

News from SKA-France

BIMONTHLY BULLETIN

SKAO Science Data Challenge 2



MAP OF WORLDWIDE PARTICIPATION



THE CHALLENGE IN NUMBERS

Teams analysing **1TB** of astronomical data

280 registered participants in **22** supercomputing countries

8 supercomputing centres

15 million CPU core hours* and 15 TB RAM available for teams



The challenge's 3D data cube is a series of stacked radio images, each reflecting a different frequency. It shows galaxies across a distance of 4 billion light years.

*A core hour refers to the number of processor units (cores) used, multiplied by the duration of the job in hours.

Infographic representing participation in the SKAO's Data Challenge 2 (Credits: SKA Observatory)

PROJECT

Second SKA Data Challenge: top score achieved by a French team on Jean Zay machine of GENCI/IDRIS

The results of the Second of the SKAO Data Challenges, which are designed to prepare future users to efficiently handle SKAO data, were announced by SKAO on October 13, 2021 with an excellent news for the French community: the Second SKAO Data Challenge (SDC2) has been won by a French team who has benefited from the MINERVA project funded by the Observatoire de Paris – PSL and has used the resources of the French National Jean Zay supercomputer of GENCI operated by the CNRS

WHAT'S INSIDE THIS ISSUE

PROJECT	
SKAO in France and in the world	P. 1
SCIENCE	
Pathfinders and precursors results	P. 4
EVENTS	
Future meetings & conferences	P. 6
JOB ANNOUNCEMENTS	
SKAO-related positions	P. 8



P. Diamond (SKAO DG, centre), D. Fredericks (Secretary of Australia's Department of Industry, Science Energy and Resources, left) and P. Mjwara (Director General of South African Department of Science and Innovation, right) sign the Host Country Agreements on October 14, 2021

Credits: SKAO

institute [IDRIS](#). In addition to the computing and human resources made available by GENCI and IDRIS, a research engineer from Observatoire de la Côte d'Azur (OCA) has provided support to SDC2 users, OCA having been the entry point to the IDRIS supercomputer.

In total, forty teams, comprising 280 participants in 22 countries, took part in SDC2 and were supported by eight supercomputing centres around the world. Teams were tasked with developing computer algorithms to identify and characterise nearly 250,000 galaxies in a simulated 1TB SKAO data cube mimicking a spectro-imaging observation including the fundamental spectroscopic line of hydrogen atoms around 1.4 GHz.

A more detailed description of the SDC2 results is available at the [SKAO webpage](#), while more information about the French participation can be found in the [Paris Observatory press release](#).

Steps forward for the SKA project during the last SKAO Council and SKA Organisation Board meetings

October 14, 2021 saw another historic milestone in the SKA project development, with the [signature of the Hosting Agreements](#) between SKAO and the two countries that will host the two telescopes, Australia and South Africa. The two documents, signed by P. Diamond (SKAO DG) for SKAO, D. Fredericks (Secretary of Department of Industry, Science Energy and Resources) for Australia, and P. Mjwara (Director General of Department of Science and Innovation) for South Africa, are key elements of the ongoing SKAO construction, as they set out the rights and responsibilities of each party regarding the sites, assets and infrastructure required to build and operate the SKA telescopes. More information are available at the [SKAO webpage](#).



Members of the SKA Organisation Board of Directors at the 37th Board meeting

(Credits: SKAO)

The signature ceremony, unfortunately still on-line due to Covid-19 restrictions, took place during the [4th SKAO Council Meeting](#), which was held on [October 14-15, 2021](#). In the same meeting, the Council also welcomed the recent news of the [agreement signed by SKAO and Sweden's Chalmers University of Technology](#). This will allow Chalmers to represent Sweden in the project, while work is ongoing to establish the country as a SKAO member.

Meanwhile, following the transition of the SKA Organisation to the SKA Observatory on May 1st, 2021, [the Board of the SKA Organisation had its 37th and last meeting on September 9, 2021](#). T. Devaney (Head of Strategy) presented an update on the planning for the dissolution of the SKA Organisation, whose process is expected to commence in early-2022 and to be completed by mid-2022. SKA-France warmly congratulates the SKA Organisation that, as stressed by L. Börjesson, Chair of the Board, has successfully completed its mission, with

construction of the SKA that has now been commenced by SKAO.

Very sadly, both the SKA Organisation Board and the SKAO Council meetings started with [one minute's silence held in the remembrance of A. Srivastava](#), who sadly passed away on 18 August 2021. Arun was the Vice-Chair of the SKA Organisation Board and a representative from the Department of Atomic Energy (DAE) in India. We express our sincere condolences to Arun's colleagues and family.

