New Zenith

The Monthly Newsletter of the Vectis Astronomical Society

Vol 29 Issue 1 — February 2021 *When Printed, this Newsletter costs VAS at least £1*

Society News

The Observatory is still Closed

Online Meetings Start From February

The first meeting for 2021 is

Observing Planetary Nebulae

Friday 26th February
7 pm start

Please see the Back Page for full details

CPRE Free Family Astronomy Events

See Page 10 for full details of online family activities starting on February 6th.

Membership

It has been a difficult time for many for almost a year now. We have not chased elapsed memberships during the pandemic months but we will have to start soon. Please look out for an email from our Membership Secretary.

Thank you for supporting VAS, it's been a strange time but hopefully there is some hope for a return to normal (whatever that is) sometime in 2021.

Meantime keep an eye on our announcements for a full online meetings programme

Brian Curd

VAS Website: wightastronomy.org

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

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Kings Road
Bembridge
Isle of Wight PO35 5NT
Tel: 07594 339950 or email: **editor@wightastronomy.org**

Material for the next issue by the 6th of the month please.

Registered Charity No 1046091

Observatory Diary

The diary is currently empty!

VAS Website: wightastronomy.org

Contents this Month

2021 Monthly Meetings

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

Date	Subject	Speaker
26 Feb	Observing Planetary Nebulae	Owen Brazell

Monthly Meetings are Online Until Further Notice

Sorry but we are still unable to hold face-to-face meetings during the Covid-19 virus pandemic.

Details of how to join the Online meetings will be emailed to members.

Please see the Back Page

All Observatory Visits are Cancelled Until Further Notice

Please see the important information above this.

IMPORTANT

Could all VAS members please ensure they notify the Membership Secretary of any change of address.

To ensure our compliance with GDPR rules, we must maintain accurate membership records.

VAS Contacts 2021

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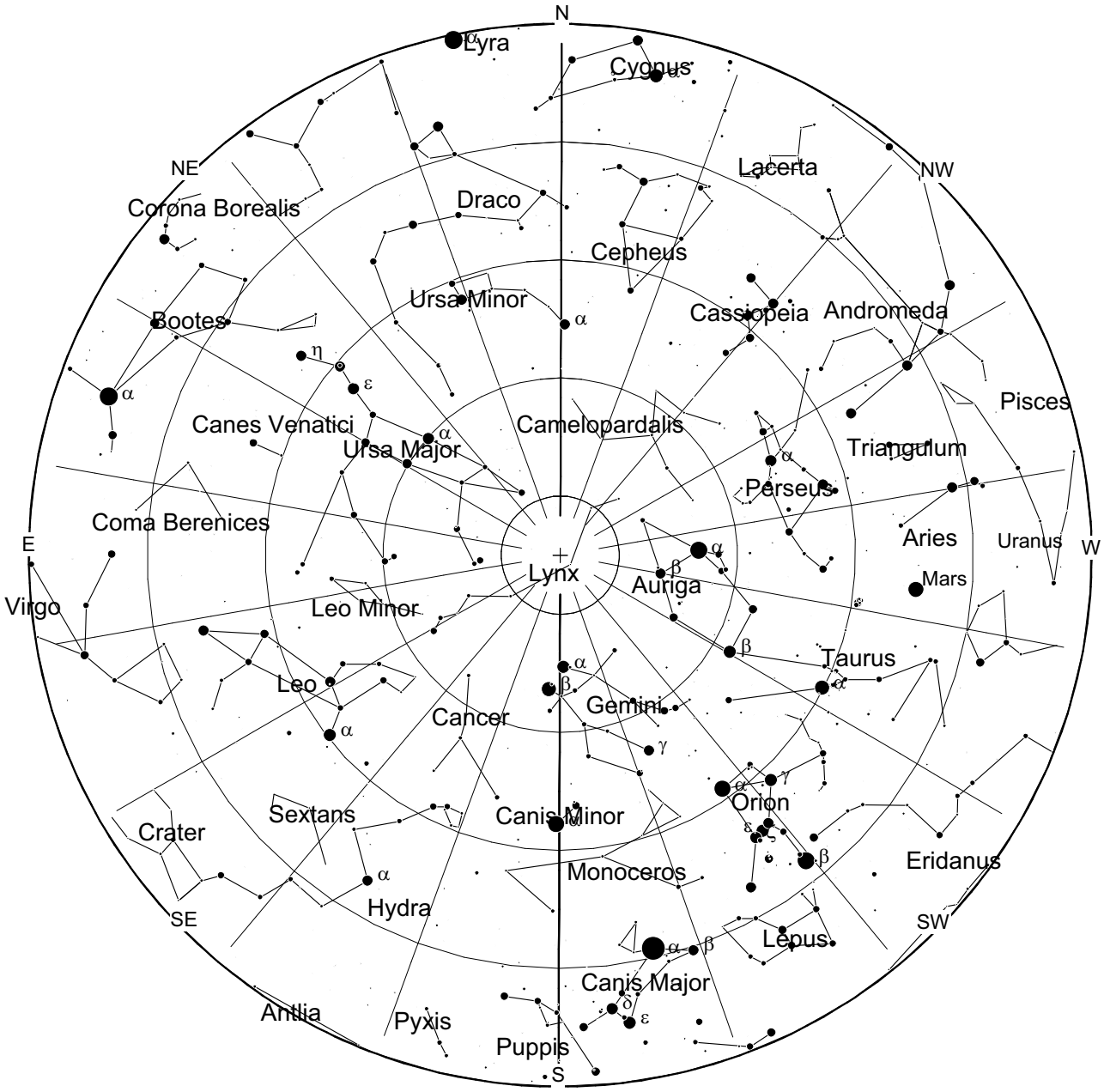
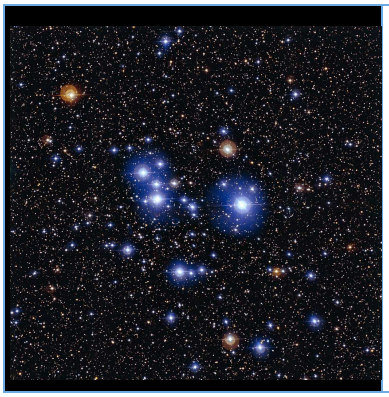
Important

