

Society News

Observatory News

Thursday Bookings - Members Only

- The maximum number of people allowed in the observatory is 6 (*including 1 committee member*).
- All visitors **must** book their visit before attending. **No booking = no entry!**
- Bookings will be on a *first-come-first-served* basis and applies to all members including committee.
- Bryn Davis is taking the bookings and can be contacted by email (see page 2) or by phone 406125.

The Future

The latest UK Covid rules will be announced on 19th July so, if anything changes, we will let VAS members know as soon as possible.

It looks like we may soon be on the home stretch as far as Covid is concerned but, we won't be taking any chances and it is likely that we will have some restrictions for a while yet.

July Monthly Meeting

Unfortunately due to a Committee oversight, we don't have a speaker for the July Zoom meeting. This may be solved in time, so please keep a close eye on your inbox for emails.

Telescopes for Members?

There are currently three small (4-6 inch) Dobsonian telescopes at the observatory which are looking for good homes! These haven't been used for sometime and require cleaning and checking. Once this is done, they will be made available to any members who want one. There is no specific charge for any of the 'scopes but, of course, a donation to club funds would be welcomed.

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.

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

The diary is currently empty!

VAS Website: wightastronomy.org

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2021 Monthly Meetings

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

Date	Subject	Speaker
26 Mar	Space Traffic Control	Dr Stuart Eves
23 Apr	HOYS	Dirk Froebrich
28 May	Can we live on Mars?	Greg Smye-Rumsby
25 Jun	The Astronomy of Robert Hooke in Context	Paul Bingham

**All Monthly Meetings are
ONLINE ONLY**

**Please DO NOT attend the
Observatory or Pavilion**

ONLINE ONLY

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

***Please see the Back Page
for the latest information***

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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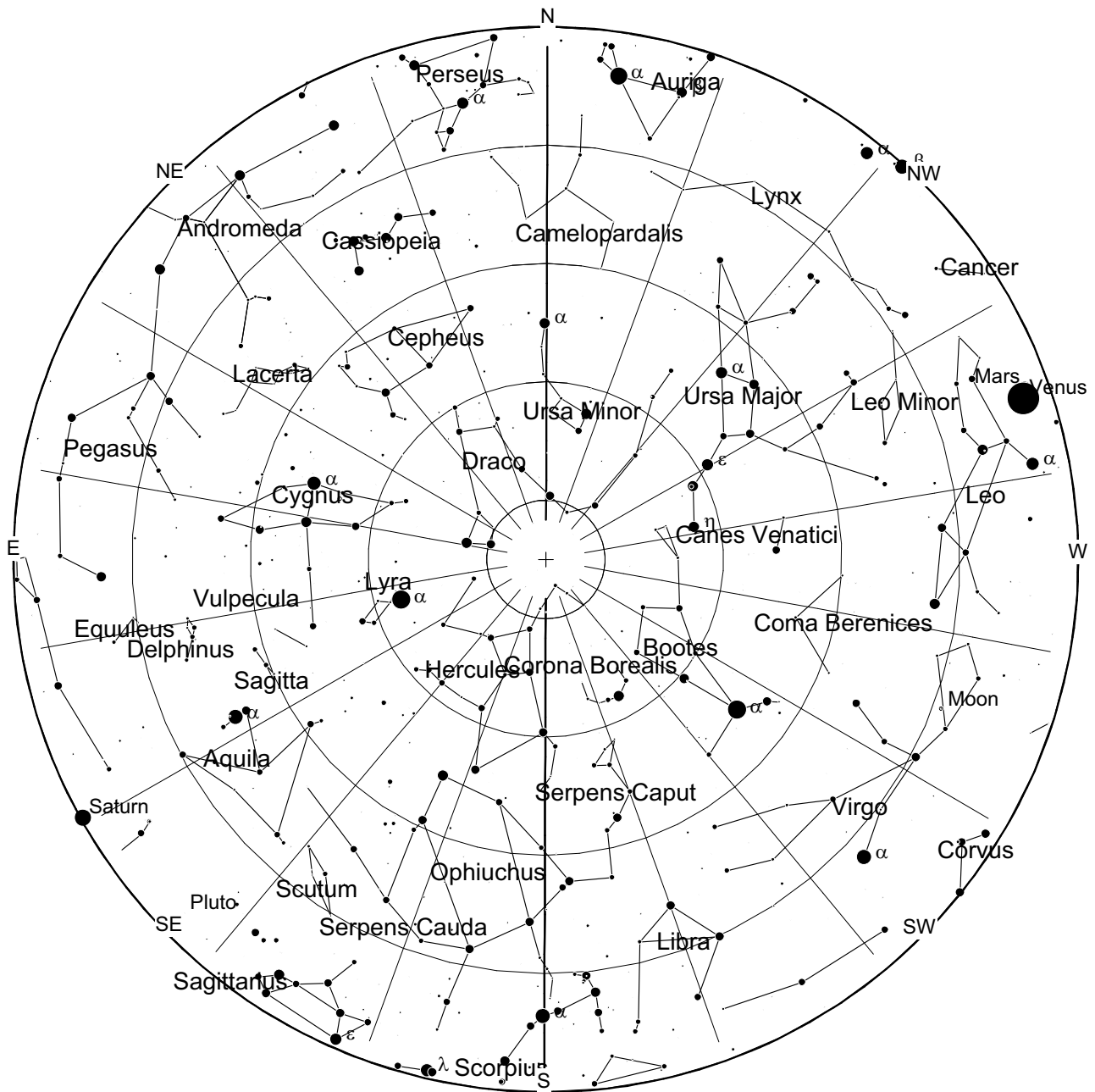
Important

**Thursday Opening
The observatory is
open for
MEMBERS ONLY**

**YOU
MUST
BOOK**

See the front Page

July 2021 - Sky Map



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







NGC 6633 is a large bright open cluster in the constellation Ophiuchus. Discovered in 1745-46 by Philippe Loys de Chéseaux, it was independently rediscovered by Caroline Herschel in 1783 and included in her brother William's catalog as H VIII.72. Bright enough to be seen with the naked eye, the cluster is considered a fine object for binoculars or small telescopes.

