New Zenith

The Monthly Magazine of the Vectis Astronomical Society

Vol 20 Issue 4 — May 2012

When Printed, this Newsletter costs VAS at least £1

Society News

Visitors

We've had a few really good Thursday sessions down at the observatory recently and, with a lot of help from our members, we've shown many visitors some of the reasons we love astronomy.

I think I can safely say that anyone who gets involved in the outreach activities will gain a lot from the experience and become a lot more familiar with both the skies and the equipment available at the observatory.

I guess this is a double edged sword to some as it may appear that visitors are given priority over members on a Thursday; it must though be remembered that we are a charitable organisation with a remit to provide public outreach and that donations from visitors make a real contribution to club funds.

As we approach the Island's tourist season and the evenings get lighter we will be getting more visitors and the observatory will be busier. It's important to the Society that visitors are made welcome and that they get the chance to use the equipment there, so if you can give a hand on a Thursday, feel free to drag a telescope outside and get stuck in.

AGM is Approaching

It's getting near to that time of year again.. Committee members are quaking in their boots as the prospect of losing their jobs grows by the day.

Election forms will be attached to next month's New Zenith and I ask each of you to consider standing for the committee. It's not onerous, but in order for the VAS to continue (*and hopefully evolve a little*) we need an active and reliable core to continue with the statutory business of the Society.

As I mentioned a few months ago, plans are underway for a major announcement at the June monthly meeting which will hopefully encourage more club activity.

The election is your chance to shape the Society in 2012/13 so please help by getting involved.

Brian Curd
Observatory Director

VAS Website: www.wightastronomy.org

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

The Editor New Zenith
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Winford
Sandown PO36 0JY

Tel: **01983 864303** or email: **editor@wightastronomy.org**

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

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Registered Charity No 1046091

Observatory Diary

Monday, 19.30hrs	**Members Only**. Telescope and night sky training. ***Contact Barry Bates 01983 872979***
Thursday, 19.30hrs	**Members and Public**. Informal meeting and observing.

Contents this Month

Monthly Meeting Calendar 2012

Check the website for up to the minute information.

Travel for our monthly speakers is sponsored by:

Date	Subject	Speaker
27 Apr	Answering the Biggest Questions with the Biggest Surveys	Dr Thomas Kitching
25 May	How Sir James Jeans lifted the spirits in the aftermath of the Great War	Dr Guy Moore
29 June	Member's Forum and Special Project Presentation	
27 July	TBA	TBA
24 Aug	Observing Galaxies - Faith Jordan **AGM** **Meeting Starts at 19.00hrs**	
28 Sep	The future is out of this world	Dr Stuart Eves
26 Oct	TBA	Owen Brazell
23 Nov	Mapping the Universe	Dr Rita Tojeiro

All details correct at time of publication.

PLEASE NOTE...

The venue for the June meeting will be as normal

Please keep an eye on the local press for any notification of traffic diversions and allow a little more time for your Journey as the Festival is sure to make a things a little more difficult to those driving into Newport from the East Cowes and Staplers directions

VAS Contacts 2012	
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NZ Distribution	**Brian Bond** distribution@wightastronomy.org

New Members

A very warm welcome to our new members:

