

## Report on the International School for Young Astronomer (ISYA)

Romania - Bucharest July 26 - August 14 1999

Michèle Gerbaldi, Secretary for the ISYA

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This 24th ISYA took place in Romania at University of Bucharest. All the activities were at the Faculty of physics, located at Magurele, a suburb of Bucharest.

It was organized in collaboration with Dr. Magda Stavinschi, Director of the Astronomical Institut of the Romania Academy of Science, Bucharest.

The Local Organizing Committee was chaired by Prof. Mircea V. Rusu (Faculty of Physics, University of Bucharest).

The *foreign Faculty* were :

Attilio Ferrari - University of Turin, Italy

Michèle Gerbaldi - Université de Paris Sud XI, Institut d'Astrophysique de Paris, France

Edward Guinan - University of Villanova, USA

Donat Wentzel - University of Maryland, USA

Jean-Paul Zahn - Observatoire de Paris, France

The *Romanian Faculty* were :

Tatiana Angelescu - University of Bucharest

Andrei Inonescu - University of Bucharest

Mircea Rusu - University of Bucharest

Magda Stavinschi - Astronomical Institut of the Romanian Academy of Sciences, Bucharest

Among the foreign faculty, Michèle Gerbaldi, Edward Guinan (assistant Secretary for the ISYA) and Donat Wentzel were able to be present during the all ISYA, Attilio Ferrari stayed 10 days, and Jean-Paul Zahn was present during the last week.

### I - Participants

All the applications for this ISYA were received by e-mail or faxes. These communications were essential to coordinate the acceptance of the applicants as well as to set up the travel budget. 78 applications were received from 16 different countries, showing the impact of previous ISYA. 13 applications came from Egypt but none from Iran.

In August 1999 a Workshop was held at Bucharest under the auspices of the NATO Advanced Study Institute : "Advances in Solar Research at Eclipses, from Ground and from Space". We had, so far, the possibility to propose to some of the candidates to participate to this Conference instead of the ISYA, taken into consideration their background, some of the applications being issued by post-doctorate students.

Thanks to a good collaboration between the organizers of the ISYA and the NATO Workshop such solution gave us the possibility to reply positively to more applications. Of course this was possible only for students coming from a country eligible as "NATO country".

20 foreign and 32 Romanian students were invited to participate to this 24th ISYA.

At the last moment two foreign participants cancelled their participations as well as some of the selected Romanian students.

The ISYA was held with 18 foreign and 23 Romanian participants.

The participants came from :

Algeria : 2 (men), Egypt : 3 (women), Morocco : 2 (men), Nigeria : 1 (man) Russia : 3 (2 women; 1 man), Turkey : 2 (1 woman; 1 man), Uzbekistan : 3 (women), Vietnam : 2 (women).

Romania : 23 (11 women, 12 men).

## II - Academic Activities

The background of the 41 participants ranged from a BSc. to a PhD started from about one year or half (3 of them) and one post-doctorate participant. Most of the participants had a MSc in astrophysics. Some (2 foreign and 2 Romanian) participants had previous experiences in teaching at high school level or have been involved in Training the School Teachers at the University.

Most of the Romanian participants had followed the "Module d'études francophones en astronomie". This module give them a good background in stellar and extragalactic astrophysics.

All the lectures were given in English, each lecture was of 90mn.

At the beginning of the ISYA, the spoken English level of the participants was ranging from "very fluent" to "hesitant"; on the second week the language barrier was broken.

But the language was not a real barrier even on the first week for the interactions between the participants and the faculty.

It must be stressed that the personal involvement of the Romanian participants was impressive, in particular to make comfortable the foreign participants not only at their arrival but during the all ISYA.

### II - 1 - Lectures

The topics covered by the lectures are:

*Tatiana Angelescu*

1. The modern astrophysics and the physics of elementary particles
2. The neutrino and its implications in astrophysics and cosmology
3. Quantum cosmology: the first three minutes.

*Attilio Ferrari*

1. Morphology of galaxies
2. Active galaxies
3. Extragalactic jets
4. Unified models of active galactic nuclei

*Michèle Gerbaldi*

1. Structure of stellar atmospheres
2. Determination of the abundances in a stellar atmosphere
3. Stellar atmosphere models and synthetic spectra
4. Links between theory and observations

*Edward Guinan*

1. Eclipses and occultations: what we learn
2. The Sun in time
3. Variable stars as astrophysical tools :checks on stellar evolution and stellar structure
4. New Developments in exosolar planets.

*Andrei Ionescu*

1. Planetary atmosphere; properties and structure
2. The interactions in the high atmosphere with the Solar and cosmic radiation
3. Cosmic masers

*Mircea Rusu*

1. Chaos in physics and astrophysics
2. Fractal structure of the Universe
3. Characterization of a non-linear dynamical system; noise analysis.

