New Zenith

The Monthly Newsletter of the Vectis Astronomical Society

Vol 30 Issue 10 — November 2022 *When Printed, this Newsletter costs VAS at least £1*

Society News

Our 25th November Monthly Meeting will be held in the Observatory as the Pavilion is not available.

Space is a bit more restricted so please let me know if you will be attending.

editor@wightastronomy.org

Observatory News

Work has started on a refurbishment of the VAS dome area. The main Meade LX200 telescope is now out of service and has been removed.

Our first priority is to repair some deterioration of the dome's surface and to reseal the dome against the weather.

Do not enter the dome area unless you are helping with repairs

This is quite a large project and will take some time to complete. Once the dome is weatherproof we will be repairing/changing the rotation and roof opening controls. we also intend to replace the telescope and its pillar.

Anyone got a free length (about 6m) of RSJ?

Please bear with us and, if you feel like helping, you will be made very welcome!

Help Needed!

Please note that your Committee has two vacancies: A Secretary and NZ Editor. If you can help in either case please contact any of the other members listed on Page 2.

Brian Curd

VAS Website: wightastronomy.org

Submissions or letters to New Zenith are always welcome and should be sent to:

The Editor, New Zenith
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Material for the next issue by the 6th of the month please.

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Observatory Diary

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training.
Thursday	Members (19.30hrs) and Public (20.00hrs). Informal meeting and observing

VAS Website: wightastronomy.org

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2022 Monthly Meetings

Check *http://www.wightastronomy.org/meetings/* for the latest information

Date	Subject	Speaker
25 Nov	The UK National Space Strategy **Meeting in the Observatory**	Adam Amara

2023 Monthly Meetings

Check *http://www.wightastronomy.org/meetings/* for the latest information

Date	Subject	Speaker
27 Jan	Eclipses	Richard Flux
24 Feb	**ZOOM only** - Astronomical Spectroscopy	Steve Broadbent
24Mar	Not Booked	
28 Apr	Sundials	Peter Ransom
26 May	Not Booked	
23 Jun	**Possibly ZOOM** Stellar Evolution - the life cycle of a star and its implications for life in our Solar System	Dr Elizabeth Cunningham
28 Jul	Variable Stars	Bryn Davis
25 Aug	AGM	**Meeting in the Observatory**
22 Sep	Not Booked	
27 Oct	Not Booked	
24 Nov	EM-bridge technology and applications	Alan Thomson

Observatory Visits Booked

No bookings so far

Please phone me for the current situation (number on the front page)

It would be appreciated if members could avoid using the observatory at these times.

GDPR rules mean we must maintain accurate membership records, please tell us about any contact detail changes

VAS Contacts 2022

President	Barry Bates president@wightastronomy.org
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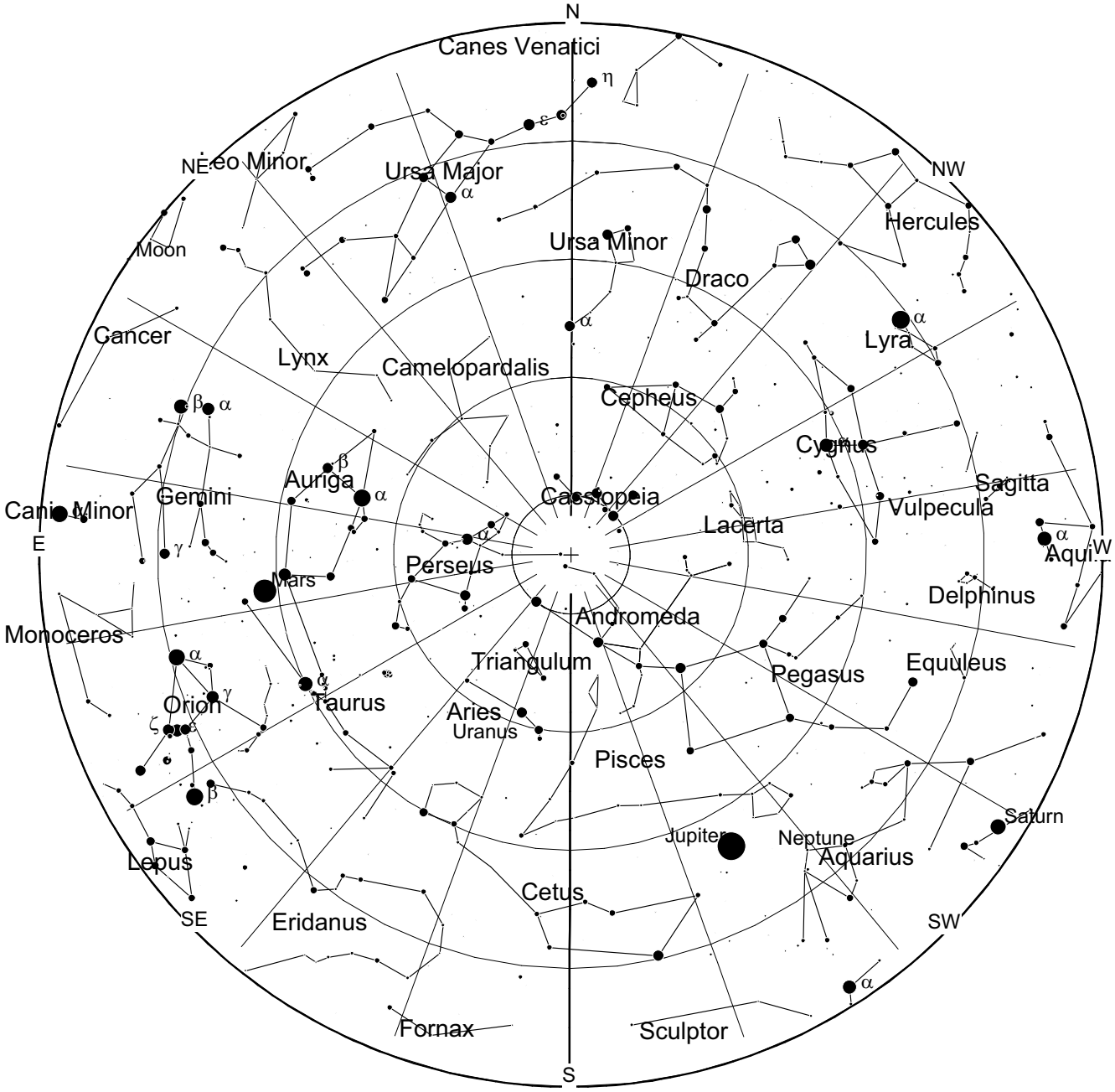
Important

