"The Southern Cross"

The Hermanus Astronomy Centre Monthly Newsletter

September 2024

It is our honour to congratulate **Derek Duckitt** on his election as President of the Astronomical Society of Southern Africa (ASSA) at the society's AGM on August 26th.

MONTHLY MEETING

These meetings are scheduled for the **Third Tuesday** of each month except December.

Our last Monthly meeting was held at Onrus Manor and virtually on Zoom on **Tuesday August 20th**. This was presented by Derek Duckitt, his topic being ***"Astronomy Cell Phone Apps"*.**

https://www.youtube.com/watch?v=AvDW92LVius

Our next meeting, scheduled for **Tuesday September 17th**, will be virtual on Zoom and will be presented by **Prof Ilani Loubser** (North-West University) - ***"Monsters of the Universe: The build-up of the most massive galaxies"***. The most massive galaxies in the Universe are found in the centres of clusters of galaxies

SPECIAL INTEREST GROUP ACTIVITIES

Cosmology

These meetings are scheduled for the **First Tuesday** of each month except January.

On **Tuesday August 6th**, in the series "THE ENTIRE HISTORY OF THE UNIVERSE", we watched episode 22: ***"Why is Everything made of Atoms?"*** The YouTube video link:

https://www.youtube.com/watch?v=ae36scLdCsE&list=PLROBLlvnR7BEF9b1NOvRf_zhboibmywJb&index=22&t=15s&pp=iAQB

Episode number 23 of the same series is scheduled for **Tuesday September 3rd**, ***"Have We Really Found the Theory of Everything?"*** The YouTube video link:
https://www.youtube.com/watch?v=E4CsY5B3BoI&list=PLROBLlvnR7BEF9b1NOvRf_zhboibmywJb&index=23&t=160s&pp=iAQB

Astrophotography

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

For further information, 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.

On **Tuesday August 27th**, we watched and discussed ***"Consciousness in the Age of Artificial Intelligence".***

Our thanks to Derek for extracting a transcript which is added as a separate attachment.

The YouTube video link:

https://youtu.be/06-iq-0yJNM

The YouTube discussion link:

https://youtu.be/jxVJsZmuJiI

The next Study Group is scheduled to meet on **September 24th**, the topic yet to be finalised. Details will be circulated via e-mail and on our website.

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

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Observing

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

Optimal dates for **September 2024**:

SUGGESTED EVENING OBSERVATION WINDOW
(Lunar observations notwithstanding)

Date		*Moon*	*Dusk End*
August 24 to	*Rises*	**22h50 (72%)**	**19h44**
September 5	*Sets*	**20h44 (4%)**	**19h51**
September 22 to	*Rises*	**22h56 (71%)**	**20h04**
October 4	*Sets*	**20h30 (4%)**	**20h15**

Moonwatch a few days either side of the **First Quarter** (Wednesday 11th).

Eclipses None observable from southern Africa in August 2024.

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 **eta Eridanids.** Please see *Skynotes* page 2 and the *2024 Sky Guide* p. 86 for more details.

Observing Please keep an eye on our activities calendar on the website –

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

The Solar System - Sadly**,** in just six months time, our magnificent and most photogenic planet **Saturn** will "lose" his rings, but only for about 7 years this time. More on Saturn in the October Skynotes. From the Goddard Space Center: https://www.youtube.com/watch?v=mN8o90UbpmE

Outreach

HERMANUS SCIENCE AND TECHNOLOGY CLUB

July 23 ESKOM Palmiet Hydro-electric Power Station

There was a successful tour to the Palmiet power station enjoyed by a group of about 40 grades 6 and 7 scholars from Lukhanyo and Mt Pleasant schools. The presentation in their auditorium kicked off the day perfectly pitched at the right level to spark their interesting questions. This was followed by tours to the impressive stations and dams.

August 14 CTICC

"GLOBAL ASTRONOMY CONFERENCE IN AFRICA"

Astronomy is the ultimate outreach. It's the reaching out from the very centre of self to our history right back to the Big Bang or whatever came before it.

Nowhere has this been more evident to me than the privilege of attending the global astronomy conference at the CTICC with Indiphile on Wednesday 14 August.

Indie, Duduzile Kubheka and Mick Fynn

Our past Chairman and current National Outreach representative, Pierre de Villiers, has been nurturing Indiphile's astrophysics interests since I first visited Lukhanyo School with him a decade ago. He had the grade 6s and 7s enthusiastically and artistically painting the planets that have become the cliff path Solar system that we find today proudly displayed in the Hermanus Tourism Centre and proportionally along the cliff path from the Sun at the old harbour to Pluto at Grotto beach.
This model demonstrates how empty space is and how inconceivable the distances.

At 10h00 on August 14th, Indiphile was met at the door of the CTICC by the Coordinator of the global conference, Duduzile Kubheka, and was greeted as her special guest with honorary labels and VIP status to the exhibition centre, the auditorium and whatever other lectures he wished to attend punctuated with lunch and refreshments.

His eyes were opened to the outreach culture of the global astronomy community. The first impressive exhibition we saw was packed with schoolchildren on this NASA open day with numerous displays, a shoulder bag to hold all the available glossy information freely available in the hall and all these foreign stands of the most highly qualified astronomers on earth attending the once in every three year conference was open to us.

The Italian stand was already inviting everyone to attend the next conference in 2027 which they will be hosting. The SANSA stall was right next to NASA and their staff were greeting Indiphile as a long lost astronomer brother. Andile was there with the SANSA vehicle prominently displayed outside the front door.

