

Society News

Monthly Meetings

Please note that all 2017 Friday monthly meetings will now be held in the Pavilion, Watery Lane, Newchurch. That's the building next to our Observatory. Start times and basic details are unchanged.

The recent building work at the Pavilion has improved the facility markedly. There's plenty of free parking and it's also right on the No.8 bus route!

Fund Raising

Every year it gets more difficult to keep a cap on our subscription rates for members. In order to keep them to an absolute minimum and to continue to offer great value for money we need to keep our eyes open for fund raising opportunities.

If you can think of any additional ways VAS can raise money please let a committee member know.

Computer Monitors Wanted

In an effort to attract more members and visitors to the observatory we are intending to instal some information points around the building.

These will comprise small, internet connected computers and monitors displaying live data from NASA TV, Aurora cameras, Satellite tracking etc etc. If you or your company are disposing of working, reasonably modern computer monitors please let us know (the larger the screens the better).

Telescope Cleaning

Following the building work, some of the VAS telescopes have mirrors rather dustier than we would like.

Over the next few Thursdays we will be holding mirror cleaning lessons for those interested.

Honestly, it's not as scary as it sounds and if done properly provides an almost free method to get your reflector back to the condition it was on the day you bought it.

Brian Curd
Editor New Zenith.

VAS Website: wightastronomy.org

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

The Editor, New Zenith
Carpenter's Cottage
Dennett Road
Bembridge
Isle of Wight PO35 5XF

Tel: **01983 872875** or email: editor@wightastronomy.org

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

The Vectis Astronomical Society and the Editor of the New Zenith accept no responsibility for advice, information or opinion expressed by contributors.

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Observatory Diary

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training. Please contact Martyn Weaver 07855 116490
Thursday	Members (19.30hrs) and Public (20.00hrs). Informal meeting and observing

VAS Website: wightastronomy.org

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PLEASE NOTE:
All monthly meetings are now held at the Newchurch Pavilion next to the Observatory

2017 Monthly Meetings

Date	Subject	Speaker
Please check wightastronomy.org/meetings/ for the latest information		
27 Jan	Dark nebula Shrouds of night	Owen Brazell
24 Feb	TBA	TBA
24 Mar	TBA	TBA
28 Apr	Radiation protection in space (for manned missions)	Dr Elizabeth Cunningham
26 May	Mapping orbits around black holes and neutron stars	Dr Diego Altamirano
23 Jun	"It's not all rocket science" - progression of The Needles 'Black Knight Rocket' site	Mike Kelleway
28 Jul	Pseudoastronomy: Planet X, Zetans, and Lost Civilisations	Stephen Tonkin
25 Aug	Annual General Meeting and Citizen Science	Chris Lintott
22 Sep	TBA	TBA
27 Oct	TBA	TBA
24 Nov	TBA	TBA

Observatory Visits Booked

I currently have no solid dates for February visits BUT I have many requests and am awaiting replies.

I am restricting visits to Mon, Tues and Wed wherever possible.

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.

VAS Contacts 2016/17

President	Barry Bates president@wightastronomy.org
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NZ Distribution	Graham Osborne
Others	Mark Williams, Nigel Lee & Stewart Chambers