*Magda Stavinschi*

1. Time
2. Mechanism of solar eclipses

*Don Wentzel*

1. An introduction to the Sun, with an emphasis on the role of the magnetic field in the atmosphere
2. Magnetostatics: the concepts of magnetic pressure, magnetic tensions, force-free fields, with applications for solar and some cosmic examples.
3. MHD: the frozen-in approximation, solar and cosmic examples
4. Basic hydrodynamics of the solar wind, and magnetic influences.

*Jean-Paul Zahn*

1. Internal structure of the Sun
2. Convection
3. Helioseismology

The notes of the lectures were photocopied and distributed to the participants.

Two very general conferences on total solar eclipses were given by Jay Pasachoff in the framework of the NATO Workshop to which the ISYA participants joined.

A special session on *Teaching Astronomy* was organized at the *Children Palace* which is an Institution open to the children till 18 years old, to practice activities in all domains from arts to sciences.

Astronomy is one of them. In a dome, there is a small refractor , several small telescopes can be used on a terrace, there is a coelostat to project a Sun image.

During this session Educational Activities of the IAU were presented.

## **II - 2 - Practical Activities**

Formal and informal sessions of practical activities were organized.

A session on the visual analysis of solar photographs has been set up, the photographs being provided by D. Wentzel.

Two sessions on data reduction were organized, using the PC of the Physics Department. These data on stellar photometry and spectroscopy were brought by E. Guinan and M.

Gerbaldi and illustrated the lectures on binary stars as well as those on stellar atmosphere structure.

During the all ISYA we had access to the computers and accounts have been opened for everybody. The MIDAS software has been implemented and training sessions to get familiar with it took place.

Connections through Internet were very fast due to the use of a dedicated line via a satellite. Thanks to this favorable situation query of data bases could be done to enrich the discussions with the participants. No astronomical library being available at this University the access to ADS was extremely useful for these discussions. Reprints brought by the foreign faculty on related topics to their lectures were widely used by the participants.

A MEADE telescope (25cm) bought by the Bucharest observatory has been used during the ISYA. Ed Guinan brought a photometer which could have been used with it. The set up of the instrumentation was done at the beginning of the second week, unfortunately no "good" nights allowed to do variable stars observations. This instrumentation even of small size was very much appreciated by the participants.

We visited the instrumentation available at the Bucharest Observatory.

### **II - 3 - The solar total eclipse**

Under the guidance of E. Guinan and M. Rusu, several small experiments were prepared to be done during the total solar eclipse :

- photometric ones to measured the intensity in various wavelength domains, of the corona
- measurement of ionospheric radio emission.

As the sky has been partially cloudy, the photometric experiments could not be performed, but various photographic and video observations were done: by chance the phase of totality was observed at Magurele.

### **II - 4 - Participant Talks**

Sessions were organized for talks by the participants about their Institutions and their works. 19 talks were given always followed by ample discussion. These talks were mainly related to the presentation of either their MSc or the beginning of their PhD.

The timetable of all the activities during this ISYA as well as the names and addresses of all the participants have been printed and distributed. This programme is given in Annex.

### **III - Non Academic Activities**

Academic activities were stopped during the Saturday afternoon and the Sunday.

Bucharest sightseeing was organized on Saturday July 31rd, afternoon as well as a visit to the Village Museum on August 7th, afternoon.

On Sunday August 1st, a one-day tour was arranged at Sinaia in the Carpates mountains where is the former royal summer residence: Peles Castle.

On Sunday 8th a one-day tour was organized to Curtea de Arges, an old historical City.

A friendly "Romanian night" was organized by the Romanian participants as well as parties.

#### **IV - Budget and Local Organization**

An important help was given by the colleagues of the Faculty of Physics in many practical domains during the ISYA.

The IAU and UNESCO provided travel grants to foreign and Romanian participants.

The stay during the ISYA was entirely paid by the Romanian sponsors for the students as well as for the faculty members. The main Romanian sponsor is the Faculty of Physics, University of Bucharest, but several organizations and companies from Romania also contributed to support the ISYA as well as individuals. The list is given in Annex (see the Programme of the 24th ISYA)

Acknowledgments must also be given to the French CNRS (Centre National de la Recherche Scientifique) which contributed also to this ISYA through the PICS (Joint Programme in Astronomy between France and Romania).

The faculty of Physics of the Bucharest University is located at Magurele in a suburb, 15km from downtown.

All the meals were taken at the University canteen which was reopened specially for the ISYA. The Housing for the students were provided at the Dormitories on the Magurele Campus. The faculty members stayed at the hotel either at Magurele or downtown in an hotel run by the University.

All the foreign participants and the faculty members have been provided with free pass in the bus transportation system for the duration of the ISYA.

#### **IV - 1 - Expenses supported by ICSU/UNESCO income**

ICSU/UNESCO financial support : 20000 USD

8000 USD were brought directly to Bucharest and the remaining was put at disposal through the banking system; in total 19805 USD were available, the bank charged 195 USD for the transfer.

