Report on the 26th International School for Young Astronomers (ISYA)

Argentina - CASLEO - 12-30 August 2002

Michèle Gerbaldi, Chairperson for the ISYA

Nidia Morrell, Director of the 26th ISYA, La Plata Observatory

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I - Introduction

On behalf of the Facultad de Ciencias Astronómicas y Geofísicas de la Universidad Nacional de La Plata, Argentina, the organization of the 26th International School for Young Astronomers took place at the Complejo Astronómico El Leoncito (CASLEO), San Juan (altitude 2500 m) the major Argentinian National Observatory, under the direction of Prof. Nidia Morrell.

The *Local Organizing Committee* was:

Nidia Morrell (La Plata University, chair)
Zulema López García (San Juan University)
Jesús Calderón (Córdoba University)
Roberto Gamen (La Plata University)
Pablo Cincotta (La Plata University)

This 26th ISYA has been organized so successfully, due to the strong impetus by Nidia Morrell and her colleagues. The "savoir-faire" of the astronomical Argentinian community has been fully devoted to this School.
For the first time, the participants to an ISYA could do observations using a 2.15 m telescope thanks to the allocation of time by the Scientific Committee of CASLEO: during 11 nights, observational time was available for photometry or spectroscopy.
Dr. Hugo Levato, director of CASLEO, made possible the organization of the ISYA at this observatory.

Lecturers and participants were staying at an hotel at Barreal, a village located in the Calingasta Valley (altitude 1800m). One hour bus drive was necessary, each way, over mountain gravel road. This has been achieved thanks to the capability of the university bus driver Daniel Sánchez. The University of San Juan made available the bus for the whole ISYA duration.

The *faculty members* were:

- Maria Victoria Alonso (OAC, Córdoba, Argentina - Observatoire Midi-Pyrénées, Toulouse, France)
- Itziar Aretxaga (INAOE, Tonantzintla, Mexico)
- Rodolfo Barbá (FCAG, La Plata, Argentina),
- Guillermo Bosch (FCAG, La Plata, Argentina)

• Pablo Cincotta (FCAG, La Plata, Argentina)
• Sylvio Ferraz Mello (IAG, Sao Paulo, Brazil)
• Diego García Lambas (OAC, Córdoba, Argentina)
• Michèle Gerbaldi (IAP, Paris, France)
• Ed Guinan (Villanova University, USA)
• Mariano Méndez (SRON, The Netherlands)
• Nidia Morrell (FCAG, La Plata, Argentina)

Among the faculty members, Rodolfo Barbá, Michèle Gerbaldi and Nidia Morrell stayed during the all ISYA, Ed Guinan during more than two weeks. Several faculty members were able to stay not longer than 8 days; stays as short as 3 days do not permit real interaction with the participants even if the language barrier did not exist during this ISYA.
Ruben Díaz, a PhD student from Córdoba Observatory, stayed during all the School in order to animate the observing runs as well as the sessions of practical activities.
Federico Bareilles, system manager from La Plata Observatory, stayed the first week at the observatory to install and control the running of all the computer network and to provide useful information.

The number of participants was 28: 14 foreign and 14 Argentinian.

II - Participants

This ISYA was advertised as usual in the Bulletin of the IAU, as well as on the Web Page of the La Plata Observatory. Specific information was sent to several institutions in South and Central America by Prof. Nidia Morrell.

46 applications, from 22 countries outside of the South and Central America region, were received but were not taken into account during the selection, those countries being too far from the geographical area considered for this ISYA.

22 applications, from 10 Latin American countries other than Argentina were received. According to the budget, 15 foreign participants were invited, from 8 different countries in South and Central America; 1 foreign student canceled his participation at the very last moment.

32 applications were received from Argentinian students, 21 students were invited to participate, but 7 of them canceled their participation, at the last moment, for various personal reasons (such as health/family problems or the need to start new university term abroad).

The participants came from:

Brazil: 3 (male), Cuba: 2 (male), Ecuador: 1 (male), Honduras: 1 (male), Nicaragua: 2 (1 female, 1 male), Peru: 2 (male), Uruguay: 1 (female), Venezuela: 2 (male).
Argentina: 14 participants (8 female, 6 male), 4 from Buenos Aires, 5 from La Plata, 3 from Córdoba and 2 from San Juan.