Sorry, but the Observatory is still closed to all members and visitors until further notice

February 2021 - Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 February 2021



Messier 47 is an open cluster in the mildly southern constellation of Puppis. It was discovered by Giovanni Batista Hodierna before 1654 and in his then keynote work re-discovered by Charles Messier on 1771.

There is no cluster in the position indicated by Messier, which he expressed in terms of its RA and DEC with respect to the star 2 Puppis. However, if the signs (+ and -) he wrote are swapped, the position matches. Until this equivalency was found, M47 was considered a lost Messier Object. This identification as the same thing only came in 1959 with a realization by Canadian astronomer T. F. Morris.

M47 is centered about 1,600 light-years away and is about 78 million years old. The member stars have been measured down to about red dwarfs at apparent magnitude 19. There are around 500 members, the brightest being HD 60855, a magnitude 5.7 Be star.

February 2021- Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
11h	19th	27th	4th
			

Planets

Mercury

If the sky is very clear, it may be possible to catch a glimpse of Mercury during the first few days of the month for an hour or so after sunset. Mercury is quite close to the Sun and it will be a challenge to spot even with a pair of binoculars. It returns later in the month to the morning sky, but from our latitude it will be very close to the horizon and will be almost impossible to see.

Venus

At the start of the month Venus can be seen very low down in the east just before sunrise. As the month progresses it gets lower down closer to the Sun and more difficult to observe such that at the end of the month Venus rises at almost the same time as the Sun.

Mars

Mars is well placed high in the south-western evening sky. If viewed at the same time very night it hardly seems to change its position, though you will notice the stars sliding by night by night. It is the brightest object in that part of the sky, and that along with its distinct red colour make it easy to identify. For telescopic viewing it is now well past its best but still worthy of observation before it spends about a year as a diminutive red spot close to the Sun in the evening and morning skies.

Jupiter & Saturn

Both the gas giants are very close to each other and appear in the morning sky just after conjunction with the Sun this month. From our latitude observing either planet will be a very difficult challenge even at the end of the month when they will have both moved further away from the Sun.

Uranus

Uranus can be found in the constellation of Ares about half way between the stars Sheratan and Menkar in Cetus. There are no nearby bright guide stars to ease location. Uranus is about magnitude 6 and can be easily found using binoculars.

Neptune

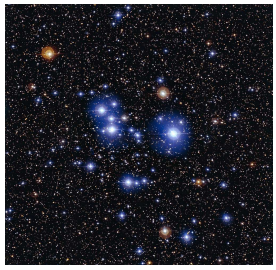
For the first few days of the month Neptune may be visible low down in the western sky once it has darkened after sunset. It will however be quite close to the horizon by the time the sky is dark enough, and Neptune is quite a faint object making this a very challenging observation. Neptune will be lost in the bright twilight for the coming months.

Deep Sky

M46 Open Cluster
RA 7h 42m Dec -14° 51' mag 6.5

Visible through binoculars as a misty smudge against the winter Milky Way in the same field of view as M47, M46 is a cluster of some 500 stars spread over an area equivalent to the full Moon. For observers with larger telescopes there is an 11th magnitude planetary nebula located towards the northern edge of the cluster. This nebula is a foreground object and appears to be within the cluster boundary purely by chance.

