New Zenith

The Monthly Magazine of the Vectis Astronomical Society

Vol 21 Issue 10 — November 2013

When Printed, this Newsletter costs VAS at least £1

Society News

VAS Christmas Dinner

The VAS Christmas dinner this year will be held at **19.30 on Friday 29th November at The Merrie Garden** (*near Morrison's Lake*)

Booking forms are available at the observatory on Thursday evenings and at monthly meetings. Please return your booking by the October meeting and pay by the November meeting (cheques to society) £15.99.

For more details contact Barry Bates 872979.

BBC Stargazing Live!

Advanced warning - BBC Stargazing Live! will be on 7th, 8th and 9th Jan 2014. We are hoping to arrange an event at the observatory - probably on Thursday 9th if we can hire the Pavilion. Help will be needed I'm afraid ;)

Clear Skies!
Brian Curd
Observatory Director

Subscriptions

On 1st October membership subscriptions for the 2013/14 year became payable. Renewal reminders were therefore sent out to those members who have not set up Standing Orders. It is now more than three weeks into the month and so far only 23% of those members have paid.

If you have a query with the subscription, or the dog has eaten the reminder, please contact me.

Part of the rationale for changing the subscription year is to save costs. Sending further subscription reminders wastes VAS funds. Therefore, please process the Standing Order Mandate, forward a cheque or pay in cash at the Observatory or the Newport Meeting.

Many thanks

Norman Osborn - Membership Secretary
01983 404397 or members@wightastronomy.org

VAS Website: www.wightastronomy.org

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

The Editor New Zenith
35 Forest Road
Winford
Sandown PO36 0JY

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

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

VAS Registered Office

35 Forest Road, Winford, Isle of Wight, PO36 0JY

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Observatory Diary

Monday, 19.30hrs	Members Only by arrangement 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 2013

Check the website for up to the minute information.

Travel for our monthly speakers is sponsored by:

Date	Subject	Speaker
25 Oct	Radio Astronomy	Dr Sadie Jones
22 Nov	Club Night	TBA

All details correct at time of publication.

Monthly Meeting Calendar 2014

Date	Subject	Speaker
24 Jan	TBA	
28 Feb	History of the Dark Sky	Alan Dowdell
28 Mar	Fascinating Facts About Solar Eclipses	Sheridan Williams BAA
25 April	Cosmic Rays	Prof. Alan Watson
23 May	TBA	Dr Thomas Kitching
27 June	The Radio Sky	Paul Hyde BAA
25 Jul	Exoplanets and How We Find Them	Jakub Bochinski, Chairman OU Astronomy Club
22 Aug	TBA	
26 Sep	Mysteries of the Solar System	Dr Stuart Eves Astrium
22 Oct	TBA	
28 Nov	TBA	

Telescope Training

Members wanting training on the observatory Meade LX200 should contact:

