New Zenith

The Monthly Newsletter of the Vectis Astronomical Society

Vol 30 Issue 4 — May 2022

When Printed, this Newsletter costs VAS at least £1

Society News

Dark Skies News

The Isle of Wight Council have now restarted the process for Dark Skies approval from the International Dark Sky Association. The application being submitted is more or less the same as that previously used but it does include details of the changes to street lighting in the Brighstone area. Whilst the changes have not yet been made, the official promise to deal with the problem is said to be enough to at least restart the approval process.

Observatory Visits

We've seen quite a few visitors at the observatory in the last few weeks but it would be nice to see a few more members.

We are fully open every Thursday evening from 7.30pm and all the telescopes etc are available.

Brian Curd

VAS Website: wightastronomy.org

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

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Sandown
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PO36 8EE
Tel: 07594 339950 or email: **editor@wightastronomy.org**

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

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

Registered Charity No 1046091

Observatory Diary

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training.
Thursday	Members (19.30hrs) and Public (20.00hrs). Informal meeting and observing

VAS Website: wightastronomy.org

Contents this Month

2022 Monthly Meetings

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

Date	Subject	Speaker
27 May	Orbital Oddities	James Fradgley
24 Jun	TBA	
22 Jul	James Webb Space Telescope	Dr Stephen Wilkins
26 Aug	AGM	No Speaker
23 Sep	Kristian Birkeland - The story of the father of Northern Lights knowledge	Jonathan Clough
21 Oct	Outreach Event	
25 Nov	The UK National Space Strategy	Adam Amara

