

ies at arcsecond angular scales, allowing the characterisation and separation of some of the secondary effects in the CMB, such as the Sunyaev–Zeldovich and Ostriker–Vishniak effects. Those observations could probe the reionisation epoch, the nature of the dark energy and allow the study of high redshift galaxy clusters and protoclusters, as explained by José Antonio Rubiño.

### Preparing for ALMA — synergies

The final session of the conference was designed explicitly to promote synergies between the radio and non-radio astronomers, with the aim of preparing for challenging projects with ALMA. Survey projects with the strong involvement of the Spanish community, which would provide the best targets for ALMA studies, were reviewed. Narciso Benítez presented preliminary results from the ALHAMBRA (Advancer Large Homogeneous Area Medium-Band Redshift Astronomical) survey and introduced the future Javalambre/PAU (Physics of the Accelerating Universe) survey, which will cover the full northern sky with 40 medium band filters. Jordi Cepa summarised some of the surveys proposed by the OSIRIS instrument at the 10.4-metre GranTeCan (GTC) telescope, Marc

Balcells presented the near-infrared spectroscopy of  $z = 1\text{--}2.5$  galaxies to be performed by the GOYA (Galaxy Origins and Young Assembly) project with the GTC/EMIR instrument and Nieves Castro-Rodríguez reviewed Herschel and Spitzer cosmological surveys.

With ALMA approaching operations in the next few years, it is clear that the various millimetre and submillimetre facilities must be already preparing the first science targets. Single-dish far-infrared to millimetre facilities were reviewed by David Hughes, while Paul T. P. Ho focused on the interferometric ones, showing how the SubMillimeter Array (SMA) is preparing specifically for higher frequency studies in the ALMA era. Antonio Alberdi presented the sensitivity improvements that could be obtained if a phased array with a large number of antennas working at millimetre and submillimetre wavelengths like ALMA is used as an element of the VLBI array, while José-Carlos Guirado identified various scenarios where the synergy between ALMA and the Square Kilometre Array (SKA) may optimise their scientific output, as complementary instruments in frequency coverage and maximum resolution. Javier Goicoechea summarised the design concept behind SAFARI, a European imaging far-infrared spectrometer for the

SPICA mission covering the 30–210  $\mu\text{m}$  band, and highlighted science questions that it will be possible to address with SPICA/SAFARI that will complement ALMA capabilities.

Complementarities between ALMA and existing forthcoming X-ray observatories, which together can help to disentangle the contribution of star formation and supermassive black hole growth to the bolometric luminosity of AGN and luminous infrared galaxies, were presented by Francisco Carrera. Special interest was raised by the talk by José-Miguel Rodríguez-Espinosa, who showed the status of the Spanish GTC telescope, which has just entered operations, alerting the community to the excellent opportunities that the GTC offers to start preparing programmes for ALMA observations, as well as providing instrumental possibilities to follow up ALMA discoveries.

### Acknowledgements

The workshop was supported by the Spanish Astronomy Infrastructures Network (RIA) and by the CSIC.

### Links

<sup>1</sup> <http://riastronomia.es/opencms/opencms/Workshops/R20081201.html>

Report on the ESO Workshop

## E-ELT Design Reference Mission and Science Plan

held at ESO Garching, Germany, 26–28 May 2009

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ESO hosted a dedicated workshop on the European Extremely Large Telescope (E-ELT) Design Reference Mission (DRM) and the Design Reference Science Plan (DRSP). The main aim of this three-day workshop was to exchange information and ideas with the scientific community on the status of the E-ELT and in particular on the development of the E-ELT science case through simulations.

Bringing together interested members of the community, various instrument study teams, members of the Science Working Group and the E-ELT Science Office at ESO, the focus of the workshop was to provide all interested parties with a platform for open exchange and critical assessment of the results of E-ELT performance simulations. In addition, the workshop provided an opportunity to present and discuss the E-ELT DRSP,



The participants at the E-ELT Design Reference Mission and Science Plan workshop assembled in the grounds of ESO Headquarters.

and to encourage the community to provide input to this wide-ranging survey of the scientific aspirations for the E-ELT. The workshop was timed to take place shortly before the deadline for DRSP submissions.

This was the second DRM workshop funded by the FP7 programme, E-ELT Preparatory Phase. The first took place in May 2008 and focused on simulation tools and methods, rather than results. This year's workshop attracted 83 registered participants (up from 34 last year),

which we are happy to interpret as a reflection of the community's rising interest in the E-ELT.

The introductory session covered the E-ELT project status, a summary of the science case and the DRM, and a summary of the methods and aims of the DRSP, including a live demo on how to complete the online submission form.

This introduction was followed by presentations grouped into sessions based on four broad science themes: Stars and Planets, Galactic Centre and Black Holes, Resolved Stellar Populations and High Redshift Universe, each being closed by an open discussion. On the

second day there was also a session on instrumentation and observing techniques. All presentations are available from the workshop web page<sup>1</sup>.

In addition to covering the key, well-established E-ELT science cases and instrument studies, the presentations and discussion sessions included themes that had not been covered in depth previously, such as opportunities for high-impact science from high-precision astrometry, polarimetry and high-time-resolution observations.

Overall, the workshop was perceived as being very lively and interesting. It provided very valuable input to the E-ELT project on its way to completing the detailed design phase by the end of 2010.

#### Acknowledgements

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#### Links

<sup>1</sup> <http://www.eso.org/sci/facilities/eelt/science/drm/workshop09/>

Report on the ESO Workshop

## Imaging at the E-ELT

held at ESO Garching, Germany, 29 May 2009

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Sandro D'Odorico<sup>1</sup>

<sup>1</sup> ESO

The aim of this one-day workshop, part of the FP7-funded programme to prepare for the European Extremely Large Telescope, was to bring together members of the community working on

wide-field imagers on 4–8-metre-class telescopes and on instruments and science cases related to imaging at the E-ELT, exploring complementarities and synergies between the two communities.

The workshop was organised as part of the FP7 programme "Preparing for the construction of the European Extremely Large Telescope (E-ELT)", within the Work