Barry Bates on 872979

VAS Contacts 2013/14	
President	Barry Bates president@wightastronomy.org
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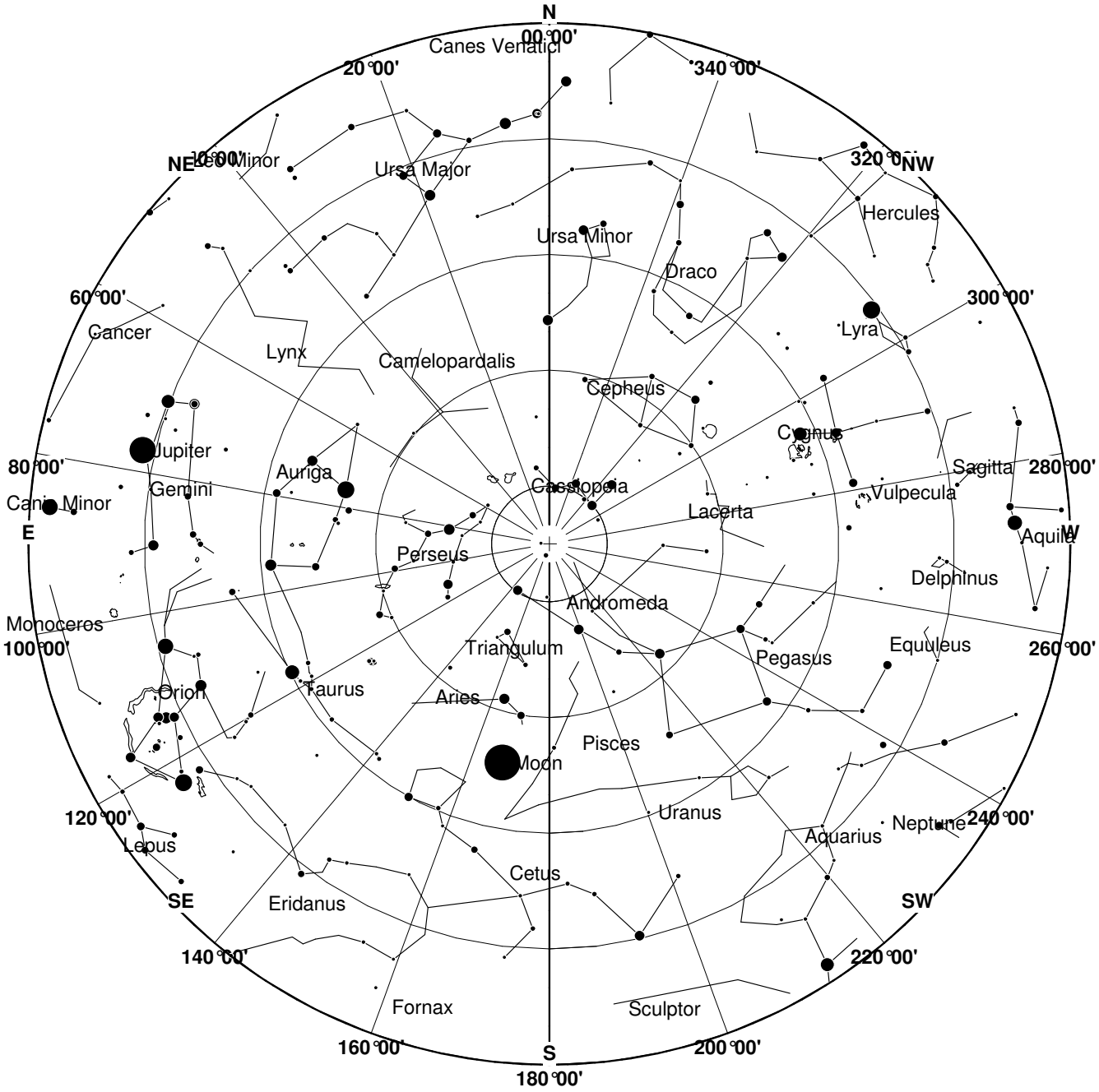
NZ Distribution	Brian Bond distribution@wightastronomy.org
Others	Mark Williams Nigel Lee

November 2013 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 November 2013

Messier 74 (also known as NGC 628) is a face-on spiral galaxy in the constellation Pisces. It is at a distance of about 32 million light-years away from Earth. The galaxy contains two clearly defined spiral arms and is therefore used as an archetypal example of a Grand Design Spiral Galaxy. The galaxy's low surface brightness makes it the most difficult Messier object for amateur astronomers to observe. However, the relatively large angular size of the galaxy and the galaxy's face-on orientation make it an ideal object for professional astronomers who want to study spiral arm structure and spiral density waves. It is estimated that M74 is home to about 100 billion stars.

November 2013 Night Sky

Moon Phases

New	1st Qtr	Full	Last Qtr
5th	12th	19th	27th

Planets

Mercury

The innermost planet, Mercury makes an appearance in the morning sky from mid month. At 07:00 it peaks at about 12° in the south east on the 16th. It then spends the remaining days of the month sinking down towards the horizon. On the 26th it is less than a moon width from Saturn. This conjunction may be a challenge to observe being only 8° above the horizon a 07:00.

Venus

Venus can be found very low in the south south-west as the sun sets and remains visible for about another hour. It Is in a poor position for observation but a telescope will show the phase change from a 'half moon' at the start of the month to a distinct crescent phase by its close.

Mars

During the month Mars drifts eastwards from about a quarter of the way from Regulus in Leo to Spica in Virgo to about half way between the two stars. At a little fainter than 1st magnitude it is easily visible and one of the brighter objects in that part of the sky. It is however still rather small for telescopic observation making it difficult to spot any surface markings.

Jupiter

Jupiter is well placed for late night observation rising in the mid evening and remaining visible until after sunrise. It is by far the brightest object in that area of the sky making it very obvious. Binoculars will show the four Galilean moons and any small telescope will show the cloud bands.

Saturn

Saturn is not well placed for observation this moth, being just visible low in the pre-dawn sky. It is close to Mercury on the 16th.

Uranus

Both outer planets are well placed for observation in the mid evening at the beginning and end of the month; the Moon interferes with observation during the middle of the month. Uranus is in Pisces where there are no particularly bright guide stars. Use a planetarium program or the finder chart in previous New Zenith to locate this ice giant.

Neptune

Neptune like Uranus is in an area of rather dim stars, it can be found between Ancha, Sigma Aquarii and 38 Aquarii. Being only magnitude 8 makes Neptune a more difficult target for binoculars than Uranus, bit without the bright moonlight still within grasp.

