Breckland Astronomical Society

Affiliated to the British Astronomical Association and the Federation of Astronomical Societies

EXTRA TERRESTRIAL

Newsletter November 2026



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Copy is always needed for this newsletter. Articles with an astronomical theme are welcome but anything of likely interest to the membership will be considered. Text or Word documents are preferred but handwritten submissions are also welcome.

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Chairman's Notes November and December 2026

Dan Self

Hello and welcome. Phew, at least those heatwaves are over for now and the night sky is expanding its time range again for all to witness. We had a little flurry of aurora one night, and an alert was put out on Facebook. Very nice pictures as long as you were away from wasted and excessive light shining up into the atmosphere and scattering off the aerosol particles that occur due to humidity. This light pollution has a tendency to totally ruin aurora as was my experience despite driving away from the city. However, it was completely stunning display well away from light polluted areas – such as Norwich and the continuous and overlit construction and industrial zone in the A11 / A47 area.

We've had two very different hall sessions, one filled with the Wonderdome 3D interactive experience and was very busy with youngsters and one with a zoom talk on Women in Astronomy, which was hampered at first by poor internet signal. Sherry was a wonderful performer in the dome and Mary McIntyre is rather a legend herself! A few of us went to host a stargazing event at Hunstanton Observatory – it was mostly cloudy but amazing what could be spotted despite them. Looking forward to Nov 13th talk (Myths and Legends) - it will be suitable for everyone at any level of knowledge.

We have spent most of the time with the 20 inch dome motor down and awaiting repair. As I write, the worn bearing is finally with Norfolk Precision Engineering in Horsford who can manage a super quick fix. Richard has kindly sourced runner wheels for the dome. In the meantime, without being asked, Lee and Keith among others (Martin) found a way to bolt the next biggest 12 inch Meade onto the iOptron mount, and we have a beautiful scope there. It was used to image Saturn in stunning detail, revealing 0.5 arc-second features. If you look closely you can see Tethys hiding.



We are still looking at all our equipment and deciding what can be combined into working systems and what we can sell and what is good for use. New member Lee has been really helpful with knowledge of reviving some old mounts. We have pulled out the central desk in the downstairs room to make space in the observatory for more of the wonderfully keen visitors to fit down there and watch our new plasma exhibits and see the pictures on display.

We've had still more webpage and comms tweaks from Keith Fowler who has put a lot into organisation. We would like members to book now if you haven't already the annual meal at the Crown – please go to https://www.brecklandastro.org.uk/breckland-astro-annual-dinner and input

your choices and Keith will send out a link for a deposit. £30 two course £36 three, not including drinks which you can get at the well-stocked bar.

This time of year, you can easily spot bright planets, deep-sky star clusters, and more meteors during the long nights of November and December 2026, especially in the morning sky when lovely Orion is high and proud.

Planets

Mercury: Has a good morning apparition through the middle of November from about 6 am low in the East – it brightens and is a good distance to the lower left of bright Venus. It reaches greatest elongation but not necessarily altitude or visibility on November 20. Altitude peaks earlier and brightness later.

Try this very useful site: https://www.obliquity.com/skyeye/archive/2026/mercuryapp.html

Venus: Shines brightly in the pre-dawn eastern morning sky, reaching its peak morning brilliance in late November. It slowly dances around star Spica during November. It has a very small phase and large crescent as it emerges from the twilight in early November. ON THE 7th - The very faint old 4% crescent moon passes very close to it and Spica. This will be very low and visible before dawn. In fact, it has its maximum magnitude of -4.9 in late November 2026.

Mars: Rises late in the evening and brightens noticeably in Leo as December ends. Catch it near Jupiter and Regulus and the Moon on the 2nd and 3rd November, or the 30th November. Mars peaks next year and will grow in brightness and apparent size this year. Mars

Jupiter: Dominates the night sky as a brilliant naked-eye object, sitting high in the constellation Gemini. Mars does a dance around Jupiter much as it did in the 1980s when I was a child getting interested in astronomy. They are also near Regulus.

Saturn: Visible low in the western evening sky shortly after sunset and becoming visible high throughout the night. It is an ideal time to view Saturn. Saturn shows clear ring systems through a small telescope.

Uranus: Reaches opposition on November 25, 2026, glowing faintly in Taurus and best viewed with binoculars or a telescope.

Neptune is fairly near Saturn in the sky and requires a good chart to find but is so satisfying to see that tiny blue disk – and observe its real colour, not the digitally altered one. There is something special about witnessing direct proof of the presence of this hitherto inaccessible planet.

Comets

Comets around this winter look to be a fairly faint bunch of regular background snowballs flying around the place. Periodic comet *161P/Hartley-IRAS* moves from Delphinus to Sagitta and starts to set earlier. It comes close to the Coathanger asterism in the latter half of November. Perihelion is 1.265AU from the Sun on the 27th of November. It has an orbital period of 21.5 years and reaches further out than Saturn. It may be quite faint though.

Morning object *252P/LINEAR* which has an interesting history of fragmenting and being unusually bright, possibly being responsible for meteor showers, appears low in the dawn sky. It has not been reported observed at the time of writing.

Comet 10P Tempel (2) is emerging from the deep south coming back into Cetus, while fading. It crosses a virtual line between the stars Diphda and the rightmost star of the constellation and is simultaneously due south of Saturn on the 19th December. Although the Moon is quite bright at this time. Expect to see a small fuzzy cloud of coma dust, made from cometary ices and glows due to C2 and CN and CN+ ions in the green-blue part of the spectrum. It comes near NGC 246 the Skull Nebula later.

Comet C/2024 T5 ATLAS stays below Orion in Lepus throughout November and December, and reaches perihelion in May next year. It is already visible but still faint. It moves slowly north and west (right) against the stars and accelerates in the new year towards Eridanus.

Asteroids

Major asteroid *Vesta* is near Saturn in Cetus/Pisces fading from 7-8 magnitude and *Ceres* is a steady 7th magnitude in Gemini near Castor and Pollux. Fragments of this asteroid are present as meteorites on Earth, kindly pointed out by David Bryant – these are known as HED achondrites, and examples include Diogenite from Tatahouine 27/06/1931, Howardite from Morocco 2003 and Eucrite from Camel Donga 1984.

Less well-known asteroid 192 Nausikaa, named after a princess in Homer's Odyssey, is also near Saturn and Neptune but to the upper right, it can be found just south of the Square of Pegasus at magnitude 9. It is an S-type 86km across, fairly elliptical, with a 13.6hr rotation period.

6 Hebe was the sixth to be discovered but is visible near Jupiter and Regulus at magnitude 11 brightening to 9. It is interesting as it has a large mass and a low volume, giving it a high bulk density of 3.5g/cm3. It is an H chondrite so fairly common type and 190km across.

27 Euterpe is also nearby in the sky - just the other side of Jupiter from our perspective,

Major Meteor Showers

We could catch the tail end of the Orionids from comet Halley. This was pretty impressive this year during October.

Taurids: low activity with broad peaks around November 5 and 9th but new moon. Possible slow fireballs. The origin is subject to some debate but associated with asteroid 2004 TG10 and comet Encke.

Leonids: Peaks overnight on November 17–18, 2026, offering this year up to 15 fast, bright shooting stars per hour. Best caught on the earlier night of the 17th as the waxing gibbous moon doesn't set until late. However the early morning viewing is far better for this shower due to the radiant being much higher. Parent comet 55P Tempel Tuttle is a long way from the Sun now, although it is approaching again. The impact velocity is very high 70 km/s.