NGC 6633 is also known as the Tweedledum Cluster (paired with IC 4756 as Tweedledee), also as the Captain Hook Cluster. It is also designated Collinder 380 or Melotte 201. Nearly as large as the full moon, the cluster contains 38 known stars and shines with a total magnitude of 4.6; the brightest star is of mag 7.6. Its age has been estimated at 660 million years.

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It uses material from the Wikipedia article "NGC 6633".

July 2021 - Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
10th	17th	24th	1st&31st
			

Planets

Mercury

Mercury makes a poor appearance in the morning sky this month. At best it is only about 6 degrees above the horizon at sunrise making it a challenging object. Look a few degrees below and to the right of the thin crescent moon on the morning of the 8th.

Venus

The Evening Star is easily seen low down in the western sky for an hour or so after sunset. It is not well placed for observation during this apparition, although it is well separated from the Sun it remains close to the horizon at sunset. The thin crescent moon is close by on the 12th.

Mars

Mars is now on the far side of its orbit from us making it too faint to be easily seen against the bright sunset sky. It will re-appear in the morning sky towards the end of the year.

Jupiter

Jupiter rises in the southeast after midnight and can be observed until dawn. being rather low down in the sky the view will be somewhat spoiled by the atmospheric turbulence as the air cools after the hopefully warm summer days.

Saturn

At the end of the month Saturn is at opposition and for this year is at its best for observation. It is visible all night, but best observed when it is at its highest in the sky; low in the south at around 1 to 2am. It can be found to the right and below the much brighter Jupiter. These are the only two bright star like objects in that part of the sky.

Uranus

Uranus is too close to the sun to be observed this month.

Neptune

Neptune can be observed for a short time when the sky is at its darkest, but at this time of the year it is not really dark enough to be easily seen without a reasonably sized telescope. It is to be found close to the border of Aquarius and Pisces with no bright guiding stars nearby.

Deep Sky

IC4665 Open Cluster

RA 17h 47m Dec 5° 42' mag 4.2

This is a large cluster slightly more than a degree in diameter. It is best viewed in a rich field telescope or large binoculars. The brighter members form right angled triangular patterns around the cluster's centre. Under a dark sky it is visible to the naked eye using averted vision. Look for fuzzy smudge about a degree north of the magnitude 2.7 star Cebalrai in Ophiuchus.

NGC6633 Open Cluster

RA 18h 28m Dec 6° 34' mag 4.5

Although it is clearly visible in binoculars it is best viewed through a rich field telescope where the brighter members of this cluster form a rather wavy looking wedge of stars. If viewed before the sky darkens too much restricting the number of visible stars the scene is reminiscent of a miniature Leo, the backward question mark is a little indistinct, but the back and haunches are easily distinguishable.

IC4756 Open Cluster

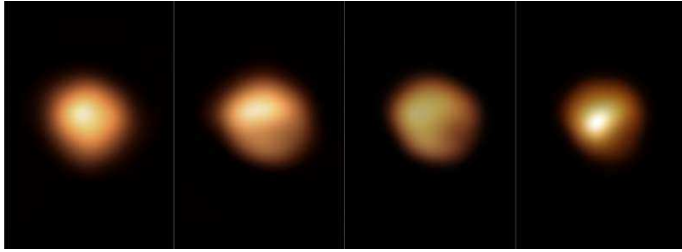
RA 18h 39m Dec 5° 27' mag 4.5

Located a short distance to the southeast of NGC6633 this cluster is also an easy binocular target, but again is best views through a small low magnification telescope. There are a number of long chains of stars throughout the cluster the brighter ones form a rough five pronged Catherine wheel shape covering most of the cluster. The brighter foreground stars form a slight distraction when observing this cluster.

Peter Burgess



Mystery of Betelgeuse's dip in brightness solved



Images, from the SPHERE instrument on ESO's Very Large Telescope, show the surface of the red supergiant star Betelgeuse during its unprecedented dimming, which happened in 2019 - 2020. The image on the far left, taken in Jan 2019, shows the star at its normal brightness, while the remaining images, from Dec 2019, Jan and Mar 2020, were taken when the star's brightness had noticeably dropped, especially in its southern region. The brightness returned to normal in Apr 2020. Credit: ESO/M. Montargès et al.

When Betelgeuse, a bright orange star in the constellation of Orion, became visibly darker in late 2019 and early 2020, the astronomy community was puzzled. A team of astronomers have now published new images of the star's surface, taken using the European Southern Observatory's Very Large Telescope, that clearly show how its brightness changed. The new research reveals that the star was partially concealed by a cloud of dust, a discovery that solves the mystery of the Great Dimming of Betelgeuse.

Betelgeuse's dip in brightness - a change noticeable even to the naked eye - led Miguel Montargès and his team to point ESO's VLT toward the star in late 2019. An image from Dec 2019, when compared to an earlier image taken in January of the same year, showed that the stellar surface was significantly darker, especially in the southern region. But the astronomers weren't sure why.

The team continued observing the star during its Great Dimming, capturing two other never-before-seen images in Jan 2020 and Mar 2020. By Apr 2020, the star had returned to its normal brightness.

“For once, we were seeing the appearance of a star changing in real time on a scale of weeks,” says Montargès, from the Observatoire de Paris, France, and KU Leuven, Belgium. The images now published are the only ones we have that show Betelgeuse's surface changing in brightness over time.