M47 Open Cluster
RA 7h 37m Dec -14° 31' mag 4.5



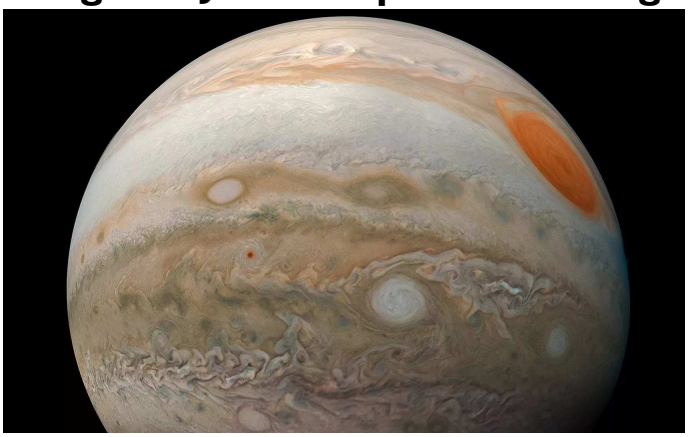
In a clear sky M47 may be seen with the naked eye, but optical aid is required to show the full splendour of this cluster. The cluster stars have a wide range of brightness from about magnitude 6 and beyond. This together with a few bright foreground stars allows the imagination to run free with all the different star patterns.

M48 Open Cluster
RA 8h 14m Dec -5° 49' mag 5.5

M48 Is one of the 'lost' Messier objects as, at the original coordinates, there is no object to be found. It is believed that the great comet hunter made an error in either his records or calculations and that this is the object he actually observed. Under dark skies it can be seen with the naked eye and several stars can be resolved even with binoculars. A telescope shows what has been variously described as an arrowhead or boomerang shaped collection of stars.

Peter Burgess

InSight & Juno Keep On Trucking



NASA's InSight lander on Mars and the Juno orbiter at Jupiter have new leases on life.

Why it matters: The spacecraft are expected to continue gathering data about their respective planetary targets during their newly extended missions, allowing scientists to learn more about seismic activity on Mars and turn their attention to the moons of Jupiter.

Where it stands: Juno's mission has been extended to September 2025 or whenever its life ends with a crash into Jupiter's atmosphere.

InSight will continue its mission to study Mars' geology and seismic activity from the Martian surface through December 2022.

What's next: Both missions are expected to make good use of their extended time at Jupiter and Mars.

InSight's extra two years will see the spacecraft collect more data on marsquakes to help create a long-term dataset that scientists can refer to for years to come, according to NASA.

Juno will broaden the scope of its studies to observe Jupiter's rings and moons including flybys of Ganymede, Europa and Io.

The big picture: NASA often extends the missions of its satellites and spacecraft in space if they're functioning well and still beaming home useful data.

The Mars Opportunity rover, for example, landed on Mars in 2004 for a 90-day mission, but the little spacecraft managed to keep roaming the Red Planet for nearly 15 years, after being granted multiple extended missions.

Link: https://www.axios.com/

Is this the Oldest Observatory?

In a remote location about 50km southwest of Melbourne, Australia, the ancient Aboriginal site of Wurdi Youang is made up of an arrangement of stone that aligns with prominent solar positions, marking the seasons throughout. throughout the year with the annual solstices and equinoxes. Some researchers believe it could be up to 10,000 years old and may be the world's oldest astronomical observatory.

The site is made up of 100 basalt stones which form an egg-shaped ring about 50m in diameter. The three largest stones are on the west side of the ring, and the smallest stones at its outer indicate the position of the sun during the summer and winter solstices. Wurdi Youang proves the ingenuity of the early aborigines, and could date from the Paleolithic age, which makes it older than Stonehenge.

The mysterious stone arrangement once belonged to the Australian Wathaurong tribe, who may have occupied the area as early as 25,000 BC. The Wathaurong culture collapsed with the arrival of European settlers in the 1700s, and the last member of the Aboriginal tribe died in the 19th century. Scientists are working to determine when the site was built and believe it may be older than a similar site in ancient Egypt, the Nabta Playa Stone Circle dating from 5000 BC, which would make Wurdi Youang the first known rock formation in the world used for astronomical purposes.

Not only does the site demonstrate the sophisticated knowledge of early Australians about complex systems and nature, the researchers say the site could also reverse the long-held colonial perception that Indigenous Australians were nomadic hunter-gatherers, as the site would have been used for generations. Despite the lack of historical evidence on the purpose of the site, a study published in the journal Rock Art Research shows that the alignment of rocks at solar positions and equinoxes was deliberately designed.

In an attempt to accurately date the site, the researchers are using luminescence dating, where a piece of quartz found under the stones could estimate when it was last exposed to the sun through a radiometric method – thus helping to give the site a specific age.

Link: https://oltnews.com/

The Earliest Supermassive Black Hole and Quasar in the Universe

Maunakea observatories provide key observations

The most distant quasar known has been discovered. The quasar, seen just 670 million years after the Big Bang, is 1000 times more luminous than the Milky Way, and is powered by the earliest known supermassive black hole, which weighs in at more than 1.6 billion times the mass of the Sun. Seen more than 13 billion years ago, this fully formed distant quasar is also the earliest yet discovered, providing astronomers with insight into the formation of massive galaxies in the early universe.