Geminids: Peaks on December 13–14, 2026, delivering the year's richest display with up to 120 often yellow or green meteors per hour under favourable moon conditions which is the case this year! Their origin is an object that's now an asteroid, 3200 Phaethon.

The Quadrantids: are just after the new year, and can be seen early in the evening, at dusk, and this is near a new moon. They also peak better before dawn. Their radiant is in the Northern sky, moving from the NNW, rightward and down then back up to high/NE.

Bright and Quick Deep Sky Objects

The Andromeda Galaxy (M31): Sits high in the western evening sky during November, appearing as an oval smudge of ancient starlight to naked eyes under dark skies.

The Pleiades (M45): Located in Taurus, this famous "Seven Sisters" open cluster is high and clear all night, easily seen with the naked eye or enhanced with binoculars.

Everyone loves the Pleiades – it's the first star cluster many people find in the sky, because it's so big and bright and obvious to the naked eye. Also known as the Seven Sisters because its seven brightest stars can be seen without any optical aids, through binoculars or a telescope this spill of gemstone stars never disappoints.

But there are other clusters around it that deserve your precious eyepiece time too.

Nearby M35 in Gemini is smaller and fainter than the Pleiades, but beautiful in its own right. Visible to the naked eye as a small, out-of-the-corner-of-your-eye smudge close to the feet of Gemini, this fifth-magnitude cluster is more easily seen in binoculars and is resolved as a misty speckle in telescopes. Around 24 light years in diameter, the cluster contains at least 120 stars – perhaps as many as 500 – and lies 2,800 light years from Earth.

The Orion Nebula (M42): Shines as a fuzzy sword hanging off Orion's belt, revealing glowing gas clouds through standard binoculars or telescopes.

An Easy Test of Your Sky

A dark sky test is to look at the Square of Pegasus when high in the sky and count how many extra stars you see within its boundaries. Sir Patrick Moore used to propose this but for the test to be accurate you must be patient and look for some time.

Number of stars visible	Limiting Magnitude	Sky conditions
2	4.6	Light polluted or hazy
4	5.0	'suburban' level
7 or 8	5.5	Fairly bright rural sky
11 – 13	6.0	Good dark rural sky
21+	6.5+	Pristine 'mountaintop' sky

In February, the CPRE call for a similar test using the Rectangle of Orion, which has a few more stars within it, so the values are about double. In UK, mist blocks more starlight, compared to light pollution masking them, so this is an approximate science.

The faintest star visible or "Limiting magnitude" is a fairly complex issue. Starlight can be scattered away before reaching the ground, it can be optically refracted from turbulence, it can be masked by light pollution, the light pollution can be at different wavelengths and intensity profiles with altitude. Eyes can vary a lot also. So, star visibility isn't a perfect measure but reasonable when an average is taken. A meter called an SQM is used (we have one) to measure more accurately.

Talks

September - Wonderdome was a great piece of entertainment and visual spectacle, showing trips across the cosmos and Apollo. However we did have to remain quiet outside the dome. Our usual timings were out a bit but it worked well with a bit of organising. It was very popular with families and got a big crowd. Lovely to see! Sherry Fuller was a very entertaining presenter who is a comedian as well as a presenter.

October – Mary McIntyre - Women In Astronomy Part 2.

It took until 2017 until a woman got on a Scottish bank note!

The talk starts with example Maria Mitchell was born in Nantucket 1818.

In 1835 she allowed non white pupils at her school. Her dad was a teacher and amateur astronomer. 1847 she discovered a decent comet Miss Mitchell's comet. Became a professor at Vassar Observatory but for a much lower wage than a man. She popularised women. She was spoken of highly. There is a lovely quote about her about an eye directing a needle. Crater Mitchell is right beside Aristoteles.

Elizabeth Brown b 1830. Her dad was an astronomer so so was she. Many women weren't allowed near the observatories of men. So, she built her own. She did Meteorology also. She did solar work and travelled to eclipses including the one in 1887. Back then some in authority believed night air was dangerous to females! So solar became more trendy! In fact global travel was much more dangerous but they didn't bat an eyelid at that.

Elizabeth Isis Pogson, Oxford b 1852.

Elizabeth went to India and took over as director of observatory in Madras after her dad died. She was declined as fellow of RAS but the BAA supported women from day 1.

Mary Proctor b. Ireland 1862 and moved to Missouri. She and her dad founded a journal called "*Knowledge*". Another teacher of astronomy and an eclipse chaser. A prolific writer of childrens books.

Now we come on to the more famous Wilhamena Fleming, a Harvard "computer". She has a crater named after her - taken with Apollo, located on far side of the moon. She classified spectra and did important work on star science.

Another "Computer" was Annie Jump Cannon who classified a quarter of a million stars. She was very bombastic and worked at Harvard a long time. For someone on such a little wage she was quite authoritative.

Antonia Maury, niece of Henry Draper, studied under Maria Mitchell at Vassar. Graduated in 1887, she determined the orbit of the first spectroscopic binary. There is a small lunar crater located on the upper right near side – yes 'Maury' is a female.

My personal favourite is Henrietta Swan Leavitt b.1868, degree 1892 (not upheld by many) – She looked extensively at magnitudes of stars. She discovered the important period luminosity relationship of Cepheid Variables. Her work was published by Pickering (the PI of the 'computers' but he states clearly it was her work. Her Crater is 66km diameter (big) but on the far side.

Annie Scott Maunder was the first Greenwich "computer" until she got married! This rendered her unemployable! She still photographed sunspots along with Walter her husband every clear day. A

giant sunspot of 1892 was finally found only in an obscure 1923 book. Both together they discovered the 11 year solar cycle. After marriage she became the BAA journal editor 1892, not considered a 'job'. (Note BAA = British Astronomical Association – whom Breckland AS is affiliated with). Her crater is on far side but with many terraces. Just at edge of libration zone – so a good challenge to look for.

Mary's own picture of sun is very high resolution taken in 2024 with a large sunspot.

The main reason astronomer Pickering chose women was because he could pay less. Work was assigned to them. He only had a certain budget and went with cheap underpaid labour. Men had to take the spectra and operate the stuff, women could not touch it! Some of the women resigned as they didn't get credit. There was no opportunity for extra learning or career development. A glass ceiling.

For Greenwich the lady had to be a graduate. A man not so. It took 40 years before the next lady was employed after Maunder.

Women weren't allowed to graduate formally until 1920. Cambridge not until 1948. Queens College at Oxford it was 1979! It soon became 50:50 sex mix thereafter.

(USA) Adelaide Ames 1900-1932

She wanted to be a journalist but became a Harvard Computer under Harlow Shapley. Cataloguing galaxies in virgo/coma of 13th magnitude. They found evidence of galaxy superclustering. They weren't randomly distributed. They published a 1931 catalog, a big success and reference but sadly in 1932 she died in a boat accident.

Cecilia Payne Gaposchkin was born in Bucks. 1900 she moved to London Paddington for school, but they wouldn't let her study science until she moved to St Paul's. She got a scholarship for Cambridge but couldn't officially graduate so moved to US. She was a most capable go-getter.

She saw Eddington's eclipse talk!

