New Zenith

The Monthly Newsletter of the Vectis Astronomical Society

Vol 27 Issue 9 — October 2019 *When Printed, this Newsletter costs VAS at least £1*

Society News

New Committee Members

The AGM resulted in some changes to the VAS Committee. These are detailed on page 3.

Many thanks to those who helped during 2018/19 and welcome to those just joining us for 2019/2020.

There are still vacancies for anyone who would like to join us in a non-specific role. Please get in touch if you can help.

2020 Monthly Meetings

As you will see on Page 2, many of the meetings have already been arranged. There are however two where we have been offered a choice of lecture subjects

Dr Stephen Wilkins of Sussex University has offered two alternative titles:

- The Webb Telescope (in anticipation of the launch of the Webb Space telescope in 2021); OR
- The Origin of the Elements (about the astrophysical origins of the elements; 2020 is the UNESCO International Year of the Periodic Table).

Dr Stuart Eves has offered:

- Archaeo-Astronomy; OR
- How astronomers can save the world; OR
- A talk about his book "Space Traffic Control"

Send your vote for these talks to Simon Gardner at:

progorg@wightastronomy.org

Brian Curd
Observatory Director and NZ Editor

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.

Registered Charity No 1046091

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

Contents this Month

2019 Monthly Meetings

Date	Subject	Speaker
Check *http://www.wightastronomy.org/meetings/* for the latest information		
27 Sep	What have black holes ever done for us?	Dr David Williamson
25 Oct	Dark Skies Event	
22 Nov	How (on Earth) did Life Start?	James Fradgley

2020 Monthly Meetings

Date	Subject	Speaker
24 Jan	TBA	TBA
28 Feb	Dark Skies Event	
27 Mar	Hoys-Caps Citizen Science Project	Dirk Froebrich
24 Apr	TBA	TBA
22 May	**See Front Page**	Dr Stephen Wilkins
26 Jun	**See Front Page**	Dr Stuart Eves
24 Jul	Young Astronomer's Event	
28 Aug	AGM	
Sep	TBA	TBA
Oct	TBA	TBA
Nov	TBA	TBA

Observatory Visits Booked

No bookings so far

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

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

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 2018/19

President	Barry Bates president@wightastronomy.org
Chairman	Bryn Davis chairman@wightastronomy.org
Secretary	Richard Flux secretary@wightastronomy.org
Treasurer	Stewart Chambers treasurer@wightastronomy.org
Observatory Director	Brian Curd director@wightastronomy.org
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Astro Photography	Simon Plumley ap@wightastronomy.org
Outreach	Elaine Spear outreach@wightastronomy.org
NZ Editor	Brian Curd editor@wightastronomy.org
Membership Secretary	Mark Williams members@wightastronomy.org
NZ Distribution	Graham Osborne distribution@wightastronomy.org
Others	Dudley Johnson

