Report on the

NEON Observing Schools 2006

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The NEON school participants at OHP.

This year has seen the organisation of two NEON summer schools, sponsored by the European Community Marie Curie Actions programme: the Fifth NEON Observing School (23 July–6 August, 2006) at the Observatoire de Haute-Provence, France; and the Second NEON Archive Observing School (30 August–9 September, 2006) at ESO Headquarters, Germany. The purpose of these summer schools is to provide the opportunity for young astronomers to gain practical experience in observational techniques, data reduction and analysis and the use of virtual observatory tools.

The students at both schools carried out small research projects, centred on front-line astrophysical topics, in small groups under the supervision of experienced astronomers. These practical exercises are introduced by lectures on general observational techniques and archival research for both ground- and space-based astronomy, by world-class lecturers also supported by the Opticon Network.

The observing school at the Observatoire de Haute-Provence (OHP) concentrated on the skills required to execute an observing programme at the telescope, from the preparation of targets to data reduction, including the set-up and calibration of the instruments. This school gathered 22 students of 13 different nationalities, with an exact balance of gender (the selection had been based on purely scientific criteria). The research projects in groups of four or five dealt with the following topics: observation and interpretation of variability at the lower end of the Cepheid instability strip, led by Yves Fremat (Belgium); the Tully-Fisher relation in local clusters, under the direction of Joel Vernet (ESO); spectroscopic and interferometric study of the star χ Cygni, with Hervé Le Coroller (OHP); physical characterisation of selected asteroids, under the supervision of Simone Marchi (Padova); and the study of stellar populations in elliptical galaxies, led by Santos Pedraz from the Calar Alto Observatory (Spain). The students could use four different telescopes with either CCD-photometry or spectroscopy, the smallest but not least interesting being an 80-cm telescope with a mirror polished by André Couder himself; this one was used for visual observations and some technical tests, in particular the Foucault knife-edge test which probably only the oldest of the presently active astronomers still remember how to perform.

Photo: E. Janssen, ESO

The NEON school participants at ESO Headquarters.

The school saw intensive days and nights in a very pleasant setting. The instrument development laboratories and the geophysical research activity on the site provided other topics of interest as distractions!

The Archive Observing School at ESO focused more on the use of existing data and the multi-wavelength research possible with high-quality archival data combining ground and space observations. The first step, instead of acquiring the data at the telescope, consisted of the archive retrieval and quality appraisal of the data. In the case of HST data, often a science-ready product can be retrieved while for other data the typical data-reduction steps have to be performed. Twenty students (13 female and 7 male) coming from 12 different European countries attended. A full record of the school, including the final presentations of the research projects can be found at *http://www.eso.org/neon-2006*. The research projects, conducted in groups of four, were focused on the multi-wavelength analysis of archival data spanning a wide range of astrophysical topics: VLT/FLAMES-GIRAFFE spectroscopy of stars in the open cluster NGC 2506 to determine radial velocities and abundances, under the lead of Frédéric Royer (Paris); searching for a galaxy at redshift 10 us-

ing ultra-deep ISAAC and FORS imaging, guided by Michael Schirmer (ING, La Palma); calculating the ionising flux of O-stars in dusty embedded star clusters using VLT/VISIR and HST images, introduced by Margrethe Wold (ESO); the search for ultra-compact dwarf galaxies in Abell 1689 with the help of HST images and spectroscopic confirmation with VLT/FORS, led by Steffen Mieske (ESO); and last but not least, the study of globular clusters and low-mass X-ray binaries in a Virgo elliptical by combining HST imaging with Chandra data, under the supervision of Andrés Jordan (ESO). Besides the usual series of lectures introducing basic photometric and spectroscopic techniques, special attention was given to the presentation of the available archives and archival research techniques. Taking advantage of ESO's strong involvement in instrumentation and telescope design, further lectures dealt with the diversity of instrumentation covering a large wavelength range and the history and future of telescope design.

The feedback from the school indicated a high satisfaction rate of the students and, what is more important, a notable increase in interest to make use of archival data and the need to learn more about the relevant research tools including Virtual Observatory developments. It is clear that the multi-wavelength approach is becoming the best way to do good research in astrophysics.

A common feature of both schools was the very positive impact of gathering students from various origins and nationalities, which is seen as a good start for future, pan-European collaborations. This was complemented by open discussions on the situation of jobs in astronomy and career strategies. Various job possibilities at individual universities and laboratories were presented as well as the more general exchange programmes offered by the European Union.

It is clear that the success of these schools calls for more such events in the future. We are pleased to announce the next NEON Observing School which will take place in Asiago Observatory (Italy), 4–18 September 2007. More detailed information on programme and registration will be announced later this year on the EAS web pages and through the usual communication channels. A further two NEON schools are planned for 2008: one will take place in La Palma using the ING and NOT telescopes, and the other one at ESO Headquarters, Garching, once more focusing on the use of Archival Data.

Report on the Meeting on

Science with ALMA: a New Era for Astrophysics

held in Madrid, Spain, 13–18 November 2006

Paola Andreani, Martin Zwaan, Robert Laing (ESO)

Three hundred scientists from all over the world met during a warm November week in Madrid to discuss the scientific revolution (or, according to one speaker, evolution) that we expect from ALMA. The large number of participants, the richness of the science and the wider community's increasing interest in ALMA made this meeting an optimistic and exciting one. The talks and posters covered almost all of the science areas relevant to ALMA including its main drivers: the formation and evolution of galaxies, the physics and chemistry of the interstellar medium, and the processes of star and planet formation. We heard about new results from the current generation of millimetre and sub-millimetre arrays such as the SMA and the recently upgraded Plateau de Bure Interferometer, as well as related observations at other wavelengths (especially from the Spitzer Space Telescope). The anticipated performance of ALMA and the current status of the project were both described, and many speakers presented ambitious plans for observing with the array once it becomes fully operational. It would be impossible even to list all of the contributors in a short article; instead, we briefly summarise some of the key topics, concentrating on star and galaxy formation.

Our present picture of low- and high-mass star formation is based on indirect evidence. Although the formation sites have been identified, the processes cannot be followed in detail. Stars form in the central cores of molecular clouds, mostly in multiple systems and coherent clusters. Observations show that the mass function of the molecular condensations is similar to the initial mass function for stars and that the fraction of the cloud in the condensed phase corresponds to the expected star-formation efficiency, but we do not know which physical processes govern the mass fragmentation of molecular clouds and hence shape the initial mass function. We do not understand in detail the kinematics and dynamics of accretion onto protostellar cores, the formation and collimation of outflows and the eventual evolution of circumstellar discs to form planetary systems, asteroids and comets. Still less do we comprehend the role of magnetic fields.

ALMA will be able to see the collapse of the central regions in pre-stellar cores and in young stellar objects, image the complex structures of infalling, outflowing and accreting material and follow the formation and evolution of discs. These processes will be studied not only with