

Society News

Obvious News

The Observatory is Closed and All Monthly Meetings are Cancelled Until Further Notice

As I am sure everyone must know, we are unable to hold meetings during the current Covid-19 virus pandemic.

The VAS Observatory is closed and all meetings are currently cancelled.

The government will let us know when the situation changes and, of course, we will contact members both here, via the website and social media when that situation changes.

I hope we can resume normal activities soon but we find ourselves affected by a very serious situation.

Stay safe and well and, let's hope we're back to normal soon.

Not Quite so Obvious News

Sorry to report that very little, if anything, has changed on Earth since last month!

The lock down is still firmly in place and the skies are slowly clearing, other than that.....

Various VAS committee members are working hard trying to get permission(s) for some online talks and presentations - I'll send out an email to members when/if this goes through.

Please be assured that there are many other societies and members trying to get something similar in place - I suspect this means it will happen it's just a case of when.

Please feel free to contribute to NZ with photos, questions, articles or anything which may be of interest to others.

Stay safe and well.

*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:

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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.

Registered Charity No 1046091

Observatory Diary

The VAS Observatory is closed to all members and visitors until further notice

VAS Website: wightastronomy.org

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2020 Monthly Meetings

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

All Monthly Meetings are Cancelled Until Further Notice

Sorry for the rather blunt (but nonetheless obvious) headline!

As I am sure everyone must know, we are unable to hold meetings during the current Covid-19 virus pandemic.

All meetings are currently cancelled and the VAS Observatory is closed. The government will let us know when the situation changes and, of course, we will contact members both here and via the website and social media when that situation changes.

I hope we can resume normal activities quite soon but we find ourselves affected by a very serious situation.

Stay safe and well and let's hope we're back to normal soon.

Observatory Visits Booked

All Observatory Visits are Cancelled Until Further Notice

Please see the important information above this.

IMPORTANT

Could all VAS members please ensure they notify the Membership Secretary of any change of address. To ensure our compliance with GDPR rules, we must maintain accurate membership records.

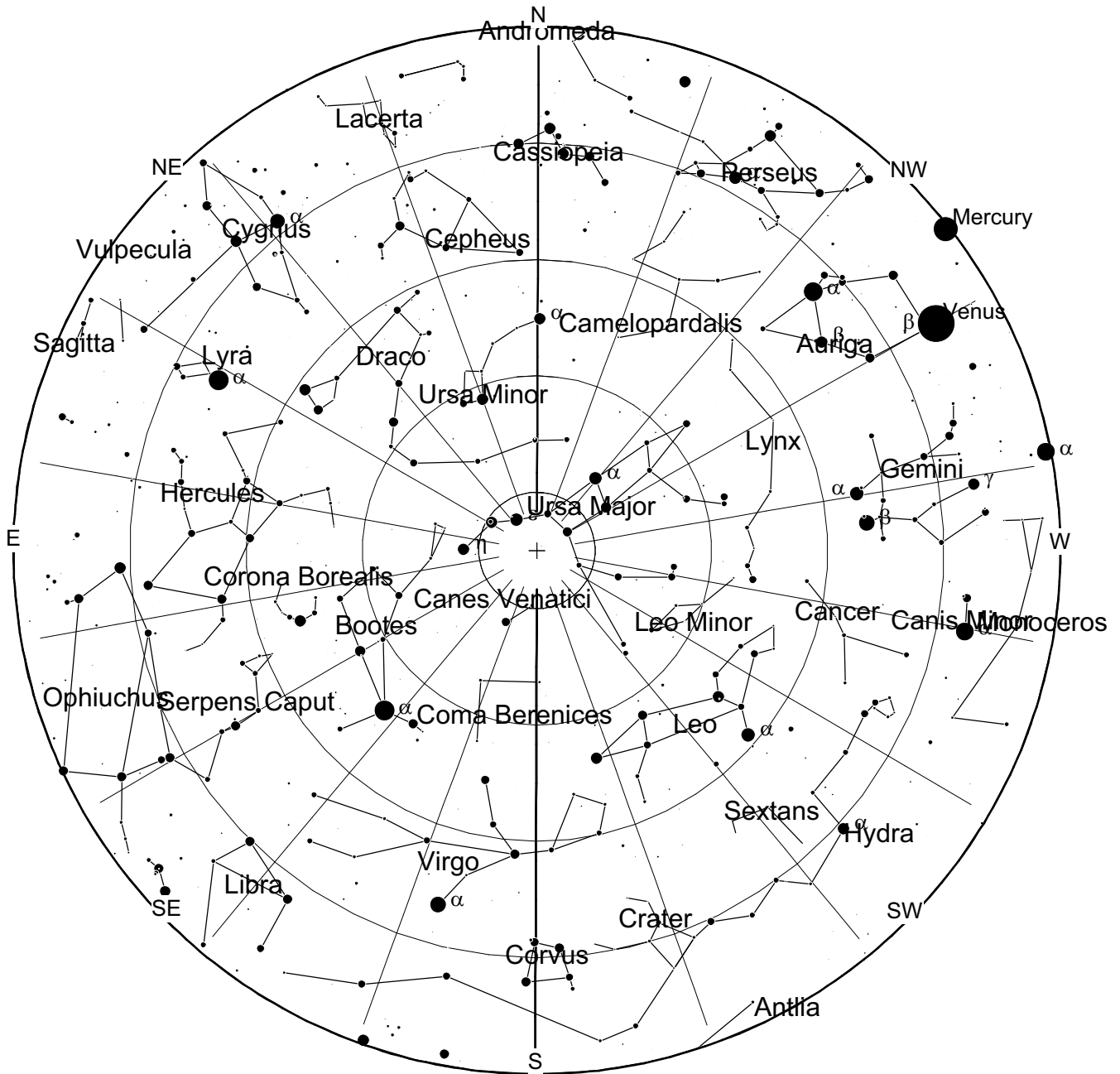
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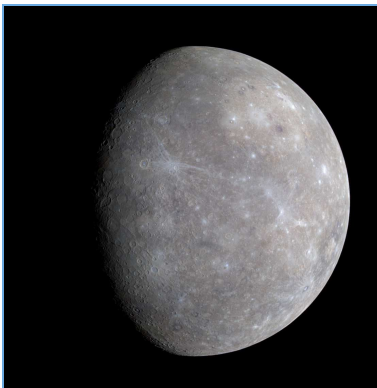
Important