In their new study, published in *Nature*, the team revealed that the mysterious dimming was caused by a dusty veil shading the star, which in turn was the result of a drop in temperature on Betelgeuse's stellar surface.

Betelgeuse's surface regularly changes as giant bubbles of gas move, shrink and swell within the star. The team concludes that some time before the Great Dimming, the star ejected a large gas bubble that moved away from it. When a patch of the surface cooled down shortly after, that temperature decrease was enough for the gas to condense into solid dust.

“We have directly witnessed the formation of so-called stardust,” says Montargès, whose study provides evidence that dust formation can occur very quickly and close to a star's surface. “The dust expelled from cool evolved stars, such as the ejection we've just witnessed, could go on to become the building blocks of terrestrial planets and life,” adds Emily Cannon, from KU Leuven, who was also involved in the study.

Rather than just the result of a dusty outburst, there was some speculation online that Betelgeuse's drop in brightness could signal its imminent death in a spectacular supernova explosion. A supernova hasn't been observed in our galaxy since the 17th century, so present-day astronomers aren't entirely sure what to expect from a star in the lead-up to such an event. However, this new research confirms that Betelgeuse's Great Dimming was not an early sign that it was heading towards its dramatic fate.

Witnessing the dimming of such a recognizable star was exciting for professional and amateur astronomers alike, as summed up by Cannon: “Looking up at the stars at night, these tiny, twinkling dots of light seem perpetual. The dimming of Betelgeuse breaks this illusion.”

The team used the Spectro-Polarimetric High-contrast Exoplanet REsearch (SPHERE) instrument on ESO's VLT to directly image the surface of Betelgeuse, alongside data from the GRAVITY instrument on ESO's Very Large Telescope Interferometer (VLTI), to monitor the star throughout the dimming. The telescopes, located at ESO's Paranal Observatory in Chile's Atacama Desert, were a “vital diagnostic tool in uncovering the cause of this dimming event,” says Cannon. “We were able to observe the star not just as a point but could resolve the details of its surface and monitor it throughout the event,” Montargès adds.

Montargès and Cannon are looking forward to what the future of astronomy, in particular what ESO's Extremely Large Telescope (ELT), will bring to their study of Betelgeuse, a red supergiant star. “With the ability to reach unparalleled spatial resolutions, the ELT will enable us to directly image Betelgeuse in remarkable detail,” says Cannon. “It will also significantly expand the sample of red supergiants for which we can resolve the surface through direct imaging, further helping us to unravel the mysteries behind the winds of these massive stars.”

More at: <https://phys.org/>

Scientists detect signatures of life remotely

It could be a milestone on the path to detecting life on other planets: Scientists under the leadership of the University of Bern and of the National Centre of Competence in Research (NCCR) PlanetS detect a key molecular property of all living organisms from a helicopter flying several kilometers above ground. The measurement technology could also open up opportunities for remote sensing of the Earth.

Left hands and right hands are almost perfect mirror images of each other. But whatever way they are twisted and turned, they cannot be superimposed onto each other. This is why the left glove simply won't fit the right hand as well as it fits the left. In science, this property is referred to as chirality.

Just like hands are chiral, molecules can be chiral, too. In fact, most molecules in the cells of living organisms, such as DNA, are chiral. Unlike hands, however, that usually come in pairs of left and right, the molecules of life almost exclusively occur in either their "left-handed" or their "right-handed" version. They are homochiral, as researchers say. Why that is, is still not clear. But this molecular homochirality is a characteristic property of life, a so-called biosignature.

As part of the MERMOZ project, an international team led by the University of Bern and the National Centre of Competence in Research NCCR PlanetS, has now succeeded in detecting this signature from a distance of 2 kilometers and at a velocity of 70 kph. Jonas Kühn, MERMOZ project manager of the University of Bern and co-author of the study that has just been published in the journal *Astronomy and Astrophysics*, says: "The significant advance is that these measurements have been performed in a platform that was moving, vibrating and that we still detected these biosignatures in a matter of seconds."

An instrument that recognizes living matter

"When light is reflected by biological matter, a part of the light's electromagnetic waves will travel in either clockwise or counterclockwise spirals. This phenomenon is called circular polarization and is caused by the biological matter's homochirality. Similar spirals of light are not produced by abiotic non-living nature," says the first author of the study Lucas Patty, who is a MERMOZ postdoctoral researcher at the University of Bern and member of the NCCR PlanetS,

Measuring this circular polarization, however, is challenging. The signal is quite faint and typically makes

up less than one percent of the light that is reflected. To measure it, the team developed a dedicated device called a spectropolarimeter. It consists of a camera equipped with special lenses and receivers capable of separating the circular polarization from the rest of the light.

Yet even with this elaborate device, the new results would have been impossible until recently. "Just 4 years ago, we could detect the signal only from a very close distance, around 20 cm, and needed to observe the same spot for several minutes to do so," as Lucas Patty recalls. But the upgrades to the instrument he and his colleagues made, allow a much faster and stable detection, and the strength of the signature in circular polarisation persists even with distance. This rendered the instrument fit for the first ever aerial circular polarization measurements.

