

IRACE gives more freedom in programming read-out sequences. The TIMMI2 detector (Raytheon CRC774) has a rather complex architecture, and especially “long” detector integration times (exceeding 100 ms; this is long for the mid-infrared!) could only be done in very compromised form with the old system.

(2) *Spectroscopy*: The sensitivity improved by a factor of 2: 50mJy/10sigma/1hr at 10 micron.

(3) *Polarimetry*: This has been extensively tested. A new Instrument Package is available on the web and is already installed at the telescope.

### Developments

In April, TIMMI2 will undergo regular maintenance. We plan to reinstall the science grade array, together with new cryo cabling and detector board.

The Lunar Occultation mode will be

implemented soon. It is not yet operational at a template level: we hope to offer it in visitor mode during Period 71, and in full operation mode for Period 72.

The possibility to chop at different PA angles is under investigation. This will be a major improvement for extended source observations.

The new, more compact control rack leaves more space in the Cassegrain cage. The implementation of a rotator function is under study.

## OTHER ASTRONOMICAL NEWS

### NEWS FROM SANTIAGO

#### International Workshop on

## STRUCTURE EVOLUTION AND COSMOLOGY: NEW SYNERGY BETWEEN GROUND-BASED OBSERVATIONS, SPACE OBSERVATIONS AND THEORY

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M. PIERRE (CEA/SAp/France) and  
A. REFREGIER (CEA/SAp/France)

An international Workshop, “Structure Evolution and Cosmology: New Synergy between Ground-based Observations, Space Observations and Theory”, was organized jointly by the European Southern Observatory (ESO/Chile), the Centre National d’Etudes Spatiales (CNES/France) and the Commissariat pour l’Energie (CEA/France), at ESO/Santiago from October 28 to 31, 2002.

The ESO facilities in Santiago were hosting such a large meeting for the first time: according to the attendees it was a very successful trial and, on our side, we were very happy to share with them our renewed environment, as well as the coffee-breaks on the lawn!

A total of 144 astronomers and students attended the Workshop, which was opened by the ESO Director General, Catherine Cesarsky. After the usual welcome words given in the name of the Scientific Organizing Committee (Danielle Alloin, Marguerite Pierre and Alex Refregier), we started a half-day tutorial about Cosmology. This was an excellent way to refresh and update our ideas in the field and we recommend the superb tutorial presentations to be found on the Workshop webpage (see below)!

The unfortunate overbooking problems of some flights prevented a few of our reviewers to arrive on time for their presentation, or arrive at all! Thanks to the friendly attitude of all speakers, we did some re-shuffling of the programme and, among others, exchanged weak-lensing against strong-lensing (still lensing anyway!). This gave a touch of “impromptu” to the Workshop, creating the nice feeling that we were all involved in the Workshop organization...

A rather complete panel of topics related to Cosmology were covered: from the description of the early universe by particle physicists, to the birth and evolution of large-scale structures (simulations and observations), to various aspects of galaxy clusters, to the numerous lensing effects one encounters when probing the high-z universe... Vivid and interesting discussions followed the presentations, continued at the posters display and at the coffee-breaks/lunches. The need for a good interplay between space-based and ground-based observations (to accomplish a multi-wavelength coverage), but also with simulations and theoretical approaches, was highlighted throughout the Workshop. And this is indeed what is giving rise to the great achievements of modern astrophysics!

The dense programme of the Workshop was interrupted for half a day to visit La Sebastiana, the house of Pablo Neruda in Valparaíso: an attempt to join the dreams of the poet with our more arid research activities?

*“La luz bajo los árboles,  
la luz del alto cielo.  
La luz verde enramada  
que fulgura en la hoja  
y cae como fresca arena blanca.  
Una cigarra eleva  
su son de aserradero  
sobre la transparencia.  
Es una copa llena de agua,  
el mundo.”*

Then, walking down through Valparaíso’s stairs and paths, we reached the restaurant at the top of a tower in the port, where the Workshop dinner was held, and from there we could enjoy the magnificent view to the bay and the hills of Valparaíso, all twinkling in the night. On our way back to Santiago, the bus was stopped for a while because of an excess of weight (!) and during this unexpected pause, some of our skilled theoreticians were desperately trying to see the Magellanic Clouds, in spite of an intense light background. The happy ones who went to

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 contrib-

uted 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

*D. ALLOIN (ESO/Chile) and  
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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  $\pm 0.1$  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 ( $\pm 2$  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  $66 \pm 6$  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 par-

ticularly 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".