The VAS Observatory is closed to all members and visitors until further notice

May 2020 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 May 2020



Mercury is the smallest and innermost planet in the Solar System. Its orbit around the Sun takes 87.97 days, the shortest of all our planets.

Like Venus, Mercury orbits the Sun within Earth's orbit as an inferior planet, and its apparent distance from the Sun as viewed from Earth never exceeds 28°. This proximity to the Sun means the planet can only be seen near the western horizon after sunset or eastern horizon before sunrise, usually in twilight. At this time, it may appear as a bright star-like object. The planet telescopically displays the complete range of phases, similar to Venus and the Moon, as it moves in its inner orbit relative to Earth.





Mercury is tidally locked with the Sun in a 3:2 spin-orbit resonance, meaning that relative to the fixed stars, it rotates on its axis exactly three times for every two revolutions it makes around the Sun. An observer on Mercury would therefore see only one day every two Mercurian years.

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It uses material from the Wikipedia article "Mercury".

May 2020 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
22nd	30th	7th	14th

Planets

Mercury

Mercury makes a good appearance in the evening sky this month. On the 21st & 22nd it is in close conjunction with Venus making it much easier to spot in the bright evening sky.

Mercury Altitude & Azimuth at 21:00 -						
Date	Az	Alt		Date	Az	Alt
13	298	6		23	293	14
15	297	8		25	292	15
17	296	9		27	291	15
19	295	11		29	290	16
21	294	12		31	290	16

Venus

Venus heads towards opposition with the Sun this month. During the last week of the month it will drop noticeably in the sky each night until, by the last few days of the month, it will be lost to view.

Mars

Mars straggles behind Jupiter and Saturn as they pull away from it, heading towards the south in the predawn sky, while Mars stays close to the eastern horizon. Look for it low in the south east from about 4am onwards. On the 16th it is just above the crescent moon.

Jupiter

From about 3am onwards Jupiter can be seen in the south eastern sky. It is by far the brightest star like object in that part of the sky and can be seen while it is quite close to the horizon. On the 15th it makes a nice grouping with the crescent moon and the much dimmer Saturn.

Saturn

Saturn can be found about 5° to the east of the much brighter and similarly coloured Jupiter. Neither planet is

well placed in the sky for observation this year, so if you are an early riser you may as well start observing from this month onward, the views are not going to get significantly better.

Uranus & Neptune

Both outer planets are lost in the glare of the Sun until later in the year.

Deep Sky

M5 Globular Cluster

RA 15h 19m Dec 2° 3' mag 6



Easily visible as a fuzzy patch through binoculars M5, at 13,000,000,000 years old is one of the most ancient of these star clusters that surround our galaxy. The telescopic view is of a bright, slightly squashed core surrounded by numerous well resolved halo stars.

M64 Black Eye Galaxy

RA 12 57m Dec 21° 38' mag 9



The Black Eye galaxy gets its name from the dark dust lane that crosses its centre. It will need a dark sky and high magnification to spot the 'eye'.

M94 Cat's Eye Galaxy

RA 12 51m Dec 41° 4' mag 8.1

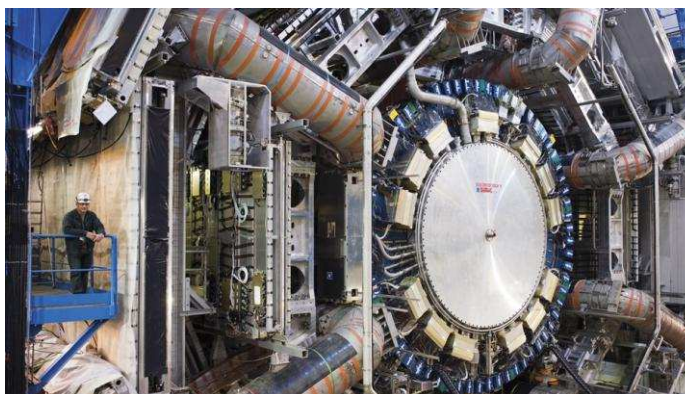


This is a face on spiral galaxy with tightly wrapped arms ringed by bright new stars. This indicates that this galaxy may have been in a collision in the astronomically recent past. The visual appearance is of a bright core surrounded by a faint evenly illuminated oval halo. The spiral arms are too tightly wound to show any detail in all but the very largest amateur telescopes.