13266 USD : travel, paid cash to foreign faculty members and foreign participants

2167 USD : travel, paid cash to Visit Romania S.A. (pre-paid airplane tickets)

147 USD : travel, paid cash to Romanian participants

1762 USD : local transportation, paid cash to Condor Agency

300 USD : computing hardware and hardware for experiments, paid cash  
to the LOC (M. Rusu)

385 USD : gasoline for transfer to the airport by private car; telephone, fax expenses;  
paid cash to the LOC (M. Rusu)

Total cost : 18027 USD.

Back to UAI : 1778 USD.

All the accounting for these expenses as well as the certifications of travel expenses are given in Annex.

#### **IV - 2 - Expenses supported by local sources of income**

Rooms and Meals : 3954 USD

Miscellaneous (T-Shirt of the Eclipse-day, photocopies, etc...) : 1094 USD

Total : 5048 USD

The above amount represents only for what has been directly paid by the LOC. Several expenses, such as the stay of the foreign faculty members at the University Hotel downtown, were directly paid by the Faculty of Physics or by the sponsors and are not budgeted here.

#### **V - Conclusion**

For the first time, an International School on Astrophysics was organized in Romania. The point of view of the Romanian faculty members involved in this ISYA, is that it was a success due to the fact that a common project was successfully realized on an international scale in connection with the Astronomical Institut of the Romanian Academy of Science. The long term feedback from the participants will be reviewed in five years from now.

The IAU organizers, the participants and the host institution expressed their thanks to UNESCO: without their help and label, organizing such a course with such an international audience would have been very difficult. UNESCO was mentioned in the documents distributed to the participants including the Certificate of attendance, and will be mentioned in the report published in the IAU Bulletin.

REVIEW OF ISYA-24, July 26-August 14, 1999, IN BUCHAREST, ROMANIA

by Donat G. Wentzel, May 2003

*Donat G. Wentzel*

Several rounds of e-mail to participants led to a current e-mail address for 38 of the 41 participants. The review request asked for academic and job progress and ISYA influence thereupon; specific memorable subjects, lecturers, practical activities including eclipse ; whether ISYA provided a broader outlook on science and useful English practice ; quality of living and educational conditions and resulting later contacts with other participants ; suggestions for improvements. We received a good response: Ten out of 18 foreign participants and ten out of 23 Romanian participants responded during March 2003. All the respondents valued the ISYA very highly. A high proportion is still active in astronomy/astrophysics.

PROGRESS of Foreign participants: nine of the ten are still active in astronomy/astrophysics.

1) One Algerian, who already had a PhD (signal processing) used ISYA for professional development to turn to astronomy. "I learn about helioseismology from students of Uzbekistan and I initiated later this project in my institute." (Algiers Observatory) "I have an optimistic view of the development of astronomy in Algeria ... I want to participate actively in this project and ... the ISYA has brought a great contribution in this attitude."

2) Seven of the ten expect PhD's (six of them in astronomy): The two Turkish participants will soon receive a PhD related to stellar spectra, having visited Saul Adelman in the USA for six months. The Uzbeki student expects a PhD on helioseismology within a year. The three Egyptians each expect to receive a PhD within a year. One Algerian is pursuing a PhD in seismology in France.

3) The two Vietnamese are still teaching university-level physics and astronomy, now with greater authority.

PROGRESS of Romanian participants:

Seven of the ten are still active in astronomy / astrophysics.

1) Seven of the ten had ten-month visits at the University and Observatory of Turin, Italy or the University and MPI Radioastronomie, Bonn, Germany. (Three of them credit the Erasmus program). Of these seven, five are now seeking the Ph.D in : USA (two at Univ. of Alabama, advisor J. Sulentic, one at Northeastern University, astrophysics), Holland (one officially at Nijmegen, actually working at Fermilab USA), Germany (one at MPI Aeronomie, solar). One is seeking the MSc in Osaka, Japan (x-ray astronomy), and one is researcher at the Astronomical Institute, Bucharest (gamma ray bursts, etc.).

2) In addition, one teaches mathematics and informatics in highschool in Bucharest and is registered for a binary-star PhD topic in the Faculty of Mathematics, Bucharest University ; one is starting a PhD thesis on statistical physics in Paris ; one seeks a Ph.D. at the Bucharest Institute for Physics and Nuclear Engineering (nuclear spectroscopy).

COMMUNICATION: Many of the Romanians (and even some foreigners) are still in e-mail communication with each other, in part due to four having been in Turin and three in Bonn. Noticeably they keep in contact with Bucharest University, apparently thanks to Prof. Rusu having created a real astronomical community within the Faculty of Physics of the University of



Bucharest (Assoc. of Amateur Astronomers), supported by the international activities activated by Magda Stavinschi (Bucharest Astronomical Inst.)

**TEACHING:** Several participants praised the teaching (unasked): "Experience new pedagogical methods"; "Teaching methodology was effective"; "Our teachers have presented their courses with great devotion and passion"; "I am impressed by Dr. Gerbaldi...". Several praised the role of the participants' presentations. Only two mentioned the lecture notes as needed to compensate for slow English comprehension.