The background of these 28 participants, ranged from finishing their Licenciado degree (nearly equivalent to a MSci. degree, and the first degree in Astronomy or Physics available from Argentinian universities, where the BSci. degree does not exist; 6 students: 1 from La Plata, 2 from San Juan and 3 from Córdoba were in this situation) or having started their PhD about one year ago (8 students: 4 from Buenos Aires and 4 from La Plata).

III - Academic Activities

Spanish/English was the language of the ISYA.

III - 1 - Lectures

The topics covered by the lectures were:

• Introduction to Galaxies: *María Victoria Alonso*

The Milky Way
Stellar Populations
Galaxy morphology
Scaling relations
Galaxy distances, the high-z Universe
4 lectures (6 hours)

• Active Galactic Nuclei: *Itziar Aretxaga*

AGN taxonomy and unification
The role of BHs in AGN
The role of stars in AGN
3 lectures (4.5 hours)

• Astronomy with Large Astronomical Databases: *Rodolfo Barbá*

The observing proposal and Internet resources for Astronomy
Data mining and Virtual Observatories
Practical use of astronomical databases: MAST - HST - 2MASS
4 lectures (6 hours)

• Star Forming Regions: *Guillermo Bosch*

Giant HII Regions
Dynamics of HIIRs
Stellar kinematics in 30 Dor
3 lectures (4.5 hours)

• Topics in Theoretical Galactic Dynamics: *Pablo Cincotta*

Statistical description of N-body gravitating systems
General aspects of dynamics in Hamiltonian systems
Open problems
3 lectures (4.5 hours)

• Dynamics of Extrasolar Planetary Systems: *Sylvio Ferraz Mello*

2-body problem plus orbit determination problem
The determination problem in case of many planets (N-body simulations)
Description of the dynamics of planetary migration
3 lectures (4.5 hours)

• Cosmology: *Diego García Lambas*

The large scale structure of the Universe

General Relativity: the world at large
The formation of structure in the Universe
Statistical studies of the large scale distribution of mass and galaxies.
3 lectures (4.5 hours)

• Stellar Astrophysics: *Michèle Gerbaldi*

The HR diagram
The observational tools
The model atmosphere
Spectrum synthesis and abundances
3 lectures (4.5 hours)

• Binaries, The Sun: *Ed Guinan*

Extrasolar planets
The search for life in the Universe
Eclipsing binaries and the distance to the Large Magellanic Cloud
The Sun in time
4 lectures (6 hours)

• High Energy Astrophysics: *Mariano Méndez*

Continuum processes in X-ray and Gamma-rays
X-ray spectroscopy: practical application

High-time resolution observations of galactic X-rays sources
4 lectures (6 hours) 4 hours of practical exercises.

III - 2 - Practical Activities

A network of 10 computers under LINUX was set up for the practical activities. Specialized software packages were installed for the reduction and analysis of optical (IRAF) and X-ray (XSPEC) observations.

19 hours of practical work took place during the ISYA including: analysis of X-ray observations, data reduction and analysis of the spectroscopic and photometric observations done at the 2.15-m telescope. All together 10 sessions of practical work were organized.

III - 3 - Observations with the 2.15-m telescope

Under the supervision of Rodolfo Barbá and of Nidia Morrell, an observing program has been set up in order to make comprehensive observations which may constitute later a short publication.
BVRI photometry and intermediate resolution spectroscopy in a selected area of NGC 6357 were done.
Each student spent one observing night (6 hours) at the 2.15-m telescope.
Data reductions using dedicated software and analysis of the photometric and spectroscopic observations were done during the practical activities.

A visit to the nearby Estación de Altura Carlos Ulrico Cesco, from the Félix Aguilar observatory of San Juan University was organized, on 14th August, afternoon. This observatory is mostly devoted to astrometric and solar observations. Among its instrumentation there is a double astrographic telescope (presently equipped with a CCD mosaic), a meridian circle, a solar coronograph (MICA), a solar Hα spectrograph (SPECHA), and other telescopes. Lic. Carlos López, from the University of San Juan, kindly showed and explained this observatory's facilities to the ISYA group.

A visit to the Burek mountain (7 km away from El Leoncito) took place on 28th August afternoon, where the 60-cm Helen Sawyer Hogg telescope (originally at Las Campanas Observatory and on long term loan to CASLEO) is currently being installed. This telescope will be devoted to direct CCD imaging and stellar spectroscopy.