Peter Burgess

Columbia to Upgrade Large Hadron Collider, the World's Largest Atom Smasher

The National Science Foundation awards \$75 million to a Columbia-led team to support major improvements necessary to advance high-energy physics.



Columbia University will lead a team of scientists in an effort to enhance the capabilities of the ATLAS detector at the Large Hadron Collider (LHC), the world's highest-energy particle accelerator designed to produce some of nature's tiniest and most exotic subatomic particles by smashing protons together.

The multi-year, \$75 million project, funded by the National Science Foundation (NSF), will allow the ATLAS detector to take full advantage of the increase in luminosity, or rate of collisions, planned for an upgrade of the LHC accelerator, operated by the European Organization for Nuclear Research, known as CERN.

The LHC which is housed underground, deep beneath the international border separating France from Switzerland--accelerates protons in a ring of superconducting magnets almost to the speed of light before they collide and explode, giving rise to particles possibly never seen before.

“These improvements will enable scientists to push the boundaries of discovery, increasing the likelihood of revealing entirely new phenomena--from extra dimensions of space to the building blocks of dark matter,” said Michael Tuts, professor of physics at Columbia University and principal investigator on the project. “They will open up a new window on particle physics, bringing us closer to decoding how the universe truly works.”

Columbia's work on the ATLAS upgrade is expected to begin this month and continue over five years. Tuts and his team will design, build and test key electronic components for the ATLAS system at Nevis Laboratories in Irvington,

New York, the University's primary center for the study of high-energy experimental particle and nuclear physics, and then ship them overseas for installation in ATLAS.

John Parsons and Gustaaf Brooijmans of Columbia's physics department will direct the Columbia technical aspects of the project, which will provide training opportunities for postdocs and graduate students.

The 7,000-ton ATLAS, the largest detector ever constructed for a particle collider, acts as a giant “digital camera” that captures the particle debris produced in collisions for further analysis. It was built between 1998 and 2008 by an international collaboration of more than 3,000 scientists and engineers and nearly 200 universities and laboratories from 38 countries. This NSF award for the high luminosity upgrade of the ATLAS detector continues the international collaboration.

In 2012, researchers at ATLAS and the Compact Muon Solenoid (another detector at CERN) jointly discovered a long-theorized particle known as the Higgs boson, the missing piece of physics' so-called “standard model,” which describes elementary particles and how they interact. The Higgs particle, which led to the award of the Nobel Prize in Physics in 2013, signals the existence of an invisible energy field throughout the universe that imbues other particles with mass.

The high-luminosity LHC upgrade, estimated for completion in 2025, will increase the total number of collisions in the ATLAS detector by a factor of 10, according to CERN, enabling scientists to collect data more efficiently and at higher rates.

Scientists hope higher luminosity will allow them to continue the hunt for dark matter, which comprises 25 percent of our universe; capture and analyze new particles, interactions and physical properties; and increase the computing capacity to share that data with scientists around the world.

The Columbia-managed NSF ATLAS upgrade project supported by this award includes the following institutions: University of Arizona, Boston University, University of Chicago, University of Illinois at Urbana-Champaign, Indiana University, University of Michigan, Michigan State University, New York University, Northern Illinois University, University of Oregon, University of Pennsylvania, University of Pittsburgh, Southern Methodist University, Stony Brook University, University of California-Irvine, University of Massachusetts-Amherst, University of Texas- Arlington, and University of Texas-Austin.

From: https://www.eurekalert.org/pub_releases/2020-04/cu-ct040120.php

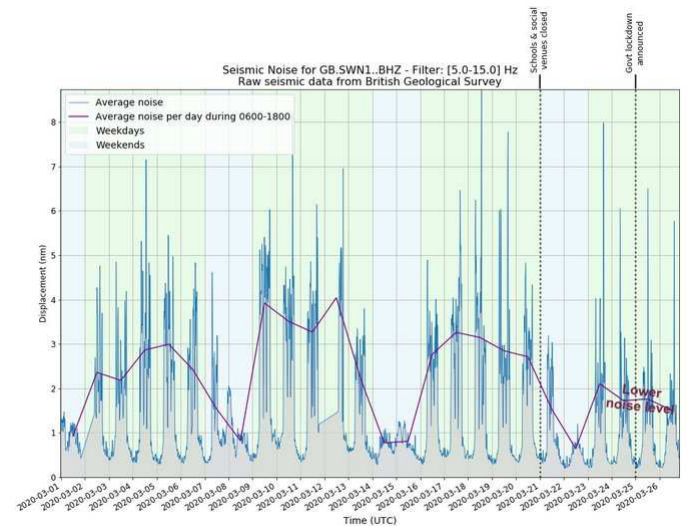
Coronavirus Lockdowns Across the Globe are Actually Causing the Earth to Move Less

With roughly one-third of the world's population on lockdown, our planet has fallen silent. So silent, in fact, that the Earth has quite literally stilled - a reduction in the hum of human activity has caused a decrease in the Earth's crust vibrations, scientists say.