**PRACTICAL ACTIVITIES :** There was a large range of opinions of the practical activities, from complaints : "It was not well balanced between theory and practice"; "I think that the experimental work, even at the level of processing existing data, was the weak point of that summer school."; and "It would have been interesting to have a connection to some teams doing "real" eclipse experiments." to praise : "The practical activities were particularly helpful, ... my first contact with the kind of work an astronomer does"; "The great benefit was the outlook on the experiments"; and "I believe that some of the student experiments led by Prof. Rusu during the solar eclipse yielded much more valuable results than some "professional experiments". (He praises Prof. Rusu for preparing teaching experiments using ordinary things which anyone can find.)

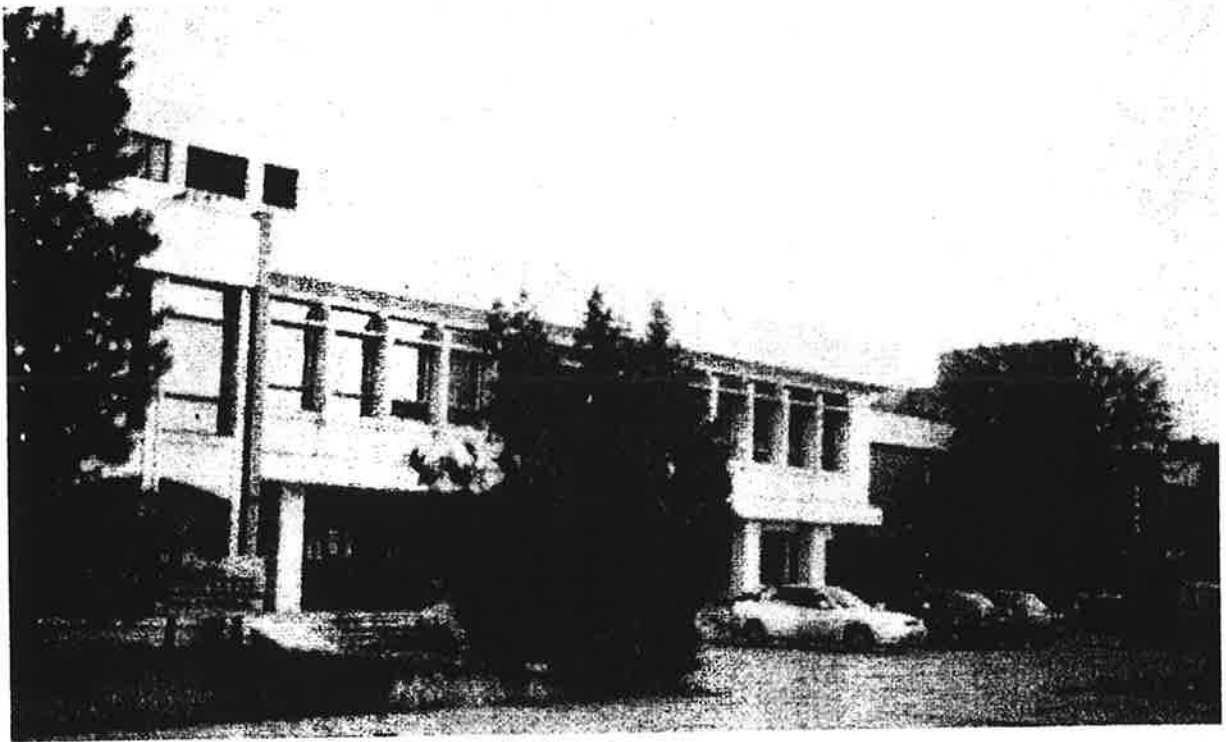
**INTERESTING REMARKS :** 1) The broadening experience of ISYA was expressed in terms of: "The school put me in contact for the first time with "research-oriented people" ; "... a closer look at the real world of science". 2) "Mr. Guinan's course determined me to make extrasolar planets the topic of my diploma paper." For another student also, Guinan's lectures led to his B.Sc. thesis. After ISYA, Guinan wrote a letter of recommendation for a student to participate at an Erice winter school, where she met her current German thesis advisor (P. Biermann). She wrote: ISYA "completely shaped my life". ISYA was "the first time I heard about the dynamo mechanism in stars, now I have a paper on the large scale magnetic fields in the galaxy." 3) Gerbaldi's spectroscopy course ultimately led to a student's working in nuclear spectroscopy. And it was the practical activities (including those that summer organized by Prof. Rusu) which led this student to decide to do some experimental physics. 4) One student wrote that "the Eclipse was the main event" as the experimental light curve figured in her Diploma thesis. 5) There were numerous comments similar to "ISYA is an important experience in my scientific life"; "will never forget the eclipse".