1925 PhD. Thesis related spectra to temperature but said the sun was 99% hydrogen. Russell dissuaded her from saying this as it would thought to be made of earth stuff. Russell found this was true and claimed the discovery.

She did loads of stellar accurate work cataloguing. She ended up writing books on the side and so much that she got recognised as a professor at Harvard 1956. Finally for womena first head of science department.

Margherita Hack 1923-2013. Worked for Otto Struve. She had no tolerance for pseudo science and was overtly anti-fascist. 1964 became professor in Italy and transformed it making collaborations. Used space telescopes. Turned to outreach TV later in life and a magazine and populariser. Why have we not heard of her?! Mary never met her.

You may know this one: Vera Cooper Rubin 1928-2016 had a telescope as a 10 year old. '48 Vassar graduate. Barred from Princeton as she was female. Observations of galaxies that deviated from Hubble flow and work led to discovery of dark matter. Advocate for women and got lots of honors. Amazing contribution to astronomy.

OF COURSE has the observatory named after her. The observatory WAS called the Large Synoptic Survey (functional!) now named The Vera Rubin Obs. It can see down to magnitude +23 and covers the whole sky every 3 days! It is an 8metre scope with a 3.2gigapixel camera that was

made here in the UK. It gets a million alerts a night! Aha! DATA processing is quite involved. You can go to its website – and see imaging jobs scheduled and beautiful pictures of e.g. trifid and lagoon nebulae.

Carolyn Shoemaker - died 2021

Originally a housewife to Gene. Her kids grew up and she was bored with how she had been taught Astronomy. However, Gene taught her and inspired her in 1980 aged 51 to start a CalTech career finding comets and asteroids near Earth's orbit with David Levy and in 1989 she became a professor in her own right.

Then 1993 Shoemaker Levy 9 came along on course for Jupiter! Using a binocular comparator technique she and Gene discovered it. She found 5 moving objects near Jupiter. Mary got to interview Carolyn in her 90s she was very lovely. Gene sadly died in car accident with Carolyn in the car in 1997. In her lifetime she discovered 32 comets. Nearly the same as Messier!

The best till last - Jocelyn Bell Burnell 1943-present

At Glasgow University she was only girl that year to graduate and at the ceremony everyone cat called the girls as a cruel tradition. She knuckled down and graduated and got a position at Cambridge with Tony Hewish. She found a bit of “scruff” on her radio trace and found it again and located it. She tracked it down.

Her supervisor got the Nobel prize the first in astronomy. She was very happy. She was humble about grad students being not awarded Nobel prizes. She had some silly girly attention at her interviews. They didn't take her seriously.

She travels with her husband. And was glad she didn't get the Nobel prize as it would have stopped any future prizes. She donated her later prize money to set up minority schools. And is very active e.g. in the Athena Swann awards. Mary was star struck when meeting her.

Mary I am star struck with your presence!

And Mary we should promote your book with Ian and Rachel!

Questions were good but a bit hard to hear.

The IAU membership female demographic falls off later in life. Wonder if it has to do with marriage, etc. The message was encourage the girls! Confidence!

…

Upcoming – Karenmae Bloom talks about Myths and Legends of the Sky on Friday November 13th at 19:30. Karenmae is a former school teacher who can make the session really interactive and fun!

Enjoy! See you soon.

Please try to make some of the talks as we are selling our new Calendars there from the image competition this year. They are in the print shop now!

Dan Self

A Deeper Dive into the Early Winter Sky

Dan Self

Find your photographic nebula targets here! There is a pannable, zoomable H alpha Northern Hemisphere survey via Aladin lite: https://www.simg.de/nebulae3/dr0_1/halpha8/

Here are several interesting, obscure, and challenging deep-sky observation targets that are a step up (or a step down?) from the regular Messier catalogue visible in late autumn skies:

NGC 7789 (Caroline's Rose)

Type: Open Cluster

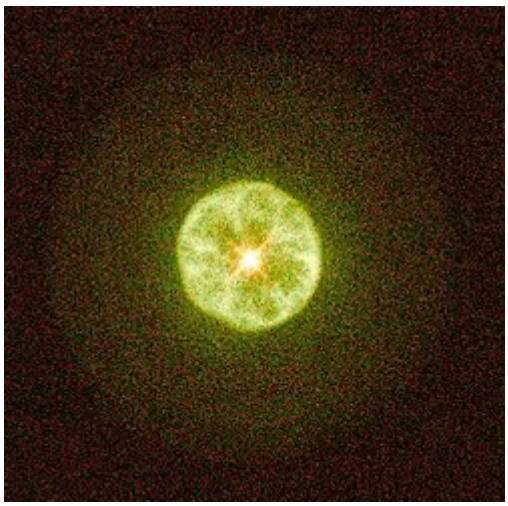
Constellation: Cassiopeia

Magnitude: +8.3

Apparent size: fairly large

Why it's so interesting: Discovered by Caroline Herschel, this rich, densely packed cluster contains thousands of faint stars that intertwine in patterns resembling the petals of a rose. It is a wonderful alternative to the Double Cluster. Not too far away from the double cluster in Perseus. It is Located 7,600 lightyears away, its hundreds of stars span an area of around 60 lightyears. When viewed through a telescope at high magnification, the cluster's orange and blue stars, and the dark lanes between them really do resemble a rose with open petals. Caroline's Rose is estimated to be 1.6 billion years old; that's very old for an open cluster, but much younger than any globular cluster.

IC 3568 (The Lemon Slice Nebula)



Type: Planetary Nebula

Constellation: Camelopardalis

Magnitude: +10.6

Apparent Size: 6" halo 18"

Why it's so interesting: Located not far from Polaris, this is a very small, compact, and high-surface-brightness planetary nebula that looks like a crisp greenish-yellow lemon slice in medium-to-large apertures (>12"). About 4500 light years away, it is very small but has a faint outer halo. Almost exactly circular. It is best at high magnification and the eye gets a challenge in picking out tantalising details and colour.

NGC 2276 (Anyone want to think of a name?)

Type: Peculiar Spiral Galaxy

Constellation: Cepheus (or near Polaris region)

Magnitude: +10.6

Apparent size: 2.2’ x 1.9’

Why it’s so interesting: It features a lopsided, asymmetric spiral structure caused by gravitational interactions with its neighbour, NGC 2300, and ram pressure stripping from intergalactic gas. It provides a stark, weird contrast to tidy face-on spirals like M74. Very interesting, especially clear in images! Fairly low surface brightness, size and awkward positioning make it an under-imaged target.

NGC 188 – Caldwell 1

Type: Open Cluster

Constellation: Cepheus (about 4° from of Polaris)

Magnitude: +8.0

Size: fairly large 15’

Why it’s so interesting: Unlike most open clusters that break apart and disperse after a few hundred million years, NGC 188 is one of the oldest known open clusters in the Milky Way, sitting at nearly 7 billion years old. Mentioned by Jonathon Clough from Cambridge as one of his list of interesting objects, due its ancient age, vast mass and year round visibility.

NGC 6340 (No name)

Type: Lenticular with faint spiral structure Galaxy

Constellation: Draco

Magnitude: +11.0

Size: Fairly small for a galaxy but others in vicinity. 3.0’ x 2.4’

Why it’s so interesting: Located roughly 55 million light-years away, this tight, bright-cored spiral offers a quiet yet rewarding challenge for observers testing mid-to-large backyard scopes away from heavy light pollution. This was on a BAA Deep Sky object of the month, as it looks like an elliptical, but has faint large spiral structure superimposed upon it, possibly a major merge. Visible all year round, it may be rather far north for being a popular target for imaging.