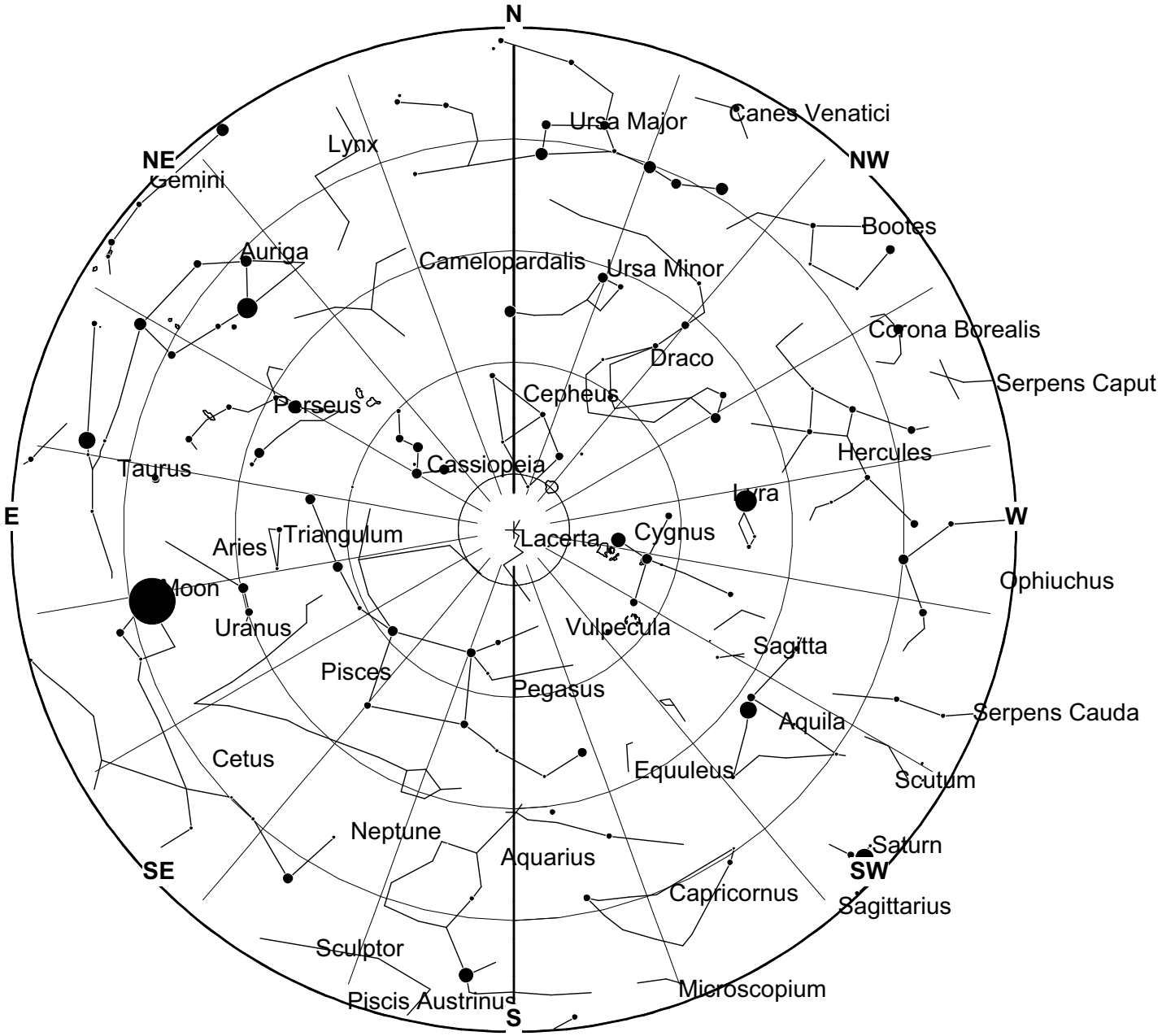
Important

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.

October 2019 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 October 2019

The **North America Nebula** (NGC 7000 or Caldwell 20) is an emission nebula in the constellation Cygnus, close to Deneb (the tail of the swan and its brightest star). The remarkable shape of the nebula resembles that of the continent of North America, complete with a prominent Gulf of Mexico.

The North America Nebula is large, covering an area of more than four times the size of the full moon; but its surface brightness is low, so normally it cannot be seen with the unaided eye. Binoculars and telescopes with large fields of view (approximately 3°) will show it as a foggy patch of light under sufficiently dark skies

October 2019 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
28th	5th	13th	21st

Planets

Mercury

Mercury continues its poor evening apparition, setting about 30 minutes after the Sun.

Venus

Venus may be glimpsed low in the west-south-west just after sunset. As the month progresses it moves away from the Sun but, because in the early evening at his time of year the ecliptic, the path that the Sun follows through the sky is very low. It does not rise higher in the sky, it just moves further south. This means that Venus still sets just after the Sun making it difficult to spot

Mars

Mars is still too close to the Sun to be visible this month.

Jupiter

As the sky darkens after sunset, the first object to become visible low in the south-southwest is Jupiter. It is now though rather too low in the sky for serious observation. The cloud bands and moons are easily visible, but the atmospheric turbulence will degrade the appearance.

Saturn

After Jupiter the next object to become visible is Saturn low in the south-southeast. It is not as bright as Jupiter, but is the brightest object in that part of the sky. As with Jupiter the atmospheric turbulence will degrade the seeing.

Uranus

Uranus lies on a line between the fourth magnitude star Mesarthim in Aries and the slightly fainter Xi2 Ceti. It is about 8° south of Mesarthim and 5° north of Xi2.

Neptune

At the start of the month Neptune draws is just to the east of the fourth magnitude star Phi Aquarii. There is also a star of similar brightness to Neptune close by; Neptune is the more northerly of the two. On the 5th and 6th Neptune passes within about 1 arc minute of the star and by the end of the month is just over a moon diameter to the west.

Deep Sky

NGC6946 Galaxy
RA 20h 35m Dec 60° 11' mag 9.7

Located just off the plane of the Milky Way, the intervening material in our own galaxy helps makes this face on spiral galaxy represents a rather challenging object. At a distance of about 10M light years it is relatively close by galactic standards, but this does not make it any easier to see. Use as large an instrument as you can on this galaxy to reveal the structure in the spiral arms. This galaxy has hosted 8 supernovae in the past 90 years, something of a record. After observing this galaxy or if the sky or your eyes fail you with this target, stop by at the nearby open cluster NGC6939. At low power both objects will be in the same field of view.

NGC6910 Open Cluster
RA 20h 23m Dec 40° 48' mag 7.4

NGC6910 is a small cluster located about ½° north of Sadr the central star of Cygnus. The brighter members make a cluster of three short spokes.

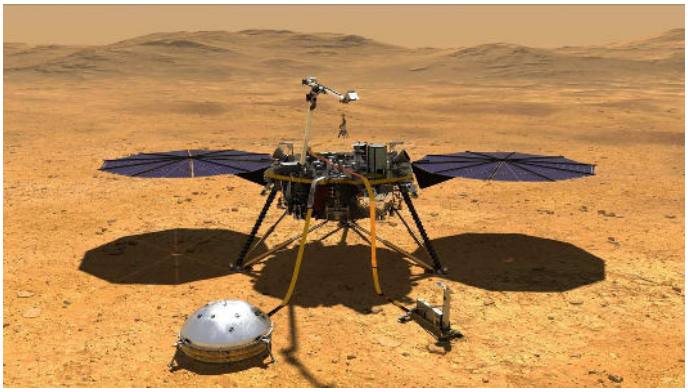
NGC7000 North America Nebula
RA 20h 59m Dec 44° 28' mag 4.0

Located 3° to the east of Deneb in Cygnus is this large misty patch in the Milky Way that can be seen with the naked eye. Unless the sky is very dark this nebulosity is the light from the myriad of background stars, if conditions are suitable the darker rift of the 'Gulf of Mexico' can be visualised. Large aperture binoculars or a rich field telescope will help reveal the nebulosity. Most of the light emitted is the deep red of hydrogen alpha, to which our eyes lack sensitivity. A nebula filter can help to increase the contrast with the background sky glow. This is a rewarding area for long exposure photography.