**ISYA-24**



**24<sup>th</sup> INTERNATIONAL SCHOOL FOR  
YOUNG ASTRONOMERS**

July 26 – August 14, 1999, Bucharest, ROMANIA



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**PROGRAMME**

# 24<sup>th</sup> INTERNATIONAL SCHOOL FOR YOUNG ASTRONOMERS

July 26 – August 14, 1999, Bucharest, ROMANIA

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**Organizers**

**ICSU/UNESCO**

**INTERNATIONAL ASTRONOMICAL UNION**

**ASTRONOMICAL INSTITUTE OF THE  
ROMANIAN ACADEMY – BUCHAREST,  
ROMANIA**

**FACULTY OF PHYSICS, UNIVERSITY OF  
BUCHAREST**

**Local Organizing Comitee**

**Mircea V. RUSU - ISYA Course Coordinator**

**Ion MUNTEANU - Vice-Rector, University of Bucharest**

**Voicu V. GRECU - Dean, Faculty of Physics**

**Florin POPESCU - Head of Atomic and Nuclear Physics Dept.**

**Elena BORCA - Faculty of Physics**

**Cornelia PALIVAN - Faculty of Physics**

**Horatiu PALIVAN - Faculty of Physics**

**Florin MARICA - Faculty of Physics**

and

**ASOCIATION OF AMATOR ASTRONOMERS FROM FACULTY OF  
PHYSICS, UNIVERSITY OF BUCHAREST**

## YOUR HOST

The Physics Faculty and the Atomic and Nuclear Physics Department have initiated immediately after 1989 a study direction with concrete perspectives for the future: the Astrophysics.

This new direction could be recognized also because our students have been candidates at the positions from the Astronomical Institute of the Bucharest Academy through the Doctoral Degrees from our country and abroad, where the professors from our Faculty have been Ph.D. supervisors or have took part from the commissions of examination. In the meantime, our students have won competitions for admissions for Master and Doctoral Degrees in Astrophysics abroad (Canada, France, United States), and recently in the SOCRATES/ERASMUS Program (1999-2000) we have students who are attending the Master Degree in Astrophysics in France, The Paris-Meudon Observatory and in Italy, Turin University and next year in Greece at the Athens University.

In the same time, at our Faculty have been invited professors, astrophysiciens worldwide known (United States, Australia, France, Germany, Italy) to keep conferences/courses for the students.

Since 1997, together with the Cultural Council of France Embassy in Romania, the Astronomical Institute and Faculty of Physics, we have organized courses for high level studies (for 8-10 days) at the faculty, with the students from the terminal years. This courses will continue also this academic year between 20 and 30 March.

In the period before the Solar Eclipse from 11<sup>th</sup> of August 1999, the Physics Faculty, together with the International Astronomical Union (IAU) and Astronomical Institute of the Romanian Academy organizes the "24<sup>th</sup> International School for Young Astronomer", which will contain lessons and practical activities for the students that are involved in Doctoral Degrees in Astronomy and Astrophysics and young researchers from all over the world.

The list of participants at this International School which will take place between July 26 and August 14, 1999 includes 50 students (from Russia, Uzbekistan, Turkey, Egypt, Maroc, Vietnam, Niger, Algeria and Romania) and 10 professors (from France, Italy, United States and Romania).

## Teaching Team

**Tatiana ANGELESCU**, University of Bucharest, Romania

**Attilio FERRARI**, University of Turin, Italy

**Michèle GERBALDI**, University Paris XI, France

**Edward GUINAN**, University of Villanona, USA

**Andrei IONESCU**, University of Bucharest, Romania

**Mircea RUSU**, University of Bucharest, Romania

**Magda STAVINSCHI**, Astronomical Institute of the Romanian  
Academy of Science, Bucharest

**Donat WENTZEL**, University of Maryland, USA

**Jean Paul ZAHN**, Observatory of Paris, France

*The lessons will be hold in the **Hall A1**, the practical classes on computers will be hold in the **Computer Room** and the astronomical studies will be hold in the **Astrophysics Laboratory**.*

# PROGRAMME

MONDAY, JULY 26, 1999

09:00 - 10:30	Registration
10:30 - 11:00	Coffee break
11:00 - 12:30	Opening Session
13:00 - 14:15	Lunch
14:30 - 16:00	D. Wentzel <i>The Sun with an Emphasis on the Role of the Magnetic Field in the Atmosphere (1)</i>
16:00 - 16:30	Coffee break
16:30 - 18.00	Presentation. Organization
19:00	Dinner

THUESDAY, JULY 27, 1999

08:00 - 9:00	Breakfast
09:00 - 10:30	D. Wentzel <i>The Sun with an Emphasis on the Role of the Magnetic Field in the Athmosphere (2)</i>
10:30 - 11:00	Coffee break
11:00 - 12:30	E. Guinan <i>Eclipses and occultation from the Sun to the Stars; eclipsing binary stars as astrophysical laboratories; exosolar planets (1)</i>
13:00 - 14:15	Lunch



14:30 - 16:00	M. Gerbaldi <i>Stellar astrophysics: why the stellar observations, tools for the interpretation of the observations, link between observations and theory (1)</i>
16:00 - 16:30	Coffee break
16:30 - 18.00	<i>Exercises</i>
19:00	Dinner