NGC 1333 The Embryo Nebula

Type: Reflection Nebula

Constellation: Perseus

Magnitude: ~10.0

Apparent Size: 6 x 3’

Why it’s so interesting: Hidden inside the Taurus-Perseus molecular cloud complex, it gets ignored for brighter northern targets like M45. A complex mix of swirling blue-grey reflection nebulosity and deep crimson hydrogen-alpha knots, marking a very active, chaotic star-forming nursery. Hard to see well but photographs well and is tantalising, with

you wanting to push for more exposure and more structure to reveal. There are some stunning pictures of this hidden glow among the cold Perseus cloud out there.

NGC 1491 – the Fossil Footprint Nebula

Type: Emission Nebula

Constellation: Perseus

Magnitude: ~ +11

Apparent Size: 9 x 6'

Why it's so interesting: Astrophotographers are attracted to the much larger California nebula, however this is less visible to the eye than NGC 1491. It can be seen faintly as an odd-shaped glow in a dark sky as it is at a high declination near lambda Persei. It was discovered by William Herschel in 1790.

More **Interesting Stars**

Double star Almach, Gamma Andromedae (Instead of Albireo)

While other amateur astronomers swoon over the glowing gas and dust clouds of nebulae, the star-spangled arms of spiral galaxies or the sharp detail on planets, double star aficionados delight in seeing pairs of stars with sequin-like contrasting colours. There is something aesthetically pleasing about such a simple view.

The most famous double star is probably gold and blue Albireo, in Cygnus, (beta Cygni, in the centre of the Summer Triangle), but close to the galaxy M31 is another double star that you really should get to know - Almach in Andromeda. It looks like a single yellow-white star to the naked eye, but look at it through binoculars and you'll see it has a fainter, more sublime blue-hued companion close to it. Located 355 lightyears away from Earth, Almach is high in the sky and waiting for you as darkness falls on autumn nights, so don't just hopscotch past it as you head to the Andromeda Galaxy.



Chart: Perseus and Andromeda looking high in the WSW November.

If you hop along to the wrong star, closer to M31 is Mirach, beta Andromedae. A close look at this star in an 8 inch or so telescope around bright Mirach shows its colour – can you see anything else though? There have been sightings of Mirach's ghost! Look if you dare!

Algol minima times

Algol beta Persei is a bright star in Perseus, it is also an eclipsing binary and gets occulted every 2.8 days or so. As such it can be intriguing to learn the constellation and see it unusually in its dim phase for a few hours.

This occurs on the morning of 10th November 00:30 peak.

12th November 21:20 peak.
15th November 18:09 peak, brightening from dusk – watch for the slow re-brightening.
30th November (morning of) 2:14 am.
2nd December 23:00
5th December 19:50
8th December 16:40
23rd December (morning of) 00:45
25th December 21:35
28th December 18:25

Variable Stars

Omicron (Mira) Ceti is due to ramp up in brightness to naked eye level during November from about 8th to 4th.

https://apps.aavso.org/v2/tools/light-curves/ if you type star name as Greek letter or other letter / Constellation in the abbreviated form first 3 letters ggg ccc you can select dates and produce your own custom light curve up to date. E.g. alp ori is Betelgeuse, omi cet is mira, but e.g. T CrB is acceptable for variables.

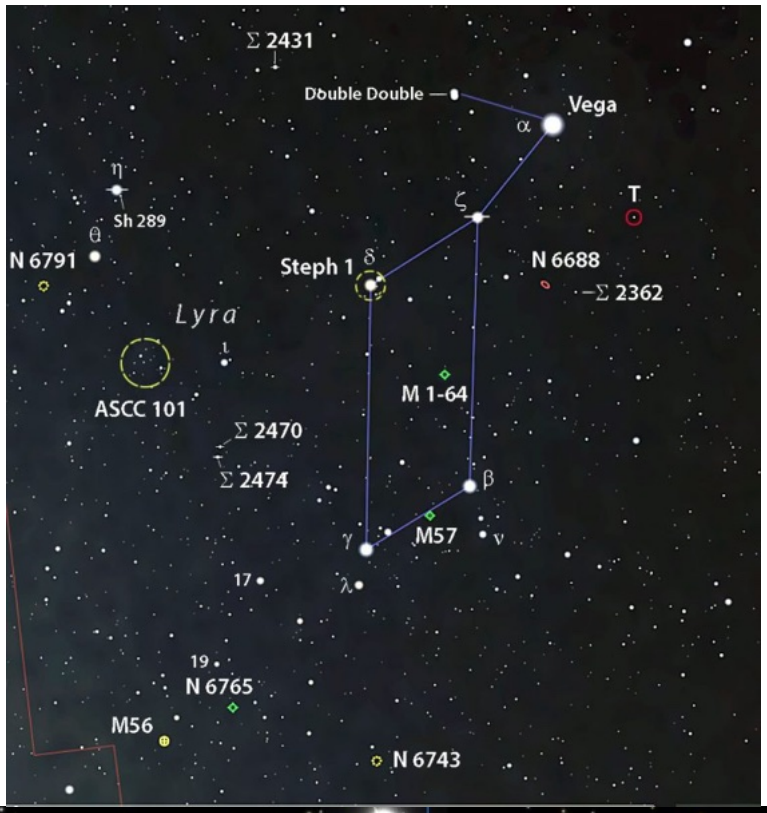
Popular Carbon Stars to see are intensely red, and include T Cancri near M44 and R Leporis (Hind's Variable Star) although the latter has been more lackluster in recent years due to its part of the cycle getting out of phase with its viewing season. T Cancri is more consistent. Other red stars to try are T Lyrae and 119 Tauri (brighter but less red) above Orion and near zeta Tauri.

