, when he was appointed chief-assistant of the Chair of Astrophysics.

Research:

I. Galactic Dynamics and Related Fields:

1) G. Contopoulos studied the response of a plane galaxy to a given

spiral perturbation. The main factors contributing to the response were found and their effect was calculated. A paper on this subject was accepted for publication in «Astronomy and Astrophysics».

2) Applying the above theory to bars, G. Contopoulos found the possible extent of bars in various types of galaxies. If the amplitude of the bar does not decrease considerably outwards we have the following cases. (a) If there is only one Inner Lindblad Resonance (ILR) the bar should extend from the ILR to corotation. If there are two, well seraparated, ILR's we may have an inner bar from the center to the inner ILR and another bar from the outer ILR to corotation. If the two ILR's are close to each other, or if there is no ILR at all, the bar may extend all the way to corotation.

3) G. Contopoulos calculated the 4-armed response in a spiral (or barred) galaxy. This is largest near the ILR. A paper on this subject is included in the proceedings of the IAU Symposium No. 84.

4) G. Contopoulos continued his study of selw-consistent spiral models, especially in the case of weak bars.

5) Th. Papayannopoulos completed his work on the orbits and integrals of motion near the particle resonance in galaxies. Two papers on this subject were accepted for publication in «Astronomy and Astrophysics». One of them refers to the numerical study and the other to the theoretical study of the orbits near the particle resonance.

6) Th. Papayannopoulos and J. Manoussoyannaki worked on the non-linear self-consistent problem near the particle resonance.

7) E. Spithas continued his study of the quasilinear theory of density waves.

II. Integrals of Motion:

1) G. Contopoulos continued his work on dynamical systems of three or more degrees of freedom that are near integrable systems.

2) P. Michaelidis completed his thesis, under G. Contopoulos, on «Orbits in a Dynamical Model of Galactic Type». This work was devoted to a system of two degrees of freedom near a 3:2 resonance. Periodic and non-periodic orbits were studied, both theoretically and experimentally, and a comparison between theory and numerical experiments was made.

3) Ch. Varvoglis continued his thesis (under G. Contopoulos) on the orbits and integrals of motion in the Astron machine for plasma confinement.

4) M. Zikides studied numerically the orbits in a resonant dynamical system. The structure of the ergodic region was explored. There are indications that an infinity of bifurcations occur as the energy approaches the escape energy.

III. Relativity:

1) D. Dionysiou and D. Vaïopoulos worked on the Lagrangian of n charged particles up to the fourth and fifth order (paper under preparation).

2) D. Dionysiou worked on Newtonian and Post-Newtonian equations of motion with electric charge in General Relativity (papers under preparation).

IV. Celestial Mechanics:

1) M. Zikides studied the family v of simple periodic orbits in the rectricted three-body problem.

2) M. Zikides and A. Pinotsis studied the evolution of families of periodic orbits with collision and mass ratio near 1.

V. Lunar and Planetary Studes — Remote Sensing:

1) M. Moutsoulas and P. Preka (supported by the National Research Foundation) worked on problems of lunar crater morphology and completed the classification of crater characteristics.

2) M. Moutsoulas and S. Piteri (supported by the National Research Foundation) worked on photogrammetric reductions leading to precise definitions of the lunar control points.

3) M. Moutsoulas and P. Preka produced a moon-light curve taking into account the phase effect as well as atmospheric factors.

4) M. Moutsoulas, H. Maroukian of the Physical Geography Dept., and H. Focas of the Meteorology Dept., constructed signature models for photointerpretation of LANDSAT satellite imagery.

VI. Stellar Evolution:

1) P. Laskarides and D. Vaïopoulos continued their work on stellar evolution with variable G. A paper on this subject was accepted for publication in «Astronomy and Astrophysics».

2) P. Laskarides and A. Pinotsis continued their work on theoretical isochromes in the case of stellar evolution with variable G. A paper on this subject has been accepted for publication in the «Monthly Notices of the R.A.S.».

3) A. Pinotsis completed his research on his thesis, under P. Laskarides, on stellar evolution with variable G.

VII. Spectroscopic and Photometric Observations:

1) P. Laskarides took 17 spectra of early type stars with the Richardson spectrograph attached to the 26-inch refractor of the Penteli Astronomical Station.

2) H. Rovithis - Livaniou and P. Rovithis, completed their study of the extinction coefficients at the Kryonerion Astronomical Station.

3) H. Rovithis - Livaniou made photoelectric observations of the eclipsing binaries 44i Boo, DR Vul and AR Lac at the Kryonerion Astronomical Station.

4) P. Niarchos made photoelectric observations of the eclipsing binaries AH Vir, V566 Oph and VW Cep at the Kryonerion Astronomical Station.

5) E. Theodossiou, together with E. Kontizas, continued a project on the determination of the effective temperatures of early type stars for different spectral subclasses, combining ultraviolet data from the TD—1 Satellite and ground based observations.

VIII. Solar Observations:

1) D. Papathanasoglou and J. Deliyannis made solar spectroscopic observations of various formations of the photosphere of the Sun at the Pic-du-Midi Observatory in December 1978.

2) J. Deliyannis continued his spectrophotometric observations of the solar prominences.

3) C. E. Alissandrakis continued his study of solar activity regions in centimeter wavelengths.

4) C. E. Alissandrakis, together with D. Dialetis and T. Prokakis of the National Observatory of Athens, studied the solar flare and radio burst of 19 September 1977. The same, with P. Preka of the Chair of Astrophysics, continued their study of the solar flare and radio burst of 10 July 1978.

5) C. E. Alissandarkis, together with K. Macris and Th. Zachariades of the Research Center for Astronomy of the Academy of Athens, started a study of the solar granulation.

IX. **Infrared Astronomy:**

Miss E. Antonopoulou continued her work on infrared photometry of close binary systems (of RS Canum Venaticorum type) and on infrared techniques. She carried out infrared observations, in collaboration with Dr. M. Williams, at the Kryonerion Astronomical Station, the Cabezon Observatory on Tenerife, and the South African Astronomical Observatory on Sutherland.

