New Zenith

The Monthly Newsletter of the Vectis Astronomical Society

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

Society News

Happy New Year

Well here we are again starting another orbit of our star!

I really hope we get some better weather soon and get at least half a chance to use the range of telescopes we have at the observatory.

2018 was one of the worst years I have experienced for Thursday evening observing - cloud, rain and wind are very common words in the Observatory logbook for last year. To quote somebody quite famous, "Things can only get better".

What's Happening?

- As you can see from the table on page 2, booking for group visits are looking good for the next month or so.
- The dome, main room and entrance corridor at the observatory need painting, this will probably start when we get some better weather. Spring/Summer?
- The Dark Skies Accreditation project is going through something of a rebirth and we are hoping to submit our application to the IDA in the next few months.
- We need to clean and collimate at least two of the society's large dobsonian telescope's and will be doing this on Thursday evenings. If you'd like to learn how to do this vital maintenance to your own telescope, come and join us.
- Otherwise it's business as usual.
  The observatory is **your** resource, please come and use it.

  We have some great monthly meetings arranged, please come along.

  We have this monthly newsletter, please send in your news, articles and photographs.

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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Tel: **01983 872875** or email: **editor@wightastronomy.org**

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

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Observatory Diary

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training. Please contact Martyn Weaver 07855 116490
Thursday	Members (19.30hrs) and Public (20.00hrs). Informal meeting and observing

VAS Website: wightastronomy.org

Contents this Month

2019 Monthly Meetings

Date	Subject	Speaker
Check *http://www.wightastronomy.org/meetings/* for the latest information		
25 Jan	The History of Astronomy	Bryn Davis
22 Feb	Imaging the Sun	John Slinn
22 Mar	Isle of Wight Dark Sky Park - an Update	AONB, CPRE & VAS
26 Apr	Can we Live on Mars?	Greg Smye-Rumsby
24 May	The Rise and fall of the Herstmonceux Observatory	Keith Brackenborough
28 June	Nuclear Physics - Life, the Universe and Everything!	Dr Elizabeth Cunnigham
26 July	Young Astronomers' Event	
23 Aug	AGM and Social Evening	
27 Sept	A transportable/deployable radio telescope for hydrogen line observation	Alan and Martin Thompson
25 Oct	Dark Skies Event	
22 Nov	TBA	TBA

Observatory Visits Booked

Mon 28 Jan	West Wight Group
Mon 4 Feb	Godshill and Rookley Scouts
Wed 20 Feb	Island Singles Group
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.	

The Committee Needs A Programme Organiser

If you could help organise the VAS programme of monthly meetings, we'd love to hear from you

VAS Contacts 2018/19

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NZ Distribution	Graham Osborne
Others	Mark Williams, Nigel Lee, Stewart Chambers, Elaine Spear

