missions. New, large, spectroscopic surveys are complementing the satellite data, producing precise stellar parameters and measured *V*sin*i*. Steve Kawaler and Kepler Oliveira reviewed the present status of methods for determining the rotation velocities of white dwarf stars via asteroseismology and spectroscopy, which will open up the study of rotation in the final stages of stellar evolution.

Stellar rotation and angular momentum evolution are also intimately coupled to proto-planetary discs and to the presence of planetary systems. The interaction between planets and stars is, however, not limited to the dynamics in the early stages, but continues all through the stellar lifetime. On the one hand, evidence is being sought for the presence of chemical abundance peculiarities in planet-hosting stars. R. Similjanic and A. Recio-Blanco reinforced the evidence for a link between rotation history and light-element abundances. This connection is not new, but in spite of the amount of data available, its nature is not yet fully understood.

On the other hand, rotation-induced magnetic activity of stars plays a key role in determining whether planets can retain a magnetosphere, which is essential for life as we know it. As Edward Guinan emphasised, "the Sun is still a dangerous star". In the same vein, Nuno Santos remarked on the analysis of rotation from the point of view of the research on exoplanets; he noted that "astronomers working on exoplanets don't like the fact that stars rotate", since the rotation–activity connection is the main source of stellar noise in planet searches.

Several talks (e.g., Reiners, Gouveia dal Pino, Vishniac and Lazarian) reminded us that while magnetic activity and magnetic fields can now be measured well in many stars and qualitatively understood, detailed modelling of the (Solar) dynamo still encounters several challenges in reproducing the observations. For binary stars in particular, as stressed by Klaus Strassmeier in his review, the situation is significantly more complex.

Acknowledgements

Galileo would likely have been delighted to discover the long trail that has been explored in Solar and stellar rotation since his time! The conference was superbly organised, and the attendees could enjoy the beautiful beach of Tabatinga, close to Natal, on the social trip (see Figure). The Local Organising Committee, and in particular Bruno Canto Martins, Sanzia Alves and Bia Pessoa, had a hard time making everything run smoothly, or perhaps more appropriately, "rotate swiftly", but succeeded admirably.

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Links

[1] Conference web page: http://www.dfte.ufrn.br/400rotation/index.htm

Report on the

ALMA Community Days: Preparing for Cycle 2

held at ESO Headquarters, Garching, Germany, 19–20 November 2013

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ALMA has now been obtaining scientific observations for the astronomical community for over two years. While commissioning is still continuing, the upcoming Cycle 2 should allow for nearly 2000 hours of science observations. The Cycle 2 ALMA Community Days, summarised here, were designed to optimally prepare the European ALMA Community for proposal submission and were held just a couple of weeks before the Cycle 2 deadline.

The Atacama Large Millimeter/submillimeter Array (ALMA), is the world's leading observatory at millimetre and submillimetre wavelengths. It is the result of a global cooperation involving Europe (through the ESO Member States), North America and East Asia, as well as the host country Chile. Located at the unique site on the Chajnantor Plateau in northern Chile at over 5000 metres above sea level, the final array will comprise at least 66 high precision antennas equipped to observe in the 30 GHz to 1 THz frequency range. The antennas are grouped into the main array, comprising 50 12-metre dishes, and the Atacama Compact Array (ACA, also known as the Morita Array), containing 12 closely placed 7-metre antennas together with four total-power 12-metre antennas used to recover large-scale structures on the sky. By combining data obtained with different configurations of the main array and the ACA, complex and extended sources can be accurately imaged.

ALMA has been used, at least part of the time, for observations proposed by the

Figure 1. A clear statement from Wolfgang Wild, the ALMA Program Manager, on the status of ALMA was presented at the Community Days.

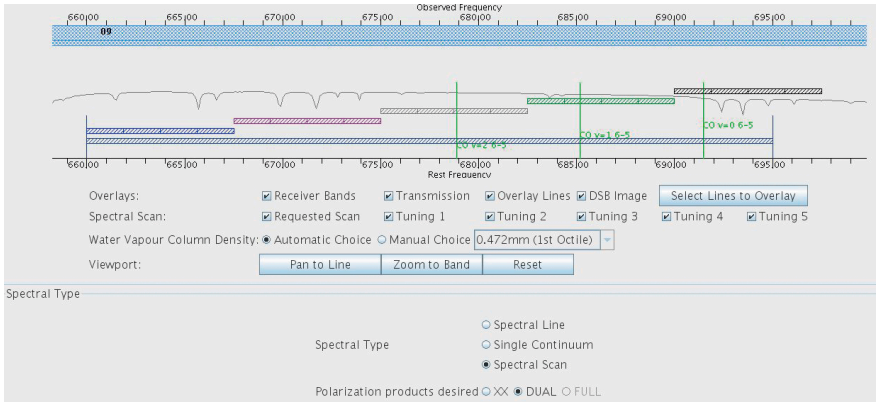

Figure 2. An example Observing Tool screen is shown for defining the spectral setup. In this example, a Band 9 spectral scan has been chosen, and the CO lines have been overlaid for visualisation.

international astronomical community since Early Science operations began with Cycle 0 in September 2011. It is currently obtaining data for Cycle 1, and the deadline for proposing Cycle 2 observations, scheduled to start in June 2014, was in December 2013. While construction has now officially ended, commissioning is still ongoing and the scientific capabilities of the array will continue to increase over the coming years. In Cycle 2, there will be at least 34 antennas available in the main array and nine 7-metre antennas together with two 12-metre antennas used in the ACA. The receiver bands offered are 3, 4, 6, 7, 8 and 9, corresponding to wavelengths of about 3.1, 2.1, 1.3, 0.87, 0.74 and 0.44 millimetres respectively. Polarisation observations will be possible for the first time for on-axis continuum observations in Bands 3, 6 and 7. Finally, antenna baselines of up to 1.5 kilometres are offered in Bands 3, 4, 6 and 7, while for Bands 8 and 9 baselines will be up to 1.0 kilometres.