- Ryan Cooke
- Ashley Fisher

VAS Committee

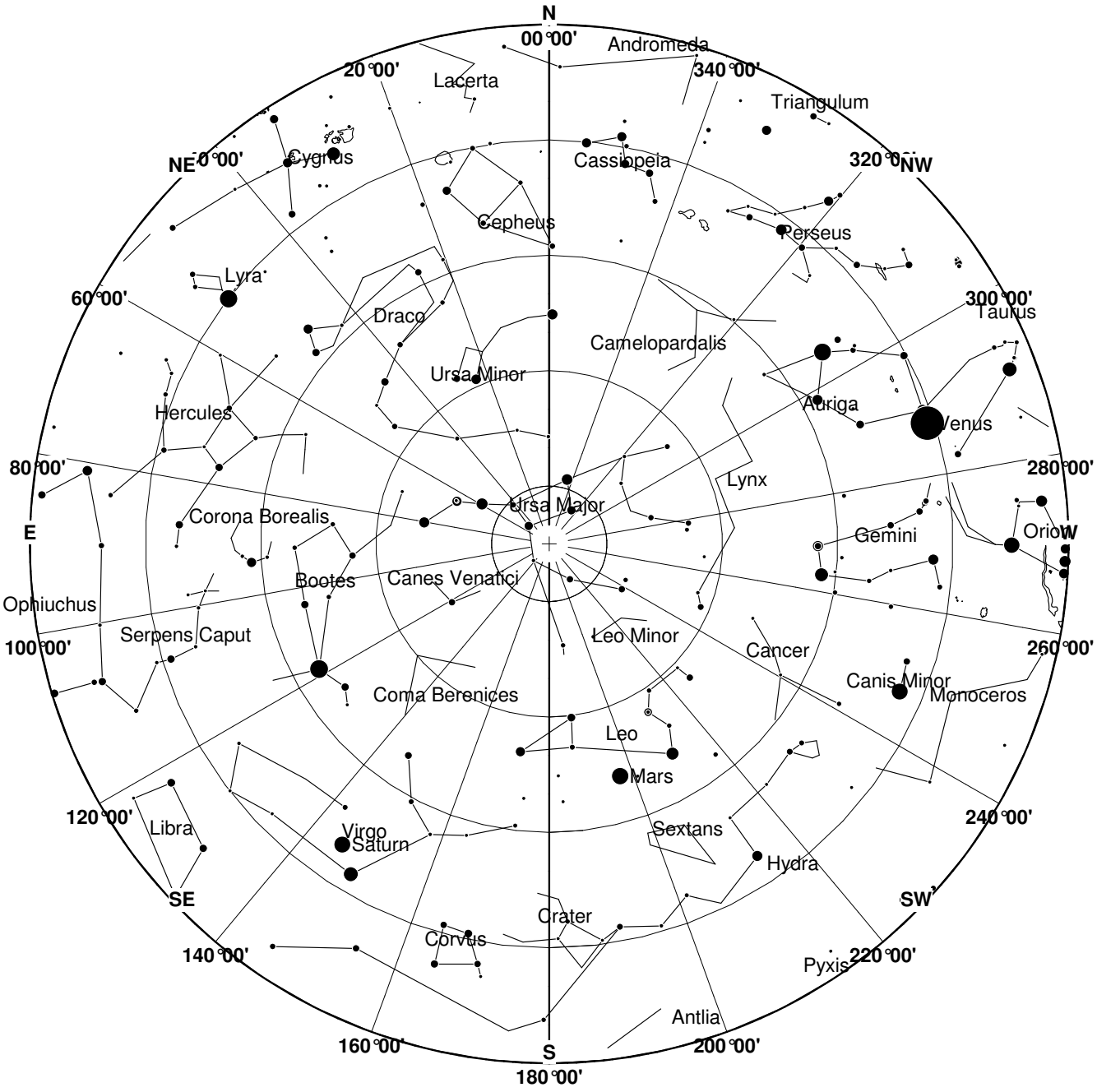
AGM

Please don't forget the Society AGM in August

It's your chance to elect the committee for the next year and perhaps even stand for election yourself

Election forms will be attached to next month's NZ

May 2012 Sky Map



View from Newchurch Isle of Wight UK - 2100hrs - 15 May 2012

The Black Eye Galaxy (also called Sleeping Beauty Galaxy; designated Messier 64, M64, or NGC 4826) was discovered by Edward Pigott in March 1779, and independently by Johann Elert Bode in April of the same year, as well as by Charles Messier in 1780. It has a spectacular dark band of absorbing dust in front of the galaxy's bright nucleus, giving rise to its nicknames of the "Black Eye" or "Evil Eye" galaxy. M64 is well known among amateur astronomers because of its appearance in small telescopes. It is a spiral galaxy in the Coma Berenices constellation.

May 2012 Night Sky

Moon Phases

New	1st Qtr	Full	Last Qtr
20th	28th	6th	12th

Planets

Mercury
Being at superior conjunction (behind the Sun) this month, Mercury is not available for viewing.

Venus
This month the ever thinning crescent of Venus dives rapidly towards the Sun ready for June's transit. At sunset Venus stands some 35 degrees above the horizon at sunset and only 9 degrees by its close.