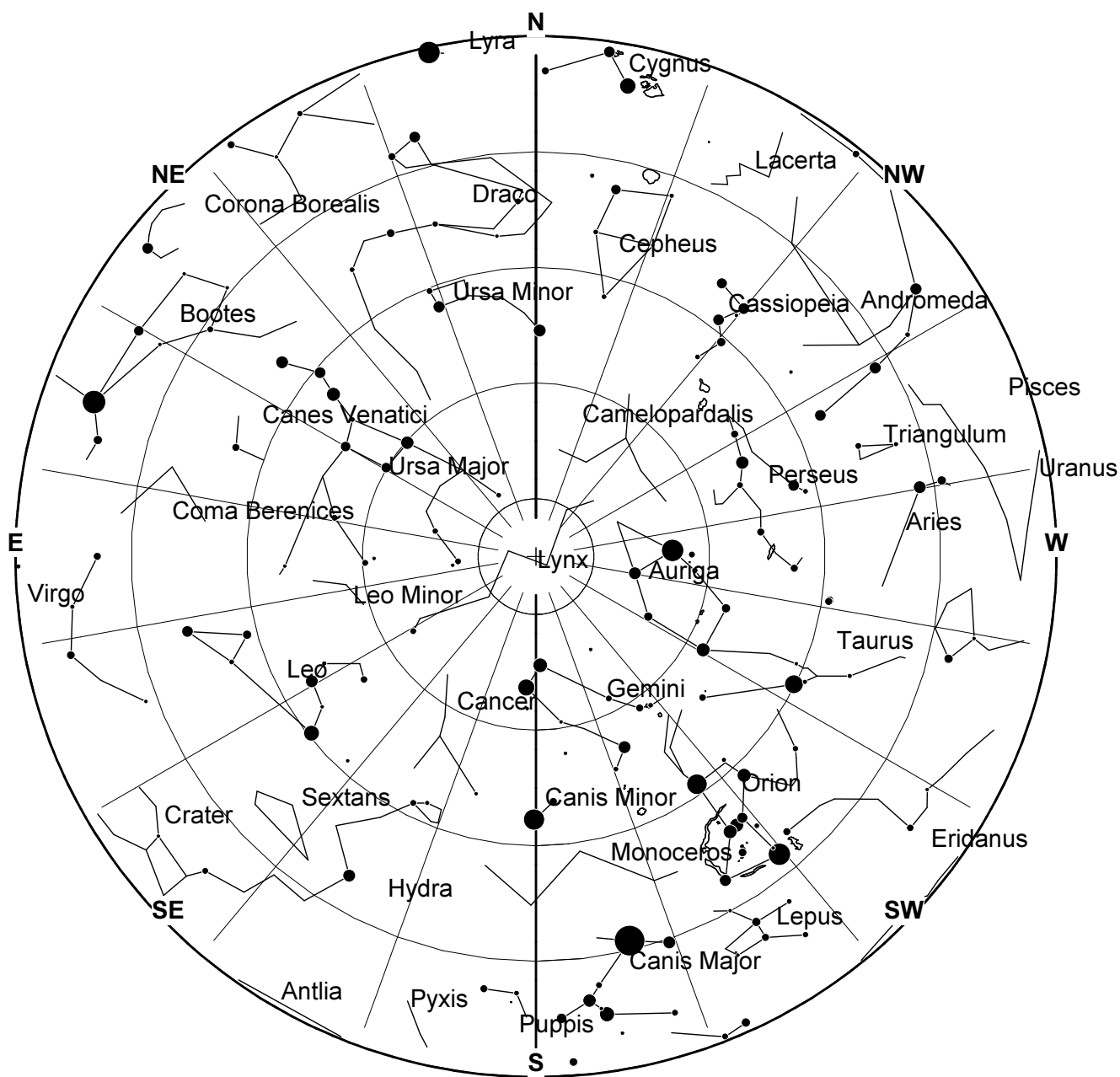
Important

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

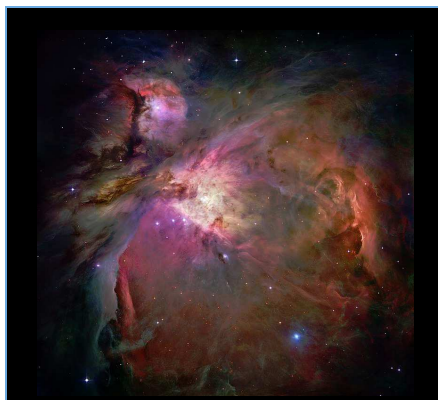
On several occasions, lights, heaters and the Meade LX200 have been left on!

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

February 2017 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 February 2017







The Orion Nebula (also known as Messier 42, M42, or NGC 1976) is a diffuse nebula situated in the Milky Way, being south of Orion's Belt in the constellation of Orion. It is one of the brightest nebulae, and is visible to the naked eye in the night sky. M42 is located at a distance of $1,344 \pm 20$ light years and is the closest region of massive star formation to Earth. The M42 nebula is estimated to be 24 light years across. It has a mass of about 2000 times the mass of the Sun. Older texts frequently refer to the Orion Nebula as the Great Nebula in Orion or the Great Orion Nebula.

The Orion Nebula is one of the most scrutinized and photographed objects in the night sky, and is among the most intensely studied celestial features. The nebula has revealed much about the process of how stars and planetary systems are formed from collapsing clouds of gas and dust. Astronomers have directly observed protoplanetary disks, brown dwarfs, intense and turbulent motions of the gas, and the photo-ionizing effects of massive nearby stars in the nebula.

This article is licensed under the [GNU Free Documentation License](#).
It uses material from the Wikipedia article "Orion Nebula".

February 2017 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
26th	4th	11th	18th

Lunar Eclipse

The first eclipse of 2017 occurs during the night of the 10th/11th between 22:34 and 02:53. This is a penumbral eclipse; this means that the Moon passes only through the outer part of the Earth's shadow. It will not be a spectacular event and hardly worth getting dressed up for. A casual observer may not even notice that Moon is slightly less bright than usual for a few hours.

Planets

Mercury

This month Mercury makes a very poor apparition in the morning sky. At best it rises an hour before the Sun but is only 6° above the horizon at sunrise. After the first week of the month it is too close to the Sun to be seen.

Venus

As soon as the sky starts to darken Venus appears in the south western sky. Far brighter than any star and if the sky is clear can even be seen before the Sun sets if you know where to look. A small telescope will show the changing phase as the month progresses. At the start of the month it shows a quarter phase and by the month end its size has increased while the phase is a fairly slender crescent.

Mars

Use Venus as a guide to finding Mars. Look to the left of the dazzlingly bright Venus and the next brightest object close by is Mars. It is distinctly red in comparison to Venus, and much dimmer, but still brighter than any nearby star.

Jupiter

At the start of the month Jupiter rises at about midnight and by the time the sun rises is visible in the south west. Jupiter is by far the brightest object in that part of the sky making it easy to identify.

Saturn

It is a little too early in the year for any serious observation of Saturn. If it is very clear you have a good eastern horizon, look low down just before the sky starts to brighten at sunrise and you may just spot the ringed planet.

Uranus

Uranus is now past its best position for observation; this month is about the last chance to spot it for this apparition. At mid month look for it a little above about mid way of a

line between Epsilon and Mu Piscium. Venus and Mars can be used as pointers. Follow a line from Venus to Mars, then carry on about the same distance again but a little above. In a binocular field of view Uranus, Zeta and 88 Piscium make a triangle with Uranus the left most point.

On the 26th Mars is just 0.5° to the right of Uranus, it stays close for a day either side.

Neptune

Neptune is very close to opposition this month, and as such is not visible against the glare of the Sun.

