New Zenith

The Monthly Newsletter of the Vectis Astronomical Society

Vol 24 Issue 4 — May 2016

When Printed, this Newsletter costs VAS at least £1

Society News

Transit of Mercury

As members will almost certainly know, on Monday May 9 there will be a transit of Mercury across the Sun's disk. This relatively rare phenomenon is always an interesting spectacle to watch and we are intending to be at the observatory with equipment to witness the event. The actual transit lasts from 12:12 BST till 19:41 BST.

If we can attract enough members (minimum 8) to attend we will open things to the public and advertise it. Using the VAS solarscope and a Coronado (kindly offered by John Langley) we should, weather permitting, get a good view.

If you can help, even for a couple of hours, please contact Elaine Spear (elainespear1@gmail.com).

Physics Event

VAS have been invited to Cowes Enterprise College for a Physics Day on Tuesday 5th July. They are expecting visits from most of the Island's schools and hope we can provide an insight to astronomy.

We would have an exhibition stand and need some volunteers to help for the day. If you can help for an hour or two please drop me an email.

Treasurer

Our Treasurer, David Kitching, has left us! David is moving off the Island to be closer to his (growing!) family.

There were two volunteers for the position, **Simon Plumley** and **Stewart Chambers** and I thank them both. Simon was first to "step up" so his application is gratefully accepted. Stewart, if you'd like to be part of the Committee in a general role we'd be pleased to have you join us.

David, thank you for your contribution to VAS, it really is most appreciated and we all wish you the very best closer to your family on the "north island".

Brian Curd
Editor New Zenith.

VAS Website: wightastronomy.org

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

The Editor New Zenith
75 Hefford Road
East Cowes
Isle of Wight PO32 6QU
Tel: **01983 296128** or email: **editor@wightastronomy.org**

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

VAS Registered Office

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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, 19.30hrs	Members and Public. Informal meeting and observing

Contents this Month

2016 Monthly Meetings

Date	Subject	Speaker
Please check **wightastronomy.org/meetings/** for the latest information		
22 Apr	Astronomy on the Tablet	Dr Lilian Hobbs
27 May	Meteors	Richard Kacerek
24 Jun	***TBA***	***TBA***
22 Jul	***TBA***	***TBA***
26 Aug	AGM Starts at 7pm sharp William Herschel and the Rings of Uranus	Dr Stuart Eves
23 Sep	Galaxy Formation	Prof Chris Lintott
28 Oct	Radiation protection in space (for manned missions)	Dr Elizabeth Cunningham
25 Nov	Stellar population modelling	Dr Claudia Maraston

Observatory Visits Booked

None booked this month

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

Let there be light... and there was...

Pleased to report that the electrical "anomalies" in the observatory have been rectified.

Jez the electrician has worked his magic and all the corridor lights are now controlled by one switch (the two way stuff has been removed) and all is now sweetness and light!

Hopefully we can now get the layout changes finished and fit the new cupboards

VAS Contacts 2014/15

President	Barry Bates president@wightastronomy.org
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NZ Distribution	Brian Bond distribution@wightastronomy.org
Others	Mark Williams & Nigel Lee