Mars
Now well past its best Mars is still the brightest object in the south western sky at sunset. With the planet having a diameter of only 9 arc seconds any surface markings will be difficult to see even through a large telescope.

Jupiter
Jupiter is on the far side of the Sun this month and therefore invisible.

Saturn
At sunset Saturn is in the southern sky above the bright star Spica. The rings are now opening up and making a good show. As we move away from opposition the shadow of the planet will become more noticeable on the rings.

Uranus & Neptune
Both the outer planets are in the morning sky, but are too close to the glare of the Sun for observation this month.

Meteors

The Eta Aquirids shower peaks on the 5th. The last quarter moon will diminish the visibility of the expected 35 meteors per hour.

The second peak of the Alpha Scorpiids has a peak of about 5 per hour on the 13th.

Deep Sky objects

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 12h 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 12h 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.

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.

Peter Burgess

Dr Who's sonic screwdriver invented at Dundee University

Scientists claim to have invented their own version of Doctor Who's famous sonic screwdriver.

The Dundee University researchers have created a machine which uses ultrasound to lift and rotate a rubber disc floating in a cylinder of water.

It is said to be the first time ultrasound waves have been used to turn objects rather than simply push them.

The study could help make surgery using ultrasound techniques more precise, the physicists said.

Surgeons use ultrasound to treat a range of conditions without having to cut open a patient.

The ability to steer ultrasound waves to the precise spot where they are needed could make those treatments even more effective.

http://www.bbc.co.uk/news/uk-scotland-17760077

Kent stargazers to get one of country's best telescopes

The heavens are about to come a little closer to Kent after a team of stargazers staged a major coup to obtain one of Britain's best telescopes.

The Royal Observatory, Edinburgh, agreed to give one of its professional telescopes to the organisation.

The Mid-Kent Astronomical Society already had its head in the clouds after staging a series of astonishing displays of its equipment for the public to use when they appeared on the BBC's Stargazing Live programmes earlier this year.

Best loved on the evenings were the mountains on the Moon and awe-inspiring close-up views of Jupiter.

Now with the Edinburgh telescope on its way to the county, local stargazers will have an even better view of the sky at night.

Noel Clark, from the society said: "If people found the views through our other telescopes exciting; they will feel their brains being sucked into space by this baby."

The half-metre aperture telescope is one of the largest in amateur hands. It was originally built in 1967 to train students at Edinburgh University, but it is now upgrading and making its original equipment available.

Local haulier Matt Swain has even agreed to transporting the huge piece of scientific equipment for free.

Mike Phillips, chairman of the Mid-Kent Astronomical Society, said: "We have big plans for this telescope to provide views of our universe to school groups and all who are interested. We look forward to introducing many more people to the wonders of the night sky."

More at: ***http://goo.gl/Id0iV***

When will the Moon leave the Earth's orbit?

The Moon will not leave the Earth's gravity, unless it is affected by some external force such as an asteroid strike, even though the orbit of the Moon is increasing slightly.

The Earth's rotation is slowing down due to tidal 'braking' that is the tidal bulges interact with the Moon's gravitation to produce a decelerating torque that slows the Earth's rotation, causing an increase in the length of the day.

The equal and opposite reaction is a torque exerted by the Earth on the Moon's orbit that increases its angular momentum.

This is achieved by an increase in the distance between the Moon from the Earth, pushing it 1.25in farther away each year, and a decrease in the rotation rate of the Moon about the Earth, which increases the length of the month.

The Earth's rotation decelerates more rapidly than that of the Moon, so eventually the angular velocities of the Earth and the Moon will be equal, a condition called synchronous rotation.

At that point, a billion or so years hence, an Earth day and month will be equal at about 47 current Earth days, and the Moon's distance from Earth will be 135 per cent of its current value.

Then, for millions of years, one side of the Earth will face the Moon. Half the world will see the Moon, while the other half will never see it.

This stable situation is not the end of the matter. Today, the Sun's tidal pull on Earth is only half as strong as the Moon's. But as the Moon departs, the Sun will grow relatively more influential.

Ultimately, it will make Earth spin even slower, and the Moon will start falling toward us.

It will break apart before it reaches 10,000 miles away because its silicate rocks are only half as dense as the Earth's heavier materials. This would take three to five million years to occur.