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 2022

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Others	Dudley Johnson

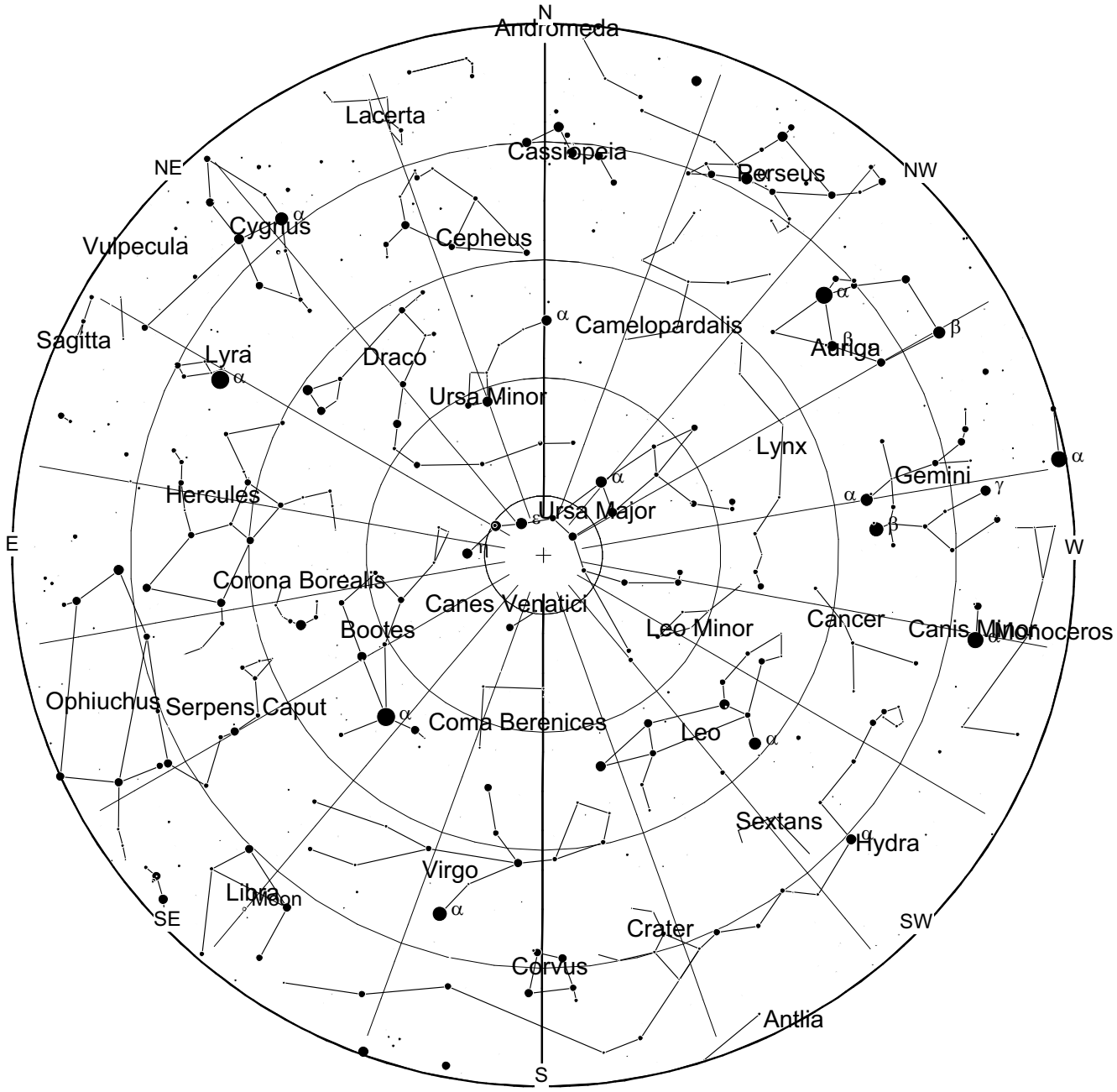
Important

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.

May 2022 - Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 May 2022

A **globular cluster** is a spherical collection of stars. Globular clusters are very tightly bound by gravity, with a high concentration of stars towards their centers. Their name is derived from Latin globulus - a small sphere. Globular clusters are occasionally known simply as globulars.

Although one globular cluster, Omega Centauri, was observed in antiquity and long thought to be a star, recognition of the clusters' true nature came with the advent of telescopes in the 17th century. In early telescopic observations, globular clusters appeared as fuzzy blobs, leading French astronomer Charles Messier to include many of them in his catalog of astronomical objects that he thought could be mistaken for comets. Using larger telescopes, 18th-century astronomers recognized that globular clusters are groups of many individual stars. Early in the 20th century, the distribution of globular clusters in the sky was some of the first evidence that the Sun is far from the center of the Milky Way.

This article is licensed under the GNU Free Documentation License.
It uses material from the Wikipedia article "Globular Cluster".

May 2022 - Night Sky

Moon Phases Dec 2021

New	First Qtr	Full	Last Qtr
30th	9th	16th	22nd
			

Planets

Mercury

During the first week of the month Mercury can be seen low down in the west north-west just after sunset, setting at about 22:30. As the week progresses it get fainter and sets earlier eventually fading into the twilight. On the 2nd it is just to the right of the thin crescent moon with the Pleiades star cluster a little further to the right.

Venus

Venus is visible in the east in the pre-dawn sky. It rises about 45 minutes before the Sun so the sky will be relatively bright at this time, but Venus being so bright will be easily seen. On the 1st it is in close conjunction with Jupiter which will be noticeable fainter but still bright. On the 27th Venus will be close to and above the waning crescent moon.

Mars

Mars is a rather challenging object this month. It is not very bright and although it rises about 2 hours before the Sun it is not very high in the sky at sunrise. If viewed at the same time every day it hardly moves towards the west, but does rise higher each day.

Jupiter

After its close encounter with Venus on the 1st Jupiter moves to the west increasing its distance from the Sun, rising earlier and getting higher in the sky each morning. On the 25th it is above the crescent moon making a right angled triangle with Mars to the right.

Saturn

Saturn can be seen low in the south east in the early morning sky. On the 22nd it is above the last quarter moon.

Uranus & Neptune

Both the outer planets are too close to the Sun to be seen this month

Deep Sky

M53 Globular Cluster
RA 13h 13m Dec 18° 7' mag 8.5

Lying some 60,000 light years away very few stars can be resolved in this cluster without the use of a large telescope. Through smaller instruments and binoculars it looks like a tailless comet.

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.

M63 Sunflower Galaxy
RA 13 16m Dec 41° 58' mag 8.5

This is a barred spiral galaxy 37 million light years away. It was originally discovered by Pierre Mechain, a friend of Charles Messier and who went on to discover over 25 more objects that were subsequently added to Messier's catalogue. Through a small telescope it is visible as an elongated smudge, but with larger apertures and a dark sky some hint of detail in the spiral arms may be seen.

Peter Burgess

Crumbling planets might trigger repeating fast radio bursts

Interactions between a planet and a magnetic neutron star might be the source of repeating, millisecond-long bursts of cosmic radio waves.

Credit: Mark Garlick/science Photo Library/getty

Fragmenting planets sweeping extremely close to their stars might be the cause of mysterious cosmic blasts of radio waves.

Milliseconds-long fast radio bursts, or FRBs, erupt from distant cosmic locales. Some of these bursts blast only once and others repeat. A new computer calculation suggests the repetitive kind could be due to a planet interacting with its magnetic host star, researchers report in the March 20 Astrophysical Journal.