EEC were generously sharing their pride in the 40% investment they had made into the James Webb telescope; a 40% investment giving huge returns already to the astronomy world through its infra red telescope; returns such as being able to analyse galaxies so distant and close to the Big Bang, where the presence of oxygen should be impossible according to current scientific knowledge and yet traces are being identified to challenge even Big Bang theory.

The Australian exhibition tied together with the South African SKA project who, along with South America, provide so much new information on the understudied southern skies. The SA science and technology exhibition were able to offer important information on bursaries and scholarships that could be available for budding tertiary and post grad students like Indiphile.

It was difficult to get the students to leave this hall of mysterious magic to attend the impressive auditorium lectures by four speakers who demonstrated impressive experiments and examples of precision mathematics, test tubes sufficiently filled with water to play Nkosi Sikhilele tributes and humorous animated presentations. They emphasised to the students that each of the speakers present had spent more time in post school studies than the students had been living! Masters, doctors and professors shared their rags to riches experiences that had led them to the satisfaction of a career in astronomy. One doctor had initially aspired to be an astronaut but had found in the study to achieve this that she preferred the more academic route she has now taken. Another doctor had found her niche in the developmental field and explained the numerous professions that existed in the astronomical world.

Most importantly they underlined the importance of appreciation of the generosity of all the astronomers present to host this outreach day, a generosity which must never be taken as a right or entitlement, but rather an invitation to start a lifelong pursuit of science, serious industrious hard work and rewarding perseverance to increase our purposeful meaning as sustainable productive humans.

We honour and thank this community for their relentless search for scientific answers and generous sharing of the answers they unravel en route. Hopefully they have now planted seeds for us to form our own astronomic roots and fruits!

August 21 Iziko and Observatory

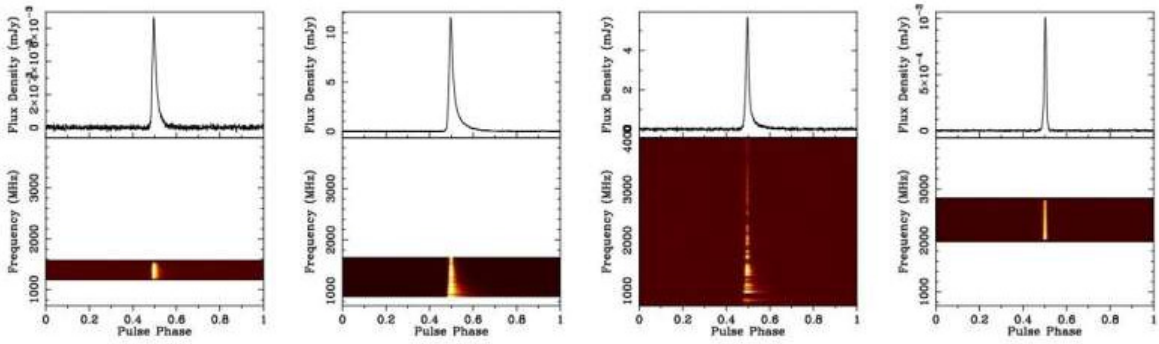
Later in the day, the scholars visited the Maclean telescope and museum at the SAAO Observatory.

The dome of the historic Maclean telescope

The two groups with the Museum in the background

(Compiled By Pieter Kotzé)

Study sheds more light on the nature of pulsar PSR J1227−6208



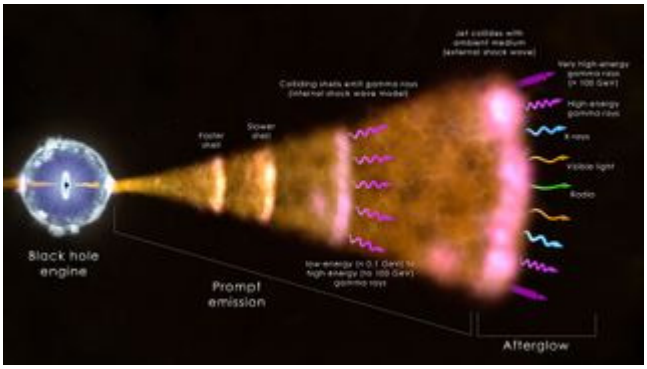
Time-integrated pulse profiles of J1227−6208 as recorded with the different receivers (from left to right: Parkes multibeam, MeerKAT L-band, Parkes UWL and MeerKAT S-band). Credit: Colom iBernadich et al., 2024.

Astronomers from the Max Planck Institute for Radio Astronomy (MPIfRA) in Bonn, Germany and elsewhere have inspected a recycled pulsar known as PSR J1227−6208. The new study, published July 18 on the preprint server *arXiv*, provides important insights into the nature of this pulsar. Pulsars are highly magnetized, rotating neutron stars emitting a beam of electromagnetic radiation. They are usually detected in the form of short bursts of radio emission; however, some of them are also observed via optical, X-ray and gamma-ray telescopes. The so-called recycled pulsars are old pulsars that have been spun up or "recycled" through accretion of matter from a companion star in a close binary system. The more massive and evolved the companion star is at the onset of the mass transfer, the slower is the final spin rate of the recycled pulsar. Therefore, recycled pulsars with massive companions, such as carbon monoxide (CO) or oxygen/neon/magnesium composition (ONeMg) white dwarfs (WD) or neutron stars, are much slower rotators, in general, when compared to millisecond pulsars (MSPs) with helium (He) WD companions.https://phys.org/news/2024-07-nature-pulsar-psr-j12276208.html

NASA telescope may have found antimatter annihilating in possibly the biggest explosion since the Big Bang

It's for excellent reason this gamma-ray burst is called the "brightest of all time" or the "BOAT."

