New Zenith

The Monthly Newsletter of the Vectis Astronomical Society

Vol 29 Issue 3 — April 2021 *When Printed, this Newsletter costs VAS at least £1*

Society News

Unfortunately, the Observatory and Pavilion remain Closed

Online Virtual Meetings

There seems to have been some confusion about the online monthly meetings. The link given on the back page of this newsletter (and those previously) has the correct information. **The same link will be used for all meetings unless alternative information is provided**.

PLEASE USE THE LINK ON THE BACK PAGE

Observatory News

We will not be opening the observatory anytime really soon. Social distancing still applies and the space available in the building is restricted.

Of course re-opening of all facilities will be discussed and checked at upcoming committee meetings but we cannot make announcements yet.

Apologies For The Late NZ

You can see from the address on the top right of this page that I have moved (again!). Unfortunately this has not happened without difficulty. It seems that, despite having telephone and broadband sockets in the property, Openreach don't appear to have any connection records!

On the day I was to be connected they phoned my mobile and told me I had to be home so they could connect a tracer. Unfortunately I was in a work meeting and was unable to escape - hence no broadband connection. I am now told it won't be connected for another week or more. So, this edition of NZ was assembled whenever I had a connection (mostly on Ryde Pier, thanks WightLink).

I hope there aren't too many errors in this NZ and hope to be back and properly online in time for the May edition.

Brian Curd

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.

Observatory Diary

The diary is currently empty!

VAS Website: wightastronomy.org

Contents this Month

2021 Monthly Meetings

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

Date	Subject	Speaker
26 Mar	Space Traffic Control	Dr Stuart Eves
23 Apr	The HOYS Citizen Science Project	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
Members will receive sign in details by email

Please DO NOT attend the Observatory or Pavilion

ONLINE ONLY

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

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

Please see the Back Page

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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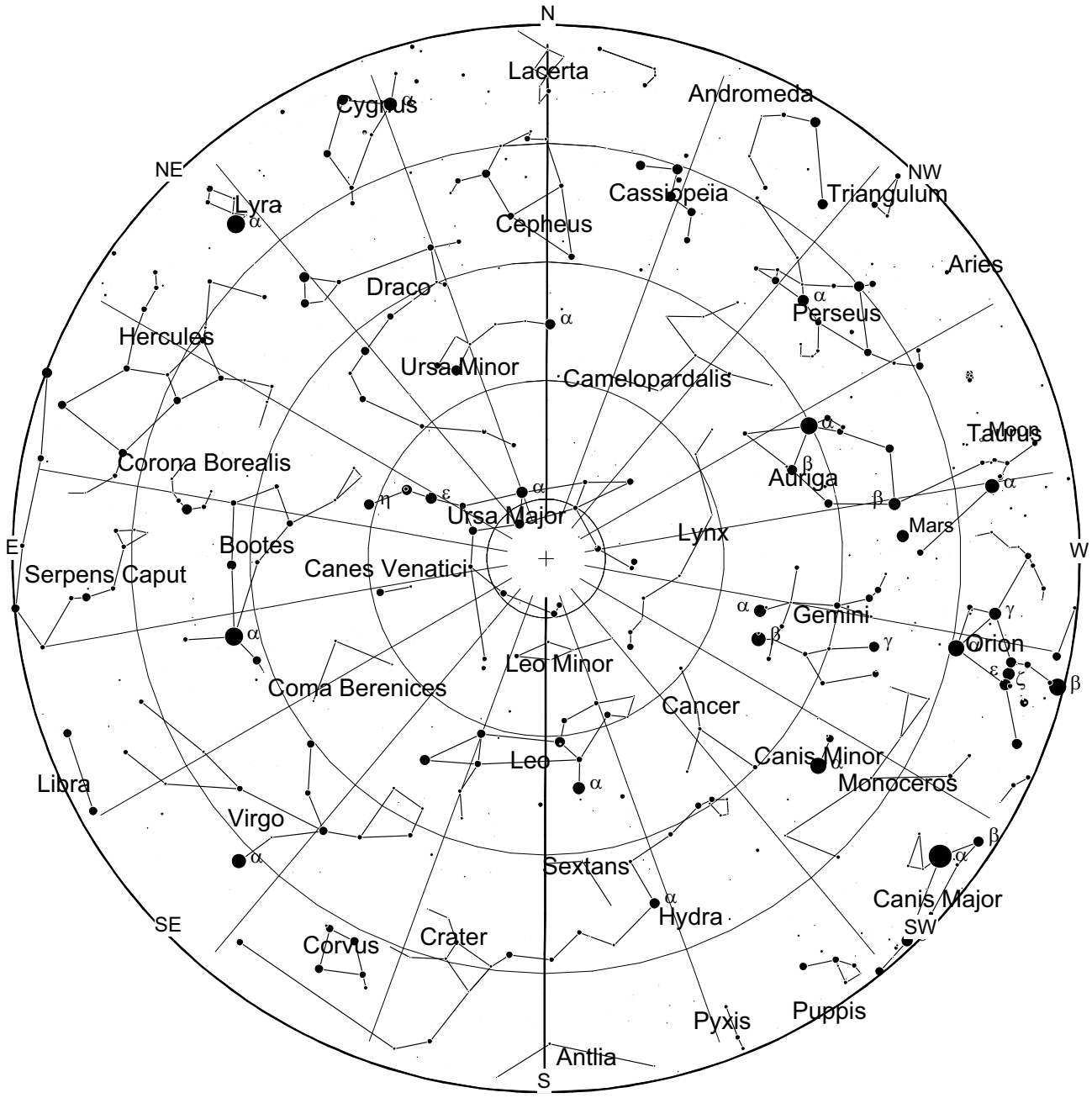
Important