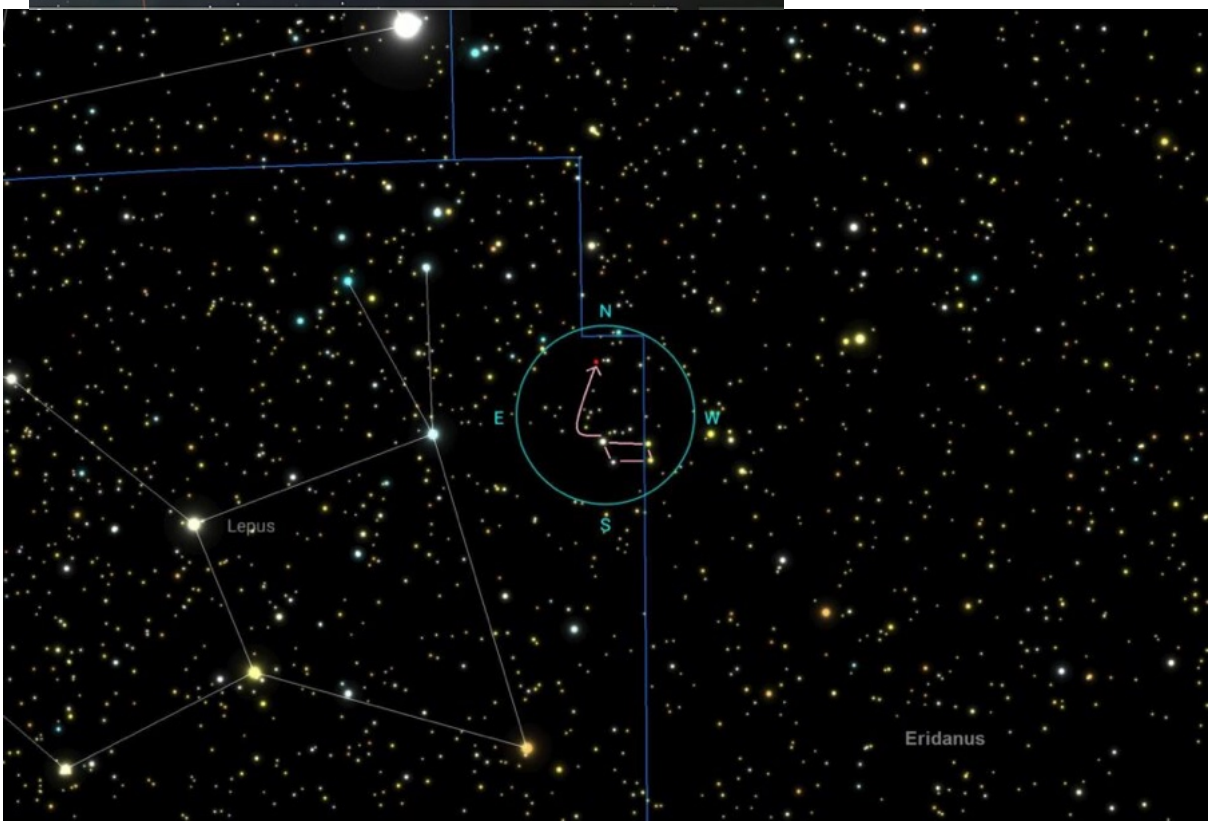
T Lyrae can be found from this chart – along with some other delights in the constellation Lyra:



Zoomed finder for T Cancri making an equilateral triangle with central stars in Cancer.

R Leporis can be found below Rigel in Orion with this chart.





Dan Self

Table of Passes of the International Space Station from Norwich, UK Nov-Dec 2026

Date	Bright-ness	Rising			Culmination			Setting			Pass type
	(mag)	Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.	
1 Nov	-0.8	03:57:50	13°	SE	03:57:50	13°	SE	03:58:18	10°	SE	visible
1 Nov	-1.6	05:30:48	13°	SW	05:31:14	13°	SW	05:32:53	10°	S	visible
2 Nov	-1.3	04:45:32	14°	S	04:45:32	14°	S	04:46:18	10°	S	visible
12 Nov	-1.4	18:21:23	10°	S	18:22:16	14°	S	18:22:16	14°	S	visible
13 Nov	-1.5	17:34:43	10°	SSE	17:36:12	12°	SE	17:36:39	12°	SE	visible
13 Nov	-0.8	19:09:09	10°	SW	19:09:36	13°	SW	19:09:36	13°	SW	visible
14 Nov	-2.4	18:21:38	10°	SW	18:23:54	29°	S	18:23:54	29°	S	visible
15 Nov	-2.3	17:34:16	10°	SSW	17:37:02	24°	SSE	17:38:08	20°	ESE	visible
15 Nov	-1.0	19:10:09	10°	WSW	19:11:04	17°	WSW	19:11:04	17°	WSW	visible
16 Nov	-1.7	16:47:06	10°	S	16:49:25	18°	SE	16:51:44	10°	E	visible
16 Nov	-3.1	18:22:26	10°	WSW	18:25:14	49°	SSW	18:25:14	49°	SSW	visible
17 Nov	-3.1	17:34:46	10°	SW	17:37:58	44°	SSE	17:39:20	27°	ESE	visible
17 Nov	-0.9	19:11:16	10°	W	19:12:16	18°	W	19:12:16	18°	W	visible
18 Nov	-2.6	16:47:12	10°	SW	16:50:15	33°	SSE	16:53:19	10°	E	visible
18 Nov	-3.4	18:23:27	10°	WSW	18:26:20	61°	WSW	18:26:20	61°	WSW	visible
19 Nov	-3.7	17:35:39	10°	WSW	17:38:59	68°	SSE	17:40:22	32°	E	visible
19 Nov	-0.8	19:12:22	10°	W	19:13:18	17°	W	19:13:18	17°	W	visible
20 Nov	-3.3	16:47:53	10°	WSW	16:51:10	56°	SSE	16:54:23	11°	E	visible
20 Nov	-3.2	18:24:31	10°	W	18:27:19	59°	W	18:27:19	59°	W	visible
21 Nov	-3.8	17:36:39	10°	W	17:40:01	84°	S	17:41:19	35°	E	visible
21 Nov	-0.7	19:13:25	10°	W	19:14:15	16°	W	19:14:15	16°	W	visible
22 Nov	-3.7	16:48:47	10°	WSW	16:52:08	78°	S	16:55:20	11°	E	visible
22 Nov	-3.1	18:25:32	10°	W	18:28:16	54°	WSW	18:28:16	54°	WSW	visible
23 Nov	-3.8	17:37:38	10°	W	17:41:00	81°	S	17:42:18	35°	ESE	visible
23 Nov	-0.6	19:14:28	10°	W	19:15:14	15°	W	19:15:14	15°	W	visible
24 Nov	-3.7	16:49:43	10°	W	16:53:05	85°	S	16:56:22	11°	E	visible
24 Nov	-2.7	18:26:31	10°	W	18:29:18	44°	SW	18:29:18	44°	SW	visible
25 Nov	-3.4	17:38:34	10°	W	17:41:53	61°	SSW	17:43:26	28°	SE	visible
25 Nov	-0.5	19:15:44	10°	W	19:16:23	13°	WSW	19:16:23	13°	WSW	visible
26 Nov	-3.6	16:50:37	10°	W	16:53:58	73°	SSW	16:57:19	10°	ESE	visible
26 Nov	-2.0	18:27:33	10°	W	18:30:27	27°	SSW	18:30:36	27°	SSW	visible
27 Nov	-2.4	17:39:29	10°	W	17:42:37	36°	SSW	17:44:57	15°	SE	visible
28 Nov	-2.8	16:51:28	10°	W	16:54:43	48°	SSW	16:57:58	10°	SE	visible
28 Nov	-0.9	18:29:05	10°	WSW	18:30:56	14°	SW	18:32:25	11°	S	visible
29 Nov	-1.2	17:40:36	10°	W	17:43:09	20°	SW	17:45:41	10°	SSE	visible

30 Nov	-1.6	16:52:23	10°	W	16:55:18	28°	SSW	16:58:13	10°	SSE	visible
2 Dec	-0.6	16:53:45	10°	WSW	16:55:40	14°	SW	16:57:35	10°	S	visible

