



“The Southern Cross”

The Hermanus Astronomy Centre Newsletter

APRIL 2024

Please note that all our regular meetings are scheduled for **TUESDAYS**, commencing at **18.00 (6 pm)** unless otherwise advised. The day and date may change from time to time according to the current Hermanus load shedding status and/or according to venue availability for a physical meeting; such changes will be notified via e-mail and on our website.

MONTHLY MEETINGS

Monthly Meetings are held on the **Third Tuesday** of each month except December.

Our last meeting was held at **Onrus Manor** on **March 19th**. **Narusha Isaacs-Klein** spoke to us on Zoom from the University of the Western Cape, providing an overview of the *Square Kilometre Array* (SKA) and touching on South Africa's rich astronomical history and its contributions to the field. She is deeply involved in empowering the youth in her community, fostering a passion for higher education. Her dedication extends to both astrophysics and education, where she strives to make a positive impact. Her commitment to research and community empowerment reflects her mission to advance knowledge and inspire future astronomers.

For those who were unable to attend, herewith the YouTube link:

<https://www.youtube.com/watch?v=xnPAOp0ZRrI>

Our next Monthly Meeting will be on **Tuesday April 16th** commencing at **18.00 (6 pm)** and will again take place at Onrus Manor with a Zoom link on request for those who cannot be there in person.

John Ward, of SANSA, will speak to us on his Antarctic Research.

SPECIAL INTEREST GROUP ACTIVITIES

Cosmology

These meetings are scheduled for the **First Tuesday** of each month except January. We commence at **18.00 (6 pm)**.

On **Tuesday March 5th**, in episode 17 of “THE ENTIRE HISTORY OF THE UNIVERSE”, we watched “*What Actually are Space and Time?*”

Herewith the YouTube video link:

https://www.youtube.com/watch?v=qr0wyKbm7m4&list=PLROBLIvnR7BEF9b1NOvRf_zhboibmywJb&index=18&t=5s&pp=iAQB

and the YouTube discussion link:

<https://www.youtube.com/watch?v=OzpySD9Gz8g>

The next episode of the “THE ENTIRE HISTORY OF THE UNIVERSE” series is episode 18 “*How Did Our Universe Emerge From Chaos?*” - scheduled for **Tuesday April 2nd**.

The series continues for another 15 episodes to episode 33.

For further information, please contact Derek Duckitt: derek.duckitt@gmail.com.

Astrophotography

This SIG is no longer scheduled but can be arranged as requested by group members.

For further information, please contact Deon Krige: krige.deon44@outlook.com and please keep an eye on our website calendar and our e-mail notices and invites.

Study Group

Scheduled for the **Last Tuesday** of each month.

In our March 26th meeting, we watched videos and discussed *Windmills – Incredible Ancient Engineering*.

1. The video links: <https://www.youtube.com/watch?v=3ugw7-BwsmI&pp=ygU3VGhlc2UgQW5jaWVudCBXaW5kbWlsbHMgV2VyZSBCdWlscCBPdmVyIDEsMDAwIFllYXJzIEFnbnw%3D%3D> These Ancient Windmills 1.2 mins
2. <https://www.youtube.com/watch?v=Uv3Pn2DFkDw> Nashtifan 1000 yrs ago 6 mins
3. <https://www.youtube.com/watch?v=3STOY9DEi2s> Netherlands 21 mins

The discussion link: <https://www.youtube.com/watch?v=MI264W5h38Y>

The next is scheduled for **April 30th**, the topic is yet to be finalised but will most likely be an update on Homo Naledi. Please keep an eye on our website calendar on <https://www.hermanusastronomy.co.za/>

For further information regarding Study Group, please contact Peter Harvey petermh@hermanus.co.za

Observing

This section includes recommended dates for **Stargazing**, **Moonwatch**, **Meteors**, **Solar observation** and whatever else deserves a close look.

On **Monday March 11th**, a small but enthusiastic group of members collected at Gearing's Point sundials (GPAED) to witness the setting of the Sun on the March Equinox. The Sun did indeed set on schedule at 18h50 and in Pierre's "V", as he predicted.