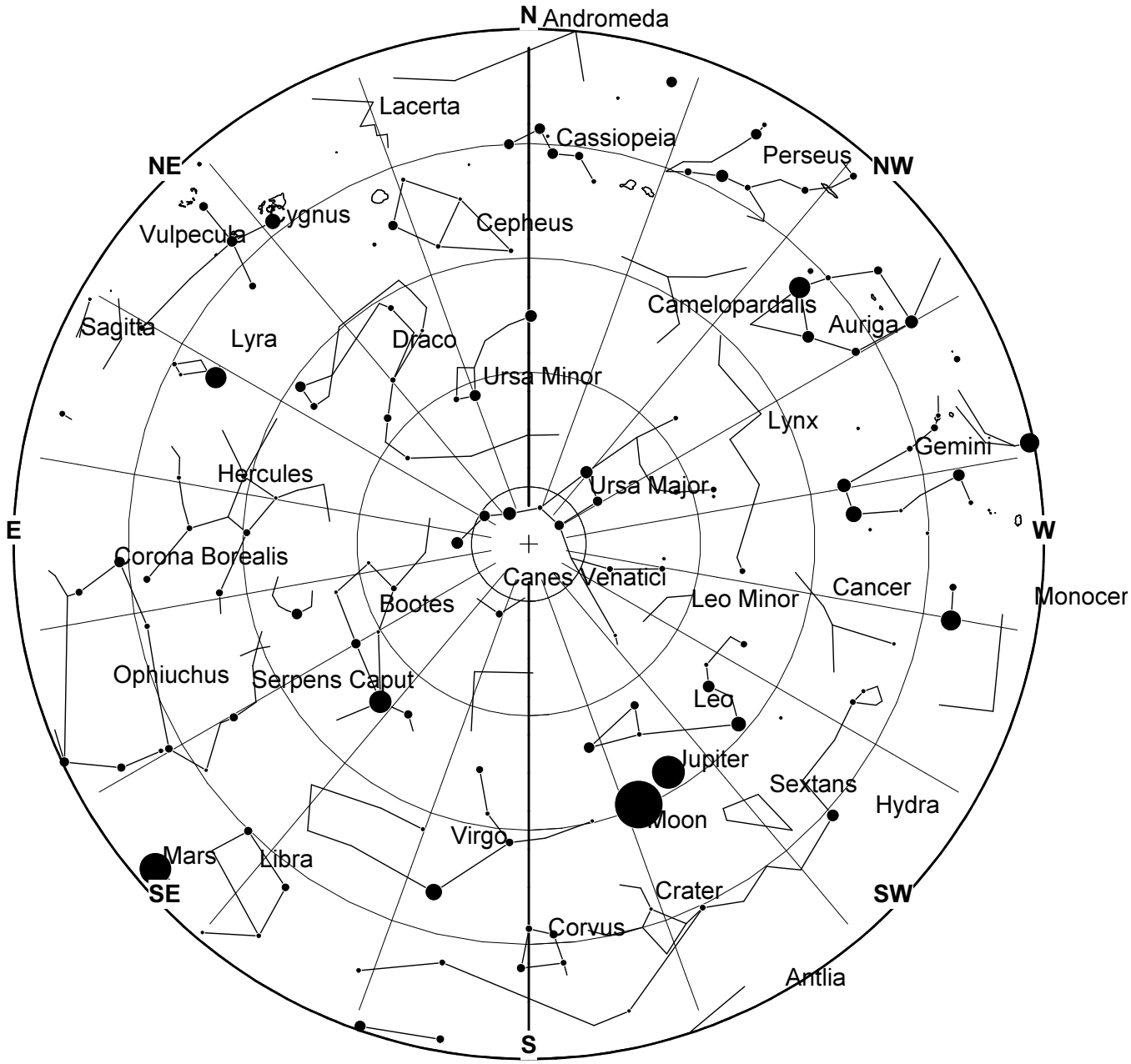
Important

Members using the observatory outside normal Thursday meetings MUST enter a line or two in the Observatory Log Book.

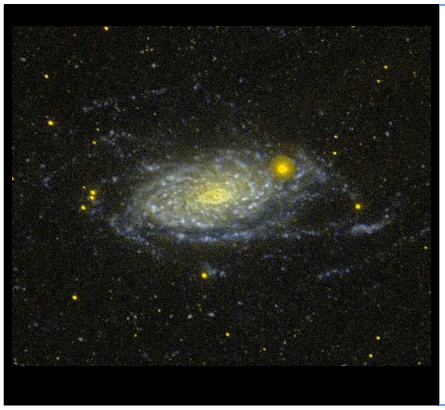
On several occasions, lights, heaters and the Meade LX200 have been left on!

When leaving, please ensure all is secure and all lights, heaters and telescopes are TURNED OFF.

May 2016 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 May 2016



Messier 63 (*also known as M63, NGC 5055, or the Sunflower Galaxy*) is a spiral galaxy in the constellation Canes Venatici consisting of a central disc surrounded by many short spiral arm segments. M63 is part of the M51 Group, a group of galaxies that also includes M51 (the 'Whirlpool Galaxy'). M63 is an active galaxy with a LINER nucleus. M63 was discovered by Pierre Méchain on June 14, 1779. The galaxy was then listed by Charles Messier as object 63 in the Messier Catalogue.

In the mid-19th century, Lord Rosse identified spiral structures within the galaxy, making this one of the first galaxies in which such structure was identified.

In 1971, a supernova with a magnitude of 11.8 appeared in one of the arms of M63.

May 2016 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
6th	13th	21st	29th

Planets

Mercury

Mercury is visible for only a few hours this month as it crosses the face of the Sun between 12:14 and 19:38 on the 9th. Transits of Mercury are not very common, and this one, being visible form the UK will no doubt get some publicity. As with any observation that includes the Sun, take great care that any filters used are suitable and if there is any doubt do not put your eyes anywhere near the eyepiece. Observing by projecting an image of the Sun onto a card is safe as is the use of a video camera; if anything goes wrong then it is only a replaceable piece of equipment that is damaged and not your irreplaceable eyes.

Mercury's disk on the face of the sun will be tiny, so take a little time to find it, it may not be clear if the focus is only slightly off. If you do see it, then it will give some appreciation as to the size difference between Mercury and the Sun; Mercury is a little over half the distance between us and the Sun,

Venus

Venus is approaching conjunction with the Sun this month. It is passing behind it and is not visible until the end of June when it starts a poor apparition as the Evening Star.

Mars

At the start of the month Mars rises just before midnight. By the end of the month we are just passed opposition which occurs on the 22nd which finds Mars due south at 1AM (midnight GMT). At the end of the month it is south at midnight BST. It is rather low down and not best placed for observation, but make the most of it, the distance between us and Mars will increase quite rapidly towards the end of June and it will decrease noticeably in size making the surface markings more difficult to see. Mars is by far the brightest of the three objects in that part of the sky; below and left is the red giant star Antares, the opposite of Mars, about 3 magnitudes fainter with a similar colour, and Saturn, a little further to the left 2 magnitudes fainter and a distinctly yellow colour by comparison.

Jupiter

Jupiter is visible high in the south as the sky darkens after sunset. It is so bright that it becomes visible during the twighlight. With the decreasing hours of darkness there will be reduced opportunity for observation.

Saturn

Saturn is close to Mars in the sky, it is due south and best placed for observation at about 3AM at the start of the month and at 1AM and the month's end. The rings are fully open so despite it being very low in the sky and subject to atmospheric turbulence it is still a worthwhile target.