Lecture report 23 March 2012

"Black Holes - no need to be afraid"

Prof. Ian Morison
Jodrell Bank Observatory & Gresham College

This lecture to a full house, including new members and star party visitors, turned our attention toward the practical aspects of black holes, how they can be spotted by their observational consequences and what might happen at the centre of our galaxy. To see more and better pictures than sketched here, plus mathematical explanations and lecture details, visit the Gresham College website, ***www.gresham.ac.uk*** *giving access to lecture transcripts and more material from the lecturer.*

Two centuries ago, Laplace (1749-1827) and geologist John Michell, had stellar gravitational ideas verging on black holes. The **Newtonian approach** begins with the escape velocity of an object from the Earth of 11.2km/sec, increasing to 16km/s if the Earth were made of lead. If enough mass were packed in until the escape velocity equalled the speed of light, it would be a "black hole", a term coined by John Wheeler. They can be of various sizes. Short-lived very small ones of 10^{-18}m might be formed in the LHC - a court case tried to stop switch-on, but now it's on, you can check on a website to see if the Earth still exists, the lecturer "checks it daily"... If the Earth were packed into a 3cm ball, it would make a black hole, but many are typically 10 to 30km across, containing 40 solar masses or so, but supermassive ones bigger than our solar system are found at the centres of galaxies.

The Einsteinian approach with its untouchable maths, starts with stories. Journalists commented to Eddington, "you are just one of three who understand general relativity". "...so who are the other two?" asked he. Einstein linked space with time. Mass makes curves in space-time, like a metal ball making a depression on a taught rubber sheet. With sufficient mass, a ball pulls space-time inwards enough to stop light escaping, and it's then a black hole, distorting light around it like a lens. The lecturer asked if anyone here had used tensor calculus, of the sort used by Chaim Weizmann - one affirmative waver said he'd used it in electromagnetism. A **Schwarzschild** black hole (non-rotating) emerged theoretically in 1916, following Einstein's general relativity of 1915, but not till 1967 with the discovery of pulsars did gravitationally collapsed objects get onto the astronomical map.

Event horizon and the size of a black hole are not the same. If the Earth were made heavy enough to be a black hole, then the event horizon and black hole size would be the same. But concentrate the mass into a ping-pong ball at the middle, and this leaves gravity unchanged at the original surface, which is still the event horizon. So inside the event horizon it could be mostly empty space.

Not a vacuum cleaner: We are familiar with comets, just a few crash into the small target of the Sun. If the solar mass was compressed, making a black hole only 3km across, comet collisions would be even rarer, and Earth would orbit as usual but without daylight or warmth. So black holes do not 'hoover up all the goodies' nearby.

Stellar-derived black holes. Stellar nuclear fusion converts hydrogen to helium, to carbon and oxygen. Massive stars make heavier elements, eventually becoming white dwarves, squashing down until electrons resist with a 'degenerative pressure'. Pauli's exclusion principle prevents identical particles being forced into the same quantum state - they push back. When this is overcome, neutron stars can form, like the one in the Crab nebula, emitting a strong persistent source of gamma and X-rays. This neutron star spins at 30.2Hz, called a 'pulsar', it has been used to study the Sun's corona and Titan's atmosphere during occultations.

If a neutron star of more than 3 solar masses tries to form, its 'degenerative pressure' is not enough to avoid crushing into a black hole. Scientists then puzzle over either a mathematical singularity with infinite density or they think the neutrons turn into a tiny ball filled with 'neutron-quark soup' with its own degenerative pressure. Here quantum mechanics and general relativity meet. A neutron quark is a billionth of a neutron's volume, so a black hole might contain a billion solar masses compressed into a grain of 0.04mm.