Deep Sky

NGC2244

RA 6h 32m Dec 4° 57' mag 4

This star cluster surrounded by the Rosette nebula that on the clearest nights is visible to the naked eye as a bright spot in the winter Milky Way. Binoculars show the brightest members of the cluster forming a rectangular shape. The rosette nebula is a large object, about twice the diameter of the full moon, so is best observed using a rich field telescope; a nebula filter will help increase the contrast with the background sky.

NGC2169

RA 6h 9m Dec 13° 58' mag 5.9

This cluster is easily visible in binoculars as a small parallelogram. Increasing the magnification to about 100 with a small telescope will reveal that the stars spell out this cluster's popular name, the '37' cluster. The 7 is quite clear if you can see down to magnitude 11, the 3 is less obvious but is there with a little imagination

M42 Orion Nebula

RA 5h 35m Dec -5° 25' mag 4

Visible to the naked eye as the sword of Orion the light we see is a glimpse into a large, relatively nearby star forming region. We are looking into a hollowed out shell of gas that is glowing from the intense radiation emitted by the newly formed stars. Four of these bright stars are closely grouped near the centre of the nebula forming an asterism known as the Trapezium. There is detail to be seen in all sizes of telescope and binoculars making this probably the most observed object in the night sky.

Peter Burgess

SILLY QUESTIONS?

We all know that there's no such thing as a silly question but.....

What is that ring (or rainbow) around the moon?

The ring is what atmospheric scientists call a “halo” or “glory.” It probably looked something like this:



A halo around the Moon Credit: APOD

Halos are caused by the light of the sun or moon passing through a very thin layer of cirroform (ice-crystal) clouds in the upper atmosphere. The ice crystals refract the light of the moon, similar to the way water droplets in the lower atmosphere can refract sunlight to produce a rainbow. Just like a rainbow, strong halos can have bands of color in them, due to slightly different refractive properties of the ice crystals for different colors. Essentially, halos ARE rainbows caused by primary refraction in ice crystals.

Some interesting facts about halos: Halos always occur exactly 22 degrees away from the sun or moon. Occasionally, intense halos can be double halos, just as intense rainbows can be doubled. Intense halos can also produce “moondogs” or “sundogs,” very bright regions on the halo evenly spaced at 90 degree intervals around the halo.

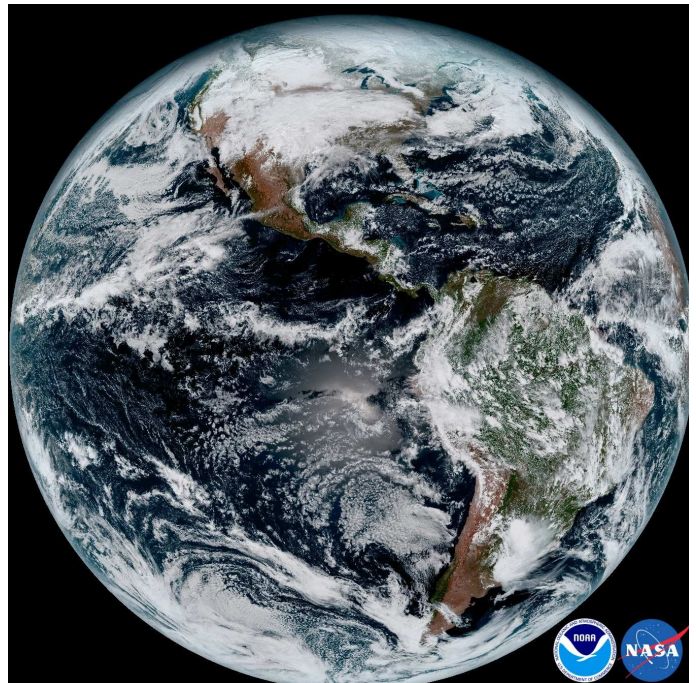
Have a look at this [link](#). There are some very nice pictures of halos and moondogs there, as well as some informative diagrams showing how the light is bent by the ice crystals.

More like this at: [Curious Minds Online](#)

If you have a “Silly Question” you’d like to ask, please send it to the Editor (details on the front page). No need to worry, you will not be identified;)

NOAA’s GOES-16 Satellite Sends First Images to Earth

GOES-16, the first spacecraft in NOAA’s next-generation of geostationary satellites, has sent its first high-resolution images back to Earth.



This composite color full-disk visible image was captured at 1:07pm EST on January 15, 2017 and created using several of the 16 spectral channels available on the ABI.

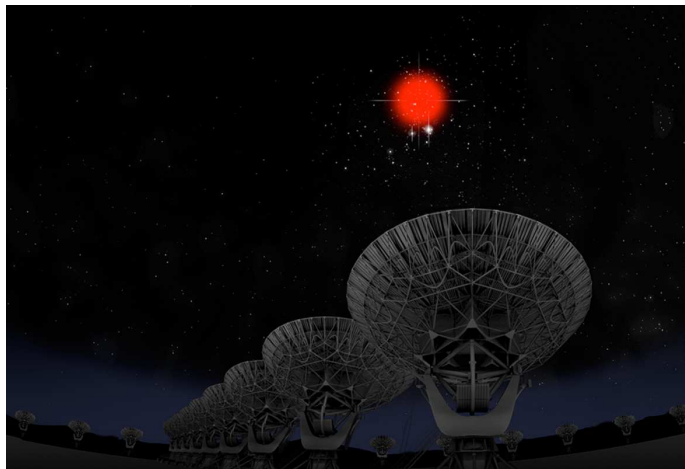
The image shows North and South America and the surrounding oceans. GOES-16 observes Earth from the coast of West Africa, to Hawaii, and everything in between.