NASA's Fermi gamma-ray space telescope has examined what may have been the most powerful explosion since the Big Bang, discovering a hitherto unseen feature. The feature could be the result of matter and antimatter particles annihilating at 99.9% the speed of light. The blast was an example of a gamma-ray burst (GRB); when it was first seen on Oct. 9, 2022, by NASA's Fermi Gamma-ray Space Telescope and the Neil Gehrels Swift Observatory, it was designated GRB 221009A. The power of the GRB was soon revealed, and it earned the nickname the Brightest Of All Time or the "BOAT." "As long as we have been able to detect GRBs, there is no question that this GRB is the brightest we have ever witnessed by a factor of 10 or more," Wen-fai Fong, an associate professor of physics and astronomy and leader of the Fong Group at Northwestern and one of the discoverers of the BOAT explained around the time it was deemed so utterly bright.

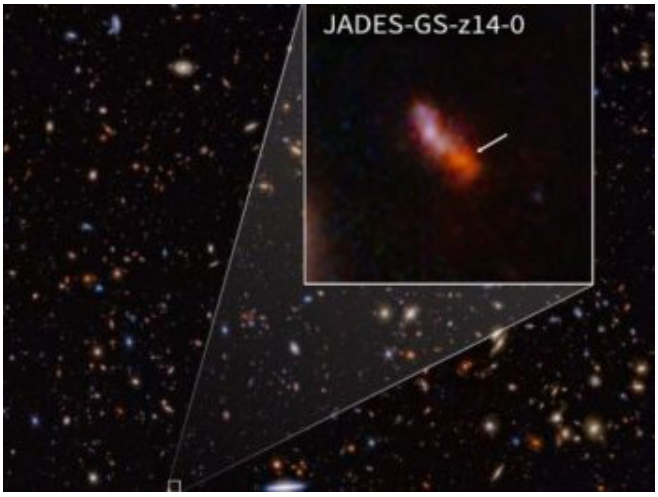


An illustration showing how GRBs are launched from black hole engines. (Image credit: NASA/Goddard Flight Center)

https://www.space.com/nasa-boat-gamma-ray-burst-antimatter-annihilation

https://www.spacedaily.com/reports/Scientists_discover_first_of_its_kind_energy_peak_or_jet_from_gamma_ray_burst_999.html

Astronomers Just Discovered The Earliest Galaxy We've Ever Seen



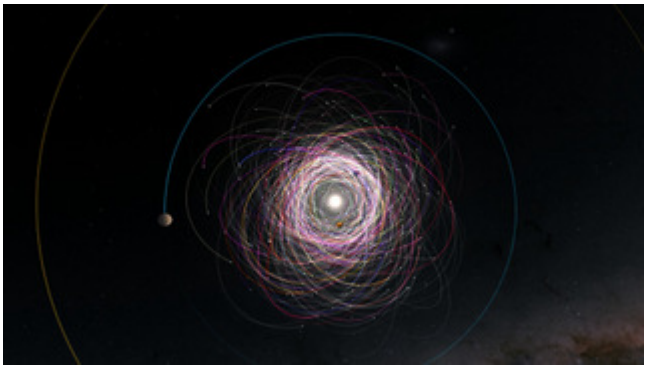
The most distant galaxy discovered to date, JADES-GS-z14-0, less than 300 million years after the Big Bang. (NASA, ESA, CSA, STScI, Brant Robertson/UC Santa Cruz, Ben Johnson/CfA, Sandro Tacchella/Cambridge, Phill Cargile/CfA)

A newly discovered galaxy has just smashed the record for the earliest seen yet, presenting a major challenge to our current models of galaxy formation. It's called JADES-GS-z14-0, and it's brightly gleaming in the early Universe, as it looked less than 300 million years after the Big Bang. A second recent discovery, called JADES-GS-z14-1, was confirmed to be nearly as distant. The detections, astronomers say, are now "unambiguous", which means the Cosmic Dawn might have some 'splainin' to do. "In January 2024, NIRSpec observed this galaxy, JADES-GS-z14-0, for almost ten hours, and when the spectrum was first processed, there was unambiguous evidence that the galaxy was indeed at a redshift of 14.32, shattering the previous most-distant galaxy record," said astronomers Stefano Carniani of Scuola Normale Superiore in Italy and Kevin Hainline of the University of Arizona. "From the images, the source is found to be over 1,600 light-years across, proving that the light we see is coming mostly from young stars and not from emission near a growing supermassive black hole. "This much starlight implies that the galaxy is several hundreds of millions of times the mass of the Sun! This raises the question: How can nature make such a bright, massive, and large galaxy in less than 300 million years?"

https://www.sciencealert.com/astronomers-just-discovered-the-earliest-galaxy-weve-ever-seen

Over 350 asteroids have hidden moons, Gaia space telescope finds

"This discovery shows that there are many asteroid moons out there just waiting to be found."