WEDNESDAY, JULY 28, 1999

08:00 - 9:00	Breakfast
09:00 - 10:30	E. Guinan <i>Eclipses and occultation from the Sun to the Stars; eclipsing binary stars as astrophysical laboratories; exosolar planets (2)</i>
10:30 - 11:00	Coffee break
11:00 - 12:30	<i>Participants talk (1)</i>
13:00 -14:15	Lunch
14:30 - 16:00	M. Rusu <i>Chaos in physics and astrophysics, fractal structure of the universe (1)</i>
16:00 - 16:30	Coffee break
16:30 - 18.00	<i>Exercises</i>
19:00	Dinner

THURSDAY, JULY 29, 1999

- 08:00 - 9:00            Breakfast
- 09:00 - 10:30        M. Rusu  
*Chaos in physics and astrophysics, fractal structure of the universe (2)*
- 10:30 - 11:00        Coffee break
- 11:00 - 12:30        M. Stavinschi  
*Astronomy: the time, mechanism of the solar eclipses (1)*
- 13:00 - 14:15        Lunch
- 14:30 - 16:00        D. Wentzel  
*The Sun with an Emphasis on the Role of the Magnetic Field in the Athmosphere (3)*
- 16:00 - 16:30        Coffee break
- 16:30 - 18.00        *Exercises*
- 19:00                 Dinner

FRIDAY, JULY 30, 1999

- 08:00 - 9:00            Breakfast
- 09:00 - 10:30        E. Guinan  
*Eclipses and occultation from the Sun to the Stars; eclipsing binary stars as astrophysical laboratories; exosolar planets (3)*
- 10:30 - 11:00        Coffee break
- 11:00 - 12:30        M. Gerbaldi  
*Stellar astrophysics: why the stellar observations, tools for the interpretation of the observations, link between observations and theory (2)*

13:00 -14:15            Lunch

14:30 - 16:00            M. Stavinschi  
*Astronomy: the time, mechanism of the solar eclipses (2)*

16:00 - 16:30            Coffee break

16:30 - 18.00            *Visit of the Observatory of Bucharest*

19:00                      Dinner

SATURDAY, JULY 31, 1999

08:00 - 9:00            Breakfast

                              09:00 - 10:30            PT2

10:30 - 11:00            Coffee break

11:00 - 12:30            *Participants talk (2)*

13:00 -14:15            Lunch

14:00 - 18:00            *Visit of Bucharest*



SUNDAY, AUGUST 1, 1999

*Visit Sinaia and Peles Castle (all day)*



MONDAY, AUGUST 2, 1999

08:00 - 9:00

Breakfast

09:00 - 10:30

D. Wentzel

*The Sun with an Emphasis on the Role of the Magnetic Field in the Atmosphere (4)*

10:30 - 11:00

Coffee break

11:00 - 12:30

M. Rusu

*Chaos in physics and astrophysics, fractal structure of the universe (3)*

13:00 - 14:15

Lunch

- 14:30 - 16:00 A. Ferrari  
*Galaxies, active galaxies, extragalactic jets, active galactic nuclei (1)*
- 16:00 - 16:30 Coffee break
- 16:30 - 18.00 *Participants talk (3)*
- 19:00 Dinner

THUESDAY, AUGUST 3, 1999

- 08:00 - 9:00 Breakfast
- 09:00 - 10:30 M. Gerbaldi  
*Stellar astrophysics: why the stellar observations, tools for the interpretation of the observations, link between observations and theory (4)*
- 10:30 - 11:00 Coffee break
- 11:00 - 12:30 A. Ferrari  
*Galaxies, active galaxies, extragalactic jets, active galactic nuclei (2)*
- 13:00 -14:15 Lunch
- 14:30 - 16:00 T. Angelescu  
*Astrophysics and the physics of elementary particles; neutrinos, quantum cosmology (1)*
- 16:00 - 16:30 Coffee break
- 16:30 - 18.00 *Participants talk (4)*
- 19:00 Dinner

WEDNESDAY, AUGUST 4, 1999

- 08:00 - 9:00            Breakfast
- 09:00 - 10:30        M. Gerbaldi  
*Stellar astrophysics: why the stellar observations, tools for the interpretation of the observations, link between observations and theory (5)*
- 10:30 - 11:00        Coffee break
- 11:00 - 12:30        T. Angelescu  
*Astrophysics and the physics of elementary particles; neutrinos, quantum cosmology (2)*
- 13:00 - 14:15        Lunch
- 14:30 - 16:00        E. Guinan  
*Eclipses and occultation from the Sun to the Stars; eclipsing binary stars as astrophysical laboratories; exosolar planets (4)*
- 16:00 - 16:30        Coffee break
- 16:30 - 18:00        *Participants talk (5)*
- 19:00                 Dinner

THURSDAY, AUGUST 5, 1999

- 08:00 - 9:00            Breakfast
- 09:00 - 10:30        D. Wentzel  
*The Sun with an Emphasis on the Role of the Magnetic Field in the Atmosphere (5)*
- 10:30 - 11:00        Coffee break
- 11:00 - 12:30        E. Guinan

*Eclipses and occultation from the Sun to the Stars;  
eclipsing binary stars as astrophysical laboratories;  
exosolar planets (5)*