Useful measurements on earth and in space

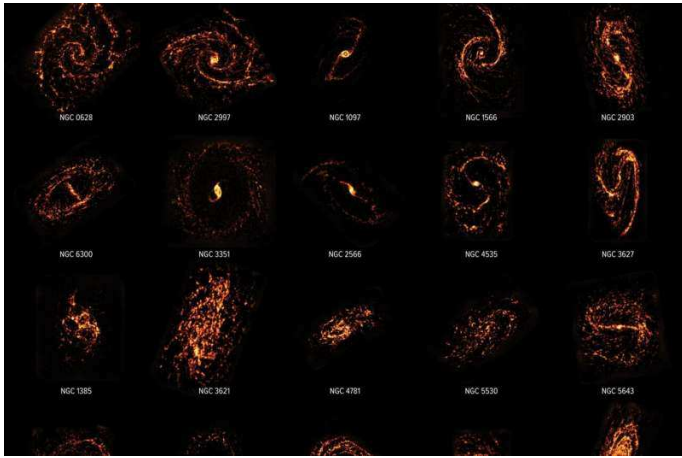
Using this upgraded instrument, dubbed FlyPol, they demonstrated that within mere seconds of measurements they could differentiate between grass fields, forests and urban areas from a fast moving helicopter. The measurements readily show living matter exhibiting the characteristic polarization signals, while roads, for example, do not show any significant circular polarization signals. With the current setup, they are even capable of detecting signals coming from algae in lakes.

After their successful tests, the scientists now look to go even further. "The next step we hope to take, is to perform similar detections from the International Space Station (ISS), looking down at the Earth. That will allow us to assess the detectability of planetary-scale biosignatures. This step will be decisive to enable the search for life in and beyond our Solar System using polarization," says MERMOZ principal investigator and co-author Brice-Olivier Demory, professor of astrophysics at the University of Bern and member of the NCCR PlanetS says.

The sensitive observation of these circular polarization signals is not only important for future life detection missions. Lucas Patty explains: "Because the signal directly relates to the molecular composition of life and thus its functioning, it can also offer valuable complementary information in Earth remote sensing." It can for instance provide information about deforestation or plant disease. It might even be possible to implement circular polarization in the monitoring of toxic algal blooms, of coral reefs and the effects of acidification thereon.

From: <https://www.sciencedaily.com/>

Cosmic cartographers map nearby Universe revealing the diversity of star-forming galaxies



Using the Atacama Large Millimetre/submillimetre Array, scientists completed a census of nearly 100 galaxies in the nearby Universe, showcasing their behaviours and appearances. The scientists compared ALMA data to that of the Hubble Space Telescope. Credit: ALMA (ESO/NAOJ/NRAO)/PHANGS, S. Dagnello (NRAO)

Astronomers using the Atacama Large Millimeter/submillimeter Array (ALMA) have completed the first census of molecular clouds in the nearby universe, revealing that contrary to previous scientific opinion, these stellar nurseries do not all look and act the same. In fact, they're as diverse as the people, homes, neighborhoods and regions that make up our own world.

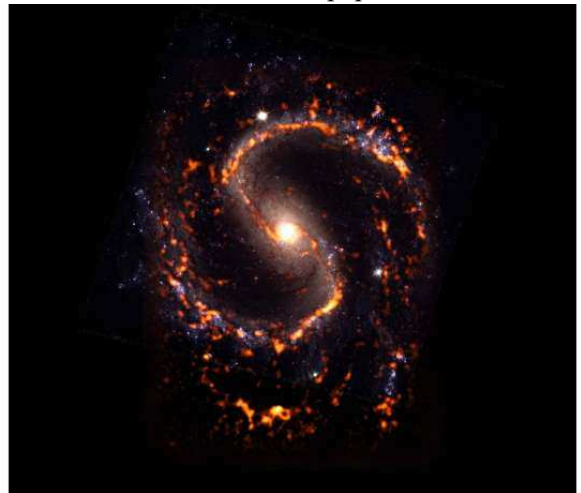
Stars are formed out of clouds of dust and gas called molecular clouds, or stellar nurseries. Each stellar nursery in the universe can form thousands or even tens of thousands of new stars during its lifetime. Between 2013 and 2019, astronomers on the PHANGS project (Physics at High Angular Resolution in Nearby Galaxies) conducted the first systematic survey of 100,000 stellar nurseries across 90 galaxies in the nearby universe to get a better understanding of how they connect back to their parent galaxies.

“We used to think that all stellar nurseries across every galaxy must look more or less the same, but this survey has revealed that this is not the case, and stellar nurseries change from place to place,” said Adam Leroy, associate professor of astronomy at Ohio State University (OSU), and lead author of the paper presenting the PHANGS ALMA survey. “This is the first time that we have ever taken millimeter-wave images of many nearby galaxies that have the same sharpness and quality as optical pictures. And while optical pictures show us light from stars, these ground-breaking new images show us the molecular clouds that form those stars.”

“To understand how stars form, we need to link the birth of a single star back to its place in the universe. It's like linking a person to their home, neighborhood, city and region. If a galaxy represents a city, then the neighborhood is the spiral arm, the house the star-forming unit, and nearby galaxies are neighboring cities in the region,” said Eva Schinnerer, an astronomer at the Max Planck Institute for Astronomy and principal investigator for the PHANGS collaboration “These observations have taught us that the 'neighborhood' has small but pronounced effects on where and how many stars are born.”

To better understand star formation in different types of galaxies, the team observed similarities and differences in the molecular gas properties and star formation processes of galaxy disks, stellar bars, spiral arms, and galaxy centers. They confirmed that the location, or neighborhood, plays a critical role in star formation.

“By mapping different types of galaxies and the diverse range of environments that exist within galaxies, we are tracing the whole range of conditions under which star-forming clouds of gas live in the present-day universe. This allows us to measure the impact that many variables have on the way star formation happens,” said Guillermo Blanc, an astronomer at the Carnegie Institution for Science, and a co-author on the paper.