Comet ISON

If we are lucky Comet ISON will put on a good show in the morning. For the first week it is likely to be a challenge for binoculars as it passes from about half way between Regulus and Spica until it passes close to Zavijava in Virgo on the 7th. Over the next week or so it travels on to a meeting with Spica on the 18th. By this time it should be visible to the naked eye. As the month progresses it dips closer to the Sun until at the end of the month it passes behind it and maybe becomes a spectacular day time comet for a few days in early December before returning to the morning skies. It is very likely that this comet has never visited the inner solar system before so what will happen when it gets close to the Sun is educated guess work. It may prove to be anything from a complete flop to a great comet. It may even break up potentially giving us a spectacular fireworks show with sky full of smaller comets. We will just have to watch and wait.

Deep Sky

Stock 2 Open Cluster
RA 2h 15m Dec 59° 20' mag 4.4

From the double cluster follow the curved chain of stars toward Cassiopeia; for about 2.5°, about half a 10x50 binocular field. To the left is a group of stars making a rather crooked H shape, sometimes called the strongman cluster. This is Stock 2, another open cluster that needs low magnification, this is a rather sparse cluster about 1 degree in diameter. A telescope shows chains of stars and dark areas in the cluster.

M103 Open Cluster
RA 1h 34m Dec 60° 42' mag 7.0

A celestial Christmas tree. This is a young cluster with many bright blue members, the brightest of which forms the star on top of the tree. It is a colourful cluster with a number of orange and yellow stars that make up the effect of Christmas tree lights. M103 is the last entry of Messier's catalogue; the remaining objects were added after his death based on his unpublished work.

M74 The Phantom Galaxy
RA 1h 37m Dec 15° 50' mag 9.1

This low surface brightness face on spiral galaxy is probably the most challenging of all the Messier objects. With a large aperture telescope and dark skies detail can be glimpsed in the spiral arms.

Peter Burgess

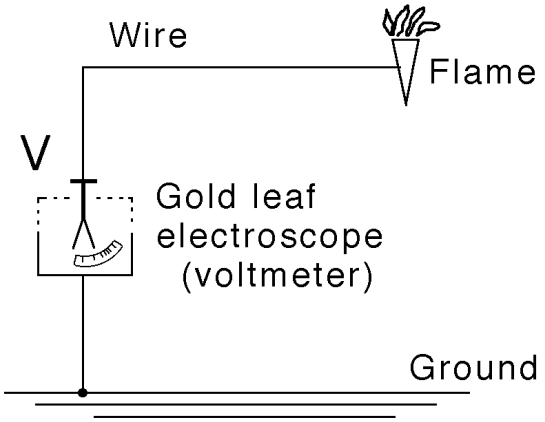
Atmospheric Electricity and High Energy Particles

Lecture Report 27 September 2013

Professor Giles Harrison

Department of Meteorology - University of Reading

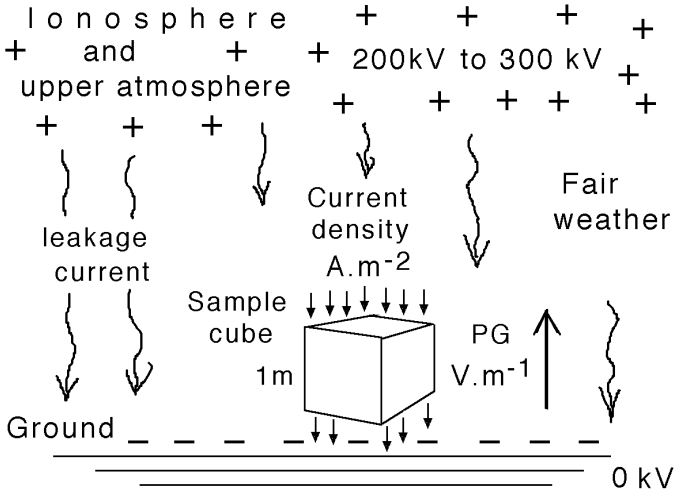
The speaker provided us with excellent coverage of a basic subject which, for more than two centuries, has attracted the attention of some of the world's greatest physicists, such as Coulomb and Kelvin. Amongst the many pictures shown were early examples of handwritten laboratory notes and letters, and a movie of sprites - upward lightning strikes - which early scientists had anticipated. By following the history - the voyages of the Carnegie*, the utilization of the gold-leaf electroscope, the collation of thunderstorm data - one becomes familiar with the fundamentals of global electricity and how the global circuit was discovered. This is now a modern subject essential to climate physics; the many years of data represents another method of gaining knowledge about our planet. The world's thunderstorm activity can be monitored at points around the globe, rather like the pulse of a human can be measured at various points in the body. To understand all the data requires understanding physical mechanisms - the influence of solar magnetic activity upon cosmic particle flux; the differences between land and ocean upon ionisation; the effects of radon, smoke and aerosols; volcanic electrification; ionic mobilities; the transport of fair weather electric current through the vast areas of global layer clouds, and the albedo of planets and their atmospheres changing with solar activity. All this points to the necessity for ongoing research, essential to understand the Earth's climate.*