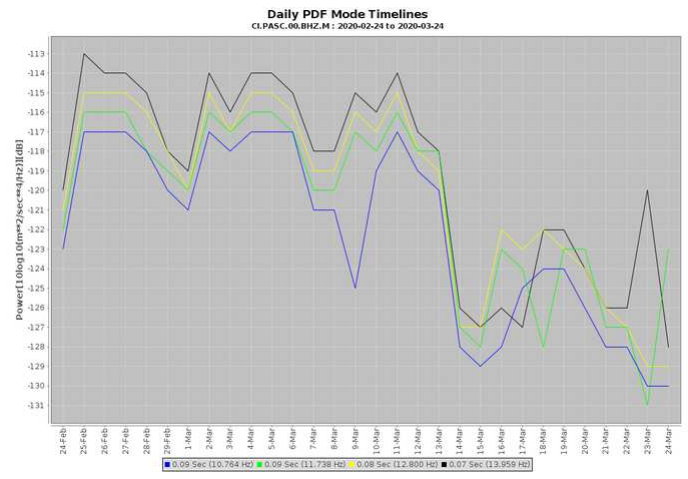
As Nature explains, on a daily basis, various man-powered movements contribute to background seismic noise, or a persistent vibration of the Earth's crust: engines firing up in a factory, a truck roaring down a highway, the rumbling of a train pulling into a station. Individually they're insignificant, but taken together they weave a blanket of high-frequency sounds that make it more difficult for seismologists to detect signals occurring at the same frequency, such as a brewing volcano or the aftershocks of an earthquake.

But with many of these motions on pause during the COVID-19 pandemic, researchers are observing less seismic noise. Seismologists at the Royal Observatory of Belgium in Brussels noticed that vibrations due to human activity dropped by about one-third after the city introduced coronavirus containment measures, according to seismometer data.

And seismologists across the globe are seeing the same effect. Stephen Hicks, a faculty member in the Department of Earth Science and Engineering at Imperial College London, posted to Twitter a graph showing lower average seismic noise levels in the United Kingdom following coronavirus measures:



“Here's daily mode noise power from a station in Los Angeles over the past month; the drop is seriously wild.”

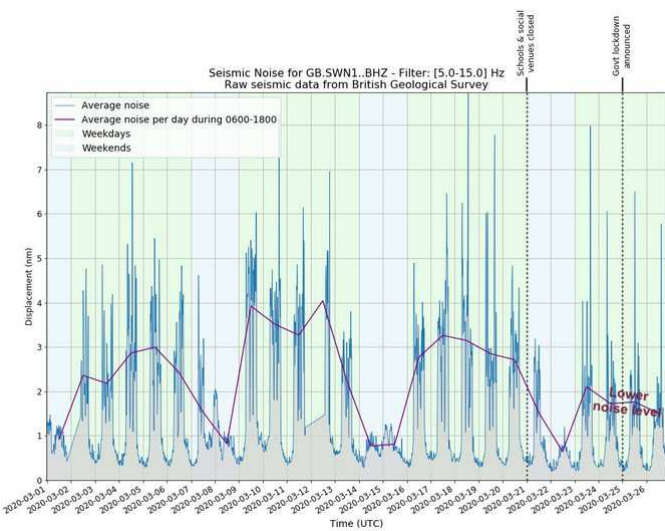


Graph of seismic noise levels over the past month. Weekends are lower than weekdays, and the past week is lowest of all.

This respite in seismic noise, while it lasts, may allow scientists to better study the natural activity of the Earth's crust. Researchers, including those who use the impact of crashing ocean waves to predict volcanic behavior and those responsible for triangulating the location of an earthquake's epicentre, may be able to detect more minute changes and gather more precise data, possibly leading to a geological boon.

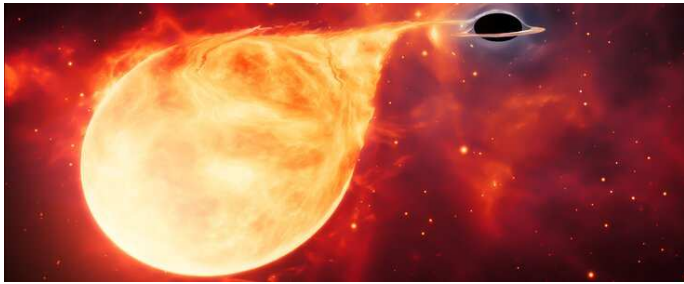
One of very few positives to come of the coronavirus crisis has been the chance for us to appreciate the joys of nature - and now, for us to better understand the workings of this planet that we inhabit. So let's grant ourselves this spring of hope! We need it more than ever!

