https://www.hermanus.astronomy@gmail.com

"The Southern Cross"

The Hermanus Astronomy Centre Monthly Newsletter

September 2025

MONTHLY MEETINGS

At Our Monthly Meeting on Tuesday August 19th, the renowned South African planetary photographer **Clyde Foster** presented virtually via Zoom *"The Planets up close and personal"*.

Another top rate presentation.

For those who would like to revisit this presentation, the YouTube link is:
https://www.youtube.com/watch?v=op4kdVmxfJA

SPECIAL INTEREST GROUP ACTIVITIES

Cosmology

On Tuesday August 5th, we watched and discussed episode 31 of the History of the Universe series, *"Why shouldn't the Universe Exist?"*

The video link:

The discussion link:

https://youtu.be/doBVcpaXo2E

The next meeting, scheduled for Tuesday September 2nd, will be episode 32, *" What Is (Almost) Everything Made Of?"*

For further information regarding the Cosmology group, contact Derek Duckitt – derek.duckitt@gmail.com

Study Group

The meeting planned for Tuesday August 26th was cancelled.

The YouTube link:

The discussion recording link:

Our next meeting, scheduled for **Tuesday September 30th**, “”

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

---

Observing

No suitable evenings were available during July.

On **Sunday September 7th**, a total lunar eclipse (Blood Moon) will be observable in Hermanus; please see the timetable below:

Penumbral phase begins (P1)	17:28:06	Totality ends (U3)	20:53:18
Partial phase begins (U1)	18:26:51	Partial phase ends (U4)	21:56:53
Totality begins (U2)	19:30:36	Penumbral phase ends (P4)	22:55:27
Moment of greatest eclipse	20:11:46		

Depending on weather conditions and interest level, we may gather at Gearing’s Point to share this event.

Optimal dates for **September 2025**:

SUGGESTED EVENING OBSERVATION WINDOWS

(Lunar observations notwithstanding)

Date		*Moon*	*Dusk end*
September 15	*Rise*	**22h47 (81%)**	**19h20**
to September 27	*Set*	**20h53 (10%)**	**19h27**

Skynotes Moon: **The late Heavy Bombardment.**

Skynotes Object of the month: **The Helix Nebula.**

From Tim Cooper

The latest circular of the Comet Asteroid and Meteor Section will be circulated when available.

MNASSA

The Monthly Notes of the Astronomical Society of Southern Africa are available on