Uranus & Neptune

Both outer planets are lost in the glare of the sun and will not return to our skies until later in the year.

Deep Sky

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.

M64 Black Eye Galaxy
RA 12 57m Dec 21° 38' mag 9

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

M94 Cat's Eye Galaxy
RA 12 51m Dec 41° 4' mag 8.1

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

Peter Burgess

Cartoon Laws of Physics

Any body suspended in space will remain in space until made aware of its situation

Daffy Duck steps off a cliff, expecting further pastureland. He loiters in midair, soliloquizing flippantly, until he chances to look down. At this point, the familiar principle of 32 feet per second per second takes over.

Any body in motion will tend to remain in motion until solid matter intervenes suddenly

Whether shot from a cannon or in hot pursuit on foot, cartoon characters are so absolute in their momentum that only a telephone pole or an outsize boulder retards their forward motion absolutely. Sir Isaac Newton called this sudden termination of motion the stooge's surcease.

Any body passing through solid matter will leave a perforation conforming to its perimeter

Also called the silhouette of passage, this phenomenon is the speciality of victims of directed-pressure explosions and of reckless cowards who are so eager to escape that they exit directly through the wall of a house, leaving a cookie-cutout-perfect hole. The threat of skunks or matrimony often catalyses this reaction.

The time required for an object to fall twenty stories is greater than or equal to the time it takes for whoever knocked it off the ledge to spiral down twenty flights to attempt to capture it unbroken

Such an object is inevitably priceless, the attempt to capture it inevitably unsuccessful.

All principles of gravity are negated by fear

Psychic forces are sufficient in most bodies for a shock to propel them directly away from the earth's surface. A spooky noise or an adversary's signature sound will induce motion upward, usually to the cradle of a chandelier, a treetop, or the crest of a flagpole. The feet of a character who is running or the wheels of a speeding auto need never touch the ground, especially when in flight.

As speed increases, objects can be in several places at once

This is particularly true of tooth-and-claw fights, in which a character's head may be glimpsed emerging from the cloud of altercation at several places simultaneously. This effect is common as well among bodies that are spinning or being throttled.

A wacky character has the option of self-replication only at manic high speeds and may ricochet off walls to achieve the velocity required.

Certain bodies can pass through solid walls painted to resemble tunnel entrances; others cannot

This trompe l'oeil inconsistency has baffled generations, but at least it is known that whoever paints an entrance on a wall's surface to trick an opponent will be unable to pursue him into this theoretical space.

The painter is flattened against the wall when he attempts to follow into the painting. This is ultimately a problem of art, not of science.

Any violent rearrangement of feline matter is impermanent

Cartoon cats possess even more deaths than the traditional nine lives might comfortably afford. They can be decimated, spliced, splayed, accordion-pleated, spindled, or disassembled, but they cannot be destroyed. After a few moments of blinking self pity, they reinflate, elongate, snap back, or solidify. Also, cat will assume the shape of its container.

Everything falls faster than an anvil.

For every vengeance there is an equal and opposite revengeance

This is the one law of animated cartoon motion that also applies to the physical world at large. For that reason, we need the relief of watching it happen to a duck instead.

A sharp object will always propel a character upward

When poked (usually in the buttocks) with a sharp object (usually a pin), a character will defy gravity by shooting straight up, with great velocity.

The laws of object permanence are nullified for "cool" characters

Characters who are intended to be "cool" can make previously nonexistent objects appear from behind their backs at will. For instance, the Road Runner can materialize signs to express himself without speaking.

Explosive weapons cannot cause fatal injuries

They merely turn characters temporarily black and smokey.

Gravity is transmitted by slow-moving waves of large wavelengths.

Their operation can be witnessed by observing the behaviour of a canine suspended over a large vertical drop. Its feet will begin to fall first, causing its legs to stretch. As the wave reaches its torso, that part will begin to fall, causing the neck to stretch. As the head begins to fall, tension is released and the canine will resume its regular proportions until such time as it strikes the ground.

Black Velvet Nebula Cake

I've never made a cake myself but I did find this recipe on the web the other day.

If you do try it please send a photo of the result to NZ.

Black velvet cake - 12 servings

Recipe adapted from Food.com

If making the Nebula cake, fold 5 ounces of white confetti sprinkles into the cake batter before baking (this may reduce bake time a little, so keep an eye on the cakes as they bake). You'll also need 1 lb of ready-made black fondant for covering the cake. Follow the instructions as outlined in the blog post for decorating with the nebula motif.

- 260g all-purpose flour
- 300g granulated sugar
- 125g unsweetened dark cocoa powder, (Dutch process preferred)
- 2 teaspoons baking soda
- 1 teaspoon baking powder
- 1/2 teaspoon salt
- 2 eggs
- 240 ml cold coffee
- 1 cup 240 ml buttermilk
- 120 ml vegetable oil
- 1 to 1 1/2 teaspoons black gel food colour

Dark Chocolate Frosting

- 227g unsalted butter, melted
- 170g dark cocoa powder
- 770g powdered sugar, sifted
- 160 ml milk
- 2 teaspoons vanilla extract
- 1/2 teaspoon black gel food colour

Make the cakes: Preheat oven to 350 degrees. Spray one 10-inch bundt pan or two 9-inch round pans with a nonstick cooking spray and set aside.