Quasars, which are powered by the feeding frenzies of colossal supermassive black holes, are the most energetic objects in the universe. They occur when gas in the superheated accretion disk around a supermassive black hole is inexorably drawn inwards, radiating light across the electromagnetic spectrum. The amount of energy emitted by quasars is enormous, with the most massive examples easily outshining entire galaxies.

An international team of astronomers announced the discovery of J0313-1806, the most distant quasar known to date with a redshift of z = 7.64. The study, which includes data from several Maunakea Observatories in Hawaii has been accepted in The Astrophysical Journal Letters and is available in pre-print format on arXiv.org.

“The most distant quasars are crucial for understanding how the earliest black holes formed and for understanding cosmic reionization — the last major phase transition of our universe,” said Xiaohui Fan at the University of Arizona.

The presence of such a massive black hole so early in the universe’s history challenges theories of black hole formation. “Black holes created by the very first massive stars could not have grown this large in only a few hundred million years,” says Feige Wang, NASA Hubble fellow at the University of Arizona and lead author of the research paper.

The observations that led to this discovery were made using a variety of observatories around the world, including several world-class telescopes in Hawaii.

Data from Pan-STARRS1 and the UKIRT Hemisphere Survey helped to first identify J0313-1806. Once the team confirmed it as a quasar, they obtained high-quality spectra from Keck Observatory and Gemini North to measure the mass of the central supermassive black hole.

“Measurement of spectral lines that originate from gas surrounding the quasar’s accretion disk allows us to determine the black hole’s mass and study how its rapid growth influences its environment. For such distant quasars, the most important spectral lines are redshifted to near-infrared wavelengths and Keck’s NIRES spectrograph is excellent for these observations,” said co-author Aaron Barth of the University of California, Irvine.

“Observing infrared light requires low temperatures. The near-freezing climate prevailing at the sky-scraping summit of Maunakea (4205 m) make it one of the only sites on Earth with instruments sensitive enough to observe such red wavelengths,” said Joe Hennawi, a professor at UC Santa Barbara who helped execute the observations with the Keck/NIRES spectrograph.

In addition to weighing the monster black hole, the Keck Observatory and Gemini North observations uncovered an extremely fast outflow emanating from the quasar in the form of a high-velocity wind traveling at 20% of the speed of light.

“Energy released by such an extreme high-velocity outflow is enough to impact the star formation in the entire quasar host galaxy,” said co-author Jinyi Yang, Peter A. Strittmatter at the University of Arizona.

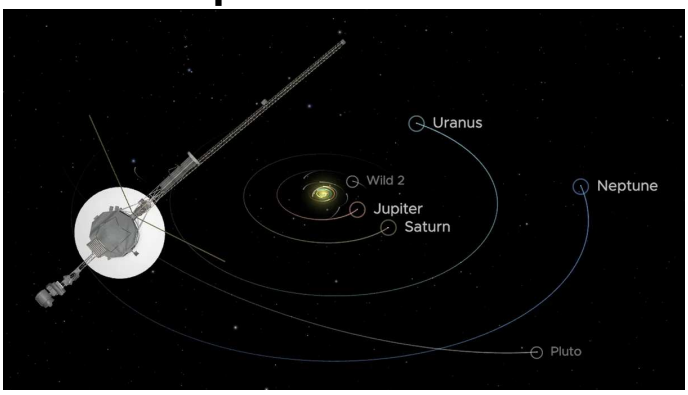
This is the earliest known example of a quasar sculpting the growth of its host galaxy, making J0313-1806 a promising target for future observations.

The galaxy hosting J0313-1806’s is undergoing a spurt of star formation, producing new stars 200 times faster than the Milky Way. The combination of this intense star formation, the luminous quasar, and the high-velocity outflow make J0313-1806 and its host galaxy a promising natural laboratory for understanding the growth of supermassive black holes and their host galaxies in the early universe.

“This would be a great target to investigate the formation of the earliest supermassive black holes,” concluded Wang. “We also hope to learn more about the effect of quasar outflows on their host galaxy — as well as to learn how the most massive galaxies formed in the early universe.”

More at: https://keckobservatory.org/

Here's the View from Humanity's Furthest Spacecraft



Speeding towards Rasalhague and the other stars that make up the 'Serpent-bearer' is Voyager 1, the furthest human-made object in the Universe. It's currently 14.1 billion miles from the Sun and speeding away at roughly 38,000 mph.

That's too far to observe Voyager 1 twinkle in the night sky. But you can turn the tables and see what it sees, as it looks back at us. Via NASA's Eyes website (and app), you can *pay a virtual visit* to where the spacecraft is now and explore its vantage as it hurtles towards the edge of the solar system.

There's Jupiter and Saturn, so seemingly close together; and Uranus, Pluto and Neptune, their orbits farther away. At the center of it all, the Sun. Nearby, the inner planets, including Earth: so close to it that they don't even get a name-tag. Those planets and their trajectories are so familiar yet now so distant, it's enough to make you homesick by proxy!