Peter Burgess

Strange Magnetic Pulses that Happen at Midnight Detected on Mars

A NASA robot on Mars sends back unusual findings, including timed magnetic pulses.



- Scientists reveal preliminary findings from NASA's Insight Lander on Mars.
- The lander has been on Mars since November 2018.
- The data includes detection of magnetic pulses, happening at local midnight.

NASA's Insight Lander, a robot designed to study the deep insides of Mars, taking its vital signs, has sent back a wealth of information. Within the preliminary findings is evidence of a strange magnetic pulse some times emanating from the planet precisely at midnight.

The seemingly timed nature of the phenomenon raised the attention of the scientists poring over the data. The cause of the pulsation is currently unknown. The researchers are trying to pinpoint whether the signal is from deep underground or closer to the surface.

What's unusual about this occasional magnetic pulsation or wobbling is that it happens at a time when such events would be unlikely on Earth, where they are often related to northern or southern lights, explains National Geographic. While we don't know yet why the ones on Mars take place, the scientists conjecture that it may have to do with how the location of the lander on Mars aligns with the tail of the magnetic bubble around Mars. This tail may be interacting with the magnetic field on its way by, causing the pulsing. NASA scientists are planning further research, including flying the MAVEN orbiter above the lander to confirm this suspicion.

The information was presented at the joint meeting of the European Planetary Science Congress and the American Astronomical Society, taking place in Geneva, Switzerland between from 15th to 20th of September, 2019.

The Insight Lander has been on the red planet since November 2018. Among the information it's collected is the temperature of the upper crust, sounds of earthquakes recorded inside Mars, and measurements of the magnetic field.

Data from the lander shows that the crust of the planet is much more magnetic than predicted, ten times more so than Earth's. Mars's magnetosphere extends 60 to 250 miles above, also found out the lander. This suggests to the scientists that Mars once had a large magnetic field that was possibly able to support life. Once that was gone, radiation was sure to make the planet what it is now.

More at: https://bigthink.com/

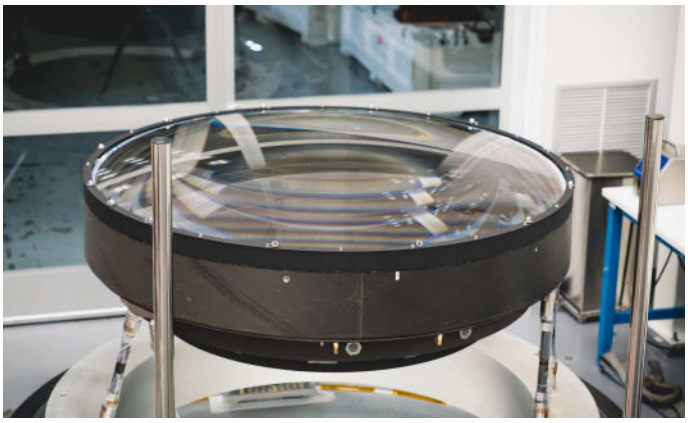
I Thought I Might Order a Couple!

I found this item on the *First Light Optics Website*.

Take a look for yourself; it's down at the bottom of the *OFFERS* page.

I bet they'd charge extra for Island delivery!

Moving the Largest High-Performance Lens Ever Built



Not all the most interesting telescopes need to live in space. The Large Synoptic Survey Telescope (LSST) will sit on top of a mountain in Chile some 8,800 feet up and snap 3.2-gigapixel (3,200-megapixel) images of the sky every 20 seconds. All told, it will be able to snap digital images of the entire southern sky every few nights. By taking relatively long 15-second exposures, scientists will be able to study the early universe, track dimly-lit asteroids and better understand dark energy.

The LSST cameras has 32 times the resolution of the best consumers shooters out there in order to image the maximum amount of sky possible. It's also the "largest CCD [charge coupled device] mosaic in the world," according to the contractor that worked on it. To focus all that light, the telescope has a very wide 3.5-degree diameter field of view and extremely fast aperture, giving it an immense 319 meters-squared, degrees-squared "entundue" - three times more than the best current telescopes.

To achieve that feat, it will use three mirrors, with the primary at 8.4 meters (28 feet) in diameter, the secondary at 3.4 meters and the tertiary at 5 meters. The challenge is to get rid of any aberrations, which is where the lens above comes into play.

SLAC said that the 1.55-meter (5.1-foot) L1 lens shown above is the "largest high-performance optical lens ever fabricated." It was designed by Lawrence Livermore National Laboratory (LLNL), based on work spanning nearly two decades, and fabricated using very advanced optic systems. It was built, along with the 1.2-diameter L2 companion lens, by Ball Aerospace and subcontractor Arizona Optical Systems in a process that took five years.