In a large bowl, combine flour, sugar, cocoa, baking soda, baking powder and salt.

Make a well in the center and pour in the eggs, coffee, milk and oil. Mix in the black food colour; batter will be thin.

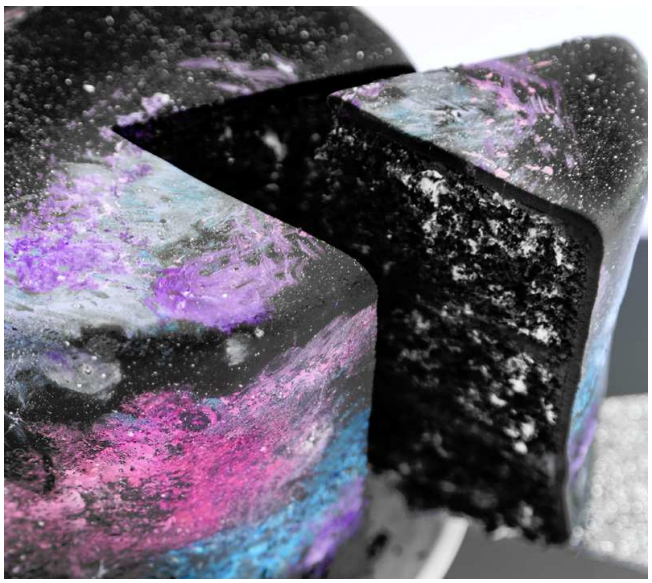
Pour into prepared pan(s). Bake for 35 to 40 minutes for bundt pan, 25 minutes for 9-inch round pans, or until a toothpick inserted into the center of the cake comes out clean. Allow to cool completely.

Make the frosting: In a large bowl, mix together melted butter and cocoa. Alternately add powdered sugar and milk, beating to spreading consistency.

Add a small amount of additional milk, if needed. Stir in vanilla and black food colour.

Frost cake and decorate as desired.

For full details of the cake, read the post at:
http://www.sprinklebakes.com/2016/04/black-velvet-nebula-cake.html



What Is The Surface Of Neptune Like?

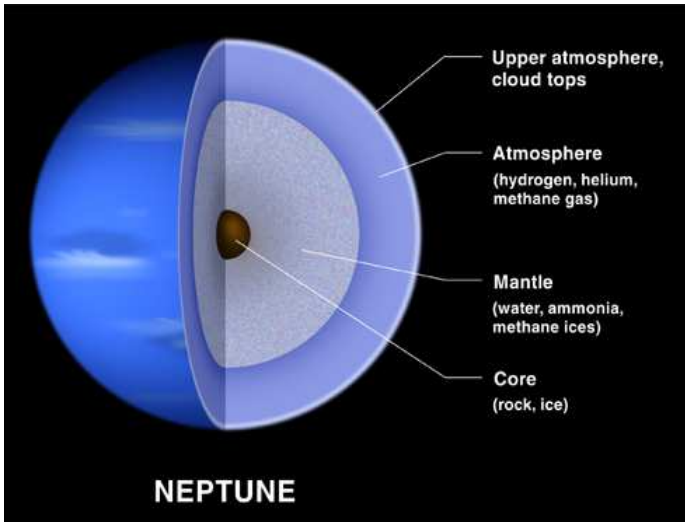
As a gas giant (or ice giant), Neptune has no solid surface. In fact, the blue-green disc we have all seen in photographs over the years is actually a bit of an illusion. What we see is actually the tops of some very deep gas clouds, which in turn give way to water and other melted ices that lie over an approximately Earth-size core made of silicate rock and a nickel-iron mix. If a person were to attempt to stand on Neptune, they would sink through the gaseous layers.

As they descended, they would experience increased temperatures and pressures until they finally touched down on the solid core itself. That being said, Neptune does have a surface of sorts, (as with the other gas and ice giants) which is defined by astronomers as being the point in the atmosphere where the pressure reaches one bar. Because of this, Neptune's surface is one of the most active and dynamic places in entire the Solar System.

Composition and Structure:

With a mean radius of 24,622 ± 19 km, Neptune is the fourth largest planet in the Solar System. But with a mass of 1.0243×10^{26} kg – which is roughly 17 times that of Earth – it is the third most massive, outranking Uranus. Due to its smaller size and higher concentrations of volatiles relative to Jupiter and Saturn, Neptune (much like Uranus) is often referred to as an "ice giant" – a subclass of a giant planet.

As with Uranus, the absorption of red light by the atmospheric methane is part of what gives Neptune its blue hue, although Neptune's is darker and more vivid. Because Neptune's atmospheric methane content is similar to that of Uranus, some unknown atmospheric constituent is thought to contribute to Neptune's more intense colouring