FRBs are relative newcomers to astronomical research. Ever since the first was discovered in 2007, researchers have added hundreds to the tally. Scientists have theorized dozens of ways the two different types of FRBs can occur, and nearly all theories include compact, magnetic stellar remnants known as neutron stars. Some ideas include powerful radio flares from magnetars, the most magnetic neutron stars imaginable. Others suggest a fast-spinning neutron star, or even asteroids interacting with magnetars.

"How fast radio bursts are produced is still up for debate," says astronomer Yong-Feng Huang of Nanjing University in China.

Huang and his colleagues considered a new way to make the repeating flares: interactions between a neutron star and an orbiting planet. Such planets can get exceedingly close to these stars, so the team calculated what might happen to a planet in a highly elliptical orbit around a neutron star. When the planet swings very close to its star, the star's gravity pulls more on the planet than when the planet is at its farthest orbital point, elongating and distorting it. This "tidal pull," Huang says, will rip some small clumps off the planet. Each clump in the team's calculation is just a few kilometers wide and maybe one-millionth the mass of the planet, he adds.

Then the fireworks start. Neutron stars spew a wind of radiation and particles, much like our own sun but more extreme. When one of these clumps passes through that stellar wind, the interaction "can produce really strong radio emissions," Huang says. If that happens when the clump appears to pass in front of the star from Earth's perspective, we might see it as a fast radio burst. Each burst in a repeating FRB signal could be caused by one of these clumps interacting with the neutron star's wind during each close planet pass, he says. After that interaction, what remains of the clump drifts in orbit around the star, but away from Earth's perspective, so we never see it again.

Comparing the calculated bursts to two known repeaters — the first ever discovered, which repeats roughly every 160 days, and a more recent discovery that repeats every 16 days, the team found the fragmenting planet scenario could explain how often the bursts happened and how bright they were.

The star's strong gravitational "tidal" pull on the planet during each close pass might change the planet's orbit over time, says astrophysicist Wenbin Lu of Princeton University, who was not involved in this study but who investigates possible FRB scenarios. "Every orbit, there is some energy loss from the system," he says. "Due to tidal interactions between the planet and the star, the orbit very quickly shrinks." So it's possible that the orbit could shrink so fast that FRB signals wouldn't last long enough for a chance detection, he says.

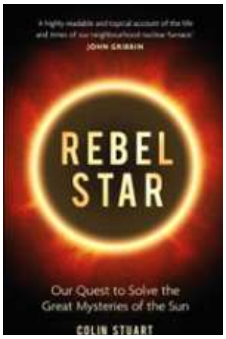
But the orbit change could also give astronomers a way to check this scenario as an FRB source. Observing repeating FRBs over several years to track any changes in the time between bursts could narrow down whether this hypothesis could explain the observations, Lu says. "That may be a good clue."

From: https://www.sciencenews.org/

Fast Radio Bursts

In radio astronomy, a fast radio burst (FRB) is a transient radio pulse of length ranging from a fraction of a millisecond to a few milliseconds, caused by some high-energy astrophysical process not yet understood. Astronomers estimate the average FRB releases as much energy in a millisecond as the Sun puts out in 3 days.

While extremely energetic at their source, the strength of the signal reaching Earth has been described as 1,000 times less than from a mobile phone on the Moon.



Rebel Star: Our Quest to Solve the Great Mysteries of the Sun

By Colin Stuart (published by Michael O'Mara Books, 2019)

The Sun has been worshipped, feared or puzzled over through all of human history. It is the source of all our energy, the sustainer of life and will ultimately bring down the curtain on our planet. Yet there is still so much we don't understand about it.

Colin Stuart was our speaker at VAS last month, and I now highly recommend reading the book on which his Rebel Star talk was based. The book may lack the audio-visuals of his excellent presentation - the bubbling cells on the solar surface, the sound of solar earthquakes, the terrifying whiplash of solar flares - but the book has more time to expand the stories and characters and astonishing ideas that tell the history of the study of the Sun. It is highly readable and tackles some very hard concepts successfully without recourse to a single equation: a good plan for an accessible popular science book.