New member of the SKA-France Director's team

SKA-France Director's team is happy to welcome a new member: Shan Mignot. "After graduating as an engineer in 2001 and a Master's degree in astronomy in 2002, I started working at Observatoire de Paris on the specification and design of the algorithms and the FPGA-CPU processing units on board ESA's Gaia mission. I was recruited as a research engineer by CNRS



Shan Mignot
(Université Côte d'Azur, Observatoire de la Côte d'Azur, CNRS, Laboratoire Lagrange)

in 2004 and defended my PhD on the work done for Gaia in 2008.

On board a satellite constraints are such that everything is tightly coupled so a system's view is necessary. Building on this first experience, from 2010 onwards, I have been a systems engineer for multi-object spectrographs with the aim of conducting ground follow-up observations to complement Gaia's catalogue, first with GYES proposed for the Canada-France-Hawaii telescope, then by leading the development of the high-resolution spectrograph for 4MOST on ESO's VISTA telescope, then by contributing to the Mauna Kea Spectroscopic Explorer for the Canada-France-Hawaii telescope again and finally in managing the fabrication and verification of the fibre links for WEAVE on the William Herschel telescope.

I moved to the Lagrange laboratory at Observatoire de la Côte D'Azur in September 2021 to contribute to the design and procurement of SKA's Science Data Processor, the machines which will process the data collected by the antennas before their distribution to scientists worldwide, with a view to optimising the match between the software and the hardware in the context of High Performance Computing."

A warm welcome to Shan!

SCIENCE

Workshop "Which Observatories for PCMI"



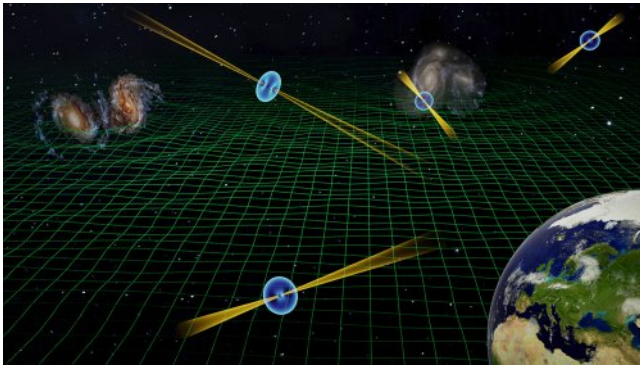
From October 18 to October 21, 2021, the "Programme National de Physique et Chimie du Milieu Interstellaire" (PCMI) has organised a four-day meeting ("Which Observatories for PCMI?") to discuss about how state-of-the-art astrophysical facilities are expected to improve our understanding of the impact of the interstellar medium physics and chemistry on a wide range of astrophysical objects (e.g. from high redshift galaxies to star and planet in the Milky Way).

The combination of multi-wavelength facilities will be key for ISM studies. Invited speakers have therefore presented the perspectives opened by observatories and instruments covering a large portion of the electromagnetic spectrum, including the low frequency part that will be observed by the SKAO. The status and scientific goals of the SKA project have been highlighted by M.-A. Miville-Deschenes (CEA).

This confirms once more the high interest of PCMI in the SKAO, as already shown, e.g., by the original and rich contribution of this community to the [French SKA White Book](#) published in 2017.

The European Pulsar Timing Array towards the detection of the gravitational wave background

As extensively and very clearly explained in a [press-release published by Paris Observatory](#) on October 28, 2021, the European Pulsar Timing Array (EPTA) has announced to have identified a "promising signal" in the search for the gravitational wave background.



Artist's view of the EPTA experiment
(Credits: M. Kramer, MPIfR)

This stochastic background is expected to be produced by the combined signals of the total population of supermassive black hole pairs emitting very low frequency gravitational waves by slowly approaching each other. Ground based gravitational wave detectors cannot detect such low frequency signals, that can instead be revealed by exceptional "instruments" within our Galaxy: Pulsar Timing Arrays' (PTAs).

PTAs are arrays of pulsars, highly magnetised compact stars with spin periods as short as a few milliseconds. Thanks to the very stable rotation of pulsars, PTAs can be used as a galactic scale detector of very low frequency gravitational waves.

The EPTA is a collaboration gathering about 40 scientists around the five largest European radio telescopes, including the

French decimetric radio telescope of Nançay (Observatoire de Paris - PSL / CNRS / Université d'Orléans).