Members using the observatory MUST enter a line or two in the Observatory Log Book.

On several occasions, lights, heaters and the Meade LX200 have been left on!

When leaving, please ensure all is secure and all lights, heaters and telescopes are TURNED OFF.

November 2022 - Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 November 2022

The Pleiades also known as The Seven Sisters, Messier 45 and other names by different cultures, is an asterism and an open star cluster containing middle-aged, hot B-type stars in the north-west of the constellation Taurus. At a distance of about 444 light years, it is among the nearest star clusters to Earth. It is the nearest Messier object to Earth, and is the most obvious cluster to the naked eye in the night sky.

The cluster is dominated by hot blue luminous stars that have formed within the last 100 million years. Reflection nebulae around the brightest stars were once thought to be left over material from their formation, but are now considered likely to be an unrelated dust cloud in the interstellar medium through which the stars are currently passing. This dust cloud is estimated to be moving at a speed of approximately 18 km/s relative to the stars in the cluster.

November 2022 - Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
23rd	1st & 30th	8th	16th
			

Planets

Mercury

Mercury is in conjunction with the Sun at the start of the month, and although it draws away to the east and is technically visible in the evening sky late this month and in early December it is too close to the horizon to be seen through the haze. I may be visible during the day if the sky is very clear, but conditions will be far from optimal.

Venus

Like Mercury Venus is very close to the Sun, but with an angular separation of less than 10°, is too close to be easily visible this month.

Mars

Mars is in the constellation of Taurus and easily seen in the eastern sky during mid evening. It is brighter than any other star in that part of the sky and making a roughly right angled triangle with the similarly coloured red giant stars Aldebaran in Taurus and Betelgeuse in Orion. With Mars now quite close to the Earth a small telescope will some show surface markings. The coming opposition early next month the next few weeks mark the best time for observing Mars.

Jupiter

As soon as the sky darkens Jupiter is conspicuous in the south east, it is far brighter than any star and well placed for easy observation.

Saturn

Saturn an be found in the faint sprawling constellation of Capricorn, although much fainter than Jupiter it is still the brightest object in that part of the sky, It can be found to the south as the sky darkens, and by mid evening has dropped too close to the horizon for clear observation. If you have a telescope, now is a good time to see the planet's shadow on the rings,

Uranus

Being high in the southern sky during the evening Uranus is well placed for observation this month. It is not close to any well know guide star so locating it for the first time can be a challenge. However once found if the surrounding star field is memorised it is easily recovered. A finder chart can be found in the September NZ.

Neptune

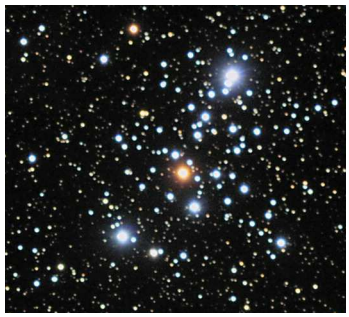
Neptune lies roughly half way between the 4th star Phi Aquarii and the much brighter Jupiter. It about magnitude 8 and can be seen in a pair of binoculars. Use the finder chart in August NZ to aid in finding the outermost ice giant.

Deep Sky

Stock 2 Open Cluster
RA 2h 15m Dec 59° 20' mag 4.4

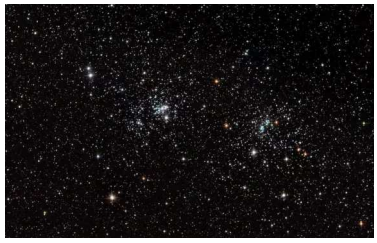
From the double cluster follow the curved chain of stars toward Cassiopeia; for about 2.5°, about half a 10x50 binocular field. To the left is a group of stars making a rather crooked H shape, sometimes called the strongman cluster. This is Stock 2, another open cluster that needs low magnification, this is a rather sparse cluster about 1° in diameter. A telescope shows chains of stars and dark areas in the cluster.

M103 Open Cluster
RA 1h 34m Dec 60° 42' mag 7.0



A celestial Christmas tree. This is a young cluster with many bright blue members, the brightest of which forms the star on top of the tree. It is a colourful cluster with a number of orange and yellow stars that make up the effect of Christmas tree lights. M103 is the last entry of Messier's catalogue, the remaining objects were added after his death based on his unpublished work.

