

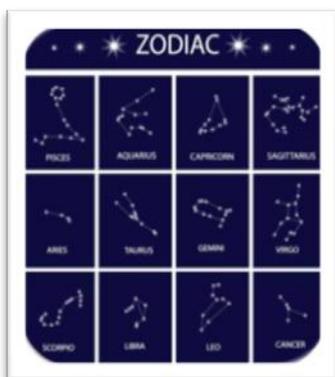
Issue: February 2016



>>> Ayrshire Astronomical Society Newsletter

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DONT MISS....

21st March 2015

Speaker: David Woods

Subject:

Thirteen out of Ten;

A Tribute to Neil Armstrong

and Apollo 11's landing on
the Moon

Next Meeting:

22nd February 2016

**A Series of Short Talks
By
Members**

Following the successful Telescope Night last month, this month, we have short talks on a number of astronomical topics that should attract a wide range of interest. The talks are aimed at introductory level, but of course there will be the opportunity for questions and also to talk to the speaker in detail during the break time and pursue any areas that particularly interest you. Planned talks are as follows but the programme may vary slightly on the night;

- An Introduction to Stellarium (the free and very powerful planetarium program); presented by Graham Longbottom
- An introduction to Autoguiding; presented by Roger Harman
- An introduction to using remote Telescopes; presented by Nick Martin
- Some Novel Approached to Wide Field Photography; presented by Paul Cameron
- Planning a simple observing session; presented by Allan McIntyre

Events :

Bellsbank Primary School, Dalmellington



This month AAS supported the Kilmarnock Science and Engineering Society 2016 Outreach Program by presenting an Astronomy Day to the pupils at Bellsbank Primary School. The day ran from 10am until 3pm and was scheduled to allow all four classes, some 80 pupils in all, to have hands on time with telescopes and to learn about solar observing, the spectrum and astronomy in general. It was a hectic day but the enthusiasm of the pupils was amazing and very rewarding. Thanks to Alex Baillie and John Sharp for their tireless help. Feedback from the school following the event was very positive so it seems that our perception of the pupils interest was well founded.

We will be returning to Bellsbank Primary on the 12th of March again in conjunction with KES to take part in a public open day – **additional helpers will be very welcome please contact Graham if you can come along.**

Upcoming Events:

12 March 2016 Public Outreach with Kilmarnock Engineering and Science Society Bellsbank Dalmellington

23rd April 2016 Eglington Country Park, Irvine with RSPB

8th May 2016 Cars on Campus at St Josephs School Kilmarnock

9 May 2016 Public Event: Transit of Mercury

26 June 2016 Public Event: International Sun Day

TBC June 2016 "Celebrate Ayrshire" at Culzean Castle Country Park

Helpers will be very welcome at any of these events and no experience is necessary

please contact Graham if you can come along.

We are also looking at the potential for undertaking some pop up events as these seem to be a popular method of public outreach. The favourites would be solar events on a sunny day (of course) in a local park, supermarket car park or the like. Evening events could also work well. If you would like to suggest locations/ help / take part speak to any of the committee members (usual suspects).

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Presidents' Word

History is made this month (actually “announced” rather than “made”)



Yes! I did get out in the observatory a couple of nights and look at the heavens but that wasn't it, although on performance to date it should certainly rate! No, the real history is the discovery on the 14th of September at 09:50:45 UT of gravitational waves by the LIGO observatory over in the USA using pair of gigantic instruments in Hanford Washington and Livingston Virginia.

The Laser Interferometer Gravitational- wave Observatory used precise wavelength laser light projected along two L shaped, 4km long interferometers, to detect a minute shift in its wavelength, due to the passage of a gravitational wave, that caused the laser to get out of step and show interference fringes. Transferred to a “sound image”, the interference comes across as a regular “chirp” as the waves passed.

The movement caused by the gravitational wave was so small that the instrument had to be made with the ability to compare the wavelengths in the two arms of the detectors to within 1/10,000 of the width of a proton – that is to say 1/100,000 of a nanometre – something only recently possible with the improvement in technology.

Apparently the disturbance caused by the passage of the gravitational wave emerged at a frequency of 35HZ and sped up to 250Hz before disappearing 0.25 seconds later. The signal, appearing in the two detectors at Louisiana and Washington 0.007 seconds apart, was the correct timing for a light speed propagation. This discovery represents the culmination of some 4 decades of effort to detect the first gravitational wave following their prediction by Einstein a century ago.

The waves are thought to have arisen from the collision of two black holes some 1.3 billion years ago as they orbited around each other, spiralling ever closer at half the speed of light until eventually they merged in a massive explosion. Modelling suggests that the two black holes were only some 210 kilometres apart when they merged. Their respective masses are estimated at 36 solar masses, and 29 solar masses, with the final black hole having a mass of only 62 solar masses. The resulting loss of 3 solar masses caused an invisible explosion as the lost mass was converted into energy ($E=Mc^2$) creating one tenth of a second when the explosion “shone” brighter than all the galaxies in the universe. The invisible burst of energy resulting in the distortion of space time that we call a gravitational wave.