Proof provided by Derek



For quick reference:

Optimal dates for **APRIL 2024**:

SUGGESTED EVENING OBSERVATION WINDOW

(Lunar observations notwithstanding)

<i>Date</i>	<i>Moon</i>		<i>Dusk end</i>
2nd April	<i>Rises</i>	23h17 (50%)	19h59
to 13th April	<i>Sets</i>	20h07 (12%)	19h47

Moonwatch – a few days either side of the **First Quarter** (Sunday April 15th)

No centre Stargazing or Moonwatch activities are planned at present. They do tend to be arranged at short notice for weather considerations. Please watch our activities calendar on the website –

<https://www.hermanusastronomy.co.za/>

Eclipses – None observable from southern Africa. A total Solar Eclipse will be visible from Mexico, USA and Canada on 8th April 2024.

I shall circulate a link to watch on the internet closer to the time. Johan informs me that it will also be available on YouTube.

The Sun - The Sun and Auroral Activity: Daily solar activity and predictions for auroral activity can be found at the following website: <https://www.spaceweatherlive.com/en/solar-activity.html>

Meteors - The **April Lyrids** will commence on Sunday April 14th and will peak on April 22nd. A fairly energetic shower but the Moon will be a hindrance.

For the dedicated meteor enthusiast, please see page 4 in the April *Skynotes* and in the 2024 Sky Guide p. 86.

Comet <https://www.marthastewart.com/rare-green-comet-12p-pons-brooks-8610933>

Future Trips

No outings are planned at present.

OUTREACH

The Science and Technology Club



On Tuesday March 19, the inaugural meeting of the Science and Technology Club was held at SANSA. Attendance included 27 learners of Lukhanyo and Mount Pleasant Primary. The next two meetings will be at their respective schools as they construct their sundials.

The Hermanus Astronomy Centre recently formed a Science & Technology Club with learners from Mount Pleasant Primary, Lukhanyo Primary and Zwelihle Primary Schools. The objective of the HS&TC is to stimulate these youths through various Astronomy, Science and Technology activities and excursions with the ultimate aim of making them interested in and confident with Science and Technology.

The Club will meet on a fortnightly basis at SANSA, at the relevant schools or at the facilities being visited during excursions.

A wide range of activities is envisaged, for each of which participants will be expected to write a short report on what they have learnt:

Astronomical:

☀ Sunspot counting, photographing and reporting to the Astronomical Society of Southern Africa's (ASSA) Solar specialist section.

☀ Moon gazing between New Moon and First Quarter to *identify* and *observe* (for at least 30 seconds until you can describe or sketch) specific targets, which will include *Mare* or Seas, Craters, Mountain Ranges & Rilles (long narrow depressions that resembles channels). Photos and "learnt reports" will be shared with other Outreach practitioners throughout the country *via* ASSA (Astronomical Society of Southern Africa).

☀ Star gazing site to *identify* and *observe* specific targets such as the Milky Way galaxy, constellations, open and globular clusters of stars, bright and dark nebulae and individual stars, specifically those which form part of indigenous folklore. This will be done at the Gearings Point Astronomy Education Display where five tablets explain how to use our observational tools: Eyes, binoculars and telescopes.

☀ Curriculum-based workshops on the Solar System and Seasons with handouts to enable participants to repeat these workshops themselves.

☀ A workshop on "How Sundials work" with a folded A4 take-home Horizontal sundial for Hermanus.

☀ This workshop is preparatory to helping *the learners* at each individual school to design and mark out an Analemmatic sundial for their own school. Part of this activity is to install a 500 mm Shadow Sticks to initiate a year-long science experiment of marking the stick's shadow tip once a week and watch how these marked points trace out an Analemma.

Learners from Mt Pleasant Primary at SANSA



Science Excursions to:

☀ SANSA

☀ The SAAO, SKA, Noon Gun, Iziko Planetarium and Museum in Cape Town

☀ Fernkloof Botanical Gardens to learn about our fynbos

☀ If possible, a visit to Sutherland

Technology Excursions:

☀ Visit Palmiet Hydro-electric power station to learn how it works.