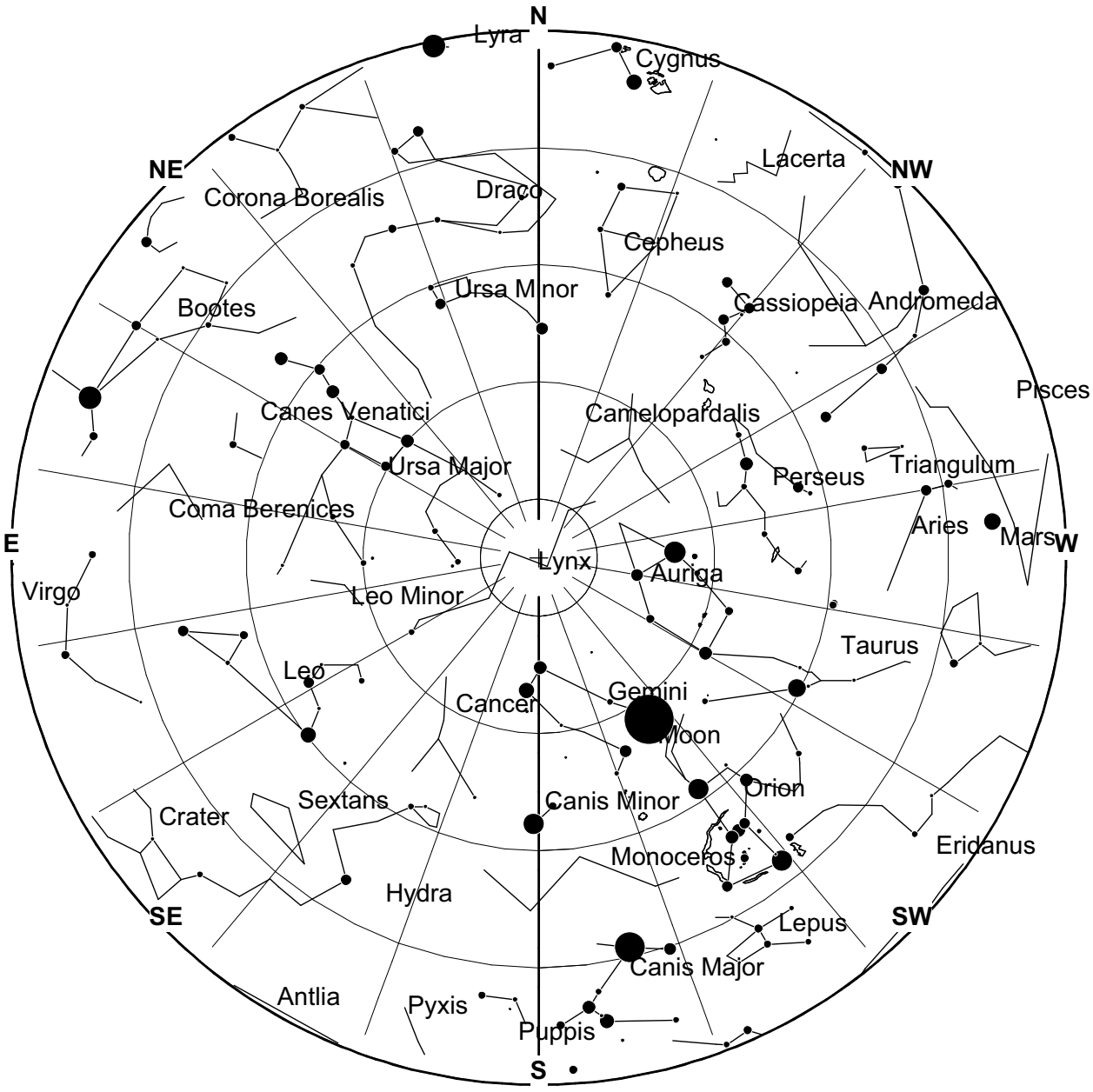
Important

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.

February 2019 Sky Map



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

Mercury is the smallest and innermost planet in the Solar System. Its orbital period around the Sun of 87.97 days is the shortest of all the planets in the Solar System. It is named after the Roman deity Mercury, the messenger of the gods.
Like Venus, Mercury orbits the Sun within Earth's orbit as an inferior planet, and never exceeds 28° away from the Sun when viewed from Earth. This proximity to the Sun means the planet can only be seen near the western or eastern horizon during the early evening or early morning. At this time it may appear as a bright star-like object, but is often far more difficult to observe than Venus. 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, which reoccurs over the so-called synodic period approximately every 116 days.

February 2019 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
4th	12th	19th	26th

Planets

Mercury

Mercury puts in a fairly reasonable appearance in the early evening sky just after sunset, it is quite bright at about magnitude -1, but the sky is not yet fully dark making it more difficult to spot. A pair of binoculars helps considerably to spot this little world that is so close to the Sun.

Date	Az	Alt	Date	Az	Alt
10th	245	3	**20th**	246	12
12th	245	5	**22nd**	246	14
14th	245	7	**24th**	246	16
16th	245	9	**26th**	247	17
18th	245	11	**28th**	248	17

Azimuth and elevation for Mercury at 17:30

Venus

Look low in the southeast before sunrise to find the dazzlingly bright Venus which is now sliding closer towards the sunrise, leaving Jupiter behind after its close conjunction in January. On the 18th it passes about 1 degree, two moon diameters above the much fainter Saturn. Venus rises at 05:11, so there is a little time before the dawn sky gets too bright to see Saturn.

Mars

If viewed at the same time each night Mars seems can be found at the same azimuth and elevation in the southwestern sky after dark, hardly changing its position all month. There are no stars nearby that are as bright or as noticeably red in colour so making it easily identifiable. On the 12th it passes close to the ice giant Uranus

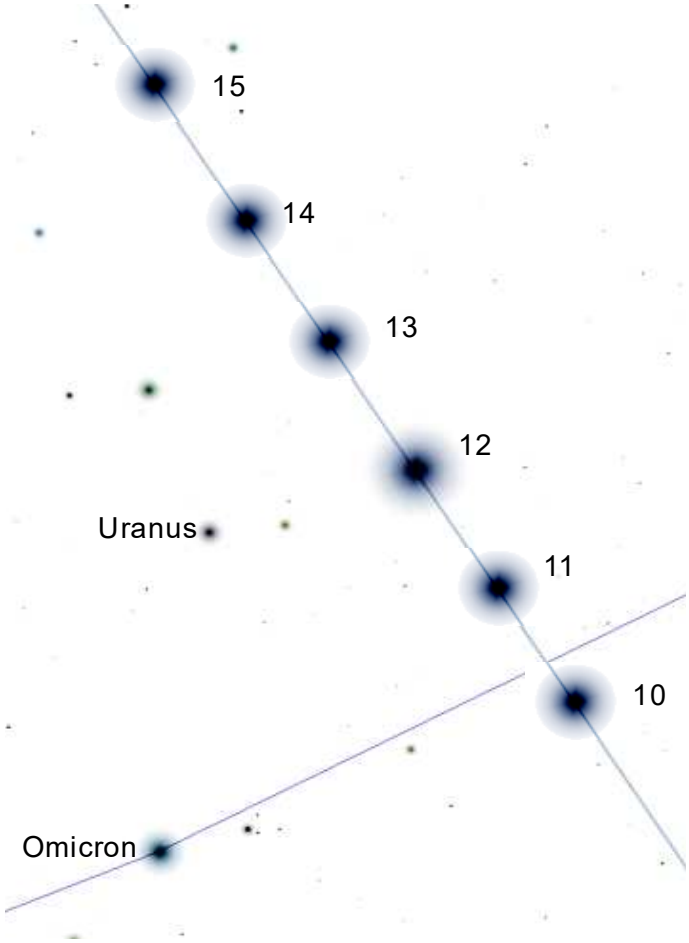
Jupiter

Another early morning planet, Jupiter starts the month low in the southeast and drifts towards the south away from the much brighter Venus as the month progresses.

