

News from SKA-France

BIMONTHLY BULLETIN



*French President Emmanuel Macron and South African President Cyril Ramaphosa
(Pretoria, May 28, 2021 - Credits: SKA Observatory)*

PROJECT

A historic moment for the SKA project in France

Following the decision of the French Ministry of Higher Education, Research and Innovation (MESRI) of engaging in the process of applying for membership in SKA Observatory (which was announced during the first SKAO Council Meeting on February 4, 2021), a unanimous decision by the SKAO Council has made France the first country to join the Observatory beyond its seven founding members (Australia, China, Italy, the Netherlands, Portugal, South Africa and the United Kingdom). The announcement of France's accession to the SKA Observatory was made by the French President Emmanuel Macron in occasion of his state visit to South Africa, during the press conference held together with South African President Cyril Ramaphosa on **May 28, 2021**.

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Edited by C. Ferrari (SKA-France Director)



Picture of the 3rd SKAO Council meeting: participants from the Office could finally attend the meeting from the Council Chamber at SKAO Headquarters

Credits: SKAO

The next and final step for France to become an SKAO Member State will be the ratification of the accession to the Intergovernmental Organisation Convention by the French parliament.

To be noted that, a few days after this excellent news on the French membership, China has announced to have finalised the ratification of the SKAO Convention (June 3, 2021), while Switzerland has taken a key step towards SKAO, with the École Polytechnique Fédérale de Lausanne (EPFL) that has signed a Cooperation Agreement with SKAO on behalf of the Swiss astronomy community.

Green light for construction of SKA telescopes

The 3rd SKAO Council Meeting was held on June 24-25, 2021. The Council and Science and Engineering Advisory Committee Chairs, as well as representatives from SKAO Member and Observer Countries, attended the meeting remotely, while personnel from the Office could finally convene in the SKAO Council Chamber.

The meeting allowed to reach a **new milestone in the SKA project: the SKAO member states approved the start of**

construction of the two SKA telescopes in Australia and South Africa. More information is available at the project web-page, which hosts the interview of the Council Chair (C. Cesarsky) and the Director General (P. Diamond) of SKAO, and a video summarising the 30-year history of the SKA project. A beautiful representation of the huge amount of work of hundreds of people (within the SKAO Office and all over the world) that has allowed to reach this historic moment. We warmly congratulate all those who made this major achievement possible!

On **June 29, 2021**, the announcement of the green light to SKA construction to the astronomical community by P. Diamond during the plenary session of the 2021 European Astronomical Society meeting was followed by the SKAO Press Conference. Moderated by W. Garnier (SKAO Director of Communications, Outreach and Education), the Press Conference saw the participation of SKAO representatives (P. Diamond; J. McMullin/ Deputy DG & Programme Director; S. Berry/Head of the DG's Office; P. Hartley/ SKAO Post-doctoral Fellow), as well as of C. Ferrari (SKA-France Director).

SKAO appoints key roles in host countries

On May 11, 2021, SKAO announced the [appointment of S. Pearce \(Australia\) and L. Magnus \(South Africa\) as telescope directors](#). These are the most senior SKAO operations representatives in the telescope host countries, in charge of establishing and leading SKAO operations, overseeing staff and all elements of the telescope systems in the two countries.

At the moment of their nomination, S. Pearce was Acting as Chief Scientist for the Australian science agency (CSIRO), while L. Magnus was instead Head of Operations at the South African Radio Astronomy Observatory (SARAO).



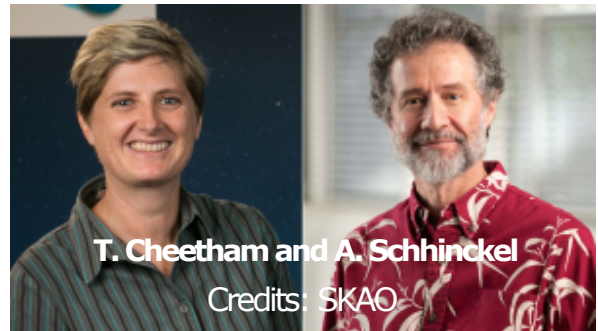
S. Pearce and L. Magnus

Credits: SKAO

[Site Construction Directors for Australia and South Africa](#), in charge of working within the Telescope Delivery Teams to coordinate the construction activities and with the Telescope Directors to align with the broader SKAO activities in-country, were appointed a few weeks later, on June 1st, 2021.

A. Schhinckel (SKA head of construction planning for Australia and leading the SKA programme at Australia's national science agency CSIRO at the moment of his nomination) and T. Cheetham (head of construction planning for the South African Radio Astronomy Observatory before her

new role within SKAO) were nominated for Australia and South Africa, respectively.