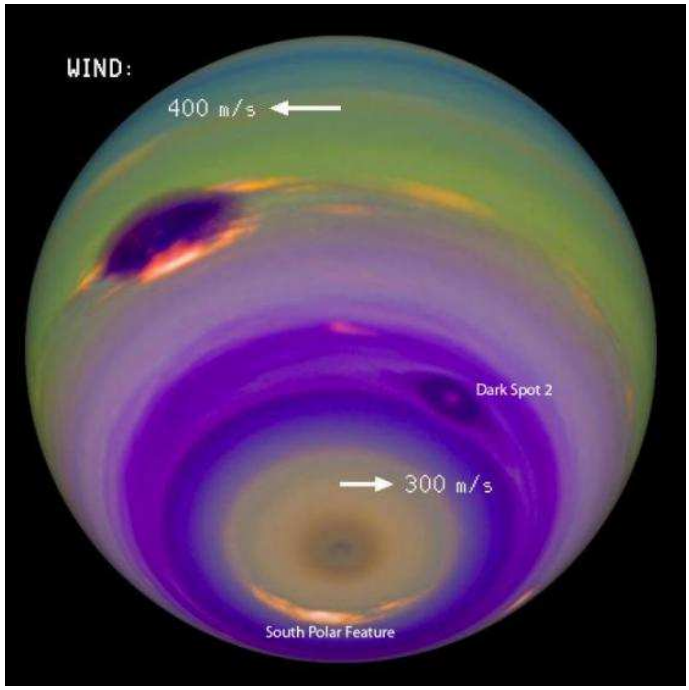
Also like Uranus, Neptune's internal structure is differentiated between a rocky core consisting of silicates and metals; a mantle consisting of water, ammonia and methane ices; and an atmosphere consisting of hydrogen, helium and methane gas. It's atmosphere is also divided into four layers, consisting of (from innermost to outermost) the lower troposphere, the stratosphere, the thermosphere and the exosphere.

The two main regions of Neptune's atmosphere are the two innermost ones: the lower troposphere, where temperatures decrease with altitude; and the stratosphere, where temperature increases with altitude. Within the troposphere, pressure levels range from one to five bars (100 and 500 kPa), hence the surface of Neptune is defined as being within this region.

Atmosphere:

Neptune's "surface" can therefore be said to be composed of about 80% hydrogen and 19% helium, with a trace amount of methane. The surface layer is also permeated by roving bands of clouds with varying compositions, depending on altitude and pressure. At the upper-level, temperatures are suitable for methane to condense, and the pressure conditions are such that clouds consisting of ammonia, ammonium sulfide, hydrogen sulfide and water can exist.

At lower levels, clouds of ammonia and hydrogen sulfide are thought to form. Deeper clouds of water ice should be also found in the lower regions of the troposphere, where pressures of about 50 bars (5.0 MPa) and temperature of 273 K (0 °C) are common.



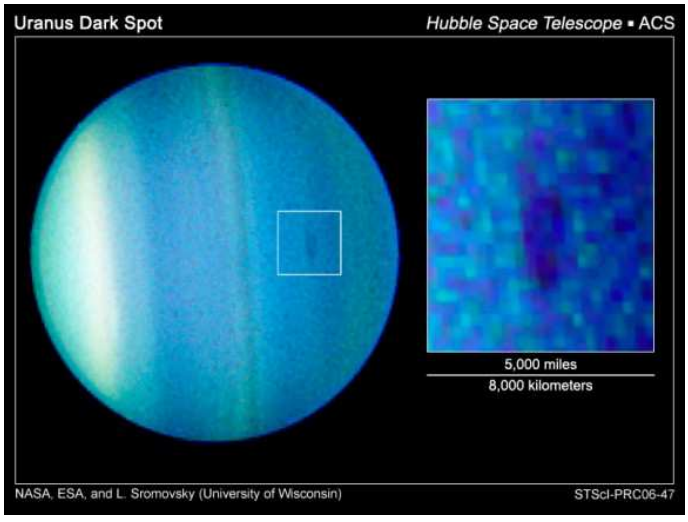
Neptune's atmosphere, with colors contrasts modified to emphasize the planet's atmospheric features. Credit: Erich Karkoschka

In this image, the colors and contrasts were modified to emphasize the planet's atmospheric features. The winds in Neptune's atmosphere can reach the speed of sound or more. Neptune's Great Dark Spot stands out as the most prominent feature on the left. Several features, including the fainter Dark Spot 2 and the South Polar Feature, are locked to the planet's rotation, which allowed Karkoschka to precisely determine how long a day lasts on Neptune.

For reasons that remain obscure, the planet's thermosphere experiences unusually high temperatures of about 750 K (476.85 °C/890 °F). The planet is too far from the Sun for this heat to be generated by ultraviolet radiation, which means another heating mechanism is involved – which could be the atmosphere's interaction with ion's in the planet's magnetic field, or gravity waves from the planet's interior that dissipate in the atmosphere.

Because Neptune is not a solid body, its atmosphere undergoes differential rotation. The wide equatorial zone rotates with a period of about 18 hours, which is slower than the 16.1-hour rotation of the planet's magnetic field. By contrast, the reverse is true for the polar regions where the rotation period is 12 hours.

This differential rotation is the most pronounced of any planet in the Solar System, and results in strong latitudinal wind shear and violent storms. The three most impressive were all spotted in 1989 by the Voyager 2 space probe, and then named based on their appearances.



The first to be spotted was a massive anticyclonic storm measuring 13,000 x 6,600 km and resembling the Great Red Spot of Jupiter. Known as the Great Dark Spot, this storm was not spotted five later (Nov. 2nd, 1994) when the Hubble Space Telescope looked for it. Instead, a new storm that was very similar in appearance was found in the planet's northern hemisphere, suggesting that these storms have a shorter life span than Jupiter's.