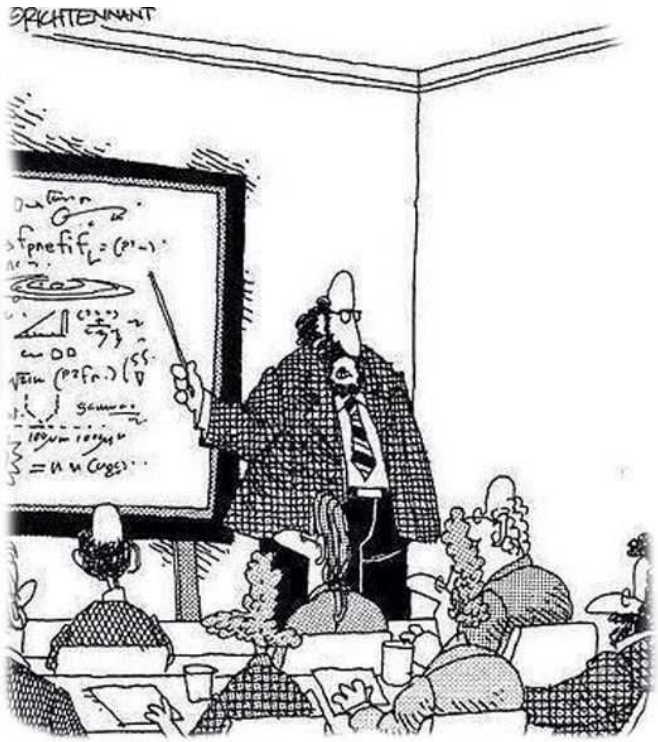
"The success of the fabrication of this unique optical assembly is a testament to LLNL's world-leading expertise in large optics, built on decades of experience in the construction of the world's largest and most powerful laser systems," said physicist Scot Olivier.

The camera itself is the size of a small car and weighs more than three tons. Each massive image it produces will be a gold mine for scientists, and it's expected that the LSST will detect about 20 billion galaxies during a 10-year time frame, while also creating time-lapse movies that could reveal changes in galaxies and stars.

The images won't just benefit scientists. "Anyone with a computer will be able to fly through the universe, past objects 100 million times fainter than can be observed with the unaided eye." SLAC and LSST hope it will become a platform for crowd-sourced astronomical discoveries. The LSST is scheduled to start imaging the southern sky by 2023.

Suffice to say, this is one valuable piece of glass, so moving it from Tucson, Arizona to the SLAC National Accelerator Laboratory in Menlo Park was a bit of an event, according to SLAC's Flickr site. And yes, it was apparently shipped by FedEx.

Extra links at: https://www.engadget.com/

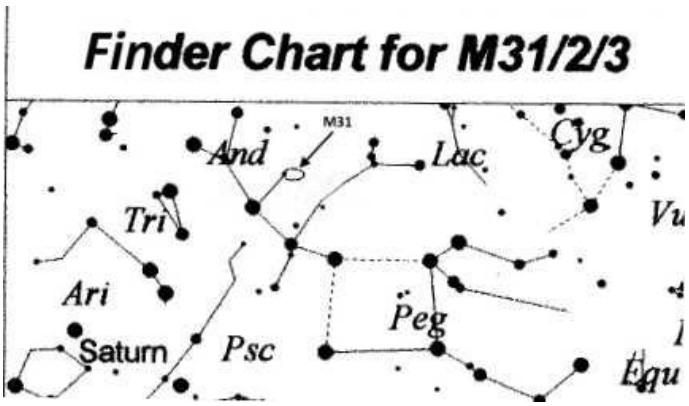


My 100 Best Night Sky Sights

Spiral Galaxies

It may not have passed unnoticed that there has been no mention of galaxies at all in any of the last four articles, so here to rectify that omission are three of them all at once.

Coordinates: M31 - RA: 00h 42m 42s, Dec: +41° 16'
M110 - RA: 00h 40m 24s, Dec +41° 41'



The ***Great Andromeda Galaxy*** is to some observers one of the most awe-inspiring sights in the heavens and to others a great disappointment (initially I was in the latter category but not now). The major galaxy of the local group to which our own Milky Way Galaxy belongs, M31 is relatively close to us and therefore we see it larger than any other save for our two satellite galaxies, the Magellanic Clouds, and they're too far south to see from the UK. Despite this proximity it shows little detail through telescopes possessed by most amateur astronomers, hence the potential disappointment. But it has positive attributes in plenty, many of which are possessed by no others.

It can be seen with the unaided eye as a faint elongated patch of hazy light on any reasonably clean autumnal night by anyone with average good eyesight. If you do have difficulty in making it out, any pair of binoculars will show it easily when it will now be significantly larger and brighter as the greater light grasp reveals more of the galaxy.

It's when M31 is observed through a telescope that some are disappointed. Although covering an area of sky some eight times that of the Moon (nearly 3° long by 2/3° across) only the central third is revealed to medium sized telescopes and in most it spreads out beyond the field of view so you have to pan the instrument to see it all.

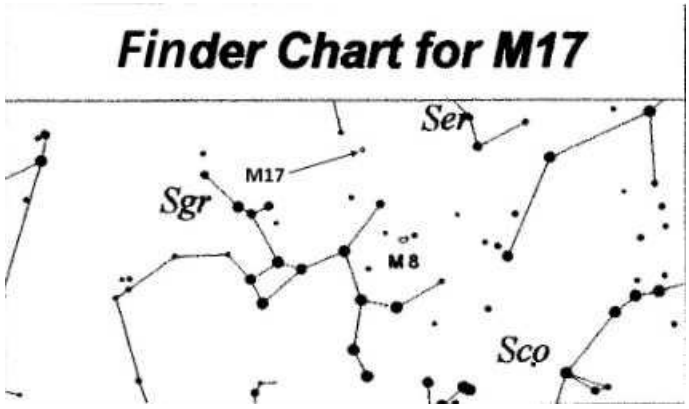
But there's much more to M31 than a large, bright patch of light. Just as we have our Magellanic clouds, so the Andromeda Galaxy has two attendants of its own. To the south is the elliptical galaxy ***M32***, which looks like a small, bright ball of light, separated from its parent by clear, dark sky. When photographed by large telescopes, so much more of the parent is visible that junior is seen superimposed against one edge of the spiral galaxy.