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

April 2021 - Sky Map



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

The Orion Nebula (M42 & NGC 1976) is an HII region that is visible, in dark sky areas, by naked eye as the central object in the sword of the constellation Orion.

The main part of the nebula is separated from a smaller part of the same cloud, separated by a dark absorbing region known as the Fish's Mouth.

The nebula surrounds, and is excited by, the four young stars called the Trapezium. The Nebula is about 1500 light years away.

The Orion Nebula is over a degree across on the sky and thus some25-30 light years in size. Its mass is several hundred times that of the Sun

April 2021- Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
12th	20th	27th	4th
			

Planets

Mercury

Mercury starts a good evening apparition during the last week of the month.

It is in close conjunction with Venus, about 1 degree to the right, on the 25th. This will be quite difficult to see, both planets being only 5 degrees above the horizon at sunset. At the end of the month Mercury sets about 90 minutes after the Sun. A pair of binoculars will help find this little world, find Venus and pan up a few degrees, if the sky is clear Mercury will be seen as a relatively bright slightly reddish tinted point of light.

Venus

Venus becomes the Evening Star at the end of the month along with Mercury. Look for it just above the horizon after sunset. Venus is quite bright and can be easily seen even against the bright sunset sky.

Mars

At the start of the month Mars is well placed in the western sky during the early evening. It is now noticeably fainter than the nearby red giant star Aldebaran, about 10 degrees closer to the horizon. If viewed at the same time every night Mars seems to stay at about the same height above the horizon causing it to slide through the constellations. At the end of the month it has moved into Gemini, about half way between Castor & Pollux and Aldebaran, but the sky will be much brighter making this probable the last opportunity to easily spot the Red Planet before it is lost in the in the glare of the Sun until it reappears in the morning sky at the end of the year.

Jupiter

Jupiter is not well placed in its orbit for observation from the northern hemisphere. It rises just over an hour before the Sun, and although because of its brightness is just visible in the south-eastern sky just before sunrise it will be a very challenging object.

Saturn

As with Jupiter, Saturn in not well placed for observation this month. It rises a little before Jupiter, but is significantly fainter and will not be visible against the bright pre-dawn sky.

Uranus & Neptune

Both the outer planets are unfavourably placed for observation until later in the year.

Deep Sky

Leo Triplet M65, M66, NGC3628
RA 11h 20m Dec 13° 14'

Just under the lion's hind legs in an area not much larger than the full moon are three spiral galaxies. Using a low power all three can be seen in the same field of view. Each is about half way between edge on and face on so appear as an oval smudge with a bright core. NGC3628 is the largest of the three and the faintest (just mag 9.5), why it does not have its own place in the Messier catalogue we will never know, perhaps it says something for the quality of 18th century optical equipment.

Another Leo Triplet M95, M96, M105
RA 10h 46m Dec 12° 8'

Continue towards the lion's front legs and you will encounter another triplet of galaxies. This time spaced further apart but still visible in the same field of view, these galaxies are a little fainter and smaller and are nearer to being face on. A large telescope is needed to spot the barred spiral and ring structure of M95. While observing M105 look for NGC3384 & NGC3389 making yet another closely spaced triplet with M105.

NGC3521 Galaxy
RA 11h 6m Dec -0° 6' mag 10.0

Still in Leo but much further to the south, between Virgo and Sextans is to be found this compact spiral. As with most galaxies a large telescope is needed to glimpse any structure in the spiral arms and dust lanes, but even small 'scopes show it to have an oval shape with a bright core

Peter Burgess

Bits of Theia Might be in the Earth's Mantle

A "smoking gun" for the ancient calamity that formed Earth's large Moon may still exist deep in the mantle of our planet.

An artist's conception of Theia hitting the Earth. NASA/JPL-Caltech

Evidence for the past impact that created our one large Moon might lie far beneath our feet.

Researchers out of Arizona State University (ASU) made their case in a great piece of planetary forensics presented at the virtual 52nd Lunar and Planetary Science Conference. Their study posits that the large Theia impactor that struck Earth early on in its history, leading to the Moon's formation, might have left large, dense masses deep in our planet's mantle today. The study will appear in Geophysical Research Letters.