The Scooter is another storm, a white cloud group located farther south than the Great Dark Spot. This nickname first arose during the months leading up to the Voyager 2 encounter in 1989, when the cloud group was observed moving at speeds faster than the Great Dark Spot. The Small Dark Spot, a southern cyclonic storm, was the second-most-intense storm observed during the 1989 encounter. It was initially completely dark; but as Voyager 2 approached the planet, a bright core developed and could be seen in most of the highest-resolution images.

Internal Heat:

For reasons that astronomers are still not clear on, the interior of Neptune is unusually hot. Even though Neptune is much further from the Sun than Uranus and receives 40% less sunlight, its surface temperature is about the same. In fact, Neptune gives off 2.6 times more energy than it takes in from the Sun. Even without the Sun, Neptune glows.

This high amount of interior heat matched with the coldness of space creates a huge temperature difference. And this sets the winds blasting around Neptune. Maximum wind speeds on Jupiter can be more than 500 km/hour. That's twice the speed of the strongest hurricanes on Earth. But that's nothing compared to Neptune. Astronomers have calculated winds blasting across the surface of Neptune at 2,100 km/hour.

Deep down inside Neptune, the planet might have an actual solid surface. At the very core of the gas/ice giant is thought to be a region of rock with roughly the mass of the Earth. But temperatures at this region would be thousands of degrees; hot enough to melt rock. And the pressure from the weight of all the atmosphere would be crushing.

In short, there is simply no way one could stand on the "surface of Neptune", let alone walk around on it.

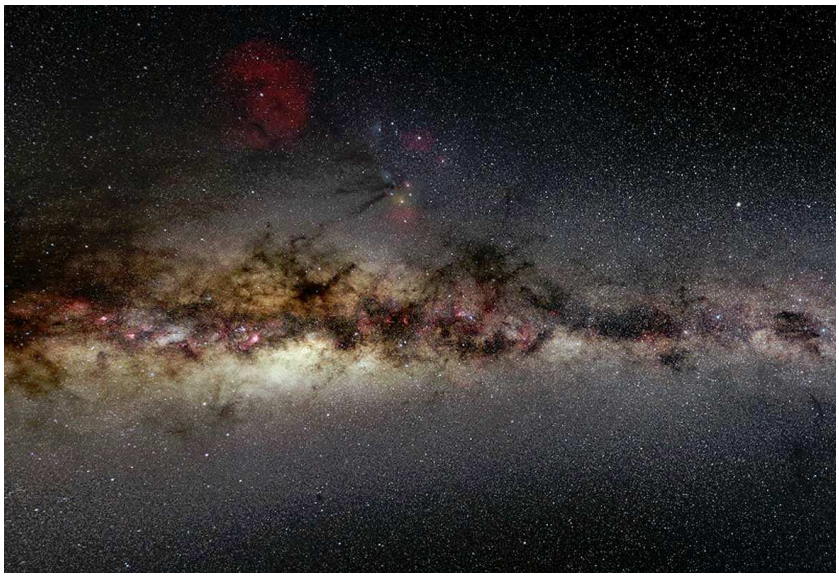
For links and animations:
http://www.universetoday.com/22070/surface-of-neptune/

"We see it [the as-yet unseen, probable new planet, Neptune] as Columbus saw America from the coast of Spain. Its movements have been felt, trembling along the far-reaching line of our analysis with a certainty hardly inferior to that of ocular demonstration"
William Herschel

Never-before-seen galaxy spotted orbiting the Milky Way

The galaxy's empire has a new colony. Astronomers have detected a dwarf galaxy orbiting the Milky Way whose span stretches farther than nearly all other Milky Way satellites. It may belong to a small group of galaxies that is falling into our own.

Giant galaxies like the Milky Way grew large when smaller galaxies merged, according to simulations. The simulations also suggest that whole groups of galaxies can fall into a single giant at the same time. The best examples in our cosmic neighbourhood are the Large and Small Magellanic Clouds, the Milky Way's two brightest satellites, which probably orbit each other.



The Milky Way is orbited by 49 other galaxies – that we know of - ESO

Orbiting galaxies

About four dozen known galaxies orbit our own. The largest in terms of breadth is the Sagittarius dwarf, discovered in 1994 – but it's big only because our galaxy's gravity is ripping it apart. The next two largest are the Magellanic Clouds.

Now, Gabriel Torrealba at the University of Cambridge and his colleagues have found a new galaxy about 380,000 light years away in the constellation Crater. "It's the fourth largest satellite of the Milky Way," Torrealba says.

Named the Crater 2 dwarf, the new galaxy is not apparent to human eyes, though individual stars within the galaxy are visible. The team were only able to find it this January by using a computer to look for over-densities of stars in data from images taken by a telescope in Chile.

How do you measure a galaxy?

Most galaxies don't have defined edges, so astronomers sometimes express a galaxy's size in terms of its "half-light diameter", which encloses the brightest part of the galaxy and emits half of its light. The Crater 2 dwarf has a half-light diameter of 7000 light years – which, if we could see it, would look twice as big as the full moon.

Josh Simon, an astronomer at the Carnegie Observatories in Pasadena, California, says the galaxy is notable because it is brighter than nearly all of the many galaxies found orbiting the Milky Way during the past decade. It emits 160,000 times more light than the sun.