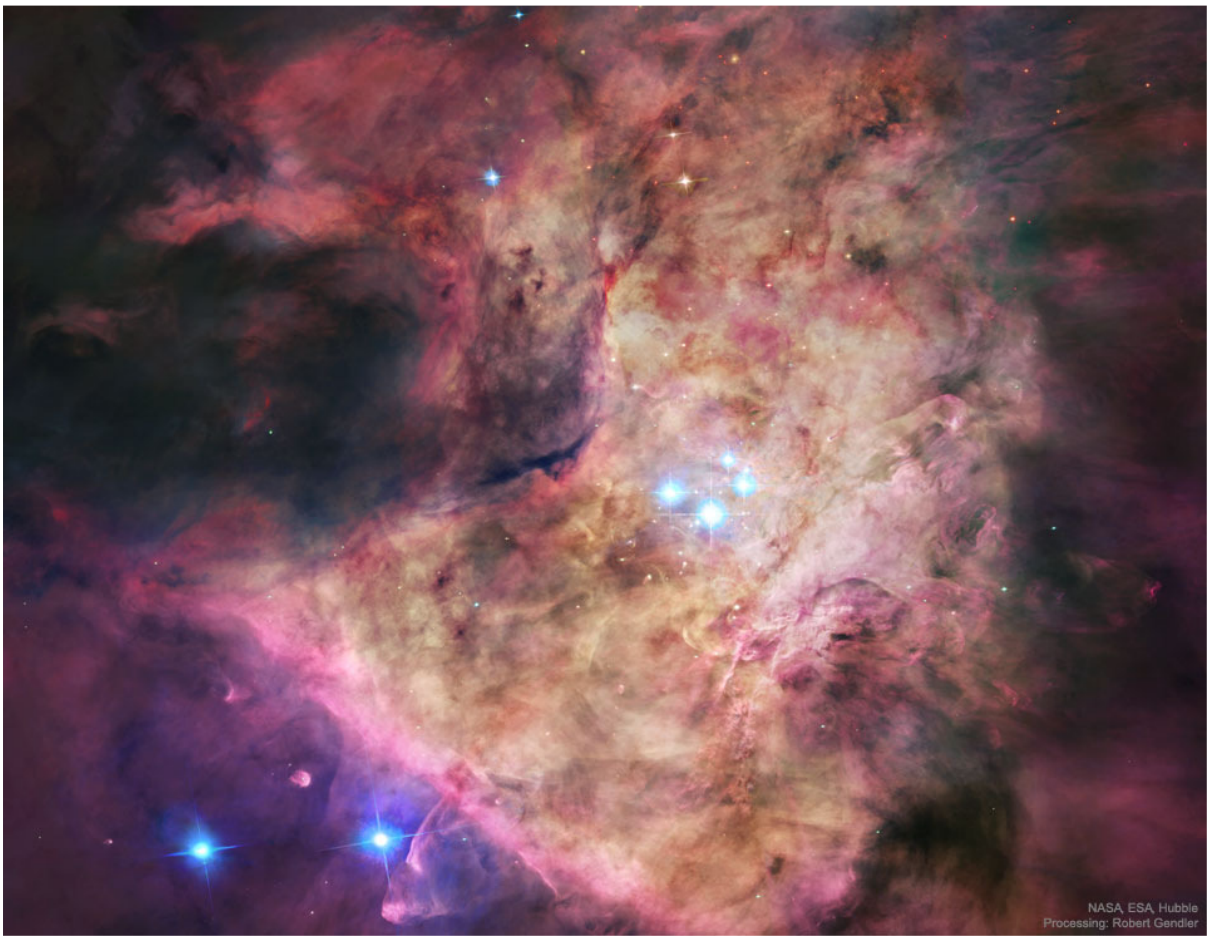
http://www.mnassa.org.za/

Breaking News

ASTRONOMY NEWS: July 2025 overleaf…

(Compiled by Pieter Kotzé)

Astronomy Picture for August



Trapezium: In the Heart of Orion
Image Credit: Data: Hubble Legacy Archive, Processing: Robert Gendler

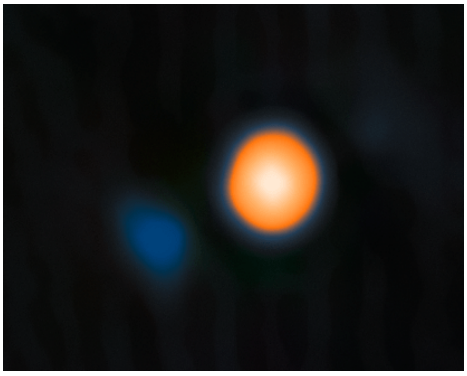
Explanation: What lies in the heart of Orion? Trapezium: four bright stars, that can be found near the centre of this sharp cosmic portrait. Gathered within a region about 1.5 light-years in radius, these stars dominate the core of the dense Orion Nebula Star Cluster. Ultraviolet ionizing radiation from the Trapezium stars, mostly from the brightest star Theta-1 Orionis C powers the complex star forming region's entire visible glow. About three million years old, the Orion Nebula Cluster was even more compact in its younger years and a dynamical study indicates that runaway stellar collisions at an earlier age may have formed a black hole with more than 100 times the mass of the Sun. The presence of a black hole within the cluster could explain the observed high velocities of the Trapezium stars. The Orion Nebula's distance of some 1,500 light-years make it one of the closest candidate black holes to Earth.