GOES-16, the first spacecraft in NOAA’s next-generation of geostationary satellites, has sent the first high-resolution images from its Advanced Baseline Imager (ABI) instrument. Included among them are a composite color full-disk visible image of the Western Hemisphere captured on January 15, 2017. Created using several of the ABI’s 16 spectral channels, this full-disk image offers an example the satellite’s advanced technology.

The ABI can provide a full disk image of the Earth every 15 minutes, one of the continental U.S. every five minutes, and has the ability to target regional areas where severe weather, hurricanes, wildfires, volcanic eruptions or other high-impact environmental phenomena are occurring as often as every 30 seconds. The ABI covers the Earth five-times faster than the current generation GOES imagers and has four times greater spatial resolution, allowing meteorologists to see smaller features of the Earth’s atmosphere and weather systems.

More at: <https://www.nesdis.noaa.gov/>

Cosmic Radio Bursts Tracked to Home Galaxy for First Time



Pinpointed at last - Bill Saxton, NRAO/AUI/NSF; Hubble Legacy Archive, ESA, NASA

For the first time, we have followed a fast radio burst home. While we're still not sure what causes these brief barrages of radio waves, we now know where one of them comes from, giving us a new way to study their origins.

Fast radio bursts (FRBs) are some of the universe's most elusive phenomena: powerful radio signals that flash from distant space for milliseconds and then disappear without a trace. They have been blamed on everything from black holes to extraterrestrial intelligence.

Because they're so brief, and because radio telescopes can only watch a small area of the sky at a time, only 18 FRBs have ever been detected. Of those, only one has been observed to repeat: FRB 121102. Now, a team of astronomers has used a collection of radio telescopes around the globe to finally pinpoint this repeating burst.

"It is absolutely nailed down," says Shami Chatterjee at Cornell University in Ithaca, New York, who presented the results at a meeting of the American Astronomical Society in Grapevine, Texas today. "Even two months ago, I did not think we could tell this full story, and now we can."

Wimpy host

Chatterjee and his colleagues tracked down the FRB using the Karl G. Jansky Very Large Array, a group of 27 radio telescopes in New Mexico, and the 21-telescope European VLBI Network.

Together, these networks can achieve much higher resolution than any single radio dish. After observing nine more bursts, they located the FRB about 100,000 times more precisely than previous attempts with individual telescopes.

This boost in precision allowed Chatterjee and his colleagues to unambiguously associate an FRB with other signals for the first time. Persistent radio waves that the researchers discovered originating from near FRB 121102 are actually coming from exactly the same place, an extremely faint dot in the sky.

That tiny dot, FRB 121102's home, is a dwarf galaxy. It's around a tenth the diameter of the Milky Way, dim but still forming stars, and more than 2.5 billion light years away.

"Before this step was taken, we could still continue having endless arguments about exactly how far away the FRBs were and therefore what their energetics were and what they were coming from," says Chatterjee. "Now we know."

More at: <https://www.newscientist.com/>

VAS Radio Astronomy



Members may remember a year or so ago when we were talking about some experimentation with Radio Astronomy.

Well we did start looking into it but what with one thing and another - *mainly knocking walls down!* - it got rather forgotten about. Now all the walls are back up, it seems the right time to reinstate the project.

This will be very much a "learn as we go" exercise where all those taking part will get involved at a very practical level.

Obviously we aren't aiming to use antennae like those above, that would perhaps be overkill for Newchurch, but we will be experimenting with both wire and dish aerials.

If you'd like to get involved please come along on a Thursday evening and make yourself known to either me or Dudley Johnson.

Brian Curd

Physicists Confirm Possible Discovery of Fifth Force of Nature



"If confirmed by further experiments, this discovery of a possible fifth force would completely change our understanding of the universe," says UCI professor of physics & astronomy Jonathan Feng, including what holds together galaxies such as this spiral one, called NGC 6814. Credit: ESA/Hubble & NASA; Acknowledgement: Judy Schmidt

Recent findings indicating the possible discovery of a previously unknown subatomic particle may be evidence of a fifth fundamental force of nature, according to a paper published in the journal *Physical Review Letters* by theoretical physicists at the University of California, Irvine.

"If true, it's revolutionary," said Jonathan Feng, professor of physics & astronomy. "For decades, we've known of four fundamental forces: gravitation, electromagnetism, and the strong and weak nuclear forces. If confirmed by further experiments, this discovery of a possible fifth force would completely change our understanding of the universe, with consequences for the unification of forces and dark matter."

The UCI researchers came upon a mid-2015 study by experimental nuclear physicists at the Hungarian Academy of Sciences who were searching for "dark photons," particles that would signify unseen dark matter, which physicists say makes up about 85% of the universe's mass. The Hungarians' work uncovered a radioactive

decay anomaly that points to the existence of a light particle just 30 times heavier than an electron.

"The experimentalists weren't able to claim that it was a new force," Feng said. "They simply saw an excess of events that indicated a new particle, but it was not clear to them whether it was a matter particle or a force-carrying particle."

The UCI group studied the Hungarian researchers' data as well as all other previous experiments in this area and showed that the evidence strongly disfavors both matter particles and dark photons. They proposed a new theory, however, that synthesizes all existing data and determined that the discovery could indicate a fifth fundamental force. Their initial analysis was published in late April on the public arXiv online server, and a follow-up paper amplifying the conclusions of the first work was released Friday on the same website.