The Theia Hypothesis

The leading theory for the formation of the Moon is that a roughly Mars-size object, dubbed Theia (named for the Titan who was mother to the moon goddess Selene), struck young Earth around 4.5 billion years ago. The abundance of indirect evidence for this cataclysmic event includes the high angular velocity seen in the Earth-Moon system today, as well as the Moon's tiny iron core and high mass ratio relative to Earth. Stable isotope samples brought back by Apollo astronauts also suggest a common origin for Earth and the Moon.

But direct evidence for Theia hypothesis has so far been lacking. While the cores of Earth and Theia probably merged right away, where did the rest of the rogue impactor go?

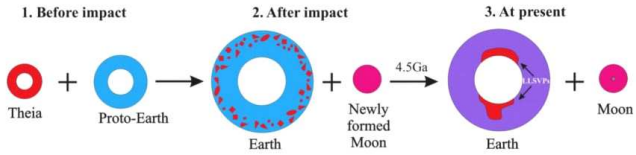
Graduate student Qian Yuan (ASU) and colleagues looked at continent-size features deep in Earth's mantle, known as large, low shear velocity provinces (LLSVPs). These two large masses, 1,000 kilometers tall and several thousand kilometers wide, sit on either side of the Earth's core like a giant set of earmuffs, one under Africa and the other under the Pacific Ocean.

While seismic waves traversing the interior of our planet have revealed these denser regions of the mantle, their origin remains unclear. There are a few different ways in which the LLSVPs might have formed, but the ASU team suspected they could be the remnants of Theia.

Recently, geologists sampled volcanic rocks in Samoa and Iceland, thought to have come from the deep mantle based on chemical studies. Based on those samples, the LLSVPs date back to at least 4.45 billion years ago - right around the time of the suspected Theia impact event.

Yuan and his colleagues simulated the impact and followed the evolution of Theia's remains over time. They found that the its mantle was denser than Earth's, so rather than mixing in, it piled up at the bottom of the mantle against the outer core.

The simulations suggest that Theia might have been much larger than previously suspected, perhaps four times as massive as Mars, and denser too. The Apollo samples support the high density. Lunar rocks exhibit a relatively low ratio of heavy hydrogen (deuterium) to light hydrogen, from which the team calculates that Theia's mantle must have been between 2% and 3.5% denser than Earth in order to retain the light gas. This estimate is consistent with the high density required by their simulations.



This diagram outlines the evolution of Earth's mantle. Theia hits Earth, the cores merge, and the Moon as a result of the impact. However, Theia's mantle is denser than Earth's so it doesn't mix in; instead it sinks over time, glomming together on either side of the core. Qian Yuan / ASU

Lumps in the Gravy

The fact remains, though, that we still don't understand the exact nature of the LLSVPs. "We don't know what they (the LLSVPs) are," says seismologist Jennifer Jenkins (Durham University, UK), who was not involved in the study. "They could be piles of subducted oceanic tectonic plates, iron enriched remnants of a basal magma ocean from early in Earth's history when the mantle was still cooling and solidifying, or closely spaced hot thermal

upwellings within the convecting mantle that get blurred together into one big 'blob'."

Part of the problem is that the primary method for studying LLSVPs involves examining low-frequency seismic waves, but these paint a fuzzy picture. The masses deep within our planet might be riddled with structure. "There may be holes in them," seismologist Barbara Romanowicz (UC Berkeley) told Science. "There may be a bundle of tubes." If so, it could throw the Theia-remnant assertion into doubt.

New techniques, such as utilizing the Moon's tidal pull on Earth, may eventually help narrow down the LLSVPs' structure.

Future lunar sample returns may also help settle the mystery. The Apollo missions sampled equatorial sites on the lunar nearside, but doubts linger over the deuterium-to-hydrogen ratio measured there, mainly due to possible interaction with the solar wind. Scientists would like to resample in the South Pole-Aitken basin, near the lunar south pole. A later impact might have exposed mantle on the basin floor, so it's an ideal site for pristine samples of the lunar interior.

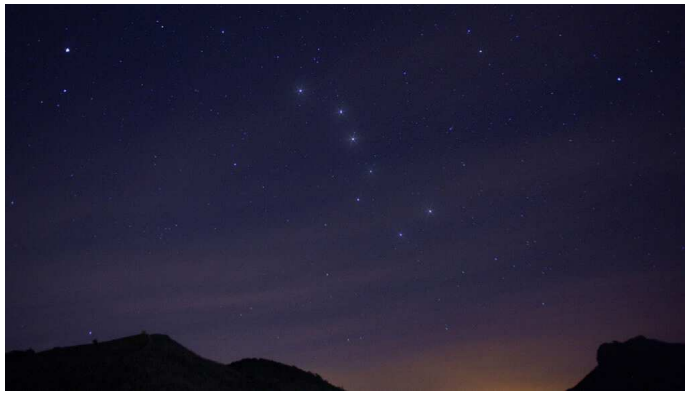
China's Chang'e 4 mission is currently exploring Von Kármán Crater within the basin, and a south pole site will also be the target for NASA's VIPER rover launching in 2023. The crewed Artemis initiative could also pay it a visit in coming years.