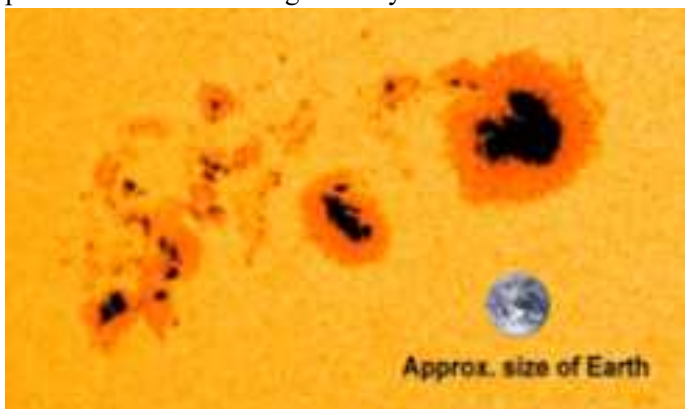
Rebel Star leads us through the lifetime of our neighbourhood star from birth in a compressed cloud of dust (recycled from older decayed stars) to its inevitable death via a turbulent and unpredictable present. We can count on the Sun rising and setting for all of our days, but it is anything but fixed and unchanging. How we came to know about each detail of the Sun's behaviour - the nature and sunspots, the Sun's composition, the processes and structures within it, the far-reaching magnetic fields and solar storms - these unworldly things are introduced through the very human characters who developed the methods and instruments that prise open the mysteries. Stuart introduces us to the pioneers of solar studies who often have surprising backstories, these dedicated men and women who with astonishing patience and ingenuity allow us to see what we were always told never to look at!

The book is choc-a-bloc with brilliant mind-expanding facts:

- The light from our sun started its journey to us not 8-and-a-half minutes but thousands of years ago!
- The lifetime of sun-spots appear in pairs which migrate relative to the Sun's equator, driven by a huge “conveyor belt”.
- The solar wind would have long ago stripped away the Earth's atmosphere if it weren't for the magnetic field.
- Potentially deadly Coronal Mass Ejections (CMEs) may spit out a Mount Everest-worth of matter travelling at a million miles per hour!

Massive solar flare eruption (class X2.2) 20 April 2022

The very real threat of the Sun’s activity disrupting modern life, by frying satellite networks and disabling power distribution, has prompted a number of space missions and experiments - each with its own bewildering or whimsical acronym (look out for STEREO, GONG and STEVE amongst the MACHOs and the WIMPs!) - to probe further into the Sun's mysterious atmosphere to help us understand and to provide “early warning” to observe potential hazards coming our way.



Sunspot AR1944 January 2014 with Earth for scale (credit: NASA/SDO)

The last few chapters of this superb book cover the investigation of the further reaches of the Sun's influence to the edges of the Solar system and into interstellar space, through evidence gleaned from the furthest flung messages in a bottle, the Pioneer and Voyager spacecraft. A section on the Sun's place in our Galaxy (out in the suburbs of a spiral arm of the Milky Way) leads into a final chapter “Lights Out” which spells out our star's distant future as a red giant (swallowing up the inner planets) and finally fading as a white dwarf as nuclear fuel runs out.

Reviewer: Simon Gardner

When the Magellanic Clouds Cozy up to Each Other

Five synchronized peaks of star formation reveal the two galaxies' most intimate encounters

Like two great songwriters working side by side and inspiring each other to create their best work, the Magellanic Clouds spawn new stars every time the two galaxies meet.

Visible to the naked eye but best seen from the Southern Hemisphere, the Large and Small Magellanic Clouds are by far the most luminous of the many galaxies orbiting the Milky Way. New observations reveal that on multiple occasions the two bright galaxies have minted a rash of stars simultaneously, researchers report March 25 in Monthly Notices of the Royal Astronomical Society: Letters.

Astronomer Pol Massana at the University of Surrey in England and his colleagues examined the Small Magellanic Cloud. Five peaks in the galaxy's star formation rate - at 3 billion, 2 billion, 1.1 billion and 450 million years ago and at present — match similarly timed peaks in the Large Magellanic Cloud. That's a sign that one galaxy triggers star formation in the other whenever the two dance close together.

"This is the most detailed star formation history that we've ever had of the [Magellanic] Clouds," says Paul Zivick, an astronomer at Texas A&M University in College Station who was not involved in the new work. "It's painting a very compelling picture that these two have had a very intense set of interactions over the last two to three gigayears."

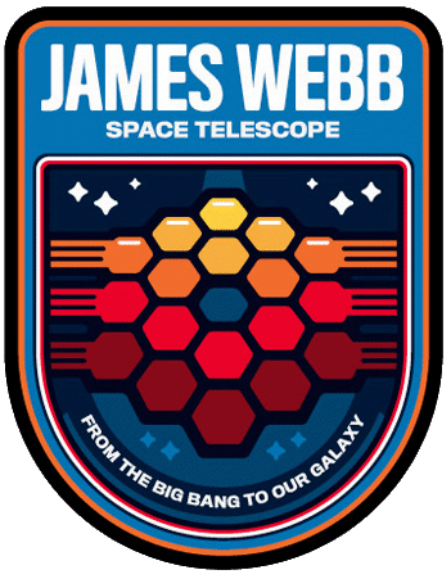
Even as the two galaxies orbit the Milky Way at 160,000 and 200,000 light-years from Earth, they also orbit each other. Their orbit is elliptical, which means they periodically pass near each other. Just as tides from the moon's gravity stir the seas, tides from one galaxy's gravity slosh around the other's gas, inducing star birth, says study coauthor Gurtina Besla, an astrophysicist at the University of Arizona in Tucson.