The UCI work demonstrates that instead of being a dark photon, the particle may be a "protophobic X boson." While the normal electric force acts on electrons and protons, this newfound boson interacts only with electrons and neutrons - and at an extremely limited range. Analysis co-author Timothy Tait, professor of physics & astronomy, said, "There's no other boson that we've observed that has this same characteristic. Sometimes we also just call it the 'X boson,' where 'X' means unknown."

Feng noted that further experiments are crucial. "The particle is not very heavy, and laboratories have had the energies required to make it since the '50s and '60s," he said. "But the reason it's been hard to find is that its interactions are very feeble. That said, because the new particle is so light, there are many experimental groups working in small labs around the world that can follow up the initial claims, now that they know where to look."

Like many scientific breakthroughs, this one opens entirely new fields of inquiry.

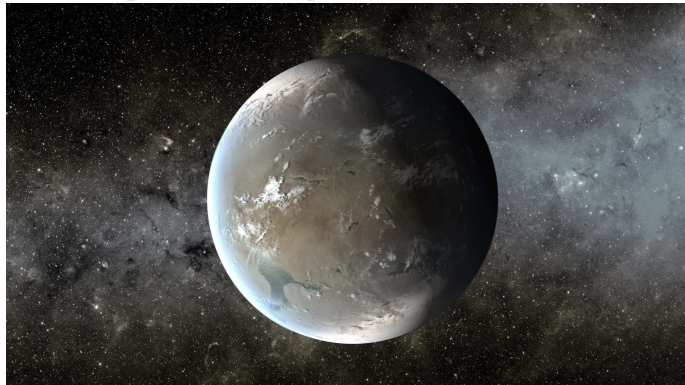
One direction that intrigues Feng is the possibility that this potential fifth force might be joined to the electromagnetic and strong and weak nuclear forces as "manifestations of one grander, more fundamental force."

Citing physicists' understanding of the standard model, Feng speculated that there may also be a separate dark sector with its own matter and forces. "It's possible that these two sectors talk to each other and interact with one another through somewhat veiled but fundamental interactions," he said. "This dark sector force may manifest itself as this protophobic force we're seeing as a result of the Hungarian experiment. In a broader sense, it fits in with our original research to understand the nature of dark matter."

Read more at: <https://phys.org/news/>

Astronomers Prepare to Search for Alien Life at Nearby 'Habitable' Exoplanet

The Wolf 1061 star system is only 14 light-years away and a team of astronomers are doing the groundwork to begin looking for signs of extraterrestrial biology in one of its planet's atmospheres.



As we continue the hunt for habitable worlds beyond our solar system, we're finding more and more candidates closer to home. There's even a small rocky exoplanet within the so-called "habitable zone" at Proxima Centauri, the dinky red dwarf star right next door. But there's more, and astronomers are beginning to identify which of these strange new worlds we could soon get a good look at with the next generation of advanced telescopes on Earth and in space.

One tantalizing potentially habitable exoplanet orbits the star Wolf 1061, only 14 light-years away — a distance that is practically on our galactic doorstep. Known to host three exoplanets, the Wolf 1061 system is interesting as it could be a target for NASA's James Webb Space Telescope (JWST) that is scheduled to launch in 2018. Sitting at the sun-Earth L2 point — an island of gravitational calm nearly one million miles away in Earth's shadow — the infrared JWST could be used to detect atmospheric components in worlds that could, hypothetically, support life. Other exoplanet-hunting projects are being launched, such as the Transiting Exoplanet Survey Satellite (TESS), the CHAracterising ExOPlanet Satellite (CHEOPS), and the PLANetary Transits and Oscillations of stars (PLATO) mission, that will greatly benefit from this advanced research to characterize the habitable potential of distant worlds.

Nestled in the habitable zones of stars, exoplanets (like the one in Wolf 1061) are thought to be neither too hot or too cold for liquid water to persist on their surfaces. On Earth, where there's liquid water, there's life, and if there's water on these worlds, there could be life there too. That's the basic logic, but there are many other factors at play that determine whether a planet can indeed support life. So if

we can properly characterize exoplanetary atmospheres, we might, some day, be able to detect the chemicals that may reveal information about any "biomarkers" that may be present — chemicals that reveal the presence of biological processes. As Wolf 1061 hosts a small rocky exoplanet (called Wolf 1061c) within its habitable zone, it is one of the closest exoplanetary locations where we could uncover this biological evidence.

"The Wolf 1061 system is important because it is so close and that gives other opportunities to do follow-up studies to see if it does indeed have life," said Stephen Kane, an astronomer at San Francisco State University and lead author of new research to be published in the *Astrophysical Journal*.

Working with researchers at Tennessee State University and in Geneva, Switzerland, Kane's team took precise measurements of the Wolf 1061 system to calculate the extent of its habitable zone, stellar activity and planetary orbits. Interestingly, Wolf 1061c has a chaotic orbit that is heavily influenced by the gravity of the other planets in the system, causing it to lurch sometimes closer to the star and at other times further away. It also occupies the inside edge of the star's habitable zone, which poses a quandary for its true habitable potential.

Venus, for example, lies within the inside edge of the sun's habitable zone, yet Venus is anything but "habitable" — despite being approximately Earth-sized. The toxic and thick Venusian atmosphere is the consequence of a runaway greenhouse effect where too much energy has been trapped by the atmosphere, causing it to heat up to lead-boiling temperatures. Though it may have once been a more temperate world, any water that once existed on its surface has been broken down into its component hydrogen and oxygen atoms. The only regions of Venus that are remotely "Earth-like" are high up in Venus' atmosphere — leading to speculative ideas that floating lifeforms may be present, or that humans may one day inhabit Venus in "cloud cities" that float high above the crushing lower atmospheric pressures.