NASA Scientist Finds Predicted Companion Star to Betelgeuse

An image of Betelgeuse, the yellow-red star, and the signature of its close companion, the faint blue object.

Data: NASA/JPL/NOIRLab. Visualization: NOIRLab.

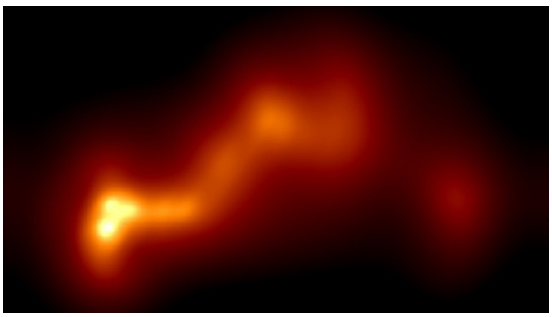
A century-old hypothesis that Betelgeuse, the 10th brightest star in our night sky, is orbited by a very close companion star was proved true by a team of astrophysicists led by a scientist at NASA's Ames



Research Centre in California's Silicon Valley. The research published in The Astrophysical Journal Letters in the paper "Probable Direct Imaging Discovery of the Stellar Companion to Betelgeuse."Fluctuations in the brightness and measured velocity of Betelgeuse, the closest red supergiant star to Earth, had long presented clues that it may have a partner, but the bigger star's intense glow made direct observations of any fainter neighbours nearly impossible. Two recent studies by other teams of astronomers reignited the companion star hypothesis by using more than 100 years of Betelgeuse observations to provide predictions of the companion's location and brightness. If the smaller star did exist, the location predictions suggested that scientists had a window of just a few months to observe the companion star at its widest separation from Betelgeuse, as it orbited near the visible edge of the supergiant. Searches for the companion were initially made using space-based telescopes, because observing through Earth's atmosphere can blur images of astronomical objects. But these efforts did not detect the companion.

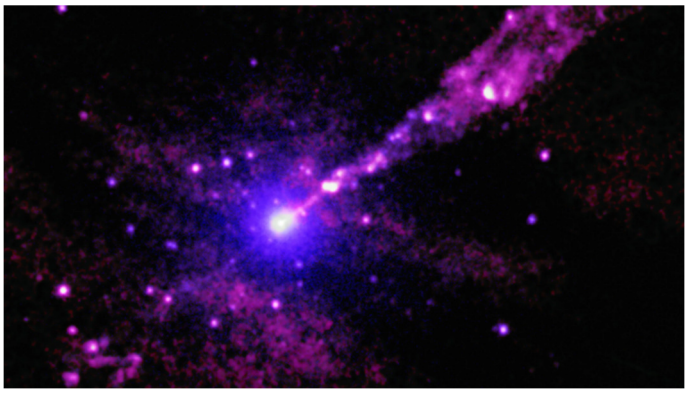
https://www.nasa.gov/science-research/astrophysics/nasa-scientist-finds-predicted-companion-star-to-betelgeuse/

Exotic 'blazar' is part of most extreme double black hole system ever found, crooked jet suggests



A radio-wavelength image of the crooked jet beaming out from the supermassive black hole system OJ 287. (Image credit: Dr Efthalia Traianou, Heidelberg University, IWR)

A beam of particles speeding away from the vicinity of a monstrous black hole has been found to be severely kinked, providing compelling evidence that the black hole is actually part of the most extreme binary system known.The black hole and its crooked jet are found in a blazar known as OJ 287, located about four billion light-years away. A blazar is a quasar seen head-on, and a quasar is the active core of a galaxy where the resident supermassive black hole is pulling in huge amounts of matter. That matter spirals around the black hole, forming what's called an accretion disk, and there's so much matter that the accretion disk becomes a bottleneck.Rather than flowing into the black hole's maw, the infalling matter piles up in the disk, the density and temperature dramatically increasing such that it shines so brightly that it can be seen across the universe. Magnetic fields wrapped up in the accretion disk are able to funnel some of the charged particles in the matter away from the black hole, collimating them and accelerating them in two opposing jets that blast away from the black hole for thousands of light-years at close to the speed of light. Because we see blazars almost head-on, they appear even brighter than regular quasars.https://www.space.com/astronomy/black-holes/exotic-blazar-is-part-of-most-extreme-double-black-hole-system-ever-found-crooked-jet-suggests