You can click and drag your way around Voyager 1, shifting your perspective to explore the region – spotting Sedna, Halley's Comet and a few other less familiar members of our solar family.

Although it's still sending data back to Earth, most of Voyager 1's instruments have now been powered down, and the craft is expected to go entirely dead by 2030 at the latest; but its incredible journey isn't over. In fact, it will most likely continue long after you, I and everything we know will have disappeared. Here's how it all started.

The year is 1977. Jimmy Carter's first year as president. Elvis Presley's last year alive. Star Wars hits the big screen. On September 10, Hamida Djandoubi becomes the last person ever to be guillotined in France. Five days earlier, Voyager 1 takes off from Cape Canaveral.

Voyager 1 is a small craft, weighing barely 1,820 lb. Its most prominent feature is a 12-ft wide dish antenna, for talking with Earth – when there's no straight line of communication, a Digital Tape Recorder kicks in, able to hold up to 67MB of data for later transmission. In all, Voyager 1 carries 11 instruments to study the heavens.

The idea for the Voyagers, 1 and 2, grew out of the Mariner program's focus on the outer planets. The Voyagers got their own name as their field of study started to diverge towards the outer heliosphere and beyond.

The heliosphere is the 'solar bubble' created by the solar wind, i.e. the plasma emitted by the Sun. The region where solar wind slows down to below the speed of sound is called the termination shock. The heliopause is the outer limit of this bubble, where outward movement of solar plasma is nullified by interstellar plasma from the rest of the Milky Way. Beyond lies interstellar space.

The Voyagers were built to withstand the intense radiation in those far reaches of space – in part by applying a protective layer of kitchen-grade aluminum foil.

Humanity's farthest probe into the Universe was launched on September 5, 1977, confusingly 16 days after Voyager 2. More than 43 years later, the craft is still sending data back to Earth – but not for very much longer. Here are a few snapshots for the family album:

- Dec 19, 1977: Voyager 1 overtakes Voyager 2. Voyager 1 is travelling at a speed of 3.6 AU per year, while Voyager 2 is only going at 3.3 AU. So, Voyager 1 is constantly increasing its lead over its slower brother.
- Early 1979: Voyager 1 flies by Jupiter and its moons, taking close-ups of Jupiter's Great Red Spot and spotting volcanic activity on the moon Io – the first time ever this was observed outside Earth.
- Late 1980: flyby of Saturn and its moons, especially Titan. The flybys of the two gas giants gave 'gravity assists' that helped Voyager 1 continue its journey.
- Feb14, 1990: Voyager takes a 'Solar System Family Portrait', its final picture and the first one of the solar system from the outside - an image of the Earth from 3.7 billion mi away, a 'Pale Blue Dot'.
- Feb 17, 1998: Voyager 1 reaches 69.4 AU from the Sun, overtaking Pioneer 10 and becoming the most distant spacecraft sent from Earth.
- 2004: Voyager 1 becomes the first craft to reach termination shock, at about 94 AU from the Sun.
- Aug 25, 2012: after a few months of 'cosmic purgatory' and 10 days before the 35th anniversary of its launch, Voyager 1 became the first human-made vessel to cross the heliopause, at 121 AU, thus entering interstellar space.
  Soon after, Voyager 1 entered a region still under some influence of the Sun, which scientists dubbed the 'magnetic highway'.

- Nov 28, 2017: all four of Voyager 1's trajectory correction manoeuvre (TCM) thrusters are used for the first time since Nov 1980. This will allow Voyager 1 to continue to transmit data for longer.
- Nov 5, 2018: Voyager 2 crosses the heliopause, departing the heliosphere. Both Voyagers are now in interstellar space.

While both Voyagers have now left the heliosphere, that doesn't mean they're outside the solar system yet. The latter is defined as the vastly larger region of space, populated by all the bodies that orbit the Sun. The limit of the Solar system is the outer edge of the Oort cloud.

As available power declined, more and more of the Voyager 1's instruments and systems have been turned off – prioritising the instruments that send back data on the heliosphere and interstellar space. It is expected that the last instruments will cease operation sometime between 2025 and 2030.

Travelling at just about 38,000 mph relative to the Sun, the craft will need 17 and a half millennia to cover the distance of a single light year. Proxima Centauri, the closest star to the Sun, is 4.2 light-years away. If Voyager 1 were going in that direction, it would need almost 74 millennia to get there. But it isn't. So, what is next?

- In 2024, NASA plans to launch the Interstellar Mapping and Acceleration Probe (IMAP), which will build on Voyager's observations of the heliopause and interstellar space.
- In about 300 years, Voyager 1 will reach the inner edge of the Oort Cloud.
- In about 30,000 years, it will exit the Oort Cloud – finally leaving the solar system altogether.
- In about 40,000 years, it will pass within 1.6 light-years of Gliese 445, a star in the constellation Camelopardalis.
- In about 300,000 years, it will pass within less than 1 light-year of the star TYC 3135-52-1.
- According to NASA, Voyagers 1 and 2 “are destined – perhaps eternally – to wander the Milky Way.”

