

Society News

It's been a Very Busy Month

Quite a few visits last month: two cub packs, two groups from the Women's Institute, a group of undergraduates and finally Bestival. We also have a few more in October as you can see from "Observatory Visits Booked" on page 2.

These visits help raise funds for VAS and are becoming increasingly important in our efforts to keep costs down. If you can help with future events, please get in touch as an extra pair of hands is often very useful.

The seemingly never ending tourist season this year, on top of all these visits mean NZ is smaller this month - *sorry, but I just haven't had much free time ;)*

Telescope Training

Martyn Weaver has volunteered to help train members in the use of the observatory's Meade LX200. We are making arrangements to restart Monday training sessions at the moment and will publish details next month.

Astro-Photography

Simon Plumley has volunteered to join the VAS Committee as Astro-Photography Organizer and is working hard to finalise a training syllabus for the recently purchased refractor (and associated equipment). We hope to publish a training schedule next month.

New Committee

As those who attended last month's AGM will know, the VAS Committee remains basically unchanged and I'd like to thank all those who help keep the Society running.

Early Warning

Some of us need a rest next year and I'd really like to have some members ready to take over next August.

Please consider helping and get in touch with any Committee Member if you are willing to help.

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

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Observatory Diary

| | |
|-----------------------|---|
| Monday, 19.30hrs | Members Only by arrangement Telescope and night sky training. New arrangements are underway |
| Thursday, 19.30hrs | Members and Public. Informal meeting and observing |

Contents this Month

| | |
|---|---|
| <i>Society News</i> | 1 |
| <i>October 2015 Sky Map</i> | 3 |
| <i>October 2015 Night Sky</i> | 4 |
| <i>IET - WiFi Security Workshop</i> | 5 |
| <i>Winchester Science Centre</i> | 5 |
| <i>Field Curvature</i> | 6 |
| <i>Committee post available</i> | 7 |
| <i>The Back Page</i> | 8 |

2015

| Date | Subject | Speaker |
|--------|--|----------------------|
| 25 Sep | Photographing the Aurora | Elizabeth Cunningham |
| 23 Oct | TBA | TBA |
| 27 Nov | <i>Medley of talks & discussion:</i> <ul style="list-style-type: none"> • Goldilocks Planets • OBAFGKM (The development of Star Classification). • Night Vision • Arcturus | James Fradgley |

Please check wightastronomy.org/meetings/ for the latest information

2016

| | | |
|--------|--|--------------------|
| 22 Jan | TBA | TBA |
| 26 Feb | Basket Balls and Beyond <i>Bring a Friend</i> | Jane A Green |
| 25 Mar | Death From Space | Ninian Boyle |
| 22 Apr | Astronomy on the Tablet | Dr Lilian Hobbs |
| 27 May | Meteors | Richard Kacerek |
| 24 Jun | ESA EUCLID Mission Latest Update | Dr Tom Kitching |
| 22 Jul | TBA | TBA |
| 26 Aug | William Herschel and the Rings of Uranus | Dr Stuart Eves |
| 23 Sep | Galaxy Formation | Prof Chris Lintott |
| 28 Oct | TBA | TBA |
| 25 Nov | TBA | TBA |

Observatory Visits Booked

Wed 7th Oct - Newchurch Scouts
Wed 14th Oct Newchurch Cubs
Mon 19th Oct Newchurch Beavers

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

**VAS Contacts
2014/15**

| | |
|-----------------------------|--|
| President | Barry Bates president@wightastronomy.org |
| Chairman | Bryn Davis chairman@wightastronomy.org |
| Secretary | Vacancy secretary@wightastronomy.org |
| Treasurer | David Kitching treasurer@wightastronomy.org |
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| Membership Secretary | Norman Osborn members@wightastronomy.org |
| NZ Distribution | Brian Bond distribution@wightastronomy.org |
| Others | Mark Williams & Nigel Lee |