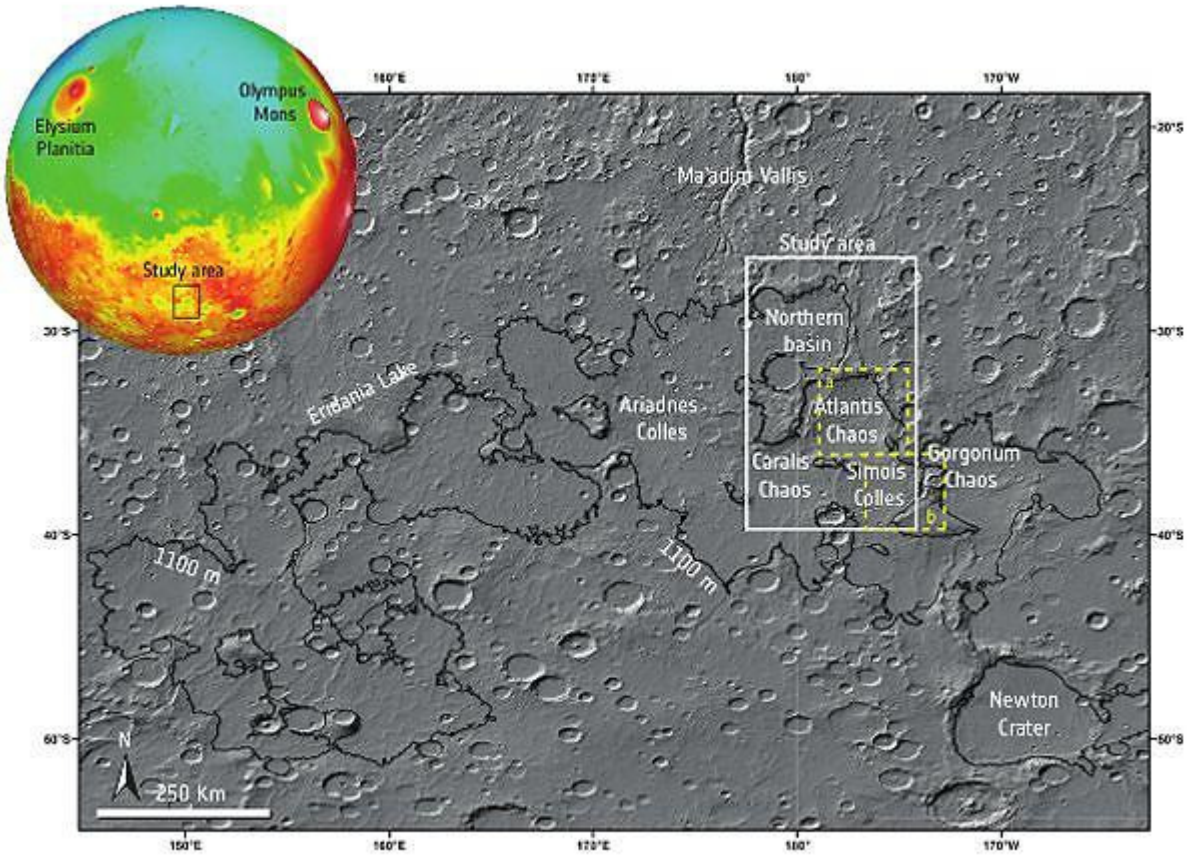
This image shows many looping and overlapping orbits circling the sun, all of different colors (to differentiate between asteroids). The centre of the image – representing an area within the orbit of Jupiter – is very densely packed with orbits, while the outer edges remain clearer, showing the background plane of the Milky Way. (Image credit: ESA/Gaia/DPAC)

The European Space Agency's (ESA) Gaia space telescope has already proven itself invaluable in

tracking billions of stars in the Milky Way, but now it has proved its worth with much smaller bodies, much closer to home. The Gaia mission has spotted potential moons orbiting over 350 asteroids that were previously predicted to be singletons. Gaia had already been investigating known asteroid binaries, confirming they have companions, but this breakthrough shows the star surveyor is capable of conducting "blind searches" for completely new asteroid-moon partnerships. If the new observations are confirmed, these 352 binaries will almost double the number of known binary asteroid systems in the solar system.

https://www.space.com/gaia-350-asteroids-hidden-moons

Mars Express Reveals Ancient Lake Eridania on Mars

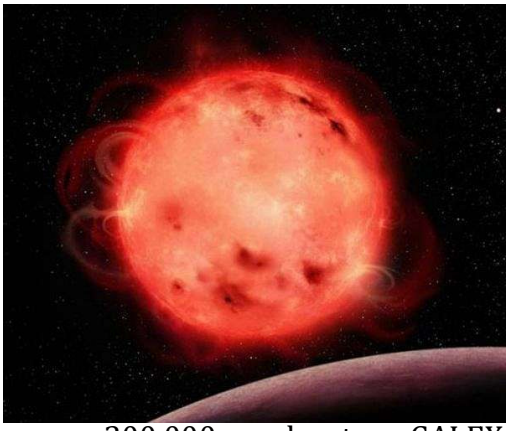


Mars once hosted a lake larger than any on Earth. The dried remnants of this ancient lakebed are shown in amazing detail by ESA's Mars Express. A new view from Mars Express's High Resolution Stereo Camera (HRSC) showcases Caralis Chaos, an area believed to have been rich in water. The lower-right part of the frame features the remains of an old lakebed, visible in the associated topographic view in shades of blue. The boundaries of this lakebed curve from the bottom-center of the frame to the top right, skirting a large central crater. This ancient lakebed now contains numerous raised mounds, thought to have formed as ancient Martian winds swept dust across the planet. This dust was later covered and altered by water before drying out again and breaking apart. The broader region around Caralis Chaos contains several old lake basins that have eroded over time. Together, these basins form the remnants of a vast ancient lake known as Lake Eridania. Covering over a million square kilometres, Lake Eridania once held more water than all other Martian lakes combined and was larger than any known lake on Earth. It contained enough water to fill the Caspian Sea nearly three times over and likely existed around 3.7 billion years ago. Initially, it was one large body of water,

but it later dried out into smaller isolated lakes before disappearing entirely along with the rest of Mars's water.

https://www.spacedaily.com/reports/Mars_Express_Reveals_Ancient_Lake_Eridania_on_Mars_999.html