But wait, what's this fuzzy oval patch lurking on the other side of M31. This is ***NGC205*** (aka ***M110***), the other elliptical satellite galaxy situated ½° to the NW and, although much larger than M32, appearing less bright and decidedly elliptical. Rich field telescopes used with a low power eyepiece will contain all three galaxies in the same view – a really fine sight (my 10" SCT at f6.3 with a 40mm eyepiece just captured this spectacle).

When you gaze upon M31 reflect upon a few data. The great spiral galaxy shines with the light of 200 to 300 ***billion*** suns, yet its distance is such that we can only just make it out without optical aid. If it ceased to exist we would not know it for another 2.3 million years. Although it occupies a mere 3° of sky, it takes light, travelling at 300,000 kilometres per second, over 130 years to cross from one edge to the other. Doesn't it make you feel small? – a great way to place any problems you may have in perspective!

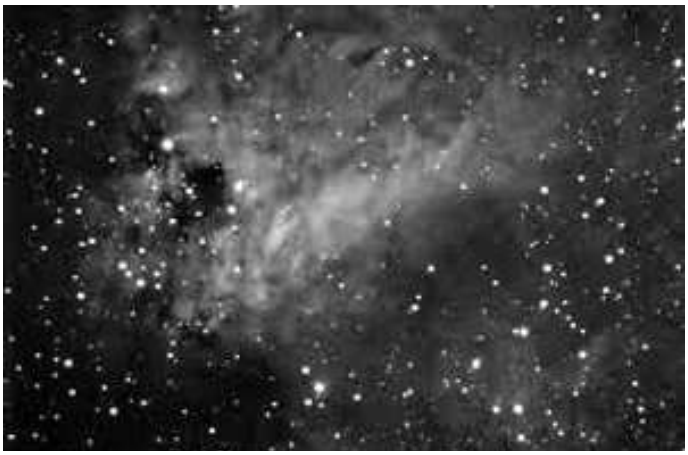
Emission Nebula

Coordinates: RA: 18h 20m 48s, Dec -16° 11'



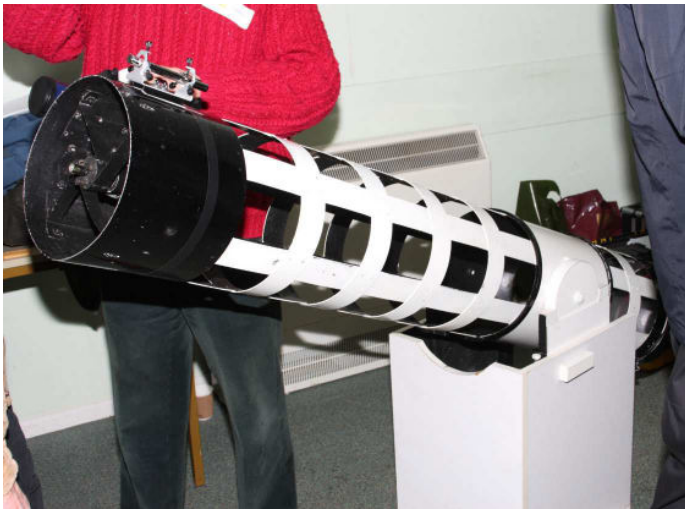
When balmy summer evenings make you wish for excuses not to retire for the night there can be few better than the sight of ***M17 – the Swan Nebula.*** Although inhabiting the southern constellation of Sagittarius it's at its northern extremity and so well positioned for our delight, especially in July when it is at its highest elevation. In my opinion M17 vies for pole position in the nebula category. Described by some as a 'tick' or a figure 2 in the sky and alternatively known as the Omega Nebula, when you look at it there is no doubt whatsoever that this beautiful object is a swan, serenely floating along the starry river. This strong impression is immeasurably enhanced in telescopes that invert ***and*** reverse the image when, with no drive engaged the swan drifts majestically across the scene. Almost any telescope will reveal this lovely sight, with the graceful curve of its neck bowed as it dips its beak into the celestial waters.

This just has to be one of the most engaging views anywhere in the heavens and it would be difficult to imagine it capable of improvement, but M17 provides one of the many incentives to acquire an Olll filter. With this, admittedly expensive, device attached to the eyepiece the swan appears to stand out from the darkened background sky and, with an 8" or larger instrument in really good conditions it's possible to glimpse fainter elements of the nebula looking incredibly like its wings folded in classical form across its back.



If the editor can reproduce the photograph it will provide some indication of the splendour of the object but nevertheless will be only a pale shadow of the true spectacle that just has to be seen and that can be found 9° due north of the Sagittarius 'teapot lid'.

Originally published in March 2000
Bert Paice



Bert's homemade Dobsonian.
Over many years, a much loved and much used telescope

Young Astro and Science Fest

Saturday 27th July 2019

We get many visitors to the observatory on a Thursday when we are open to the public, some local and some visitors to the Island. We also host local groups, such as WI and camera clubs. When we have held our various open evenings or Dark Skies events in conjunction with the AONB and CPRE we have seen between 80 and 150 people attend, usually adults, with a few children.