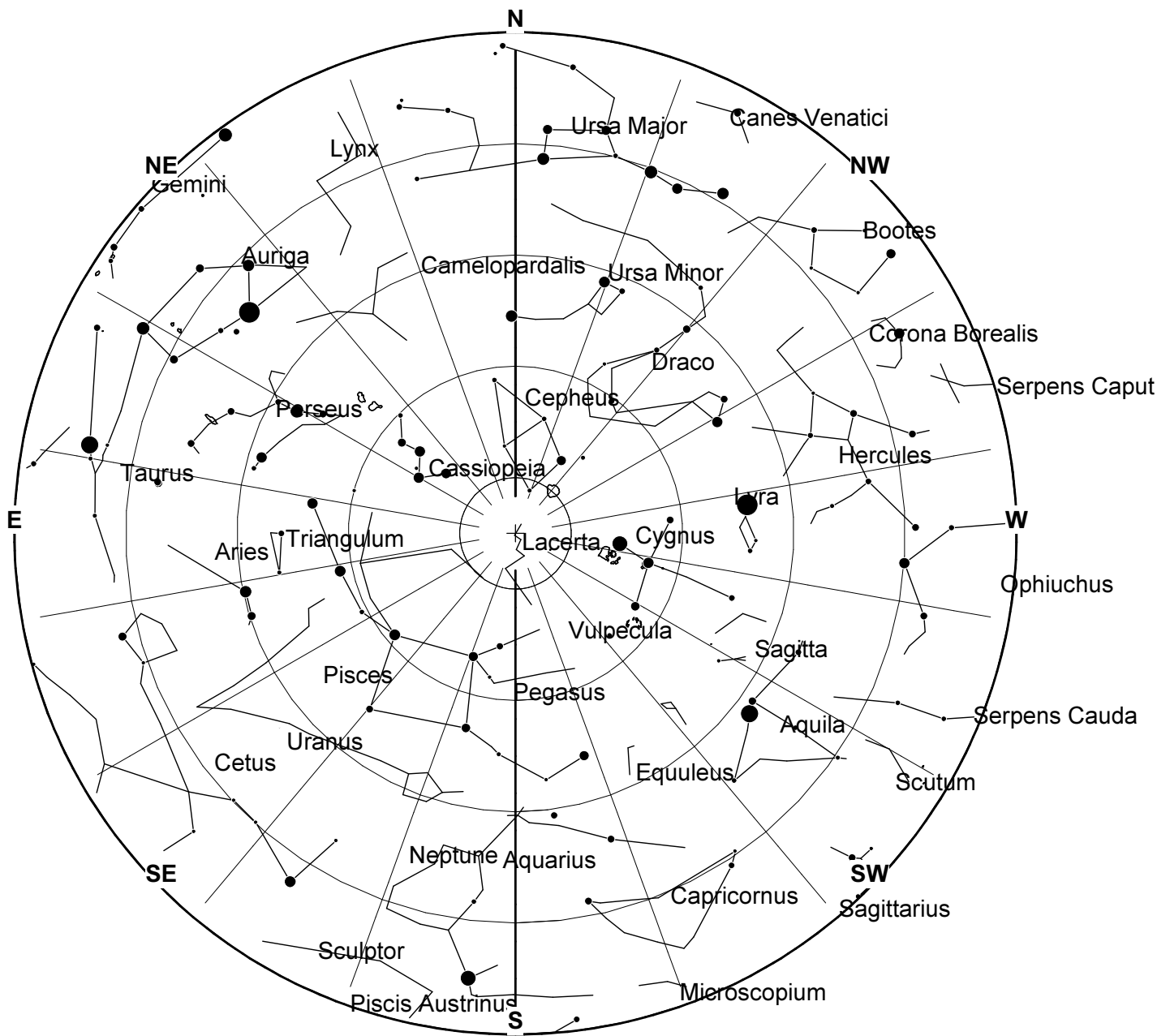
Important

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**.

October 2015 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 October 2015







Stephan's Quintet in the constellation Pegasus is a visual grouping of five galaxies of which four form the first compact galaxy group ever discovered. The group was discovered by Édouard Stephan in 1877 at Marseille Observatory.

The group is the most studied of all the compact galaxy groups. The brightest member of the visual grouping is NGC 7320 that is shown to have extensive H II regions, identified as red blobs, where active star formation is occurring

This article is licensed under the [GNU Free Documentation License](#). It uses material from the Wikipedia article "Stephan's Quintet".