More details at: <https://www.fastcompany.com/>



Celeste Labeledz, a geophysics PhD candidate at the California Institute of Technology, also reported lower seismic noise levels in Los Angeles:

Hubble Finds Best Evidence for Elusive Mid-size Black Hole



New data from the NASA/ESA Hubble Space Telescope have provided the strongest evidence yet for mid-sized black holes in the Universe. Hubble confirms that this “intermediate-mass” black hole dwells inside a dense star cluster.

Intermediate-mass black holes (IMBHs) are a long-sought “missing link” in black hole evolution. There have been a few other IMBH candidates found to date. They are smaller than the supermassive black holes that lie at the cores of large galaxies, but larger than stellar-mass black holes formed by the collapse of massive stars. This new black hole is over 50 000 times the mass of our Sun.

IMBHs are hard to find. *“Intermediate-mass black holes are very elusive objects, and so it is critical to carefully consider and rule out alternative explanations for each candidate. That is what Hubble has allowed us to do for our candidate,”* said Dacheng Lin of the University of New Hampshire, principal investigator of the study¹.

Lin and his team used Hubble to follow up on leads from NASA’s Chandra X-ray Observatory and the European Space Agency’s X-ray Multi-Mirror Mission (XMM-Newton), which carries three high-throughput X-ray telescopes and an optical monitor to make long uninterrupted exposures providing highly sensitive observations.

“Adding further X-ray observations allowed us to understand the total energy output,” said team member Natalie Webb of the Université de Toulouse in France. *“This helps us to understand the type of star that was disrupted by the black hole.”*

In 2006 these high-energy satellites detected a powerful flare of X-rays, but it was not clear if they originated from inside or outside of our galaxy. Researchers attributed it to a star being torn apart after coming too close to a gravitationally powerful compact object, like a black hole.

Surprisingly, the X-ray source, named 3XMM J215022.4-055108, was not located in the centre of a galaxy, where massive black holes normally reside. This raised hopes that an IMBH was the culprit, but first another

possible source of the X-ray flare had to be ruled out: a neutron star in our own Milky Way galaxy, cooling off after being heated to a very high temperature. Neutron stars are the extremely dense remnants of an exploded star.

Hubble was pointed at the X-ray source to resolve its precise location. Deep, high-resolution imaging confirmed that the X-rays emanated not from an isolated source in our galaxy, but instead in a distant, dense star cluster on the outskirts of another galaxy — just the sort of place astronomers expected to find evidence for an IMBH. Previous Hubble research has shown that the more massive the galaxy, the more massive its black hole. Therefore, this new result suggests that the star cluster that is home to 3XMM J215022.4-055108 may be the stripped-down core of a lower-mass dwarf galaxy that has been gravitationally and tidally disrupted by its close interactions with its current larger galaxy host.

IMBHs have been particularly difficult to find because they are smaller and less active than supermassive black holes; they do not have readily available sources of fuel, nor do they have a gravitational pull that is strong enough for them to be constantly drawing in stars and other cosmic material and producing the tell-tale X-ray glow. Astronomers therefore have to catch an IMBH red-handed in the relatively rare act of gobbling up a star. Lin and his colleagues combed through the XMM-Newton data archive, searching hundreds of thousands of sources to find strong evidence for this one IMBH candidate. Once found, the X-ray glow from the shredded star allowed astronomers to estimate the black hole’s mass.

Confirming one IMBH opens the door to the possibility that many more lurk undetected in the dark, waiting to be given away by a star passing too close. Lin plans to continue this meticulous detective work, using the methods his team has proved successful.

“Studying the origin and evolution of the intermediate mass black holes will finally give an answer as to how the supermassive black holes that we find in the centres of massive galaxies came to exist,” added Webb.

Black holes are one of the most extreme environments humans are aware of, and so they are a testing ground for the laws of physics and our understanding of how the Universe works. Does a supermassive black hole grow from an IMBH? How do IMBHs themselves form? Are dense star clusters their favoured home? With a confident conclusion to one mystery, Lin and other black hole astronomers find they have many more exciting questions to pursue.

Links etc at: <https://www.spacetelescope.org/news/heic2005/?lang>

What is the Origin of Water on Earth?

While everybody agrees that our blue planet is rich in water, this observation is at odd, first, with the exploration of other rocky planets, genuinely lacking surface water, and second, with the idea of a giant impact between the proto-Earth and a planetary embryo the size of Mars that created the Moon. Such a catastrophic event should have vaporized any pre-existing water, leaving behind a dry Earth. After the giant impact catastrophe, we have thus two options to explain the presence of water on Earth: either water was brought back later, after the catastrophe, notably by icy or water-rich asteroids; or the giant impact was not big enough to vaporize all the water on Earth.

Because of the importance of water to sustain life, the question of the origin of water on Earth is primordial. A major challenge in investigating this question is that Earth, as an active planet, has lost all the traces of that formation.