Intense Stellar Flares from Red Dwarfs Pose Risks to Exoplanet Habitability



Astronomers have revealed that red dwarf stars can emit stellar flares with far-ultraviolet (far-UV) radiation levels significantly higher than previously thought. This discovery highlights the potential impact of these intense UV flares on the habitability of planets orbiting red dwarf stars."Few stars have been thought to generate enough UV radiation through flares to impact planet habitability. Our findings show that many more stars may have this capability," said first author Vera Berger, who led the research while at the University of Hawai'i and is now based at the University of Cambridge. Berger and her team utilized archival data from the GALEX space telescope, examining flares among 300,000 nearby stars. GALEX, a now-decommissioned NASA mission, observed most of the sky in near- and far-UV wavelengths from 2003 to 2013. The team employed new computational techniques to extract insights from the data.

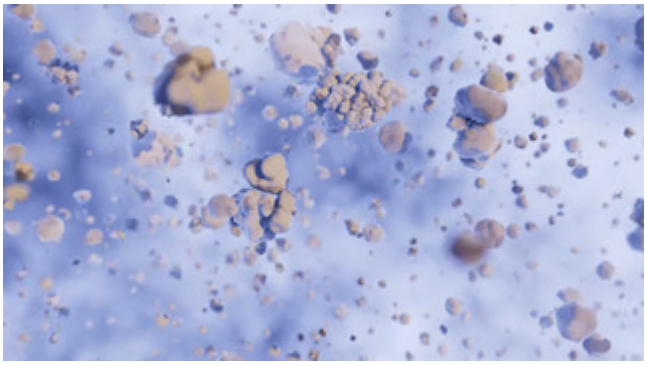
https://www.spacedaily.com/reports/Intense_Stellar_Flares_from_Red_Dwarfs_Pose_Risks_to_Exoplanet_Habitability_999.html

https://www.space.com/red-dwarf-stars-uv-radation-harmful-to-life

The building blocks of life can form rapidly around young stars

New research could solve the mystery of how the complex building blocks of life first formed.

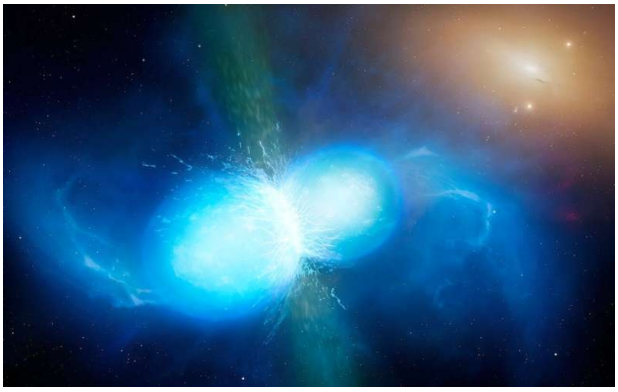
Scientists have long queried how the complex molecules needed for life could have formed around the tumultuous and violent environment of the sun in its youth. A family of meteorites called "chondrites" is theorized to have delivered the right stuff for life to Earth. But the question is, how did complex organic molecules containing elements like carbon, nitrogen, and oxygen come to be sealed in these meteorites in the first place? New research suggests that the "hot spot" for the formation of these macromolecules, the essential building blocks of life, may be so-called "dust traps" in swirling disks of matter around infant stars. Here, intense starlight from the central young star could irradiate the accumulating ice and dust to form carbon-containing macromolecules in just decades, which is relatively rapid.



An illustration of icy particles harboring complex molecules (Image credit: ESO/L. Calçada)

https://www.space.com/life-ingredients-form-dust-traps-young-stars

Neutron-star mergers illuminate the mysteries of quark matter



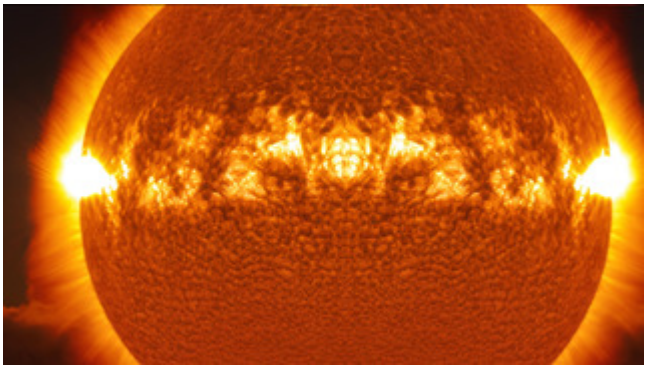
During a neutron-star merger, the stars rapidly change shape and heat up, causing changes in the state of matter inside them. The merger may also produce quark matter, where the elementary particles quarks and gluons, usually confined within protons and neutrons, are liberated and begin to move freely. According to research findings in quark matter the bulk viscosity peaks at significantly lower temperatures than in nuclear matter. Credit: University of Warwick/Mark Garlick

Neutron stars are the remnants of old stars that have run out of nuclear fuel and undergone a supernova explosion and a subsequent gravitational collapse. Although their collisions—or binary mergers—are rare, when they do occur, these violent events can perturb spacetime itself, producing gravitational waves detectable on Earth from hundreds of millions of light years away. During a neutron-star merger, the stars rapidly change shape and heat up, causing changes in the state of matter inside them. The merger may also produce quark matter, where the elementary particles quarks and gluons, usually confined within protons and neutrons, are liberated and begin to move freely.

https://phys.org/news/2024-08-neutron-star-mergers-illuminate-mysteries.html

Newly found star 30 times the size of the sun has an unexpected chemical composition