Sketch 1

Fair weather electricity. Thunderstorms have naturally received much attention, beginning with the dangerous experiment of **Benjamin Franklin** (1706-1790), killing several people trying to repeat it, flying a kite into a thundercloud in 1752 and drawing sparks. This proved that clouds contained the same stuff stored in Leyden jars - foil on the inside and outside of a bottle making a capacitor. These can be charged by frictional electricity, such as ebonite rubbed on fur, or charge-separating machines like the Wimshurst. Keen observers such as **L.G Lemonnier** also noticed that dust was attracted to wires even in **fair weather**, so the atmosphere appeared slightly electrified. Primitive apparatus, see *Sketch 1* where a flame gives ions communicating better with the air - gives a voltage, even in fair weather, 100 volts or so for a wire one metre from the ground, measurable with a gold leaf electroscope. These instruments have a leakage resistance of billions of ohms and can be precharged with calibrated voltages and touched onto an insulated conductor - if the leaf separation is unchanged then the same voltage exists on the insulated conductor. Leaf divergence can also be read against a (non-linear) scale, from tens of volts to several kV.

'Fair weather' is now a scientific term referring to calm conditions, when none of the charge separation associated with convection inside thunder clouds is occurring nearby. Driven by solar power, thunder clouds are the atmospheric batteries of the planet, causing the ionosphere, the 'Kennelly Heaviside' layer, to rise in potential to 200kV to 300kV, dependent upon global thunderstorm activity. The ionosphere is such a good conductor, it behaves as the outer plate of a spherical capacitor, setting up a locally vertical potential gradient over the entire Earth. It causes a downward leakage current of about 2 pA/m^2 over fair weather regions, amounting to a total of some 1000 amps globally.



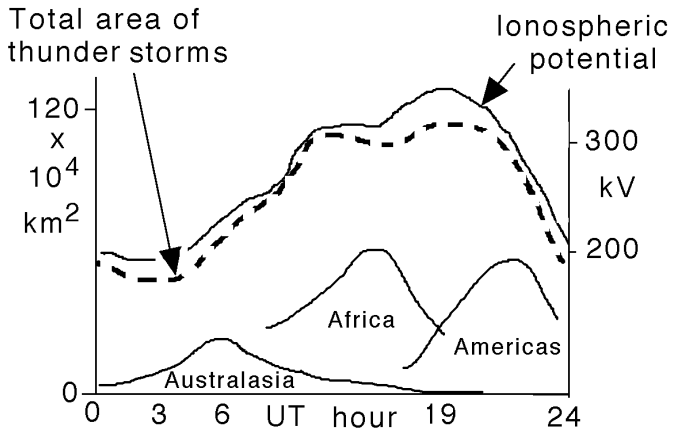
Sketch 2 Thunderstorm return circuit

Air conduction was recognized in 1784 by **Charles Coulomb**, (1736-1806). Gases, once thought to be perfect insulators, contain ions, giving air a slight conductivity. The electric field in *Sketch 2* is downward, but the **potential gradient (PG)** is positive, measured upwards, but it can become negative when it rains. Underneath disturbed clouds, the PG increases to tens of kV/m.

Lord Kelvin (William Thomson 1824-1907) experimented with measuring the PG at Kew, using water drops and photography to make a recording apparatus, which was installed in 1861.

The source of the ions was puzzling and not, at first, believed. Radioactive minerals, like pitchblende, could discharge electroscopes, so ionization of the air was thought to be caused by terrestrial radioactivity - some of it is, including by radon gas, but V.F.Hess (1883 -1964) found that whilst ionization decreased up to a height of 300m getting further away from the soil, it then increased when ascending the Eiffel tower, further increasing when measured from a balloon. The total eclipse of April 12, 1912, was not accompanied by a decrease in ionization, so the rays weren't coming from the Sun, but the idea that the rays came from space was slow to be accepted. Eventually they were called 'cosmic' by Millikan in 1925. In this room, ions are made at the rate of about two per cc per second.

Meanwhile the ***Carnegie*****,** built of wood to enable magnetic studies, set out on several voyages 1915-1929 and measured the PG over the oceans. Extraordinarily, over years of measurements, it was found that the daily variation of PG relates to universal time, not to local time, peaking near 1900 UT with a minimum at 0300 UT. As it happens, the signal from over the sea is less affected by terrestrial effects, and the data obtained, relating to global effects, came to be known as **"The Carnegie Curve"**.



Sketch 3

Charles Thomas Rees 'CTR' Wilson (1869-1959) inventor of the Cloud Chamber, recognized a vertical electric current in fair weather and that there must be a global circuit driven by thunderstorms. The Carnegie Curve was found in the 1930s to correlate with global thunderstorm activity, mostly occurring in the regions of South America, Central Africa and Australasia, see the very approximate *Sketch 3*. Here the ionospheric potential is sketched which relates closely to the averaged PG (which varies locally - it can be plotted as percentage variations of the local mean value to reveal the global effect.)

