



Astro Flyer



SEPTEMBER 2022

Club News

From The President

Observatory Project – a site inspection with Council and university staff is planned for 13Sep22. All of the players – us, the university, the council planning department and the contractors – are lined up. Hopefully we will get the go ahead from council soon so that construction can commence.

We are expanding our line-up of speakers for our meetings and again I call on the members to step up if you are able. The committee will be looking into the availability of guest speakers to increase our range of content. We will keep you posted as that activity progresses.

Next Meeting September 16th 6.30 for 7pm winter time.

Keep on watching!
Best Regards,
Mark Town

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MOON PHASES



New Moon First Quarter Full Moon Last Quarter
Sep 26 Oct 3 Oct 10 start→Sep 18

Viewing Nights

VIEWING NIGHTS
Starting again

Club viewing nights are selected to provide viewers with the best possible conditions for good viewing. They are held on specific Saturdays at different locations around Nowra.

Dates & Locations

Sat Aug 27th Uni
Sat Sept 24 Woncur Rd
Sat Oct 22 Uni
Sat Nov 26 WoncurRd

More Club Information
Including viewing site
Directions Page

OUT THERE BY BOB TURNBULL OBSERVATION OFFICER

September to October

Hopefully we can look forward to some drier warmer nights to poke out scopes to the heavens!

Before I commence with astronomical objects for the next 2 months, I will refer to John Bambury's organising towards our club assisting Public Schools and the general public.

Thursday 22nd September at 7pm, Shoalhaven Heads Public School. Mark Town will attend with his 16" Meade Lightbridge scope, John Gould will have the clubs 4" refractor and Jon Bambury will have his 14" SDM.

It is hoped one or two more people will attend if possible.

Astrology The Ngungwah Aboriginal Corporation is organising an evening on 16th October at Coolangatta Estate.

These details are as the Committee has advised me on 11th August.

"They are hoping to combine a night of astrology with Cultural stories about the sky from this Yuin Country. They have invited Dr Robert Fuller, and Paul McLeod to be in attendance. They believe that there is considerable interest in Aboriginal understanding of the night sky.

Recommended reading "The First Astronomers" by Duane Hamacher"

Planets

Jupiter is at opposition on 27th September diameter 49.9" and magnitude of -2.9 rising in the early evening, refer for position on 11th-13th evening sky page 69. *Jupiter's Satellites*: of this planet on top right and bottom right page 69.

Mercury is in Virgo, low in the western sky.

Comets c/2017 K2 Panstarrs will remain 6 magnitude in October and moves out of view but begins in Lupus after which it crosses back to Scorpius and then in Norma in months end.

Moonlight on the Nepean

Spend time learning about Ruby Payne-Scott 1912 – 1981 (Page 72 of your Astronomy 2022). She was unique in the achievements in Science and one of our rare women that encouraged many women to enter Science and Astronomy in Australia.

Wishing you all good viewing!

Bob Turnbull
Observation Officer

Astro Events from Frank Gross



Scientists Scan Nearby Open Cluster, Find It Hides a Planetary Nebula



Ivan Petricevic

Posted on August 25, 2022

Researchers have revealed that the open cluster M37, located 4,500 light-years away in the constellation Auriga is home to a planetary nebula.

An open cluster known as Messier 37 has been studied using astro-photometry. As a result of this research, it was discovered that Messier 37 hosts a large and evolved planetary nebula. A paper detailing the study was published on the pre-print repository arXiv.org on August 12.

In the process of evolving from a main sequence star into a red giant or white dwarf, planetary nebulae (PNe) are expanding shells of gas and dust that are ejected from the surface of the star. While they are relatively rare, they are important for astronomers who study the chemical evolution of galaxies and stars.

Located 4,500 light-years away in the constellation Auriga, Messier 37, or M37, also called NGC 2099, is considered the brightest and richest open cluster (OC) in Auriga.