X. **Instruments:**

1. H. Rovithis - Livaniou and P. Rovithis, completed their study of the two-beam, multi-mode, nebular-stellar photometer of the National Observatory of Athens. A new photometric head was constructed for bright stars observations (paper in press).

2) D. Papathanasoglou and J. Deliyannis, together with T. Prokakis and D. Dialetis of the National Observatory of Athens as well as C. E. Alissandrakis studied the construction and installation of the proposed new solar telescope and spectrograph of the Kryonerion Astronomical Station.

3) J. Deliyannis, under Dr. Z. Mouradian, studied the optics of the above mentioned solar telescope; he is studying now the optics of the spectrograph.

Publications:

1) G. Contopoulos, «The Non Linear Theory of Spiral Galaxies», **I.A.U. Colloquium** No. **45**, 1977. p. 229.

2) G. Contopoulos, «Stochasticity, Adiabatic Invariants and the Third Integral», Book of Abstracts, N. C. Christofilos International Summer School and Conference in Plasma Physics, U.S. Energy R. and D. Administration, 1977, p. 37a (abstract).

3) G. Contopoulos, «Integrable and Stochastic Behaviour in Dynamical Astronomy», in G. Casati and J. Ford (eds) «Stochastic Behaviour in Classical and Quantum Hamiltonian Systems», Springer Verlag, 1978, p. 1.

4) G. Contopoulos, «The Disappearance of Integrals in Systems of More Galaxies», **Astron. Astrophys. 64,** 323, 1978.

5) G. Contopoulos, «Periodic Orbits near the Patricle Resonance in Galaxies», **Astron. Astrophys. 64,** 323, 1978.

6) G. Contopoulos, «Higher Order Resonances in Dynamical Systems», **Celestial Mechanics 18,** 195, 1978.

7) G. Contopoulos (with L. Giorgilli and A. Galgani), «On the number of Isolating Integrals in Hamiltonian Systems», **Phys. Rev. A 18,** 1183, 1978.

8) G. Contopoulos, «The Dynamics of the Spiral Structure in Galaxies», in A. Reiz, T. Andersen (eds): «Astronomical Papers dedicated to B. Strömgren», Copenhagen Univ. Observatory, 1978, p. 387.

9) Z. Kopal, M. Moutsoulas, F. B. Waranius (eds), «Bibliography», **The Moon 17,** 309 and 425, 1977.

10) M. Moutsoulas and D. Dionysiou, «Astrodynamics», Lecture Notes, in Greek.

11) M. Moutsoulas, «Remote Sensing», Lecture Notes, in Greek.

12) H. Rovithis - Livaniou, «Fourier analysis of the light curves of eclipsing variable stars — II. Photometric perturbations for partial eclipses», **Astrophys. Space Sci. 52,** 271, 1977.

13) H. Rovithis - Livaniou, «Fourier analysis of the light curves of eclipsing variable stars — III. Photometric perturbations for partial eclipses», **Astrophys. Space Sci. 59,** 463, 1978.

14) H. Rovithis - Livaniou (with P. Rovithis), «Observations of 44i Boo with the new 48 inch reflector of the National Observatory of Athens at Kryonerion, Greece», I.B.V.S., No. 1501, 1978.

15) P. Niarchos, «Fourier Analysis of the Light Curves of W UMa - type Stars», **Astrophys. Space Sci. 58,** 301, 1978.

16) J. Deliyannis, D. Papathanasoglou and M. Stathopoulou, «On the Variation of the Direct Solar Radiation during the Annular Solar Eclipse of April 29, 1976», Praktika of Academy of Athens **53,** 89, 1978 (in Greek).

17) E. Antonopoulou (with P. M. Williams, D. H. Beattie, T. J. Lee and J. M. Stewart), «Condensation of a shell around HD 193793» **Monthly Notices R.A.S. 185,** 467, 1978.

18) E. Antonopoulou (with P. M. Williams, D. H. Beattie, T. J. Lee and J. M. Stewart), «Infrared Observations of the Radio Binary HR 1099», **Observatory 98,** 207, 1978.

19) J. Manoussoyannaki, «Partially Degenerate Stellar Models» M. Sc. Thesis, St. Andrews University, 1977.

20. C. E. Alissandrakis and M. R. Kundu, «6 Centimeter Observations of Solar Bursts with 6" Resolution» **Astrophys. J. 222,** 342, 1978.

Meetings — Lectures

G. Contopoulos was invited lecturer at the following Meetings:

a) Symposium in honor of B. Strömgren (Copenhagen 30 May — 1 June 1978), where he spoke on «The Dynamics of Spiral Structure in Galaxies»; b) NATO Summer School on «Instabilities in Dynamics» (Cortina d'Ampezzo 30 July — 12 August 1978), where he spoke on «Instabilities in Dynamics»; c) Sixth European Cosmic Ray Symposium (Kiel 11-15 September 1978), where he spoke on «Theoretical concepts of the spiral structure of our Galaxy».

G. Contopoulos was invited to the IAU Symposium No. 84 on «The Large - Scale Characteristics of the Galaxy», where he presented a paper on «The Four-Armed Response near the Lindblad Resonances in Galaxies».

G. Contopoulos gave lectures at MIT, the University of Maryland, the Atlanta Institute of Technology, the University of Chicago and the Max-Planck Institut für Radioasronomie, Bonn.

Finally he attended meetings of the Executive Committee of the IAU, The Board of Directors of «Astronomy and Astrophysics», the Astronomy Committee of the European Science Foundation and the NATO Science Committee.

M. Moutsoulas and Prof. G. Veis of the Technical University of Athens, organized three COSPAR Symposia on aspects of satellite geodesy and cartography. Namely, the Symposium «100 Years of Lunar Mapping» (25 - 27 May), the «Laser Workshop» (24 - 27 May) and the Symposium «The Use of Artificial Satellites for Geodesy and Geodynamics» (29 May - 3 June).

M. Moutsoulas attended a) The Centenary celebrations of the Pic-du-Midi Observatory; b) The Symposium on the Concept of Continuity in Mathematics (Athens, 1 - 3 September) where he presented a paper on «Pseudodiscontinuities in Physical Geography Modelling»; c) The Meeting

of Commission 2 (Equipment for Analytic Photogrammetry and Remote Sensing) of the International Society of Photogrammetry (Paris, 12 - 14 September) where he presented an account of the activities of his group, and d) The Annual Meeting of the International Academy of Astronautics.