During the last encounter, which happened 100 million to 200 million years ago, the smaller galaxy probably smashed right through the larger, Besla says, which sparked the current outbreak of star birth. The last star formation peak in the Large Magellanic Cloud occurred only in its northern section, so she says that's probably where the collision took place.

Based on the star formation peaks, the period between Magellanic encounters has decreased from a billion to half a billion years. Besla attributes this to a process known as dynamical friction. As the Small Magellanic Cloud orbits its mate, it passes through the larger galaxy's dark halo, attracting a wake of dark matter behind itself. The gravitational pull of this dark matter wake slows the smaller galaxy, shrinking its orbit and reducing how much time it takes to revolve around the Large Magellanic Cloud.

The future for the two galaxies may not be so starry, however. They recently came the closest they've ever been to the Milky Way, and its tides, Besla says, have probably yanked the pair apart. If so, the Magellanic Clouds, now separated by 75,000 light-years, may never approach each other again, putting an end to their most productive episodes of star making, just as musicians sometimes flounder after leaving bandmates to embark on solo careers.

From: https://www.sciencenews.org/



Coming Soon to a Screen Near You!

Wartime Skygazing: an Amateur Astronomer in Ukraine

Plakha Alexander poses with his Sky Watcher 305mm Newtonian telescope on Sky Watcher EQ6 mount.

On February 24, 2022, a waning crescent Moon hung in the sky above Ukraine. From 240,000 miles away on the lunar surface, Plakha Alexander thought, all would have appeared deceivingly peaceful on our blue planet. But the amateur astronomer, business owner, and Ukrainian knew reality to be quite different. He was using his own telescope to observe the Russian advance.

The Russian invasion of Ukraine completely upended Plakha's life and his small business selling astro gear, but he still holds defiantly to the dream of peace for his country. Recently I had the opportunity to talk to Plakha about his unique perspective as a Ukrainian citizen and as an amateur astronomer coming to terms with an uncertain future.

The observatory near Donetsk.

With a strong interest in astronomy since his childhood, Plakha eventually built an observatory near Donetsk, in the now-disputed Donbass region of southeastern Ukraine. He hosted friend and mentor John Dobson for a visit to his observatory in 2006, and the two spoke about the importance of popularizing astronomy.

But Plakha had to change course in 2014, when Russian mercenaries occupied part of the Donetsk and Luhansk regions and annexed Crimea. "Russian mercenaries bombed my house and my observatory," Plakha says. "I was forced to move to Kharkiv."

Two years later after rebuilding his life in a new city, Plakha started his own company, *Astro-Gadget.net*. Plakha says he has sought to follow the values he learned from Dobson, who advocated creating useful products for astronomy enthusiasts at affordable prices. The online store fulfilled that goal, offering astrophotography aids, Bluetooth and Wi-Fi adapters for controlling telescopes, USB interface cables, kits for adding computer control to focusers, anti-dew heaters, and much more.

Software programmers and electronics and design engineers from all over Ukraine crafted the products. "The most important thing," Plakha adds, "is that they are all amateur astronomers with extensive experience, and we are all united by a love for astronomy."

Everything was going well with the fledgling company when uncertainty once again reared its ugly head. Last December, the Russian military began amassing along Ukraine's border. But Plakha remained certain Russia wouldn't invade. "I thought that Putin was bluffing, intimidating, and just showing strength," he says.

"In the first days of the invasion, we experienced a shock," Plakha continues. "Kharkiv was heavily bombed, houses were burning, and people were dying."

Prior to the war, Plakha had purchased a house in Kharkiv and dreamed of building a new observatory. But as the bombs fell, he realized he would lose his dream a second time. He spent the first few days of the war with his family in a shelter, venturing out between the shelling and bombing to help the injured.

About a week after the Russians' initial push had stalled, Plakha took a brief window of opportunity to move his family, staff, and business to a safer location in western Ukraine. That action wasn't without its own risks. During the move, a Russian shell landed in his front yard; fortunately for him and his neighbors, it did not explode.

Yet, even though the Russian army has destroyed thousands of homes and buildings as well as the city's infrastructure, Plakha says he still envisions one day returning to Kharkiv to restart his dream. For now, though, he is resigned to staying in the west.

"I think Russia no longer has the power to take over all of Ukraine," he says with hope. "Therefore, the western regions of Ukraine will remain safe, and here we can continue our work. . . . Life must go on."