An artist's conception of VIPER on the Moon
NASA

"It would be great to go to the Moon and test whether magmas 'erupting' from deep within the Moon record a low deuterium/light hydrogen signature," says team member Steven Desch (ASU). "The right samples would settle the debate one way or the other.

Link: https://skyandtelescope.org/

Why Humans Chose Particular Groups of Stars as Constellations



Patterns of human eye movement are among several factors that explain why certain star groupings, such as the Big Dipper (pictured), stand out to people across cultures and time. SHIM YOUNGBO/500PX/GETTY IMAGES

The Big Dipper's stars make up a conspicuous landmark in the sky of the Northern Hemisphere. Even novice stargazers can easily pick out the shape, part of the Ursa Major constellation. Now, scientists have shown that three factors can explain why certain groups of stars form such recognizable patterns.

To replicate how humans perceive the celestial sphere, a team of researchers considered how the eye might travel randomly across this night sky. Human eyes tend to move in discrete jumps, called saccades, from one point of interest to another. The team created a simulation that incorporated the distribution of lengths of those saccades, combined that with basic details of the night sky as seen from Earth - namely the apparent distances between neighboring stars and their brightnesses.

The technique could reproduce individual constellations, such as Dorado, the dolphinfish. And when used to map the whole sky, the simulation generated groupings of stars that tended to align with the 88 modern constellations recognized by the International Astronomical Union, Sophia David and colleagues reported March 18 at an online meeting of the American Physical Society.

"Ancient people from various cultures connected similar groupings of stars independently of each other," said David, a high school student at Friends' Central School in Wynnewood, Penn., who worked with network scientists at the University of Pennsylvania. "And this indicates that there are some fundamental aspects of human learning … that influence the ways in which we organize information."

Link: https://www.sciencenews.org/

'Smoking Gun' Dark Matter Signature Possibly Identified

Researchers propose a new method that could definitively prove the existence of dark matter.

Milky Way Galaxy

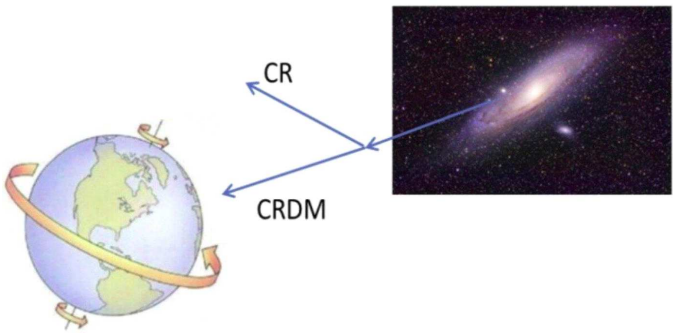
Credit: NASA, JPL-Caltech, Susan Stolovy (SSC/Caltech) et al.

- "Scientists identified a data signature for dark matter that can potentially be detected by experiments.
- "The effect they found is a daily "diurnal modulation" in the scattering of particles.
- "Dark matter has not yet been detected experimentally.

Dark matter, a type of matter that is predicted to make up around 27 percent of the known universe, has never been detected experimentally. Now a team of astrophysicists and cosmologists think they found a clue that may lead them to finally detect the elusive material, so hard to find because it does not absorb, reflect, or emit light.

The existence of dark matter has so far been predicted by inference from its gravitational effects on the motion of the stars and galaxies rather than direct observation. No existing technologies can pick it out. This has led researchers at the Shanghai Jiao Tong University and the Purple Mountain Observatory of the Chinese Academy of Sciences to identify characteristic dark matter signatures that would be easier to detect.

Their new paper proposes a new type of effect that relates to the so-called "sub-GeV dark matter" which is boosted by cosmic rays. Looking for this effect can potentially allow direct detection of dark matter using nuclear recoil techniques.



The diurnal effect of accelerated dark matter rays.Credit: Ge et al.

.The research team included Shao-Feng Ge and Qiang Yuan, who explained that their approach is to look for a prominent signature of accelerated dark matter particles that come from the galaxy's center, where dark matter and cosmic rays are at high density. They found that these particles have a "diurnal modulation" - a scattering pattern that is linked to the time of day. At periods when the Galaxy Center faces the side of the planet that's opposite the location of the detector, the Earth shadows a large amount of these particles. At other times, they come in as a signal with "higher recoil energy."