Both Voyager 1 and 2 carry a Golden Record that contains pictures, scientific data, spoken greetings, a sampling of whale song and other Earth sounds, and a mixtape of musical favorites, from Mozart to Chuck Berry.

Perhaps in a distant future and place, some alien intelligence with a record player will have a listen to Blind Willie Johnson hum Dark Was the Night, Cold Was the Ground, and think of us: “What a strange old planet that must have been.”

Links etc: https://bigthink.com/

Record-breaking Laser could help Test Whether Einstein was Right

Scientists from the International Centre for Radio Astronomy Research (ICRAR) and The University of Western Australia (UWA) have set a world record for the most stable transmission of a laser signal through the atmosphere.

In a study published today in the journal Nature Communications, Australian researchers teamed up with researchers from the French National Centre for Space Studies (CNES) and the French metrology lab Systèmes de Référence Temps-Espace (SYRTE) at Paris Observatory.

The team set the world record for the most stable laser transmission by combining the Aussies' 'phase stabilisation' technology with advanced self-guiding optical terminals.

Together, these technologies allowed laser signals to be sent from one point to another without interference from the atmosphere.

Lead author Benjamin Dix-Matthews, a PhD student at ICRAR and UWA, said the technique effectively eliminates atmospheric turbulence.

“We can correct for atmospheric turbulence in 3D, that is, left-right, up-down and, critically, along the line of flight,” he said. “It's as if the moving atmosphere has been removed and doesn't exist. “It allows us to send highly-stable laser signals through the atmosphere while retaining the quality of the original signal.”

The result is the world's most precise method for comparing the flow of time between two separate locations using a laser system transmitted through the atmosphere.

ICRAR-UWA senior researcher Dr Sascha Schediwy said the research has exciting applications.

"If you have one of these optical terminals on the ground and another on a satellite in space, then you can start to explore fundamental physics," he said. "Everything from testing Einstein's theory of general relativity more precisely than ever before, to discovering if fundamental physical constants change over time."

The technology's precise measurements also have practical uses in earth science and geophysics.

"For instance, this technology could improve satellite-based studies of how the water table changes over time, or to look for ore deposits underground," Dr Schediwy said.

There are further potential benefits for optical communications, an emerging field that uses light to carry information.

Optical communications can securely transmit data between satellites and Earth with much higher data rates than current radio communications.

"Our technology could help us increase the data rate from satellites to ground by orders of magnitude," Dr Schediwy said. "The next generation of big data-gathering satellites would be able to get critical information to the ground faster."

The phase stabilisation technology behind the record-breaking link was originally developed to synchronise incoming signals for the Square Kilometre Array telescope.

The multi-billion-dollar telescope is set to be built in Western Australia and South Africa from 2021.

More at: https://www.eurekalert.org/

Astronomers Discover First Cloudless, Jupiter-like Planet

Astronomers at the Center for Astrophysics | Harvard & Smithsonian have detected the first Jupiter-like planet without clouds or haze in its observable atmosphere.

Named WASP-62b, the gas giant was first detected in 2012 through the Wide Angle Search for Planets (WASP) South survey. Its atmosphere, however, had never been closely studied until now.

"For my thesis, I have been working on exoplanet characterization," says Munazza Alam, a graduate student at the Center for Astrophysics who led the study. "I take discovered planets and I follow up on them to characterize their atmospheres."

Known as a "hot Jupiter," WASP-62b is 575 light years away and about half the mass of our solar system's Jupiter. However, unlike our Jupiter, which takes nearly 12 years to orbit the sun, WASP-62b completes a rotation around its star in just 4.5 days. This proximity to the star makes it extremely hot, hence the name "hot Jupiter."

Using the Hubble Space Telescope, Alam recorded data and observations of the planet using spectroscopy, the study of electromagnetic radiation to help detect chemical elements. Alam specifically monitored WASP-62b as it swept in front of its host star three times, making visible light observations, which can detect the presence of sodium and potassium in a planet's atmosphere.

While there was no evidence of potassium, sodium's presence was strikingly clear. The team was able to view the full sodium absorption lines in their data, or its complete fingerprint. Clouds or haze in the atmosphere would obscure the complete signature of sodium, Alam explains, and astronomers usually can only make out small hints of its presence.

"This is smoking gun evidence that we are seeing a clear atmosphere," she says.

Cloud-free planets are exceedingly rare; astronomers estimate that less than 7% of exoplanets have clear atmospheres, according to recent research. For example, the first and only other known exoplanet with a clear atmosphere was discovered in 2018. Named WASP-96b, it is classified as a hot Saturn.

Astronomers believe studying exoplanets with cloudless atmospheres can lead to a better understanding of how they were formed. Their rarity "suggests something else is going on or they formed in a different way than most planets," Alam says. Clear atmospheres also make it easier to study the chemical composition of planets, which can help identify what a planet is made of.