☀ Visit the Wind Turbine farm near Caledon to learn how it works.

☀ Visit a Solar farm to complete the “renewable” energy technology.

☀ Visit Abagold to learn about abalone farming.

☀ Visit the Preekstoel chemical & biological water purification works.

☀ Visit the Birkinhead Lighthouse.

A schedule of activities was drafted together with the schools for alternative activities between the three options.

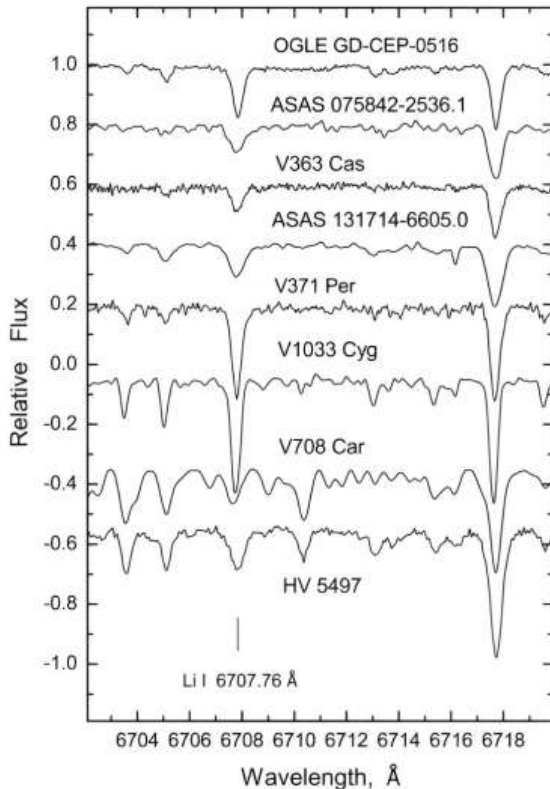
The first activity was a guided tour of SANSA, which elicited a gratifyingly lot of interaction between the tour guide Thandile Vuntu and the learners.

The second activity was a workshop on “How Sundials Work” in preparation for the learners designing and marking out Analemmatic sundials for their own schools.

– Pierre de Villiers and Mick Fynn

(Compiled By Pieter Kotzé)

Variable star V708 Car has an unusual chemical composition, study finds



Lithium line in the spectrum of V708 Car and other lithium-rich Cepheids. Credit: Kovtyukh et al., 2024.

An international team of astronomers has performed spectroscopic observations of a variable star known as V708 Car. Results of the observational campaign indicate that this star has an unusual chemical composition. Cepheid variables (or Cepheids) are luminous, yellow, horizontal branch stars changing their brightness with time as a result of regular stellar pulsations. Given that their periods of variation are closely related to their luminosity, astronomers use them to measure interstellar and intergalactic distances. Classical Cepheids, also known as Population I Cepheids, undergo pulsations with very regular periods on the order of days to months. Given that their pulsation and stellar parameters are strictly connected, these variables are also used as a test bed for stellar evolution theories. Located about 14,350 [light years](#) away from the Earth, V708 Car is a massive long-period classical Cepheid. Previous observations have found that it is a [supergiant star](#) with a mass of some 12 [solar masses](#), pulsation period of approximately 52.4 days (which increases at a rate of 52

seconds per year), and its luminosity is at a level of 18,400 solar luminosities. <https://phys.org/news/2024-02-variable-star-v708-car-unusual.html>

