Issue: March 2018

Ayrshire Astronomical Society Newsletter

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Moon Phases March /April 18
24th First Quarter
31st Full Moon (Blue Moon)
8th April Last Quarter
16th New Moon
22nd First Quarter
30th Full Moon

Next Meeting:

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26th March 2018

7pm

At the Prestwick Academy

Guest Speaker

Dr Alan T Cayless

Astronomy in the Sun – The Open Science Observatory in Tenerife

Photo taken by March Charron, 28th February 2018

President's Word

Joint Lecture with KESS:

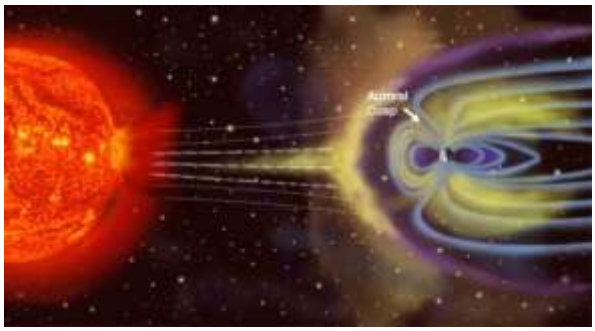
This month, on the day after the AAS meeting, we have our second and final joint lecture with KESS. You will see the poster in the newsletter, but PLEASE NOTE that the lecture is in the LIBRARY at THE GRANGE ACADEMY in Beech Avenue, Kilmarnock and NOT at the usual venue of the new Kilmarnock College. Please try and make it along, it is of course free to AAS members.

AGM:

Once again the AGM will be upon us in May. Again a film and buffet have been suggested and, as this format seems quite popular, it is likely to be followed, but confirmation will be in the April newsletter.

As you will know, ALL position on the committee are open to all members and it is always good to have new blood and new approaches. All you need to do is put your name down by telling our Secretary Angela that you would like to seek election and for which post, e.g. President or Ordinary member. Election is by simple show of hands at the AGM.

News and Event



An international team of researchers are venturing to the high Arctic to explore Earth's magnetosphere like never before.

The Grand Challenge Initiative – Cusp will include 11 sub-orbital sounding rockets launched from two Norwegian sites in 2018 and 2019: Andøya Space Center on an island off the Norwegian coast and Svalbard Rocket Range in the Svalbard Islands, part of Norway located in the Arctic Ocean. Several missions will include simultaneous launches from both two sites to obtain multi-dimensional information.

The two-year initiative combines missions fielded by Canada, Norway, the Japanese Aerospace Exploration Agency (JAXA), NASA, and other countries. The 11 rockets are part of eight overall missions participating in the project.

The Auroral Cusp

Earth's poles offer scientists a unique environment to study the electrically charged solar wind's interaction with our planet's magnetic field. The *auroral cusp* above the poles is where the magnetic field dips inward, enabling charged particles to impact Earth's atmosphere. This high-energy clash heats the upper atmosphere by hundreds of degrees, causing it to inflate and driving fierce winds within it.

12th March, Science day at Willowbank School in Kilmarnock, organized by KESS

17th March Galston Community Science Day

Joint lecture with Kess 27th March

"Are we alone in the Universe? Studying Exoplanet Atmospheres"

Maire Gorman, Department of Physics, Aberystwyth University.

Tuesday 27th March 2018, 7.30-9.00 pm, The Library, Grange Academy, Beech Avenue, Kilmarnock KA1 2EN.

Since 1995 over 3700 exoplanets (planets orbiting stars outside our solar system) have been detected using various methods, all of which have inherent biases that have made scientists question the structure of our very own solar system. The study of exoplanets is now progressing from a focus on mere detection to actual characterisation of their atmospheres. In order to deduce the composition of an exoplanet atmosphere, knowledge of molecular spectroscopy is essential as different molecules will emit different "signatures" of light. Hence the ExoMol group at University College London, which Dr Gorman is part, was formed and has the sole aim of calculating lists of wavelengths ("line lists") for molecules of interest using high level quantum chemistry methods in conjunction with available measured experimental data. Since completing her PhD in which she generated line lists for the diatomic molecules of Chromium Hydride (CrH) and Manganese Hydride (MnH), Maire has been (literally!) working through the periodic table studying other diatomic molecules with the help of enthusiastic students at Aberystwyth University.

Alex's Space

Astronomy:

Stars and planets pass overhead every night, but what we make of them is an individual matter. Some people are content to ignore the Cosmos, whilst others, more sky-aware, want to explore this realm and make it part of their lives. An infinite universe lies within our reach every clear night – astronomy compels us to look upwards and leads us away from this world to wonders of the Cosmos, and you can start the fantastic adventure this very evening!

Astronomy Unaided:

One of the pleasures in astronomy is simply looking up at the night sky with the naked eye and finding and identifying the various celestial objects that can be seen there – both natural and artificial, and, once able to identify the constellations, using these as pointers to other objects.

Astronomy Aided:

Binoculars are much more than the poor relation of telescopes! - They can show things that telescopes cannot, and they can be used to make serious observations. Above all, they are good value and convenient – even astronomers with large telescopes use them regularly. 8x40 and 10x50 are quite popular sizes and can be held quite steady – very important – bigger sizes are best mounted on a camera tripod or similar, and all can benefit from the use of a mirror mount.