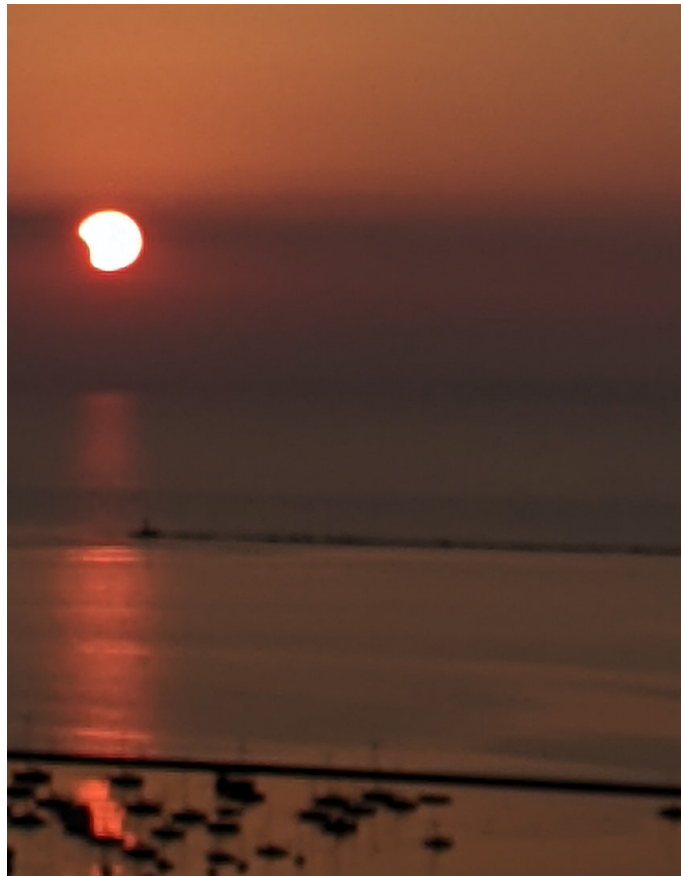
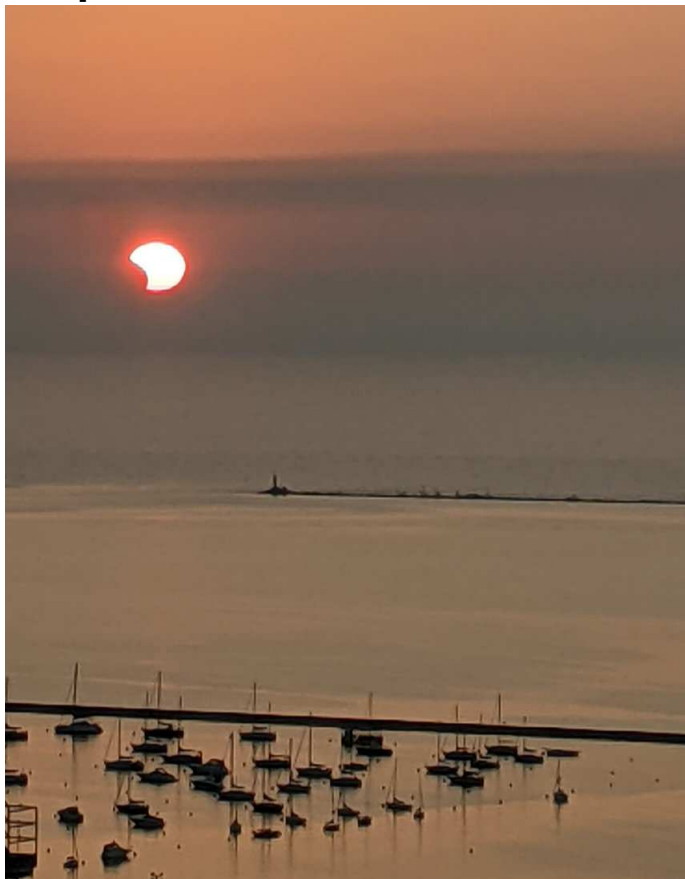


NGC4535 is a galaxy in the nearby Universe featuring grand-design spiral plus stellar bar morphology. The census revealed that contrary to commonly accepted scientific theory, not all stellar nurseries look or act the same way. Credit: ALMA (ESO/NAOJ/NRAO)/PHANGS, S. Dagnello (NRAO)

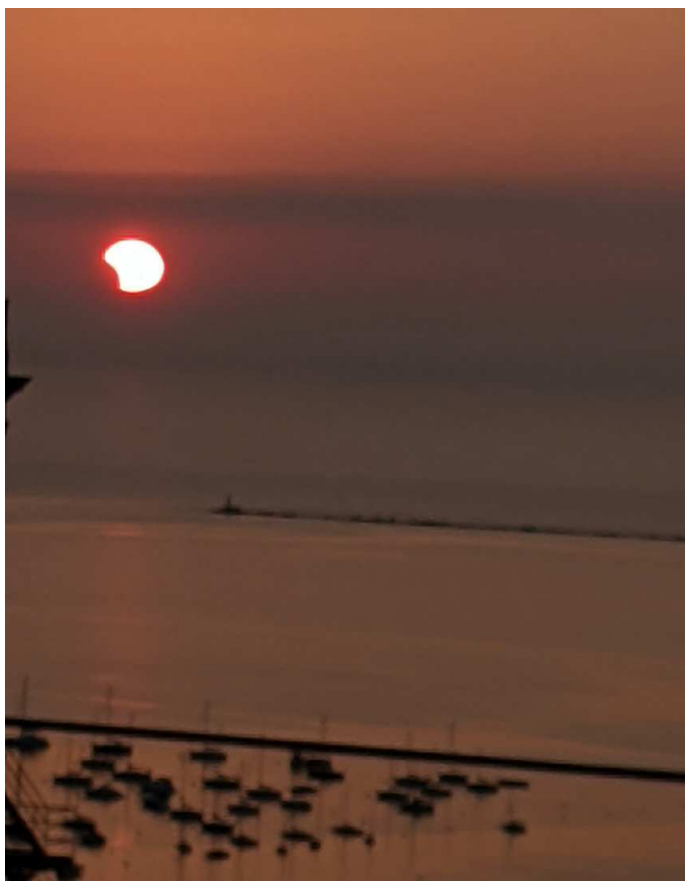
“How stars form, and how their galaxy affects that process, are fundamental aspects of astrophysics,” said Joseph Pesce, National Science Foundation's program officer for NRAO/ALMA. “The PHANGS project utilizes the exquisite observational power of the ALMA observatory and has provided remarkable insight into the story of star formation in a new and different way.”