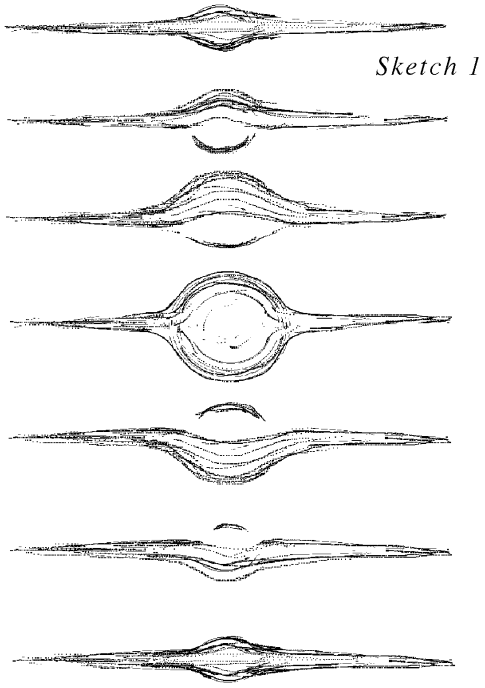
The No-hair theorem says that black holes are characterised by their mass, electric charge and angular momentum, any other information is hidden inside (magnetic poles appear forbidden).

Kerr black holes get their name in 1963 from the person who solved the equations which include rotation, and they include a 'frame dragging ergosphere'. An object straying into this volume gets pulled around by a 'Penrose process', the black hole spin reduces and the object comes flying back out with bigger energy.

Tidal forces: A finite object approaching a black hole experiences huge tidal forces, becoming stretched by 'spaghettification'. Someone falling into a black hole would last a few seconds, vanishing in a puff of blue light, visible as a long drawn out reddening flash getting dimmer because gravitational redshift expands time until there's nothing left to see.

Detection: *Sketch 1* is of a simulation of a black hole passing (top to bottom) across an edge-on galaxy, with Einstein rings appearing. Similarly a star passing in front of another can brighten the image of the further star for a few seconds. In this way it has been demonstrated that the dark matter halo around the Milky Way is not composed of black holes, but Macho-96 BLG-5 identifies a microlensing event (970 days) in Sagittarius, caused by a

black hole of about six solar masses, at a range of 100,000 ly (light years).



Sketch 1

As a binary member: The regular red- and blue-shifting of a star reveals the maximum velocity of the star towards and away from the observer and its period of orbit around the common mass centre of a pair. Knowing the type of star under observation yields its probable mass, enabling the deduction of the mass of the invisible member of the pair. (Try the maths - it's very interesting!) If the invisible member is of several solar masses what else could it be but a black hole? Often the black hole has an accretion disc, containing gas heated by differential rotation and friction to millions of degrees causing X-ray emission, sometimes bits and pieces vanish into the black hole causing massive flares of X-rays, light, and radio.

On 5 August 1975, Professor Keith Pounds at Leicester University, examining data coming at 1 bit per second from the X-ray pinhole camera with ten-degree resolution aboard Ariel V (1974-1980), found a very strong X-ray flare. To pin it down more accurately Professor Morison used the MkII Telescope at Jodrell Bank to scan the sky, but found nothing because, it turns out, the radio waves come a few days later... then, on a twenty foot length of chart recording, very close to the edge "**We found it!".** Labelled **A0620-00**, also called, **Monoceros X1**, in the Rosette nebula, it consists of a black hole with a K2 type companion star. It has a radial velocity of 460 km/s and period 0.32 day, giving a combined mass of 10.5 solar masses. With the K2 star at 0.5- 0.8 solar mass, the invisible companion object is greater than 9.7 solar masses, so it must be a black hole, possibly the closest one at a distance of 3500 ly.

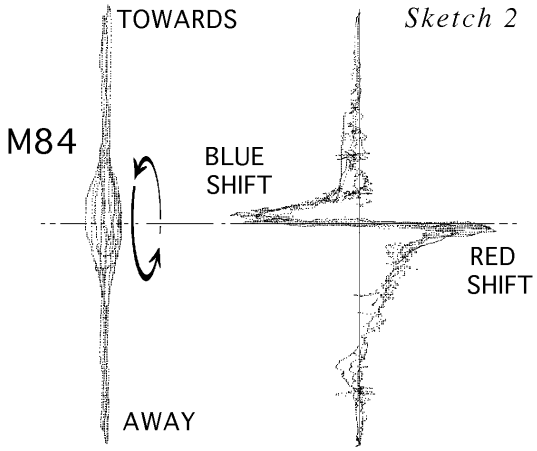
Cygnus X1, 7000 ly away, contains a black hole of 15 solar masses, with an accretion disk and jets making a powerful X-ray source, fluctuating several times per second, not as regular as a neutron star, orbiting around a blue supergiant variable stellar companion. It was discovered from an Aerobee rocket, using spin to sweep the sky with a Geiger counter, leading to NASA launching the Uruhu satellite and finding 300 new X-ray sources in the 1970s. It is a microquasar, with a non-eclipsing orbit of 5.6 days. Its precessing jets (of 10^{30}watts) bore into the interstellar medium, making energized rings and radio emission. A good proportion of the rest mass in the accretion disc is converted into radiation, higher than the 1% conversion of rest mass into energy that occurs in stars.

