

The SKAO logo is rendered in a bold, white, sans-serif font. The letter 'A' is stylized with a black starburst pattern and several small white dots, suggesting a celestial or technological theme. The background of the entire slide is a composite image showing a night sky with a vibrant rainbow galaxy and a landscape of radio telescope dishes and infrastructure under a dark sky.

SKAO

SKA SWG Update

Robert Braun, SKAO Science Director

16 July 2024

SKA Science Update

Start Recording!

- Membership: Welcome to India who have completed SKAO membership ratification on 4 July!
- Construction Update
- SKA Science Meetings
 - 2025 Science Meeting (Philippa)
- Science Data Challenges
- SWG Collaboration Facilitation (Philippa)
- Reminders & Information
- AOB



Construction Update

- 3 years into ~7-year construction phase; 89 contracts awarded; €761M total value (81% of total value)
- Progress: 31.8% complete, compared with 36.4% planned and 32.6% spent (i.e. behind schedule and slightly over budget – but mismatch is due to advance payments)
- 2024 is pivotal for SKA; by the end of the year:
 - SKA-Low AA0.5 – to be complete
 - First two SKA-Low stations handed over for commissioning on 4 July
 - SKA-Mid AA0.5 – to be well under way
 - First SKA-Mid dish “big lift” of main reflector occurred on 4 July



Science Meetings

- European Astronomical Society (EAS) 1-5 July Padova.
 - [EAS SS31](https://eas.unige.ch/EAS_meeting/): The SKAO: pathway to science operations, 5 July, https://eas.unige.ch/EAS_meeting/
- [IAU GA](#): 6-15 August, Cape Town.
 - **SKAO Session 9 August**, and various SKA-related Symposia <https://astronomy2024.org/>
- East Asia SKA Workshop, week of November 18, Thailand
- [Cosmic Ecosystems in Radio & Optical](https://www.eso-ska2024.org/) – ESO-SKA, 9-13 Dec, near Perth, AU <https://www.eso-ska2024.org/>
- **SKA Science Conference, June 2025**, Gorlitz Germany, see next slides

Presentations from most past SKAO-(co)led science meetings are available:
<https://www.skao.int/en/science-users/483/science-meetings>



2025 SKAO Science Meeting and the new SKAO Science Book



2025 Science Meeting: overview

- **Name:**
 - Advancing Astrophysics II: Preparing for Science with the SKAO
- **Dates:**
 - 16th-22nd June 2025
- **Location:**
 - Görlitz, soon to be the home of the brand new German Center for Astrophysics (Deutsches Zentrum für Astrophysik, DZA)
- **Numbers:**
 - In person: ~300
 - Virtual attendance to be supported for all sessions
- **Themes:**
 - Updates to the SKA Science Book
 - Noting the transition from SKAO commissioning to science verification and observing: “Observing with the SKAO” sessions



Science meeting programme

- Plenary sessions
 - Organised by broad Science theme
 - Plus “Observing with SKAO” special plenary session
- Parallel sessions
 - In order to facilitate SWG interaction and collaborations, organise into SWGs
 - Will also enable Operations to be able to tailor talks for different technical requirements
 - See Wendy’s corner plot illustrating SWG overlaps - will use this information to identify which sessions to run at the same time
 - Participants will be asked at registration to indicate priority of (up to three?) parallel sessions, in order to assign rooms (of differing sizes) to sessions
 - Either: 1 or 1.5 days dedicated to parallel sessions
- Posters
 - ‘Lightning’ talks: aim to organise relatively early in the week in order to promote speakers’ posters for viewing