Saturn

Saturn is a rather difficult object at the moment; at this point in its orbit it is low down in our sky at best, and that coupled with rising only a little more than an hour before sunrise makes it a challenge. Look for it close to Venus around the 18th.

Uranus



Uranus and Mars 10th to 15th February

Uranus is in the constellation of Pisces about 1.5° east of the star Omicron Piscium. On the 12th it is in conjunction with Mars. Mars passes about 1° west and above Uranus. Having the much brighter Mars nearby for a few days makes a good sign post for finding the closest of the ice giant worlds.

Neptune

Neptune is on the far side of the Sun this month and will not be visible again until later in the year.

Deep Sky

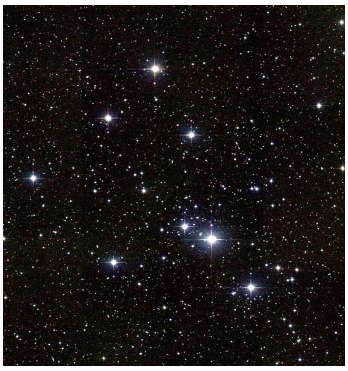
M46 Open Cluster RA 7h 42m Dec -14° 51' mag 6.5

Visible through binoculars as a misty smudge against the winter Milky Way in the same field of view as M47, M46 is a cluster of some 500 stars spread over an area equivalent to the full Moon. For observers with larger telescopes there is an 11th magnitude planetary nebular located towards the northern edge of the cluster. This nebula is a foreground object and appears to be within the cluster boundary purely by chance.

M1 Crab Nebula, Supernova Remnant RA 5h 35m Dec 22° 1' mag 8.4

It should be remembered that Charles Messier's catalogue is a list of objects that could be mistaken for comets, not a list of must see objects in the night sky. Many of them can be a disappointment to the casual observer. The first entry in the catalogue the Crab Nebula is one of these, it could easily be taken for a tailless comet. In a small telescope it appears as an oval smudge with no detail, larger instruments do however show some mottling.

The remains of the star which exploded in 1054 and was recorded by the Chinese is a 16th magnitude neutron star in the heart of the nebula spinning at 30 times per second. Despite its visual appearance this object is one of the most studied in the night sky, it is a nearby natural particle acceleration that dwarfs anything we can create here on Earth.



M41 Open Cluster RA 6h 46m Dec -20° 46' mag 4.5

Under a clear dark sky this cluster can be seen with the naked eye as a bright spot towards the edge of the winter milky way about 4 degrees beneath Sirius. A small telescope will show it as a large if somewhat sparsely populated cluster.

Peter Burgess

Zodiacal Light

Zodiacal light seen behind the Submillimeter Array from the summit of Mauna Kea - Credit Steven H. Keys and http://www.keysphotography.com

Zodiacal light (*also called false dawn when seen before sunrise*) is a faint, diffuse, and roughly triangular white glow that is visible in the night sky and appears to extend from the Sun's direction and along the zodiac, straddling the ecliptic. Sunlight scattered by interplanetary dust causes this phenomenon. Zodiacal light is best seen during twilight after sunset in spring and before sunrise in autumn, when the zodiac is at a steep angle to the horizon. However, the glow is so faint that moonlight and/or light pollution outshine it, rendering it invisible.

Zodiacal light is produced by sunlight reflecting off dust particles in the Solar System known as cosmic dust. Consequently, its spectrum is the same as the solar spectrum. The material producing the zodiacal light is located in a lens-shaped volume of space centered on the sun and extending well out beyond the orbit of Earth. This material is known as the interplanetary dust cloud. Since most of the material is located near the plane of the Solar System, the zodiacal light is seen along the ecliptic. The amount of material needed to produce the observed zodiacal light is quite small. If it were in the form of 1 mm particles, each with the same albedo (reflecting power) as Earth's moon, each particle would be 8 km from its neighbours. The gegenschein may be caused by particles directly opposite the Sun as seen from Earth, which would be in full phase.