P. Laskarides is a member of the Organizing Committee of a NATO Summer School on «Galactic X-Ray Sources» that will take place in Greece in May 1979.

J. Deliyannis attended the Meeting of the European Physical Society on «Highlights of Solar Physics» held in Toulouse, France, on 8 - 10 March 1978. He also attended the 44th IAU Colloquium on «Physics of Solar Prominences» held in Oslo, Norway, on 14 - 18 August 1978.

E. Antonopoulou attended the Royal Astronomical Society Discussion Meeting held in York, England in April 1978.

D. Dionysiou, D. Vaïopoulos and P. Niarchos attended the COSPAR Symposium held in Lagonissi, Greece, on 25 May — 5 June 1978.

J. Deliyannis, A. Pinotsis, M. Tsoga and E. Theodossiou attended the Fourth European Regional Meeting on «Stars and Star Systems» held in Uppsala, Sweden, on 7 - 12 August 1978.

C. Alissandrakis gave a lecture at the Meudon Observatory.

Weekly seminars were organized at the Astronomy Department of the University and the Academy of Athens. Among the speakers were: Y. Terzian, G. Contopoulos, Th. Papayannopoulos, D. Vaïopoulos, P. Niarchos, E. Spithas and C. Alissandrakis.

A paper by G. Contopoulos, Th. Papayannopoulos, E. Athanassoula, J. Colin and Ch. Terzides on the «Spiral Structure of Galaxies» was presented at the 1st Panhellenic Physics Symposium in Thessaloniki. The Proceedings (in Greek) were published in 1978.

Drs. Th. Papayannopoulos and D. Vaïopoulos participated in the «7th Week of Physics» in the Nuclear Research Center Demokritos and presented papers under the titles «Galactic orbits near the particle resonance» and «Stellar Evolution with variable G» respectively.

The Head of the Department
G. CONTOPOULOS

ATSRONOMY DEPARTMENT

UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1978

Staff: Dr. G. Bozis was temporary Head of the Department from January 1st to October 1st, 1978. For the same period Dr. S. Persides was one leave of absence at the Institute of Astronomy of the University of Cambridge. Dr. S. Persides continued as temporary Head of the Department from October 1st.

Dr. Ch. Terzides was appointed chief assistant of the Department in December, 1978.

Miss D. Mori resigned in December 1978.

Thus the staff of the Department at the end of 1978 was as follows:

1) Dr. S. Persides, assistant professor, 2) Dr. N. Spyrou and Dr. Ch. Terzides, chief assistans, 3) Mr. D. Papadopoulos, Mr. N. Caranicolas, Mr. P. Fylactopoulos, Mr. S. Avgoloupis and Mr. H. Varvoglis, assistants, 4) Mrs. F. Papageorgiou and Mrs. Ch. Mertzanides, secretaries, and 5) Mr. K. Papadopoulos, technician.

Research Programs:

I. Galactic Dynamics and Related Fields:

Dr. Ch. Terzides continued his research on the estimation of the halo masses in spiral galaxies in connection with the density wave theory of the spiral structure. Of special interest are the values of the masses in the halo that permit the propagation of the spiral waves up to corrotation. Dr. Terzides also started a study of the problems of galaxy formation in several cosmological models.

Mr. N. Caranicolas continued his work under the supervision of Prof.

G. Contopoulos, on the form of the third integral and periodic orbits in nearly axisymmetric galaxies.

Mr. H. Varvoglis continued his work under the supervision of Prof. G. Contopoulos on the motion of charged particles in the Astron thermonuclear reactor. In this work an optimum value for the angular momentum of the particle has been computed and from the numerical study of orbits evidence has been found for the existence of a new isolating integral of motion. The above work will soon be submitted as a Ph.D. thesis.

II. General Relativity — Relativistic Astrophysics:

Dr. Persides continued his work on gravitational radiation, asymptotically falt space - times, etc. He studied specifically the question of proper definition of asymptotic flatness at null and spatial infinity. Rigorous definitions have been given for an asymptotically Euclidean three-dimensional space with positive - definite metric and for an asymptotically Minkowskian space-time at null and spatial infinity. Three papers have been accepted for publication in the Journal of Mathematical Physics.

Dr. Persides studied the relation of the Bondi energy momentum to the Landau - Lifshitz energy momentum. He proved the equivalence of the two definitions under certain conditions. A paper has been accepted in the Journal of General Relativity and Gravitation.

Dr. Persides examined the behaviour of bounded sources at timelike infinity. A formulation of asymptotic flatness at timelike infinity and a unified approach for null, spatial and timelike infinity have been established. Two papers are to be submitted for publication.

Dr. Persides and Mr. Papadopoulos studied the Landau - Lifshitz complex and gave a covariant definition of the energy momentum. A paper has been accepted for publication in the Journal of General Relativity and Gravitation.

Mr. D. Papadopoulos continued his research on perturbations in the space-time of a Schwarzchild black hole. He studied the static scalar field and the propagation of the time dependent scalar field outside and inside the horizon and the electrostatic field. His work will soon be submitted as a Ph.D. thesis.

Dr. N. Spyrou continued his research program concerning (i) the relativistic description of the dynamical behaviour of many body systems of

realistic bodies, (ii) various relativistic effects of astrophysical interest induced by the characteristics of finite dimensions, internal structure and internal motions of the bodies, and (iii) the way these characteristics affect the observed motions of the system. He examined how useful information concerning the interior of the stars can be derived from the observed motions of the system.

In the case of a relativistic many-body system of realistic bodies, Dr. Spyrou examined the motion of the system's center of mass. In the case of a relativistic binary composed of realistic stars he studied the conditions under which the relative orbit can be considered as planar and evaluated its elements, derived the dependence of the apsidal motion on the internal characteristics, gave the relativistic generalisations of the usual Keplerian laws and of the mass-function and also proposed methods for the theoretical evaluation and measurement of the inertial masses of the binary's members. A paper on these subjects has been accepted for publication in the Journal of General Relativity and Gravitation and six more have been submitted for publication.