In the real atmosphere, clouds are not formed *directly* because of ions. People often mistakenly believe that the atmosphere behaves just like the gas in a Wilson cloud chamber, but the gas in this apparatus contains 400 times more water than the real atmosphere, so the formation of water droplets directly attributable to ions is a tiny effect - or else the atmosphere might always be overcast? Much research in this area is reported in the references, such as the CERN cloud experiment (arXiv: 0104048 physics.ao-ph) and other papers.

The increasing ionization of air with height, makes the upper atmosphere an increasingly better conductor, so for a given downward electric leakage current, the PG *decreases* with height. The several hundred kV of the upper atmosphere is soon achieved well below the height of the ionosphere. It is measured by balloon, integrating the PG during ascent. Clean air is a *better* conductor than dirty or foggy air, because dirt particles and water droplets mop up the ions responsible for making air electrically conductive.

At any given time there are 1000 to 2000 thunderstorms on the Earth, each leaking about 1 amp into the ionosphere which becomes positively charged, and the Earth's surface, negatively charged. The return path consists of the very small picoamps per square metre leaking back to ground over the vast fair-weather regions.

Measurements. The **Wilson method** of measuring **current density** uses an insulated collecting plate of known capacitance connected to an electroscope; the rate of rise of voltage gives the current incident on the plate - divide this by its area to get the current density. Such apparatus was used from 1909 to 1979.

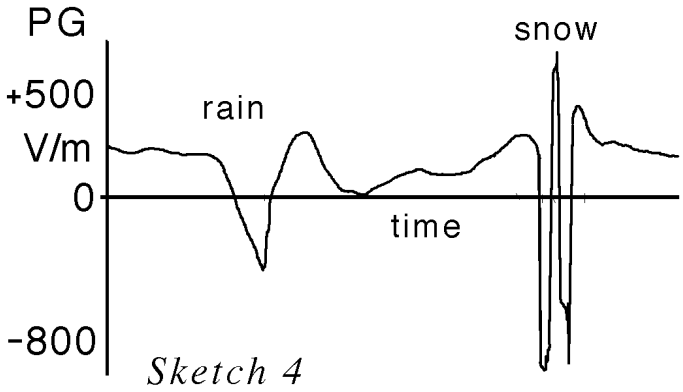
The **field mill** for measuring **PG**, has an outer earthed stator containing blades and spaces matching the blades and spaces of a rotor beneath. As the insulated rotor rotates, it acquires a fluctuating voltage due to the rapid alternate influences of the external PG and the earth potential on the stator blades – this is amplified and calibrated to give PG.

Atmospheric conductivity can be measured by sample air aspirated between insulated concentric tubes, and measuring the very small current passing from the inner tube to the instrument walls, in **Gerdien Tube** apparatus.

See the references for other apparatus and details. Spider webs are a common problem necessitating their frequent removal.

Layer Clouds. The fair weather downward leakage current of picoamps per square metre has to pass through layer clouds, covering some 40% of the planet. This means that the voltage across the clouds increases, accompanied, in theory by increased positive charge on the top and negative charge underneath. Balloons have been launched and this charge is measurable, aircraft have detected increased charge densities around the edges of layer clouds too. The fair weather current is the most closely related observable parameter to global thunderstorm activity, the

PG is more variable locally, *Sketch 4*, and was affected by nuclear weapons testing in the 1950s and 1960s.



Cosmic rays. Cosmic ray information and climate data goes back a long time, being retrievable from ice cores going back a million years. The cosmic rays make carbon-14 in the atmosphere, detectable in the layers of the ice-cores, and the cosmic rays are strongest when solar activity is weakest. The Earth has had thunderstorms going back millions of years too, seen in fulgurites - tubes of vitreous silica formed by lightning strikes into sand, and preserved in sandstone - particularly seen on **Arran Isle**, to as far back as when the island was once on the Equator. Solar modulation of low energy cosmic rays is apparent in data collected from 1955 to 2013, the cosmic rays have 11-year cycles, with peaked and flat maxima alternating, spanning 22 years. The Sun modulates low energy cosmic rays by 10% to 15%, high energy rays are less affected. Neutron detectors monitor galactic cosmic rays, and they influence our environment right down to the Earth's surface.

