SKA SWG Update

Robert Braun, Science Director

19 February 2019
Science Activity Updates

• Governance

• Critical Design Reviews
  • LFAA Bridging (as per Gianni’s request)

• SKA related meetings (All)

• SWG Posters (Tyler)

• 2019 SKA Science Meeting and KSP Workshop
  • Workshop Schedule (as per Lourdes, George requests)

• Science Data Challenges (Anna)
Negotiations to establish SKA Inter-Governmental Organisation.

Text of Convention and protocols now agreed
Initialing of documents completed
Ministerial signing ceremony 12 March 2019

Transition planning underway
# CDR Activity – Update Feb 2019

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<td>29 January 2018</td>
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<td>17-20 April 2018</td>
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<td>SaDT &amp; SAT</td>
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<td>CSP</td>
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<td>25 – 28 September 2018 !!</td>
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<td>- PSS, PST, CBF-Low, CBF-Mid Sub-Element CDRs</td>
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<td>MeerKAT Integration</td>
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<td>SDP CDR</td>
<td>17 September 2018</td>
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<td>1 Apr 2019</td>
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<td>- Band 1, LMC Sub-CDR 20 Sept 2018</td>
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<td>- DSH Struct Sub-CDR 1 Apr 2019</td>
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<td>- Band 5 Sub-CDR 27 Aug 2019</td>
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<td>System</td>
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CDR Activity – Update Jan 2019

• LFAA CDR Report urges:
  1. Risk mitigation
     • Demonstrate station beam calibration with both simulations and prototypes
  2. Requirement reevaluation
     • Will only undertake once reliable measurements in hand
The SKA Science Community

- SKA Science Working Group membership has grown by factor of four in the past 5 five years
- SKA Splinter Session at the 2019 AAS, > 100 attendees (Tyler)
- PHISCC Meeting Perth 11 – 13 February, ~ 80 attendees (Sarah/Jeff)
- SKA 2019 Science Meeting and KSP Workshop, ~ 300 registrants
Upcoming SKA-related Meetings

- CTA 1st Science Symposium, 6 – 9 May, Bologna
- New Perspectives on Galactic Magnetism June 10-14 2019 [https://conferences.ncl.ac.uk/galacticmagnetism/](https://conferences.ncl.ac.uk/galacticmagnetism/)
- EWASS FRBs Special Session, 24 June, Lyon [https://eas.unige.ch/EWASS/session.jsp?id=SS24](https://eas.unige.ch/EWASS/session.jsp?id=SS24)
SWG Posters

• Aim to have a poster (banner) for each SWG

• First use was AAS in January,


  then the April SKA meeting, ...

• Seven posters produced:

  https://www.dropbox.com/sh/yb7tpn0u5b91iid/AAAFhgBkMfsUNjDPQhtRhRNqa?dl=0

• Remaining posters (you know who you are!) please push ahead with submissions ASAP so that you will be represented at the April SKA meeting
Extragalactic Continuum

Key focus areas are:

- The large differential magnification allows the detection of intrinsically faint objects out to redshift 2.500 MHz (redshift 1.86).
- The large differential magnification allows the detection of gravitationally lensed radio sources (at least 3 orders of magnitude more than are currently known) from a shallow all-sky survey over 1000 square degrees.
- A statistical measurement of the total energy and dark matter which determine the growth of late-time large-scale structure.
- A statistical measurement of the dark matter and environment as well as redshift.
- The observing wavelengths of ALMA/ESO/NAOJ/NRAO are critical to the SKA.

This artist’s concept depicts looking back in cosmic time to the quasar J1342+0928.

- The unique clustering properties of HI-selected galaxies provide a statistical measurement of the gravitational lensing effect of all matter – including dark matter – as well as the number density of dark matter halos.
- The HI images have been integrated over a redshift range of 6 < z < 30.
- Out the deepest observations of the diffuse neutral Hydrogen gas to trace the evolution of cosmic structure in the 6 < z < 30 range.
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Science Meeting

- 2019 SKA Science Meeting and KSP Workshop, 8 – 12 April
  - ~290 paid registrations
  - HQ Auditorium capacity ~160
  - Use Alderley Park back-up venue (232+XX capacity) for Mon – Fri
  - HQ reception (TBC) on Monday
KSP Workshop Schedule

• 2019 SKA KSP Workshop, 11 – 12 April
  • Thursday morning general introduction plenary
    • SDP data products
    • SRC coordination progress
    • Science Data Challenges current and upcoming
  • Thursday afternoon and Friday morning
    • SWG self-organized break-outs (detailed schedules to be circulated to permit cross-fertilization) on topics like KSP coordination, pilot studies with path finders, etc.
    • Special multi-SWG topical break-outs (eg. High frequency white paper)
  • Friday afternoon wrap-up plenary
    • Reporting by SWG on progress to date
Science Data Challenge #1

- **SDC1** released, 26 November!
- Continuum sub-band images ($\Delta \nu / \nu_c = 30\%$)
- SKA1-Mid, three frequencies: $\nu_c = 0.56$, 1.4 and 9.2 GHz
- One pointing: $8^h$, $100^h$ and $1000^h$ observations
- Data info:
  - Images of 32k pixels per side for the full FoV
  - 1.50, 0.60 and 0.091” FWHM resolution at 0.56, 1.4 and 9.2 GHz
  - Size of a single frequency slice: 4GB (x9 = 36GB total)
Data Challenges

• SDC1 includes true inputs for a 5% of the field of view, which can be used by participants to assess their analysis

• To participate, register your interest by sending an email to skaSDC1@skatelescope.org

• Provisional deadline 15/3/19, for results to be presented at the SKA science conference in April

• 13 participating teams so far, some of them outside the SKA WG community. Several issues with the data have been reported and remedied, so please download latest release.

• SKAO working on results assessment and scoring

• SDC2: let’s hear your suggestions on what the next challenge could be!
SQUARE KILOMETRE ARRAY
Exploring the Universe with the world’s largest radio telescope