So what is all the excitement about apart from the discovery of the wave and further verification of Einstein's Theory of Relativity? Well, it would seem that because the gravitational wave is a distortion of space time, it does not suffer from the blocking effect on light that is caused by the “Big Bang Primordial Soup”, thus there is the real possibility that we will be able to “see past the light barrier” and gain valuable insights and data from the very early state of the universe. In addition it may also allow us to get information from within Black Holes.

It is a new window on the universe and who knows what it may deliver to us. At the time of the discovery of radio waves, who would have imagined the way that they have changed our knowledge and lives in the years that followed!

(source Science Magazine)

Wanted: Newsletter Editor



Yes the Editor job is still available!!!

If you would like to get involved but not be too committed then why not just send in a short article? Offering do not have to be works of literary genius or even in finished form, those things can be worked – just send it in, every little helps!

newsletter@ayrastoro.com

An Artist Amongst Us yes! our very own talented astronomical artist moving amongst us quietly and unrecognised – as yet! Those of you who came to the equipment night may have noticed some rather nice astronomical painting on display, a cracking horse head nebula, and a cratered moon, amongst others. News has reached my ears that you can own your very own signed, limited edition painting should you wish, or perhaps commission your own favourite night sky object – look no further ...www.artbyisabelle.co.uk ...or speak to her in person at one of our meetings.

Alex's Space

50 Shades of

“Planet Earth is the most dazzling gem in the jewel box” – so said an astronaut at the Goddard Space Centre. This accolade gave me the idea for this article, so here goes!



The colours an artist chooses to paint a picture is a personal expression of creative skill and imagination, but is such expression limited to human works of art or are they also displayed in the natural world? We live in a world rich in spectacular colours, everywhere we look different shades and hues captivate our eyes, but where do these colours come from? The answer has to do with the nature of light and how it interacts with different surfaces.

Light from the Sun appears white to our eyes, but white light, as we know, can be separated into all the colours of the visible spectrum, each colour corresponding to a different wavelength. Most objects contain chemical substances called pigments that absorb certain wavelengths and reflect others. What is reflected back by each object appears as the wonderful variety of colours that we see... the bright red of a ripe tomato or the dark green from a piece of Jade. However, among the most beautiful colours displayed in nature are those that come from a phenomenon known as iridescence, but how are these colours produced? It has nothing to do with pigments but

is due to the precise structural patterns within the surface of the object. A good example is the wing of the common MORPHO butterfly. Its' wings have layers of microscopic evenly spaced ridges, similar to diffraction gratings used in types of spectrascopes, but these ridges have even smaller ridges on their sides. The distance between these ridges is smaller than the wavelength of light, consequently, they break up the light waves and create an interference pattern. As a result, some colours are cancelled out and, amazingly, some are intensified. These intensified light waves are reflected back to or eyes as a dazzling shimmering blue colour. This brilliant work of art is the result of ingenious and intricate design.

Spectacular colours can be found not only in objects around us, but above us as well. As the Sun goes down in the evening, magnificent sunsets “paint” the sky with breathtaking colours. But what is behind this artistry in the sky? As sunlight travels to Earth, the light strikes the molecules and dust particles in our atmosphere, this light is diffused or scattered. The extent to which a light wave is scattered depends on its wavelength, blue light waves have a short wavelength and are widely scattered throughout the atmosphere, that is why we see a lovely blue sky – summer or winter – when the sun is high above the horizon on a clear day. However , when the Sun is near the horizon, the light must travel through more of the atmosphere t reach our eyes. The short wavelength blue light finds it tough going, gives up the ghost and virtually disappears, whereas the longer wavelengths are made of “the right stuff” and travel straight through adorning the sky with their golden and crimson rays – what a rich diversity of colours have been used to “paint” our Earthly home.



And finally, something to think about ---- In these modern times man has peered into the far reaches of space – and seen creation at an awe inspiring scale – can we ever unravel the mysteries?

Tune in next month and perhaps submit your own short article – the AAS library could provide you with the knowledge and inspiration!

Isabelles' Solar Corner



Solar Wind

The solar wind is a stream of energized, charged particles, primarily electrons and protons. Have a look at the previous articles of how electrons/protons are formed and reach the solar surface.

The solar wind streams these particles off the sun in all directions at different speeds. The velocity of the solar wind is higher over coronal holes, about 800km/s. Temperature and density is low over coronal holes and the magnetic field is weak. Those holes occur at poles and low altitudes. At the more stable central belt, the speed of the solar wind only reaches about 300km/s. It takes about two to four days to reach Earth's magnetic shield.