NGC869 & 884 The Double Cluster
RA 2h 19m Dec 57° 19' Mag 5.3



Either one of these clusters would be high in the list of sights in the winter sky yet here we have two in the same field of view. They can be seen as a pair of diffuse glows with the naked eye, and were recorded by the ancient Greeks. A small pair of binoculars shows them to be a pair of rich star clusters and will resolve a few of the stars. A telescope at low magnification gives the best view, careful use of magnification is needed as too much will spoil the view.

Peter Burgess

NASA DART Mission Successfully Shoved an Asteroid

It worked! Humanity has, for the first time, purposely moved a celestial object.

As a test of a potential asteroid-deflection scheme, NASA's DART spacecraft shortened the orbit of asteroid Dimorphos by 32 minutes - a far greater change than astronomers expected.

The Double Asteroid Redirection Test, or DART, rammed into the tiny asteroid at about 22,500 kilometers per hour on September 26. The goal was to move Dimorphos slightly closer to the larger asteroid it orbits, Didymos.

Neither Dimorphos nor Didymos pose any threat to Earth. DART's mission was to help scientists figure out if a similar impact could nudge a potentially hazardous asteroid out of harm's way before it hits our planet.

The experiment was a smashing success. Before the impact, Dimorphos orbited Didymos every 11 hours and 55 minutes. After, the orbit was 11 hours and 23 minutes, NASA announced October 11 in a news briefing.

"For the first time ever, humanity has changed the orbit of a planetary body," said NASA planetary science division director Lori Glaze.

Four telescopes in Chile and South Africa observed the asteroids every night after the impact. The telescopes can't see the asteroids separately, but they can detect periodic changes in brightness as the asteroids eclipse each other. All four telescopes saw eclipses consistent with an 11-hour, 23-minute orbit. The result was confirmed by two planetary radar facilities, which bounced radio waves off the asteroids to measure their orbits directly, said Nancy Chabot, a planetary scientist at Johns Hopkins Applied Physics Laboratory in Laurel, Md.

The minimum change for the DART team to declare success was 73 seconds - a hurdle the mission overshot by more than 30 minutes. The team thinks the spectacular plume of debris that the impactor kicked up gave the mission extra oomph. The impact itself gave some momentum to the asteroid, but the debris flying off in the other direction pushed it even more - like a temporary rocket engine.

https://www.sciencenews.org/

Black Hole Discovered Firing Jets at Neighbouring Galaxy

With the help of citizen scientists, a team of astronomers has discovered a unique black hole spewing a fiery jet at another galaxy. The black hole is hosted by a galaxy around one billion light years away from Earth named RAD12.

Galaxies are typically divided into two major classes: spirals and ellipticals. Spirals have optically-blue looking spiral arms with an abundance of cold gas and dust. In spiral galaxies, new stars form at an average rate of one Sun-like star per year. In contrast elliptical galaxies appear yellowish and lack distinct features such as spiral arms.

Star formation in elliptical galaxies is very scarce; it is still a mystery to astronomers as to why the elliptical galaxies we see today have not been forming new stars for billions of years. Evidence suggests that supermassive or 'monster' black holes are responsible. These 'monster' black holes spew gigantic jets made of electrons moving at very high speeds at other galaxies, depleting the fuel required for future star formation: cold gas and dust.

The unique nature of RAD12 had been observed using optical data from the Sloan Digitised Sky Survey and radio data from the Very Large Array (FIRST survey). However, follow-up observation with the Giant Meterwave Radio Telescope in India was required to confirm its truly exotic nature: The black hole in RAD12 appears to be ejecting the jet only towards a neighbouring galaxy, named RAD12-B. In all cases, jets are ejected in pairs, moving in opposite directions at relativistic speeds. Why only one jet is seen coming from RAD12 remains a puzzle.

A conical stem of young plasma is seen being ejected from the centre and reaches far beyond the visible stars of RAD12. The GMRT observations revealed that the fainter and older plasma extends far beyond the central conical stem and flares out like the cap of a mushroom. The whole structure is 440 thousand light years long, which is much larger than the host galaxy itself.

Research lead Dr Ananda Hota says, "We are excited to have spotted a rare system that helps us understand radio jet feedback of supermassive black holes on star formation of galaxies during mergers. Observations with the GMRT and data from various other telescopes such as the MeerKAT radio telescope strongly suggest that the radio jet in RAD12 is colliding with the companion galaxy. An equally important aspect of this research is the demonstration of public participation in making discoveries through the RAD@home Citizen Science research collaboratory."

https://www.sciencedaily.com/

The UK Space Strategy
By Adam Amara

VAS Monthly Meeting Fri 25th Nov 2022 19:30 at The Pavilion, Watery Lane, Newchurch IW

Adam Amara introduces his talk:

"Space technologies are an important part of modern life. Everything from the way we navigate our way through a new town to how we monitor our natural environments has been revolutionised because of space. In science, we can now build and launch incredible telescopes, like JWST, that let us look deep into the cosmos as we try to unravel the mysteries of the Universe."