Heaviest pair of black holes ever seen weighs 28 billion times more than the sun

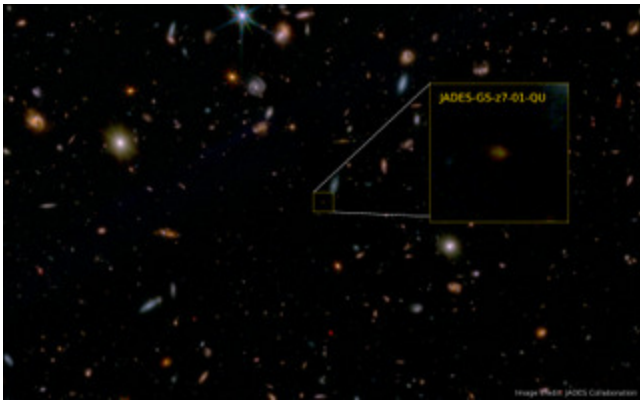
"Normally, it seems that galaxies with lighter black hole pairs have enough stars and mass to drive the two together quickly. But the binary has scoured the central galaxy of such matter, leaving it stalled." Two supermassive black holes found in collision-created "fossil galaxies" are so massive that they refuse to collide and merge. The discovery could explain why, although supermassive black hole mergers are predicted theoretically, they have never been observed in progress. The [supermassive black hole](#) system is located in [elliptical galaxy](#) B2 0402+379. Together, the two black holes have a joint mass that is 28 *billion* times larger than that of [the sun](#), making this the most massive black hole binary ever seen. Not only that, but the binary components of this system are the closest in a supermassive black hole pair, separated by just 24 light-years. This is the only [supermassive black hole binary](#) that has ever been resolved in enough detail to see both objects separately. Curiously, while the proximity of the two bodies suggests they should collide and merge, they appear to have been locked in the same orbital dance around each other for over 3 billion years.



An illustration shows two supermassive black holes locked by their size and prevented from merging (Image credit: NOIRLab/NSF/AURA/J. daSilva/M. Zamani)

<https://www.space.com/supermassive-black-holes-pair-heaviest-stalled-merger>

James Webb telescope detects oldest 'dead' galaxy in the known universe — and its death could challenge cosmology

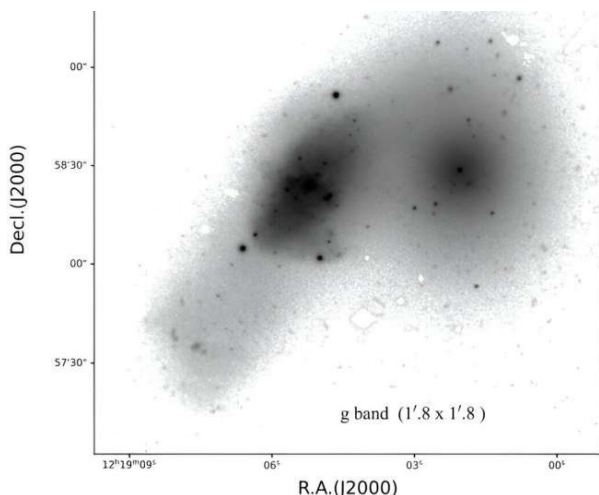


An image from the James Webb Space Telescope highlighting JADES-GS-z7-01-QU, the oldest "dead" galaxy ever observed (Image credit: JADES Collaboration)

Astronomers using the [James Webb Space Telescope \(JWST\)](#) have discovered the oldest "dead" galaxy ever seen — but the cosmic corpse has left scientists puzzled as it defies explanation by our current knowledge of the early cosmos. The galaxy suddenly and mysteriously halted star formation when the universe was just 700 million years old, when countless stars were birthing thanks to an abundance of pristine gas and dust elsewhere in the universe. The galaxy, named JADES-GS-z7-01-QU and described in a paper published Wednesday (March 6) in the journal [Nature](#), provides astronomers with a peek into the elusive underpinnings of galaxy evolution in a primordial universe, including why galaxies stop forming new stars and whether forces driving their starbursts alter across epochs. <https://www.livescience.com/space/cosmology/james-webb-telescope-detects-oldest-dead-galaxy-in-the-known-universe-and-its-death-could-challenge-cosmology>

Observations explore the nature of merging dwarf galaxy VCC 322

Using the Canada France Hawaii Telescope (CFHT), Chinese astronomers have performed multi-band observations of a merging dwarf galaxy known as VCC 322. [Results](#) of the observational campaign, presented March 4 on the preprint server *arXiv*, deliver crucial information regarding the nature and properties of this galaxy. Dwarf galaxies, with masses below 5 billion solar masses, contain up to several billion stars and are the most numerous galaxies in the universe. Their formation and activity are assumed to be heavily influenced by interactions with larger galaxies. Although mergers of dwarf galaxies are expected to occur at all redshifts, they are still not fully understood, mainly due to the observational challenges of such events. However, there is evidence that dwarf mergers play a significant role in triggering star formation in the nearby universe.