From: https://skyandtelescope.org/

4 Billion-year-old Relic From Early Solar System Heading Our Way

An enormous comet - approximately 80 miles across is heading our way at 22,000mph from the edge of the solar system. Fortunately, it will never get closer than 1 billion miles from the sun, which is slightly farther from Earth than Saturn; that will be in 2031.

Comets are icy bodies that were unceremoniously tossed out of the solar system in a gravitational pinball game among the massive outer planets, said David Jewitt. The UCLA professor of planetary science and astronomy co-authored a new study of the comet in the Astrophysical Journal Letters. The evicted comets took up residence in the Oort cloud, a vast reservoir of far-flung comets encircling the solar system out to many billions of miles into deep space, he said.

A typical comet's spectacular multimillion-mile-long tail, which makes it look like a skyrocket, belies the fact that the source at the heart of the fireworks is a solid nucleus of ice mixed with dust - essentially a dirty snowball. This huge one, called Comet C/2014 UN271 and discovered by astronomers Pedro Bernardinelli and Gary Bernstein, could be as large as 85 miles across.

“This comet is literally the tip of the iceberg for many thousands of comets that are too faint to see in the more distant parts of the solar system,” Jewitt said. “We've always suspected this comet had to be big because it is so bright at such a large distance. Now we confirm it is.”

This comet has the largest nucleus ever seen in a comet by astronomers. Jewitt and his colleagues determined the size of its nucleus using NASA's Hubble Space Telescope. Its nucleus is about 50 times larger than those of most known comets. Its mass is estimated to be 500 trillion tons, a hundred thousand times greater than the mass of a typical comet found much closer to the sun.

“This is an amazing object, given how active it is when it's still so far from the sun,” said lead author Man-To Hui, now with the Macau University of Science and Technology in Taipa, Macau. “We guessed the comet might be pretty big, but we needed the best data to confirm this.”

So the researchers used Hubble to take five photos of the comet on Jan. 8, 2022, and incorporated radio observations of the comet into their analysis.

The comet is now less than 2 billion miles from the sun and in a few million years will loop back to its nesting ground in the Oort cloud, Jewitt said.

Comet C/2014 UN271 was first serendipitously observed in 2010, when it was 3 billion miles from the sun. Since then, it has been intensively studied by ground and space-based telescopes.

The challenge in measuring this comet was how to determine the solid nucleus from the huge dusty coma - the cloud of dust and gas - enveloping it. The comet is currently too far away for its nucleus to be visually resolved by Hubble. Instead, the Hubble data show a bright spike of light at the nucleus' location. Hui and his colleagues next made a computer model of the surrounding coma and adjusted it to fit the Hubble images. Then, they subtracted the glow of the coma, leaving behind the nucleus.

Hui and his team compared the brightness of the nucleus to earlier radio observations from the Atacama Large Millimeter/submillimeter Array, or ALMA, in Chile. The new Hubble measurements are close to the earlier size estimates from ALMA, but convincingly suggest a darker nucleus surface than previously thought.

“It's big and it's blacker than coal,” Jewitt said.

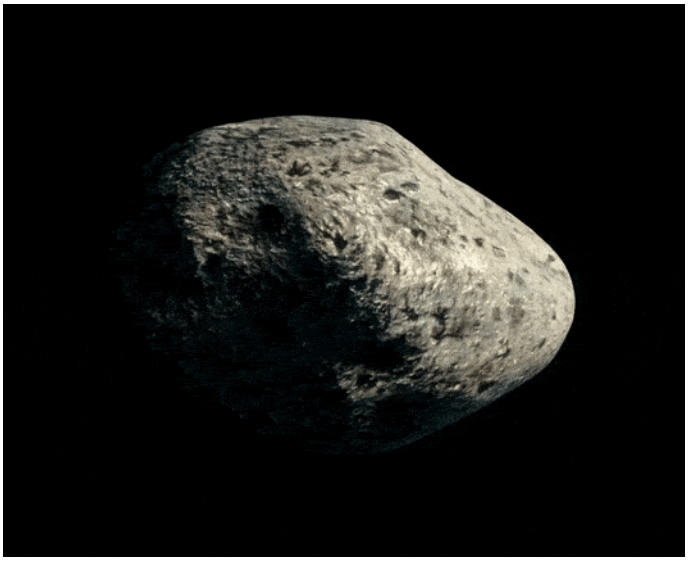
The comet has been falling toward the sun for well over 1 million years. The Oort cloud is thought to be the nesting ground for trillions of comets. Jewitt thinks the Oort cloud extends from a few hundred times the distance between the sun and the Earth to at least a quarter of the way out to the distance of the nearest stars to our sun, in the Alpha Centauri system.