III. Observational Astronomy:

Mr. Avgoloupis and Mr. Fylactopoulos continued their research work concerning the photoelectric photometry of the flare stars under the supervision of Prof. Mavridis. Using the Stefani telescope they observed four flare stars. Two papers containing the results of their observations will soon appear in the Information Bulletin on Variable Stars of the Konkoly Observatory, Budapest.

Publications:

1. N. Spyrou: Relativistic Equations of Motion of Extended Bodies: Gen. Rel. Grav., **9**, 519, 1978 = Contr. Astron. Dept. Univ. Thessaloniki, No. 92.

2) N. Spyrou: Newtonian Dynamics of Systems of Extended Bodies: Celectial Mechanics, **181**, 351, 1978 = Contr. Astron. Dept. Univ. Thessaloniki, No. 94.

3) N. Spyrou: Lie Derivatives, Killing's Equations, Gegenbauer Polynominals: A combined use for the evaluation of Some Useful Integrals, Bull. Greek Mathem. Soc., **19**, 198, 1978 = Contr. Astron. Dept. Univ. Thessaloniki, No. 95.

4) N. Spyrou: Post-Galilean Invariance of Post-Newtonian Hydrodynamics: Ssi. Ann., Fac. Phys. and Mathem., Univ. Thessaloniki. 17. 211. 1977. = Contr. Astron. Dept. Univ. Thessaloniki, No. 93.

5) N. Spyrou: The Parametrized Post-Newtonian Formalism: Technical Annals, **2**, 23, February 1978 (review article in Greek).

6) N. Caranicolas: Models of Galaxies, Technical Annals, **2**, 1978 (review article in Greek).

Meetings:

Dr. Persides participated in the Meeting of the Royal Society (London) on the Recent Developments in General Relativity in June and the Advanced Study Institute (sponsored by NATO in Cambridge) on Globular Clusters in August.

Lectures:

Dr. Persides gave lectures at the University of Cambridge on his recent research work.

Dr. Spyrou gave a lecture at the Center for Astronomy and Applied Mathematics of the Academy of Athens.

Dr. Persides, Mr. Papadopoulos and Mr. Varvoglis gave lectures at Nuclear Research Center «Democritos» on their recent research work.

Teaching:

Dr. Bozis taught Spherical Astronomy and Celestial Mechanics to third year students of Physics and Mathematics.

Dr. Persides taught from October courses on Astronomy and Astrophysics to the third and fourth year students of Physics and Mathematics.

Dr. N. Spyrou delivered lectures on Classical and Relativistic Astrophysics, General Relativity and Cosmology to the third and fourth year students of Physics and Mathematics.

The Head of the Department
Asst. Professor S. PERSIDES

DEPARTMENT OF ASTRONOMY

TECHNICAL UNIVERSITY OF ATHENS

ANNUAL REPORT 1978

Staff: There have been no changes in the staff of the Department which, as in the previous year, consists of: 1) Professor Dr. J. Argyrakos, Chairman, 2) Mr. M. Kyriakopoulos, Chief Assistant, 3) Mrs. K. Babilis, Assistant, 4) Miss E. Cheretis, Assistant, 5) Mr. B. Kyriakou, Assistant, 6) Mrs. K. Loukidelis, Assistant, and 7) Mr. G. Missas, Technician.

Teaching and Training: During the academic year 1977 - 1978 Professor J. Argyrakos, assisted by his Chief Assistant Mr. M. Kyriakopoulos and Assistants Mrs. K. Babilis, Miss E. Cheretis, Mr. B. Kyriakou, and Mrs. K. Loukidelis, delivered a course on General, Spherical, Practical, and Geodetical Astronomy. The courses were attended by 131 students of the 5th six-month of the Rural and Survey Engineer School of this University.

Scientific Activities: During this academic year the Department continued his effort for acquisition Computers' Programs for automatically computation of Geodeticoastronomical observations.

The Head of the Department
Professor J. ARGYRAKOS

RESEARCH CENTER FOR ASTRONOMY AND APPLIED MATHEMATICS

ACADEMY OF ATHENS

ANNUAL REPORT 1978

Staff: There have been no changes in the staff which, as in the previous year, consists of: 1) Ass. Prof. Dr. C. J. Macris, Director, 2) Dr. C. P. Poulakos, Chief Assistant, 3) Dr. B. P. Tritakis, Chief Assistant, 4) Mrs. H. C. Dara - Papamargariti, Assistant, 5) Mr. Th. Zachariadis, Assistant, 6) Dr. B. C. Petropoulos, Assistant, 7) Mr. M. C. Chondros, Secretary - Librarian, 8) Mr. E. St. Tsioros, Technician and 9) Mrs E. D. Panoysi-Kountourioti, Assistant of Secretariat.

Research Programs: During the year 1978 the following programs were carried out:

1) Study on a New Index of Solar Activity and its Relation to Other Indices of Solar Activity by Prof. Dr. J. Xanthakis and Dr. C. Poulakos.

2. Prediction of the Radio Emission Indices of the Sun in the Frequency Range 1000 MHz $\leq$ F $\leq$ 3750 MHz by Prof. Dr. J. Xanthakis and Dr. C. Poulakos.

3) Photometric studies of New Galaxies from plates taken at the Haute Provence Observatory with the Schmidt Telescope are pursued by Prof. Dr. J. Xanthakis and Dr. C. Poulakos.

4) Study of the Mean Distribution of the Interplanetary Magnetic Field by Prof. Dr. J. Xanthakis and Dr. B. Tritakis.

5) Solar Activity and Terrestrial Phenomena by Prof. Dr. J. Xanthakis and Drs. B. Tritakis and B. Petropoulos.

6) Study of the Fine Structure of the Solar Photosphere by Dr. C. Macris.

7) Study of the Atmospheres of the Planets Mars and Venus by Drs. C. Macris and B. Petropoulos.

8) Photometric Study of the Solar Granulation by Drs. C. Macris, C. Alissandrakis and Mr. Th. Zachariadis.

9) The survey for finding out new Flare Stars is continued by Dr. C. Poulakos.

10) Stars With Strong Emission in the Ha Spectral Region by Dr. C. Poulakos and Mr. Th. Zachariadis.

