

SWG Chairs 18th Jan 2022

SWG co-chairs: Jan Forbrich, Abhirup Datta, Adriano Ingallinera, Andrei Mesinger, Aris Karastergiou, Barbara Catinella, Divya Oberoi, Fernando Camilo, George Heald, Josep-Miquel Girart, Jason Hessels, Laurent Lemy, Mark Sargent, Marta Spinelli, Natasha Hurley-Walker, Paolo Serra, Patrick Woudt, Sebastien Muller, Valentina Vacca.

SKAO: Robert Braun, Tyler Bourke, Anna Bonaldi, Jeff Wagg, Simon Purser, Philippa Hartley (notes)

Apologies: Francoise Combes

Observatory news

The next formal member, Switzerland, of the Observatory will join tomorrow. An informal Committee of Council meeting is taking place today. The next group of countries is moving forward to full membership: Spain, France, Canada, Sweden and India making suitable interim arrangements, and agreements are progressing with Germany.

This progress means we can now move on to construction contracts: both software and infrastructure. Many have already awarded (see slide 4). The progress represents a huge quantity of work, and is running pretty much to schedule, with the award of software contracts almost complete. Imminent contracts include components and sub systems for the first array assembly of LOW and MID, which will be used for interferometric testing specifically, among other tests.

The photos on slide 5 illustrate progress for MID telescope dishes and LOW telescope electronics. SMART boxes bring signals together from antennas for beam forming; a redesign of these components solved a temperature issue. Safety components such as electrostatic testing station have begun to be installed.

Science Data Challenge 2

Philippa: we are wrapping up SDC2 and it has been an exciting and satisfying challenge to progress with over 12 teams taking part and presenting catalogues of HI sources

Varied methods were applied and the paper is now drafted which presents the results of these methods and an analysis of biases in source-finding. It shows our sensitivity to HI mass as a function of redshift. The paper should be submitted to MNRAS soon.

We found that (as in the case of SDC1) different methods performed differently at different parts of the challenge. Interestingly, MINERVA (who won) combined the output from two different techniques to gain ~10% improvement in results

We were fortunate to have support from data centres from around the world, who all hosted the 1TB dataset, and provided participants with computational resources required to process the data. This provided a testbed for SKA regional centres.

Taking the lessons learned to feed into future data challenges and SKA regional centres and we are aware that there might be additional data centres that would like to participate in the future.

EoR and Magnetism data challenges

Looking at an end-to-end data challenge from visibilities to EoR power spectrum. This will be broken into three tiers, with Tiers 1 and 2 covering analysis from visibilities to foreground subtraction and Tier 3 involving the power spectrum itself.

Tiers 1 and 2: It has been challenging to generate the wide-field visibilities for this part of the challenge due to the diffuse nature of both the EoR signal and Galactic foreground and the importance of 3D effects. We have taken a hybrid approach to modelling the sky, where we use both an image-based model tapered with OSKAR station beams and then de-gridded to visibilities using MIRIAD as well as a compact Gaussian representation of bright all-sky sources that are DFT-ed to visibilities with OSKAR. We can then do the imaging in CASA, which allows us to account for the 3D nature of both the acquired data and the hemisphere of visible sky. We have been provided with updated functionality within CASA and Miriad in order to support a larger number of antennas: special thanks to Mark Kettenis and Mark Wieringa who made these revisions. The next casacore release will include these updates, while the latest Miriad (released 31st Dec) includes this support.

Tier 3: This is a cosmological inference exercise, and investigations for this are being performed by Eunseong Lee. The simulations that will feature in this challenge are less computationally expensive to generate, but are likely be intensive for participants to analyse: we are currently estimating the computational cost of this. We have developed a scoring code that will be publicly released along with the existing scoring codes for SDC1 and SDC2. We will aim for spring to release this part of the challenge.

A Magnetism SKA Data Challenge (MSDC) is being developed by Takuya Akahori and the Magnetism SWG. The simulations for this challenge also include several components: from both our own Galaxy and extragalactic sources.

SRC training events

As part of the SKA Regional Centre preparation activities, we are organising a series of training events. Our first event will begin in two weeks. Registration has closed, at around 260 registrations. We are excited about this and looking forward to it. The event will include hands on exercises as well as talks. The hands-on exercise will involve a containerised solution to the SDC1, prepared by Alex Clarke (SKAO), with beginner exercises as well as advanced ones.

Qs so far?

None

Upcoming meetings

VLBI in SKA era: George Heald

Taking place 14th Feb. Registration is still open and is free. 170 registered so far. 50 contributed abstracts - abstract writers will find out tomorrow whether their talk will be included.

Cosmology SWG Annual meeting: Stefano Camera

This will take place on 31st Jan. The SWG aimed to keep a face-to-face element to the meeting but are now going ahead fully remotely. A session in each morning and afternoon. Presentations from precursors including CHIME, EMU, ASKAP, HERA. The final programme will be finalised within the week. Hoping for a remote social event on the second day.

Cradle of Life meeting: Laurent Lemy

CoL is having its regular monthly meeting this week. The meetings are recorded and posted of the CoL webpage. This week we will be looking at exoplanets and space weather.

URSI Atlantic radio science meeting: Tyler Bourke

This will take place at the end of May. The deadline for abstracts has been extended. We do not know yet whether there will be an in-person component but are hoping there can be.

Building Bridges EAS session: Jan Forbrich

This session has been created as a merger of star formation and galactic science topics, and is currently planned as an in-person meeting only.

Towards the SKA Observatory: Artificial Intelligence in radio astronomy: Philippa Hartley

This EAS special session will present high impact AI developments in radio astronomy, in the context of the SKAO.

Timing and Imaging of compact sources with SKA pathfinders: Aris Karastergiou

This meeting will bring together results and methodologies from several SKA pathfinders and precursors. This will be face-to-face only but will be moved to next year if this is not possible. Provisionally 6 - 12 June, with backup dates 5 - 11 Sept.

SALF (Science At Low Frequencies): Jason Hessels

This was a very recent successful meeting, which presented great results from MeerKAT, MWA, LOFAR and GMRT. In the coming year the plan is to have SALF meetings in person or at least hybrid.

AOB

Natasha

Transients Nature paper: sharing today a couple of slides ahead of a paper publication. We found a really unusual 18 minute period transient in MWA data. Paper will be published in Nature this month (January 27th). The finding straddles several SWG topics including CoL, our Galaxy, continuum and transients. The finding was a surprise after applying a new

method to the data. We suspect the emission to originate from either a long-period magnetar or white dwarf pulsar. We are obtaining more data currently. This transient has not switched on again since, but we are continuing to look for similar objects.

Fernando:

MeerKAT: a call for proposal will hopefully come out next month.

Tyler:

Working group banners: we are in the process of updating these, and aim to complete these by the end of February - Stay tuned to hear from Tyler and Joe Diamond (SKAO comms) for how to contribute. The banners have proved very popular in HQ, at events, online and in lectures and courses. There is still time for groups to make changes as needed.

Barbara:

A review of ASKAP survey science projects group will meet end of January.

Future SWG Chairs meetings

Please, as always, let us know if you have any topics you would like to hear about in upcoming meetings.