The orbital period of M37 through our galaxy is 219.3 million years. When it is nearest to the galactic center, it is 19,600 light-years away. At its farthest point in its orbit, it is 30,700 light-years away.

It contains more than 500 known stars and has a radius of about 10 to 13 light years, about 150 of which are brighter than magnitude +12.5, as well as about a dozen red giants.

Experts believe it has a total mass of around 1,500 solar masses. It is believed that M37 was discovered before 1654 by the Italian astronomer Giovanni Battista Hodierna.

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Image Credit: Wikimedia Commons

Open cluster Messier 37 in Auriga

Astronomers from the National Autonomous University of Mexico present evidence that PN IPHASX J055226.2+323724, first detected in 2008, does indeed belong to Messier 37.

As a result of further analysis, it has been determined that the likely central star of this PN is a white dwarf that is highly likely to be a proper motion member of Messier 37.

Sabin (2008) classified the nebula as a PN candidate based on IPHAS [INT Photometric H-Alpha Survey] images. Here, high-resolution radial velocity data confirm this rare OC-PN link, [the researchers wrote](#).

In order to conclude that IPHASX J055226.2+323724 is a member of Messier 37, the ESA's Gaia satellite data is used to determine the radial velocities and proper motions for the star cluster and central star of the planetary nebula. In addition, PN density, reddening, and distance agreement support this hypothesis.

In the study, the researchers found IPHASX J055226.2+323724 to be a large (approximate radius 5.2 light years), bipolar and evolved (approximately 78,000 years old) PN with low surface brightness. As a result of its patchy internal structure, the PN exhibits a Type-I (nitrogen enriched) chemistry based on its emission line spectra. With a mass of about 0.63 solar masses, the nebula's central star is a [white dwarf](#).

Taking a broad view of the results, the authors report that IPHASX J055226.2+323724 is the third PN known in a Galactic open cluster. Their findings provide important insights into the maximum observable lifetime of PNe as a whole.

The researchers explain in their paper that M37 possesses the largest kinematical age ever measured, which implies longer visibility lifetimes when clustered.

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Researchers Spot the Remnants of a 260-Million-Year-Old Radio Galaxy in Deep Space



Ivan Petricevic

Posted on August 27, 2022

According to two scientific papers, the oldest radio galaxy discovered to date is hidden within a cluster. Scientists believe that they have discovered the oldest fossil radio galaxy yet discovered, hidden in a cluster, far away in deep space.

As per scientists' current understanding, as a result of a supermassive black hole, the brightest galaxy in the cluster burst into space, blowing massive *bubbles* of radio light, Science Alert revealed.

"These newly discovered bubbles – known as radio lobes, or a radio galaxy – are the oldest of their kind we've ever seen," claimed the astronomers' team led by Surajit Paul and Savitribai Phule from Pune University in India. In addition, astronomers led by Gopal Krishna at the University of Mumbai discovered two newer lobes related to the parent galaxy.

This object represents a rare pairing of lobes, suggesting erupted episodes from the supermassive black hole of the galaxy. It is common for radio lobes to be found throughout the universe. Radio lobes are also found in our home galaxy, the Milky Way. Supermassive black holes produce these when they become active and begin consuming matter from the surrounding space.

Intergalactic medium, which is a thin, gaseous layer between galaxies, is susceptible to the effects of radio lobes since they can extend millions of light-years beyond the galaxies from which they originate.

Astro Events from Frank Gross

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The study of these structures offers a better understanding of this medium's recurring, episodic nature and the supermassive black holes that generate it.

Many of the particles fall into the black hole. Still, some of them are accelerated to their poles along the lines of the black hole's external magnetic field, resulting in two jets traveling at a significant part of the speed of light.

As these jets traverse the interstellar medium, they form lobes that interact with it. Electrons are accelerated, and radio waves are emitted by the lobes, acting as a synchrotron.

Due to their rapid disappearance, we cannot locate examples older than 200 million years from our perspective since they vanish very quickly. The researchers noted that these "relics" could provide valuable information about the conditions that led to their formation.