T. Cheetham and A. Schhinckel

Credits: SKAO

SKA at the 2021 meeting of the French Astronomy & Astrophysics community

The [week of French Astronomy 2021](#) (a virtual event held on-line from June 7 to June 11, 2021) has allowed to get an overview of the importance that the SKA project will play for future French astrophysical and cosmological studies.

On June 7, during the first plenary session of the meeting, G. Perrin (CNRS/INSU Deputy Director, Head of Astronomy & Astrophysics Division) announced to the whole French astronomical community the important progresses of France towards its SKAO membership.

Among the parallel sessions organised during the meeting, SKAO and the results from pathfinder/precursor telescopes were of course at the heart of the [A.S. SKA-LOFAR workshop](#), held on June 11, 2021, and which saw, among others, a talk by F. Combes about the [scientific perspectives opened by the SKA project](#), and one by C. Ferrari about [SKA-France activities and plans](#).

On the same day and during the ["Tomorrow the ELT!"](#) session, C. Ferrari also gave an overview of the [synergies between the scientific capabilities of the SKA telescopes and the future instruments](#)

of the [ESO Extremely Large Telescope \(ELT\)](#). These two major research infrastructures of the next decades open an exciting era for astronomy, as they will empower each other in our study of a wide range of science cases, spanning basically all astrophysical objects, from nearby planets to the first sources of light during the so-called “cosmic dawn”.



A bright future ahead of us thanks to the joint capabilities of SKAO and ESO-ELT!

Courtesy: C. Ferrari

On June 10, 2021, an [entire session was devoted to the enigmatic Fast Radio Bursts](#), extensively treated in previous SKA-France bulletins as they have brought to some of the most exciting discoveries of the last few years thanks to observations of SKA pathfinders and precursors.

SCIENCE

NenuFAR observations of the Sun

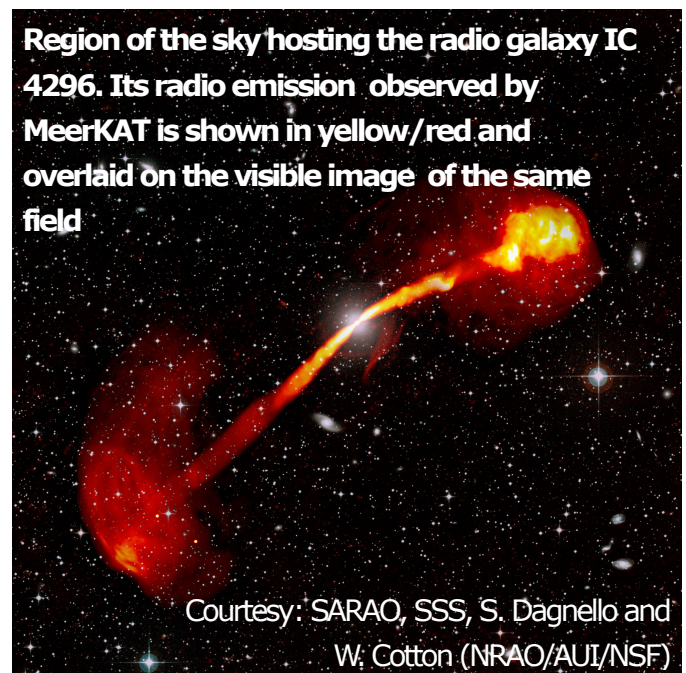
On June 10, 2021, as NenuFAR was observing a partial solar eclipse, the Sun produced a specular coronal mass ejection (CME). These eruptions are often associated with energetic particles, which produce different forms of light, and are particularly bright at radio wavelengths. [NenuFAR managed to observe](#) (live through the NenuFAR TV) [the transient](#)

radio signature of a shock wave driven by the CME and high-energy electrons trapped inside the eruption. By studying these radio emissions we can gain new insight into how CMEs interact with the solar atmosphere to produce energetic particles. This enables us to better forecast such “space weather” events and help protect any vulnerable technology on Earth.

The text above is extracted and adapted from the [NenuFAR news](#) by [E. Carley, A. Loh, B. Cecconi, J. Girard](#) on behalf of the NenuFAR collaboration.

MeerKAT

A [new study](#), lead by J. Condon (NRAO, USA) and [accepted for publication in the Astrophysical Journal](#) on June 9, 2021, has shown once more the importance of the combination of sensitivity, angular resolution, and dynamic range allowed by the South African SKA pathfinder, MeerKAT, in studying radio galaxies.



Courtesy: SARAO, SSS, S. Dagnello and W. Cotton (NRAO/AUI/NSF)

IC4296 is a typical “red & dead” elliptical galaxy (i.e. with no evidence of recent star formation). It hosts a massive black hole

(with a mass of a billion suns), whose activity is responsible for the observed radio emission extending on gigantic scales: 510 kpc in units used by astronomers, corresponding to more than 15 billions of billions of km!