13:00 - 14:15

Lunch

14:30 - 16:00

A. Ferrari

*Galaxies, active galaxies, extragalactic jets, active  
galactic nuclei (3)*

16:00 - 16:30

Coffee break

16:30 - 18.00

*Discussion in Astrophysics Laboratory*

19:00

Dinner

FRIDAY, AUGUST 6, 1999

08:00 - 9:00

Breakfast

09:00 - 10:30

M. Gerbaldi

*Stellar astrophysics: why the stellar observations, tools  
for the interpretation of the observations, link between  
observations and theory (6)*

10:30 - 11:00

Coffee break

11:00 - 12:30

A. Ferrari

*Galaxies, active galaxies, extragalactic jets, active  
galactic nuclei (4)*

13:00 -14:15

Lunch

14:30 - 16:00

T. Angelescu

*Astrophysics and the physics of elementary particles;  
neutrinos, quantum cosmology (3)*

16:00 - 16:30

Coffee break

16:30 - 18.00

*Participants talk (6)*

19:00 Dinner

SATURDAY, AUGUST 7, 1999

08:00 - 9:00 Breakfast

09:00 - 10:30 A. Ferrari  
*Galaxies, active galaxies, extragalactic jets, active galactic nuclei (5)*

10:30 - 11:00 Coffee break

11:00 - 12:30 E. Guinan  
*Eclipses and occultation from the Sun to the Stars; eclipsing binary stars as astrophysical laboratories; exosolar planets (6)*

13:00 - 14:15 Lunch

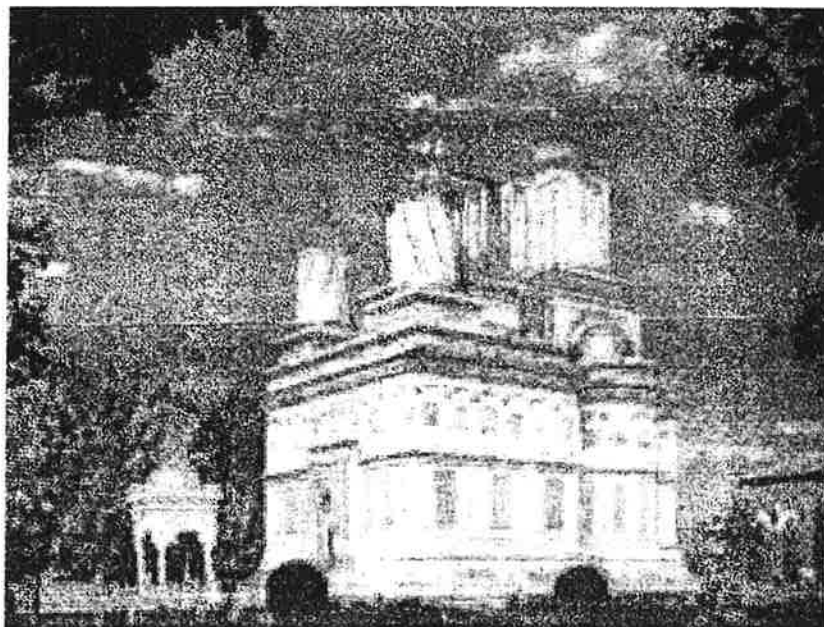
14:30 - 18:00 *Visit of the Village Museum*





SUNDAY, AUGUST 8, 1999

*Visit of an historical town in the South of Romania - Curtea de Arges (all day)*



MONDAY, AUGUST 9, 1999

08:00 - 9:00

Breakfast

09:00 - 10:30

D. Wentzel

*The Sun with an Emphasis on the Role of the Magnetic Field in the Atmosphere (6)*

10:30 - 11:00

Coffee break

11:00 - 12:30

A. Ferrari

*Galaxies, active galaxies, extragalactic jets, active galactic nuclei (6)*

13:00 - 14:15

Lunch

16:00 - 18:00 R. Passachoff  
*(Invited lecture at NATO workshop - Astronomic  
Institute of the Romanian Academy)*

19:00 Dinner

THUESDAY, AUGUST 10, 1999

08:00 - 9:00 Breakfast

09:00 - 10:30 J.P.Zahn  
*Internal structure of the Sun (1)*

10:30 - 11:00 Coffee break

11:00 - 12:30 A. Ionescu  
*Planetary atmosphere: the interaction in the high  
atmosphere with the solar and cosmic radiation (1)*