"The conventional diurnal effect is only for slow moving (nonrelativistic) DM particles in our galaxy (so-called standard DM halo)," Ge and Yuan said to Phys.org. "The effect is negligibly small either from direct experimental constraints, or due to the detection threshold. For light DM particles, on the other hand, the DM-nucleus interaction is much less constrained, which leaves room for strong diurnal modulation."

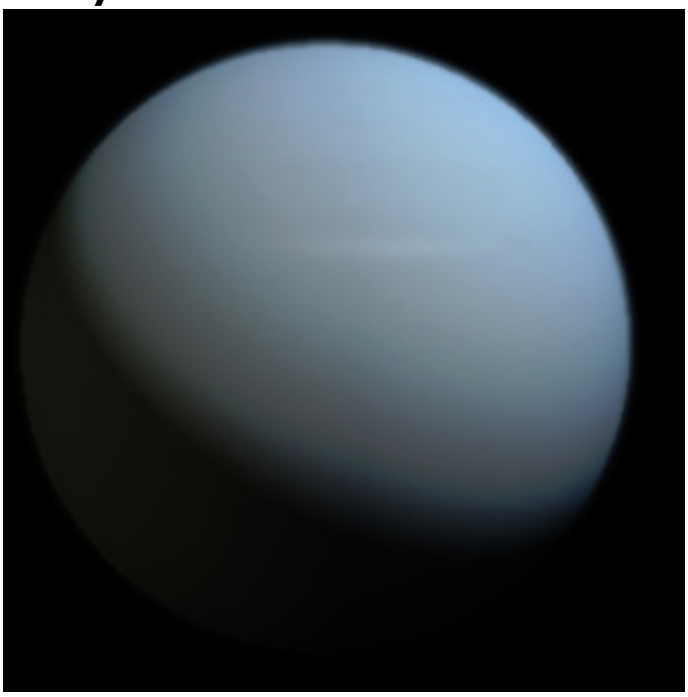
Researchers Ning Zhou and Jianglai Liu, who were also involved in the study, said in an interview that the signature they are proposing could be "a smoking gun of cosmic ray boosted dark matter detection".

The researchers plan next to look for the signature in previously gathered data, as well as in underground dark matter experiments.

They are also encouraging scientists around the world to look for this signature in their data.

Link: https://bigthink.com/

X-rays From Uranus Discovered



Astronomers have detected X-rays from Uranus for the first time, using NASA's Chandra X-ray Observatory. This result may help scientists learn more about this enigmatic ice giant planet in our solar system.

Uranus is the seventh planet from the Sun and has two sets of rings around its equator. The planet, which has four times the diameter of Earth, rotates on its side, making it different from all other planets in the solar system. Since Voyager 2 was the only spacecraft to ever fly by Uranus, astronomers currently rely on telescopes much closer to Earth, like Chandra and the Hubble Space Telescope, to learn about this distant and cold planet that is made up almost entirely of hydrogen and helium.

In the new study, researchers used Chandra observations taken in Uranus in 2002 and then again in 2017. They saw a clear detection of X-rays from the first observation, just analyzed recently, and a possible flare of X-rays in those obtained fifteen years later. The main graphic shows a Chandra X-ray image of Uranus from 2002 (in pink) superimposed on an optical image from the Keck-I Telescope obtained in a separate study in 2004. The latter shows the planet at approximately the same orientation as it was during the 2002 Chandra observations.

What could cause Uranus to emit X-rays? The answer: mainly the Sun. Astronomers have observed that both Jupiter and Saturn scatter X-ray light given off by the Sun, similar to how Earth's atmosphere scatters the Sun's light. While the authors of the new Uranus study initially expected that most of the X-rays detected would also be from scattering, there are tantalizing hints that at least one other source of X-rays is present. If further observations confirm this, it could have intriguing implications for understanding Uranus.

One possibility is that the rings of Uranus are producing X-rays themselves, which is the case for Saturn's rings. Uranus is surrounded by charged particles such as electrons and protons in its nearby space environment. If these energetic particles collide with the rings, they could cause the rings to glow in X-rays. Another possibility is that at least some of the X-rays come from auroras on Uranus, a phenomenon that has previously been observed on this planet at other wavelengths.

On Earth, we can see colorful light shows in the sky called auroras, which happen when high-energy particles interact with the atmosphere. X-rays are emitted in Earth's auroras, produced by energetic electrons after they travel down the planet's magnetic field lines to its poles and are slowed down by the atmosphere. Jupiter has auroras, too. The X-rays from auroras on Jupiter come from two sources: electrons traveling down magnetic field lines, as on Earth, and positively charged atoms and molecules raining down at Jupiter's polar regions. However, scientists are less certain about what causes auroras on Uranus. Chandra's observations may help figure out this mystery.