Now that we've found Wolf 1061c, perhaps it is also an "exo-Venus", though the variability in its orbit may create bursts of global cooling followed by intense warming. "It could cause the frequency of the planet freezing over or heating up to be quite severe," said Kane in a statement.

Like the vast majority of worlds found within stars' habitable zones, Wolf 1061c's Earth-like qualities may be limited to its size and approximate orbital distance from its star — but that doesn't mean it can't host extraterrestrial life, it just means it will likely be very different life to what we are accustomed to on Earth.

More at: <http://www.seeker.com/>

Mars Rover Curiosity Examines Possible Mud Cracks



The network of cracks in this Martian rock slab called “Old Soaker” may have formed from the drying of a mud layer more than 3 billion years ago. The view spans about 3 feet (90 centimeters) left-to-right and combines three images taken by the MAHLI camera on the arm of NASA’s Curiosity Mars rover.

Credits: NASA/JPL-Caltech/MSSS

Scientists used NASA’s Curiosity Mars rover in recent weeks to examine slabs of rock cross-hatched with shallow ridges that likely originated as cracks in drying mud.

“Mud cracks are the most likely scenario here,” said Curiosity science team member Nathan Stein. He is a graduate student at Caltech in Pasadena, California, who led the investigation of a site called “Old Soaker,” on lower Mount Sharp, Mars.

If this interpretation holds up, these would be the first mud cracks -- technically called desiccation cracks -- confirmed by the Curiosity mission. They would be evidence that the ancient era when these sediments were deposited included some drying after wetter conditions. Curiosity has found evidence of ancient lakes in older, lower-lying rock layers and also in younger mudstone that is above Old Soaker.

“Even from a distance, we could see a pattern of four- and five-sided polygons that don’t look like fractures we’ve seen previously with Curiosity,” Stein said. “It looks like what you’d see beside the road where muddy ground has dried and cracked.”

The cracked layer formed more than 3 billion years ago and was subsequently buried by other layers of sediment, all becoming stratified rock. Later, wind erosion stripped away the layers above Old Soaker. Material that had filled the cracks resisted erosion better than the mudstone around it, so the pattern from the cracking now appears as raised ridges.

The team used Curiosity to examine the crack-filling material. Cracks that form at the surface, such as in drying mud, generally fill with windblown dust or sand. A different type of cracking with plentiful examples found by Curiosity occurs after sediments have hardened into rock. Pressure from accumulation of overlying sediments can cause underground fractures in the rock. These fractures generally have been filled by minerals delivered by groundwater circulating through the cracks, such as bright veins of calcium sulfate.

Both types of crack-filling material were found at Old Soaker. This may indicate multiple generations of fracturing: mud cracks first, with sediment accumulating in them, then a later episode of underground fracturing and vein forming.

“If these are indeed mud cracks, they fit well with the context of what we’re seeing in the section of Mount Sharp Curiosity has been climbing for many months,” said Curiosity Project Scientist Ashwin Vasavada of NASA’s Jet Propulsion Laboratory in Pasadena. “The ancient lakes varied in depth and extent over time, and sometimes disappeared. We’re seeing more evidence of dry intervals between what had been mostly a record of long-lived lakes.”

Besides the cracks that are likely due to drying, other types of evidence observed in the area include sandstone layers interspersed with the mudstone layers, and the presence of a layering pattern called cross-bedding. This pattern can form where water was flowing more vigorously near the shore of a lake, or from windblown sediment during a dry episode.

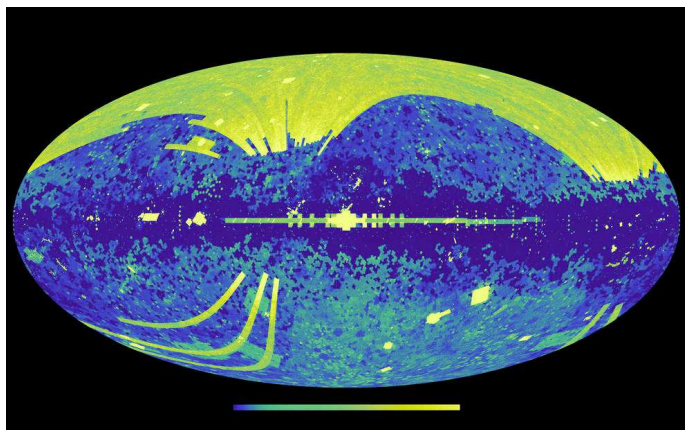
Scientists are continuing to analyze data acquired at the possible mud cracks and also watching for similar-looking sites. They want to check for clues not evident at Old Soaker, such as the cross-sectional shape of the cracks.

The rover has departed that site, heading uphill toward a future rock-drilling location. Rover engineers at JPL are determining the best way to resume use of the rover’s drill, which began experiencing intermittent problems last month with the mechanism that moves the drill up and down during drilling.

Curiosity landed near Mount Sharp in 2012. It reached the base of the mountain in 2014 after successfully finding evidence on the surrounding plains that ancient Martian lakes offered conditions that would have been favorable for microbes if Mars has ever hosted life. Rock layers forming the base of Mount Sharp accumulated as sediment within ancient lakes billions of years ago.

More at: <https://www.nasa.gov/>

How Far Away is That Galaxy? Vast Catalog Has Answers



This graphic shows all the cosmic light sources in the sky that are included in the NASA/IPAC Extragalactic Database (NED), an online repository containing information on over 100 million galaxies.