We also see beavers, scouts and brownies, hence, we are seeing more and more children, so we decided on the idea of running an event aimed at young people. The idea was to enthuse, excite and teach children some interesting things about science and astronomy. We borrowed and hired gazebos, scout mess tents, and used the pavilion, observatory and field divided into the following zones:

Amazing Stargazing (Pavilion)

Paul England brought along his inflatable indoor planetarium and ran 7, 20min shows. Bryn Davis and Stewart Chambers were glamorous assistants.

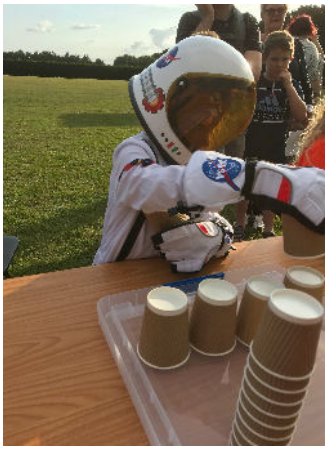
Tech Central (Observatory)

Ohbot Robot, Radio Astronomy displays with Dudley Johnson, Brian Curd gave demonstrations using Stellarium on the observatory computers and tours of the dome. Ohbot Robot is a programmable Robot using a system called scratch.

Thanks to Mark Taylor for programming the robots with some interesting astronomy facts to make them fun for the children to play with.

Telescope City

Telescope viewing was hosted by Richard Flux, Bert Paice and Simon Plumley. John Slinn brought his solar telescope and set up across the field.



Astro Art

Make a planet mask, pinwheel galaxy, sundial and star finder were run by Carly Rees and Lou Yardley. Teacher and teaching from St Helens school, who wanted to return the favour to us for attending their space camp.

Astronaut Haven

Astronaut Training tasks were run by Claire Loizos, the teacher who instigated all the Space Camps within schools. Activities included, decoding Russian, agility, memory tests under pressure and making space suit badges.

Fun Physics

Science demonstrations and activities were run by Dr Helen Clark and Chris Prowse, from The Institute of Physics. They were aided by Amelie Mulhern, who's recently completed her GCEs and has an interest in physics and wanted to volunteer.

Mark Williams was also in the physics tent, making spectroscopes and conducting demonstrations and experiments with lasers and magnets.

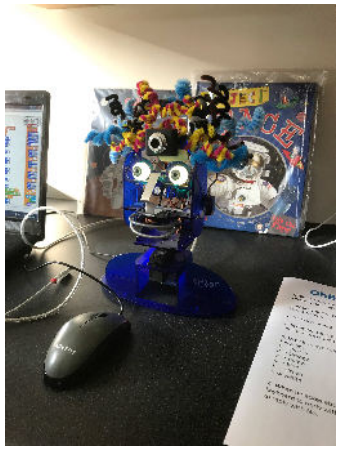
Dress up Like an Astronaut

Complete a task in an Astronaut suit, was the most popular activity and Madeline Paterson had the longest queue. Everyone wanted to be an astronaut, so next year we need more suits.

Adventure to Mars

What would you take on the 11 month journey? This game also proved popular and was run by Simon Gardner.

We had many objects laid out on a table including, a stethoscope, scaled down exercise bike and treadmill, a Kindle, camera and first aid kit. The idea was to pick 10 items to take on the mission.



Hedgehogs from Outer Space

Author Elizabeth Morley, was on hand to sign books and talk about some of the science and space activities in the book.

There were many activities for the children to participate in, with competitions and prizes awarded.

Months of planning went into the event, creating the activities and gathering support from outside association and volunteers. The local scouts helped with car park duty and, across the whole site, assisted in some of the activities.

In total we had 84 children and 62 adults turn up, which is excellent for our first junior event.

Without the help of many members, friends, family and volunteers one of this would have been possible - so thank you all.

Special thanks to Katherine Davis and Christine Chambers for making the cakes, and providing refreshments and to Jill and Jon Buck, for operating the entrance and exit.

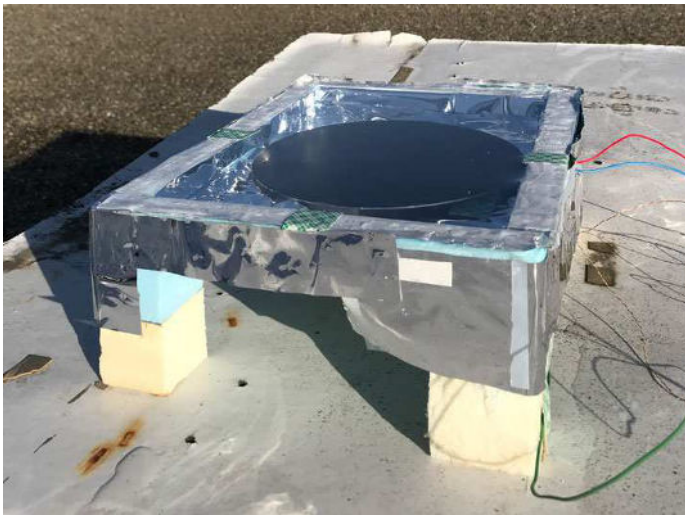
This is going to be an annual event from now on, and could get bigger, so more volunteers will be needed. Please get involved with this amazing fun event.

Elaine Spear

Editor's Note: *This event was a Herculean effort by Elaine who organized the whole thing end-to end.*
Her attention to detail amazed the VAS Committee as the weeks of preparation went by.
No wonder everything went so well! Thanks Elaine.

This Device Harnesses the Cold Night Sky to Generate Electricity in the Dark

A prototype powered a small light-emitting diode in a trial run



A new device is an anti-solar panel, harvesting energy from the cold night sky.