G-band image of VCC 322/319 from CFHT/MegaCam. Credit: Zhang et al, 2024

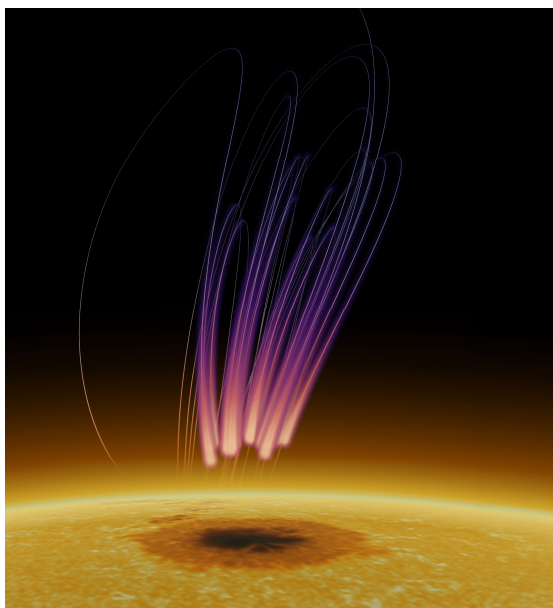
VCC 322 is a dwarf irregular galaxy in the Virgo cluster with an estimated mass of about 90 million [solar masses](#). Previous observations have found that the galaxy has tidal tails and stellar shells, which points to a [merger](#) remnant.

<https://phys.org/news/2024-03-explore-nature-merging-dwarf-galaxy.html>

NASA-Supported Team Discovers Aurora-Like Radio Bursts Above Sunspot

A NASA-funded team of scientists has discovered long-lasting radio signals emanating from the Sun that are similar to those associated with auroras – northern and southern lights – on Earth. Detected about 25,000 miles (40,000 km) above a sunspot – a relatively cool, dark, and magnetically active region on the Sun –

such radio bursts had previously been observed only on planets and other stars. “This sunspot radio emission represents the first detection of its kind,” said Sijie Yu of the New Jersey Institute of Technology, Newark, who is the lead author of a [paper](#) reporting the discovery in the January 2024 issue of Nature Astronomy.

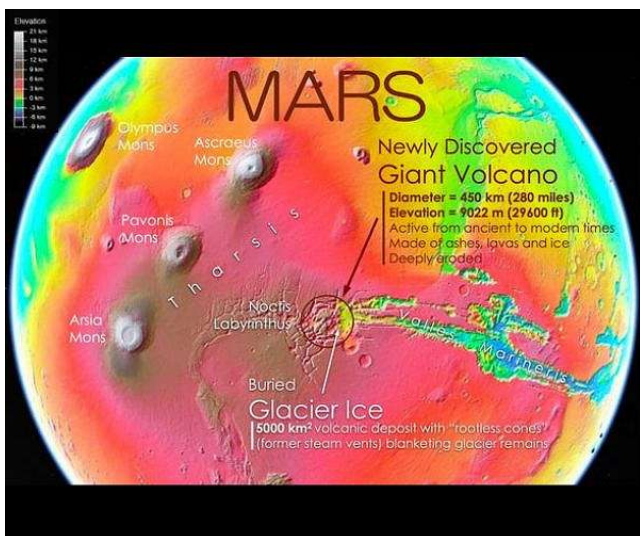


Scientists have discovered radio bursts above a sunspot that resemble radio emissions from auroras on Earth. The pink-purple streaks in this illustration represent the radio emissions, with higher-frequency radio signals in pink, closer to the sunspot, and lower frequencies in purple. The thin lines represent magnetic field lines above the sunspot. The sunspot is the dark region on the Sun at the bottom. Sijie Yu, New Jersey Institute of Technology