October 2015 Night Sky

Moon Phases

| New | First Qtr | Full | Last Qtr |
|---|---|---|---|
|  |  |  |  |
| 13th | 20th | 27th | 4th |

Planets

Mercury

Mercury makes a good morning apparition this month. From about the 8th onwards follow the line through the much brighter Venus and Jupiter towards the horizon; you should encounter Mercury low down on the horizon. On the 11th the crescent moon is $2\frac{1}{2}^\circ$ to the right and a little above. Even though Mercury can be quite bright so is the sky making it sometimes difficult to spot. Use a pair of binoculars to help the planet stand out from the sky.

| Mercury Azimuth & Altitude at 7am | | | | | |
|-----------------------------------|-----|-----|------|-----|-----|
| Date | Az | Alt | Date | Az | Alt |
| 8th | 101 | 9 | 20th | 105 | 10 |
| 12th | 103 | 11 | 24th | 105 | 7 |
| 16th | 104 | 11 | 28th | 105 | 4 |

Venus

Just after 4am Venus can be seen rising in the pre dawn sky. It is bright enough to have a distinctly ruddy hue as it lifts clear of the horizon. On the 9th it passes close to Regulus, the brightest star in Leo. On the 26 it is in close conjunction with the bright but noticeably fainter Jupiter, passing just under 1° below.

On clear mornings Venus can be followed as it rises in the sky well after sunrise.

Mars

Use the much brighter Venus and Jupiter to find the small red planet. The month begins with Mars almost midway between the two, a little closer to Jupiter. As the days pass Mars moves closer to Jupiter with the pair in close conjunction on the 18th. After this time Venus is closest and in turn has a close conjunction on the 3rd of November.

Jupiter

Together with Venus and Mars can be seen in the east before sunrise and has a close conjunction with each one during the month.

Saturn

Saturn may be glimpsed very low down towards the south western horizon for about an hour or so after sunset.

It is so low down that the atmospheric turbulence will make observation virtually impossible. The thin crescent moon lies just above on the 16th.

Uranus

Uranus can be found in the constellation of Pisces using a pair of binoculars. It is between on slightly below the stars Zeta and Epsilon Piscium.

Neptune

Look about 2° from Sigma Aquarii towards Lambda Aquarii, Neptune is magnitude 7.8 so a pair of binoculars will be needed to spot this planet.

Deep Sky

NGC7331 Galaxy

RA 22h 37m Dec 34° 24' mag 9.5

This magnitude 9.5 galaxy is like a miniature version of the nearby Andromeda Nebula, an almost edge on spiral galaxy that is adjacent to a galaxy group called Stephan's quintet. These other members of the group are a challenge for small telescopes being just a faint haze in smaller apertures. A good CCD target.

NGC7000 North America Nebula

RA 20h 59m Dec 44° 28' mag 4.0

Located 3° to the east of Deneb in Cygnus is this large misty patch in the Milky Way that can be seen with the naked eye. Unless the sky is very dark this nebulosity is the light from the myriad of background stars, if conditions are suitable the darker rift of the 'Gulf of Mexico' can be visualised. Large aperture binoculars or a rich field telescope will help reveal the nebulosity. Most of the light emitted is the deep red of hydrogen alpha, to which our eyes lack sensitivity. A nebula filter can help to increase the contrast with the background sky glow. This is a rewarding area for long exposure photography.

NGC6946 Galaxy

RA 20h 35m Dec 60° 11' mag 9.7

Located just off the plane of the Milky Way, the intervening material in our own galaxy helps makes this face on spiral galaxy represents a rather challenging object. At a distance of about 10M light years it is relatively close by galactic standards, but this does not make it any easier to see. Use as large an instrument as you can on this galaxy to reveal the structure in the spiral arms. This galaxy has hosted 8 supernovae in the past 90 years, something of a record. After observing this galaxy or if the sky or your eyes fail you with this target, stop by at the nearby open cluster NGC6939. At low power both object will be in the same field of view

Peter Burgess

Advertising in NZ

If you would like to advertise in New Zenith, you can have a space like this for £50 per year

Only four slots are available

Artwork can be created or you can supply it.

Don't forget that member's who take the electronic version see a full colour version

Contact the Editor for information

Details on the Front Page

IET - WiFi Security Workshop

An interactive workshop will demonstrate the security and vulnerabilities of modern wireless networks. Attendees will discover how quickly and easily an attacker can break into their home wireless networks and learn how to better protect themselves against such activities. This workshop will cover the 802.11 standard, MAC filtering and WEP & WPA2 encryption.

Attendees will require a Windows or Linux laptop with DVD drive and WiFi capabilities. No other equipment is required.

For more details, see:

<http://www.theiet.org/events/local/225028.cfm>

Astronomers aren't anti-light

We just want:

The right light, in the right place, at the right time

Winchester Science Centre

Following a visit to the Winchester Science Centre, Wednesday last week, members might be interested to know that adult afternoon/evening lectures relating to space, followed by a short planetarium show, are held in the centre's planetarium every month. Additionally the centre houses a broad range of thought provoking, science based, interactive exhibits that are intended for children of school age explore. *Note: Entry to the lectures/centre is not free.*

Interestingly the planetarium dome measures 65ft diameter and can be seen on Google Earth at SO21 1HZ.