The Oort cloud's comets were tossed out of the solar system billions of years ago by the gravitation of the massive outer planets, according to Jewitt. The far-flung comets travel back toward the sun and planets only if their orbits are disturbed by the gravitational tug of a passing star, the professor said.

First hypothesized in 1950 by Dutch astronomer Jan Oort, the Oort cloud still remains a theory because the comets that make it up are too faint and distant to be directly observed. This means the solar system's largest structure is all but invisible, Jewitt said.

From: https://phys.org/

Asteroids



Asteroids are rocky celestial bodies that orbit the Sun, but do not meet the requirements to be classified as a planet.

The term asteroid covers a very broad range of Solar System objects, including debris left behind by objects that did not successfully grow into planets. They are irregularly shaped, which disqualifies them from being classified as planets or dwarf planets. The asteroid belt is a region of space between the orbits of Mars and Jupiter that is densely populated with asteroids. The majority of known asteroids are found within the asteroid belt. Asteroids and comets are partially distinguished from one another by their composition: asteroids are rocky, whereas comets comprise dust and ice. When comets pass close to the Sun, some of their icy composition heats up sufficiently to be released as gas. This gas forms a loosely bound atmosphere known as a 'coma', and this gives comets their distinctive appearance of having a tail streaming behind them. In contrast, asteroids tend to remain solid. In practice, however, the distinction between asteroids and comets can be rather arbitrary.

Hubble has observed various asteroids over the course of more than three decades of observations. For example, in 2017 Hubble studied the asteroid Vesta — which is only 500 km in diameter — from a distance of 250 million kilometers. The observations created a map of its surface and were even able to capture the asteroid's changing appearance as it rotated.

Hubble also observed the spectacular asteroid collision P2010/A2 in 2010. Using Hubble to study the aftermath of the collision over five months, astronomers watched a strange, comet-like debris trail slowly evolve as the collision site orbited the Sun. This research gave clues about how asteroids behave when they collide, and how the fall-out from these impacts contributes to the dust that pervades the Solar System.

In 2017 a German-led group of astronomers used Hubble to observe two asteroids, orbiting each other in the asteroid belt between Mars and Jupiter, that exhibited comet-like features, including a bright coma and a long tail. This was the first known binary asteroid to also be classified as a comet. It was Hubble's images that revealed that it was actually not a single object, but two asteroids of almost the same mass and size, orbiting each other at a distance of about 100 kilometers. That discovery was in itself an important find; because they orbit each other, the masses of the objects in such systems can be measured. Understanding the origin and evolution of main-belt comets — asteroids orbiting between Mars and Jupiter that show comet-like activity — is a crucial element in our understanding of the formation and evolution of the whole Solar System.

Asteroid 6478 Gault is seen with the Hubble Space Telescope, showing two narrow, comet-like tails of debris that tell us that the asteroid is slowly undergoing self-destruction. The bright streaks surrounding the asteroid are background stars. The Gault asteroid is located between the orbits of Mars and Jupiter. Credit: NASA, ESA, K. Meech and J. Kleyna, O. Hainaut

In 2019, Hubble observed a rare self-destructing asteroid called 6478 Gault. The images provided new insights into the asteroid's past: the object was 4–9 kilometers wide and had two narrow, comet-like tails of debris that indicated that the asteroid was slowly undergoing self-destruction. Each tail is evidence of an active event that released material into space. The direct observation of this activity by the Hubble Space Telescope provided astronomers with a special opportunity to study the composition of asteroids. By researching the material that this unstable asteroid releases into space, astronomers can get a glimpse into the history of planet formation in the early Solar System.

More at: https://scitechdaily.com/

MAGIC Telescopes Observe Nova Explosion

Light on, light off - this is how one could describe the behavior of the nova, which goes by the name RS Ophiuchi (RS Oph).

Every 15 years or so, a dramatic explosion occurs in the constellation of the Serpent Bearer. Birthplaces of a nova are systems in which two very different stars live in a parasitic relationship: A white dwarf, a small, burned-out and tremendously dense star - a teaspoon of its matter weighs about 1 ton - orbits a red giant, an old star that will soon burn up.

The dying giant star feeds the white dwarf with matter shedding its outer hydrogen layer as the gas flows onto the nearby white dwarf. This flow of matter continues, until the white dwarf over(h)eats itself. The temperature and pressure in the newly gained stellar shells become too large and are flung away in a gigantic thermonuclear explosion. The dwarf star remains intact and the cycle begins again - until the spectacle repeats itself.

Explosion in the high-energy range

It had been speculated that such explosions involve high energies. The two MAGIC telescopes recorded gamma rays with the value of 250 gigaelectronvolts (GeV), among the highest energies ever measured in a nova. By comparison, the radiation is a hundred billion times more energetic than visible light.