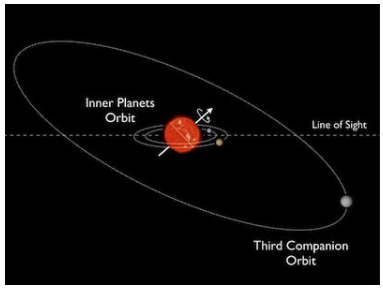
Some references (the following are obtainable in full on Google Scholar, enter title, author, year)

- "The Carnegie Curve" RG Harrison, *Surv. Geophys*. 2013.
- **"**Empirical Evidence for a nonlinear effect of galactic cosmic rays on clouds" RG Harrison, DB Stevenson, *Proc. R. Soc. A*, 2006.
- "The global atmospheric electrical circuit and climate" RG Harrison, *Surv. Geophys*. 2005
- "Self-charging of the Eyjafjallajökull volcanic ash plume" RG Harrison et al. *Environ. Res. Lett*. 2010.
- "Meteorological effects of the eclipse of 11 August 1999 in cloudy and clear conditions" KL Aplin, RG Harrison, *Proc. Roy. Soc. A*, 2002.
- "Cosmic Rays, Clouds, and Climate" KS Carslaw, RG Harrison, J Kirby, *Science*, 2002.
- "Are cold winters in Europe associated with low solar activity?" M Lockwood, RG Harrison et al, *Environ.Res. Lett*, 2010.
- www.solarham.net/plane.htm

Dr. Guy Moore

A Giant Misalignment in a Multi-Planet System

NASA PRESS RELEASE
Posted: 22 October 2013



A long-standing puzzle in the study of exoplanets is the formation of hot Jupiters, gas giant planets that snugly orbit their host star. To explain their short orbital periods, theory suggests that hot Jupiters form in long orbits and then quiescently migrate through the protoplanetary disc, the flat ring of dust and debris that circles a newly fashioned star and coalesces to form the planets.

This theory was challenged when the orbital plane of hot Jupiters were discovered to be frequently misaligned with the equator of their host stars. Scientists interpreted this as evidence that hot Jupiters are the result of chaotic close encounters with other planets.

A decisive test between the two theories are systems with more than one planet: if misalignments are indeed caused by dynamical perturbations which lead to the creation of hot Jupiters, then multi-planet systems without hot Jupiters should be preferentially aligned. What new research reveals is quite different.

Using data from the NASA's Kepler space telescope, an international research team led by Daniel Huber, a NASA Postdoctoral Program fellow at NASA's Ames Research Center in Moffett Field, Calif., studied Kepler-56, a red giant star four times larger than the sun located at a distance of approximately 3,000 light years from Earth. By analysing the fluctuations in brightness at different points on the surface of Kepler-56, Huber and his collaborators discovered that the star's rotation axis is tilted by about 45 degrees to our line of sight.

"This was a surprise because we already knew about the existence of two planets transiting in front of Kepler-56. This suggested that the host star must be misaligned with the orbits of both planets," explains Huber. "What we found is quite literally a giant misalignment in an exoplanet system."

The culprit for the misalignment is suspected to be a third, massive companion in a long period orbit, revealed by observations obtained with the Keck telescope on Mauna Kea, Hawaii.

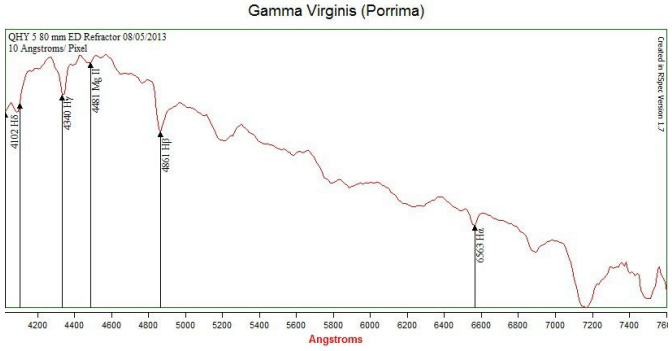
More at: ***http://www.astronomynow.com/***

Spectroscopy - Part 1

Spectroscopy enables us to gain an insight into the processes taking place in stellar atmospheres and discover more about the composition of the stars. Many of the discoveries about the Universe from the radial velocity of a star to an estimate of the Hubble parameter have been determined spectroscopically. The history of spectroscopy is interesting and if interested a book that. I recommend is "Spectroscopy the Key to the Stars" by Keith Robinson, which contains a chapter covering experiments by Newton right up to the most recent developments.

Last year my Wife bought me a Paton Hawksley Star Analyser for my Birthday. This little device is a 1.25" circular grating that fits on to the nosepiece of a camera or eyepiece. When attached to a DSLR or CCD camera it is possible to record the low-resolution spectrum of a star or planet.

I have been practicing with the Star Analyser for over a year now and have achieved some results that I am satisfied with so I thought I would share a couple of projects that may be of interest. It must be emphasized that the spectra presented in this article are low resolution and this article covers the basic details of what I have done. If you would like to try using the Star Analyser for yourself then please contact me.