A team of numerical modellers and geochemists led by Cédric Gillmann - Université libre de Bruxelles, ULB, funded by the EoS project ET-HoME - has decided to look far beyond Earth - up to Venus - to investigate the origin of terrestrial water.

While Earth and Venus could be considered as twin sisters, their respective geological and climatic evolutions diverged dramatically in the past, leading to Venus' present-day 92 bar atmosphere heated by an infernal greenhouse up to 470°C, opposed to the mild conditions and only 1 bar pressure at the surface of Earth.

However, Venus' volcanic activity and outgassing are reduced compared to Earth, because it has no plate tectonics, but has a stagnant lid instead. Even better, such a convection mode implies very little recycling of volatile species into the mantle.

As such, despite being an inferno, the evolution of the atmosphere of Venus is much easier to understand and model over geological times. In addition, because of their proximity, the Earth and Venus should have received the same type of material during their history. All these aspects combine to make Venus a perfect place to study the primitive evolution of terrestrial planets.

Using numerical simulations of impacts of different types of asteroids containing various amount of water, the team has discovered that water-rich asteroids colliding with Venus and releasing their water as vapor cannot explain the composition of Venus atmosphere as we measure it today. It means that the asteroidal material that came to Venus, and thus to Earth, after the giant impact must have been dry, therefore preventing the replenishment of the Earth in water.

Because water can obviously be found on our planet today, it means that the water we are now enjoying on Earth has been there since its formation, likely buried deep in the Earth so it could survive the giant impact.

This idea has very deep implications in terms of habitability of ancient Earth, Venus and Mars, as it suggests that planets likely formed with their near-full budget in water, and slowly lost it with time. Because Mars is much smaller, it likely lost all its water while life developed on Earth. For Venus, those results shine a complementary light on recent work advocating that water oceans existed at the surface of the planet, and help constrain the maximum amount of water that can be expected on Venus. They will also help prepare the next generation of space missions to Venus.

From: https://www.eurekalert.org/pub_releases/2020-04/uldb-wit041020.php

Let NASA Bring the Universe to Your Home



NASA's new Internet and social media special, NASA at Home, will show and engage you in the agency's discoveries, research, and exploration from around the world and across the universe – all from the comfort of your own home.

NASA at Home offers something for the whole family. It brings together a repository of binge-worthy videos and podcasts, engaging E-books on a variety of topics, do-it-yourself projects, and virtual and augmented reality tours, which include the agency's Hubble Space Telescope and International Space Station, as well as an app that puts you in the pilot's seat of a NASA aircraft.

“We know people everywhere, especially students, are looking for ways to get out of the house without leaving their house,” said Bettina Inclán, associate administrator for NASA's Office of Communications. “NASA has a way for them to look to the skies and see themselves in space with their feet planted safely on the ground, but their imaginations are free to explore everywhere we go. We've put that information at their fingertips. We hope everyone takes a few moments to explore NASA at Home.”

This special also spotlights educational and entertaining resources and activities for families and students in kindergarten and up. Plus, it provides access to everything from formal lesson plans to amazing imagery and stories about how science and exploration help the world.

If you want to practice safe science at home, we have opportunities for citizen scientists to contribute to real ongoing research, from our solar system's backyard to your own backyard. This includes searching for brown dwarfs and planets in our outer solar system and helping track changes in clouds, water, plants, and other life in support of climate research.

NASA at Home will feature ongoing opportunities to interact and hear from agency experts. For example, record-breaking astronaut Christina Koch reads children's books weekdays at 4 p.m. EDT on Instagram live as part of educational and STEM activity for students.

NASA Television also is running NASA at Home-themed programming 10 a.m. to 4 p.m. weekdays, as well as broadcasting around-the-clock with recent mission events and news, conversations with astronauts on the International Space Station, educational looks at science, technology and exploration topics, and historical programs from the agency's storied past.

<https://www.nasa.gov/specials/nasaathome/index.html>

Discovery of Life in Solid Rock Deep Beneath Sea May Inspire New Search for Life on Mars

Newly discovered single-celled creatures living deep beneath the seafloor have given researchers clues about how they might find life on Mars. These bacteria were discovered living in tiny cracks inside volcanic rocks after researchers persisted over a decade of trial and error to find a new way to examine the rocks.

Researchers estimate that the rock cracks are home to a community of bacteria as dense as that of the human gut, about 10 billion bacterial cells per cubic centimetre (0.06 cubic inch). In contrast, the average density of bacteria living in mud sediment on the seafloor is estimated to be 100 cells per cubic centimetre.

"I am now almost over-expecting that I can find life on Mars. If not, it must be that life relies on some other process that Mars does not have, like plate tectonics," said Associate Professor Yohey Suzuki from the University of Tokyo, referring to the movement of land masses around Earth most notable for causing earthquakes. Suzuki is first

author of the research paper announcing the discovery, published in *Communications Biology*.

Magic of clay minerals

"I thought it was a dream, seeing such rich microbial life in rocks," said Suzuki, recalling the first time he saw bacteria inside the undersea rock samples.