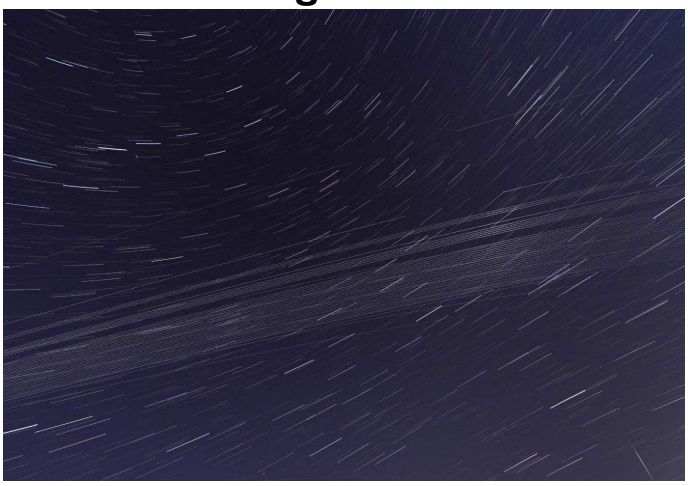
Uranus is an especially interesting target for X-ray observations because of the unusual orientations of its spin axis and its magnetic field. While the rotation and magnetic field axes of the other planets of the solar system are almost perpendicular to the plane of their orbit, the rotation axis of Uranus is nearly parallel to its path around the Sun. Furthermore, while Uranus is tilted on its side, its magnetic field is tilted by a different amount, and offset from the planet's center. This may cause its auroras to be unusually complex and variable. Determining the sources of the X-rays from Uranus could help astronomers better understand how more exotic objects in space, such as growing black holes and neutron stars, emit X-rays.

A paper describing these results appears in the most recent issue of the Journal of Geophysical Research. The authors are William Dunn (University College London, United Kingdom), Jan-Uwe Ness (University of Marseille, France), Laurent Lamy (Paris Observatory, France), Grant Tremblay (Center for Astrophysics | Harvard & Smithsonian), Graziella Branduardi-Raymont (University College London), Bradford Snios (CfA), Ralph Kraft (CfA), Z. Yao (Chinese Academy of Sciences, Beijing), Affelia Wibisono (University College London).

NASA's Marshall Space Flight Center manages the Chandra program. The Smithsonian Astrophysical Observatory's Chandra X-ray Center controls science from Cambridge Massachusetts and flight operations from Burlington, Massachusetts.

Link: https://www.sciencedaily.com/

New Study Finds Satellites Contribute Significant Light Pollution to Night Skies



An image of trails caused by the fifth deployment of satellites making up the starlink constellation. view more CREDIT: Andreas Möller

Scientists reported new research results today suggesting that artificial objects in orbit around the Earth are brightening night skies on our planet significantly more than previously understood.

The research, accepted for publication in Monthly Notices of the Royal Astronomical Society: Letters, finds that the number of objects orbiting Earth could elevate the overall brightness of the night sky by more than 10 percent above natural light levels across a large part of the planet. This would exceed a threshold that astronomers set over 40 years ago for considering a location "light polluted".

"Our primary motivation was to estimate the potential contribution to night sky brightness from external sources, such as space objects in Earth's orbit," said Miroslav Kocifaj of the Slovak Academy of Sciences and Comenius University in Slovakia, who led the study. "We expected the sky brightness increase would be marginal, if any, but our first theoretical estimates have proved extremely surprising and thus encouraged us to report our results promptly."

The work is the first to consider the overall impact of space objects on the night sky rather than the effect of individual satellites and space debris affecting astronomers' images of the night sky. The team of researchers, based at institutions in Slovakia, Spain and the US, modelled the space objects' contribution to the overall brightness of the night sky, using the known distributions of the sizes and brightnesses of the objects as inputs to the model.

The study includes both functioning satellites as well as assorted debris such as spent rocket stages. While telescopes and sensitive cameras often resolve space objects as discrete points of light, low-resolution detectors of light such as the human eye see only the combined effect of many such objects. The effect is an overall increase in the diffuse brightness of the night sky, potentially obscuring sights such as the glowing clouds of stars in the Milky Way, as seen away from the light pollution of cities.

"Unlike ground-based light pollution, this kind of artificial light in the night sky can be seen across a large part of the Earth's surface," explained John Barentine, Director of Public Policy for the International Dark-Sky Association and a study co-author. "Astronomers build observatories far from city lights to seek dark skies, but this form of light pollution has a much larger geographical reach."

Astronomers have expressed unease in recent years about the growing number of objects orbiting the planet, particularly large fleets of communications satellites known informally as 'mega-constellations'.

In addition to crowding the night sky with more moving sources of artificial light, the arrival of this technology increases the probability of collisions among satellites or between satellites and other objects, generating further debris. Recent reports sponsored by the US National Science Foundation and the United Nations Office for Outer Space Affairs identified mega-constellations as a threat to the continued utility of astronomy facilities on the ground and in low-Earth orbit. In the UK the Royal Astronomical Society has established several working groups to understand the impact of mega-constellations on optical and radio astronomical facilities used by scientists.