11 Dec	-0.1	06:30:11	10°	SE	06:30:43	10°	SE	06:31:13	10°	SE	visible
12 Dec	-1.5	07:15:46	10°	SSW	07:18:42	29°	SSE	07:21:39	10°	E	visible
13 Dec	-1.1	06:28:05	10°	SSW	06:30:40	21°	SE	06:33:16	10°	E	visible
14 Dec	-0.8	05:40:43	10°	S	05:42:40	15°	SE	05:44:38	10°	ESE	visible
14 Dec	-2.8	07:15:37	10°	SW	07:18:53	50°	SSE	07:22:08	10°	E	visible
15 Dec	-2.3	06:27:36	10°	SW	06:30:44	38°	SSE	06:33:53	10°	E	visible
16 Dec	-1.9	05:40:59	19°	SSW	05:42:37	28°	SSE	05:45:33	10°	E	visible
16 Dec	-3.5	07:15:45	10°	WSW	07:19:05	74°	S	07:22:27	10°	E	visible
17 Dec	-1.2	04:55:10	19°	SE	04:55:10	19°	SE	04:57:05	10°	E	visible
17 Dec	-3.4	06:28:06	14°	WSW	06:30:52	62°	SSE	06:34:12	10°	E	visible
18 Dec	-3.1	05:42:06	43°	SSW	05:42:40	48°	SSE	05:45:56	10°	E	visible
18 Dec	-3.7	07:15:57	10°	W	07:19:19	85°	S	07:22:41	10°	E	visible
19 Dec	-1.3	04:55:58	23°	ESE	04:55:58	23°	ESE	04:57:36	10°	E	visible
19 Dec	-3.7	06:28:53	21°	W	06:31:03	81°	S	06:34:24	10°	E	visible
20 Dec	-3.8	05:42:40	72°	S	05:42:46	72°	SSE	05:46:06	10°	E	visible
20 Dec	-3.7	07:16:08	10°	W	07:19:29	78°	S	07:22:51	10°	ESE	visible
21 Dec	-1.3	04:56:21	23°	E	04:56:21	23°	E	04:57:48	10°	E	visible
21 Dec	-3.8	06:29:16	24°	W	06:31:11	84°	S	06:34:33	10°	E	visible
22 Dec	-3.8	05:42:54	84°	SSE	05:42:54	84°	SSE	05:46:13	10°	E	visible
22 Dec	-3.3	07:16:15	10°	W	07:19:33	56°	SSW	07:22:50	10°	ESE	visible
23 Dec	-1.3	04:56:31	23°	E	04:56:31	23°	E	04:57:53	10°	E	visible
23 Dec	-3.6	06:29:25	24°	W	06:31:15	69°	SSW	06:34:35	10°	ESE	visible
24 Dec	-3.8	05:43:00	78°	SSE	05:43:00	78°	SSE	05:46:16	10°	ESE	visible
24 Dec	-2.5	07:16:23	10°	W	07:19:27	33°	SSW	07:22:30	10°	SE	visible
25 Dec	-1.2	04:56:34	22°	E	04:56:34	22°	E	04:57:55	10°	E	visible
25 Dec	-3.1	06:29:28	23°	W	06:31:10	44°	SSW	06:34:23	10°	SE	visible
26 Dec	-3.4	05:43:02	56°	S	05:43:02	56°	S	05:46:10	10°	ESE	visible
26 Dec	-1.7	07:16:46	10°	W	07:19:09	18°	SW	07:21:31	10°	S	visible
27 Dec	-1.2	04:56:36	21°	ESE	04:56:36	21°	ESE	04:57:50	10°	ESE	visible
27 Dec	-2.3	06:29:31	19°	WSW	06:30:55	25°	SSW	06:33:44	10°	SSE	visible
28 Dec	-2.6	05:43:07	33°	S	05:43:07	33°	S	05:45:43	10°	SE	visible
29 Dec	-0.9	04:56:44	16°	SE	04:56:44	16°	SE	04:57:32	10°	SE	visible
29 Dec	-1.5	06:29:39	12°	SW	06:30:27	13°	SW	06:32:07	10°	S	visible
30 Dec	-1.5	05:43:19	16°	S	05:43:19	16°	S	05:44:40	10°	SSE	visible

Thanks to heavens-above.com time of calculation 19/10/2026 prone to future errors if orbit is corrected by boosting. Current height is 420km and orbit falls on average about 1km in 17 days.

Dan’s Astrophysics Quiz

Are you a latent amateur astrophysics genius?

Have you got hidden potential as a standalone astrophysicist?

Try your luck with these 10 Degree level Astrophysics quiz questions.

1. What is the primary nuclear fusion reaction that powers stars on the main sequence, such as our Sun?

A. Hydrogen fusion into helium via the proton-proton chain or CNO cycle.

B. Helium fusion into carbon via the triple-alpha process.

C. Carbon fusion into neon and oxygen.

D. Iron fusion, which releases immense energy.

2. Following a core-collapse supernova of a massive star, what determines whether the remnant becomes a neutron star or a black hole?

A. The star's initial metallicity.

B. The mass of the remaining stellar core.

C. The rotation speed of the original main-sequence star.

D. The distance of the star from the galactic centre.

3. What defines the radius of the event horizon of a non-rotating (Schwarzschild) black hole?

A. The Compton wavelength of the central mass.

B. The distance at which orbital velocity equals the speed of sound.

C. The radius at which the escape velocity equals the speed of light.

D. The point where frame-dragging becomes infinite.

4. What theoretical mechanism, proposed by Stephen Hawking, allows black holes to slowly lose mass and eventually evaporate?

A. Tidal disruption of passing gas clouds.

B. Centrifugal ejection via relativistic jets.

C. Neutrino cooling from the accretion disk.

D. Quantum pair production near the event horizon.

5. Hubble’s Law states that the recessional velocity of a galaxy is proportional to what property?

A. Its distance from the observer.

B. Its total mass and luminosity.

C. Its rotational velocity curve.

D. Its age relative to the universe.

6. The Cosmic Microwave Background (CMB) radiation provides a snapshot of the universe when it was approximately what age?

A. 3 minutes

B. 380,000 years

C. 1 billion years

D. 9 billion years

7. The transit method for detecting exoplanets measures which periodic change in a host star's observable properties?

A. A shift in the stellar emission spectrum due to radial velocity.

B. An increase in brightness due to gravitational microlensing.

C. A slight dip in apparent brightness as a planet passes in front of the star.

D. Variations in polarization caused by planetary reflection.

8. In the nebular hypothesis of solar system formation, what primary process caused dust and gas grains in the protoplanetary disk to aggregate into planetesimals?

A. Magnetic reconnection and solar wind compression.

B. Rapid cooling leading to immediate crystal sublimation.

C. Gravitational collapse driven by dark matter pockets.

D. Electrostatic forces and collisional sticking.

9. What physical phenomenon prevents a white dwarf star from collapsing under its own gravity?

A. Thermal gas pressure from residual core fusion.

B. Centrifugal force from rapid differential rotation.

C. Electron degeneracy pressure.

D. Neutron degeneracy pressure.

10. What observational evidence led to the discovery that the expansion rate of the universe is accelerating?

A. Redshift measurements of nearby globular clusters.

B. Measurements of distant Type Ia supernovae acting as standard candles.

C. Anisotropies found in the Cosmic Microwave Background polarization.

D. Direct astrometric tracking of local group galaxies.

Answers available at the back of the newsletter.

SyQon Studio

Keith Fowler

There are many different tools for processing the multitude of short exposures taken by astro cameras and turning them into a finished image: PixInsight, Siril, DeepSkyStacker, Astro Pixel Processor, etc.
The company SyQon has become well regarded for its AI tools: **Parallax**, which is a nebula deblur and deconvolution tool; **DeepPrism** which is a noise removal tool; and **Axiom**, which is a star separation tool. For each of these, they have a free model, and more capable paid models.
There have been several hints that something bigger was coming on their website https://syqon.eu and it has had several names over time. I thought little more about it. Then it arrived, and it's a big deal too. **SyQon Studio** is the name they settled on. Pre-processing, including stacking; access to all the AI tools they've built; and dozens of other tools to produce a finished image. Now it's public beta – the team admit it has bugs and are very active fixing them.