With the launch of the James Webb Space Telescope later this year, the team hopes to have new opportunities to study and better understand WASP-62b. The telescope's improved technologies, like higher resolution and better precision, should help them probe the atmosphere even closer to search for the presence of more elements, such as silicon.

More with links: https://phys.org/

CPRE Activities

Our local group CPRE Avon and Bristol have teamed up with the amazing educator Jo Richardson at Space Detectives to bring you a brilliant programme of free events which will take place throughout Star Count (6-14 February).

There are four online events for children and families (suitable for primary-aged kids) and four for adults and older children. And the events are open to everyone, wherever you live.

But places are limited, so click the button below to reserve your place today.

CLICK HERE TO BOOK YOUR FREE PLACE

https://www.cpreavonandbristol.org.uk/what-we-care-about/starry-skies/

These exciting online sessions will delve into the wonders of the night sky, planets and the celestial objects that can be observed from our part of the world.

We'll also learn about the impact of light pollution on our view of stars and planets, and how we can start to reduce it.

In our dark skies sessions, your little ones can become a 'Dark Sky Ranger' and understand just how important it is to look after and care for the night sky, not just for now but for future generations.

The online events are hosted by Jo Richardson, a Fellow of the Royal Astronomical Society, and one of the 10 UK Space Ambassadors working with the European Space Education Office.

As these are online events, you will only need to book one place per family. Book now to avoid disappointment!

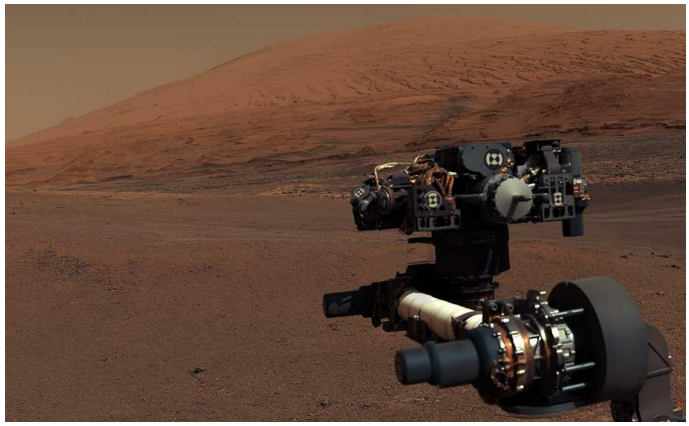
Happy star-gazing, and stay safe.

Emma Marrington

Dark skies campaigner

PS: Don't forget Star Count is starting in just one week's time! Head to our website for everything you need to know about taking part.

Curiosity Rover Reaches Its 3,000th Day On Mars



It's been 3,000 Martian days, or sols, since Curiosity touched down on Mars on Aug. 6, 2012, and the rover keeps making new discoveries during its gradual climb up Mount Sharp, the 3 mile tall (5km) mountain it has been exploring since 2014. Geologists were intrigued to see a series of rock "benches" in the most recent panorama from the mission.

Stitched together from 122 images taken on Nov. 18, 2020, the mission's 2,946th sol, the panorama was captured by the Mast Camera, or Mastcam, which serves as the rover's main "eyes." Toward the center of the panorama is the floor of Gale Crater, the 96 mile wide (154km) bowl that Mount Sharp sits within. On the horizon is the north crater rim. To the right is the upper part of Mount Sharp, which has rock layers that were shaped by lakes and streams billions of years ago.

The curved rock terraces that define the area can form when there are harder and softer layers of rock on a slope. As the softer layers erode, the harder layers form small cliffs, leaving behind the benchlike formations. They can also form during a landslide, when huge, curved slabs of bedrock slide downhill. Curiosity's team has seen benches before in Gale Crater, but rarely forming such a scenic grouping of steps.

"Our science team is excited to figure out how they formed and what they mean for the ancient environment within Gale," said Curiosity's project scientist, Ashwin Vasavada of NASA's Jet Propulsion Laboratory in Southern California, which built and manages the rover.

But don't expect a rover this busy to stay put: Soon after capturing the new panorama, it was off for higher ground. This year, the rover has been driving across a clay-bearing region called "Glen Torridon." After making a pit stop at a location nicknamed "Mary Anning," it's continued toward the next major layer, called "the sulfate-bearing unit."

Link: http://spaceref.com/

Project Maps 'astronomical' Number of Celestial Objects

Nearly 700 million astronomical objects have been carefully cataloged and made public as part of a major international collaboration involving researchers from The Australian National University.

The project has now mapped roughly an eighth of the night sky, stretching back to almost the beginning of time in some cases. This makes it one of the world's largest astronomical catalogs.

The Australian part of the survey is jointly led by ANU astronomer Dr. Christopher Lidman and Professor Tamara Davis from the University of Queensland.

They hope the project can answer some of our biggest questions when it comes to our Universe, including what it's made of and how it began.