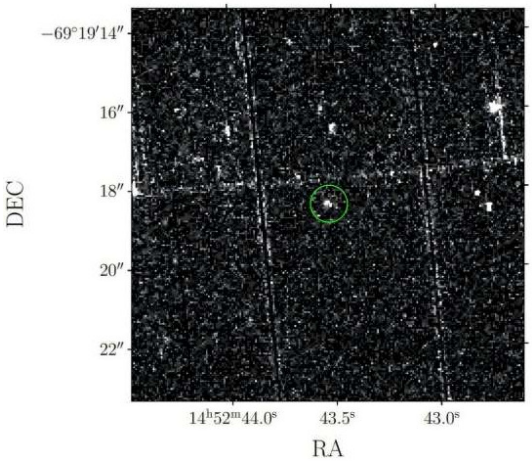


Astronomers discover ultrapowerful black hole jet as bright as 10 trillion suns lit by Big Bang's afterglow

A powerful black hole jet rips through space from the supermassive black hole at the heart of the galaxy Cen A (Image credit: NASA/CXC/SAO/D. Bogensberger et al; Image Processing: NASA/CXC/SAO/N. Wolk;)

Astronomers have discovered extraordinarily powerful X-ray jets blasting from two supermassive black holes that are so ancient that the jets shine in the afterglow of the Big Bang. "They are transforming the first light of the universe into high-energy jets," Jaya Maithil, a postdoctoral research fellow at the Harvard and Smithsonian Centre for Astrophysics, told reporters Monday (June 9) at the 246th meeting of the American Astronomical Society in Anchorage, Alaska. Using data from NASA's Chandra X-Ray Observatory and the Karl G. Jansky Very Large Array (VLA), Maithil and her team found that each jet spans a whopping 300,000 light-years — nearly three times the diameter of our Milky Way galaxy. Each jet emerges from an actively feeding supermassive black hole, known as a quasar, located about 11.6 billion and 11.7 billion light-years away.https://www.space.com/astronomy/black-holes/astronomers-discover-ultrapowerful-black-hole-jet-as-bright-as-10-trillion-suns-lit-by-big-bangs-afterglow

New long-period radio transient discovered

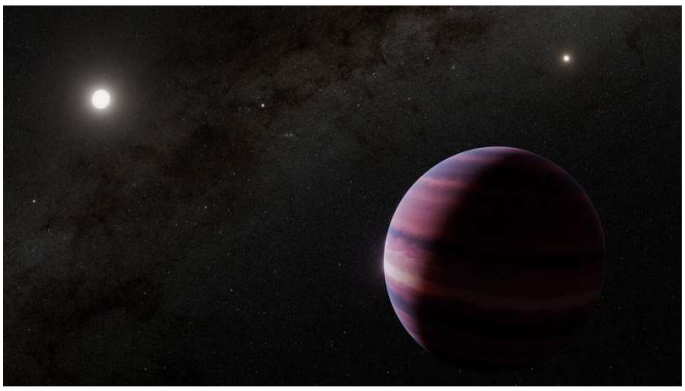


XMM-Newton EPIC-PN image cutout of the field of ASKAP J1448−6856 showing a point source detected 2" away from the Meerkat position. The green circle around the source is 30" in radius. Credit: arXiv (2025). DOI: 10.48550/arxiv.2507.13453