Credits: NASA/JPL-Caltech

A team of researchers has compiled a special catalog to help astronomers figure out the true distances to tens of thousands of galaxies beyond our own Milky Way.

The catalog, called NED-D, is a critical resource, not only for studying these galaxies, but also for determining the distances to billions of other galaxies strewn throughout the universe. As the catalog continues to grow, astronomers can increasingly rely on it for ever-greater precision in calculating both how big the universe is and how fast it is expanding. NED-D is part of the NASA/IPAC Extragalactic Database (NED), an online repository containing information on more than 100 million galaxies.

“We’re thrilled to present this catalog of distances to galaxies as a valuable resource to the astronomical community,” said Ian Steer, NED team member, curator of NED-D, and lead author of a new report about the database appearing in *The Astronomical Journal*. “Learning a cosmic object’s distance is key to understanding its properties.”

Steer and colleagues presented the paper this week at the 229th meeting of the American Astronomical Society in Grapevine, Texas.

Since other galaxies are extremely far away, there’s no tape measure long enough to measure their distances from us. Instead, astronomers rely on extremely bright objects, such as Type Ia supernovae and pulsating stars called Cepheids variables, as indicators of distance. To calculate how far away a distant galaxy is, scientists use known mathematical relationships between distance and other properties of objects, such as their total emitted energy.

More objects useful for these calculations have emerged in recent years. NED-D has revealed that there are now more than six dozen different indicators used to estimate such distances.

NED-D began as a small database pulled together in 2005 by Steer. He began serving at NED the following year to build out the database, poring over the scores of astronomical studies posted online daily, identifying newly calculated distance estimates as well as fresh analyses of older data.

From its humble origins a little over a decade ago, NED-D now hosts upwards of 166,000 distance estimates for more than 77,000 galaxies, along with estimates for some ultra-distant supernovae and energetic gamma ray bursts. To date, NED-D has been cited by researchers in hundreds of studies.

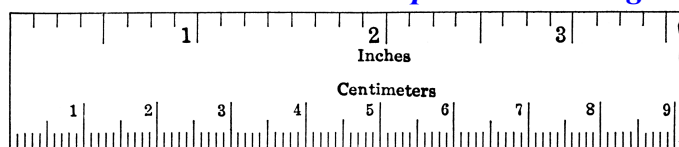
Besides providing a one-stop tabulation of the ever-increasing distance estimates published in the astronomical literature, NED-D -- as well as the broader NED -- can serve as “discovery engines.” By pooling tremendous amounts of searchable data, the information repositories can allow scientists to identify novel, exotic phenomena that otherwise would get lost in a deluge of observations. An example is the discovery of “super luminous” spiral galaxies by NED team members, reported last year, which were identified among nearly a million individual galaxies in the NED database.

“NED and its associated databases, including NED-D, are in the process of transforming from data look-up services to legitimate discovery engines for science,” said Steer. “Using NED today, astronomers can sift through mountains of ‘big data’ and discover additional new and amazing perspectives on our universe.”

NASA’s Jet Propulsion Laboratory, Pasadena, California, manages the NASA/IPAC Extragalactic Database (NED) for NASA’s Science Mission Directorate, Astrophysics Division, Washington. NED operations are conducted at the Infrared Processing and Analysis Center (IPAC) at Caltech in Pasadena. Caltech manages JPL for NASA.

- The NED archive is at:
<http://ned.ipac.caltech.edu>
- The NED-D archive is at:
<http://ned.ipac.caltech.edu/Library/Distances/>