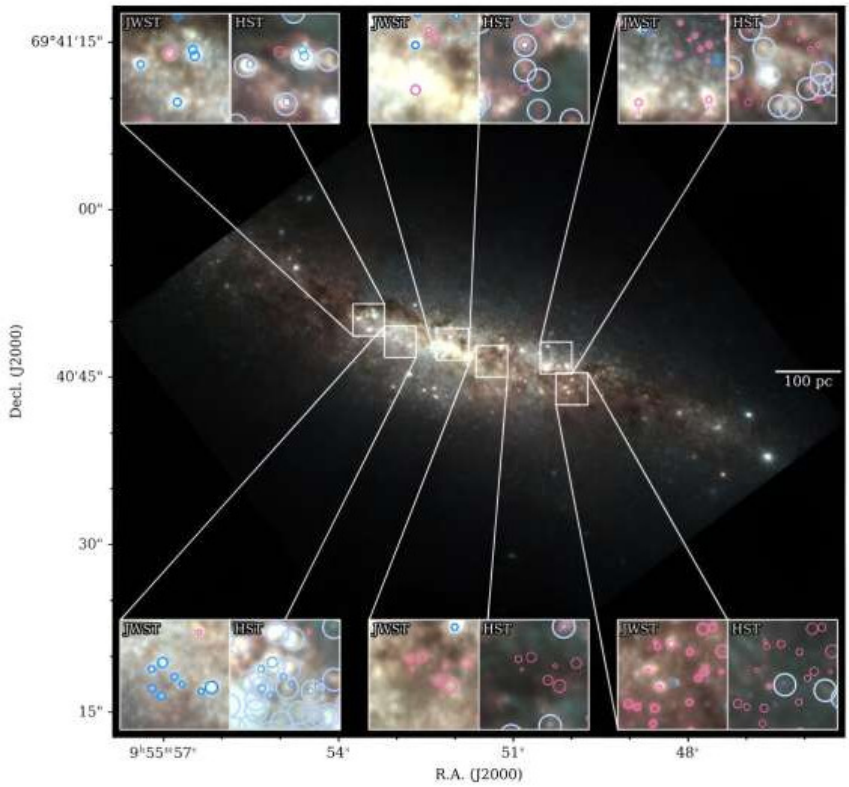
"J0524-0336 contains 100,000 times more lithium than the sun does at its current age. This amount challenges the prevailing models of how stars evolve."



An illustration showing a star more massive than the sun. (Image credit: Robert Lea (created with Canva))

Astronomers have discovered a new star that is 30 times larger than the sun and could force a major rethink of stellar evolution theories. The star, designated J0524-0336 and located around 30,000 light-years from Earth, has a shockingly high concentration of the element lithium when compared to the sun at its current age or other stars of similarly advanced ages. This is an issue for our understanding of how stars forge heavier elements via nuclear fusion because lithium is a light element; current models suggest light elements are lost through this process in favour of heavier elements like carbon and oxygen**.** Not only is J0524-0336 rich in lithium, but it also has a corresponding lack of heavy elements.https://www.space.com/large-star-discovery-stellar-evolution

Astronomers identify more than one thousand new star cluster candidates



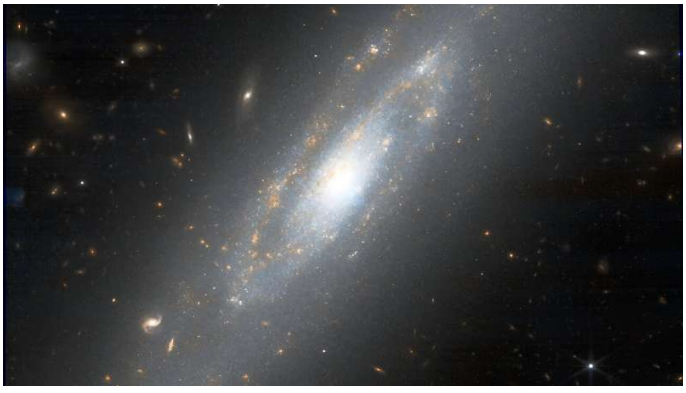
The central 870 pc of the Cigar Galaxy seen with NIRCam. Credit: Levy et al., 2024.

By analyzing the images obtained with the James Webb Space Telescope (JWST), an international team of astronomers has managed to identify more than 1,000 new star cluster candidates in the Cigar Galaxy. The finding was reported in a research paper published August 8 on the pre-print server *arXiv*. The Cigar Galaxy (also known as Messier 82, M 82, or NGC 3034) is a small, irregular starburst galaxy located some 11.73 million light years away in the constellation Ursa Major. It has a size of about 40,800 light years, dynamical mass of some 10 billion solar masses, and is one of the closest starburst galaxies to Earth. Previous observations of the Cigar Galaxy have identified 260 star clusters within 3,000 light years from the galaxy's centre and 363 star clusters outside this central region.

https://phys.org/news/2024-08-astronomers-thousand-star-cluster-candidates.html

New analysis of Webb data measures universe expansion rate, finds there may not be a 'Hubble tension'

We know many things about our universe, but astronomers are still debating exactly how fast it is expanding. In fact, over the past two decades, two major ways to measure this number—known as the "Hubble constant" —have come up with different answers, leading some to wonder if there was something missing from our model of how the universe works.