The results published today imply a further brightening of the night sky proportional to the number of new satellites launched and their optical characteristics in orbit. Satellite operators like SpaceX have recently worked to lower the brightness of their spacecraft through design changes. Despite these mitigating efforts though, the collective effect of a sharp increase in the number of orbiting objects stands to change the experience of the night sky for many across the globe.

The researchers hope that their work will change the nature of the ongoing dialog between satellite operators and astronomers concerning how best to manage the orbital space around the Earth.

"Our results imply that many more people than just astronomers stand to lose access to pristine night skies," Barentine said. "This paper may really change the nature of that conversation."

Link: https://www.eurekalert.org/

The Dinosaur-Killing Asteroid Impact Radically Altered Earth's Tropical Forests

The origins of modern tropical rainforests, such as this stretch of forest near Medellín, Colombia, trace back to the extinction event at the end of the Cretaceous Epoch, 66 million years ago.
Christian David Garcia/eyeem/getty Images

The day before a giant asteroid hit Earth 66 million years ago, a very different kind of rainforest thrived in what is now Colombia. Ferns unfurled and flowering shrubs bathed in the sunlight that streamed down through large gaps in the canopy between towering conifers.

Then the bolide hit and everything changed. That impact not only set off a massive extinction event that wiped out more than 75% of life on Earth, but it also redefined Earth's tropical rainforests, transforming them from sun-dappled, open-canopied forests into the dark, dense, lush, dripping forests of today's Amazon.

The researchers analyzed tens of thousands of fossils of pollen, spores and leaves, collected from 39 sites across Colombia, that were dated to between 70 million and 56 million years ago. The team then assessed overall forest plant diversity, dominant species and insect-plant interactions, and tracked how these factors shifted. Plant diversity declined by 45% in the immediate aftermath of the asteroid strike, the researchers found, and it took 6 million years before the rich diversity of the tropical rainforest rebounded. Even then, the forests were never the same.

“A single historical accident changed the ecological and evolutionary trajectory of tropical rainforests,” says Carlos Jaramillo, a paleopalynologist - someone who studies ancient pollen - at the Smithsonian Tropical Research Institute in Panama City. “The forests that we have today are really the by-product of what happened 66 million years ago.”

Just before the extinction event, tropical forests were a roughly 50-50 mix of angiosperms, or flowering trees and shrubs, and of other plant species such as conifers and ferns. “The competition for light was not that intense,” Jaramillo says. Afterward, ferns and conifers largely vanished, and angiosperms took over to make up about 90% of the plant species in the forest.

The reasons why aren't wholly clear. The region's climate at the end of the Cretaceous Period 66 million years ago was similar to how it is today: hot and humid. But other factors were likely at work. Huge plant-eating sauropods, the long-necked dinosaurs, would have helped maintain the open gaps, letting light in, Jaramillo says. Once the asteroid hit, those dinosaurs were out of the picture. Extinction of certain plant families due to the impact also may have played a role, he says.

A third likely factor was a shift in the chemical composition of the forest soil. Frequent rainfall during the warm, wet Cretaceous leached the soils of many nutrients, which would have favored gymnosperms like conifers, says Jaramillo. “The gymnosperms had this amazing ability to grow with very little food, and could outcompete the angiosperms.”

Ashfall fluttering to the ground in the wake of the asteroid impact may have added phosphorus to the soils, effectively fertilizing them, the team suggests. With more food available, angiosperms readily outcompeted the gymnosperms, swiftly growing skyward and blocking out the sunlight.

This thick, closed canopy appeared soon after the impact, but overall forest diversity took much longer to recover, as new species began to evolve to occupy new ecological niches. This was also true of the many insect species that had once feasted on the plants, the researchers found. Leaf fossils bear traces of the different types of interactions between herbivorous insects and plants, from creatures that strip leaves to their skeletons to those that drill careful holes through them.

“Generalist” insects and other plant-munching groups that can make do with many different types of plants for food “seemed to squeak through largely unaffected,” says coauthor Conrad Labandeira, a paleoecologist at the Smithsonian National Museum of Natural History in Washington, D.C. “The specialist interactions that got really creamed were things like leaf miners and piercers and suckers,” which are more dependent on particular plant types, Labandeira says.

The recovery path holds a valuable lesson for the long-lasting impact of modern human activities such as deforestation, Jaramillo says “Generating new diversity takes geological time,” he says. “It's not just about planting trees.”

Link: https://www.sciencenews.org/

Hubble Revisits the Veil Nebula

Credit: ESA/Hubble & NASA, Z. Levay

This image taken by the NASA/ESA Hubble Space Telescope revisits the Veil Nebula, which was featured in a previous Hubble image release. In this image, new processing techniques have been applied, bringing out fine details of the nebula's delicate threads and filaments of ionized gas.

