SSALMON

SOLAR SIMULATIONS FOR THE ATACAMA LARGE MILLIMETER OBSERVATORY NETWORK

Newsletter 4 – June 2015

Network activities

This newsletter summarises recent activities and provides more information for the expert teams, which can finally start working.

In the meantime, the network has grown to now **61 members!** Next to a presentation at The Triennial Earth-Sun Summit (TESS, Indianapolis, April 26th-30th, 2015), first results from solar co-observations of ALMA and IRIS from the test campaign in December 2014 have been presented at the IRIS-4 Workshop (Boulder, May 22nd, *see the figure on p. 2*).

The next SSALMON presentations will be given at:

- the 26th IUGG GA/IAGA (Prague, June 26th)
- the IAU GA XXIX (Honolulu, August 10th)

SSALMON webpage

The webpage http://www.ssalmon.uio.no/ is updated whenever there is new information. Please free to contribute and share relevant news. SSALMON is also active on twitter: @ssalmonetwork

First SSALMON Overview Paper

The SSALMON overview article has been accepted and published online in **Advances of Space Research**:
http://www.sciencedirect.com/science/article/pii/S0273117715003671
http://adsabs.harvard.edu/abs/2015arXiv150205601W

Solar ALMA review article

The review article with ~80 pages is still under review. See here for the latest version:
http://adsabs.harvard.edu/abs/2015arXiv150406887W

Upcoming important events

Oct.1,2015	**Deadline** for short-term goals for expert teams
Dec. 2015	Next ALMA Solar Commissioning and Science Verification (CSV) campaign
March 2016	Call for proposal for Cy4 and next solar ALMA workshop.
Oct. 2016	Cy4 begins. Regular solar observations become possible.

Expert Teams

The test with team G revealed that a more precise framework and schedule had to be defined in order to motivate the teams to move forward.
(See p.2 for instructions on how to get started).
We distinguish three different sets of team goals:

1. **Short-term goals (CSV, end of 2015)** Ideas and input for the next (and ultimate) CSV campaign in December 2015.
2. **Medium-term goals (Cy4, 2016)** Research goals and proposals for observing cycle 4 (10/2016-9/2017).
3. **Long-term goals (Cy5 and beyond)** Research plan for observations after Cycle 4 (>10/2017).

Short-term goals (end of 2015). In preparation of the upcoming commissioning and science verification campaign in December 2015, the expert teams should consider which aspects of their research goals could and should be tested and which have the highest priority. The resulting data will *eventually be available for science*, but the community needs to be given *equal access*. The focus, however, is clearly on testing and preparing regular observations for Cycle 4. The technical capabilities for the CSV campaign will most likely be close to what is specified for Cycle 4 below. Please note that the December campaign might be the last opportunity for extended tests before the commissioning phase ends.

Thus, input from the teams is needed now.

Medium-term goals (Cy4, 2016). ALMA will most likely offer the following capabilities for solar observations in Cycle 4 (10/2016-9/2017):

- Continuum observing in
  - band 3 (84 - 116 GHz, 3.6 - 2.6 mm)
  - band 6 (211 - 275 GHz, 1.4 - 1.1mm)
- At least 38 12-m antennas plus the ACA.
- The three most compact antenna configurations (38-1, -2, and -3). The most extended configuration will be out to a few 100 m.
- The interferometic mapping will allow mosaicing.
- Interferometric mapping will be supported by full disk total power maps (using fast scanning).
- The time resolution will be by default 2s.

Please note that the list of Cy4 capabilities is tentative and still has to be finalized.
The time resolution is set by the minimum integration time foreseen for Cy4. Depending on the scientific objective, it could be desirable and possible to observe with lower cadence in order to improve the quality of the final maps *(see Fig. 1)*.
One does have access to spectral information in each of the spectral windows. However, we will not be allowed to tune the location of the spectral windows in Cy4 because the detuned modes have not been tested in that mode.
Be prepared that polarization capabilities will not be offered in Cycle 4 but only in a later cycle (>10/2017).

Long-term goals (Cy5 and beyond). ALMA will offer more and more capabilities with each cycle as more experience is gained. Most likely, spectral line observations and observations in bands 4, 7, and possibly 9 will become available in Cy5 (10/2017-9/2018). The long-term goal for the expert teams is to make a strategic plan for future observations with ALMA with then enhanced capabilities. These goals might be developed and updated cycle by cycle.

Next steps for the expert teams

The commissioning and science verification (CSV) campaign in December will be important for determining which kind of observations can be done in Cy4 and which would be the most promising given the offered capabilities. It is therefore very important to receive input on scientific goals and priorities from the solar community **now**.

We would like to encourage the expert teams to express their thoughts before the CSV campaign. For that reason, we expect to receive **documents with suggestions for tests in PDF format** before

October 1st, 2015

There is no foreseen page limit but please keep it reasonably concise. The focus should be on **testing key techniques and strategies, technical requirements and feasibility and priority of observing programs** rather than obtaining extensive scientific data sets. However, more detailed observing plans as they will be needed for Cycle 4 proposals obviously define which technical aspects should be investigated in December and should be briefly mentioned.

We strongly recommend reading the **overview articles** (see p.1) for technical details of solar observing with ALMA and for suggestions for science cases.

The E-mail lists have been activated for each team. *Please use these lists to communicate with your fellow team members because it ensures that all members are included. (The e-mail lists will always be updated when new members join.)*

A template for the strategic document on an online multi-author platform will be prepared for you. *You will be notified once granted access to the document. The template is only a suggestion and each team is free to use whatever platform/program/format they find most useful.*

Public outreach

An article on solar observations with ALMA and SSALMON has been published on the Norwegian website forskning.no and on the institute/faculty webpages of the University of Oslo, Norway: http://forskning.no/universet-stjerner/2015/06/retter-alma-mot-solen, http://www.mn.uio.no/

On behalf of your SSALMON team, we wish you a nice and productive summer.

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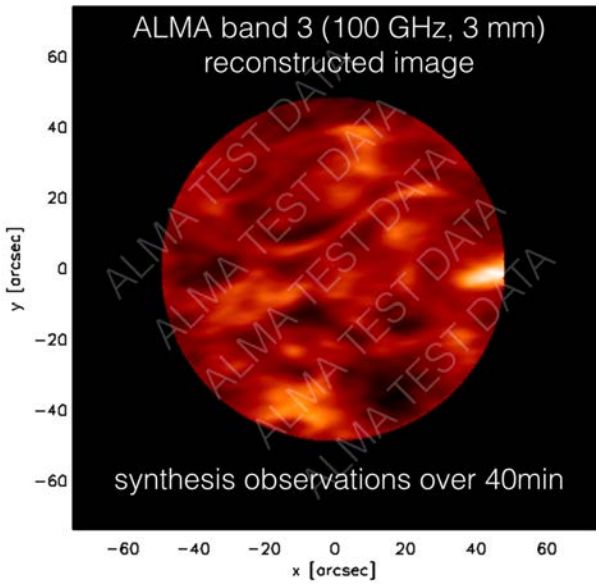

***Figure 1**: Interferometric ALMA observation of AR12230 on Dec. 12th, 2014 (5th test campaign, 49 antennas, band 3). The synthesis observation combines data obtained over 40 min, thus making use of Earth's rotation for improved imaging fidelity.*