Undersea volcanoes spew out lava at approximately 1,200 degrees Celsius (2,200 degrees Fahrenheit), which eventually cracks as it cools down and becomes rock. The cracks are narrow, often less than 1 millimeter (0.04 inch) across. Over millions of years, those cracks fill up with clay minerals, the same clay used to make pottery. Somehow, bacteria find their way into those cracks and multiply.

"These cracks are a very friendly place for life. Clay minerals are like a magic material on Earth; if you can find clay minerals, you can almost always find microbes living in them," explained Suzuki.

The microbes identified in the cracks are aerobic bacteria, meaning they use a process similar to how human cells make energy, relying on oxygen and organic nutrients.

"Honestly, it was a very unexpected discovery. I was very lucky, because I almost gave up," said Suzuki.

From the ocean floor to Mars

The clay minerals filling cracks in deep ocean rocks are likely similar to the minerals that may be in rocks now on the surface of Mars.

"Minerals are like a fingerprint for what conditions were present when the clay formed. Neutral to slightly alkaline levels, low temperature, moderate salinity, iron-rich environment, basalt rock -- all of these conditions are shared between the deep ocean and the surface of Mars," said Suzuki.

Suzuki's research team is beginning a collaboration with NASA's Johnson Space Center to design a plan to examine rocks collected from the Martian surface by rovers. Ideas include keeping the samples locked in a titanium tube and using a CT (computed tomography) scanner, a type of 3D X-ray, to look for life inside clay mineral-filled cracks.

"This discovery of life where no one expected it in solid rock below the seafloor may be changing the game for the search for life in space," said Suzuki.

More at: https://www.eurekalert.org/pub_releases/2020-04/uot-dol033020.php

Images from Simon Plumley

Venus

As Venus has been high in the evening sky I have been able to try it in the cooler evening rather than the crazy hot day light of previous attempts which makes for a better shot at cloud detail.

It took a while to tune the gear in and I did manage some UV detail which a friend of mine who is very good at planetary imaging also imaged at exactly the same time on the mainland. He and I saw and got the same result so I was delighted with that.

The images are not exactly super detailed but pretty much never are. The only way to get the clouds is using a very narrow UV filter on a mono camera of which the sensors either do not go that low in wavelength or if they do as mine does the sensitivity or QE (quantum efficiency) is low, mine somewhere around 25-30 ish QE. This means slower frame rates and lots of camera noise all which makes compiling a final image much harder, as a single image frame is almost just "mush", which is why Venus is often left off the image capture list.

Anyway, I have attached couple of images of Venus from the 6th and the 8th of April. Both are in "false" colour to contrast the UV differences in cloud. Taken as an Infrared for one image, added to a UV for the other to make a colour. Filters were a UV 320-350 μm and IR 807 μm wavelengths. Scope Celestron HD 11" using a 2x powermate and a Mono Point Grey (now FLIR) Chameleon camera. Focal length approx. 6,000 mm at F22

The Moon

I also did another mini moon mosaic (I haven't sent the BIG version!). It would blow up nice on the web site again but I have lost the skill to upload it!

This was only 20 pic mosaic taken at 2800 mm but it still looks nice.(Put a more interesting crater shot in too if that was of interest for scale etc)

I will try and do an super mega mosaic one day at higher resolution and take more time with the processing. This would be super sharp in the right conditions and with cross processing each frame about 5 times for different focus points before then joining as one frame in the multi frame jigsaw. But this is lot of work!

Anyway most delighted about the Venus shots really which you are welcome to share.