To create this colorful image, observations were taken by Hubble's Wide Field Camera 3 instrument using five different filters. The new post-processing methods have further enhanced details of emissions from doubly ionized oxygen (seen here in blues), ionized hydrogen, and ionized nitrogen (seen here in reds).

The Veil Nebula lies around 2,100 light-years from Earth in the constellation of Cygnus (the Swan), making it a relatively close neighbor in astronomical terms. Only a small portion of the nebula was captured in this image.

The Veil Nebula is the visible portion of the nearby Cygnus Loop, a supernova remnant formed roughly 10,000 years ago by the death of a massive star. That star-which was 20 times the mass of the Sun-lived fast and died young, ending its life in a cataclysmic release of energy. Despite this stellar violence, the shockwaves and debris from the supernova sculpted the Veil Nebula's delicate tracery of ionized gas-creating a scene of surprising astronomical beauty.

The Veil Nebula is also featured in Hubble's Caldwell Catalog, a collection of astronomical objects that have been imaged by Hubble and are visible to amateur astronomers in the night sky.

Link: https://phys.org/

Venus Plots a Comeback

In terms of space exploration, Mars is all the rage these days. This has left our closest neighbor, Venus -- previously the most attractive planet to study because of its proximity and similar atmosphere to Earth -- in the lurch. A new article in Chemical & Engineering News, the weekly newsmagazine of the American Chemical Society, highlights how scientists and space agencies are turning their eyes back toward Venus to learn more about its atmosphere and geology.

From the 1950s to the late 1980s, Venus was a favored planet for scientists to study, writes Associate Editor Sam Lemonick. From our vantage point here on Earth, its atmosphere looks similar to our own, but closer examinations from USSR and NASA missions revealed that the surface of Venus is over 450 C with an atmospheric pressure nearly 100 times that of Earth. This led researchers to pivot away from studying our closest planetary neighbor until the turn of the century. In more recent years, missions led by the European Union and Japan have revealed that Venus has much more complex atmospheric chemistry than previously thought. These findings have generated renewed interest from scientists, who believe further study of Venus could provide insights about the chemistry of planets far beyond our reach.

These new revelations have led space agencies to plan their next missions to Venus:

- The Indian Space Research Organization (ISRO) is planning an orbiter launch in 2024, and Russia's Roscosmos is aiming for a lander mission in 2029.
- NASA, the European Space Agency, China and a private company are also mulling plans for their own trips. These missions will likely focus on the geology of Venus rather than its atmosphere, as modern technology will allow for greater insight into the surface of the planet.
- ISRO's planned mission will use radar and infrared spectrometry to gather data over a four-year period. NASA's two proposed missions would study Venus's atmospheric chemistry and geochemistry, respectively.

Experts advocating for renewed Venus missions say that the efforts will help scientists better understand planets in our own solar system and beyond, and could provide insights into the prevalence of life in the universe.

Link: https://www.eurekalert.org/

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

Virtual Monthly Meetings

See page 2 for meeting details.

All these meetings are ONLINE ONLY

Please do not visit the Observatory or Pavilion as both are closed

We use the Zoom platform. **The same link is used for all meetings** so please make sure you store the following, you can join using this link:

https://us02web.zoom.us/j/87183717129?pwd=NXU4b1IjWit2aXJqTTZsYWN5bTIaQT09

Meeting ID: 871 8371 7129

Passcode: 821137

You can join us from 18.45 - the meeting starts at 19.00

The two Zoom meetings held so far have been very favourably reported by those who viewed them. The experience is, of course, a little different using the virtual system but altogether it is a very positive one.

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.

Reports of Spam Emails

In the last month I have received reports from several members that they have been sent emails from other members which are fraudulent.

Unfortunately there is very little that can be done to stop this kind of thing as it does not originate from the wightastronomy email server. All I can recommend is that all members are aware of this problem and:

1. *Nobody with a "@wightastronomy" email address will ask you to send money, book tokens or Amazon vouchers to them, just delete the email and forget about it.*
2. *Ensure your email software is up to date*
3. *Check that your email password is not easy to guess, if it is, change it!*
4. *Do not click on links in emails unless you know where you will be sent*
5. *Do not reply to this kind of email, all that does it to let the sender know your email address is "live"*
6. *Mark the mail as spam, your system should then take care of it*
7. *If you use a online email address book, you really should check your password. Anyone has access to all your addresses if it is guessed*

Stay safe. There are some bad people out there!

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.

"Physicists like to think that all you have do is say, these are the conditions, now what happens next?"
Richard P Feynman

"If at first an idea does not sound absurd, then there is no hope for it"
Albert Einstein

"If you haven't found something strange during the day, it hasn't been much of a day"
John Wheeler

"If time travel is possible, then where are the tourists from the future?"
Stephen Hawking

"A paradox is truth standing on its head to attract attention"
Nicholas Falletta

"The Universe is made mostly of dark matter and dark energy, and we don't know what either of them is"
Saul Perlmutter