An international team of astronomers reports the discovery of a new long-period radio transient, which received the designation ASKAP J144834−685644 (ASKAP J1448−6856 for short). The newfound transient is a crucial addition to the still short list of sources of this type. Long-period radio transients (LPTs) are an emerging class of periodic radio emitters, with ultralong rotation periods (ranging from minutes to hours) and strong magnetic fields. Although some observations have suggested that these transients may originate from rotating neutron stars with extremely strong magnetic fields (magnetars) or magnetic white dwarfs, their true nature still baffles astronomers. The Australian Square Kilometre Array Pathfinder (ASKAP) is a 36-dish radio-interferometer in Australia, operating at 700 to 1,800 MHz One of its scientific goals is the characterization of radio transient sky through the detection and monitoring of transient and variable sources."We report the discovery of a new LPT, ASKAP J1448−6856. Discovered as a 1.5-hour periodic radio source, ASKAP J1448−6856, shows a steep spectrum, elliptical polarization, and periodic narrowband emission that declines at frequencies above 1.5 GHz," the researchers wrote in the paper.

https://phys.org/news/2025-07-period-radio-transient.html

Evidence found for planet around closest sun-like star



This artist's concept shows what the gas giant orbiting Alpha Centauri A could look like. Observations of the triple-star system Alpha Centauri using NASA's James Webb Space Telescope indicate the potential gas giant, about the mass of Saturn, orbits the star by about two times the distance between the sun and Earth. In this concept, Alpha Centauri A is depicted at the upper left of the planet, while the other sun-like star in the system, Alpha Centauri B, is at the upper right. Our sun is shown as a small dot of light between those two stars. Credit: : NASA, ESA, CSA, STScI, R. Hurt (Caltech/IPAC)

Astronomers have used NASA's James Webb Space Telescope to find strong evidence for a planet orbiting a star in the triple system closest to our own sun. At just 4 light-years away from Earth, the Alpha Centauri star system has long been a compelling target in the search for worlds beyond our solar system called exoplanets. The system is made up of a close pair of orbiting stars, Alpha Centauri A and Alpha Centauri B, the two closest sun-like stars to Earth, as well as the faint red dwarf star Proxima Centauri. While there are three confirmed planets orbiting Proxima Centauri, the presence of other worlds surrounding the sun-like twins of Alpha Centauri A and Alpha Centauri B has proved challenging to confirm. Now, Webb's observations from its Mid-Infrared Instrument (MIRI) are providing the strongest evidence to date of a gas giant planet orbiting in the habitable zone of Alpha Centauri A. (The MIRI instrument was developed in part by the Jet Propulsion Laboratory [JPL], which is managed by Caltech for NASA). The habitable zone is the region around a star where temperatures could be right for liquid water to pool on a planet's surface.https://phys.org/news/2025-08-evidence-planet-closest-sun-star.html

Meet the universe's earliest confirmed black hole: A monster at the dawn of time

An international team of astronomers, led by The University of Texas at Austin's Cosmic Frontier Centre, has identified the most distant black hole ever confirmed. It and the galaxy it calls home, CAPERS-LRD-z9, are present 500 million years after the Big Bang. That places it 13.3 billion years into the past, when our universe was just 3% of its current age. As such, it provides a unique opportunity to study the structure and evolution of this enigmatic period.

Artist representation of CAPERS-LRD-z9, home to the earliest confirmed black hole. The supermassive black hole at its centre is believed to be surrounded by a thick cloud of gas, giving the galaxy a distinctive red colour. Credit: Erik Zumalt / The University of Texas at Austin

"When looking for black holes, this is about as far back as you can practically go. We're really pushing the boundaries of what current technology can detect," said Anthony Taylor, a postdoctoral researcher at the Cosmic Frontier Centre and lead on the team that made the discovery. The research is published in *The Astrophysical Journal*." While astronomers have found a few, more distant candidates," added Steven Finkelstein, a co-author on the paper and director of the Cosmic Frontier Centre, "they have yet to find the distinct spectroscopic signature associated with a black hole."