"The UK is one of the world leaders in the space domain and last year the government launched our first UK National Space Strategy. This lays out an ambitious program for how we can grow space activities in our county and why it's important. For those of us working in space, this is a very exciting time. One of the important things to realise is that the Isle of Wight, Hampshire and Surrey are at the heart of the UK space sector. This means that our regions will play a special role if we as a nation are to deliver the ambitious goals of the National Space Strategy."

"In this talk, I'll talk give a broad overview of space activities in the UK and I'll go into detail on Mission Space (#missionspace). Mission Space is a University of Portsmouth initiative to boost the space domain to make the UK a great space nation. At the University of Portsmouth, we are developing plans for a new research centre called PRISM (Portsmouth Research Institute for Space Missions). PRISM facility will act as a focal point for all university space activities. Our main aim is to enable deep meaningful academic-industry collaborations and boost our space teaching across broad parts of our portfolio."

"PRISM will also be a part of a new regional space cluster called Space South Central. This is now the biggest UK space cluster and will be anchored by three academic institutions the University of Portsmouth, the University of Surrey and soon the University of Southampton. The space domain is exciting and the next 10 years can be transformational for the country. Our region is important to these plans and the opportunities that they open up for our industries, economy and research are boundless."

About the Speaker

Since August 2020, Professor Adam Amara has been the Director of Portsmouth University's Institute of Cosmology and Gravitation (ICG) and has also been recently appointed as Chair of the UK Space Agency's Science Programme Advisory Committee.

After receiving his PhD from the Institute of Astronomy at the University of Cambridge in 2005 and Master in Physics from the University of York, Professor Amara joined the ICG as a Royal Society Wolfson Fellow in the summer of 2019. Before arriving at Portsmouth, he was Senior Scientist at ETH Zürich, a public research institute in Switzerland.

Adam's primary science area is cosmology where he studies cosmic structure in the late-time Universe, which is an era dominated by dark matter and dark energy. Cosmology is a mature and exciting field, where advances are driven by experimental programs. He has worked closely with the European Space Agency and contributed to what has become their Euclid Space Mission, "to map the geometry of the Universe and better understand the mysterious dark matter and dark energy, which make up most of the energy budget of the cosmos". Euclid is due to launch in 2023. Also due for "first light" in 2023 is the Vera C. Rubin Observatory (formerly the LSST) in Chile.

If there are new clues to fundamental physics to be discovered through all these ambitious experiments, such as the Dark Energy Survey (DES), Euclid and the Rubin Observatory, our speaker aims to be at the forefront of these ground-breaking discoveries at the ICG in Portsmouth. Moreover, he is mentoring a new generation of cosmologists who can shed new light on these questions in the fundamental physics of our times and help them to thrive in this exciting field.

Please remember that our 25th November Monthly Meeting will be held in the Observatory as the Pavilion is not available.

Space is a bit more restricted so please let me know if you will be attending.

editor@wightastronomy.org

Star duo forms 'fingerprint' in space, NASA's Webb finds

Two stars in Wolf-Rayet 140 produce shells of dust every eight years that look like rings. Each ring was created when the stars came close together and their stellar winds collided. Credit: NASA/ESA/CSA/STScI/JPL-Caltech

A new image from NASA's James Webb Space Telescope reveals a remarkable cosmic sight: at least 17 concentric dust rings emanating from a pair of stars. Located just over 5,000 light-years from Earth, the duo is collectively known as Wolf-Rayet 140.

Each ring was created when the two stars came close together and their stellar winds met, compressing the gas and forming dust. The stars' orbits bring them together about once every eight years; like the growth of rings of a tree's trunk, the dust loops mark the passage of time.

“We're looking at over a century of dust production from this system,” said Ryan Lau, an astronomer at NSF's NOIRLab and lead author of a new study about the system, published today in the journal Nature Astronomy. “The image also illustrates just how sensitive this telescope is. Before, we were only able to see two dust rings, using ground-based telescopes. Now we see at least 17 of them.”

In addition to Webb's overall sensitivity, its Mid-Infrared Instrument (MIRI) is uniquely qualified to study the dust rings - or shells, because they are thicker and wider than they appear in the image. Webb's instruments detect infrared light, a range of wavelengths invisible to the human eye. MIRI detects the longest infrared wavelengths, which means it can often see cooler objects - including the dust rings - than Webb's other instruments can. MIRI's spectrometer also revealed the composition of the dust, formed mostly from material ejected by a type of star known as a Wolf-Rayet star.

MIRI was developed through a 50-50 partnership between NASA and ESA (European Space Agency). The Jet Propulsion Laboratory in Southern California led the effort for NASA, and a multinational consortium of European astronomical institutes contributed for ESA.

A Wolf-Rayet star is an O-type star, born with at least 25 times more mass than our Sun, that is nearing the end of its life, when it will likely collapse and form a black hole. Burning hotter than in its youth, a Wolf-Rayet star generates powerful winds that push huge amounts of gas into space. The Wolf-Rayet star in this particular pair may have shed more than half its original mass via this process.

Forming dust in the wind

Transforming gas into dust is somewhat like turning flour into bread: It requires specific conditions and ingredients. The most common element found in stars, hydrogen, can't form dust on its own. But because Wolf-Rayet stars shed so much mass, they also eject more complex elements typically found deep in a star's interior, including carbon. The heavy elements in the wind cool as they travel into space and are then compressed where the winds from both stars meet, like when two hands knead dough.