11) Study of the Etesian Winds in Relation to the Solar Rotation by Dr. B. Tritakis.

12) Study of the Dynamics of the Solar Surges by Mrs. H. C. Dara - Papamargariti.

Publications: The following publications appeared in 1978 as Dimosievmata or Contributions Series I, (Astronomy), from the Research Center for Astronomy and Applied Mathematics, Academy of Athens:

1. C. J. Macris: Sur la variation des dimensions des granules photosphériques au voisinage des tâches solaires. Contribution No. 60 (C.R.A.S. t 286, serie B., pp 315 - 316, 1978).

2) J. N. Xanthakis and C. Poulakos: A New Index of Solar Activity. Contribution No. 61. (Praktika of the Academy of Athens, vol. 53, 1978).

3) B. Tritakis: Probable Values of Some Basic Parameters of the Current Solar Cycle No. 21. Contribution No. (J.I.C.R., Vol. 9, Nr. 1 pp 29 - 31, 1978).

4) C. Poulakos: A Photographic Photometry of 4 New Flare Stars. Contribution No. 63. (B.A.I.C., Vol. 23, pp. 189 - 190, 1978).

5) C. Poulakos: Extremely Red Stars at $I^{II} \cong 113^0$, $-10^0 \leq b^{II} \leq +90^0$. Contribution No. 64. (Astronomy and Astrophysics Suppl., Vol. 32, pp. 395 - 399, 1978).

6) B. Tritakis: A Regression Analysis of the Current Solar Cycle No. 21. Contribution No. 65. (J.I.C.R., Vol. 9, Nr. 4, pp 303 - 306, 1978).

7) C. Macris, B. Petropoulos: La pression et la densité de l'atmosphère de Venus calculées pour différentes compositions chimiques. Contribution No. 66. (C.R.A.S. t 287, Serie B, pp 239 - 242, 1978).

8) C. Macris, Th. Zachariadis: Study of the Inner Corona during the Solar Eclipse of June 30, 1973. Contribution No. 67. (Praktika of the Academy of Athens, Vol. 53, 1978).

9) C. Macris: The Recent Progress of the Astrophysics (In Greek. Dimosievmata Nr. 8, 1978).

Library: 220 new volumes and 2.000 reprints, mostly from foreign Institutions on an exchange basis, were secured by the library.

Meetings — Scientific Missions: Prof. Dr. J. Xanthakis participated in the ICSU General Assembly held in Athens from September 18 to September 29 as the National representative of Greece. Prof. Dr. J. Xanthakis was the vice president of the local Organizing Committee which made its best for the success of the works of ICSU.

Prof. Dr. J. Xanthakis participated in the following three International Symposiums organized by COSPAR at Lagonissi near Athens between 24.5 — 3.6.1978 a) «Workshop on Laser Ranging Instrumentation», b) «A hundred years of Lunar Mapping» as president of the Congress, and c) «The Use of Artificial Satellites for Geodesy and Geodynamics».

Dr. C. Macris went to the Observatory of Pic du Midi on August 1978 and participated in the 100th anniversary of the cited Observatory. He also worked for one month at Bagnères - de - Biggorre observatory and at the Astrophysical Institute of Paris.

Dr. C. Macris, following an invitation of the Faculty of the University of Istanbul (Constantinoupolis) participated in an Astrophysical Symposium held at Silivri, and gave a lecture under the title «Quelques Aspects Sur la Granulation Photosphérique».

Dr. B. Petropoulos following an invitation of the CNRS attended a NATO Advenced Study Institute held at Menton, France and participated in the works of COSPAR Annual Meeting in Innsbruck, Austria where he presented a paper, in ocllaboration with Dr. C. Macris, under the title «A New Model of the Mars Atmosphere».

National Scientific Committees: The Center continued offering secretarial facilities to the following Committees: 1) National Astronomical Committee, 2) National Committee for Space Research, 3) National Mathematical Committee. President of the mentioned committees is the Academician Prof. J. Xanthakis, Supervisor of the Center, and Secretary Mr. M. Chondros. These committees are in contact with the respective International Committees and coordinate the scientific research in Greece.

Cooperation with foreign Institutes: The Center has continued its cooperation with various foreign Institutes, who continue to loan us observational material for our scientific programs.

Miscellaneous: Dr. Dirk ter Haar of the Magdalen College, Oxford, England, following an invitation of the Greek National Committee for Astronomy visited our Research Center and gave a lecture on March 1978.

The National Astronomical Committee continued the yearly Astronomical Seminars for the Greek Astronomers. Chairman of the meetings was Prof. J. Xanthakis, President of the Committee. Many interesting scientific subjects were presented.

The Director of the Center
Ass. Prof. Dr. C. J. MACRIS

DEPARTMENT OF GEODETIC ASTRONOMY

UNIVERSITY OF THESSALONIKI

ANNUAL REPORT 1978

Staff: Mrs. E. Pilidou - Rossiou resigned from her post as Secretary of the Department, effective April 11, 1978.

Thus, the staff of the Department on December 31, 1978 consisted of the following: 1) Professor L. N. Mavridis, Head of the Department, 2) Dr. A. C. Tsioumis. Chief Assistant, 3) Dr. G. Asteriadis, Chief Assistant, 4) Mr. M. E. Contadakis, Assistant, 5) Mr. G. Kareklidis, Assistant, 6) Mr. D. Stavridis, Assistant, 7) Miss J. Karrinti, Assistant, 8) Mr. D. Arabelos, Assistant, 9) Mr. Ch. Kaltsikis, Assistant, 10) Miss P. Kyriakidou, Secretary, 11) Mrs. M. Spyropoulou - Topatsi, Secretary, 12) Miss M. Stamatelou, Secretary, 13) Mr. C. Rizos, Secretary, 14) Mr. Ch. Papantoniou, Technician, and 15) Mr. P. Domvros, Driver.

Equipment: The following equipment was acquired in 1978: 1) Three electronic chronographs with fast digital printer, type Tele-Longines 2002, constructed by Longines, 2) Three theodolites Wild T2 with automatic vertical index.