The source of the solar wind is the hot corona. The temperature of the corona is so high, that the sun's gravity cannot hold on to it. Scientists understand why this happens, but not quite how and where these coronal gases are accelerated to these high velocities. We will look at coronal heating in a different article.

The effect of the solar wind we can see by observing the tail of a comet, the ionised tail, which is the narrower and straighter one, is made up of ions carried by the flow of the solar wind away from the sun.

Also, when the solar wind carries particles of a coronal mass ejection and other powerful bursts of radiation into a planet's magnetic field, it can cause the magnetic field on the back side to press together. This is known as a magnetic reconnection. Charged particles then stream back towards the planet's magnetic poles and it can cause beautiful displays known as the aurora borealis in the upper atmosphere.



AAS Library

Open for business!

THE LIBRARY IS A RESOURCE FOR MEMBERS -PLEASE SUPPORT IT AND MAKE USE OF IT

The Library list is also available on the website under "links" and can be downloaded



The AAS Library is building up a good stock of items but further items are still sought and books for younger Members would be welcome, as would copies of technical manuals and "instructables". In addition if you have any DVDs, Videos, CDs and audio books, including podcasts (on tape or CD) these would also be welcome. Ownership arrangements remain as before; items can be donated to the library or simply lent to the library with ownership being retained.

If you would like to offer items for the library please speak to Alex at the next meeting or contact him by telephone on 01563 520887.

Similarly if you would like to obtain a list or borrow an item - catch him at the next meeting or give him a call on 01563 520887.

Unfortunately Alex does not have email, however messages via library@ayrastros.com will reach him the old fashioned way after a short delay but please contact him directly if at all possible.

NEW Additions this month.....

Books

23	Wonders of the Universe	Brian Cox
24	Space Shuttle Manual	Joels and Kennedy
25	Space Shuttle – The Story	Springer

DVD

3DV	How to set up and use a telescope	Ian Morison
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SCiFi Novels

1SF	The Sky is Falling	Lester Delrey
2SF	A Far Sunset	Edmund Cooper
3SF	A Fall of Moondust	A C Clarke
4SF	Summer Morning	Ray Bradbury
5SF	Rocket to Limbo	Alane Nourse
6 SF	Falling Stars	Robert Lennon

Ayrshire Astronomical Society Library List

11 February 2016

To donate or borrow items please contact Alex Baillie on 01563520887

Books

Code No.	Title	Author	Notes
1	Earth and Space	Visual Factfinder	
2	Stars and Planets	Ian Nicholson	
3	New Astronomy	Carole Stott	
4	Comets	David Seargent	
5	Stars in their Courses	Cambridge Press	
6	Nature of the Universe	Fred Hoyle	
7	Passion for Astronomy	Patrick Moore	
8	The Next 50 Years	Patrick Moore	
9	Superstars	David Clarke	
10	Between the Planets	Harvard Press	
11	Engineering Optics	Habell & Cox	
12	Hubble Telescope	Robin Kerod	
13	Atlas of the Planets	Paul Doherty	
14	Night Sky	Martin Jonson	
15	Space Handbook for the Novice		
16	Astronomy	Ian Ridpath	
17	Stellar Energy & Decay	Martin Johnson	
18	Astronomical Discovery	Herbert Turner	
19	Astronomy from Towns	Robin Scagell	
20	Using Binoculars in Astronomy	Patrick Moore	
21	Astronomy Handbook	Clare Gibson	
22	Wonders of the Solar System	Brian Cox	
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Audio Books (CD)

1AB	Hitchhikers Guide to the Galaxy Phase 1	Six CDs
2AB	Hitchhikers Guide to the Galaxy Phase 2	Six Cds

DVDs

1DV	Gravity	Feature Film
2DV	Interstellar	Feature Film
3DV	How to set up and use a telescope	Ian Morison

VHS

1VHS	2001 A Space Odyssey	Arthur C Clark	Feature Film
2VHS	2010 A Space Odyssey	Arthur C Clark	Feature Film

Podcasts (CD) 3DV How to set up and use a telescope Ian Morison

1PC	Hubble Telescope	Astronomy Cast	plus various other topics
2PC	Russian Meteor Fall	Astronomy Cast	plus various other topics
3PC	Space Stations	Astronomy Cast	plus various other topics
4PC	Space Probes	Astronomy Cast	plus various other topics
5PC	Planet Earth	Astronomy Cast	plus various other topics
6PC	Planet Jupiter	Astronomy Cast	plus various other topics
7PC	Planet Mars	Astronomy Cast	plus various other topics
8PC	Galileo and Einstein	Astronomy Cast	plus various other topics
9PC	Radio Active Decay	Astronomy Cast	plus various other topics
10PC	Planet Forming	Astronomy Cast	plus various other topics