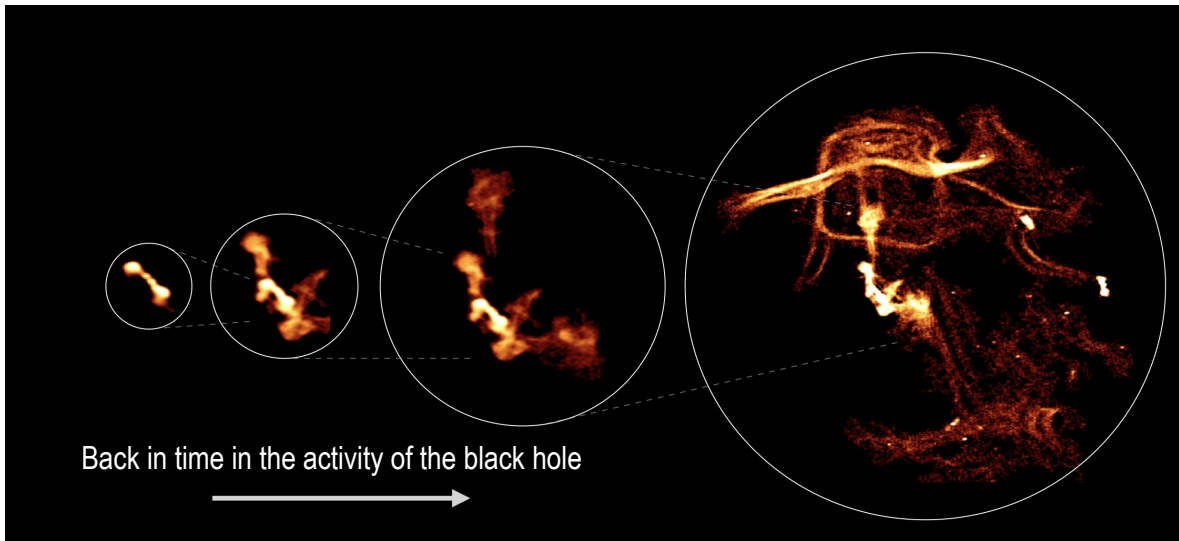
Interested readers are referred to the [Paris Observatory press release](#) and to the [scientific paper published on October 27, 2021](#), by the EPTA on the Monthly Notices of the Royal Astronomical Society.

A few hundreds million years old radio emitting plasma detected by LOFAR

On [October 18, 2021](#), a group of researchers (including C. Tasse from Paris Observatory) has announced the [discovery of a very spectacular radio source detected through low-frequency observations of the SKA pathfinder LOFAR](#).

The source, observed at 53 and 144 MHz, is characterised by a complex morphology, with bubbles and filaments of radio emitting plasma extending over hundreds of thousands of light years. The study of the multi-frequency radio emission, associated to X-ray observations of the same region of the sky, has allowed astronomers to understand that such a beautiful structure is associated to different phases of activity of a black hole hosted by a galaxy in the central region of a galaxy group (named "Nest200047"). While the central and brightest regions of the source are associated to the ongoing activity of the black hole, the low frequency radio observations of LOFAR allow us to observe older and older plasma, which was originated in previous episodes of the central galaxy activity, and is still visible on much larger spatial scales a few hundreds million years after its ejection.

Through this kind of observations, astronomers can study the complex



Time reconstruction of the activity of the black hole at the center of Nest200047 over time scales of hundreds of millions of years

(Credits: M. Brienza / Università di Bologna / Inaf)

physics associated to the interaction between the radio emitting plasma and its surrounding environments, responsible, among others, to shape the large scale structure of such an amazing source.

For more information, we refer to the [ASTRON press-release](#), and to the [scientific paper lead by M. Brienza](#) (Università di Bologna, INAF).

EVENTS

GDR ISIS Workshop “Accélération des calculs pour l’instrumentation et le traitement de données en astronomie”

10 November 2021 - Paris Observatory

This [workshop](#) aims to identify the challenges and work in progress for the acceleration of computing for astronomy, whether in the generation or in the processing of data. This acceleration on single or multi-node computational servers, associated with GPU, FPGA or MPPA, requires expertise in applications (radio astronomy, astrophysics, adaptive optics, ...), methodology (inverse problem, source separation, ...) and architecture

(parallel computing, programming, prototyping tools, ...).

After a presentation of the challenges for real-time computing for adaptive optics and the SKA radio telescope, several works will be presented. The workshop will be concluded by a round table.

More information are available at the [workshop webpage](#).

2021 SPARCS meeting “Capturing Science from the Pathfinder Survey Data”

15-19 November 2021 - Virtual Event

2021 is an exciting time for continuum pathfinder surveys from the low frequency sky (with, e.g., the new release from the LOFAR Two-metre Sky Survey and the upcoming MWA GLEAMX) to the mid frequencies (with, e.g., ASKAP’s EMU starting a second pilot survey and MeerKAT results coming out). The 2021 meeting of the SKA Pathfinders Radio Continuum Surveys (SPARCS), entitled “Capturing Science from the Pathfinder Survey Data”, will be held as a virtual meeting, with one or two sessions per day, offset in time to accommodate different time zones.