https://phys.org/news/2025-08-universe-earliest-black-hole-monster.html

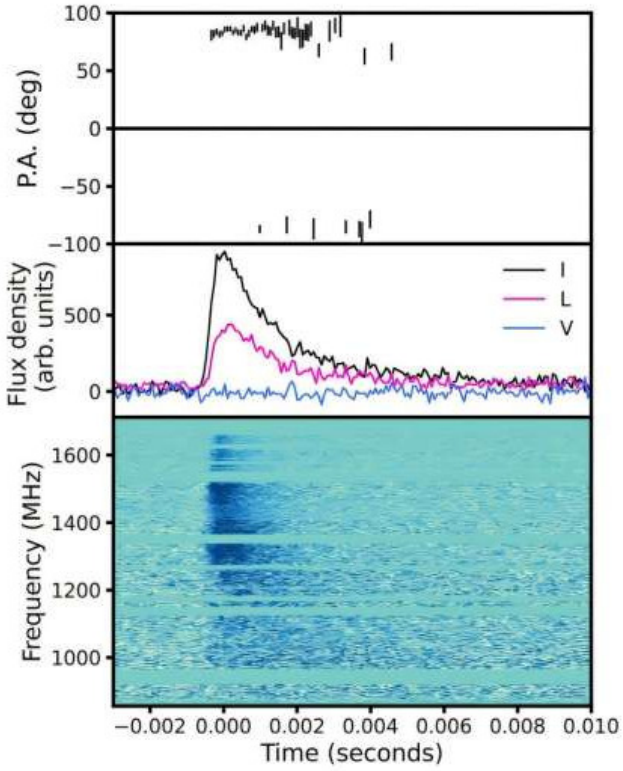
Ultraviolet light uncovers evidence of rare white dwarf star merger

Illustration depicting the hot stellar merger that formed the ultra-massive white dwarf -WD 0525+526. Credit: Dr. Snehalata Sahu/University of Warwick

University of Warwick astronomers have uncovered compelling evidence that a nearby white dwarf is in fact the remnant of two stars merging—a rare stellar

discovery revealed through Hubble Space Telescope ultraviolet observations of carbon in the star's hot atmosphere. White dwarfs are the dense cores left behind when stars exhaust their fuel and collapse. They are Earth-sized stellar embers weighing typically half as much as the sun, made up of carbon-oxygen cores with surface layers of helium and hydrogen. While white dwarfs are common in the universe, those with exceptionally high mass (weighing more than the sun) are rare and enigmatic. In a paper published in *Nature Astronomy*, Warwick astronomers report on their investigations of a known high-mass white dwarf 130 light-years away, called WD 0525+526. With a mass 20% larger than our sun, WD 0525+526 is considered "ultra-massive," and how this star came to be is not fully understood.https://phys.org/news/2025-08-ultraviolet-uncovers-evidence-rare-white.html

Astronomers detect most distant fast radio burst, just 3 billion years after Big Bang

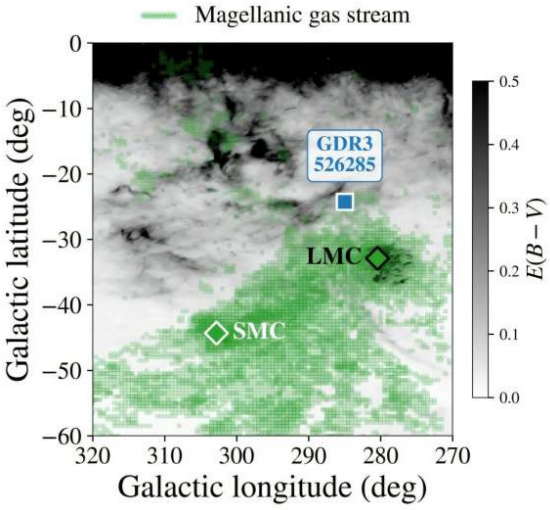


Dynamic spectrum and polarization profile of FRB 20240304B. Credit: arXiv (2025). DOI: 10.48550/arxiv.2508.01648