Research Programs: The following research programs were carried out during 1978:

1) Period Changes of Galactic Cepheids (Professor L. N. Mavridis in collaboration with Dr. K. Bahner). The investigation of period changes of selected galactic Cepheids reported last year, was continued.

2) Rotational Velocities of the Members of Selected Open Clusters (Professor L. N. Mavridis in collaboration with Professor R. Kraft). The study of the rotational velocities of 50 stars in the area of the open cluster NGC 6633 reported last year, was continued.

3) Investigation of Problems of Star Formation (Professor L. N. Mavridis in collaboration with Professors B. Strömgren and J. Xanthakis). The survey of the stars with ultraviolet excess contained in an area of 2.000 square degrees in high galactic latitudes reported last year, was continued.

4) Distribution of the M-, S-, and C- Type Stars in Selected Areas of the Milky Way (Professor L. N. Mavridis). The photographic photometry and the study of the space distribution of the M-, S-, and C-type stars found in the four areas centered on the open clusters NGC 188, NGC 752, NGC 7790, and M25 reported last year, was continued.

5) Photoelectric Observations of Flare Stars (Professor L. N. Mavridis in collaboration with Drs. G. Asteriadis and V. Tsikoudi and Messrs. G. Kareklidis, Farouk Mahmoud, P. Varvoglis, P. Phylactopoulos, and S. Avgoloupis). Photoelectric observations of the Flare Stars: 1) UV Cet, 2) BY Dra, and 3) EV Lac were carried out with the 30-inch reflector of the Department installed at the Stephanion Observatory. The results are being prepared for publication. Mr. Farouk Mahmoud completed a discussion of the three-color photoelectric observations of the Flare Star EV Lac carried out with the 30-inch reflector of the Department installed at the Stephanion Observatory during the years 1972 - 76. The results were included in his PhD Thesis submitted to the Faculty of Science, University of Thessaloniki.

6) Photoelectric Observations of Suspected Flare Stars (Dr. G. Asteriadis). Photoelectric observations of the Flare Star candidates: 1) Gliese 487 and 2) Gliese 835 were carried out with the 30-inch reflector of the Department installed at the Stephanion Observatory. The results are being prepared for publication.

7) Kinematics of Stellar Systems. The study of the kinematical behaviour of the G and K stars by Dr. A. C. Tsioumis reported last year, was continued. The study of the Kinematics of Flare Stars in the solar neighborhood by Dr. G. Asteriadis reported last year, as well as another study of the Kinematics of the AGK3 stars with parallax factor depending on the galactic latitude, also by Dr. G. Asteriadis, were completed and the results are being prepared for publication.

8) Gravity and Magnetic Investigations in Greece (Professor L. N. Mavridis in collaboration with Prof. A. Bandellas, Messrs. D. Arabelos and A. Gounaris and Miss J. Karrinti). The discussion of the gravity and magnetic measurements carried out by the Department in various areas of Greece

during the last years was continued. A new gravity and magnetic survey of high precision was initiated in the area of the lakes Ag. Vassiliou and Volvi east of Thessaloniki.

9) Propagation of Optical Radiation and Microwaves through the Earth's Atmosphere. The study of lateral refraction in the area of Thrace reported last year, was continued (Professor L. N. Mavridis in collaboration with Mr. A. Gounaris). A study of the seasonal variation of the refractivity N of the air for microwaves in the areas of Athens, Thessaloniki and Heraklion was initiated by Mr. P. Savaidis.

10) Study of the Deviation of the Vertical in Northern Greece (Professor L. N. Mavridis in collaboration with Dr. A. C. Tsioumis and Mr. D. Stavridis). The study of the deviation of the vertical in various areas of Northern Greece reported last year, was continued. The first results are under publication.

The research programs Nos. 3 and 4 were carried out in co-operation with the Research Center for Astronomy and Applied Mathematics, Academy of Athens.

Publications: The following publications appeared in 1978:

I. Contributions from the Department of Geodetic Astronomy, University of Thessaloniki:

No. 19: M. E. Contadakis, G. Kareklidis, L. N. Mavridis, D. Stavridis, H. Zervaki - Zoirou: Photoelectric Observations of the Flare Star AD Leo in 1974. Commission 27 of the IAU, Information Bulletin on Variable Stars, No. 1486, 1978.

No. 20: D. Arabelos, G. Kareklidis, L. N. Mavridis: Photoelectric Observations of the Flare Star UV Cet in 1973. Commission 27 of the IAU, Information Bulletin on Variable Stars, No. 1504, 1978.

No. 21: D. Arabelos, G. Kareklidis, L. N. Mavridis, D. C. Stavridis: Photoelectric Observations of the Flare Star EV Lac in 1973. Commission 27 of the IAU, Information Bulletin on Variable Stars, No. 1505, 1978.

II. Publications (in Greek language) of the Department of Geodetic Astronomy, University of Thessaloniki:

No. 4: A. C. Tsioumis: Space Distribution and Kinematical Behaviour of the M-Giant Stars of the Solar Neighbourhood. Proceedings, Academy of Athens, Vol. 51, 684, 1977.

No. 5: G. Kareklidis, M. E. Contadakis, L. N. Mavridis, D. Stavridis, and F. Mahmoud: Photoelectric Observations of the Flare Star BY Drac in 1973 - 1974. Proceedings, Academy of Athens, Vol. 51, 721, 1977.

No. 6: H. Zervaki - Zoirou, G. Kareklidis, L. N. Mavridis, F. Mahmoud and D. Stavridis: Photoelectric Observations of the Flare Stars BD + 13° 2618 and BD + 16° 2708 in 1973, 1974. Proceedings, Academy of Athens, Vol. 52, 133, 1978.

No. 7: H. Zervaki - Zoirou, G. Kareklidis, M. E. Contadakis, L. N. Mavridis, D. Stavridis: Photoelectric Observations of the Flare Star AD Leo in 1974, Proceedings, Academy of Athens, Vol. 52, 453, 1978.

No. 8: G. Kareklidis, L. N. Mavridis, D. C. Stavridis: Photoelectric Observations of the Flare Star BD + 55° 1823 in 1974. Proceedings, Academy of Athens, Vol. 52, 466, 1978.