The discovery could help us better understand our own star as well as the behavior of distant stars that produce similar radio emissions. The Sun often emits short radio bursts that last for minutes or hours. But the radio bursts Yu’s team detected, using the Karl G. Jansky Very Large Array in New Mexico, persisted for over a week. These sunspot radio bursts also have other characteristics – such as their spectra (or intensity at different wavelengths) and their polarization (the angle or direction of the radio waves) – that are much more like radio emissions

produced in the polar regions of Earth and other planets with auroras. <https://science.nasa.gov/science-research/heliophysics/nasa-supported-team-discovers-aurora-like-radio-bursts-above-sunspot/>

Eroded Martian Volcano with Hidden Ice Suggests Active Geological Past

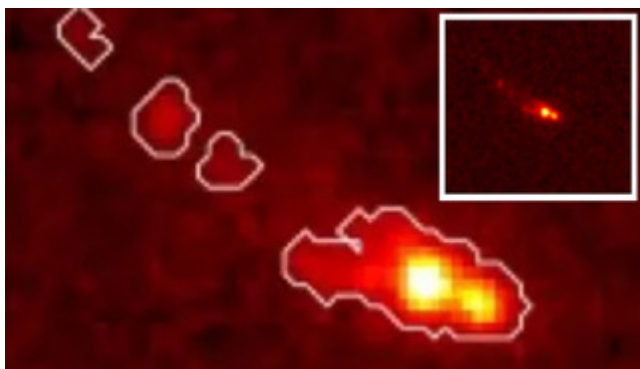


Newly discovered giant volcano is located in the "middle of the action" on Mars. Topographic map showing the iconic location of the Noctis volcano between the largest volcanic and canyon provinces on Mars.

At the 55th Lunar and Planetary Science Conference in The Woodlands, Texas, scientists unveiled the discovery of a colossal volcano, provisionally named "Noctis volcano," along with a suspected subsurface glacier in Mars' Tharsis volcanic province. This revelation comes from analysis of imagery captured by orbiting spacecraft over decades, unveiling a site with profound implications for the study of Martian geology and climate evolution. Positioned at the intersection of the Noctis Labyrinthus and the Valles Marineris, the Noctis volcano stands at

+9022 meters in elevation, covering an area of 450 kilometres in diameter. The discovery of a thin volcanic layer atop potential glacier ice marks a significant milestone in understanding Mars' geological transformations.

[https://www.spacedaily.com/reports/Eroded_Martian_Volcano_with_Hidden_Ice_Suggests_Active Geological Past 999.html](https://www.spacedaily.com/reports/Eroded_Martian_Volcano_with_Hidden_Ice_Suggests_Active_Geological_Past_999.html)



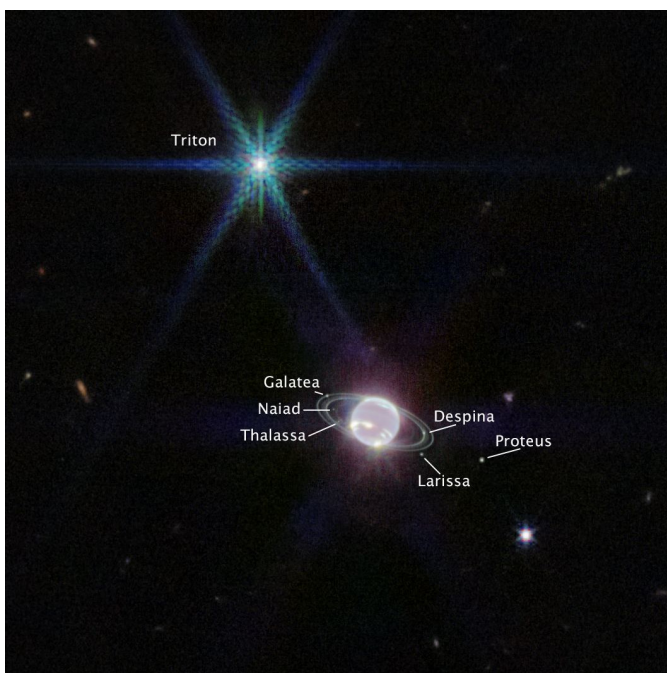
Speck of light glimpsed by Hubble is truly an enormous old galaxy, James Webb Space Telescope reveals