Some other Wolf-Rayet systems form dust, but none is known to make rings like Wolf-Rayet 140 does. The unique ring pattern forms because the orbit of the Wolf-Rayet star in WR 140 is elongated, not circular. Only when the stars come close together - about the same distance between Earth and the Sun - and their winds collide is the gas under sufficient pressure to form dust. With circular orbits, Wolf-Rayet binaries can produce dust continuously.

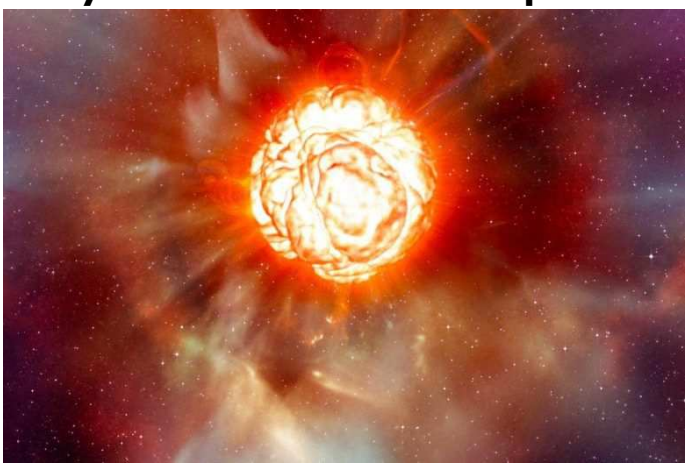
Lau and his co-authors think WR 140's winds also swept the surrounding area clear of residual material they might otherwise collide with, which may be why the rings remain so pristine rather than smeared or dispersed. There are likely even more rings that have become so faint and dispersed, not even Webb can see them in the data.

Wolf-Rayet stars may seem exotic compared to our Sun, but they may have played a role in star and planet formation. When a Wolf-Rayet star clears an area, the swept-up material can pile up at the outskirts and become dense enough for new stars to form. There is some evidence the Sun formed in such a scenario.

Using data from MIRI's Medium Resolution Spectroscopy mode, the new study provides the best evidence yet that Wolf-Rayet stars produce carbon-rich dust molecules. What's more, the preservation of the dust shells indicates that this dust can survive in the hostile environment between stars, going on to supply material for future stars and planets.

From: https://phys.org/

Massive Stars Sound Warning They Are About To Go Supernova



An artist's impression of Betelgeuse's supernova. Credit: European Southern Observatory/L. Calçada

Astronomers from Liverpool John Moores University and the University of Montpellier have devised an 'early warning' system to sound the alert when a massive star is about to end its life in a supernova explosion.

In this new study, investigators determined that massive stars (typically between 8 and 20 solar masses) in the last phase of their lives, the so-called 'red supergiant' phase, will suddenly become around a hundred times fainter in visible light in the last few months before they die. This dimming is caused by a sudden accumulation of Until now, it was not known how long it took the star to accrete this material. For the first time, scientists have now simulated how red supergiants might look when they are embedded within these pre-explosion 'cocoons'.

Old telescope archives show that images do exist of stars that went on to explode around a year after the image was taken. The stars appear as normal in these images, meaning they cannot yet have built up the theoretical circumstellar cocoon. This suggests that the cocoon is assembled in less than a year, which is considered to be extremely fast.

Benjamin Davies, lead author of the paper, says "The dense material almost completely obscures the star, making it 100 times fainter in the visible part of the spectrum. This means that, the day before the star explodes, you likely wouldn't be able to see it was there." He adds, "Until now, we've only been able to get detailed observations of supernovae hours after they've already happened. With this early-warning system we can get ready to observe them real-time, to point the world's best telescopes at the precursor stars, and watch them getting literally ripped apart in front of our eyes."