Ghostly appearance

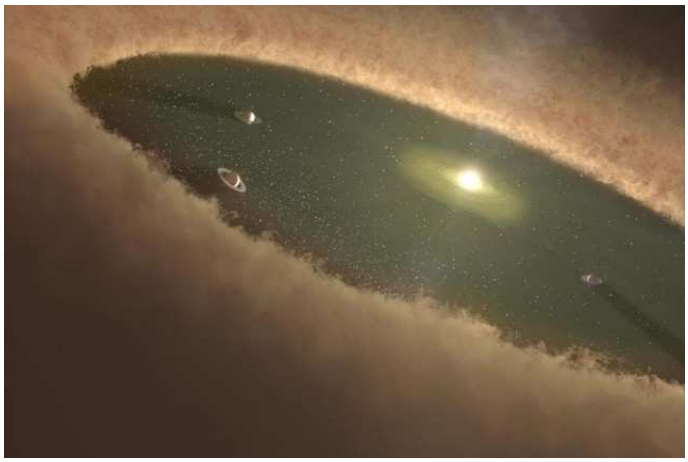
The galaxy eluded detection for so long because its stars are spread out from one another, giving it a ghostly appearance.

Torrealba says it may not be alone. The Crater 2 dwarf is near four other new-found objects: the Crater globular star cluster as well as three dwarf galaxies in Leo. All may be part of a group that is just now falling into the Milky Way.

Until now, though, the new galaxy has led a quiet life, never venturing near a giant galaxy. We know this because the galaxy is round. If it had encountered a giant, gravity would have bent the dwarf out of shape.

Read more at: ***https://www.newscientist.com/***

Did Our Sun Swallow A Planet?



As we continue to observe other planetary systems, one thing in particular is puzzling astronomers. Why do many other systems appear to have large super-Earths, whereas ours has none?

In a new paper published on Arxiv, Rebecca Martin and Mario Livio from the University of Nevada provide an answer. They suggest that we may actually have had one or more super-Earths, but they were swallowed by the Sun earlier in its life.

The researchers point to two possible ways a super-Earth can form in a planetary system: either in situ, where it forms in the system itself, or migration, when they form further out before swinging inwards.

In the case of our own Solar System, there is no direct evidence for a super-Earth forming via either scenario. But the fact that there is nothing between Mercury and the Sun hints at the possibility of one existing in the early life of our Solar System via the in situ method.

"The only (physical) evidence that super-Earths could have formed in our Solar System is the lack of anything in that region, not even a rock," Martin told Elizabeth Howell at Discovery News." So they could have formed there sweeping up all of the solid material, but then later fell into the Sun."

Via the in situ method, a super-Earth would sweep up material in the "dead zone" of the disk of dust and debris that encircles a young star, where the debris is left to sit without much hassle from other bodies. This enables super-Earths to grow to their huge sizes, without much interference from other objects. Did this happen around our Sun?

"The lack of super–Earths in our Solar System is somewhat puzzling given that more than half of observed exoplanetary systems contain one," the researchers note in their paper. "However, the fact that there is nothing inside of Mercury's orbit may not be a coincidence."

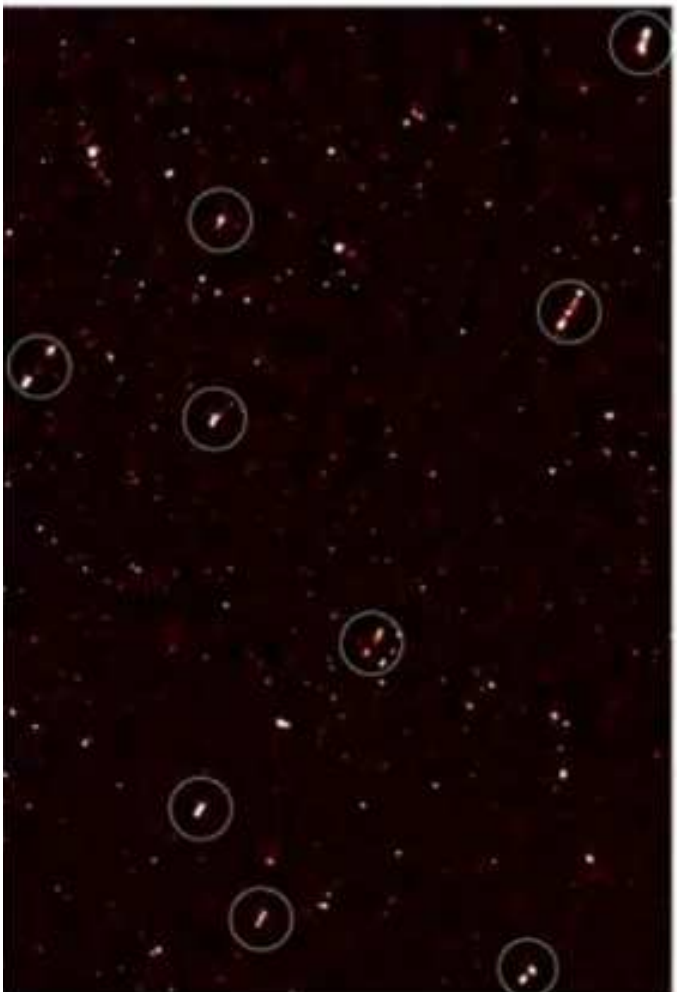
If we did once have a super-Earth, the researchers rule out the idea that it was ejected from the Solar System by some other means. "Given that the orbits of the planets in the Solar System are coplanar [all on the same plane] and not very eccentric, planet–planet scattering does not seem to be a likely ejection mechanism," they note, possibly ruling out the chance of a world like Planet Nine being an ejected super-Earth from this research. "Thus, if super–Earths formed, they most likely fell into the Sun."