One of the high-level goals of ALMA is that it should be accessible to the entire astronomical community, not just experienced submillimetre observers. This is facilitated by the comprehensive user support offered by the ALMA Regional Centres (ARCs), which have been set up in each of the three executives (Europe, North America and East Asia). The European ARC is made up of a network of nodes distributed across Europe that are coordinated by the ARC located at ESO. The ARCs make up the interface between the Joint ALMA Observatory located in Chile and the scientific community. Among other things they provide services for users, including extensive documentation (manuals, handbooks, video tutorials), an online Helpdesk facility and community events.

Community Days — presentations and tutorials

The ALMA Community Days held at ESO are part of a coordinated effort by the European ARC network to optimally prepare users for proposal submission, and similar events or presentation tours were organised by several of the ARC nodes for their local communities. They have so far taken place for every ALMA observing cycle (Randall et al., 2011; 2012); the Cycle 2 Community Days being the third such event. The format of the ESO Community Days has always been quite similar, starting off with a series of technical and scientific presentations followed by practical hands-on tutorials for the software most critical to proposal preparation. Held just a couple of weeks before the proposal deadline, the main aim is to help users finalise their scientific case and define a valid technical setup that will allow the proposed observations to achieve their aims.

In response to feedback received from the participants of previous ALMA Community Days, the Cycle 2 workshop focused more heavily on practical hands-on tutorials than previously. Only the morning of the first day was devoted to presentations, which gave attendees a quick overview of the ALMA status (see

Figure 1), recent science highlights and the user support services offered by the European ARC. The Cycle 2 policies and capabilities were also introduced, a special focus being placed on polarisation and single dish observations. After this, the participants were split into two groups (novice and advanced) according to their level of experience with submillimetre interferometry and started their hands-on tutorial sessions for the ALMA Observing Tool and the ALMA simulators.

The ALMA simulators come in two flavours: the Online Simulator Tool (OST), a web-based interface for simple simulations, and the simulation packages incorporated into the Common Astronomy Software Applications (CASA). Carrying out simulations for proposed observations is recommended, especially for spatially complex or extended sources in order to ascertain that the structure of interest can indeed be recovered. Simulations are also helpful in assessing whether ACA observations are needed in addition to those with the main array. While the novice group was given an introduction to interferometry concepts and focused mostly on the more intuitive OST, the advanced group spent more time working with the CASA-based simulation packages.

The ALMA Observing Tool (OT) is the main piece of software needed for proposal preparation. It is used to capture the scientific requirements of the observations, and contains a number of useful tools to help the user set up and visualise the required elements, e.g., the pointings and correlator modes, needed to achieve their science goal (see Figure 2). The OT also comes with an in-built time estimate and sensitivity calculator, and determines the needed array configuration(s) based on the user input. At the time of proposal submission, the OT runs a number of validation checks to ensure the technical setup of the proposed observations is sound. The OT is designed for intuitive use and comes with extensive documentation, but, due to the flexibility of the ALMA array and correlator, the technical setup of observations can be quite challenging.

The novice tutorial group therefore began with an introduction to submillimetre spectroscopy, where concepts such as basebands and spectral windows were explained. After this, a detailed demonstration was given on how to prepare a standard proposal; following that, participants were encouraged to work on their own projects under the supervision of tutors. The advanced tutorial featured a more concise demonstration covering mainly the changes made to the OT since Cycle 1, with more time available for individual work. The tutorials were truly interactive in that the information flow between the users and software experts went both ways, resulting not only in a better understanding of the tools on the side of the participants, but also yielding valuable feedback for the software scientists and developers. Many of the enhancements implemented for the ALMA software tools over the last year or two have in fact stemmed from user input, notably that given during face-to-face interactions such as practical tutorials.

Figure 3. The participants at the Cycle 2 ALMA Community Days collected together in the entrance hall of ESO Headquarters.

The ESO Cycle 2 ALMA Community Days were attended by 65 participants from all over Europe (see the photo in Figure 3), more than half of whom described themselves as novices to submillimetre interferometry. A large fraction of the novice participants had a background in optical/infrared observational astronomy, which is to be expected given the traditional ESO user community. More than two thirds of the participants were students or postdocs. Interestingly, a significant proportion (~ 1/3) of this year's participants had already attended one of the previous ESO ALMA Community Days, and stated that they would be interested in a similar workshop for future observing cycles. We can therefore conclude that these events are useful to the community and should be offered for at least as long as the scientific capabilities of ALMA are evolving.

Acknowledgements

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