SKAO Operations: Observing with SKAO

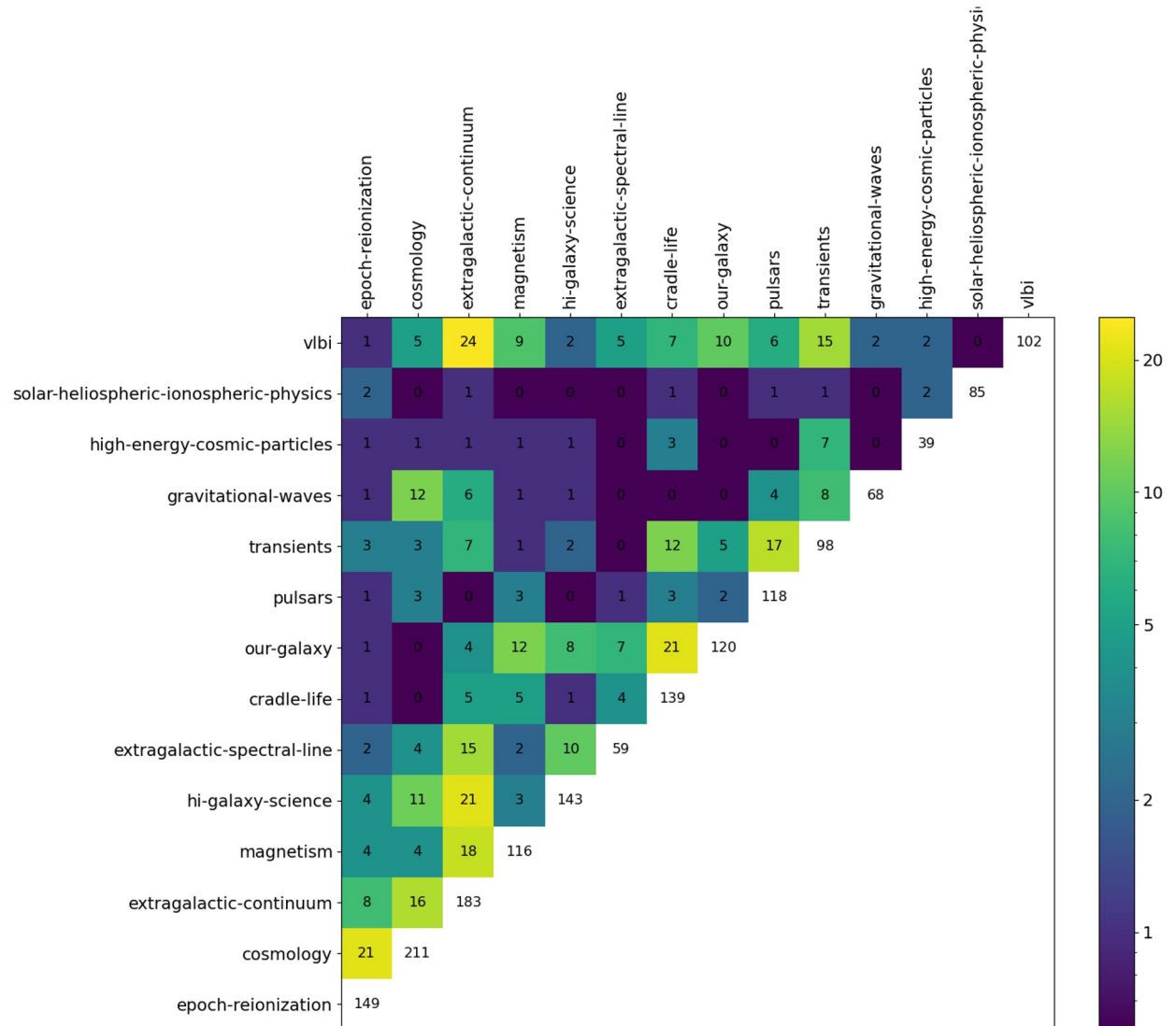
- Half day of plenary sessions dedicated to “Observing with the SKAO”
 - Detailed telescope capabilities
 - Operational policies
 - The user experience (tools, SRCNet etc)
 - Timeline to science (SV, cycle 0)
- SKAO Operations team will also hold interactive sessions with each SWG
 - Tailored capability presentations and Q&A sessions



Parallel sessions

- Eight sessions in parallel
- 14 SWGs
- Overlapping members between SWGs should help to group SWGs for parallel sessions

Number of members in common between each pair SWGs and total number of members in each SWG



Science Book: overview

- “Advancing Astrophysics II: Preparing for Science with the SKAO”
- This will be an updated version of the existing SKAO Science Book
- Some chapters may not have changed much; some will have evolved; some brand-new chapters based on new science cases
- Aim is two-fold:
 - Facilitate SWG-coordinated chapters (both new and updated)
 - Opportunity for researchers to connect with and join the SWGs



Science Book: content

Sections

- One section per broad science theme (TBD)
 - Themes to be fully inclusive
- Overview chapter at the beginning of each section

Goal of individual chapters

- Self-contained description of a science application including background and motivation
- Main focus of a chapter:
 - Demonstrate the science outcomes that are enabled by the capabilities of a particular component of the SKA design baseline, Array Assembly 4 (AA4)
- Supplementary focus:
 - Document the extent to which scientific outcomes might be achieved by the end of staged delivery (AA*)
 - Document the types of enhancements to the design baseline that could further support the science goals
- Also consider:
 - Highlight synergies with other instruments