More at: <https://www.nasa.gov/>



Space Facts

1. Mercury and Venus are the only two planets in our solar system that do not have any moons.
2. If a star passes too close to a black hole, it can be torn apart.
3. The hottest planet in our solar system is Venus. Most people often think that it would be Mercury, as it's the closest planet to the sun. This is because Venus has a lot of gasses in its atmosphere, which causes the "Greenhouse Effect".
4. The solar system is around 4.6 billion years old. Scientist estimate that it will probably last another 5000 million years
5. Enceladus, one of Saturn's smaller moons, reflects some 90% of the sunlight, making it more reflective than snow!
6. The highest mountain known to man is the Olympus Mons, which is located on Mars. It's peak is 15 miles (25KM) high, making it nearly 3 times higher than Mt Everest.
7. The Whirlpool Galaxy (M51) was the very first celestial object to be identified as being spiral.
8. A light year is the distance covered by light in a single year, this is equivalent to 5.88 trillion miles (9.5 trillion KM)!
9. The width of the Milky Way is around 100,000 light years.
10. The Sun is over 300,000 times larger than Earth.
11. Footprints and tire tracks left by astronauts on the moon will stay there forever as there is no wind to blow them away.
12. Because of lower gravity, a person who weighs 100kg on earth would only weigh 38kg on the surface of Mars.
13. Scientists believe there are 67 moons that orbit Jupiter, however only 53 of these have been named.
14. The Martian day is 24 hours 39 minutes and 35 seconds.
15. NASA's Crater Observation and Sensing Satellite (LCROSS) declared that they have found evidence of significant amounts of water on the Earth's Moon.
16. The Sun makes a full rotation once every 25-35 days.
17. Venus is the only planet that spins backwards relative to the other planets.
18. The force of gravity can sometimes cause comets to tear apart.
19. It is thanks to the Sun and our own moons gravity that we have high and low tides.
20. Pluto is smaller than the Earth's moon!
21. According to mathematics, white holes are possible, although as of yet, we have found none.
22. Our moon is around 4.5 billion years old.
23. There are more volcanoes on Venus than any other planet within our solar system.
24. Uranus' blue glow is down to the methane in its atmosphere, which filters out all the red light.
25. The four planets in our solar system that are known as gas giants are Jupiter, Neptune, Saturn and Uranus.
26. Uranus has 27 moons that have been discovered so far.
27. Because of its unique tilt, a single night on Uranus lasts for 21 years!
28. Triton, one of Neptune's moons, is gradually getting closer to the planet it orbits.
29. Scientists say that eventually Triton will get so close to Neptune, it will be torn apart by gravity, and Neptune could end up with more rings than Saturn currently has!
30. The only large moon in our solar system to orbit in the opposite direction of its planet is Neptune's moon, Triton.
31. Neptune takes 164.79 years (60,190 days) to make one orbit of the Sun. this means that since it's discovery in 1846, it has only completed just one orbit!
32. Charon is one of the moons of Pluto, and is only slightly smaller than Pluto itself.
33. The Space Station is the largest manned object ever sent into space.
34. A day on Pluto lasts for 6 days and 9 hours.
35. Saturn is the second largest planet in our solar system.
36. Any free-moving liquid in outer space will form itself into a sphere, because of its surface tension.
37. Earth, Mars, Mercury and Venus are called the inner planets as they are closest to the sun.
38. We know more about space than we do about deep in our oceans.
39. The only satellite that Britain has launched was called Black Arrow.
40. Black Arrow was developed during the 1960's and was used for four launches between 1969 and 1971.
41. The light takes 8.3 minutes to travel from the Sun the Earth.
42. The odds of being killed by space debris is 1 in 5 billion.
43. The Earth's revolution time increases .0001 seconds annually.
44. If you were driving at 75 miles (121 km) per hour, it would take 258 days to drive around one of Saturn's rings.
45. The first man on the moon was Neil Armstrong.
46. The Space Station circles the earth every 90 minutes.
47. Stars seem to twinkle in the night sky due to the light being disrupted as it passes though the Earth's atmosphere.
48. Neil Armstrong first stepped on the moon with his left foot.
49. There are three main types of galaxies out in space, and they are spiral, elliptical, and irregular.
50. There are approximately 200,000,000,000 stars in the Milky Way.

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

New Year's Resolutions

Well I'm sure you've all stopped drinking and smoking (again?) but have you considered learning something new in 2017?

MOOC is the thing you need to search for, it stands for **Massive Open Online Course**, and offers all of us the opportunity to gain knowledge at very low cost, or often for free.

There are lots of providers but, just taking *one* and searching for "physics free", gave me these courses:

- *Make a Unity 2D Physics Game - For Beginners!*
- *Physics: Intro to Electricity & Magnetism*
- *IGCSE Physics Chapter 2 Thermal Physics (Cambridge CIE)*
- *GCSE Physics (AQA) Kinetic Energy*
- *GCSE Physics (Edexcel) Momentum, Energy, Work and Power*
- *Astronomy for VCE Physics*
- *IGCSE Physics Ch 3 Electricity (Part 1 of 3) - Cambridge CIE*
- *Physics: Master 2D Torque in Record Time*
- *Role Playing Games with Sprite Kit: Heroes*
- *JGCSE Physics (AQA) Forces and their Effects*

There are many other websites and a huge number of courses to find, you're bound to find something to interest you.

Eugene Cernan, Moonwalker

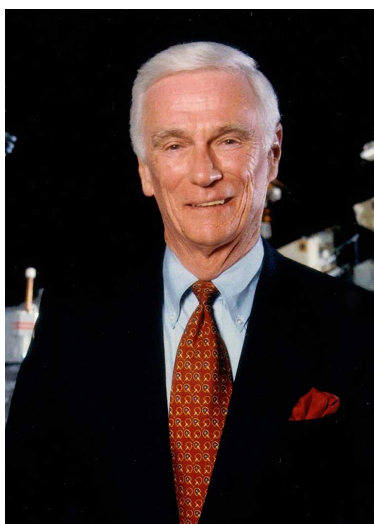
Apollo astronaut Eugene Cernan, the last human to set foot on the moon, passed away on Jan 14. He was 82. Cernan's friends and colleagues have been remembering his life and legacy this week.

He travelled into space three times: as Pilot of Gemini 9A in June 1966, as Lunar Module Pilot of Apollo 10 in May 1969, and as Commander of Apollo 17 in December 1972, the final Apollo lunar landing. On Apollo 17, Cernan became the eleventh person, and most recent man, to walk on the Moon, since he was the last to re-enter the Lunar Module Challenger after the mission's third and final extravehicular activity (EVA). Cernan was also a backup crew member for the Gemini 12, Apollo 7 and Apollo 14 space missions.

Cernan piloted the rover on its final sortie, recording a maximum speed of 11.2 mph (18.0 km/h), giving him the unofficial lunar land speed record.

Eugene is also remembered at the Minor Planets Center with (12790) Cernan.

More at: https://en.wikipedia.org/wiki/Eugene_Cernan or



Observatory

When visiting the VAS observatory, for your own safety, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

Articles Needed

New Zenith needs letters, articles, reviews or pictures related to astronomy. Contributions to the Editor at the email or postal address on the front page.

"Always remember that you are absolutely unique.

Just like everyone else"

Margaret Mead

"A day without sunshine is like, you know, night"

Steve Martin

"Infinity is a floorless room without walls or ceiling"

Anon

"Computers are useless. They can only give you answers"

Pablo Picasso

"The trouble is you think you have time"

Buddha