More at: <https://phys.org/>

Eclipse Photos.



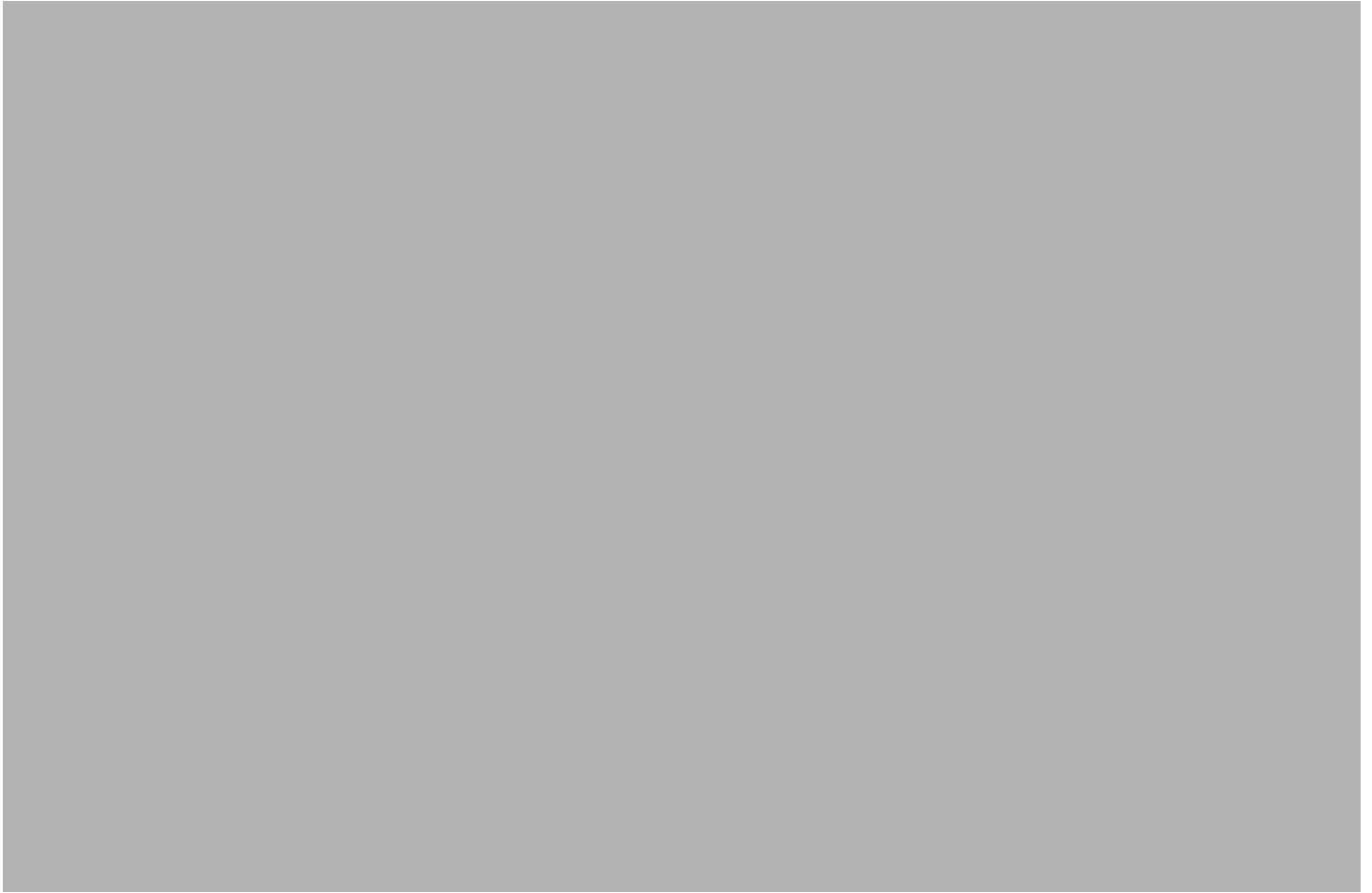
These are three shots of the recent partial eclipse taken by member Chris Wood from his Chicago apartment during sun rise. All were taken with a hand-held Google Pixel3A.



A solar eclipse occurs when a portion of the Earth is engulfed in a shadow cast by the Moon which fully or partially blocks sunlight. This occurs when the Sun, Moon and Earth are aligned. Such alignment coincides with a new moon indicating the Moon is closest to the ecliptic plane. In a total eclipse, the disk of the Sun is fully obscured by the Moon. In partial and annular eclipses, only part of the Sun is obscured.

If the Moon were in a perfectly circular orbit, a little closer to the Earth, and in the same orbital plane, there would be total solar eclipses every new moon. However, since the Moon's orbit is tilted at more than 5 degrees to the Earth's orbit around the Sun, its shadow usually misses Earth. A solar eclipse can occur only when the Moon is close enough to the ecliptic plane during a new moon. Special conditions must occur for the two events to coincide because the Moon's orbit crosses the ecliptic at its orbital nodes twice every draconic month (27.212220 days) while a new moon occurs one every synodic month (29.53059 days). Solar (and lunar) eclipses therefore happen only during eclipse seasons resulting in at least two, and up to five, solar eclipses each year; no more than two of which can be total eclipses.