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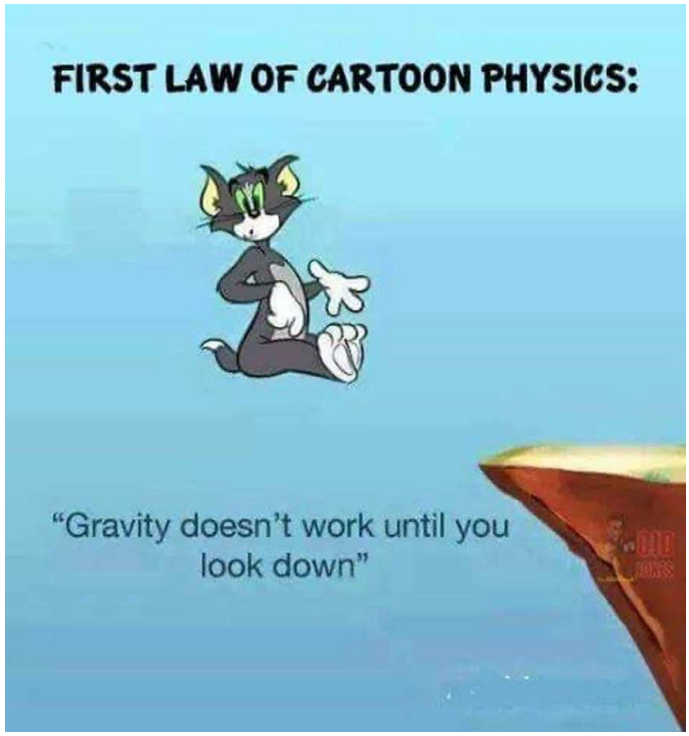
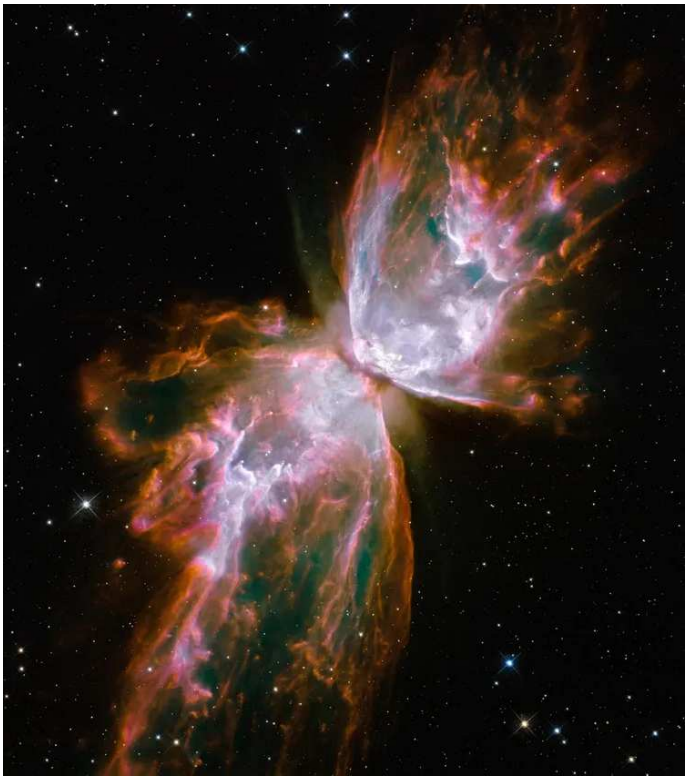
https://www.easyfundraising.org.uk/causes/vectisastronomicalsociety/?utm_campaign=raise-more&utm_content=en-n2



Planetary Nebula



Popularly called the Bug Nebula or the Butterfly Nebula, NGC 6302 looks like a delicate butterfly, but it is far from serene. What resemble dainty butterfly wings are actually roiling cauldrons of gas heated to nearly 20,000 degrees Celsius. The gas is tearing across space at more than 950,000 kilometers per hour — fast enough to travel from Earth to the Moon in 24 minutes! Credit: NASA, ESA and the Hubble SM4 ERO Team

What Is a Planetary Nebula?

A planetary nebula is a region of cosmic gas and dust formed from the cast-off outer layers of a dying star. Despite their name, planetary nebulae actually have nothing to do with planets.

Intermediate-mass stars have a mass between 80% and 800% of the Sun's mass. When these types of stars die, they expand to form red giants. The dying star will continue to expel gas, while simultaneously the remaining core of the star contracts and temporarily begins to radiate energy again. This energy causes the expelled gas to ionize, meaning that the atoms and molecules in the gas become charged and begin to emit light. The cast-off glowing gas is known as a planetary nebula.

This means that planetary nebulae are classified as emission nebulae, and are entirely unrelated to planets. The misnomer came about because of a historical misclassification. 250 years ago, astronomers thought they were looking at gas planets when they observed the colourful spectacle of planetary nebulae through their less powerful telescopes.

Planetary nebulae only last for about 20,000 years, making them a very short-lived part of the stellar life cycle.

Throughout the years, the Hubble Space Telescope has studied and imaged varying shapes and colors of these intricate planetary nebulae, the different colors arising from different, often newly created, chemical elements, showing that the final stages of the lives of stars are more complex than once thought. You can explore Hubble's spectacular collection of planetary nebula images here.

Using Hubble, astronomers caught a rare glimpse of the nebula Hen 3-1357, nicknamed the Stingray nebula, fading precipitously over just the past two decades. Even though the Universe is constantly changing, most processes are too slow to be observed within a human lifespan. However, the Stingray Nebula offered researchers a special opportunity to observe the evolution of a system in real-time. Images captured by Hubble in 2016, when compared to Hubble images taken in 1996, showed a nebula that has drastically dimmed in brightness and changed shape.

To celebrate Astronomy Day in 2003, astronomers unveiled one of the largest and most detailed celestial images to date of the Helix Nebula. The Hubble Space Telescope image showed a fine web of filamentary 'bicycle-spoke' features embedded in the colourful red and blue gas ring that is one of the nearest planetary nebulae to Earth. Being so nearby, the nebula is nearly half the size of the diameter of the full Moon. Hubble astronomers took several exposures using the Advanced Camera for Surveys to capture most of it.

Hubble's studies of a large number of planetary nebulae have also revealed that rings, such as those seen around the Cat's Eye Nebula, are much more common than previously thought and have been found in at least a third of all planetary nebulae.

The telescope also demonstrated its full range of imaging capabilities with two new images of planetary nebulae in 2020, of NGC 6302, dubbed the Butterfly Nebula, and NGC 7027. Both are among the dustiest planetary nebulae known and both contain unusually large masses of gas, which made them an interesting pair for study in parallel by researchers. The Hubble images revealed in vivid detail how both nebulae are splitting themselves apart on extremely short timescales — allowing astronomers to see changes over the past couple of decades.

https://scitechdaily.com/

Monthly Talks - a review of 2022 so far

January - Dr Justus Neumann Galaxy Bars

The year began with several Zoom talks. The first in January was by Dr Justus Neumann on Galaxy Bars. Although it was not long after Christmas, there was no chocolate involved! Instead, Justus took us through the evolution of the beautiful shapes of galaxies in all their diversity - rings, spirals and bars (Figure 1). We are privileged to have easy access to some excellent researchers from the Institute of Cosmology and Gravitation at Portsmouth University. Dr Neumann did not let us down.

