the Paranal visit after the Workshop, did see them, however!

The pleasant environment of the ESO facilities in Santiago, the tutorial, particularly appreciated by students and non-cosmologists and the great reviews/contributions/posters all contributed to making this Workshop a very exciting one!

The group of reviewers and the SOC decided that there is no need to print another book on Cosmology and that the interest of the meeting had been largely in discussing and meeting with colleagues and young researchers ... Yet, most of the reviews and presentations are available on the Workshop webpage. To retrieve the information, please go to:

http://www.eso.org/gen-fac/meetings/cosmology2002/programme.html

International Workshop on

STELLAR CANDLES FOR THE EXTRAGALACTIC DISTANCE SCALE

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An international Workshop, "STELLAR CANDLES for the EXTRAGALACTIC DISTANCE SCALE", was organized jointly by the European Southern Observatory and the Astronomy Group at the University of Concepción as a member of the FONDAP/Conicyt Centre for Astrophysics launched in Chile in 2002. The Workshop received support grants from ESO, FONDAP/Conicyt, the University of Concepción and Fundación Andes.

The Workshop was hosted on the beautifully green campus of the University of Concepción, on December 9–11, 2002, under blue skies and in a pleasant atmosphere. More than 73 astronomers had registered and attended the Workshop. We are happy to acknowledge a good participation of students from various Chilean universities. After a formal opening of the Workshop by the Rector of the University, Don Sergio Lavanchy Merino, and the Dean of the Physics and Mathematics Faculty (where the Workshop was taking place), Dr. José Sanchez, a few words of welcome were given by Dr. Wolfgang Gieren, Head of the Astronomy Group in Concepción.

A fairly large number of possible stellar "candles" used for the determination of the extragalactic distance scale, were examined and discussed during the Workshop. These encompassed: Cepheids, RR Lyrae stars, blue supergiants, the red giant clump, supernovae of types Ia and II, novae, planetary nebulae, eclipsing binaries, and globular clusters. Both theoretical and observational reviews were given by top specialists on the various candles, and some recent advances were presented. Pros and cons were discussed for each candle, giving rise to lively, sometimes hot, debates.

The comparison of distances derived for a same galaxy using different indicators was extremely interesting. Obviously, the Large Magellanic Cloud is the galaxy which has been studied through the greatest variety of distance indicators. In spite of fairly large-size variations, still to be understood, the value for the distance modulus of the LMC seems to be slowly converging: as quoted in the concluding remarks, 60 values were mentioned during the Workshop, with a mean close to 18.5 mag and uncertainty of ±0.1 mag. The question was raised about how accurately do we actually need to measure this number, for the various astrophysical applications?

Using the same distance indicator, the Cepheids, does not always lead to similar results, even if one uses the same data set! Very puzzling was the comparison of distances derived from the same large *HST* data set on Cepheids in some 25 nearby galaxies. Two independent studies have been concluded on two different values of the Hubble constant, with a net difference of 12 km/s/Mpc, three times larger than the quoted total error-bars (±2 km/s/Mpc) on each value. This opened a vivid and enlightening discussion about unknown systematics: it was wisely suggested that we use a current "best value" of 66 ±6 km/s/Mpc for the Hubble constant, until the source of the discrepancy has been understood.

On the side of theory, progress in stellar atmosphere modelling of Cepheids opens the door to direct distance determinations of improved accuracy. Coupled to interferometric measurements, this is becoming a superb and promising technique to directly derive a very accurate distance to Cepheids, to distances further out than those in reach by parallax measurements.

More and more refined analyses of other indicators are currently being developed, either from a modelling or an observational point of view. Progress is being made on RR Lyrae star observations and modelling, especially on the near-infrared period–absolute magnitude–metallicity relation which is a particularly useful tool in old population systems, on the intermediate-aged clump stars for which the most recent K-band studies in the Magellanic Clouds and other Local Group galaxies seem to indicate that very accurate distance results can be expected from this method in the near-infrared domain, and on blue supergiant stars which offer the advantage of being intrinsically very luminous candles which can be used in galaxies as distant as 10–15 Mpc but are appropriate for young population systems only. The wind momentum–luminosity relation and the flux-weighted gravity–luminosity relation for these stars are very promising tools for spectroscopic distance determinations of high accuracy from these objects. The use of spectroscopic information, which gives metallicity and reddening information on the studied objects "for free", is indeed an important plus.

The use of supernovae for distance determinations was extensively discussed since these constitute privileged – and often unique – indicators at high redshift. SNIa remain the best indicators to be used so far in very distant galaxies, although not being the perfect candle – since there are slowly declining and fast declining SNIa. It has been recommended at the Workshop to study them in the H band where the slope of the luminosity versus decline-rate relation seems to be essentially flat and where reddening corrections are smaller than in optical bands. The following comment was also made: "Despite the fact that we don't understand them, they are excellent stellar candles"... In turn, SNII are not intrinsically as bright as SNIa and are subject to more systematics, hence currently less useful as candles than SNIa. An exhaustive review on the physics of SNIa explosions was given from which the following quotation is extracted: "the red model here is the truth, the blue lines are the observations".