Website: <http://www.winchestersciencecentre.org/>

A programme of afternoon/evening lectures can be seen at: <http://www.winchestersciencecentre.org/visitor-information/whats-on/space-lectures/#.Vfu6AZejvao>

The lecture attended on Wednesday afternoon, entitled "Seeing the Invisible: the dark side of the Universe", was presented by Dr Catherine Heymens from Edinburgh University. The presentation was exceptionally good and addressed the background of dark matter and dark energy.

At the end of the lecture Dr Heymens provided information regarding an Internet based astronomical course that might be interesting to VAS members.

The course, which is being organised by Edinburgh University, is entitled "Astrotech: The Science and Technology behind Astronomical Discovery". Course syllabus is at: <https://www.coursera.org/course/astrotech>

It is believed that the course is free and commences early 2016 but requires investigation, especially as very little these days is for free. Further enquiries regarding the course will be made and passed to members when the details are known.

Another website, that members might find interesting, advertises short courses by various universities and includes science, maths and technology: <https://www.futurelearn.com/courses/categories/science-maths-and-technology>

Two courses that relate to astronomy are:

<https://www.futurelearn.com/courses/gravity>

<https://www.futurelearn.com/courses/orion>

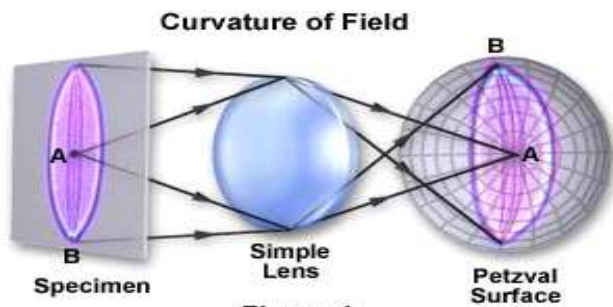
Courses advertised appear to be short duration, only requiring a few hours per week.

Dudley Johnson

Field Curvature

The last in the series of aberrations is field curvature, or Petzval field curvature, named after the mathematician and physicist Joseph Petzval.

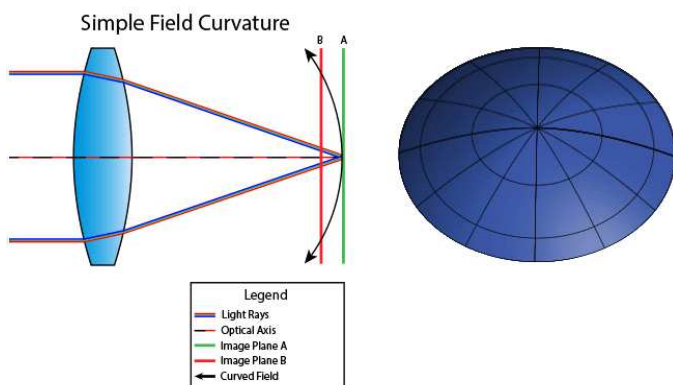
Curvature of field is the natural result of using lenses that have curved surfaces, and is the inability to focus the centre and edges of the field at the same time. When visible light is focused through a curved lens, the image plane produced by the lens will be curved as illustrated in figure 1. Notice that there are two curved planes that have been labelled A and B.



The image can be focused over the range between A and B to produce either a sharp focus on the edges or in the centre. When the image is viewed in eyepieces, it either appears sharp and crisp in the centre or on the edges of the field of view but not both.

It is a common optical problem that causes a flat object to appear sharp only in a certain part(s) of the field, instead of being uniformly sharp across the field. This happens due to the curved nature of optical elements, which project the image in a curved manner, rather than flat, as shown in the below illustration.

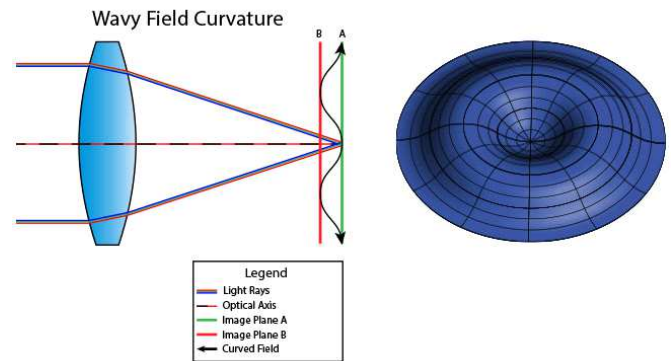
Simple Field Curvature



In a simple field curvature scenario like above, the light rays are perfectly focused in the middle and centre of the field, at the Image Plane A. Since the image is curved, sharpness starts to drop as you move away from the centre, resulting in less resolution towards the edges.