https://en.wikipedia.org/wiki/Zodiacal_light

New Horizons – Old Harmonies

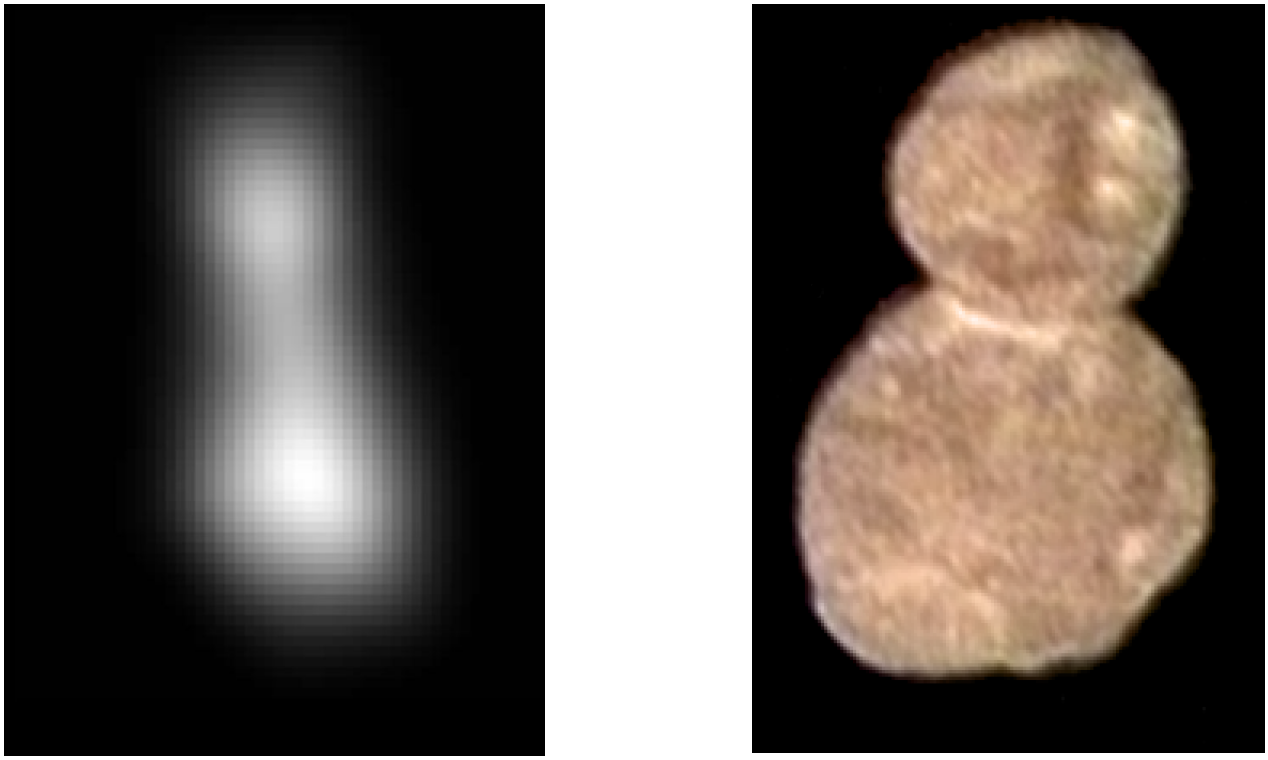


Figure 1 – What a difference a day makes!
Left: first image of Ultima Thule received on 2nd January, a "pixel at ed peanut";
Right: on 3rd January, a "snowman" about the size of the Isle of Wight (31 x 19 km). (NASA – Public Domain)

Early on New Year's Day, the New Horizons spacecraft successfully achieved its long anticipated flyby of Ultima Thule. At about 43 times the distance from the Earth to the Sun, this was the furthest encounter yet with an object in our Solar System. From that far out the messages from New Horizon take over 6 hours to reach Earth! These are exciting times of what one NASA scientist called "pure exploration". Each pixellated image of Ultima Thule shows more detail than the last. By the time you are reading this, no doubt, these pictures will be superseded, and questions are already being settled daily: it is a contact binary object rather than a close binary; and the mysterious absence of a detectable light curve amplitude (almost unchanging brightness over time) from an irregularly-shaped rotating object is due to the orientation of the axis of rotation. And other questions will answered and others posed as the data streams in.

The BBC heralded the event by an interview with Professor Brian May. The rock guitarist-cum-astrophysicist was excited not only about the brilliant scientific feat, but was speaking over the soundtrack of a song called "New Horizons" which he had written specially. On the back of an all-night party at NASA Mission Control, he was heady with anticipation for the images that will be received over the coming weeks and months, as well as about possibly re-launching his solo career!

This combination of music and science led me to think about other music inspired by astronomy. The multi-talented US musician Anna Coogan (a visitor to the IW last year) has albums *The Birth of the Stars* and *The Lonely Cry of Space and Time*, the title track written about the first gravitational wave detection by the LIGO observatory in 2017. And we can all recall numerous other pop songs inspired by manned space flight, such Elton John's *Rocket Man* and David Bowie's *Space Oddity.* These artists were more drawn towards the human experience of isolation and the new perspective of a person looking down on the Earth.

Perhaps we can imagine musicians actually looking up at the night sky in titles like *The Moon and Seven Stars,* a lively jig in the English folk tradition, and which we may guess was conceived on a starlit summer evening of song and dance as the Pleiades hung over the harvest fields. This idea was later revisited by experimental composer John Cage in the early 1960s – his piece *Atlas Eclipicalis* asks an orchestra to play from a score constructed directly from a star map. In classical music it is more often mythology than the real science that feeds composers' imaginations. For example Gustav Holst's *Planets Suite* (including the

incomparable *Mars – the Bringer of War*) was inspired by the astrological associations of the planets rather than an appreciation of the night sky itself. By contrast, Joseph Haydn's *Creation* was conceived in 1798 after he discussed music and astronomy with William Herschel who played the oboe (when he wasn't busy discovering Uranus).

Why music and astronomy? Encounters with the wonders of nature often inspire an artistic response to express a sense of awe or wonder, just as they excite the curiosity that has led to further observations and theories to make sense of what we see. And with music and astronomy there is a commonality in the mathematics underlying both harmony and orbital motion. The "Music of the Spheres" was an early model of the Cosmos (solar system) mapped from musical ideas. Regularities in the movement of the planets have been known from ancient times. Then closer observation reinforced the expectation of finding simple ratios between planets' orbits.