So, what is good?

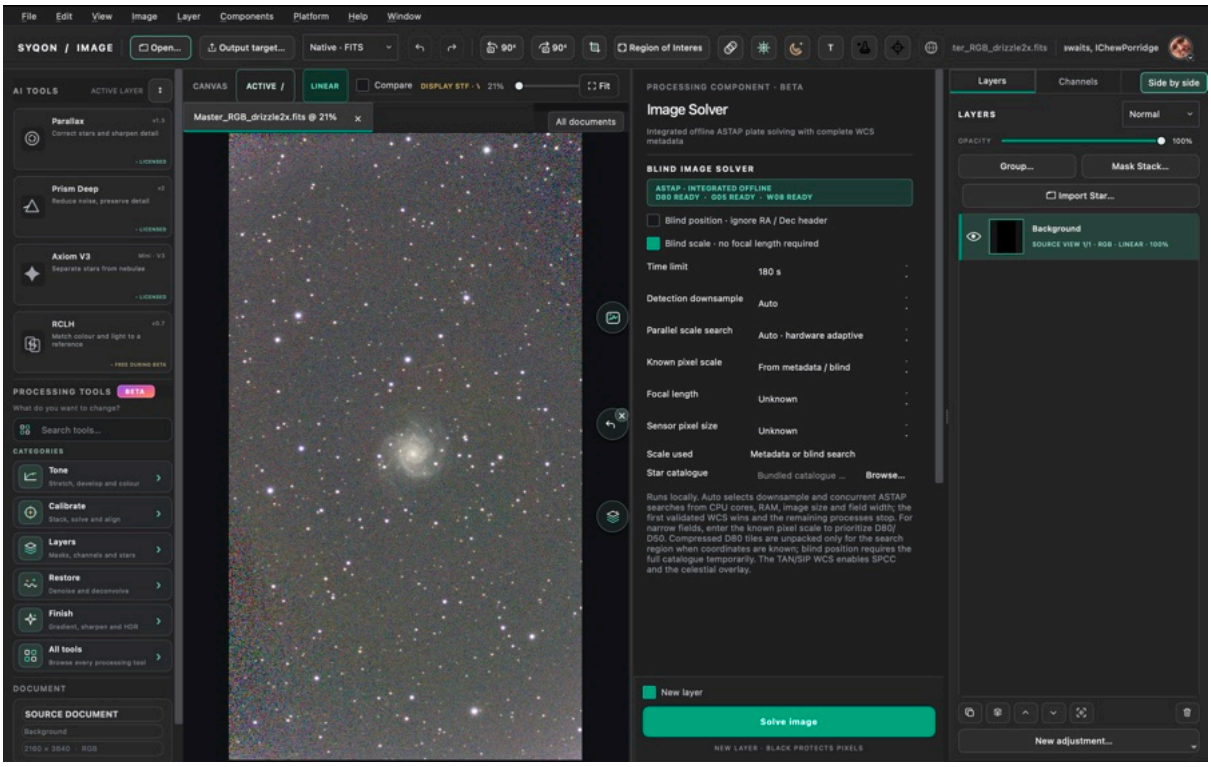
- Complete image processing from subs through to finished article.
- The editor has layers; think of Photoshop, making changes easy to understand and manage. This reduces my workflow tendency to save every few minutes with increasingly convoluted names.
- It can deal with multiple open documents (images) at a time (PixInsight does, Siril does not).
- The document has a split-screen compare, allowing very easy comparison between the before and after image on the application of each tool. "I think this tool will make it better. Oh no, my bad…"
- It's integrated, so, for the time being, there is no calling out to scripts, third-party tools, etc. It also means installation is clean and simple, including the download of GAIA catalogues for plate solving and colour correction.
- You don't have to choose to show the image with an auto-stretch or plan – Studio remembers if it's stretched or not. In Siril you get to pick from a drop-down. In PixInsight you need to attach a ScreenTransferFunction to the image.
- Has better control of the SyQon AI tools, or so it seems.
- Star separation in Siril and with StarXTerminator in PixInsight requires you to keep the starless image and store the star mask somewhere else. In Studio the somewhere else is another layer which is set disabled. The recombination tool knows where the two halves are and stitches them back together.
- Learning curve seems to be much lower than Siril (not too hard) or PixInsight (like mastering Finnish)
- The team is not a one-man band, so that continuing development doesn't rely on one enthusiast maintaining enthusiasm.
- SyQon have decided that SyQon Studio is and will remain free. They are and plan to continue making money on the AI models.

What's bad?

- Pre-processing works well for most of my images, except for my 2000-odd subs of Abell 39, which it throws away almost all of and produces a dire image of the 56 remaining. This trend has continued through recent images I've taken – most working fine, some it just has a bit of a strop over.
- No access to third-party tools – although it's a roadmap item.

What does it look like?

This is macOS version 1.1.4



- Left bar – tools (AI & regular)
- Middle – documents
- First right bar – the current tool options
- Second right bar – layers and channels

What if I have not got any paid-for SyQon AI models?

The free ones are included in Studio and they're none too shabby either.

Finally, what can it do?

NGC 7635 – Bubble Nebula – about an hour with a Seestar S50 from home. Stacked and processed in Studio.



Keith Fowler
Ancient Astronomer

John's News Notes

John Copsey

The planetary parade spoken about in the News will be very spread out and only visible in the very early morning. Mercury will be probably too low if you don't have a good horizon. Venus will be bright, and Jupiter and Mars are closest on November 15th, Saturn is the other side of the sky.

The Crew of Artemis 2 have stood down as Astronauts for future space missions. R. Wiseman, V. Glover, C. Koch, J. Hansen have left, but Christina Koch has been promoted to Engineering Director from November 1st.

Artemis 3 will carry out a mission in Low Earth Orbit to demonstrate Lunar Landers.

Space X Starship finally reached orbit for the first time.

The Indian Space Economy is set to reach 45 billion $US by 2035.

On November 23rd an Ariane 6 at Kourou, French Guiana will launch 36 Amazon LEO Satellites.

The Atlas 5 at Cape Canaveral, will launch CST Starliner Spacecraft to the ISS.

NASA's Perseverance Mars Rover's odometer has reached 28.10 miles and 2006 Martian Days (at the time of writing, mid-October 2026).

Voyager 1 is now in Interstellar Space – it was launched on 5th September 1971. In 1998 Voyager 1 overtook Pioneer 10 as the most distant spacecraft from the Sun at 69.419 AU. Voyager 1 is currently 25.75 billion km from the Sun (172.13 AU) approaching 24 light hours signal delay time. and travelling 60,904 km/h. Go to orbitalradar.com to track satellites, or orbitalradar.com/deep-space/voyager-1 for the 30 major satellites across the solar system – it is a fascinating site from NASA JPL.

Scotland is about to launch a UK satellite - it is the world's first robot to destroy space junk.

The great historical astronomical asset of the UK, Jodrell Bank, has been asked to close after losing its funding from government. Hopefully it can be saved.

On 7th October ESA with the IAU signed an agreement to commit to develop technical solutions to keep the sky dark and quiet. This is in response to the free proliferation of satellites and associated light and radio pollution. Citizens of Earth are now unable to escape satellites, and professional observatories images are full of streaks, some impossible to remove. The problem is only getting worse, according to ESA's Space Environment Report.