MAGIC was able to make its observations following initial alerts from other instruments measuring at different wavelengths. “The spectacular eruption of the RS Ophiuchi shows that the MAGIC telescopes' fast response really pays off: It takes them no more than 30 seconds to move to a new target,” said David Green, a scientist at the Max Planck Institute for Physics and one of the authors of the paper.

Accelerated protons as a part of cosmic rays

After the explosion, several shock fronts propagated through the stellar wind from the Red Giant and the interstellar medium surrounding the binary system. These shock waves work like a giant power plant in which particles are accelerated to near the speed of light. The combined measurements suggest that the gamma rays emanate from energetic protons, nuclei of hydrogen atoms.

“This also makes nova outbursts a source of cosmic rays,” explains David Green. “However, they tend to play the role of local heroes - meaning to only contribute to the cosmic rays in the close neighborhood. The big players for cosmic rays are supernova remnants. The shock fronts created from stellar explosions are far more violent compared to novae.

To fully understand the complicated interplay of violent events with the interstellar medium in the Milky Way, more observations like those reported now will be necessary. The MAGIC collaboration will therefore continue to look for “restless” objects in our Galaxy and beyond.

More: http://spaceref.com/

Polygonal Dunes On Mars

Polygonal Dunes On Mars, ©NASA HIRISE

Polygons are of great interest because they often indicate the presence of shallow ice or of desiccation such as in a mud flat. However, Nature sometimes seems too clever for us.

Polygons form by the intersecting ridges of sand dunes. If this deposit were to become indurated and eroded, we might not be able to tell that they originated as wind-blown dunes, and interpret the polygons as evidence for a dried-up lake, for example. Dunes often accumulate in the bottoms on craters, also a good setting for a (temporary) lake.

The illumination is coming from the upper left, so the bluish ridges are high-standing.

Enhanced color image is less than 1 km across and is 252 km above the surface. For full images including scale bars, visit the source link: *https://www.uahirise.org/ESP_031138_1380*

NASA/JPL/UArizona *Larger image*

From: http://spaceref.com/

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LINKS, COMMENTS AND OBSERVATIONS

Important News

The May Monthly Meeting will be the first "***in person***" meeting of 2022.

We may still use ZOOM from time to time as it does open our options and it does mean we can access a whole range of extra speakers.

Obviously news of any changes will be in NZ, on our website and by email.

AstroQuiz

1. Ariel, Umbriel, Miranda, Titania and Oberon are moons of which planet?
2. Which is the largest planet in the Solar system?
3. What is the brightest object in the night sky?
4. The Sun is the centre of the Solar System was first proposed by who?
5. Vesta is the third largest what?
6. Which present day country was the launch site for manned Soviet Union space flights?
7. Which planet did space probe Mariner 9 visit in 1971?
8. Which Russian space station operated in low Earth orbit from 1986 - 2001?
9. Name the comet that completes an orbit of the Sun once every three years - the shortest period of any known comet?
10. Which planet is nearest the earth: Mars or Venus?
11. Name the nearest known star to the Sun?
12. Which rare astronomical event occurs when a high-mass star reaches the end of its life?
13. The Shoemaker-Levy 9 comet smashed into which planet in July 1994?
14. Name the brightest star in the constellation Ursa Minor?
15. Which astronomer is best known for his laws of planetary motion?
16. In 1610, who discovered the four largest moons of Jupiter using a telescope?
17. The Sun is composed primarily of which chemical element?
18. Which astronomer proposed an equation to work out how many civilizations there could be in our galaxy?
19. Name the galaxy that contains the Solar System?
20. What unit of length is equal to about 3.26 light-years?

1. Uranus, 2. Jupiter, 3. Venus, 4. Copernicus, 5. Asteroid, 6. Kazakhstan, 7. Mars, 8. Mir, 9. Encke's Comet, 10. Venus, 11. Proxima Centauri, 12. A supernova, 13. Jupiter, 14. Polaris, 15. Johannes Kepler, 16. Galileo Galilei, 17. Hydrogen, 18. Frank Drake, 19. The Milky Way, 20. A parsec

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 relevant content. Contact details on page 1.

Strange Facts

Ninety-five percent of the matter in the universe is either dark matter or dark energy that can't be detected.

Venus spins backward on its axis compared to all the other planets in our solar system.

Neutron stars, which are leftover from the deaths of massive stars in supernova explosions, are so dense that just a bowlful of neutron star material has more mass than the Moon.

Neutron stars also spin up to 500 times per second and are some of the fastest-spinning objects known to astronomers.

A car ride to the nearest star at 70 miles per hour would last over 356 billion years.

Only one two-billionth of the Sun's energy hits the Earth.

Earth is the only known planet with plate tectonics.