(Main) The complex shape of Gz9p3 shows its origins as the result of a merger between galaxies (Inset) direct imaging by

the JWST reveals Gz9p3 has a double nucleus indicating a merger that is still ongoing(*Image credit: NASA/Boyett et al*)

What was little more than a speck of light for the Hubble Space Telescope has been revealed as one of the oldest galaxies ever discovered — and the finding owes itself to none other than Hubble's younger sibling: The James Webb Space Telescope. The [James Webb Space Telescope](#) international "Glass" Collaboration made detailed observations of the galaxy, dubbed Gz9p3, which is seen as it was just 510 million years after the [Big Bang](#). That's during the relative infancy of the universe, which is now 13.8 billion years old. The team discovered that, much like other [early galaxies seen by the JWST](#), Gz9p3 is far more massive and mature than expected for a galaxy in the infant universe. During the ancient time period in which it's been spotted, it already appears to contain several billion stars. <https://www.space.com/james-webb-space-telescope-hubble-speck-light-gz9p3>

Webb Reveals Secrets of Neptune's Evolution



JWST's view of Neptune in infrared. The telescope also studied the surfaces of two icy asteroids in the Kuiper Belt that lie beyond Neptune. Courtesy: NASA, ESA, CSA, STScI

A twinset of icy asteroids called Mors-Somnus is giving planetary scientists some clues about the origin and evolution of objects in the Kuiper Belt. JWST studied them during its first cycle of observations and revealed details about their surfaces, which gives hints at their origins. That information may also end up explaining how Neptune got to be the way it is today. The Mors-Somnus binary is part of a collection of objects beyond Neptune. They're called, aptly enough, "Trans-Neptunian Objects" or TNOs, for short. About 3,000 are numbered and known, and many more aren't yet surveyed. They all lie beyond the orbit of Neptune and are divided into various classes. There are the classical Kuiper Belt Objects (KBOs) and scattered disc objects. Within those two classes, there are

resonant TNOs—which move in resonance with Neptune and extreme TNOs, which orbit far beyond Neptune (around 30 AU). Then there are objects in orbits similar to Pluto's, called "plutinos". Mors-Somnus is also a Plutino.

<https://www.universetoday.com/166178/webb-reveals-secrets-of-neptunes-evolution/>

Orion's Twin Rogue Planets Inexplicably Blaze with Intense Radio Waves

Researchers don't know how this pair of free-floating planets formed or why it radiates so brightly.



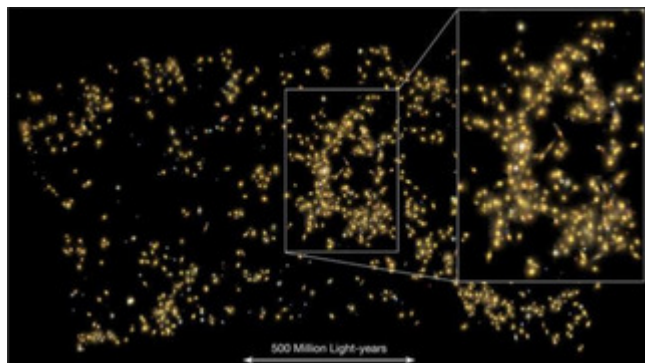
Part of the Orion Nebula shown in infrared. Credit: NASA, ESA, CSA/Science leads and image processing: M. McCaughrean, S. Pearson (CC BY-SA 3.0 IGO)

Strange, twirling [duos of roughly Jupiter-size celestial bodies](#) in the Orion Nebula have had astronomers scratching their heads since the James Webb Space Telescope (JWST) photographed them in October 2023. Unless they were violently ejected from a solar system—unlikely, given their delicate, undisturbed dance—the free-floating pairs challenge astronomers' long-standing notion that

planets can form only within a star's orbit. Researchers have now discovered radio-wavelength signals from one of these 42 so-called Jupiter-mass binary objects (JuMBOs), according to a study [in the *Astrophysical Journal Letters*](#), suggesting the pair is astoundingly bright. "It's important to understand what these objects are, and having radio data really adds a new dimension to the problem," says the study's lead author, Luis F. Rodríguez, an astronomer at the National Autonomous University of Mexico. <https://www.scientificamerican.com/article/orions-twin-rogue-planets-inexplicably-blaze-with-intense-radio-waves/>

Scientists find galaxy supercluster as massive as 26 quadrillion suns

The Einasto Supercluster is so vast that it would take a light signal 360 million years to get from one end to the other.