No. 9: D. Arabelos, G. Kareklidis, L. N. Mavridis: Photoelectric Observations of the Flare Star UV Cet in 1973. Proceedings, Academy of Athens, Vol. 52, 533, 1978.

No. 10: D. Arabelos, G. Kareklidis, L. N. Mavridis, D. C. Stavridis: Photoelectric Observations of the Flare Star EV Lac in 1973. Proceedings, Academy of Athens, Vol. 52, 548, 1978.

No. 11: G. Kareklidis, M. E. Contadakis, L. N. Mavridis, A. C. Tsioumis: Photoelectric Observations of the Flare Star EV Lac in 1974. Proceedings, Academy of Athens, Vol. 53, 98, 1979.

No. 12: G. Kareklidis, M. Contadakis, L. N. Mavridis, D. Stavridis, A. C. Tsioumis: Photoelectric Observations of the Flare Star UV Cet in 1974 - 1975. Proceedings, Academy of Athens, Vol. 53, 148, 1979.

No. 13: G. Kareklidis, M. Contadakis, L. N. Mavridis, D. Stavridis: Photoelectric Observations of the Flare Star YZ CMi in 1974 - 1975. Proceedings, Academy of Athens, Vol. 53, 169, 1979.

III. Also the following Publication:

Farouk Mahmoud: Contribution to the Study of the Flare Star EV Lac. PhD Thesis, University of Thessaloniki, 1978.

Teaching: Professor L. N. Mavridis delivered during the academic year 1977 - 1978 courses in Geodetic Astronomy to the third-year undergraduates and in Higher Geodesy to the fourth-year undergraduates of the Division

of Rural and Surveying Engineering, Faculty of Technology of the University. Chief Assistant Dr. A. Tsioumis delivered during the same academic year courses in Higher Geodesy to the third-year undergraduates of the same Division.

Visitors: Mr. Farouk Mahmoud, Helwan Observatory, completed his work at the Department and received his PhD degree from the Faculty of Sciences, University of Thessaloniki, in October 1978. He left the Department in November 1978.

Miscellaneous: Professor L. N. Mavridis was appointed, effective January 19, 1978, Director General of Higher Education, Ministry of National Education and Cults. In the same date he resigned from his posts as President of the Administrative Council, Democritus University of Thrace and President of the Administrative Council, State Scholarship Foundation.

Professor L. N. Mavridis participated in the following meetings of the Council of Europe:

1) In the meeting of the Working Group on the «Reform and Development of Tertiary (Post-Secondary) Education in Southern Europe» held in Delphi, Greece, September 20 - 22, 1978, and in Braga, Portugal, October 25 - 27, 1978, 2) in the joint meeting of the Working Groups on the «Diversification of Tertiary Education» and on the «Reform and Development of Tertiary (Post-Secondary) Education in Southern Europe» held in Strasbourg, France, December 18 - 19, 1978 and 3) in the first meeting of the «Standing Conference on University Problems» held in Strasbourg, France, December 20 - 21, 1978.

Professor L. N. Mavridis attended also the following meetings:

1) The Third Conference on the International Baccalaureat held in London, February 15-16, 1978 and

2) The Meeting of Experts Representing the Participating States of the Conference on Security and Co-operation in Europe and Their National Scientific Institutions, Foreseen by the Final Act of the CSCE and the Concluding Document of the Belgrade Meeting 1977 to Prepare the «Scientific Forum», held in Bonn, June - July, 1978.

Mr. M. E. Contadakis returned from his two-years leave of absence in the Max-Planck-Institut für Astrophysik, Heidelberg and assumed again his duties in the Department, effective October 1, 1978.

Mr. D. Arabelos received, effective October 1, 1978, an one-year leave of absence from the Department and is working at the Institut für Theoretische Geodäsie, Technische Universität Hannover.

Mr. Ch. Kaltsikis received, effective October 1, 1978 a second one-year leave of absence from the Department and is working at the Lehrstuhl für Geodäsie, Technische Universität München.

The Head of the Department
Professor L. N. MAVRIDIS

DEPARTMENT OF ASTRONOMY

UNIVERSITY OF IOANNINA

ANNUAL REPORT 1978

Staff: Dr. Vassiliki Tsikoudi, an astronomer, was appointed chief assitant, effective April 15, 1978. Thus the staff of the Department on December 31, 1978 consisted of the following persons:

1) Professor G. Banos, head of the Department, 2) Dr. V. Tsikoudi, chief assistant, 3) Mr. Ph. Krommydas, assistant, 4) Mr. D. Rizos, assistant, 5) Mrs. H. Dimou - Drosou, secretary, 6) Mr. Ch. Nakas, technician.

Teaching: Prof. G. Banos held courses in Astronomy to the third-year undergraduate students of Physics and Mathematics. He also visited with the students of Physics the astronomical stations of the National Observatory of Athens at Kryonerion, near Kiaton, and at Penteli, near Athens.

Mr. D. Rizos held tutorial courses and exercises in Astronomy to the same students.

Research: Prof. G. Banos worked on solar activity and related phenomena. Mrs. H. Dara continued her work on the solar prominences, under the supervision of Prof. G. Banos.

Dr. V. Tsikoudi did photoelectric observations, in July, of suspected flare stars, as well as of the known flare star BY Dra, using the 30'' reflector of the Stefanion Astronomical Observatory. Analysis of the observations and further study of flare stars are in progress. Her research also included the study of SO galaxies which is being prepared for publication.

Mr. Ph. Krommydas continued his work on his disertation at the University of Innsbruck, Austria.

Equipment: The following equipment were acquired: a) An 8'' Celestron Telescope with various accessories. b) A Canon F—1 camera with motor drive and accessories.

Miscellaneous: During May of 1978, Dr. V. Tsikoudi attended the Conference on artificial satellites at Lagonisi, Greece, where she held very fruitful discussions on the evolution of galaxies and cosmology with Professor H. Alfvén of the Royal Institute of Technology, Sweden, and of the University of California, La Jolla.

Mers J. Zacharopoulos and Ch. Bourdas, of the National Observatory of Athens, spent four days, in November, at the Dourouti station of the Department, working on the aluminasing plant.

All members of the Department spent time working on the Dourouti Astronomical Station and on the 24'' telescope, preparing it to begin operation during summer of 1979.