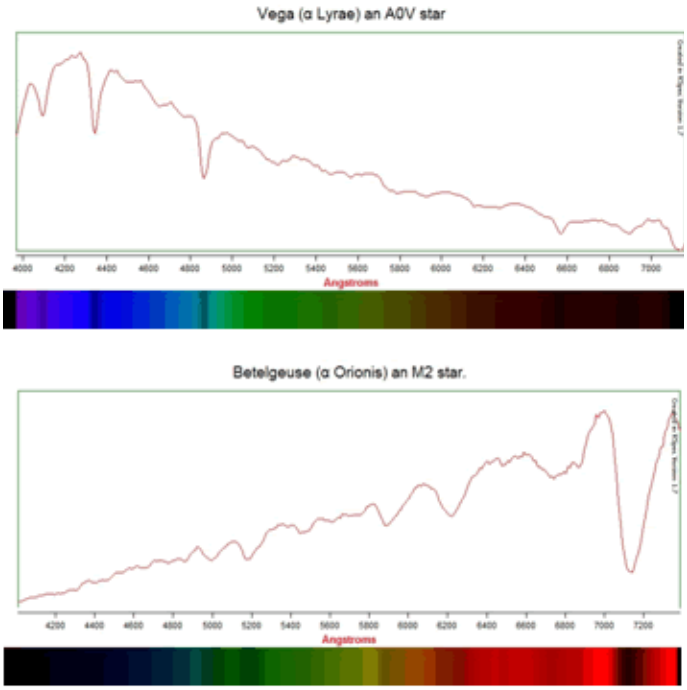


The Hydrogen Balmer series in Gamma Virginis an F0 V star

There are several books aimed towards amateur spectroscopy and I have included a brief reading list at the end of the article. Astronomical libraries contain many texts about spectroscopy and the many specialisms within the discipline however the listed books are excellent starting points.

There is a comparatively small but growing group of amateur spectroscopists worldwide but as higher end equipment costs are slowly coming down it is making spectroscopy accessible to more enthusiasts.

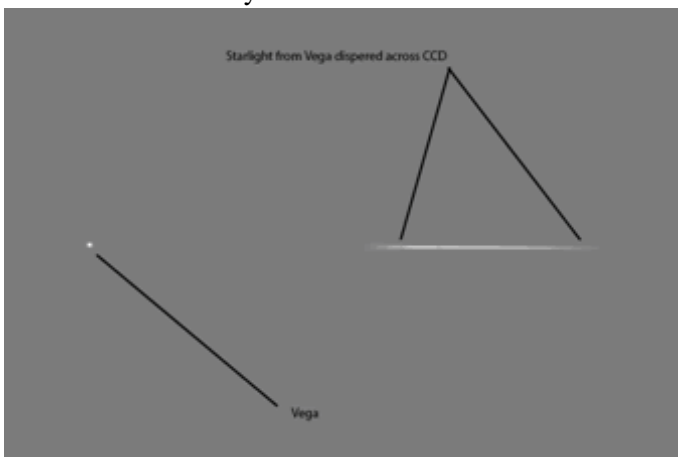
At present, the majority of amateur spectroscopists are based in Europe. Experienced observers regularly contribute to pro-am campaigns and encourage others to do so. The monitoring of Be stars and the BeSS database is one such project containing a library of spectra from Be stars that has been compiled by professional and amateur contributors.



Spectrum of Vega with the hydrogen Balmer lines visible and Betelgeuse. Note also how the graph peaks toward the UV end of the optical spectrum in Vega but towards the red end in the spectrum of Betelgeuse.

Whilst the low resolution of the Star Analyser makes it difficult to contribute to such projects it is entirely possible to discover the elements in an object, estimate the temperature of a star and determine the spectral classification of the star.

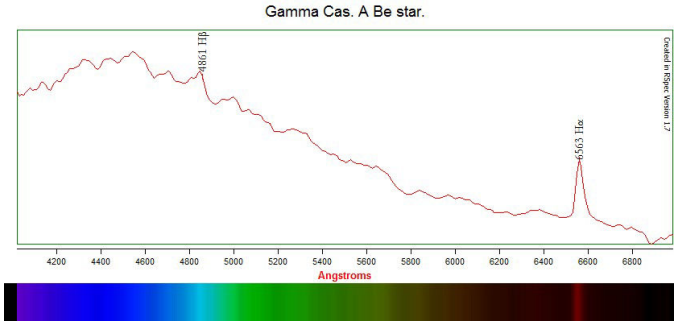
At modest cost compared to high-resolution spectroscopes, the Star Analyser presents an ideal entry level opportunity to discover more about this exciting area of amateur astronomy.



An image of Vega captured using the Star Analyser. Note how the spectrum runs horizontally across the screen. It is important that the spectrum runs as straight as possible to reduce artefacts.

What is the Star Analyser

The Star Analyser is essentially a blazed grating that disperses the light from the star across a CCD chip. When attached to the camera, the distance of the Star Analyser from the chip is fundamental in determining the dispersion of the spectrum across the camera sensor. On a computer screen the star (also called the zero order) will be visible along with the spectrum. Depending on the star being viewed it will be possible to see the absorption or emission features on the screen. Although it might be tempting to consider the maximum dispersion possible, this does not produce the best results and makes imaging harder. For my own work I have found a dispersion of around 10 angstroms/ pixel works best allowing key features to be seen in the spectrum.