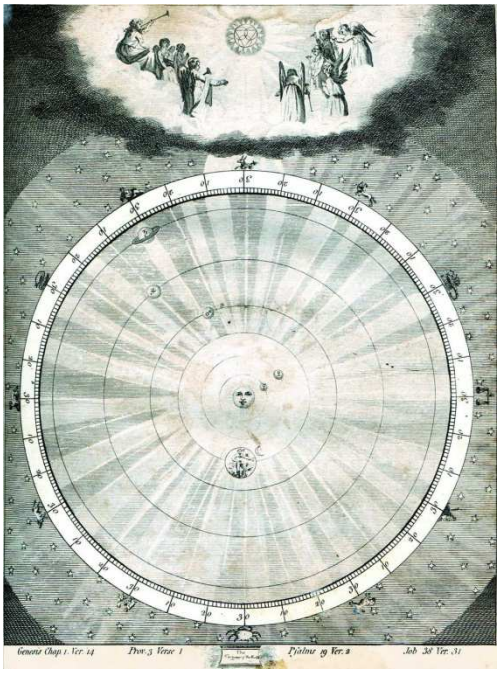


Figure 2 - Harmony of the World: an 18th century image based on the Music of the Spheres (by Ebenezer Sibly [Public domain])

Pythagoras is credited with first observing the mathematics underpinning musical harmony – first in the notes of different sized anvils, and later finding the simple relationships between lengths of strings and the "pleasant" combinations of musical pitches heard when they are plucked or bowed. String lengths of ratio 2:1 give pitches which are an octave apart; a ratio of 3:2, a perfect fifth; 4:3, a perfect fourth, etc. These pure harmonic patterns became in the Middle Ages a model which was imposed on the planetary orbital periods by none other than Johannes Kepler. In his 1619 book *Harmonices Mundi* ("The Harmony of the World") it was this music of the spheres, together with careful observations, that led to the formulation of his three laws of planetary motion that revolutionised astronomy by introducing elliptical orbits into a heliocentric system.

What may be less well known is that Kepler was so keen to make the data fit the patterns that he fudged some of the facts, including the inconvenience that the relationship between the orbital periods of Mars and Jupiter didn't fit his all-too-perfect ideas. However real physical patterns of "orbital resonances" – simple harmonic ratios between orbital periods – do emerge in many different places and are key to our understanding the formation and evolution of the solar system. Resonances can explain the distribution of asteroids in the asteroid "belt", the clockwork 4:2:1 ratio of the orbits of moons Ganymede, Europa and Io around Jupiter, and the patterns in the rings around Saturn. And finally, returning to Ultima Thule in the Kuiper Belt, far beyond the orbit of Pluto, this is the region where orbital resonances will be key to identifying the suspected Planet X (Planet 9) which so far can only be detected by its gravitational effect on other objects.

This New Year 2019 will continue to bring more discoveries and open up new questions about the Universe. And over the next 20 months, while we wait for the precious data to return from New Horizons, bear in mind the Old Harmonies of the Music of the Spheres.

Simon Gardner (3rd January 2019)

The Earth is Made of Rare and Unusual Matter

The great majority of all the matter in the universe is so-called dark matter, invisible stuff that astronomers haven't yet identified. And most ordinary or visible matter is in the form of plasma (hot, electrified gas that makes up normal stars such as the Sun) or degenerate matter (in which atoms or even the nuclei within the atoms are crushed together to unimaginable density, as found in white dwarfs and neutron stars).

You don't find dark matter, degenerate matter, or much plasma on Earth.

Compared to the great bulk of the universe, Earth and earthlings are the aliens.

Nasa's Voyager 2 probe 'leaves the Solar System'

The Voyager 2 probe, which left Earth in 1977, has become the second human-made object to leave our Solar System.

It was launched 16 days before its twin craft, Voyager 1, but that probe's faster trajectory meant that it was in "the space between the stars" six years before Voyager 2.

The news was revealed at the American Geophysical Union (AGU) meeting in Washington.

And chief scientist on the mission, Prof Edward Stone, confirmed it.

Voyager 2 launched 16 days before its twin, Voyager 1

He said both probes had now "made it into interstellar space" and that Voyager 2's date of departure from the Solar System was 5 November 2018.

On that date, the steady stream of particles emitted from the Sun that were being detected by the probe suddenly dipped. This indicated that it had crossed the "heliopause" - the term for the outer edge of the Sun's protective bubble of particles and magnetic field.

And while its twin craft beat it to this boundary, the US space agency says that Voyager 2 has a working instrument aboard that will provide "first-of-its-kind observations of the nature of this gateway into interstellar space".

The probe's present location is some 18 billion km (11 billion miles) from Earth. It is moving at roughly 54,000km/h (34,000mph). Voyager 1 is further and faster still, at 22 billion km and 61,000km/h.

Did the team plan to explore beyond the Solar System?

The Voyagers were sent initially to study the outer planets, but then just kept on going.

Prof Stone said that at the start of the mission the team had no idea how long it would take them to reach the edge of the Sun's protective bubble, or heliosphere.

"We didn't know how large the bubble was, how long it would take to get there and if the space craft would last long enough," he added. "Now we're studying the very local interstellar medium.

"It's a very exciting time in Voyager's 41 year journey."