13:00 -14:15 Lunch

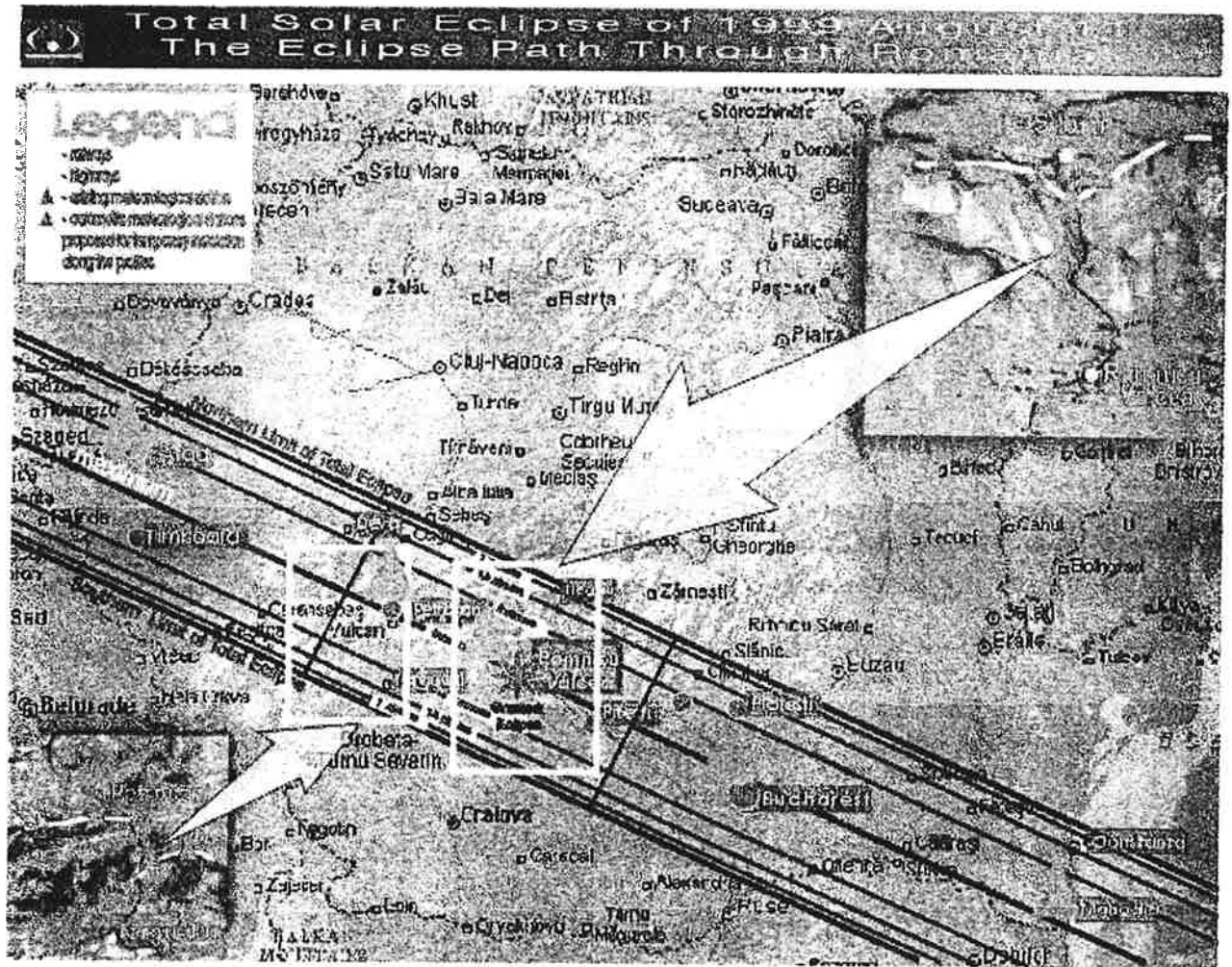
14:30 - 16:00 *Discussion*

16:00 - 16:30 Coffee break

16:30 - 18.00 *Participants talk (7)*

19:00 Dinner

WEDNESDAY, AUGUST 11, 1999



THURSDAY, AUGUST 12, 1999

- 08:00 - 9:00            Breakfast
- 09:00 - 10:30         J.P.Zahn  
*Internal structure of the Sun (2)*
- 10:30 - 11:00         Coffee break
- 11:00 - 12:30         A. Ionescu  
*Planetary atmosphere: the interaction in the high  
atmosphere with the solar and cosmic radiation (2)*
- 13:00 -14:15          Lunch
- 14:30 - 18:00         P. Heintzel  
*(Invited lecture at NATO workshop - Astronomic  
Institute of the Romanian Academy)*
- 19:00                   Dinner

FRIDAY, AUGUST 13, 1999

- 08:00 - 9:00            Breakfast
- 09:00 - 10:30         J. P. Zahn  
*Internal structure of the Sun (3)*
- 10:30 - 11:00         Coffee break
- 11:00 - 12:30         A. Ionescu  
*Planetary atmosphere: the interaction in the high  
atmosphere with the solar and cosmic radiation (3)*
- 13:00 -14:15          Lunch
- 14:30 - 16:00         *Participants talk (8)*
- 16:00 - 16:30         Coffee break

16:30 - 18.00

*Teaching of Astronomy*

19:00

Dinner

SATURDAY, AUGUST 14, 1999

08:00 - 9:00

Breakfast

09:00 - 10:00

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10:00 - 11:30

*Closing Session*

13:00 -14:15

Lunch

SUNDAY, AUGUST 15, 1999

*Departure*

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