Radio galaxies are well known to be characterised by a bright core centred on the host galaxy, and two more or less collimated jets pointing in opposite directions and terminating in diffuse lobes of radio emission. What is extremely exciting is that MeerKAT capabilities have allowed to reveal new kinds of features in the radio emission of IC4296, named, based on their appearance, "threads", "ribbons" and "rings". These are not only extremely fascinating to be observed, but, above all, allow us to understand in more details the complex physics driving the evolution of these gigantic radio sources, combining "ingredients" such as newly accelerated relativistic particles, fossil plasma from previous episodes of the massive black hole activity, magnetic fields within and around the radio galaxy.

More information in the [SARAO press release](#) and in the [scientific paper](#) by [J. Condon and collaborators](#).

EVENTS

Debating the potential of Machine Learning in astronomical surveys

18-22 October 2021 - IAP, Paris

The [2021 IAP colloquium](#) is dedicated to a [critical analysis of Machine Learning methods in astronomy](#).

A major revolution is now underway in astrophysics with the constant arrival of ever-richer and more complete datasets. The next generation of surveys soon

starting will generate orders of magnitude more data than previously. However, it is becoming increasingly clear that traditional techniques are not up to the challenge of fully exploiting these data. At the same time, in the computer industry, large-scale application of "machine learning" methods on large quantities of data have been able to solve problems that until now have been intractable.

These new techniques are now being adopted enthusiastically by astronomers who see them as a way to extract the maximum amount of science from new surveys. However, some caution is required; the concerns of industrial players developing machine learning techniques are not the same as astrophysicists who seek to explain observations in the framework of physical models.

It is therefore very timely to survey the landscape of machine-learning techniques in astronomy and to critically evaluate their usefulness for solving astrophysical problems. At IAP, many advanced analysis techniques have been pioneered to analyse data from the Planck satellite and from ground-based surveys; the avalanche of rich datasets coming from future missions like Euclid and ARIEL makes the institute a natural location to hold this conference.

The conference will explore the potential and applicability of machine learning techniques for future surveys such as DESI, [SKA](#), Euclid, Rubin Observatory, Ariel and Gaia. In particular the impact of systematic errors on the reliability of inferred parameters (cosmological or otherwise) derived using these methods will be explored. The ability of machine-learning models to lead to scientific discoveries will be critically discussed.

The IAP international colloquia, organised every year since 1985, brings together scientists from around the world. These meetings are a unique opportunity for students and postdocs in Ile-de-France to meet and interact with specialists.

This year's conference, to be held in October, will include the possibility of in-person attendance for a small number of people but the meeting will be largely online. Despite this, significant time will be set aside in the program so that all participants can interact through debates and round-table discussions.

Deadline for abstract submission is August 30, 2021. Deadline for registration is October 17, 2021.

All information at the [conference webpage](#).

JOB ANNOUNCEMENTS

SKAO Current Vacancies

The following SKAO positions are currently open:

- [Antenna Manufacturing Engineer](#) - Contract Type: Permanent (closing date: July 13, 2021)
- [Head Of Engineering Performance](#) - Contract Type: Permanent (closing date: July 30, 2021)
- [DevOps Engineer](#) - Contract Type: Permanent (closing date: August 18, 2021)
- [Postdoctoral Researcher In Radio Astronomy Simulations](#) - Contract Type: Permanent (closing date: August 31, 2021)

Interested readers can [register](#) to automatically receive an e-mail as soon as a relevant job is published. More

information can be found at the [SKAO webpage](#).

COMMUNICATION

Contact

The [8th issue of the SKA Magazine "Contact"](#) has been recently published by the SKAO Communication team.

News related to SKA-related actions and developments in France give vivid evidence of the continuously increasing engagement of the French community in the project. These include:

- a description of a [collaboration between France, Portugal, Poland, Cameroon and Haiti](#) ("Observing the Milky Way at home: hands-on the radio waves") - coordinated at French level by L. Fournier (SKA-France/LAB), F. Mottez, A.-L. Melchior and P. Salomé (Paris Observatory) - to upgrade the web interface of a European network of small radio telescopes and increase access to it for learning communities (p. 6);
- the [participation of the GENCI/IDRIS center](#) as one of the eight super-computing facilities around the world that are supporting the Second SKA Data Challenge (p. 8);
- a [summary of SKA-France's Director interview](#) during the recent SKAO Press Conference to announce the beginning of construction (pp. 18-19);
- the [news of the announcement of President Macron](#) in South Africa (p. 24);
- a description of the [new correlator for the French SKA precursor NenuFAR](#) (p. 35);
- a [summary of a Indo-French scientific meeting](#) to foster collaboration in radio astronomy (p. 44).

SKA in the French press

The press conference announcing the beginning of SKA construction has raised a strong interest towards the SKA project in the press, including in France, where articles focusing on this excellent news have been published by [Ciel & Espace](#), [Numerama](#), [Netcost-Security](#) and [Business Insider](#).