The circular “dome-like” image in three-dimensional form is shown to the right of the illustration. If the edges of the image are brought into focus, which would move the image plane closer (Image Plane B), the edges would appear sharp, whilst the middle and centre would stay less sharp.

Wavy Field Curvature

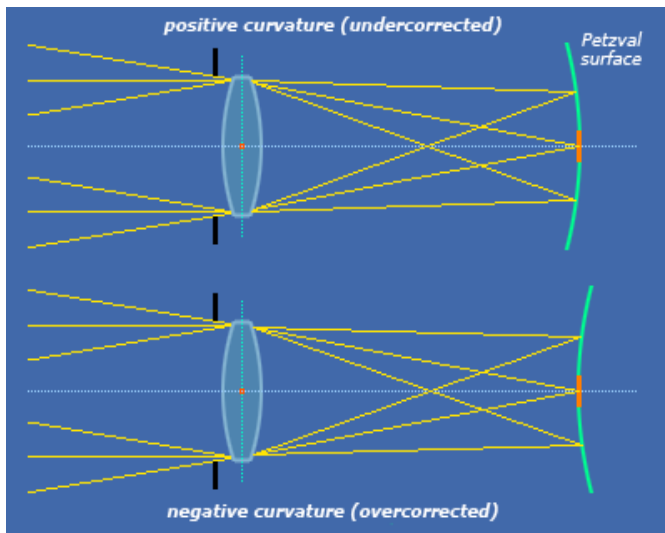


Unfortunately, field curvature is not limited to the “simple” type illustrated above. Most modern lenses incorporate many different optical elements inside lenses, with some optical elements that are specifically placed to reduce the effect of field curvature. As a result, field curvature can appear in different forms, often with “wavy” curvature, as shown below:

Lenses with wavy field curvature can show sharp centre and edge performance, but soft middle performance. If you look at the above illustration, you will see that the shape of the curved image starts out touching Image Plane A in the centre, where it is perfectly in focus. Then the image curves in the middle and comes back again in the edges. Hence, if you focus in the centre, both the centre and the edge would appear sharp, but the middle would appear softer. If you focused in the middle, which is where the Image Plane B is, the middle would appear sharp, while both the centre and the edges would appear softer. This sort of field curvature is a very common occurrence in modern lenses, even expensive professional lenses.

Positive and Negative Field Curvature

Nearly all telescope objectives produce an image with positive curvature, in which the edges of the field are focused at a shorter focal length than the center (the bowl is turned toward the objective and away from the observer). However, in eyepieces, where the focus is at the image plane, negative curvature means the bowl is facing toward the observer. Thus, if the objective has a positive curvature (as most telescope objectives do), and the eyepiece has a negative curvature, then the two focal surfaces will curve in the same direction, significantly near the edge of the field, especially in low power eyepieces or low focal ratio objectives.



Field curvature can be reduced by a combination of convex, concave lenses, and meniscus lenses, often in doublets or triplets. Stopping down the aperture also reduces field curvature. Lenses are often designed so aberrations, particularly field curvature, are corrected well when the lens is focused at infinity, but less well corrected when the lens is focused on a closer object. The use of a floating element, a lens group that adjusts its position when focusing on closer objects, is sometimes used in better lenses to keep the aberrations corrected when the lens is focusing on close objects.

Almost all astronomical objectives and eyepieces present some combination of curvature of field, astigmatism, coma, chromatic aberration or distortion, especially wide field optics. Designing lenses with no aberration is really an impossible proposal. Correcting one type of aberration may worsen another, correcting that may require adding more elements, etc. There is no perfect lens; each one has some weakness. And each should be used in a way that minimizes its weaknesses and plays to its strengths.

Elaine Spear

Editor's note: *There is a lot more information about [Joseph Petzval on the Wikipedia site](#).*

Joseph Petzval (1807 - 1891) was a mathematician, inventor, and physicist best known for his work in optics. He was born in the town of Zipser Bela in the Kingdom of Hungary (now Spišská Belá in Slovakia).

Petzval is considered to be one of the main founders of geometrical optics, modern photography and cinematography. Among his inventions are the Petzval portrait lens and opera glasses, both still in common use today. He is also credited with the discovery of the Laplace transform and is also known for his extensive work on aberration in optical systems.