Paul and his colleagues suggest that a low-mass, quiet galaxy cluster is a hot, relaxed environment that will likely increase their survival chances.

Abell 980, an approximately 2 billion light-years away galaxy cluster, was found to have such an environment using India's Giant Metrewave Radio Telescope.

There, they discovered lobes that dated back more than 260 million years and covered over 1.2 million light years. Identifying the source of the lobes was the next step.

In the second paper, Krishna and his colleagues traced it back to the brightest galaxy within the cluster, at the heart of Abell 980. Despite this, Krishna and his team indicated that it was not always present.

Over 260 million years ago, it emitted the first pair of lobes in a position 250,000 light-years away. Another pair of lobes were created when the galaxy erupted again at the cluster center, according to Pune research. As of now, only about a dozen double-double radio galaxies have been discovered, which are linked by two pairs of radio lobes.

These galaxies were named detached double-double radio galaxies due to the fact that the parent galaxy of the two pairs of lobes in Abell 980 migrated and separated the lobes.

According to the researchers, there have only been two other candidates for double-double radio galaxies, so this is the most plausible example yet. The recurring nature of supermassive black hole outbursts may be revealed by more sensitive radio observations in the future.

Both papers have not been peer-reviewed yet, and are currently being considered by Astronomy & Astrophysics and Publications of the Australian Astronomical Society.

Astro Events from Frank Gross

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Allen Telescope Array Catches Voyager 1 Interstellar Signal



Ivan Petricevic

Posted on August 27, 2022

The Allen Telescope Array has detected the farthest human-made object from Earth, Voyager 1. NASA's Voyager 1 probe, launched 45 years ago and now traveling far beyond Pluto's orbit, was detected by the Allen Telescope Array in California.

On July 9, 20 of the 42 dish antennas of the Allen Telescope Array (ATA), a radio observatory near San Francisco dedicated to discovering extraterrestrial life, reached out to Voyager 1 and made contact with it. The antennas are each about 20 feet (6.1 meters) in diameter. [According to a statement](#), the telescope recorded 15 minutes of data, which scientists stored on a disk.

In the statement, the team said, "Detecting Voyager 1, the furthest human-made object, with the refurbished Allen Telescope Array, is an outstanding demonstration of the telescope's capabilities and strengths, along with a testament to the outstanding hard work put into refurbishing the telescope since its inception in 2019".

There was no further information provided about the signal it caught in the statement. Voyager 1 has been sending back nonsense data about its location in space due to a strange glitch, which experts have still not been able to understand fully.

Although NASA has not specified when the glitch first occurred, it first reported it in May. Despite the gibberish data, the agency believes Voyager 1 is safe, as if the data were accurate, Earth would not receive the signals delivered by the spacecraft.

[As we reported previously](#), despite its glitch, the interstellar explorer continues to collect science data and return it to Earth; it is receiving and executing commands normally. Despite this, the probe's attitude articulation and control system (AACS) does not accurately represent what's happening with the spacecraft.

The AACS is responsible for orienting the spacecraft. Voyager 1's high-gain antenna keeps the spacecraft pointing precisely at Earth so that data can be sent back. AACS does not appear to be malfunctioning, but its telemetry data is incorrect. As explained by experts, the data, for example, was generated randomly or was not indicative of AACS's current state.

Currently, there is no indication that the spacecraft is in "safe mode," which is a state where only essential operations are carried out so engineers can diagnose problems. Voyager 1's signal does not seem to have weakened either, suggesting that the antenna is oriented correctly.

Astro Events from Frank Gross

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NASA's Deep Space Network still tracks Voyager 1, which is currently 14.5 billion miles away from Earth, 156 times the distance between the sun and Earth. The spacecraft delivers around 160 bits of data per second to Earth.

In the ten years since the mission entered what astronomers define as interstellar space, the spacecraft has measured interstellar medium properties beyond the edge of the heliosphere.