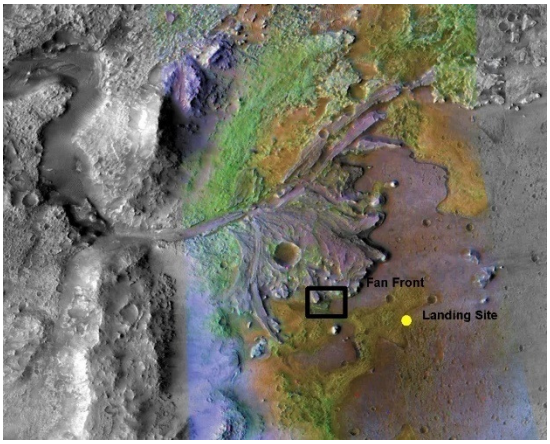
Scientists used new data taken by the James Webb Space Telescope to make a new reading of the rate at which the universe is expanding over time, by measuring light from 10 galaxies including the one known as NGC 3972, above. Credit: Yuval Harpaz, data via JWST

But new measurements from the powerful James Webb Space Telescope seem to suggest that there may not be a conflict, also known as the "Hubble tension," after all. In a paper submitted to *The Astrophysical Journal*, currently available on the *arXiv* preprint server, University of Chicago cosmologist Wendy Freedman and her colleagues analyzed new data taken by NASA's powerful James Webb Space Telescope. They measured the distance to 10 nearby galaxies and measured a new value for the rate at which the universe is expanding at the present time. Their measurement, 70 kilometers per second per megaparsec, overlaps the other major method for the Hubble constant."Based on these

new JWST data and using three independent methods, we do not find strong evidence for a Hubble tension," said Freedman, renowned astronomer and the John and Marion Sullivan University Professor in Astronomy and Astrophysics at the University of Chicago. "To the contrary, it looks like our standard cosmological model for explaining the evolution of the universe is holding up."

Ancient Rocks in Mars' Jezero Crater Confirm Habitability

According to NASA's Perseverance rover, ancient rocks in Jezero Crater formed in the presence of water. These sedimentary rocks are more than 3.5 billion years old and may predate the appearance of life on Earth. When and if these samples are returned to Earth, scientists hope to determine if they hold evidence of ancient Martian life.



This Mars Reconnaissance Orbiter image shows Jezero Crater, with Perseverance's landing site and the Fan Front feature. Rocks from the Fan Front sampled in 2022 show evidence of water that predates life on Earth. Image Credit: NASA/JPL-Caltech/MSSS/JHU-APL

In 2022, the Perseverance Rover worked its way along Jezero Crater's western slope and sampled rocks from a feature called the 'fan front.' Scientists hypothesized that some of the rocks in this region were formed in the ancient lakebed when the crater was filled with water. Perseverance analyzed the rocks' chemistry and captured images of their surroundings. Members of the Perseverance science team studied this data and have published their results.

https://www.universetoday.com/168134/ancient-rocks-in-mars-jezero-crater-confirm-habitability/

An oasis in the desert on Mars

Curiosity didn't kill the cat in this case. Instead, NASA's 1-ton rover, which for the past 12 years has been searching for the building blocks of life on Mars, discovered something never before detected on the red planet: pure sulphur. And it all happened by chance.

While exploring Gediz Vallis, a channel that winds down part of the 3-mile-tall Mount Sharp in the centre of the Gale Crater, the six-wheeled Curiosity rover drove over a rock and cracked it open, revealing yellowish-green crystals of the chemical element. The rover, which is about the size of a small SUV and is equipped with 17 cameras, had already discovered sulphur-based minerals on Mars. But the recent discovery of elemental, or pure, sulphur on the red planet was a first. And the rover found an abundance of the stuff-a field of rocks similar in appearance to the one Curiosity crumbled. "Finding a field of stones made of pure sulphur is like finding an oasis in the desert," said Ashwin Vasavada, Curiosity's project scientist at NASA's Jet Propulsion Laboratory in Southern California. "It shouldn't be there, so now we have to explain it. "Discovering the unexpected "is what makes planetary exploration so exciting," Vasavada added. But what could the presence of pure sulphur on Mars possibly mean?https://www.spacedaily.com/reports/An_oasis_in_the_desert_on_Mars_999.html

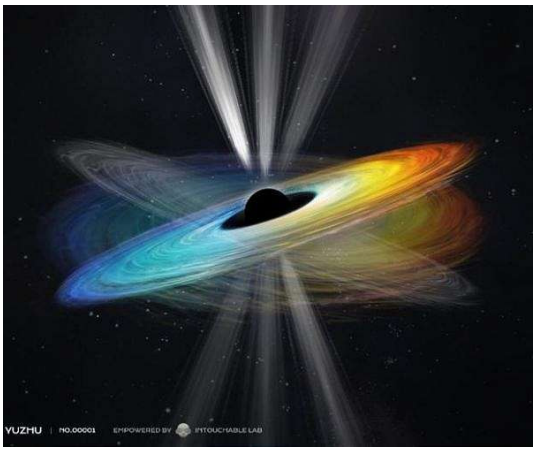
Hubble Investigates a Dwarf Galaxy Beyond the Local Group

The NASA Hubble Space Telescope has captured a detailed image of UGC 4879, a dwarf irregular galaxy also known as VV124. The high-resolution capabilities of Hubble allow astronomers to observe individual stars within the galaxy, even in its most densely populated regions. This detailed view aids in accurately determining the galaxy's distance and analyzing the composition and age of its stars.