“This is the culmination of years of effort. In addition to mapping hundreds of millions of galaxies, thousands of supernovae have been discovered,” Dr. Lidman said.

The Dark Energy Survey started collecting data in 2013 using a state-of-the-art astronomical camera fixed on a four-meter aperture telescope in northern Chile.

At the same time, the Anglo-Australian Telescope, located in Australia and operated by ANU on behalf of a group of 13 Australian universities, was used to measure exact distances to many of the objects and to confirm the nature of the supernovae.

“Hundreds of researchers from many countries have worked together over two decades to achieve this common goal,” Dr. Lidman said.

According to Professor Davis, the huge volume of data will allow the research team to measure the history of cosmic expansion and the growth of large-scale structures in the universe, “both of which reflect the nature and amount of dark energy in the universe.”

“I'm excited to use the data to investigate the nature of dark energy, which should reveal what's behind the acceleration of the expansion of the universe - one of the biggest mysteries in science,” Professor Davis said.

The data will be a valuable resource for the public, as well as astronomers and scientists around the world.

Links etc: https://phys.org/

Phosphine in Venus’s Atmosphere May Have Just Been Sulfur

The potential discovery of phosphine in Venus’s atmosphere last year made headlines around the world. On Earth, phosphine is produced by living things. Any detection of it inside another planet’s atmosphere would be a strong potential indicator of life. One reason folks got excited about the possibility is that Venus’s upper atmosphere is a much friendlier place for life to exist than its lower cloud layers or the lead-melting temperatures on the ground. The conditions approximately 50km above the planet’s surface are reportedly the most Earthlike in the solar system, with a pressure of approximately 1 atm and temperatures ranging from 0 to 50C. Could life have evolved within those cloud layers, or even migrated from the surface to the atmosphere as Venus’s climate changed? The detection of phosphine suggested that it might have.

A new analysis of the initial data, however, finds that the Cardiff researchers may have mistakenly been picking up sulfur dioxide instead. The authors note that the original paper claimed 20 parts per billion of PH3 were detected in the Martian atmosphere. After some reassessment of their initial findings, the original team asserted that the phosphine signal still remained, but at a much lower concentration of 1ppb, not 20pbb. Even one part per billion would still be interesting because phosphine is not thought to persist for any length of time in Venus’ atmosphere under any conditions, but it’s obviously a much weaker signal than initially thought.

Now, however, a further examination of the data argues that even that 1ppb is a measurement error.

“Instead of phosphine in the clouds of Venus, the data are consistent with an alternative hypothesis: They were detecting sulfur dioxide,” said co-author Victoria Meadows, a UW professor of astronomy. “Sulfur dioxide is the third-most-common chemical compound in Venus’s atmosphere, and it is not considered a sign of life.”

Meadows, lead author Andrew Lincowski, and the other researchers affiliated with this project created a radiative transfer model of the planet’s atmosphere and re-examined the data. Their paper suggests that the initial report erred by attempting to use ALMA (Atacama Large Millimeter Array) to estimate the amount of SO2 in Venus’s atmosphere. The telescope may have missed as much as 90-95 percent of the sulfur dioxide actually present, greatly increasing the chance that the specific signal attributed to phosphine at 266.94GHz is actually being caused by sulfur dioxide instead. The initial findings were attributed to phosphine because the amount of sulfur dioxide in the atmospheric layer where the phosphine was detected was thought to be low.

More: https://www.extremetech.com/

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

February 26th Online Meeting

Observing Planetary Nebulae

Owen Brazell

Planetary nebulae are the end of the life of stars between maybe 1 and 8 solar masses and their properties mean that they are particularly suited to observing by amateurs with all types of instruments and from many different kinds of sites. This talk will focus primarily on visual observing of planetary nebulae and the properties and tools that will help when trying to find them. The tools have changed over the years and some, or indeed many, maybe unfamiliar to people.

Owen Brazell has been observing deep sky objects for over 50 years and is currently President of the Webb Society as well as its galaxy section director. He was involved with the BAA Deep Sky Section for over 25 years as well as being on the BAA council. He currently observes planetary nebulae with instruments ranging in size from 180mm to 550mm.

This meeting is ONLINE ONLY
Members will receive sign in details by email

Please DO NOT attend the Observatory or Pavilion
ONLINE ONLY

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 astronomy related content. Contact details on page 1.

"I'm sure the universe is full of intelligent life. It's just been too intelligent to come here"
Arthur C. Clarke

"Space isn't remote at all. It's only an hour's drive away, if your car could go straight upwards"
Sir Fred Hoyle

"The difference between stupidity and genius is that genius has its limits"
Albert Einstein

"Physicists are made of atoms. A physicist is an attempt by an atom to understand itself"
Michio Kaku

"The earth is simply too small and fragile a basket for the human race to keep all its eggs in"
Robert A. Heinlein

"The Sun, with all those planets revolving around it and dependent upon it, can still ripen a bunch of grapes as if it had nothing else in the Universe to do"
Galileo Galilei