Science Book: coordination of the call for chapters

- We will encourage chapter submission from all members of the scientific community
- Phase 1: *Call for chapter proposals advertised both within and outside SWGs*
 - Within SWGs: SWG chairs to invite proposals for intended contributions, in order to facilitate coordination
 - Outside SWGs: a call for chapter proposals will be advertised to the international scientific community
 - will request authors to tag one or more relevant SWGs (or none, if brand new area)
 - SKAO office will forward proposals to the relevant SWG chairs
- Phase 2: *Draft chapter submissions will then be coordinated by SWG chairs*
 - SWG chairs to compile a list of chapter titles based on proposals received (both internally and externally), evaluating for overlaps and duplication.
 - Chairs to invite authors to prepare draft chapter manuscripts
 - LaTeX template will be made available
- 2015 Science Meeting SOC will select draft chapters for presentation at the meeting
 - Talks (both plenary and parallel sessions) and posters
- Final chapter versions will be submitted for review *after* the meeting



A flexible two-phase approach

Phase 1: Call for proposals, deadline September 16th

Phase 2: Authors invited to prepare drafts chapter manuscripts, deadline end of January

Flexible approach

- Recognising that work on chapter updates has been ongoing in some SWGs since early 2024 or before, some authors might be invited to begin preparing draft manuscripts prior to the Phase 1 deadline
- Remaining authors might be invited after the September 16th deadline



Timeline

- June, July 2024: Save the Date announcement; chapter proposals sought
- **September 16th**: chapter proposal deadline
- Late September: submission platform open for draft chapter manuscripts
- End January 2025: submission period ends
- Jan to mid-March: talk selection
- Mid March 2025: speaker notification
- Mid/late Jan 2025: registration open
- March 2025: early bird registration close
- May 2025: registration close
- June 16th 2025: meeting begins
- Second half of 2025: final book chapter reviews and publication



Activities this month

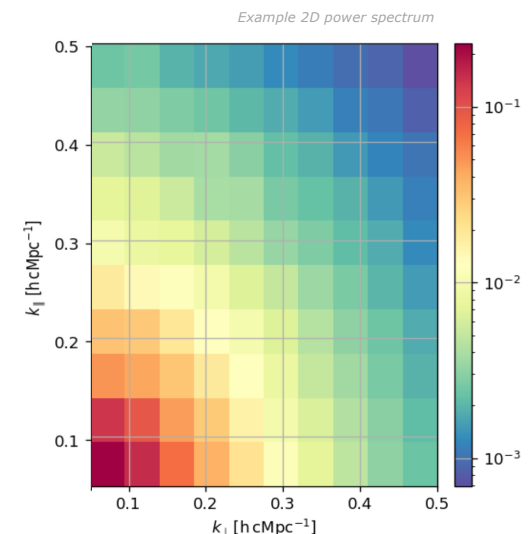
- Save the Date announcement circulated 24th June
- Call for proposals to be circulated to scientific community this week
- Chapter submissions platform testing (Oxford Abstracts) taking place this week by EOC/SOC
- Next SOC meeting this Thursday 18th July

- For reference: [Coordination of chapter submissions](#)
 - Includes plan for coordination of proposals; timeline; SOC members



Science Data Challenge 3b: EoR Inference

- Status:
 - All teams who have requested HPC resources have either received allocations or have joined waiting list in case additional resources become available
 - Teams who have received allocations are being set up
 - Final SDC3b datasets in production
 - Slight delay as we finalise the simulations
 - SDC3b 'data description document' will be shared soon



SWG Collaboration Facilitation

- Confluence
 - Provides a 'wiki' style solution to support information storage and sharing for multiple groups under one umbrella
 - Proof of concept tests completed by SKAO IT team
 - All co-chairs should now have access to this area. Please feel welcome to test and set up SWG areas
 - Once happy, we will roll out to all SWG members
 - Propose to give edit access to core SWG members only
 - Core group set-up/refresh might be required
 - Also looking at edit access for profile page for all members





Reminders & Information

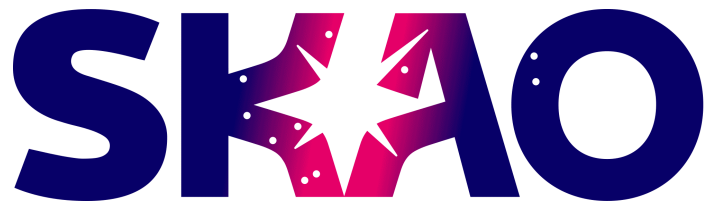
Outreach & Engagement

- **CONTACT** is the SKAO magazine aimed at the entire SKA community <https://www.skao.int/en/news-events/contact-skao-magazine>
- Ideas for articles for CONTACT are always welcome (email Tyler). These include:
 - Let's Talk About (Feature length ... science focussed)
 - Pathfinders & precursors. Short pieces on recent results
 - SKA-related events (e.g. SPARCS, etc)
 - any other news of SKA relevance (award/honours, job openings, ...)
- Encourage your SWG members to [sign up](#)