Using the MeerKAT radio telescope, an international team of astronomers have discovered a new fast radio burst, which received designation FRB 20240304B. The measured redshift of FRB 20240304B indicates that it is the most distant fast radio burst known to date. The finding was reported in a research paper published August 3 on the *arXiv* pre-print server. Fast radio bursts (FRBs) are intense flashes of radio emission that last only a few milliseconds and showcase the characteristic dispersion sweep of radio pulsars. To date, the physical nature of this mysterious phenomenon remains unknown; however, astronomers consider a variety of explanations ranging from synchrotron maser emission from young magnetars in supernova remnants to cosmic string cusps.

https://phys.org/news/2025-08-astronomers-distant-fast-radio-billion.html

Ultra-metal-poor star discovered in Milky Way's halo



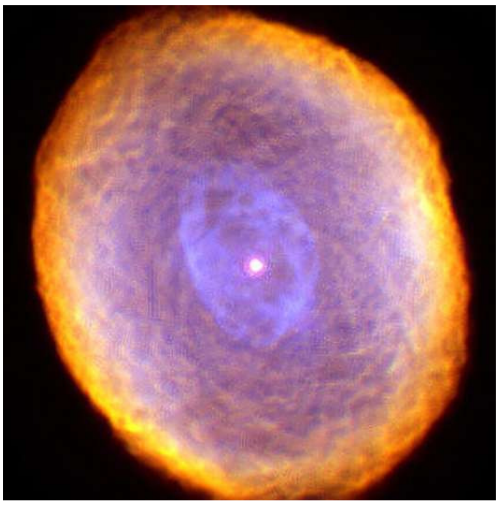
On-sky location of GDR3_526285, Small Magellanic Cloud, and Large Magellanic Cloud in Galactic coordinates. Credit: The Astrophysical Journal Letters (2025). DOI: 10.3847/2041-8213/adf196.

By analyzing the data from ESA's Gaia satellite, astronomers from the University of Chicago, Illinois and elsewhere, have identified a new ultra-metal-poor star. The newfound star, designated GDR3_526285, turns out to be one of the most metal-poor stars detected so far. The finding was announced in a research paper published August 8 in *The Astrophysical Journal Letters*. Ultra-metal-poor (UMP) stars (with iron abundances [Fe/H] below -4) are extremely rare, given that only a few dozen of such objects have been identified to date. They are assumed to be direct descendants of the first (Population III) stars and therefore could offer important insights into the

conditions in the early universe. Now, a group of astronomers led by University of Chicago's Guilherme Limberg reports the detection of a new UMP star, GDR3_526285, in Gaia's blue photometer (BP) and red photometer (RP) spectro-photometric catalog—Gaia BP/RP (XP). The status of the star was confirmed by multi-band photometry and high-resolution spectroscopic analysis using the Magellan Clay 6.5 m telescope at Las Campanas Observatory in Chile.

https://phys.org/news/2025-08-ultra-metal-poor-star-milky.html

Astronomers capture a record 130-year evolution of a dying star



Glowing like a multi-faceted jewel, the planetary nebula IC418 lies about 2,000 light-years from Earth in the constellation Lepus. In this picture, the Hubble telescope reveals some remarkable textures weaving through the nebula. Their origin, however, is still uncertain. Credit: NASA/ESA and The Hubble Heritage Team (STScI/AURA)

For the first time, scientists have directly tracked the slow transformation of a dying star over more than a century—revealing it is heating up faster than any other typical star ever observed. The research, published today in *The Astrophysical Journal Letters*, tracks 130 years of changes in the "spirograph" Planetary Nebula IC418—a glowing shell of gas and dust cast off by a dying star about 4,000 light years from Earth. By piecing together observations dating back to 1893 when astronomers first recorded the nebula by eye through a telescope to today, scientists found the nebula's signature green light, emitted by oxygen atoms, has grown about 2.5 times stronger since Victorian astronomers first studied it. This change is being driven by the central star's rising temperature, which has increased by around 3,000°C since 1893, or roughly 1,000°C every 40 years. For comparison, the sun increased by the same amount during its formation, but took 10 million years to do it. However, although the star is heating faster than ever observed, it is still slower than the latest models had predicted. This challenges current theories of how stars age and die, and may force astronomers to rethink the masses of stars capable of producing carbon—the element essential for life.