Figure 1 - Barred Galaxy NGC1300 (Credit: NASA, ESA, and The Hubble Heritage Team STScI/AURA)

February - Ralph Melligio Unmanned Satellites - The Basics

We had been forced to resort to online talks during the lockdowns of 2020 and 2021, but we have come to appreciate some of the advantages. In February, Zoom enabled us to have our first international speaker as Ralph Melligio talked to us live from California on the subject of Unmanned Satellites which drew on his career working as an officer in the US Air Force and later as a senior spacecraft engineer for Boeing and Lockheed. Far from being "launch and forget", many spacecraft require monitoring to check power levels and potential damage, to correct flight orientation etc. With an ever more crowded sky, there is a great deal more than meets the eye to running the satellites we rely on.

March - Colin Stuart Rebel Star: The Sun's Greatest Mysteries

In March I was delighted that we were able to hear author Colin Stuart talk on the subject of his excellent book Rebel Star: The Sun's Greatest Mysteries. His presentation was richly illustrated, and his considerable experience as a speaker was evident in his ease of delivery. He explained to us the extraordinary life of sunspots, which are often paired between the Sun's northern and southern hemispheres with opposite magnetic polarities. His talk paid tribute to the pioneering work of Williamina Fleming and of George Hayle who founded the Mount Wilson Solar Observatory. Another opportunity that online meetings afford us is that it can attract bigger audiences than we sometimes manage in person, especially this year through the support of the Institute of Physics, who regularly publicise our events, but also pay us a subscription to give IOP South Central Branch members access to the Zoom talks.

Figure 2 - Dangerous neighbour: a Solar flare (Credit: NASA / Goddard / SDO)

April - Greg Smye-Rumsby Arrokoth and the Sentinels

It had been just over 3 years since the New Horizons mission swung by what was then the most distant object from Earth to be visited by a spacecraft. Then dubbed "Ultima Thule", it is now known as "Arrakoth", and was the subject of Greg Smye-Rumsby's talk Arrakoth and the Sentinels in April. Greg is another very experienced speaker and teacher who took us on a journey through the cold outer reaches of the Solar System, in the Kuiper Belt and the Oort Cloud, populated with asteroids and comets and the mysterious, ancient, dusty, rocky ingredients of what formed the planets. And this story is not over yet: New Horizons travels onward, with capability of operating into the 2030s and the promise of further encounters along the way.

May - James Fradgley Orbital Oddities

James Fradgley is an old friend of VAS and has given us several talks over the years. He is highly knowledgeable and is a skilled mathematician. In his May talk called Orbital Oddities, it is fair to say that he "didn't take any hostages"! Some of us are trained mathematicians and engineers too, but I was certainly hanging on by my fingernails, trying to follow his enthusiastic trip through some of the wild and crazy configurations of stars, planets, moons and asteroids. From my hurried notes I can see that the fairly familiar ground of Lagrange Points and their exploitation by the JWST and SOHO missions soon gave way to moon's "shepherding" the patterns in the rings around Saturn, then Lissajous Halo orbits, and mind-

boggling "spiral and double horseshoe orbits" (Figure 3) and Klemperer Rosettes. It seems that if you can imagine any 3D Spirograph-like fantasy orbit, then somewhere in the universe you can find it happening!

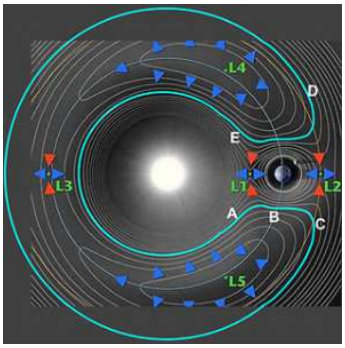


Figure 3 - Weird and wonderful Horseshoe Orbits (Public Domain, wikimedia.org)

June - Richard Flux Watching the Moon

So, it was a relief and pleasure in June to enjoy a more accessible presentation by our own Richard Flux, called Watching the Moon. It's something we can all do, but aside from the familiar phases of the Moon, Richard explained how tidal locking has put the Moon into a 1-to-1 resonance with the Earth such that we are presented with the same face of the Moon all the time. Except, of course, there is more going on due to the phenomenon of "libration" such that from Earth we are actually able to see nearly 60% (not just half) of the Moon's surface. While James' talk in May had touched on orbital oddities such as this, we were relieved that he had certainly not stolen Richard's thunder. We have so much expertise, knowledge and observational experience amongst our membership, let's encourage our own Society members to offer a talk of their own.
Please do contact your Programme Organiser at progorg@wightastronomy.org with any ideas you have. Don't be shy!