Committee post available

We are in need of a new organiser for our Friday Monthly Meetings

The role involves finding and contacting speakers and arranging for their travel

The 2016 Calendar is almost complete, so the hard part had been done

You would work alongside Elaine Spear, who promotes and advertises the talks. She is currently finding and organising the speakers as well. There is a large database of speakers which Elaine has been creating since 2009

You would not be left on your own to do this job, and would work in partnership with Elaine

Contact Elaine if you are willing and able to get involved or would like more information

elainespear1@gmail.com
07970 965105

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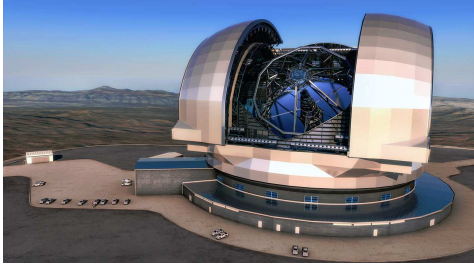
ETX 's & various scopes

**Call Paul England, VAS member
on 07771550893**

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

UK scientists seal deal on European Extremely Large Telescope's first-light spectrograph



Perched on top of Cerro Armazones in the Atacama Desert of northern Chile, the E-ELT will have a giant main mirror 39 metres in diameter. It is one of the biggest global science collaborations in history and includes an £88 million investment by the UK government. UK industry has already won over £10 million worth of

contracts from the E-ELT in advance of HARMONI and that figure is expected to at least match the UK government's investment by the time construction is complete.

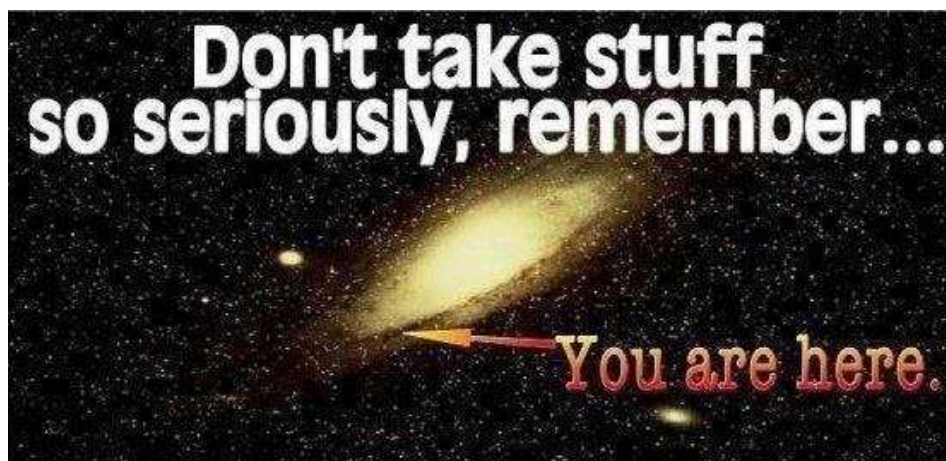
The telescope will enable scientists to see more distant objects than previously possible, allowing them to understand younger structures in our night sky than ever before — helping improve our understanding of the Universe, the effects of dark matter and energy, and planets outside of our solar system.

In its early days, the E-ELT will be equipped with three scientific instruments; two first light instruments, a camera (MICADO) and a spectrograph (HARMONI), followed soon after by the mid-infrared instrument (METIS).

The HARMONI instrument will observe an astronomical object in three dimensions simultaneously, with spatial information in two dimensions and wavelength in the third. It is led by Professor Niranjan Thatte from the University of Oxford in collaboration with the Science and Technology Facilities Council's UK Astronomy Technology Centre, Edinburgh.

"We are privileged to be leading the design and construction of the first spectrograph for the E-ELT," said Professor Thatte. "It will revolutionise observational astronomy through the 2020s and beyond. By studying the light from galaxies, distant and nearby, in great detail, we hope to unravel the physical processes that have shaped the cosmos throughout its history."

More at: <http://www.astronomynow.com>



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.

"Programming today is a race between software engineers striving to build bigger and better idiot-proof programs, and the Universe trying to produce bigger and better idiots. So far, the Universe is winning"

Rick Cook

"I confess I do not know why, but looking at the stars always makes me dream"

Vincent Van Gogh

"After one look at this planet, any visitor from outer space would say 'I want to see the manager'"

William S. Burroughs