Despite being in interstellar space, Voyager 1 still must fly through the Oort Cloud, a region of space that is located over 200 sun-Earth distances from the sun and composed primarily of comets and asteroids.

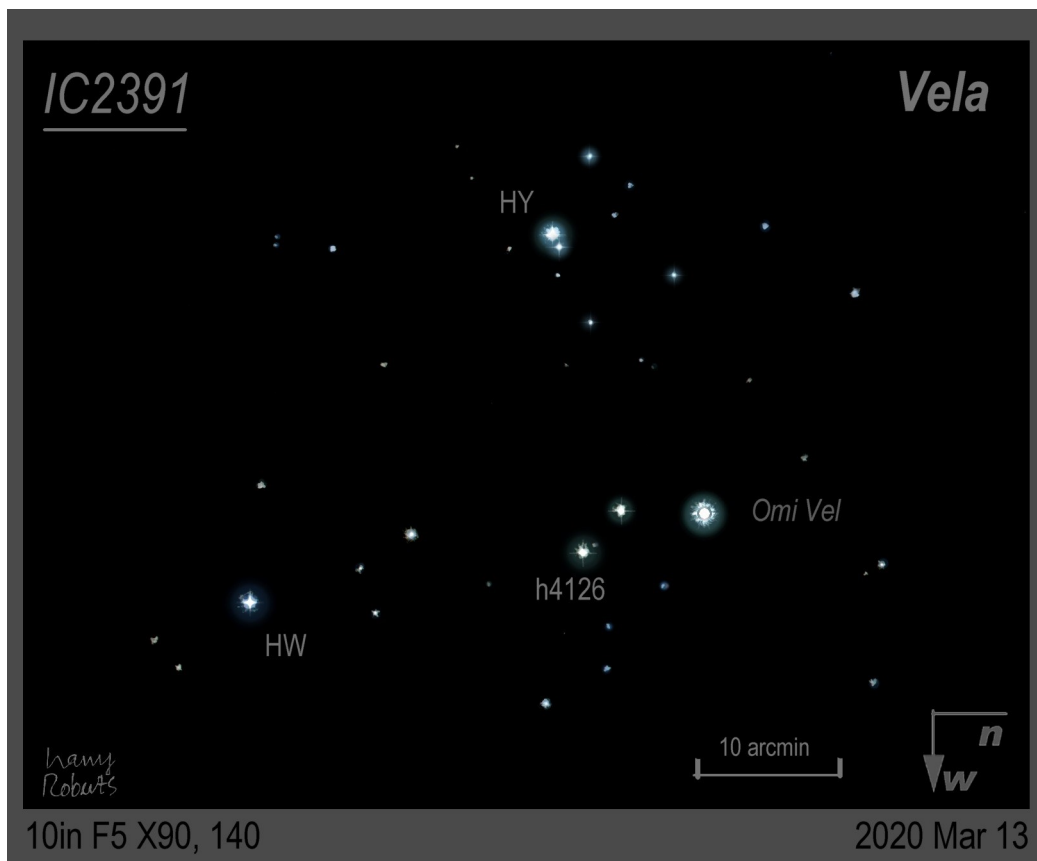
The Oort Cloud has never been visited by a spacecraft, and Voyager 1 is expected to take about 300 years to reach it. It's expected the probe will run out of fuel by 2025, shutting down its systems for good.

Omicron Velorum Cluster IC2391 by Harry Roberts

Omicron Velorum Cluster IC2391

IC2391 is a superb target for midrange and small scopes and is easily found at the westernmost arm of the so-called “False Cross” in Vela. A large naked-eye cluster, it is five times the size of Kappa Crucis cluster, the “Jewel Box”, but the six or seven main stars outline a letter “A” shape, much as in Kappa. It was suggested this might make a good target for small-scope users (thanks EO’C) – and after an initial sense of a very sparse field, its riches became clearer.