Spectrum of Gamma Cassiopeia. Note the prominent H-alpha emission line. This caused by the rapid rotation of the star creating an equatorial bulge and releasing matter in a circumstellar disc.

Equipment and software

My own telescope is relatively humble and hopefully will demonstrate that this kind of astronomy is really available to all. All my spectra were acquired using an ED 80 mm telescope with a QHY 5 camera. My mount is a HEQ5 pro mount and is controlled using Maxim DL which works perfectly. I can take unguided exposures of about 2 minutes and this has been sufficient for the work I have done so far.

There are several software packages that are available with many advanced features that are free to use. Indeed many of the features of these packages are beyond the scope of the Star Analyser resolution. Of these, Vspec is excellent freeware with a superb technical manual that will guide you through the various steps in processing your spectra. Alternatively there is Audela and the BASS (Basic Astronomical Spectroscopy Software) project which are both also free. There are also several Yahoo groups dedicated to certain software packages and indeed to the Star Analyser with contributors trying to getting the best from their equipment and share their results.

I use a software package called Rspec. It is not free (£99.00) but is intuitive and has excellent video tutorials. It is great for beginners as calibration of spectra is easy and output is excellent. All the spectrums in this article are created using Rspec. The programs creator, Tom Field, is also an active contributor to the spectroscopy forums and regularly updates the software. Demos are available which I recommend and Tom will happily extend the demo period if more time is needed.

Bright spectral class A stars such as Vega and Sirius are excellent targets with the Balmer lines readily visible in well focused images. Once acquired the spectrum must be accurately calibrated to ensure accurate identification of features and to determine the shape of the continuum. A particular feature that I like in Rspec is the one point calibration option. Once a star such as Vega is successfully calibrated, the software retains the dispersion of the spectrum. When you have captured images of your target star all that is required is to highlight the zero order and the program will do the rest. This is invaluable when imaging the fainter targets where features or the spectral class of the star prove difficult to determine.

Steve Dean

Part 2 will be included next month

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

Astronomers Discover the Most Distant Known Galaxy:

Galaxy Seen as It Was Just 700 Million Years After Big Bang

Oct. 23, 2013 — University of California, Riverside astronomers Bahram Mobasher and Naveen Reddy are members of a team that has discovered the most distant galaxy ever found. The galaxy is seen as it was just 700 million years after the Big Bang, when the universe was only about 5 percent of its current age of 13.8 billion years.

Results appears in the Oct. 24 issue of the journal Nature.

In collaboration with astronomers at the University of Texas at Austin, Texas A & M University, and the National Optical Astronomy Observatories, Mobasher and Reddy identified a very distant galaxy candidate using deep optical and infrared images taken by the Hubble Space Telescope. Follow-up observations of this galaxy by the Keck Telescope in Hawaii confirmed its distance.

In searching for distant galaxies, the team selected several candidates, based on their colors, from the approximately 100,000 galaxies identified in the Hubble Space Telescope images taken as a part of the CANDELS survey, the largest project ever performed by the Hubble Space Telescope, with a total allocated time of roughly 900 hours. However, using colors to sort galaxies is tricky because some nearby objects can masquerade as distant galaxies.

More at: ***http://www.sciencedaily.com/releases/2013/10/131023131800.htm***

Managing the Deluge of 'Big Data' from Space

Oct. 21, 2013 — For NASA and its dozens of missions, data pour in every day like rushing rivers. Spacecraft monitor everything from our home planet to faraway galaxies, beaming back images and information to Earth. All those digital records need to be stored, indexed and processed so that spacecraft engineers, scientists and people across the globe can use the data to understand Earth and the universe beyond.

At NASA's Jet Propulsion Laboratory in Pasadena, Calif., mission planners and software engineers are coming up with new strategies for managing the ever-increasing flow of such large and complex data streams, referred to in the information technology community as "big data."

How big is big data? For NASA missions, hundreds of terabytes are gathered every hour. Just one terabyte is equivalent to the information printed on 50,000 trees worth of paper.

"Scientists use big data for everything from predicting weather on Earth to monitoring ice caps on Mars to searching for distant galaxies," said Eric De Jong of JPL, principal investigator for NASA's Solar System Visualization project, which converts NASA mission science into visualization products that researchers can use. "We are the keepers of the data, and the users are the astronomers and scientists who need images, mosaics, maps and movies to find patterns and verify theories."

More at: ***http://www.sciencedaily.com/releases/2013/10/131021102842.htm***

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 needs letters, articles or pictures related to all aspects of astronomy. Contributions to the Editor please at the email or postal address on the front page.

"I have heard by round about channel that Herschel says my book 'is the law of higgledy-pigglety'"
Charles Darwin

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

"In real life, there is no such thing as algebra"
Fran Lebowitz

"The important thing to remember about mathematics is not to be frightened"
Richard Dawkins

"Maybe this world is another planet's Hell"
Aldous Huxley