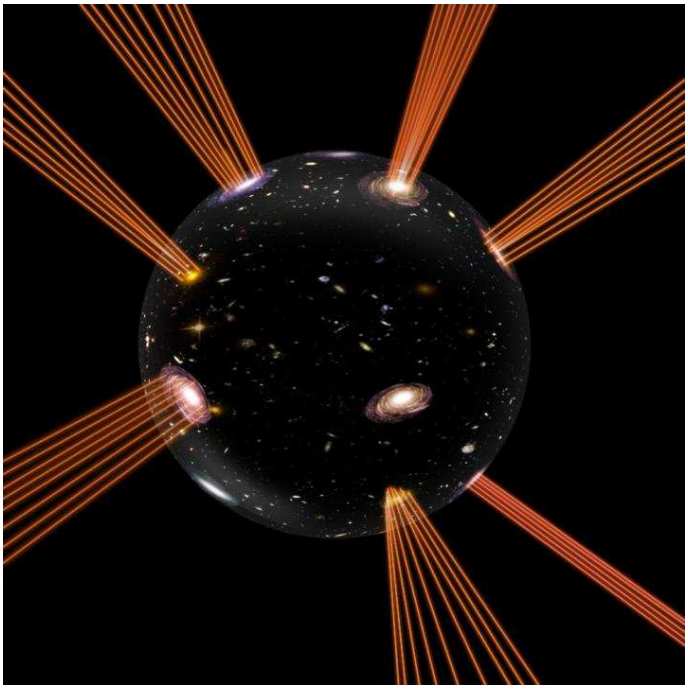
Scientists define the Solar System in different ways, so Prof Stone has always been very careful not to use the exact phrase "leave the Solar System" in relation to his spacecraft. He is mindful that the Nasa probes still have to pass through the Oort cloud where there are comets gravitationally bound to the Sun, albeit very loosely.

But both Voyagers certainly are in a new, unexplored domain of space.

Voyager 1 will not approach another star for nearly 40,000 years, even though it is moving at such great speed. But it will be in orbit around the centre of our galaxy with all its stars for billions of years.

More at: https://www.bbc.co.uk/

Our Universe: An Expanding Bubble in an Extra Dimension



In their article, the scientists propose a new model with dark energy and our Universe riding on an expanding bubble in an extra dimension. The whole Universe is accommodated on the edge of this expanding bubble. Credit: Suvendu Giri

Uppsala University researchers have devised a new model for the Universe - one that may solve the enigma of dark energy. Their new article, published in Physical Review Letters, proposes a new structural concept, including dark energy, for a universe that rides on an expanding bubble in an additional dimension.

We have known for the past 20 years that the Universe is expanding at an ever accelerating rate. The explanation is the "dark energy" that permeates it throughout, pushing it to expand. Understanding the nature of this dark energy is one of the paramount enigmas of fundamental physics.

It has long been hoped that string theory will provide the answer. According to string theory, all matter consists of tiny, vibrating "stringlike" entities. The theory also requires there to be more spatial dimensions than the three that are already part of everyday knowledge. For 15 years, there have been models in string theory that have been thought to give rise to dark energy. However, these have come in for increasingly harsh criticism, and several researchers are now asserting that none of the models proposed to date are workable.

In their article, the scientists propose a new model with dark energy and our Universe riding on an expanding bubble in an extra dimension. The whole Universe is accommodated on the edge of this expanding bubble. All existing matter in the Universe corresponds to the ends of strings that extend out into the extra dimension. The researchers also show that expanding bubbles of this kind can come into existence within the framework of string theory. It is conceivable that there are more bubbles than ours, corresponding to other universes.

The Uppsala scientists' model provides a new, different picture of the creation and future fate of the Universe, while it may also pave the way for methods of testing string theory.

https://www.eurekalert.org/

How will we reach another star?

Proxima Centauri, our closest star, is more than 4 light years away. Reaching it under 10,000 years will be challenging; reaching it with living humans will be even harder.

- Eventually, humanity will want to travel to a new solar system to propagate the human race, explore, and maybe find signs of alien life.
- But our closest neighbor, Proxima Centauri, is so far away that current methods could take tens of thousands of years.
- How will we surmount this incredible distance and the other challenges associated with interstellar travel?

Alpha Centauri, the closest star system to our own, isn't actually close at all. While light takes 8 mins to travel from the sun to Earth, it takes 4.37 yrs to travel from Proxima Centauri — that system's star — to Earth. That's all well and good for light, but human beings can't go quite so fast. Voyager 1 passed the boundaries of our solar system at around 37,000 mph, which seems pretty fast. This speed, though, is only 1/18,000th the speed of light; were Voyager 1 pointed towards Proxima Centauri, it would take 80,000 years.

This is a problem. If humanity is to survive in the long term, we need to become a multiplanetary species. And while we may be able to terraform other planets in our own solar system to become new homes, we will eventually need to travel to other stars. Equally important, we want to do so in order to learn more about our universe, satisfy our curiosity, and maybe even find alien life. But before we can, we'll have to surmount some pretty significant challenges.

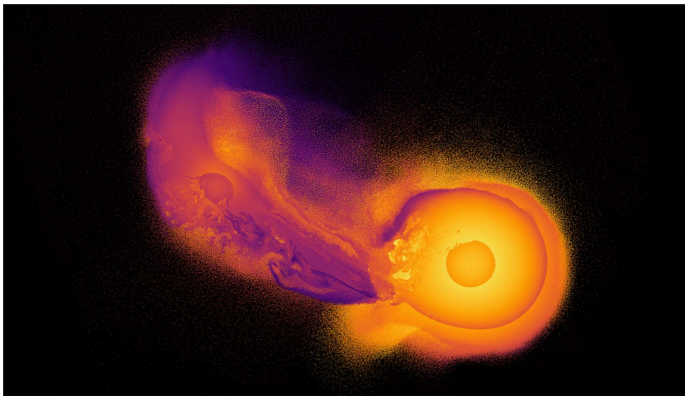
More at: https://bigthink.com/

Why Is Uranus on Its Side? Incredible Simulations Could Solve the Mystery

Solar systems are messy places, but the tools astronomers use to understand these systems can re-create that chaos with surprising beauty.