The researchers don't provide exact dates for when this might have occurred, nor do they attempt to guess at what the size or orbit of such a super-Earth might have been. But as our Solar System continues to seem more and more unique as we discover other planetary systems, perhaps this research suggests it was not always one-of-a-kind.

Read more: ***http://www.iflscience.com/***

Astronomers in South Africa discover mysterious alignment of black holes

Deep radio imaging by researchers in the University of Cape Town and University of the Western Cape, in South Africa, has revealed that supermassive black holes in a region of the distant universe are all spinning out radio jets in the same direction – most likely a result of primordial mass fluctuations in the early universe. The astronomers publish their results in a new paper in Monthly Notices of the Royal Astronomical Society.



The new result is the discovery – for the first time – of an alignment of the jets of galaxies over a large volume of space, a finding made possible by a three-year deep radio imaging survey of the radio waves coming from a region called ELAIS-N1 using the Giant Metrewave Radio Telescope (GMRT) in India.

The jets are produced by the supermassive black holes at the centres of these galaxies, and the only way for this alignment to exist is if supermassive black holes are all spinning in the same direction, says Prof Andrew Russ Taylor, joint UWC/UCT SKA Chair, Director of the recently-launched Inter-University Institute for Data Intensive Astronomy, and principal author of the Monthly Notices study.

"Since these black holes don't know about each other, or have any way of exchanging information or influencing each other directly over such vast scales, this spin alignment must have occurred during the formation of the galaxies in the early universe," he notes.

This implies that there is a coherent spin in the structure of this volume of space that was formed from the primordial mass fluctuations that seeded the creation of the large-scale structure of the universe.

With study co-author – and UCT PhD student currently working at the National Radio Astronomy Observatory, Socorro, New Mexico, USA – Preshanth Jagannathan, the team discovered the alignment after the initial image had been made. Within the large-scale structure, there were regions where the spin axes of galaxies lined up.

The finding wasn't planned for: the initial investigation was to explore the faintest radio sources in the universe, using the best available telescopes – a first view into the kind of universe that will be revealed by the South African MeerKAT radio telescope and the Square Kilometre Array (SKA), the world's most powerful radio telescope and one of the biggest scientific instruments ever devised.

Earlier observational studies had previously detected deviations from uniformity (so-called isotropy) in the orientations of galaxies. But these sensitive radio images offer a first opportunity to use jets to reveal alignments of galaxies on physical scales of up to 100 Mpc. And measurements from the total intensity radio emission of galaxy jets have the advantage of not being affected by effects such as scattering, extinction and Faraday Rotation, which may be an issue for other studies.

The presence of alignments and certain preferred orientations can shed light on the orientation and evolution of the galaxies, in relation to large-scale structures, and the motions in the primordial matter fluctuations that gave rise to the structure of the Universe.

So what could these large-scale environmental influences during galaxy formation or evolution have been? There are several options: cosmic magnetic fields; fields associated with exotic particles (axions); and cosmic strings are only some of the possible candidates that could create an alignment in galaxies even on scales larger than galaxy clusters.

More at: ***https://www.ras.org.uk/news-and-press/2816-astronomers-in-south-africa-discover-mysterious-alignment-of-black-holes***

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

Pavilion Building Work

Work has now almost finished on the access ramp at the Pavilion next to the observatory but there will be a lot more activity over the next few weeks. The NPS&CA have approved an upgrade to the Pavilion involving fairly major building works.

Anyone visiting the observatory must use a torch to ensure their own safety.

The paths are supposed to be kept clear and the works clearly marked but the area is open to the public and cannot be monitored 24/7.

Be very careful when visiting the observatory in the dark!

Spring Cleaning

The observatory needs a good clean. The facia boards, guttering and dome are looking pretty grim and could do with a bit of TLC.

On Monday 23rd May volunteers are welcome at the Watery Lane site starting at 18.30hrs to help with a general cleanup both inside and out.

Any help is welcomed as we all know that "*many hands make light work!*"

Contact Brian at ***director@wightastronomy.org*** if you can spare a couple of hours.

Playful Planetary Pillows Let You Cozy Up to the Cosmos

You can now snuggle up with the solar system thanks to these playful pillows by Pebble Plush.

Designer Paula Ma created them in the spirit of "something simple can make a big difference," and the colourful cushions certainly do!

The photographic images of planets like Earth, Neptune, and Mars add a bit of scientific whimsy to your everyday decor.

More pics at: ***http://www.mymodernmet.com/profiles/blogs/paula-ma-pebble-plush***

Observatory

When visiting the VAS observatory, for your own safety, please bring a torch. Also, please 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

New Zenith needs letters, articles, reviews or pictures related to astronomy. Contributions to the Editor at the email or postal address on the front page.

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

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

"The total amount of energy from outside the solar system ever received by all the radio telescopes on the planet Earth is less than that of a single snowflake striking the ground"
Carl Sagan