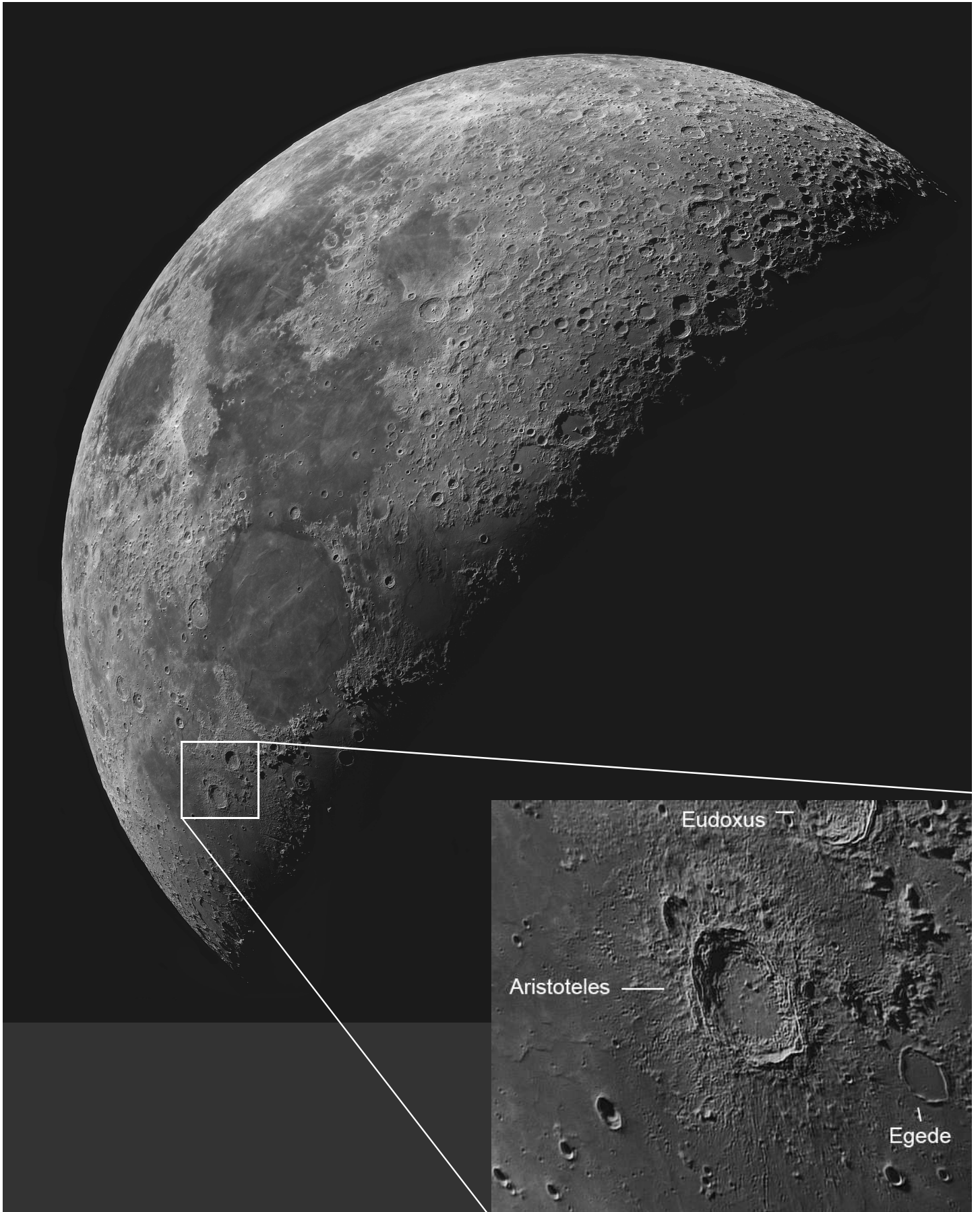
Simon Plumley



Venus - In Infrared



Venus - In Infrared + Ultra Violet



Moon Mosaic - Showing crater details



Quantum Entanglement is Tough to Dumb Down, but this Analogy can Help Detangle it

The term ‘quantum entanglement’ refers to quantum particles being interdependent even when separated, to put it in exceedingly simple terms. Because this behaviour was so at odds with his understanding of the laws of physics, Albert Einstein called the phenomenon ‘spooky action at a distance’. And because it is so hard to square with our own lived experience, it is often used as one of the foremost examples of ‘quantum weirdness’. In this expansion on a previous Royal Institution presentation, the UK science writer Philip Ball details a metaphor devised in the 1990s by Sandu Popescu, professor of physics at the University of Bristol, and Daniel Rohrlich, a physics researcher and lecturer at Ben-Gurion University of the Negev, to help bring our current best understanding of quantum entanglement into focus. In doing so, Ball also provides an enlightening window into physicists’ evolving understanding of the quantum world throughout the 20th century.

Video by The Royal Institution, Producer: Anand Jagatia

Video Link at: <https://aeon.co/videos/quantum-entanglement-is-tough-to-dumb-down-but-this-analogy-can-help-detangle-it>

An Eclipse Globe for the 21st Century

There's a saying that goes: “Once you've seen your first total solar eclipse, your first four words are 'When's the next one?’” Millions of skywatchers all across the U.S. got a chance to witness totality on August 21, 2017, and most of them were indeed seeing the Sun's corona for the first time. So are they really planning when and where to stand in the Moon's shadow again?

I sure hope so! Total solar eclipses are nature's most spectacular sky sights. Seeing the Sun's corona in the suddenly darkened daytime sky is an experience so compelling that several thousand “eclipsophiles” will travel around the world to see any total solar eclipse they reasonably can.

And to make that planning a little easier, Sky & Telescope is proud to announce its newest product: a 12-inch globe of Earth embellished with the track of every total and hybrid solar eclipse through the end of this century. I got a chance to hold one of the first ones produced just yesterday — it's both visually stunning and brimming with information..... **Price? \$109.95**

More info at: <https://skyandtelescope.org/astronomy-resources/solar-eclipse-globe-for-21st-century/>



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.

Articles Needed

NZ needs letters, articles, reviews or pictures related to astronomy. Contact details on page 1.

“There is always someone who can do a thing you do better, but nobody else can do everything you do as well as you”

Terry Pratchett

“I'm fat because I'm greedy, and if my mind is fat it's because I'm curious”

Stephen Fry

“Never in the field of human conflict has so much been owed by so many to so few”

Boris Johnson

“Logic will get you from A to Z; imagination will get you everywhere”

Albert Einstein

“There is a theory which states that if ever anyone discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable.

There is another theory which states that this has already happened”

Douglas Adams