Publications: G. Banos: Astronomy and Astrophysics, Part 3, (in Greek) University of Ioannina, Ioannina 1978.

The Head of the Department
Professor G. BANOS

DEPARTMENT OF ASTRONOMY

UNIVERSITY OF PATRAS

ANNUAL REPORT 1978

Staff: Dr. E. Evangelidis returned in October 1978 from his leave of absence for research work in the Department of Theoretical Physics, University of Oxford.

Mr. P. Antonopoulos received his Ph. D. in Astronomy from the University of Patras in May 1978.

Mr. B. Zafiropoulos is on leave of absence for postgraduate studies (University of Manchester).

Teaching: Prof. B. Barbanis held courses in General Astronomy, Dynamical Astronomy and Cosmology to the students of Mathematics and Physics. Associate Prof. G. Antonacopoulos held courses in General Astronomy, Astrophysics and Analytical Geometry. Dr. P. Antonopoulos and Mrs. C. Flogaiti - Giannoulatou held tutorial courses and exercises in Astronomy and Astrophysics, whereas the former held tutorials in Dynamical Astronomy and Cosmology.

Research Program: Dr. Barbanis studied the trapping effects on various time dependent potentias. Dr. Antonacopoulos continued his work on the equilibrium solutions and their stability of the secular variations in the restricted 3-body problem. Dr. Antonacopoulos worked also on some subjects on the post-Newtonian approximation of General Relativity: three papers have been accepted for publication. Dr. Evangelidis has been working on Density Wave Theory and Relativistic Astrophysics (cf publications). Dr. Antonopoulos completed his thesis, under B. Barbanis, on «The Trapping of Particles in a Time Dependent Hamiltonian». A paper on this subject has been accepted by the Journal Astronomy and Astrophysics. Mrs. Flogaiti-

Giannoulatou continued working on spectra of O-Stars under P. Laskaridis and G. Antonacopoulos.

Lectures: Dr. Evangelidis gave Lectures on Density Wave Theory in Oxford, Department of Theoretical Physics.

Meetings: Dr. Evangelidis attended the meeting on General Relativity, 7 - 8 June organised by Royal Society of England. Dr. P. Antonopoulos attended the NATO Advanced Study Institute on «Instabilities in Dynamical Systems with Applications to Celestial Mechanics» held in Cortina d'Ampezzo, Italy, July 30 — August 12, 1978.

Publications: 1) B. Barbanis: Exercises on Astronomy and Astrophysics (in Greek), Patras 1978. 2) E. Evangelidis: Density Wave - Star Interaction of a Differential rotating spiral system in a scalar field; Astrophys. Space Sci. 1978, **54**, 467. 3) E. Evangelidis: Force - Free Fields in the vicinity of a Reissner - Nordström Black Hole; Astrophys. Space Sci. 1978, **56**, 255. 4) E. Evangelidis: Plane of Polarization Rotation Induced by a non-Minkowskian Spacetime; University of Oxford, Department of Theoretical Physics, Ref. 62/78.

The Head of the Department
Prof. B. BARBANIS

DEPARTMENT OF ASTROPHYSICS

UNIVERSITY OF ATHENS

ANNUAL REPORT 1978

Staff: This new Department of the University of Athens was expanded during 1978 by the appointment of six new members.

Dr. M. Arzoglou - Kontizas (Ph. D. University of Edinburgh) and Dr. C. Alissandrakis (Ph.D. University of Meryland) were appointed chief assistants.

Dr. X, Moussas (Ph.D. University of Athens), Mr. E. Danezis and Miss P. Preka were appointed scientific assistants.

Also, Mrs. V. Sarrou - Vaïopoulos was appointed Laboratory Technician.

Mr. E. Nicolaïdes worked for a couple of months voluntarily.

Research:

1. S.N. Svolopoulos continued his studies on B stars from spectra taken at the Observatoire de Haute Provence.

2. M. Arzoglou - Kontiza together with E. Kontizas studied the luminosity functions of star clusters in the Small Magellanic cloud.

3. M. Arzoglou - Kontiza together with E. Kontizas and under the supervision of Dr. R. D. Cannon of the Royal Observatory of Edinburgh started a program of photoelectric photometry of the star cluster NGC 6939 with the 1,2 m-reflector of the Kryonerion Astronomical Station.

4. M. Arzoglou - Kontiza worked at the Haute - Provence during two weeks in the summer under the supervision of Prof. C. Fehrenbach on radial velocities of early type supergiants of the Large Magellanic Cloud.

5. C. Alissandrakis continued his research on the mechanism of the centimetric wavelength Emission of the Solar Active Regions.

6. X. Moussas in collaboration with J. J. Quenby, of the Imperial College of the University of London, investigated particle propagation parameters in the interplanetary medium using interplanetary magnetic field data from HEOS 2 satellite, as well as from the deep space probes HELIOS 1 and 2, PIONEERS 10 and 11 and VOYAGERS 1 and 2.

7. X. Moussas together with S. Cecchini, of the University of Bologna and J. J. Quenby obtained a solution of the full Fokker - Planck transport equation including a term concerning diffusion in energy space.

8. X. Moussas studied the structure of the stream particles in the interplanetary medium during the August 1972 event.

9. E. Danezis together with M. Arzoglou - Kontiza started star counts in star clusters of Small Magellanic Cloud.

10. P. Preka under the supervision of C. Alissandrakis studied the solar burst of July 10, 1978.

Publications:

1. E. and M. Kontizas: Monochromatic Atmospheric Extinction coefficients for the Kryonerion Observatory site; 1978, Praktika of the Academy of Athens, Vol. 53, 79.

2. X. Moussas, J. J. Quenby, 1978, Astrophys. Space Sci. 56, 483.

Meetings - Scientific Missions :

S. N. Svolopoulos and M. Arzoglou - Kontizas attended the fourth European regional meeting in Astronomy in Uppsala during August 1978.

There M. Arzoglou - Kontiza presented a paper on the star clusters of SMC.

M. Arzoglou - Kontiza visited Haute-Provence Observatory during September.

X. Moussas spent one week as a visitor at Imperial College in October.

The Head of the Department
Prof. S. N. SVOLOPOULOS