Novae were also explored for their current usefulness as distance indicators, although they seem to be hampered by larger systematics than other stellar candles. Planetary nebulae, presented as the "Swiss-army knives" of extragalactic astronomy, are also used to derive distances to galaxies, through their luminosity function (measured in the [OIII] emission line). The technique seems to work, in spite of a number of complicating factors, which led to the following remark: "An astrophysicist is someone who sees something working in practice and wonders whether it works on the basis of first principles".

The luminosity function of globular clusters is another attempt at enriching our tool-box of distance indicators, which was discussed at the Workshop. And, finally, the use of eclipsing binaries as distance indicators looks very promising if more appropriate systems in Local Group galaxies can be found.

Altogether, the Workshop allowed us to discuss and compare in depths the different stellar indicators used so far in the difficult quest of astronomers for distances. The very pleasant environment of the campus, the excellence of the talks, the challenges of the field were key-elements for stimulating discussions and exchanges. Remaining controversies were "discussed" during the soccer game which closed the Workshop, although some attendees (those for which all questions had been answered) had left already! The game was won by the population II team against the population I team, with the help of a Dutch referee who is known to be a friend of old stellar populations...

The reviews of this Workshop will be published early 2003 in a volume of the Springer series Lecture Notes in Physics, while all contributions – talks and posters – will be made available on the Workshop webpage in Concepción (http://cluster.cfm.udec.cl).

Fellows at ESO

Since the beginning ESO has provided opportunities for young scientists to interact with the environment of an observatory. Many European astronomers spent some years as post-doctoral Fellows at ESO. The Fellowship programme has been very successful; with only very few exceptions, all former ESO Fellows are now working as astronomers in the community.

In addition to developing their scientific careers the Fellows are also asked to contribute to the work of the observatories. In Chile all Fellows are involved in operational activities at Paranal and La Silla, while in Garching they participate in instrument and software development, PR activities, ALMA related studies and surveys.

With this issue of The Messenger we start short presentations of Fellows currently at ESO. They describe in their own words what research they pursue and how they are involved in ESO activities. We will continue to present some of the young faces at ESO in the coming issues. *B. Leibundgut*

Aurore Bacmann

I have been a Fellow at ESO Garching since March 2002. Before that, I had done my PhD thesis with Philippe André at CEA-Saclay near Paris, France, and spent two years as a post-doc at the University of Jena, Germany, working in the group of Thomas Henning. My area of research is star formation, mostly the early pre-stellar stages, before stars are formed within dense cores. This stage is particularly important since it represents the initial conditions of gravitational collapse and star formation. During my PhD, I used the instrument ISOCAM aboard the ISO satellite to determine the density structure of pre-stellar cores.

After my PhD, I started studying the chemistry of these cores, chiefly molecular depletion and deuteration, with collaborators from the Bordeaux and the Grenoble Observatory in France. This has been my main subject of research here at ESO. To carry out these projects, I use mostly (sub)millimetre telescopes. Additionally I work on the structure of circumstellar matter around Herbig Ae/Be stars, using polarimetry, and I am also interested in their chemistry.

Since I arrived at ESO, I have been involved in the development of the interferometer ALMA, working with Stéphane Guilloteau (IRAM/ESO). The main goal of this task is to look into the bandbass calibration of the system and determine the frequency response of the instrument. It is extremely motivating to be taking an active part in such a major and ambitious project, all the more that ALMA will be very relevant to the research I am doing.

Maria-Rosa Cioni

I am probably an astronomer since the autumn of 1990 when I started at the University in Bologna, though the bed sheets of my earliest days were full of planets and stars. After graduating I moved to the Leiden Observatory in the Netherlands where I obtained the Ph.D. degree. This first highly positive experience abroad exposed me to an international and active scientific environment that could find no better match afterwards than by coming to ESO.

I study Asymptotic Giant Branch stars, their evolution and variability properties in resolved galaxies: the Magellanic Clouds and other galaxies in the Local Group. I am actively collaborating with my former supervisor Prof. Harm Habing and our most recent paper shows the metallicity gradient in the Magellanic Clouds from the ratio of carbon- and oxygen-rich stars. My work, so far predominantly photometric, is evolving to spectroscopy using the FLAMES instrument. At the same time I follow-up from the La Palma observatory AGBs in northern Galaxies.

I am presently in the middle of my ESO fellowship and I feel proud of being among the people that work at and for the observatory and provide the resources that improve our knowledge of what is above us. I have found both in Garching and Chile, where I enjoy spending part of my time, a very friendly group of colleagues and new collaborators. I learned how to support the astronomical activities in Paranal. In particular using the UVES instrument and FLAMES in the near future.

During my free time, though there is always more work than time, I enjoy the rich social life in Munich, practise various sports and am (now) learning German.