SKA Positions

- SKAO positions (HQ Manchester UK, Australia-Low, South Africa-Mid)
<https://recruitment.skao.int/vacancies.html>
- SARAQ employee SKA positions (Cape Town, Carnarvon)
<https://www.sarao.ac.za/vacancies/>
- CSIRO employee SKA positions (Perth, Geraldton)
<https://www.csiro.au/en/careers/career-opportunities/skao>



SKAO Speaker Series

- [SKAO Speaker Series](#)

- series of interesting talks, accessible to all within the broader SKA community, covering a wide range of topics, from astronomy to physics, engineering, big data and computing, EDI, and more.
- Encourage your SWG members to sign up to give a talk (and consider giving a talk yourself).
- Talks recorded – all available for reviewing via the [Speaker Series](#) page (2020+)

SKAO SKAO Speaker Series

My personal journey as a female astronomer of colour



Cherry Ng

*Permanent Astronomer
Centre National de la Recherche Scientifique (CNRS)
Laboratoire de Physique et Chimie de l'Environnement et de l'Espace (LPC2E)
Orléans, France*

This talk is a collection of reflections on my career: from X-ray binaries to exoplanets, from pulsars to Fast Radio Bursts and SETI; on the challenges of motherhood and how it shapes my personality, and on the search for my cultural identity moving through six countries.

Wednesday 13 March 2024

10.00am UTC

[Click to access the Speaker Series talk here](#)

SKAO SKAO Speaker Series

Establishing an Evolutionary Picture of Fast Radio Bursts



Di Li

Chief Scientist - FAST

With FAST, the largest single-dish telescope ever built, we have designed the Commensal Radio Astronomy FAST Survey (CRAFTS), which realizes, for the first time at any major facility, simultaneous data recording of pulsar search, HI imaging, HI galaxies, and transients (FRB and SETI). CRAFTS has discovered ~200 pulsars, ~10 FRBs including the only persistently active repeater FRB 20190520B, and ~5000 d^2 HI images with 1% calibration consistency, 5-10 times better than what is available from Arecibo.

Based on CRAFTS, we derived a FRB event rate ~ 120K per day per 4pi. We find universal frequency-dependent depolarization among repeating FRBs, which can be well fitted by multi-path scattering and a single free parameter σ_{RM} that described the complexity of the magnetized environments of FRBs. We have published in 2021 the first complete energy distribution toward any FRB, which is clearly bimodal between 10^3 and 10^4 erg. Such bimodality was borne out in the subsequent monitoring of active repeaters. Recently, 10% drop of FRB 121102's DM on a decade time scale, is being robustly detected. I am proposing an evolutionary picture of FRBs, which aims to unify not only repeating FRBs, but most if not all non-repeaters.

Tuesday 23 April 2024

11.00am UTC (12noon BST)

[Click to access the Speaker Series talk here](#)



Construction Timeline

- **Target:** build the SKA Baseline Design (197 Mid dishes; 512 Low stations: AA4)
- Not all funding yet secured, therefore following Staged Delivery Plan (AA*)
- Develop the earliest possible working demonstration of the architecture and supply chain (AA0.5).
- Then maintain a continuously working and expanding facility that demonstrates the full performance capabilities of the SKA Design.

Milestone Event (earliest)		SKA-Mid	SKA-Low
AA0.5	4 dishes 4 stations	2025 Q4	2024 Q4
AA1	8 dishes 18 stations	2026 Q3	2025 Q4
AA2	64 dishes 64 stations	2027 Q3	2026 Q4
Science Verification begins		2027+	2027+
AA*	144 dishes 307 stations	2028 Q2	2028 Q1
Operations Readiness Review		2028 Q3	2028 Q2
End of Staged Delivery Programme		2029 Q1	2029 Q1
Early Operations (Shared Risk)		2029+	2029+
AA4 (Design Baseline)	197 dishes 512 stations	TBD	TBD