Supermassive black holes. In 1974, radio waves were the first radiation indicating interesting things happening at the centre of our galaxy, coming from **Sagittarius**. It contains a strong radio source called 'Sagittarius A star', written Sg A*. It cannot be seen optically because of dust, but the VLT in Chile, using adaptive optics, which work well in the infrared, produced an image of a bright star moving at 12000 km/s. Now with 16 years of observing using Keck, a 1 arc-second square image has revealed a dozen stars moving on Keplerian orbits, one has already completed a circuit, swooping at huge speeds in and away from a central object of 4.1 million solar masses and radius 45 AU at 26000 ly range. In 2004 a black hole of 1300 solar masses was found 3 ly from Sgr A*. A dust cloud is approaching so interesting things are likely to happen within years.

In the 1960s, the Jodrell Mk I telescope (75m) found 367 radio sources. Combining the signals with others from telescopes across the north of England, seven sources were found less than 1 arc-second across but their ranges were needed. Optically they would look like stars hence 'Quasi-Stellar-Objects', or 'quasars'. The Moon helped to establish accurate positions, such as for 3C273 (object 273 in the 3rd Cambridge Catalogue of Radio Sources in order of Right Ascension) in Virgo. Maarten Schmidt in 1963 using the 200-inch Palomar, identified a visible object coinciding with the radio source, finding a redshift of 16 per cent in its hydrogen lines, placing it far beyond the Milky Way, at a distance of 2.4 Gly. It is of 886 million solar masses and so exceedingly bright, if moved to the star Pollux, here on Earth the night would be as bright as day; it gobbles fuel at the rate of 1 solar mass per year. It has a visible jet, 23 arc seconds long. 3C273 is the most distant object likely to be seen by amateurs.

The brightest quasars convert hundreds of solar masses of matter per year into radiation and vary in brightness, not to be confused with variable stars, they have very different spectra. The rapidity of fluctuations of light, gamma and X-rays, indicates physical sizes of a few light hours. Do galaxies or black holes come first? A connection consists in supermassive black holes having about one-thousandth of the mass of corresponding galactic bulges, but in the

early universe, black holes are more massive than expected, so perhaps they did come first. Quasar HE0450-2958 doesn't have a host galaxy, but stars are forming at a rapid rate in a young galaxy nearby which it might join later. The HST made a spectrograph strip passing perpendicularly along the disc of M84, *Sketch 2*, finding speeds as big as 400km/sec only 26 ly from the centre; in its large rotating disc with very active nucleus, most of its 300 million solar masses are expected to be in a black hole, with a size of the orbit of Venus.



Intermediate. Omega Centauri contains young stars, uncommon in a cluster, the outer stars may have been stripped off, leaving a 40,000 solar mass black hole at the cluster's centre. M31G1 Mayell 11 of 17000 solar mass has similarities, it may be a remnant core of a dwarf galaxy.

Hawking radiation. Strong gravitation favours virtual particle production, particle/anti-particle pairs formed at the event horizon can split, with the normal particle emitted outwards, the anti-particle goes inwards subtracting mass from the black hole, but evaporation times of large black holes are aeons long. Cooler than the CMB they absorb energy, but as the universe expands, eventually they will evaporate. Very small ones evaporate instantly.

Discussion: one question seemed to be about black holes falling into Europe, another wondered why antiparticles go into a black hole and reduce its mass and why not the other way around; another wondered why radiation emerges as a beam up the polar axis and isn't thrown out in the plane of rotation, like a person weighs less at the equator - the lecturer talked of magnetic fields around compact objects and other details, reminding us that this is a highly complex theoretical subject whereas he is essentially an observational astronomer.