July - Dr Stephen Wilkins James Webb Space Telescope

Another of the highlights of the 2022 programme would have to be the talk in July on the James Webb Space Telescope by Dr Stephen Wilkins of Sussex University. Here again Zoom came to our rescue when - at fairly short notice - Stephen was unable to come in person. But what a treat we had since the James Webb Telescope had delivered its first set of data, and some wonderful images, just the same week. Stephen has been part of the international team working on JWST, and we caught his excitement as he was busy writing up several journal papers at the time and was able to give us hints that some momentous results were about to be published. (And indeed, his name appeared on 5 or 6 papers released within 2 weeks, with those early results already indicating older and more distant galaxies than had even been seen before!) Away from the impressive pictures (e.g. Figure 4), he explained how the real power of JWST lies in the instrumentation to explore further into the infra-red spectrum. Another astonishing early result showed the first spectrum (and therefore chemical composition) of an exo-planet. We are delighted that Stephen has promised to bring us an update, hopefully next year. These are very exciting times for astronomy!

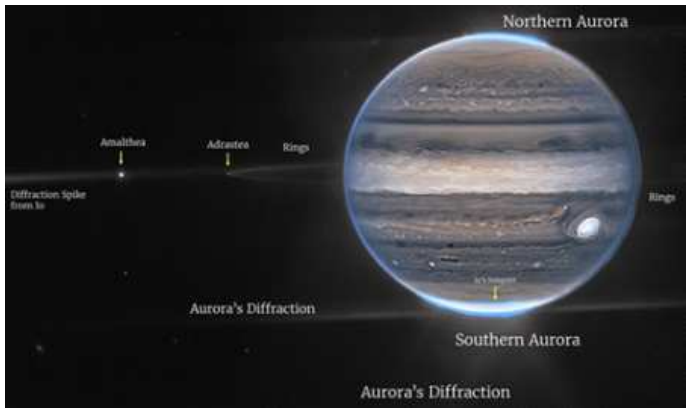


Figure 4 - JWST view of Jupiter with aurorae and rings (NASA / Astronomy Magazine)

September - Jonathan Clough Kristian Birkeland - The story of the father of Northern Lights knowledge

I wrote about Jonathan Clough's September talk (Kristian Birkeland - The story of the father of Northern Lights knowledge) in September's New Zenith, and will make every effort to make it a more regular feature to report on our events. And do please let me know what you liked and what you didn't, because any constructive feedback is welcome. Many of us prefer a "live" event, welcoming our speakers in person, but do you agree that some talks on Zoom are desirable? We hope to remain flexible, and hopefully in the future to combine live talks with Zoom-casts to improve accessibility for those who can't be at the venue. And what subjects would VAS members like to hear about? Perhaps more practical observational "how to" talks? I'm hoping we can include presentations on astrophotography and radio astronomy before too long. But it is YOUR society, so do please get in touch with any of your committee and let us know.

Finally, don't forget our last talk of 2020 on Friday 25th November at the Observatory, when Professor Adam Amara will be paying us a return visit, to talk about the UK National Space Strategy.
See you there!

Simon Gardner (Programme Organiser)

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

A Diversion (*If you've nothing better to watch!*)

By the way, I love it!

https://www.youtube.com/watch?v=Fw_vsBu7ewA&t=2s

Who Made the First Telescope?

Hans Lipperhey (circa 1570 – 1619), also known as Johann Lippershey, was a German-Dutch spectacle-maker. He is commonly associated with the invention of the telescope, because he was the first one who tried to obtain a patent for it. It is, however, unclear if he was the first one to build a telescope.

Lipperhey was born in Wesel, now in western Germany, around 1570. He settled in Middelburg, the capital of the province of Zeeland, now in the Netherlands, in 1594, married the same year and became a citizen of Zeeland in 1602. During that time he became a master lens grinder and spectacle maker and established a shop. He remained in Middelburg until his death, in September 1619.

His work with optical devices grew out of his work as a spectacle maker, an industry that had started in Venice and Florence in the thirteenth century, and later expanded to the Netherlands and Germany.

Lipperhey applied to the States General of the Netherlands on 2 October 1608 for a patent for his instrument "for seeing things far away as if they were nearby", Lipperhey failed to receive a patent since the same claim for invention had also been made by other spectacle-makers but he was handsomely rewarded by the Dutch government for copies of his design.

There are many stories as to how Lipperhey came by his invention. One version has Lipperhey observing two children playing with lenses in his shop and commenting how they could make a far away weather-vane seem closer when looking at it through two lenses. Other stories have Lipperhey's apprentice coming up with the idea or have Lipperhey copying someone else's discovery. Lipperhey's original instrument consisted of either two convex lenses with an inverted image or a convex objective and a concave eyepiece lens so it would have an upright image. This "Dutch perspective glass" (the name "telescope" would not be coined until three years later by Giovanni Demisiani) had a three-times (or 3X) magnification.

The lunar crater Lippershey, the minor planet 31338 Lipperhey, and the exoplanet Lipperhey (55 Cancri d) are named after him.

From: https://en.wikipedia.org/wiki/Hans_Lipperhey

At The Observatory

1. **Please bring a torch.**
2. **Make sure you close and lock the car park gate if you are the last to leave.**

Articles Needed

NZ needs relevant content. Contact details on page 1.

Strange Facts

The human brain takes in 11 million bits of information every second but is aware of only 40

A red blood cell can make a complete circuit of your body in 20 seconds

When a flea jumps, the rate of acceleration is 20 times that of the space shuttle during launch

If you could drive your car straight up you would arrive in space in just over an hour

If all the LEGO bricks ever manufactured were clipped on top of one another, they would make a tower ten times as high as the distance to the Moon

One quarter of all your bones are located in your feet

The majority of people in Iceland believe in elves

Out of all 118 elements found on the periodic table, Bromine and Mercury are the only two that are liquid at room temperature