AA = Array Assembly

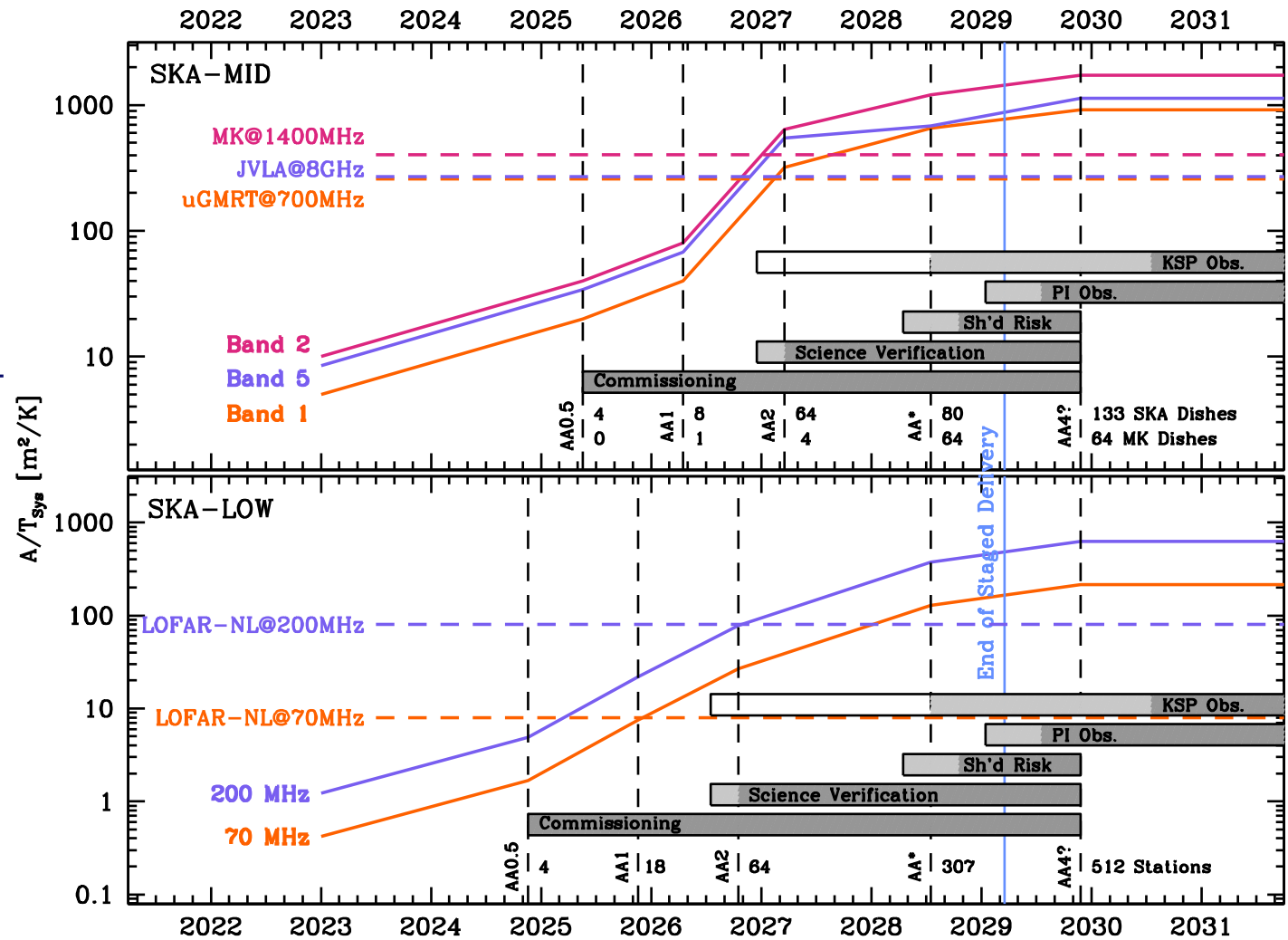
Updated April 2024 (Construction Report)

First Science Verification data release to the community expected in 2027



Commissioning Timeline

- AA0.5
 - Basic imaging and Tied-Array Beams
 - Off-line reduction
 - Limited BW/ N_{Chan}
- AA1
 - Plus multiple beams/sub-stations
- AA2
 - Plus pipeline reduction, more BW/ N_{Chan}
 - Science verification!
- AA*
 - Full BW, N_{Chan} , zooms
 - Shared Risk Cycle 0
 - PI (and KSP) Proposals!



Concept Credit: Mark Sargent



Any Other Business

- News from SWG Chairs?
- Magnetism Meeting review?

We recognise and acknowledge the Indigenous peoples and cultures that have traditionally lived on the lands on which our facilities are located.

SKAO

www.skao.int
www.skao.int/en/science-users