What do the sources say? Hartung (Malin and Frew 1995, p383) says “this bright scattered cluster including the brilliant Omicron Vel makes a fine wide field object for small telescopes and binoculars. It contains about twenty stars in a one degree field, and is visible to the unaided eye... is excellent with 10.5cm”. SkyCat2000 says: “IC2391, dia 50arcmin, 180pc (600ly), code II, 3, p” meaning: detached, weak concentration toward the centre, large range in rightness, richness poor, <50 stars. N (no. stars) 30, total apparent mag 2.5, brightest star 3.63 (omicron), earliest spectral type B3, Age 36 million yrs.”



In the eyepiece we see a marvellous collection of blue ‘gems’ strewn across a field almost 1.5 Moon diameters wide - their large brightness range adds to the drama; a superb sight in the 10inch at 50X (32 Plossl)! A pencil sketch was made using a 14Radian(X90) and a 9 Orth. (X140) then traced and later scanned. The seeing was poor as a ‘change’ moved through.

The stars all seemed to be blue B Types, bright Omicron (mg3.6) was dazzling! A stunning double lies at the eastern edge of the triangular cluster and faint background stars abound. The 9mm revealed a rich carpet of <13mag ones wherever the scope was pointed, some 40 stars were sketched and fainter ones may be added later.

Omicron Velorum Cluster IC2391 by Harry Roberts

Cont...2

Doubles. At least two, maybe three, are listed in this cluster, one is h4126, from John Herschel's catalogue. The primary, spec. Type B5 is mag. 5.4 and companion is 9.8 in PA 30 deg, sep. 16.6" arc. The other and more spectacular pair is 'marked' HY. This, and the HW caption are, presumably, Harvard 'cluster' designations, not doubles. The pair at HY is bright and impressive; mags are 5 and 5.8, sep 76" in PA310. A great site in a small 'scope.

No colour contrasts were seen this session, but may exist. IC2391 reminds one of smaller NGC2547 some 5 degrees or so to the west: both are open clusters of brilliant B-type stars in the early stages of their probably short lives.

While in the area don't miss the cluster at the 'Foot' of the False Cross, NGC2516. Arguably prettiest due to a scattering of deep red stars around a compact cluster of blue-white B types, it's also astounding in small 'scopes. Such riches!

Clear skies.

Remember Film? by Andrew Wood



Back in the day, not too long ago really, most amateur astronomers were visual observers and serious astrophotography was the preserve of those willing to expose film in a camera coupled to a telescope for long periods of guiding, send the film roll to a processing centre, and hope the processed images were ok once they arrived back.

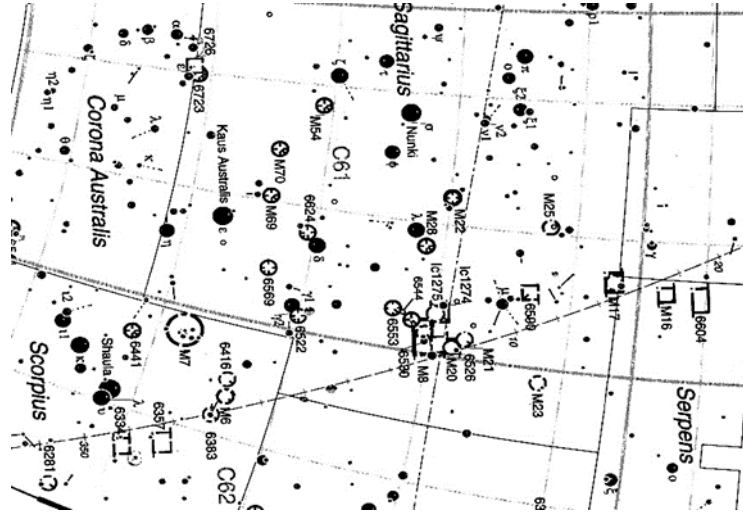
For those of us without the enthusiasm for this, we could dabble a bit in imaging using a film camera on a tripod with a standard 50mm lens to take wide angle shots of constellations for 30 seconds to a minute if we didn't want star trails; or piggy-backing the camera to a driven telescope for longer exposures.