And Finally …....

A road sign seen in the Highlands

WARNING

Bumpy Road Ahead

PLEASE REMOVE YOUR DENTURES

Dust in the Wind

(Image taken at the SDSO on Feb 13, 2018)

"When False Dawn streaks the East with cold, grey line
Pour in your cups the pure Blood of the Vine
The Truth, they say, tastes bitter in the mouth,
This is a token that the "Truth" is wine."

- Omar Khayyam

At the last AAS meeting I presented a couple of photos of the Zodiacal Light (ZL) without any explanation. I therefore make amends.

Zodiacal Light (ZL) is one of the solar systems most enigmatic features. Its faint ghostly presence follows the line of the ecliptic resembling one half a convex lens. At latitudes far from the equator it can be difficult or impossible to see for much of the year, as its angle leaves it too close to the horizon. The exceptions being late winter and early spring when the ecliptic is at its steepest after sunset or in late summer early fall when it is similarly placed before sunrise. Nearer the equator, it can be seen pretty much all year round as the ecliptic angle is nearly always fairly vertical. Because it is faint, clear moonless skies with minimal light pollution are usually needed. As it is angularly close to the sun in the sky, it is only visible for an hour or so before setting after dusk or being washed out by the dawn in the morning after rising.

References to it go back millennia, perhaps as far back as the ancient Egyptians, the Prophet Mohammed took it into account for prayer times, calling it the false dawn. According to Alexander von Humboldt the people living in Mexico were also aware of it prior to 1500, but it took until 1661 before it was mentioned in print in the West by the English clergyman and Baconian rationalist (basis of scientific method), Joshua Childrey, in 1661, though he could not offer an explanation. In 1683 the astronomer Giovanni Domenico Cassini first proposed that it was an astronomical phenomena rather than meteorological. There is some disagreement on who should be credited for

guessing that the glow is caused by sunlight reflected off of dust particles. It could belong to either Cassini, or his student, Nicolas Fatio de Duillier, later a colleague of Newton. Whichever one deserves the credit, it is close to the modern explanation of forward scattering which was confirmed by spectroscopy in the 19th and 20th centuries.

The dust, also known as the "Zodiacal Cloud," exists mainly in the inner solar system, stretching out to the orbit of Mars and is made up of particles ranging in size between 10 to 300 micrometres in diameter with an average mass of about 150 micrograms. One might ask why particles falls into this range? It turns out that smaller particles are pushed out into interstellar space by solar radiation pressure, while larger particles are slowly ground down by space weathering. The cloud may not be permanent as its particles lose angular momentum due to solar radiation, thus slowly spiralling down into the sun, so there must be a source to replenish it. The mystery of its what this is persisted into this century and has only recently been resolved with the dust most likely coming from the short period Jupiter family of comets. There is also some doubt on whether it has always been present. Cassini reported it missing in the years 1665-1681 and historically, the lack of common words for it in many of the world's languages may also indicate an ephemeral nature. It is difficult to know for certain if this is the case.

In 1803, Humboldt also coined the term Gegenschein, (German for counterglow), for a phenomenon directly related to ZL, though it was first reported to the Paris Academy as early as 1731 by Esprit Pénéza. It is a faint glow about ten to twenty degrees in diameter directly opposite the sun from light reflected back at the earth. It is more difficult to see than the ZL itself, as it is easily drowned out by light pollution, however, Wikipedia has a wonderful photograph of it here: https://en.wikipedia.org/wiki/Gegenschein

Getting back to the poetic fragment above by Omar Khayyam, the brilliant 11-12C Persian mathematician, astronomer and sometimes poet, he actually never wrote the words 'false dawn'. These were added by Edward FitzGerald who took some liberties with the original text. Since then, however, the words have taken on a life of its own by appearing in many astronomical articles about ZL. To paraphrase a remark often attributed to Mark Twain, 'a lie (or embellishment) can travel half way around the world before the truth can get its boots on.' Again, there is no evidence that Twain ever said or wrote this, so there we have it, a profound truth buried inside another lie about a lie! A tale indeed worthy of our post truth world.

I am indebted to Brian May, a frequent guest to the Sky At Night, for the information contained in his PhD thesis: "A Survey of Radial Velocities in the Zodiacal Dust Cloud," the band Kansas for the title, as well as several other sources.

Solar Corner

Solar outreach dates:

Saturday, 7th April 2018
Sunday, 27th May 2018

Dave and Isabelle are organising some solar outreach days at Roundhouse Café, Loch Doon. As for now we have pencilled in two dates (above), **from 12 noon until 3pm**. Food and drinks are available at the Café.

Save the dates – the more the merrier.

Solar outreach days are depending on good weather. We will keep you updated short notice if the events are going ahead.

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 library is now full up - if you would like to obtain a list or borrow an item

– contact Alex at the next meeting or give him a call on 01563 520887.

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

THE LIBRARY IS WAITING FOR YOUR CALL!! There are a lot of interesting items to borrow

"Hmm... Lemme check that purchase order again."