We Still Have Some Great Dark Skies!



Having recently advised a holidaymaker where to get some of the better shots on the Island, I received the photo above and some additional detail.

Hi Brian,

I hope all is well. I just wanted to thank you again for your advice which paid dividends!

There was one clear night when we visited the Isle of Wight, which was Friday June 4th. We drove down the Military Road a number of times in the days before then and I settled on Brook Chine as a reasonable spot with a car park and low likelihood of walking off a cliff in the dark!

Luckily the weather forecast was correct and the moon didn't rise until after we left. Please find attached one of the images I captured from the top of the cliff just to the West of the Brook Chine car park, facing South, at around midnight.

This image is composed of a stack of 10 shots of 12 seconds each at a focal length of 18mm. I framed it to ensure Rho Ophiuici (one of my favourite parts of the sky) was in the shot!

I had a star tracker with me, but the stack seemed to give a cleaner image than the single 90 second exposure with the tracker.

I hope you like it and thank you again!

Eshan

Hubble Data Confirms Galaxies Lacking Dark Matter



The most accurate distance measurement yet of ultra-diffuse galaxy (UDG) NGC1052-DF2 (DF2) confirms beyond any shadow of a doubt that it is lacking in dark matter. The newly measured distance of 22.1 +/-1.2 megaparsecs was obtained by an international team of researchers led by Zili Shen and Pieter van Dokkum of Yale University and Shany Danieli, a NASA Hubble Fellow at the Institute for Advanced Study.

“Determining an accurate distance to DF2 has been key in supporting our earlier results,” stated Danieli. “The new measurement reported in this study has crucial implications for estimating the physical properties of the galaxy, thus confirming its lack of dark matter.”

The results, published in *Astrophysical Journal Letters* on June 9, 2021, are based on 40 orbits of NASA's Hubble Space Telescope, with imaging by the Advanced Camera for Surveys and a “tip of the red giant branch” (TRGB) analysis, the gold standard for such refined measurements. In 2019, the team published results measuring the distance to neighboring UDG NGC1052-DF4 (DF4) based on 12 Hubble orbits and TRGB analysis, which provided compelling evidence of missing dark matter. This preferred method expands on the team's 2018 studies that relied on “surface brightness fluctuations” to gauge distance. Both galaxies were discovered with the Dragonfly Telephoto Array at the New Mexico Skies observatory.

“We went out on a limb with our initial Hubble observations of this galaxy in 2018,” van Dokkum said. “I think people were right to question it because it's such an unusual result. It would be nice if there were a simple explanation, like a wrong distance. But I think it's more fun and more interesting if it actually is a weird galaxy.”

In addition to confirming earlier distance findings, the Hubble results indicated that the galaxies were located slightly farther away than previously thought,

strengthening the case that they contain little to no dark matter. If DF2 were closer to Earth, as some astronomers claim, it would be intrinsically fainter and less massive, and the galaxy would need dark matter to account for the observed effects of the total mass.

Dark matter is widely considered to be an essential ingredient of galaxies, but this study lends further evidence that its presence may not be inevitable. While dark matter has yet to be directly observed, its gravitational influence is like a glue that holds galaxies together and governs the motion of visible matter. In the case of DF2 and DF4, researchers were able to account for the motion of stars based on stellar mass alone, suggesting a lack or absence of dark matter. Ironically, the detection of galaxies deficient in dark matter will likely help to reveal its puzzling nature and provide new insights into galactic evolution.

While DF2 and DF4 are both comparable in size to the Milky Way galaxy, their total masses are only about one percent of the Milky Way's mass. These ultra-diffuse galaxies were also found to have a large population of especially luminous globular clusters.

This research has generated a great deal of scholarly interest, as well as energetic debate among proponents of alternative theories to dark matter, such as Modified Newtonian dynamics (MOND). However, with the team's most recent findings -- including the relative distances of the two UDGs to NGC1052 -- such alternative theories seem less likely. Additionally, there is now little uncertainty in the team's distance measurements given the use of the TRGB method. Based on fundamental physics, this method depends on the observation of red giant stars that emit a flash after burning through their helium supply that always happens at the same brightness.

“There's a saying that extraordinary claims require extraordinary evidence, and the new distance measurement strongly supports our previous finding that DF2 is missing dark matter,” stated Shen. “Now it's time to move beyond the distance debate and focus on how such galaxies came to exist.”

Moving forward, researchers will continue to hunt for more of these oddball galaxies, while considering a number of questions such as: How are UDGs formed? What do they tell us about standard cosmological models? How common are these galaxies, and what other unique properties do they have? It will take uncovering many more dark matter-less galaxies to resolve these mysteries and the ultimate question of what dark matter really is.

From: <https://www.sciencedaily.com/>

How We Know the Sun is a Star

Sometimes, as a scientist, you forget how much you take for granted about the amazingness of the universe. Recently one of my compatriots related how a friend had been completely amazed that the sun was just another star. I really loved that story because, when you think about it, humans have only figured out what stars are - and that the sun is a star - very recently in our 300,000-year history.

Astronomy 101

Of course, the sun is a light in the sky, and stars are lights in the sky. But for someone starting from scratch, they might seem really different. The sun is only “up” in the day, but the stars are only up in the night. The sun can be so hot that it literally burns your skin. Stars, on the other hand, give off no warmth at all. How did astronomers see that the sun and the stars were beasts of the same feather?