Consider giant impacts, which scientists believe are responsible for our moon, Saturn's rings and Uranus' strange sideways alignment. But scientists have never gotten to see such a giant impact firsthand, and of course they can't replicate the process at a realistic scale. So, they turn to computer simulations like this one, and as computer technology continues to improve, those models can become ever more detailed.

"It's almost like having a brand-new telescope in the way that it reveals all sorts of new details and exciting topics that we could never study before," Jacob Kegerreis, a doctoral student at Durham University in the U.K., wrote to Space.com in an email. He presented the simulations for a giant impact with Uranus last month at the annual conference of the American Geophysical Union.



A frame from a high-resolution simulation of what could have happened when the planet Uranus was hit by another large celestial object.

Credit: Jacob Kegerreis, Durham University

Scientists are looking for an impact at the system because Uranus is tilted strangely on its side, with all its moons following at the same steep angle. Kegerreis is part of a project using a technique called smoothed particle hydrodynamics, a specialized technique that allows for better representation of fluids and gases in simulations. He and his colleagues used the approach to simulate what would happen in a wide range of Uranus collision scenarios.

More at: https://www.space.com/

The Milky Way Could Crash Into Another Galaxy Billions of Years Earlier Than Predicted

The Milky Way above a space observatory in Chile
Credit: ESO / S. BRUNIER

Ah, the Milky Way, our glittering home in the cosmos. Seen in an unencumbered night sky, far from the glare of city lights, it seems magnificent and eternal in its enormity. Nothing could shift this ancient web of stars, nothing could disturb its transcendent stoicism.

Except, that is, another galaxy. Galaxies orbit millions of light-years apart, but gravity, the immutable magnet of the cosmos, can pull them together, producing spectacular collisions that reshuffle stars. According to the leading theory, the Milky Way will collide with one of its closest neighbors, Andromeda, sometime between 6 and 8 billion years from now.

But the Milky Way may face another galactic threat before that, from a different neighbor. A new study predicts our galaxy will collide with a galaxy called the Large Magellanic Cloud between 1 billion and 4 billion years from now.

This is a rather surprising change in schedule, considering that the Large Magellanic Cloud, which is close enough to be seen with the naked eye, is currently moving away from the Milky Way. What gives?

Marius Cautun, an astrophysicist at Durham University's Institute for Computational Cosmology, says that recent observations of the Large Magellanic Cloud have revealed that the galaxy has more mass than previously thought. Cautun and his fellow researchers decided to run computer simulations that took this new factor into account and fast-forwarded the conditions of our cosmic neighborhood. They tested multiple scenarios, making adjustments in mass, velocity, and other measures. In the end, the simulations predicted that in several hundred million years, the Large Magellanic Cloud will turn around and head straight for the center of the Milky Way.

"The collision between our galaxy and the Large Magellanic Cloud takes place in the majority of cases—over 93 percent," Cautun says.

The collision would be a slow showdown, unfolding over the course of billions of years. Stars from the Large Magellanic Cloud would ricochet like pinballs, dislodging some of the Milky Way's stars from their orbits. Our galaxy as a whole would survive, but some stars may be flung right out of the Milky Way, Cautun says.

Meanwhile, the sleeping, supermassive black hole at the center of the Milky Way would wake up. Like volcanoes, black holes alternate between peaceful dormancy and ferocious activity, depending on the surrounding conditions. Ours is in a quiet period. But the chaos of the merger would send cosmic gas swirling toward it, and cosmic gas is dinner to black holes. The resulting feast is a spectacular show. A disk of luminous, hot cosmic material swirls around the black hole at great speed, and bursts of high-energy radiation erupt from its center. Cautun says one serving of a Large Magellanic Cloud could lead our black hole to gobble up enough material to grow 10 times its current size.

And what would happen to us, if there is any kind of "us"—life in some form—on Earth when this all goes down?

It is possible that our sun could be among the small fraction of stars that gets lobbed from the galaxy. The jostling would disturb the orbits of our solar system's planets, which could be perilous for any inhabitants. Even a small change in the relationship between the sun and the Earth could knock it out of the region where liquid water (and, therefore, life) can exist.

If life on Earth survived, though, it would take ages for anyone to realize the planet's position in the cosmos has shifted. Like the merger, the solar system's ejection would occur over such a large timescale that it'd be almost meaningless to humans. "Only at the end of the collision could our descendants tell if we have been kicked out of our galaxy," Cautun says.

The change in scenery would be remarkable. In this scenario, "our descendants will see a very different night sky, much darker than currently, with only a modest bright patch that will correspond to the Milky Way galaxy," Cautun says. "It will be tremendously more difficult for our descendants to travel to other stars—if they haven't yet done so by that time."