Registration and abstract submission are open at the [conference webpage](#). Priority deadline for talk submission was October 6, 2021. However, talks submitted after this deadline may be considered, even if they cannot be guaranteed. Talks can be on scientific results or more technical in nature. Registration will remain open after October 6, without any registration fee.

2nd NenuFAR User Workshop

17-19 November 2021 - Nançay Radio Observatory



The [2nd NenuFAR User Workshop](#) aims to prepare the opening of NenuFAR to future PI programmes, keeping in mind the complementarity with LOFAR 2.0 planned for early 2022. It will also be the [time to review what happened during NenuFAR "Early Science" phase](#).

Organisers also want to offer to users and potential users, the opportunity to get the last up-to-date information about the instrument, data processing methods and facilities illustrated by what has already been achieved in this early phase. Participants will get a chance of doing practical sessions around various projects and tools (Beamforming, pulsar, imaging, etc.) with NenuFAR data.

In the workshop, the following topics will be addressed:

- Presentation & updates about the instrument (technical presentations, and organisation according to the Science Management Plan)

- Key Programme presentations (Observation, methodologies, early results)
- Hands-on on reduction tools, pipelines, computing/storage resources
- Discussions/ Questions / Future plans

Format: the 2nd NenuFAR User Workshop will be held in a hybrid fashion, focusing on physical attendance in Nançay Radio Observatory, but also allowing for remote participation via Zoom when requested/required.

Target audience: current NenuFAR users (KP members) but also potentially new NenuFAR users or future PI proposers

Logistics: the registration, free of charge, is possible [online](#) on before November 10th, 2021. Due to COVID, accommodation on site is very limited, but a list of hotels will be provided. Other logistics details are available at the [workshop the website](#).

The workshop is supported by Paris Observatory & Nançay Radio Observatory.

VLBI in the SKA Era

14-18 February 2022 - Virtual Event



[Event registration and abstract submission are now open](#) for the upcoming symposium "VLBI in the SKA era". The abstract submission deadline is 19 November 2021, and there is no registration fee. Further information is provided below.

Virtual format: the meeting will be held on the Whova platform, which provides a rich meeting experience with built-in capability for communicating with other participants. When you register, you will receive a

confirmation email that includes links to the meeting app, which you can use through your web browser and/or on a mobile device.

Abstract review: submitted abstracts will be anonymised for review, scored by the SOC, and allocated to either the talk or poster program. Organisers are committed to diverse representation at all levels of the symposium organisation and participation. The program will be published online by 14 January 2022.

Accessibility Grants: the organisers of this event are committed to fostering a fair, equitable and inclusive event that is accessible to anyone wishing to attend. We are pleased to be able to provide Accessibility Grants to reimburse the cost of technology and support that conference attendees may require to enable them to attend this conference. Grants are available up to an indicative value of AUD\$250 per eligible attendee. Grants will be fully considered until the priority deadline (19 November), or when the budget is fully allocated. Further information is available on the event website.

Symposium outcomes: recordings of presentations and discussions will be available online after the sessions take place. There will be no conference proceedings, but the SOC will gather information from the symposium content, and lead the development of a white paper summarising the meeting outcomes.

Key dates:

- 8 October 2021 - Registration & abstract submission open
- 19 November 2021 - Abstract submission deadline

- 19 November 2021 - Priority deadline for accessibility grants
- 14 January 2022 - Symposium program published on event website
- 11 February 2022 - Registration deadline

JOB ANNOUNCEMENTS

SKAO Current Vacancies

The following SKAO positions are currently open:

- [Project Cost Analyst](#) - Contract Type: Permanent (closing date: November 8, 2021)
- [Project Manager SKA-Mid Digital](#) - Contract Type: Permanent (closing date: November 22, 2021)
- [Operations Scientist](#) - Contract Type: Permanent (closing date: November 26, 2021)
- [Scientist](#) - Contract Type: Permanent (closing date: November 30, 2021)
- [Future Opportunity - Specialist Engineer \(Various Disciplines\)](#) - Contract Type: Permanent (closing date: March 31, 2021)
- [Future Opportunity - Control Systems Engineer](#) - Contract Type: Permanent (closing date: March 31, 2021)
- [Future opportunity - Platform Developer](#) - Contract Type: Permanent (closing date: March 31, 2021)
- [Future Opportunity - RF Engineer](#) - Contract Type: Permanent (closing date: March 31, 2021)
- [Future Opportunity - System Engineer](#) - Contract Type: Permanent (closing date: March 31, 2021)

- [Future Opportunity - UX Specialist](#) - Contract Type: Permanent (closing date: March 31, 2021)
- [Future Opportunity - Database Developer](#) - Contract Type: Permanent (closing date: March 31, 2021)
- [Future Opportunity - High Performance Analysis Algorithm Developer](#) - Contract Type: Permanent (closing date: March 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](#).