Reference:

www.gresham.ac.uk/lectures-and-events/black-holes-no-need-to-be-afraid.

Dr.Guy Moore

Essays from a beginner:

On star parties

I'm very bad at getting to the Isle of Wight Star Party. In previous years I've been dealing with crises or unwell, and haven't attended this excellent institution. However, the one member of my family who is genuinely interested in astronomy visited me on the weekend of the 2012 Star Party, and we planned to join in and get the benefit of all the experience and kit and company on offer.

Friday night drew on clear. After the VAS meeting (with observation of Iridium flare thrown in gratis) we had to decide if we should go down to the holiday camp. We havered; it was already late... and then we got our scopes out on the drive for a brief observation and an early bed. Then we would be fresh for Saturday.

It didn't work out like that. We consulted, advised, drank tea, swapped equipment, fell over power cables, ate toast, and bickered in what we hoped were whispers (not to disturb the neighbours), punctuated by small cries of distress and smothered laughter. His scope has a 5" aperture, so I found M42, M13, M92, the Double Cluster, M57 and the Leo Triplet in my 10" to demonstrate the difference in light gathering, as well as Mars & Saturn. The sky was hazy but the objects looked surprisingly good, the Skyliner definitely showed its value up against his small Celestron, and I distinguished myself by finding M57 from memory, first shot. We took the scopes in at 3 am.

We eventually made it to the Star Party on Saturday afternoon. One telescope was in business - a Coronado H-alpha solar telescope, which I'd never had a chance to look through before. No significant sunspots, but the scope was showing some prominences on a bright red image. Elsewhere, there was some eye-watering kit, but all the astronomers, like us, were comatose. We promised to return later when the action started.

But as darkness fell, Rob decided he wanted to see if he could get any usable images from my very basic 10" Skyliner, and we fetched it out for some prolonged experiments with focusing and exposure. We found that the mount of the 10" sagged disastrously under the weight of the DSLR and Barlow attached to the sharp end. It wasn't designed for this, poor thing. Obviously we needed a counterweight at the blunt end. I'm afraid this was a kilo of light muscovado sugar strapped on with the belt from my jeans. Perhaps it's a good thing that we weren't at the Star Party, lowering the tone. (The sugar worked though.)

We lasted until about 2.00 on Sunday morning, and the full Star Party experience will have to wait another year. I'm sorry we didn't get there. But we star partied in spirit.

Rebecca Mitchelmore

From the Past...

The clipping on the right was (re)discovered by VAS member Ronnie Waterman recently during a cupboard clean out.Ronnie tells me it comes from the Isle of Wight Weekly Post (1976-1986) and I guess it dates from that very last year, 1986.

Halley's Comet or Comet Halley is the best-known of the short-period comets, and is visible from Earth every 75 to 76 years. Halley is the only short-period comet that is clearly visible to the naked eye from Earth, and thus the only naked-eye comet that might appear twice in a human lifetime. Other naked-eye comets may be brighter and more spectacular, but will appear only once in thousands of years.

Halley's returns to the inner Solar System have been observed and recorded by astronomers since at least 240 BCE. Clear records of the comet's appearances were made by Chinese, Babylonian, and medieval European chroniclers, but were not recognized as reappearances of the same object at the time. The comet's periodicity was first determined in 1705 by English astronomer Edmond Halley, after whom it is now named. Halley's comet last appeared in the inner Solar System in 1986 and **will next appear in mid-2061**.

During its 1986 apparition, Halley became the first comet to be observed in detail by spacecraft, providing the first observational data on the structure of a comet nucleus and the mechanism of coma and tail formation. These observations supported a number of longstanding hypotheses about comet construction, particularly Fred Whipple's "dirty snowball" model, which correctly predicted that Halley would be composed of a mixture of volatile ices – such as water, carbon dioxide and ammonia – and dust. The missions also provided data which substantially reformed and reconfigured these ideas; for instance it is now understood that Halley's surface is largely composed of dusty, non-volatile materials, and that only a small portion of it is icy.

THE COMET IS COMING!

Astronomer Mr. John Smith with his telescope.

Halleys Comet has been spotted from the Isle of Wight!