By harnessing the temperature difference between Earth and outer space, a prototype of the device produced enough electricity at night to power a small LED light. A bigger version of this nighttime generator could someday light rooms, charge phones or power other electronics in remote or low-resource areas that lack electricity at night when solar panels don't work, researchers report online September 12 in Joule.

The core of the new night-light is a thermoelectric generator, which produces electricity when one side of the generator is cooler than the other (SN: 6/1/18). The sky-facing side of the generator is attached to an aluminium plate sealed beneath a transparent cover and surrounded with insulation to keep heat out. This plate stays cooler than the ambient air by shedding any heat it absorbs as infrared radiation (SN: 9/28/18). That radiation can zip up through the transparent cover and the atmosphere toward the cold sink of outer space.

Meanwhile, the bottom of the generator is attached to an exposed aluminium plate that is continually warmed by ambient air. At night, when not baking under the sun, the top plate can get a couple of degrees Celsius cooler than the bottom of the generator.

Engineer Wei Li of Stanford University and colleagues tested a 20-centimetre prototype of the device on a clear December night in Stanford, Calif. The generator produced up to about 25 milliwatts of power per square meter of device — enough to light a small light-emitting diode, or LED bulb. The team estimates that further design improvements, like better insulation around the cool top plate, could boost production up to at least 0.5 watts per square meter.

"It's a very clever idea," says Yuan Yang, a materials scientist at Columbia University not involved in the work. "The power generation is much less than solar panels," which generally produce at least 100 watts per square meter. But this nighttime generator may be useful for emergency backup power, or energy for people living off the grid, Yang says.

A typical lamp bulb might consume a few watts of electricity, says Shanhui Fan, an electrical engineer at Stanford University who worked on the device. So a device that took up a few square meters of roof space could light up a room with energy from the night sky.

Aaswath Raman, a materials scientist and engineer at UCLA, also envisions using their team's generator to help power remote weather stations or other environmental sensors. This may be especially useful in polar regions that don't see sunlight for months at a time, Raman says. "If you have some low-power load and you need to power it through three months of darkness, this might be a way."

Links etc at: https://www.sciencenews.org/

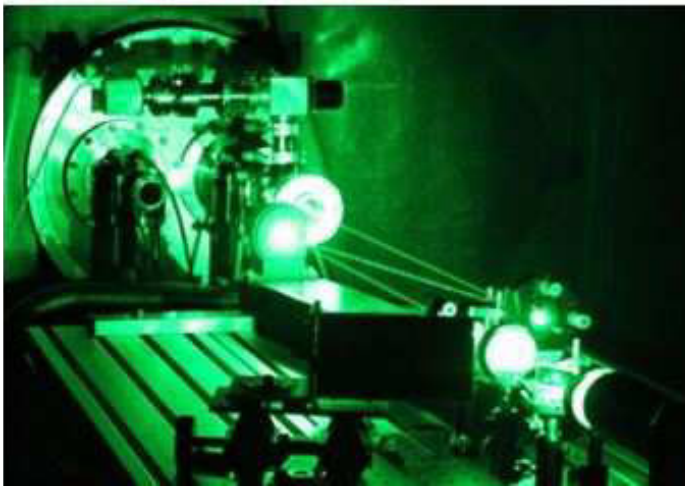
Physicists Invent a New Way to Search for Dark Matter Using Lasers

Japanese physicists devise technology to discover axion dark matter.

- Physicists from the University of Tokyo plan to use lasers to discover axions.
- Axions are theoretical particles that may be components of dark matter.
- Dark matter is a mysterious substance that may compose up to 27% of the universe.

Japanese physicists propose modifications to existing equipment that could allow them to pinpoint axions, hypothetical particles that may be components of dark matter. Dark matter, a mysterious theoretical substance that is thought to make up about 27% of all matter in the universe, is yet to be directly observed.

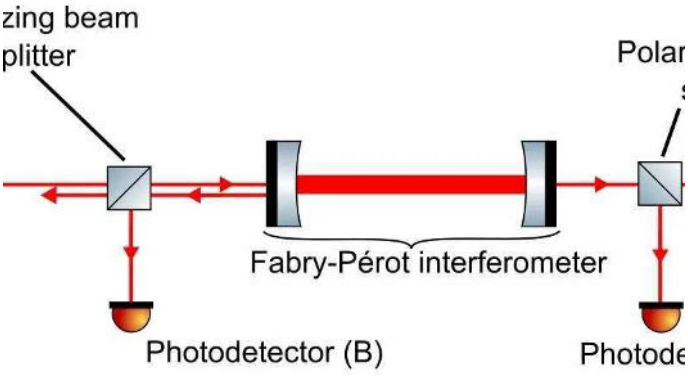
The scientists hope to track down the elusive axions using experiments with lasers.



The difficulty in finding dark matter is that it is made of, as many physicists think, weakly interacting massive particles or WIMPs, produced in the early Universe. While we haven't figured out how to spot these particles directly, interacting with regular matter, but we've been able to predict their existence by the gravitational effects they have throughout the universe.

The celebrated Large Hadron Collider in Switzerland has been used to search for WIMPs, and now a new approach from Japan hopes to use the KAGRA Observatory to discover dark matter by tracking down axions.

KAGRA stands for the Kamioka Gravitational Wave Detector. This first major gravitational wave observatory in Asia is located deep under a mountain of the Kamioka mine in Japan's Gifu Prefecture.



A schematic for the proposed instrument to hunt for axion dark matter.