I have a few albums of such images. Some of them turned out ok, others not worth preserving. I've set out to scan the decent images to digital form, archive the original prints, and throw away the rest – probably the majority.

The photo above is I think the best of them. It takes in the Sagittarius “teapot” with the “spout” pointing to the 5 o'clock direction. It was taken on July 21st, 1995, from my backyard in Wollongong, using an Olympus OM1 SLR with a 50mm lens at f2.8 piggybacked to my guided telescope and exposed for 2 minutes. The film was 400ASA Kodak Gold. For some reason, it came back processed very well.

Remember Film? by Andrew Wood

Cont...2



Above, this image is a scanned section of a star atlas of the same area and oriented to match the photo. [*Herald-Bobroff AstroAtlas* Map B06]. This is a very rich area for deep sky objects and in the bottom half of the photo, through the Milky Way, some deep sky objects have been caught on the film.

Near the bottom about a third the way across from the left is the large open cluster M7, with the stars of the tail of Scorpius trailing behind. Moving right, past a very rich area of the Milky Way, M8, the Lagoon Nebula shines red and more faintly the nearby M20, the Trifid Nebula, can also be seen. Near the right edge the nebulae M17 and M16 are also visible. At one o'clock to the star γ -Sagittarii (the top of the "teapot"), the bright globular cluster M22 is visible, though not resolved.

All of these are wonderful telescopic objects, as are the others marked on the atlas. This area of sky is visible high up in the west mid-evening this month. If the weather gives us a chance it is well worth "going deep", observing them visually, taking digital images; or both. Film is a memory.

New Moon Observing Nights



Monthly observing nights are planned alternately at two dark sky sites close to Nowra, on the Saturday closest to New Moon. If Saturday is clouded out, then the following Sunday is a possible alternative, weather permitting.

The alternate sites are:
University of Wollongong, Shoalhaven Campus, West Nowra
Woncur Avenue, Nowra Hill

Upcoming Observing Nights

August 27 Shoalhaven Campus
September 24 Woncur Avenue
October 22 Shoalhaven Campus
November 26 Woncur Avenue

Enquiries Andrew Wood (0401907012), Freya Bates (0415483656)

More Club News continued from page 1

Club/Social Viewing Nights

Club/Social Viewing Nights are on Saturday evenings "just" Before Sunset. Viewing nights are for members and invited guests. The contingency plan for poor weather on the proposed viewing night is to meet the next night (a Sunday night) .

Woncur Road, South Nowra (Head South down The Princes Highway, turn right at BTU Road, Woncur Road is the street first on the left).

University Viewing site. On the way to the university on George Evans Road go straight ahead through the second turning circle to the new viewing site.

Bring your scopes and or binoculars and a small folding chair, a decision on the day planned, depending on viewing conditions, by the club president and his deputy.

Email information if details are changed, to all, or contact Frank for changes.

Solar viewing BBQ lunches (BYO) may be held and these will be advised ahead of these events. Special events such as Comets, eclipses etc. may also warrant members night viewings.

The AGM was held at the May 2022 monthly meeting. Elected officials for 2022- 2023

The 2021 AGM has been postponed due to Covid.

Executive

President: Mark Town

Vice President: John Gould

Secretary : Andrew Wood

Treasurer: Frank Gross

Public Officer; Frank Gross

Operation Positions

Website Manager: Mark Town

Observation Officer: Robert Turnbull

Editor: Kaye Johnston

Librarian: Chris O'Hanlon

Equipment Officer: Vacant

Committee General Members:

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Larry Wakelin,

Chris O'Hanlon,

Check out the Astro Flyer on the web site: www.shoalhavenastronomers.asn.au

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The deadline for Articles for the Astro Flyer is The
First Friday of the Month.

Editor Kaye Johnston