UGC 4879 is an isolated dwarf galaxy located just outside the Local Group, approximately four million light-years from Earth. This galaxy stands out due to its isolation, making it a subject of intense study for astronomers who are keen to understand its history and development. Unlike many other galaxies that interact and merge with neighbours, UGC 4879 appears to have evolved with minimal external influence, offering a unique opportunity to study a relatively untouched relic from the early universe.

https://www.spacedaily.com/reports/Hubble_Investigates_a_Dwarf_Galaxy_Beyond_the_Local_Group_999.html

Researchers Unveil Mechanism Behind X-ray Emissions from Black Hole Accretion Disks

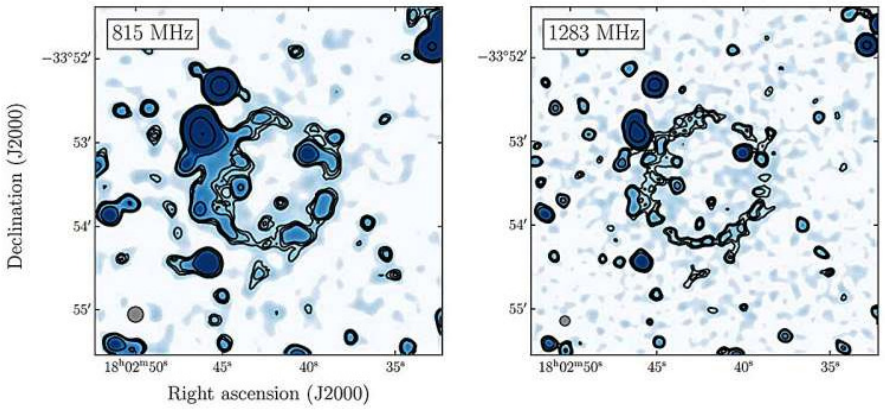


Researchers at the University of Helsinki have achieved a long-sought scientific goal: explaining the source of X-ray radiation in the vicinity of black holes. This radiation is attributed to the combined effects of chaotic magnetic fields and turbulent plasma gas.

By conducting detailed supercomputer simulations, the research team at the University of Helsinki explored the interactions among radiation, plasma, and magnetic fields surrounding black holes. Their findings indicate that turbulence driven by magnetic fields heats the nearby plasma, leading to the emission of X-rays. A black hole forms when a massive star collapses into a dense mass, with gravity so intense that not even light can escape. As a result, black holes are observed indirectly, through their influence on the surrounding environment. In many cases, black holes are part of a binary star system, where a companion star orbits the black hole. Matter from the companion star gradually spirals into the black hole, forming an accretion disk-a bright source of X-rays observable from Earth.

https://www.spacedaily.com/reports/Researchers_Unveil_Mechanism_Behind_X_ray_Emissions_from_Black_Hole_Accretion_Disks_999.html

MeerKAT observations detect a mysterious faint radio ring

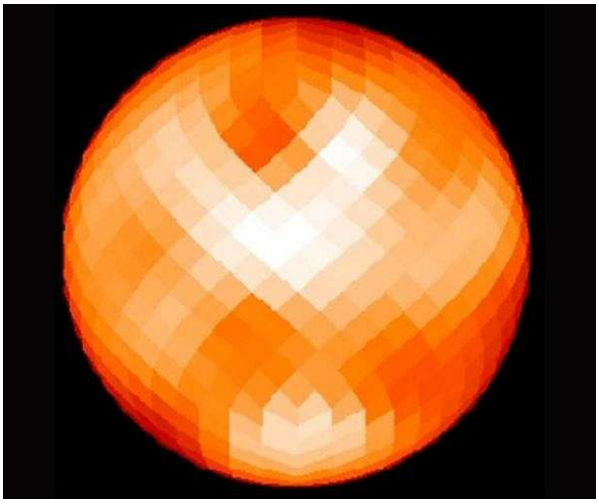


MeerKAT continuum images of Kýklos (J1802–3353) in UHF (left) and L-band (right), at reference frequencies of 815 and 1283 MHz. Credit: Bordiu et al, 2024

An international team of astronomers reports a serendipitous discovery of a new radio ring toward the Galactic centre. The newfound object is relatively faint and its true nature is yet unknown. The finding was reported in a research paper forthcoming in the *Astronomy & Astrophysics* journal.

Recent wide area radio continuum surveys have revealed the presence of low surface brightness ring-like radio sources, often associated with the late phases of stellar evolution. These so-called odd radio circles (ORCs) are in general mysterious gigantic rings of radio waves and their origin is still unexplained. Now, a new source of this type, which resembles an ORC, has been found by a group of astronomers led by Cristobal Bordiu of the Catania Observatory in Italy. The source, designated J1802–3353 and dubbed Kýklos (meaning "circle" in Greek), was detected with the MeerKAT radio telescope.https://phys.org/news/2024-08-meerkat-mysterious-faint-radio.html

Polaris Revealed to Have Spotted Surface in New Detailed Observations



CHARA Array false-color image of Polaris from April 2021 that reveals large bright and dark spots on the surface. Polaris appears about 600,000 times smaller than the Full Moon in the sky.

New research conducted with Georgia State University's Center for High Angular Resolution Astronomy (CHARA) Array has unveiled intricate details about the North Star, Polaris, including a spotted surface. The findings have been published in *The Astrophysical Journal*.

Polaris, the star marking the direction of Earth's North Pole, is renowned not only as a navigation beacon but also as a significant astronomical object. It is the brightest component of a triple-star system and is classified as a pulsating variable star, meaning its brightness fluctuates over a four-day cycle as the star expands and contracts.

As a Cepheid variable star, Polaris serves as a crucial "standard candle" for astronomers. These stars' known relationship between pulsation period and intrinsic brightness allows astronomers to determine distances to far-off galaxies and estimate the universe's expansion rate.

https://www.spacedaily.com/reports/Polaris_Revealed_to_Have_Spotted_Surface_in_New_Detailed_Observations_999.html

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