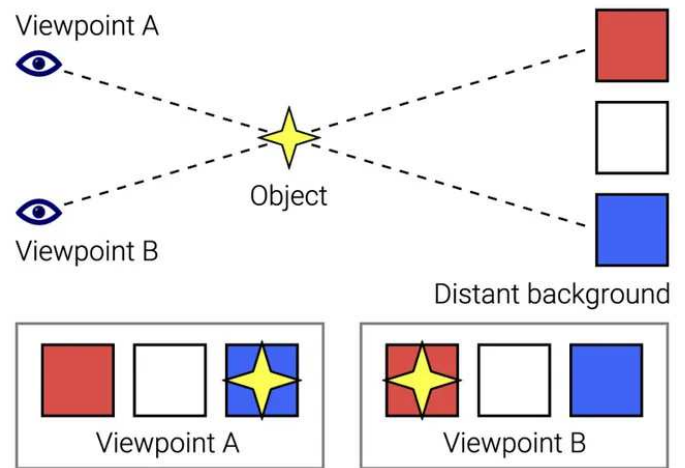
One key point was understanding that their energy output per time (what astronomers call luminosity) is similar. If stars look dim while the sun appears blinding, it's just because the sun is much closer. The luminosity of an object can be found by knowing how bright it appears to be and its distance. That means once you know the distance to an object, you can calculate its luminosity. The problem, then, of determining if the sun and stars had similar luminosities really came down to figuring out their distances. Clever people as far back as the ancient Greeks started estimating how far away the sun was, but distance measurements to the stars took humanity a lot longer.

The Problem of Parallax

The problem for the stars was the method required for calculating distances. The easiest way is what's called parallax, which relies on how a distant object shifts its position relative to a nearby object when you, the observer, shift position. You can see the effect by putting your finger up against your nose, looking at a picture on a wall, and then closing one eye and then the other. The position of your finger relative to the picture on the wall jumps back and forth as you do this.

The farther away the picture on the wall, the smaller the shift in its position. Since stars are so far away, astronomers had to wait until they had powerful telescopes before they could get accurate parallax measurements and, hence, accurate distances. Once these were determined, they found that, yes, the sun and the stars pump out comparable amounts of energy every second.

Big stars can be millions of times brighter than small stars, but what matters is that astronomers were able to determine that stars and the sun were in the same category of “luminous stuff.”



We are all Star Stuff

The next big step in showing that the sun was a star was to show that both were basically made of the same stuff. People had long imagined the sun to be made of burning stuff for obvious reasons, but what kind of stuff? Was it wood, candle wax, or coal? And what about the stars that seemed to burn so less intensely?

The answer came with the invention of spectroscopy, which involves sending sunlight or starlight through a prism to break it up into its component colors (like a rainbow). When astronomers did this with powerful enough spectrographs, they saw that the rainbow was not complete. There were dark bands or missing colors as if something had eaten the light at specific wavelengths. The dark lines were not random but appeared in specific patterns. Physicists soon found that these patterns of dark lines were like the fingerprints of specific elements (such as hydrogen, helium, nitrogen, and oxygen) in the gas that the light passed through on the way to the spectrograph.

The dark lines, therefore, seen in light from the sun or distant stars were giving astronomers an inventory of their composition. It was telling them what the sun and stars were made of. The dark lines for both were basically the same. The stars were made of the same stuff as the sun, and the sun was made of the same stuff as the stars!

With spectroscopy, astronomy became astrophysics, and soon a true science of stars began. In the decades that followed, astronomers would unpack the secrets of the inner architecture of stars, as well as the nuclear energy source that powers their titanic engines.

Through all these steps, the sun was finally recognized as just another star in the late 19th or early 20th century. It was our parent ball of nuclear fusion — neither different nor unusual compared to other stars, but, to us, very special.

From: <https://bigthink.com/>

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LINKS, COMMENTS AND OBSERVATIONS

Virtual Monthly Meetings

This is the new recurring link for our online
Monthly Meetings

Please save it and delete all other links

To Join the Zoom Meeting

Please use this link:

[https://us02web.zoom.us/j/
81142510951?pwd=a2RCQXZKMmRMeXBMSXEv
U0dxS2gzUT09](https://us02web.zoom.us/j/81142510951?pwd=a2RCQXZKMmRMeXBMSXEvU0dxS2gzUT09)

Meeting ID: 811 4251 0951

Passcode: 346096

If you possibly can, please join us for the next one. Our speakers (and club committee) give their time and effort to make the presentations as interesting as possible and they deserve our support.

Outreach Plans

During the COVID-19 lockdown and tight restrictions meant all of our plans for events and outreach had to be postponed or cancelled.

We are now starting over again to organise small events that abide with current guidelines, so you can see we are beginning to get active again.

As restrictions ease further, we shall endeavour to get out there to more events.

The Plan so far:

Space Camp - Gurnard Primary School - July

Stargazing Evening - Wight Horse Riding School - TBC Sept/Oct

VAS Observatory Tour for Young Astronomers - Oct

We shall also be involved with more Space camps when they relaunch in the Autumn Term

Elaine Spear
Outreach Officer

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.

*“A time will come when men
will stretch out their eyes.
They should see planets like
our Earth.”*

Sir Christopher Wren

*“The universe is like a safe to
which there is a combination.
But the combination is locked
up in the safe”*

Peter De Vries

*“I knew that even if I were
second or third rate, it was
astronomy that mattered”*

Edwin Hubble

*“The dinosaurs became
extinct because they didn’t
have a space program. And if
we become extinct because
we don’t have a space
program, it’ll serve us right”*

Larry Niven

*“The wireless telegraph is
not difficult to understand.
The ordinary telegraph is like
a very long cat. You pull the
tail in New York, and it
meows in Los Angeles.
The wireless is the same
only without the cat”*

Albert Einstein