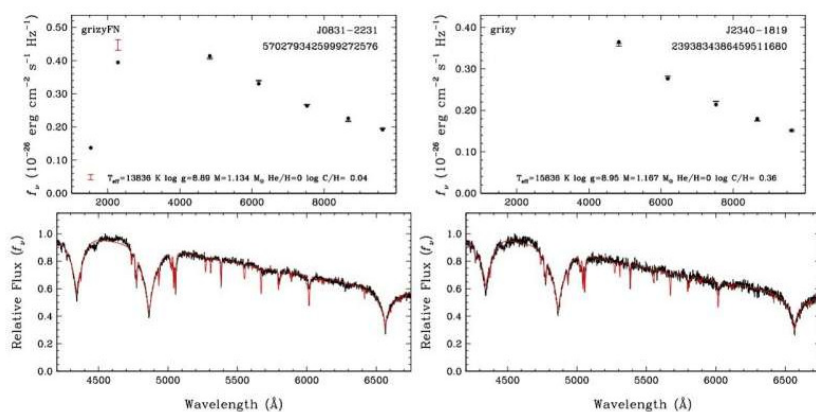


The Einasto supercluster located 3 billion light-years away and containing a mass equivalent to 26 quadrillion suns (Image credit: Shishir Sankhyayan)

Astronomers have discovered a cavalcade of monster galaxy superclusters, incredibly massive collections of galaxies and galaxy clusters in the universe. The most striking example of these 662 new [superclusters](#) is located around 3 billion light-years away from Earth and has been named the "Einasto Supercluster." This

particular supercluster is named in honour of Estonian astrophysicist Jaan Einasto, one of the discoverers of the [large-scale structure of the universe](#). The Einasto Supercluster is staggering in terms of its sheer size and mass. It contains the same mass as around 26 quadrillion [suns](#) (26 followed by 15 zeroes). This supercluster is so vast, in fact, that it would take a light signal 360 million years to travel from one side of it to the other. <https://www.space.com/einasto-supercluster-galaxy-26-quadrillion-suns>

Four new DAQ white dwarfs discovered



Model atmosphere fits to two newly discovered DAQ white dwarfs. Credit: Kilic et al, 2024

Astronomers from the University of Oklahoma and their colleagues report the detection of four white dwarf stars of a recently discovered rare DAQ spectral subclass. The newfound white dwarfs are slightly more massive than the sun. The finding was detailed in a [research paper](#) published March 13 on the preprint

server [arXiv](#). The first DAQ white dwarf was discovered in 2020, and received the designation J055134.612+413531.09, or J0551+4135 for short. The researchers that detected J0551+4135 found that its spectrum is qualitatively similar to a typical hydrogen-atmosphere white dwarf, but with the addition of numerous absorption lines from atomic [carbon](#). Thus, they classified this object as a first example of a new DAQ spectral subclass, which can be distinguished by a unique hydrogen/carbon mixed atmosphere. https://phys.org/news/2024-03-daq-white-dwarfs.html#google_vignette

COMMITTEE MEMBERS

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Elaine Sykes	(Treasurer)	083 286 2683
Peter Harvey	(Secretary, Membership, “Skynotes”, “Southern Cross”, Study Group SIG co-ordinator, Observing co-ordinator)	081 212 9481 petermh@hermanus.co.za
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Pieter Kotzé	(Events co-ordinator, “Southern Cross” Astronomy News)	082 581 3233

Non-committee member with portfolio:

Deon Krige (GPAED project, Astro-photography SIG coordinator)