https://phys.org/news/2025-08-astronomers-capture-year-evolution-dying.html

Astronomers combine X-ray and radio data to map pulsar 'hand' nebula

Credit: NASA

In 2009, NASA's Chandra X-ray Observatory released a captivating image: a pulsar and its surrounding nebula that is shaped like a hand. Since then, astronomers have used Chandra and other telescopes to continue to observe this object. Now, new radio data from the Australia Telescope Compact Array (ATCA) has been combined with Chandra's X-ray data to provide a fresh view of this exploded star and its environment, to help understand its peculiar properties and shape.

At the centre of this new image lies the pulsar B1509-58, a rapidly spinning neutron star that is only about 12 miles in diameter. This tiny object is responsible for producing an intricate nebula (called MSH 15-52) that spans over 150 light-years, or about 900 trillion miles. The nebula, which is produced

by energetic particles, resembles a human hand with a palm and extended fingers pointing to the upper right in X-rays. The pulsar spins around almost seven times every second and has a strong magnetic field, about 15 trillion times stronger than Earth's. The rapid rotation and strong magnetic field make B1509-58 one of the most powerful electromagnetic generators in the Milky Way galaxy, enabling it to drive an energetic wind of electrons and other particles away from the pulsar, creating the nebula. In this new composite image, the ATCA radio data (represented in red) has been combined with X-rays from Chandra (shown in blue, orange and yellow), along with an optical image of hydrogen gas (gold). The areas of overlap between the X-ray and radio data in MSH 15-52 show as purple. The optical image shows stars in the field of view along with parts of the supernova's debris, the supernova remnant RCW 89.

https://phys.org/news/2025-08-astronomers-combine-ray-radio-pulsar.html

Magnetic field mapping in Sagittarius C reveals new clues to Milky Way core dynamics

The complex and turbulent Galactic Centre has long challenged astronomers attempting to model its underlying physics. Now, new measurements of the magnetic field in Sagittarius C, a region within the Central Molecular Zone of the Milky Way, are offering unprecedented insight into the interplay between dense clouds, massive star formation, and magnetic structures. Sagittarius C is known for its distinctive filaments, dynamic structure, and active stellar nurseries. Using NASA's now-retired Stratospheric Observatory for Infrared Astronomy (SOFIA), researchers led by University of Chicago doctoral student Roy Zhao measured the polarized infrared emission from dust grains aligned by the local magnetic field. The observations, taken at 214 microns, reveal the field's orientation and its connection to surrounding astrophysical processes. The team found the magnetic field encircling an expanding bubble of hot ionized gas, apparently sculpted by winds from massive young stars. This configuration compresses nearby gas and shapes the magnetic geometry. The findings also bolster the magnetic reconnection hypothesis for the origin of radio filaments-where merging magnetic fields accelerate electrons to near-light speed-first suggested decades ago.

https://www.spacedaily.com/reports/Magnetic_field_mapping_in_Sagittarius_C_reveals_new_clues_to_Milky_Way_core_dynamics_999.html

Committee Members

Derek Duckitt	(Chairman, Speaker Selector, website editor, Cosmology SIG co-ordinator)	082 414 4024 derek.duckitt@gmail.com
Pierre de Villiers	(Vice-chairman, Speaker Selector, Projects and Outreach, Science and Technology Club)	082 854 2277
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
Mick Fynn	(Educational outreach)	082 443 0848

Non-committee members with portfolio:

Deon Krige	Astro-photography (SIG coordinator)
Pieter Kotzé	"Southern Cross" (Astronomy News)