III - 4 - Participant Talks

Sessions were organized for talks by the participants about their Institutions and their works.

17 talks were given, all of them followed by discussions. The student presentations (20 minutes each) added up to 5 hours, divided into 4 blocks. Most of these talks were given in English.

∗ *Javier García* (Venezuela)
Quantitative stellar spectral classification
∗ *Ileana Andruchow* (Argentina)
Photopolarimetry of blazars
∗ *Facundo Albacete* (Argentina)
Optical and X-ray survey of early type stars in NGC 3372
∗ *Oli Dors Jr.* (Brazil)
Excitation gradients in spiral galaxies
∗ *Carlos Leal* (Venezuela)
Automatic detection of moving objects in the Solar System
∗ *Ivan Ramírez* (Peru)
IRFM temperature calibration for various photometric systems
∗ *Gabriel Ferrero* (Peru)
Photometry of variable stars from the Observatory of Maranganí
∗ *Julia Arias* (Argentina)
Optical and infrared study of M8
∗ *Jorge Valiente and Ernesto Rodríguez* (Cuba)
Astronomy in Cuba
∗ *Gisela Romero* (Argentina)
First step : CO & co.
∗ *Damián Mast* (Argentina)
Integral field spectroscopy: the nuclear region of NGC 5236
∗ *Carolina Cincunegui* (Argentina)
Stellar activity indicators I
Andrea Buccino (Argentina)
Stellar activity indicators II. Extrasolar planets
∗ *Nicolas Vásquez* (Ecuador)
Observatorio de Quito. Accretion disks
∗ *Gabriela Castelletti* (Argentina)
General properties of supernova remnants
∗ *Guillermo Hägele* (Argentina)
Search for PMS objects in the Carina Nebula
∗ *Wilfredo Flores* (Honduras)
Astronomy in Honduras

IV - Non-Academic Activities

Non academic activities were organized during the ISYA.

On 21st August a 3-hours walk was organized to a petroglyph place, nearby the observatory.

On the Saturday-Sunday 17-18th a visit to the city of San Juan took place as well as a visit to the Museum at La Laja (pre-Columbian archaeology).

A second excursion took place the following weekend (Saturday 24th, Sunday 25th August) to the village of Valle Fértil and Ischigualasto National Park (Valle de la Luna), famous geological and dinosaur place.

On Friday August 23rd evening, a party was organized by the students, attended by all the students and present faculty members.

On Friday August 30, a closing barbecue, was offered at CASLEO.

V - Budget and Local Organization

Important help was given by the personal of the CASLEO Observatory in many practical domains during the ISYA.

Due to economical situation in Argentina, unexpected when the ISYA was approved by the IAU EC in 2000, only a very limited budget could be allocated to this ISYA by Argentina.
This being known lately (February 2002) the rise of other funds has been extremely difficult. Fortunately UNESCO Paris responded positively and gave a grant of 10,000 US dollars for the stay during the ISYA for the students and faculty members.
All the remaining expenses where funded by the IAU (20,000 US dollars) in a very exceptional manner.

The detail of the expenses is given in a separate document.

VI - Conclusion

The organization of an ISYA in Argentina, gave the possibility to have at least a partial overlook of the astronomy development in South/Central America, in countries other than Argentina, Brazil, Chile and Mexico.
The progress of the implementation of Astronomy in Peru at the National San Marcos University of Lima was clearly demonstrated by the presence of two Peruvian students. It is worthwhile to recall all the efforts and programs previously developed in order to enhance astronomy in Peru: VLP program and the collaboration of the countries in South America where Peruvian students obtained their PhDs.

The success of this ISYA measured right at the end of it, in term of participation of the students during the lectures, the practical activities done using computers reducing real data obtained in different spectral domains: X-rays and visible, observations done with a 2.15-m telescope in photometry and spectroscopy, is the consequence of the full involvement of all the faculty members as well as the careful preparation by the Argentinian colleagues, specially by Nidia Morrell.
The fact that all the participants (except 3 of them) and all the faculty members (except 2 of them) had their mother tongue, Spanish, as a common language, permitted fruitful discussions starting at the very beginning of the ISYA.

Paris, September 2002