The Assistant Professor Yuta Michimura from the Department of Physics at the University of Tokyo, which runs the KAGRA project, explained that because axions are light and don't interact with normal matter, they are good candidates for dark matter.

Interestingly, he also quantified how much dark matter is there, saying the amount of it inside our planet would weigh as much as a squirrel -

"We don't know the mass of axions, but we usually think it has a mass less than that of electrons," said Michimura. "Our universe is filled with dark matter and it's estimated there are 500 grams of dark matter within the Earth, about the mass of a squirrel."

As you can imagine, spotting such particles is no easy task. Physicists have to figure out ways that can make the particles reveal themselves through their signatures.

Koji Nagano, a graduate student at the Institute for Cosmic Ray Research at the University of Tokyo, says that their models show that axions affect light polarization, which describes the geometrical orientation of oscillating electromagnetic waves.

Their method of finding axions relies on this finding.

"This polarization modulation can be enhanced if the light is reflected back and forth many times in an optical cavity composed of two parallel mirrors apart from each other," further expounds their approach Nagano.

The best examples of such cavities, says the researcher, are the long tunnels of gravitational-wave observatories.

The team proposes plans to inexpensively modify existing observatories like KAGRA or the Laser Interferometer Gravitational-Wave Observatory (LIGO) in the U.S. to search for the axions. The plan, according to Michimura, would be to add "polarization optics in front of photodiode sensors in gravitational-wave detectors."

The idea's additional benefit is that it doesn't require building entirely new facilities. Upgrading gravitational wave labs would not hamper their original missions — looking for gravitational waves. But the new functionality would open a new chapter in the search for dark matter.

The study involved Koji Nagano, Tomohiro Fujita, Yuta Michimura, and Ippei Obata.

Check out the their paper "Axion Dark Matter Search with Interferometric Gravitational Wave Detectors" in the journal Physical Review Letters.

More info and links at: https://bigthink.com/

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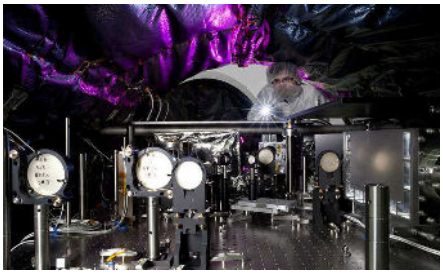
LINKS, COMMENTS AND OBSERVATIONS

WFIRST Space telescope fitted for 'starglasses'



When a new NASA space telescope opens its eyes in the mid-2020s, it will peer at the universe through some of the most sophisticated sunglasses ever designed.

This multi-layered technology, the coronagraph instrument, might more rightly be called "starglasses": a system of masks, prisms, detectors and even self-flexing mirrors built to block out the glare from distant stars - and reveal the planets in orbit around them.

Normally, that glare is overwhelming, blotting out any chance of seeing planets orbiting other stars, called exoplanets, said Jason Rhodes, the project scientist for the Wide-Field Infrared Survey Telescope (WFIRST) at NASA's Jet Propulsion Laboratory in Pasadena, California.

A star's photons - particles of light - vastly overpower any light coming from an orbiting planet when they hit the telescope.

"What we're trying to do is cancel out a billion photons from the star for every one we capture from the planet," Rhodes said.

And WFIRST's coronagraph just completed a major milestone: a preliminary design review by NASA. That means the instrument has met all design, schedule and budget requirements, and can now proceed to the next phase: building hardware that will fly in space. It's one of a series of such reviews examining every facet of the mission, said WFIRST Project Scientist Jeffrey Kruk of NASA's Goddard Space Flight Center in Greenbelt, Maryland.

"Every one of these reviews is comprehensive," Kruk said. "We go over all aspects of the mission, to show that everything hangs together."

The WFIRST mission's coronagraph is meant to demonstrate the power of increasingly advanced technology. As it captures light directly from large, gaseous exoplanets, and from disks of dust and gas surrounding other stars, it will point the way to technologies for even larger space telescopes.

Future telescopes with even more sophisticated coronagraphs will be able to generate single pixel "images" of rocky planets the size of Earth. Then the light can be spread into a rainbow called a "spectrum," revealing which gases are present in the planet's atmosphere - perhaps oxygen, methane, carbon dioxide, and maybe even signs of life.

"With WFIRST we'll be able to get images and spectra of these large planets, with the goal of proving technologies that will be used in a future mission - to eventually look at small rocky planets that could have liquid water on their surfaces, or even signs of life, like our own," Rhodes said.

In this way, WFIRST is a kind of pioneer. That's why NASA considers the coronagraph to be a "technology demonstration." While it is likely to generate important scientific discoveries, its main job is to prove to the scientific community that complex coronagraphs really can work in space.

"This may be the most complicated astronomical instrument ever flown," Rhodes said.

Read more at: https://phys.org/

At The Observatory

For your own safety, please bring a torch.
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

NZ needs letters, articles, reviews or pictures related to astronomy.

"For me, it is far better to grasp the Universe as it really is than to persist in delusion, however satisfying and reassuring"
Carl Sagan

"I... a universe of atoms, an atom in the universe"
Richard Feynman

"Something deeply hidden had to be behind things"
Albert Einstein

"It took less than an hour to make the atoms, a few hundred million years to make the stars and planets, but five billion years to make man"
George Gamow

"All what we think and know is an illusion. Nothing exists. Everything is an opinion"
Ash Vaz

"Everything is drawn inexorably toward the future"
Kip S. Thorne