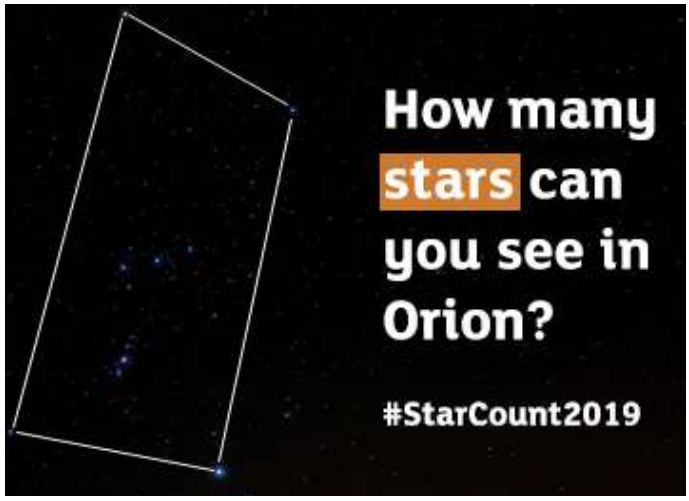
If this imagined future scares you, consider that a collision with Andromeda would be much worse. The Milky Way would easily devour the smaller Large Magellanic Cloud and maintain its signature spiral shape, even if its insides will be all jumbled. Andromeda, on the other hand, is about the same size as the Milky Way. Astronomers expect that mashup to be destructive, and the Milky Way as we know it—the neat, shimmering band of stars—is unlikely to survive.

Cautun says that a collision between the Milky Way and the Large Magellanic Cloud would shift our galaxy's position in space. But Andromeda will still come for it, a few billion years later.

"Ultimately, there is no escape," he says.

Links at: https://www.theatlantic.com/

CPRE Star Count 2019



2nd Feb - 23rd Feb

Help us reclaim our dark skies

Dark, starry skies are one of the most magical sights the countryside can offer. But light pollution means many of us can't see the stars. We want to reconnect people with the wonder of our glorious night skies.

You can take part in #StarCount2019 and help us find our darkest skies, to ensure more of us can more of us can experience this natural wonder.

Our Star Count will take place this February, with support from the British Astronomical Association, and we'll be asking you to look up at the night sky and tell us how many you can see in Orion. You can do this from anywhere in England.

The results will help us to create a map of people's views of the night sky, which will highlight the effect of light pollution on views of the stars.

https://www.cpre.org.uk/

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

More Interesting Stuff!

Anti-scientific beliefs and their consequences

The rise of anti-scientific thinking and conspiracy is a concerning trend.

https://bigthink.com/

Treasure trove of planets found hiding in dust

The first unbiased survey of protoplanetary disks surrounding young stars in the Taurus star-forming region turned up a higher-than-expected number of disks with features suggesting nascent planets.

https://www.eurekalert.org/

"Mirror Image" of our universe existed before big bang

A bizarre theory could explain dark matter.

https://futurism.com/

Beautiful Computers

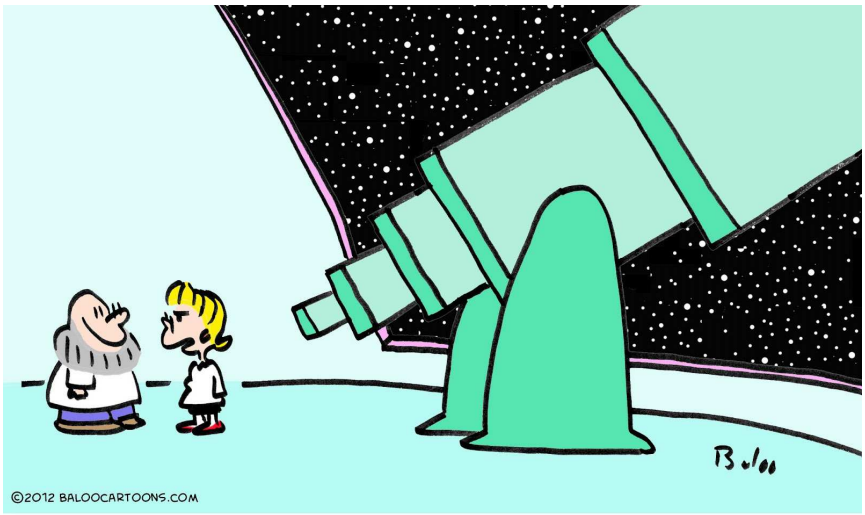
Photographing computers to show the art inside the black box.

https://boingboing.net/2019/01/24/cray-aesthetics.html

4 Dark Matter Searches to Watch in 2019

2018 was a big year for dark matter. As usual, astronomers didn't actually find any of the stuff, which is invisible to all our telescopes but appears to make up at least 80 percent of the universe by mass.

https://www.livescience.com/



"What do you mean, you can't look at the Milky Way because you're lactose-intolerant?"

At The Observatory

For your own safety, please bring a torch.
Make sure you close and lock the car park gate if you are the last to leave (if you need the combination to the lock, please contact a member of the committee)

Articles Needed

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

"We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology."
Carl Sagan

"We are all born ignorant, but one must work hard to remain stupid"
Benjamin Franklin

"Technology is a useful servant but a dangerous master"
Christian Lous Lange

"The advance of technology is based on making it fit in so that you don't really even notice it, so it's part of everyday life"
Bill Gates

"We can't blame the technology when we make mistakes"
Tim Berners- Lee