An Island amateur astronomer, Mr. John Smith, of Forest Road, Winford, said he saw and photographed the comet from his garden observatory on Sunday.

He is the first Islander to witness the body which becomes visible for only a few weeks every 76 years.

Having unsuccessfully attempted to view the comet on Saturday, he preset his telescope to the correct co-ordinates for Sunday's sighting.

Mr. Smith, who is secretary of the Vectis Astronomical Society, said, 'This is the most memorable observation I have made since I built my observatory in 1979.'

He plans to unveil his photographs at the next meeting of the society.

The comet, which will not be visible to the naked eye until November, appeared as a white haze on Mr. Smith's photograph, which was taken by a camera fixed to the eyepiece of his £2,000 telescope, a 10in. reflector.

After disappearing from our skies at the end of the year, the comet will then be visible from Australia before it vanishes on its 76-year orbit, to return in the year 2061.

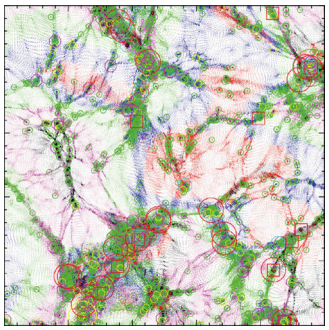
A collection of Mr. Smith's astronomical photos is on exhibition in London.

Included in his gallery is a picture, taken from his Winford observatory, of the 'Whirlpool' galaxy, which is over 15,000,000 light years from Earth.

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

A Box of Universe - Watch the cosmos evolve in a cube one billion light-years wide.

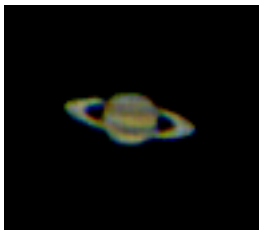


Isaac Newton's universe was a cosy, tidy place. Gathered around the sun were six planets, a handful of moons and the occasional comet, all moving against a backdrop of stationary stars. Newton provided us with the mathematical tools needed to compute the motions of these bodies. Given initial positions and velocities, we can calculate the forces acting on each object, using Newton's law of universal gravitation.

From the forces we can determine accelerations, and then update the positions and velocities for the next round of calculations. This scheme of computation is known as the n-body method. Perhaps Newton himself could have put it to work if he had had suitable computing machinery.

See: ***http://www.americanscientist.org/issues/pub/a-box-of-universe/3***

First attempt at Imaging



Astro-imaging grabbed my attention in November when I was given an SPC-900 for my birthday. I'd just like to share this image of Saturn which I captured from my balcony on 19th Mar.

It's only small and when zooming in it becomes pixellated but I'm really pleased with it. The shadow cast by Saturn onto it's rings is nicely visible, as are the coloured bands. My eyes may be playing tricks on me, but I think I can make out the Cassini Division!

There have of course, been many outstanding photos taken of Saturn. This just illustrates what can be achieved with a modest ETX-90, Phillips webcam and no garden. After all, Saturn is nearly a billion miles away!

For the technically minded, I used Sharpcap, a free online capture program. Personally, I found Registax 5 easier to stack images than Registax 6 (also free to download). Stargazing can be a bit like fishing, one night I might set up, take two or three captures and be back in the warm after half an hour. On other occasions, I might waste an entire evening and come in empty handed.

At this stage, you might want to leave stacking your images until the next day! There are online tutorials which may be a bit scary at first. Remember you can always press pause and after some practice you'll soon be doing everything from memory. It's easy to play around with the exposure and gain controls to achieve a nice black sky.

This image was the result of stacking 1000 frames at 10 frames per second, so just one and a half minutes of keeping the object in view. Registax likes a bit of movement of the object as the software can track it even if you're gently moving the scope by hand. I didn't feel the need to enhance the image and I've yet to understand photo-editing. Good luck to anyone trying this and have fun!

Martyn Weaver

Observatory

For your own safety, when visiting the VAS observatory, 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 welcomes letters, articles or pictures related to all aspects of astronomy. Contributions to the Editor at the email or postal address on the front page.

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

Douglas Adams

Quotations

"With fame I become more and more stupid, which of course is a very common phenomenon"

Albert Einstein

"A physicist is an atom's way of knowing about atoms"

George Wald