The Extremely Large Telescope ELT is getting built in Chile with a 39m mirror. This is a huge step up from the largest telescopes currently in use.

The Roman Space Telescope launched on the 30th August and is travelling to its station 1 million km from Earth. It will be the successor to Hubble, with a much wider field of view. It is named after Nancy Grace Roman, an American astronomer who made important classifications of stars, she became NASA chief of Astronomy in the 1960s and 70s. The telescope is now in focus and already performing 30% better than expected. Watch this space.

Francis Halzen got awarded the Nobel Prize for proposing an instrument to detect cosmic neutrinos and raising money to build the successful Ice Cube instrument at the South Pole – see the special write up and focus piece.

A Fast Radio Burst was detected by the Meerkat Telescope in South Africa that was the furthest yet. Nothing could be seen from ground-based telescopes so JWST was commissioned, and its source, a distant galaxy, was measured to be 10.6 billion light years away making it the furthest away FRB. It was thought to be produced by a magnetar, but it could be a kilonova, a neutron star collision.

John Copsey

Member’s Recent Astrophotography

Dan Self

Trip to Northumberland small town of Wooler from the backyard I could almost see 6th magnitude stars. Here is the panorama I could muster with a Camera and Tripod. It was spectacular darkness but hard work to reach. Please could ALL landowners and security folk in Norfolk get a bit less inconsiderate about their overlighting and dim it and direct it downwards... refit now save energy! I'm sure nature would benefit and we would all be better off. Plus, the actual universe would start appearing again. Driving past sets of bright whites depressingly too often down here.



A late night imaging and observing session in a beautiful clear and dark sky. Three of us survived into the witching hour (when Orion starts to rise). An absolutely gorgeous image of Saturn on the 12" SCT showing spokes in the rings.

A fairly short capture run of less than 1000 frames of Saturn on the 12 inch SCT late Tuesday, demonstrates the scope really has passed the test of its optics, and we look forward to using it for visitors to get view of this most beautiful planet. You can see what I think are spokes in the rings and the Cassini division.





The 12" Schmidt - Cassegrain telescope, wonderful optics, somewhat heavy to track on our iOptron mount but it did the job... Just. Not bad for a run of about 15 1-minute exposures at f/6.3. Messier 33 an entire spiral galaxy with its bright nebula region prominently showing, which led to it having two other separate NGC designations, visual astronomers thinking they could see discrete deep sky objects.



Andrew Scott

Partial eclipse views, using the "hedge-hole" method ...



Gerald North

Yesterday, 12th August 2026 myself and a number of members of the Breckland Astronomical Society, including Justin, Tony, Simon, Stephen and Murray were joined by a very large numbers of the public. Some of us brought our own telescopes and others brought out suitable instruments. I had a queue at my Meade ETX90 (fitted with an Inconel full aperture solar filter) with people wanting to take a look and also borrow my eclipse glasses. That queue was unbroken right through the event and until the Moon's disk had almost completely left the Sun. I walked back away from the main group and took the photo at just a few minutes before eclipse maximum. All the BAS members present worked hard and the members of the public loved it judging their reactions and by all the thanks the delighted people heaped on us. It was a very joyous experience that we all enjoyed and it certainly made a new happy memory for me!

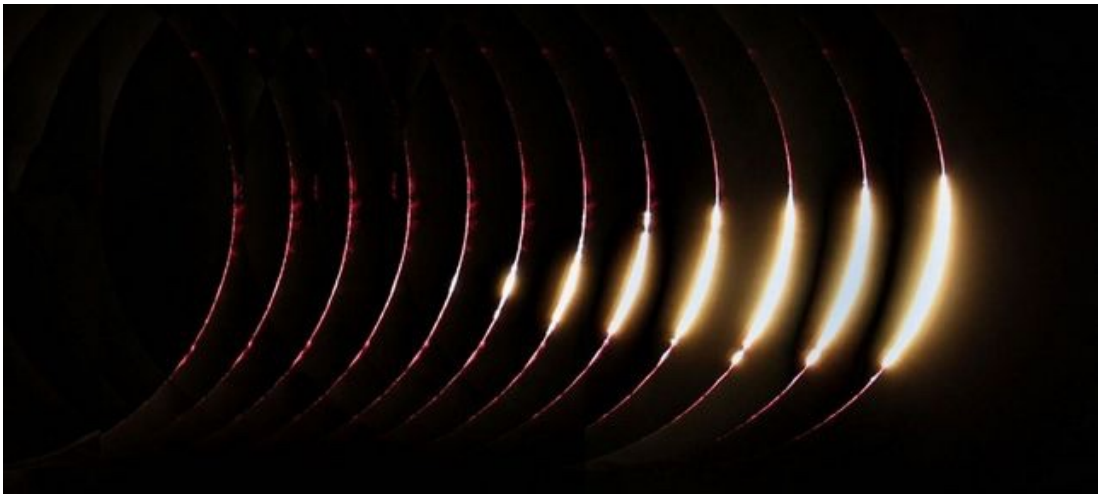


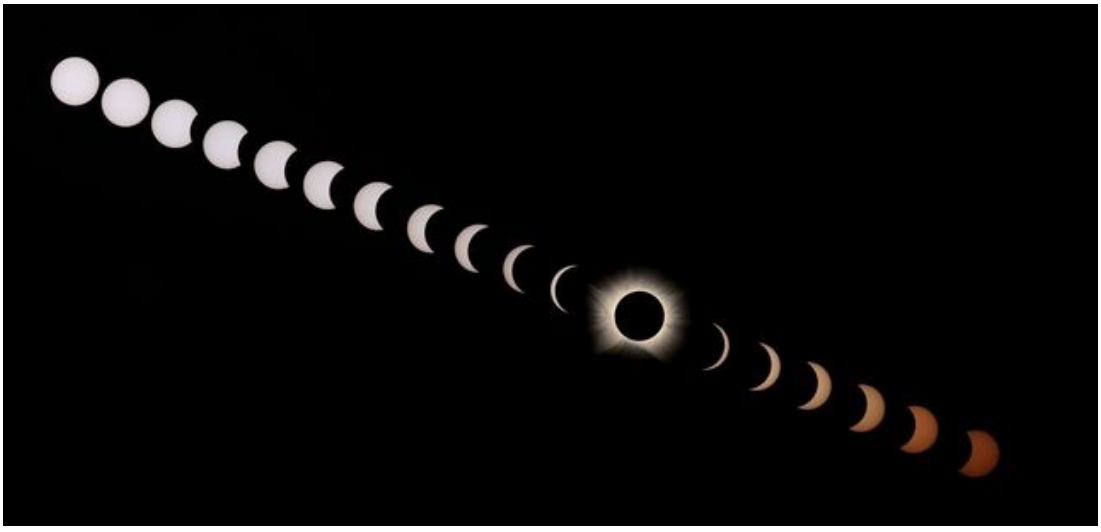
Luke Broom-Lynne

A couple of captures of Baily's Beads at the beginning and end of totality.

Colle, Castile y Leon, Spain, 42.84093 degrees north, 5.24420 West, altitude 1114m.







Keith Fowler

NGC 7331 and Deer Lick Group



IC5146 – The Cocoon Nebula



NGC 7023 The Iris Nebula

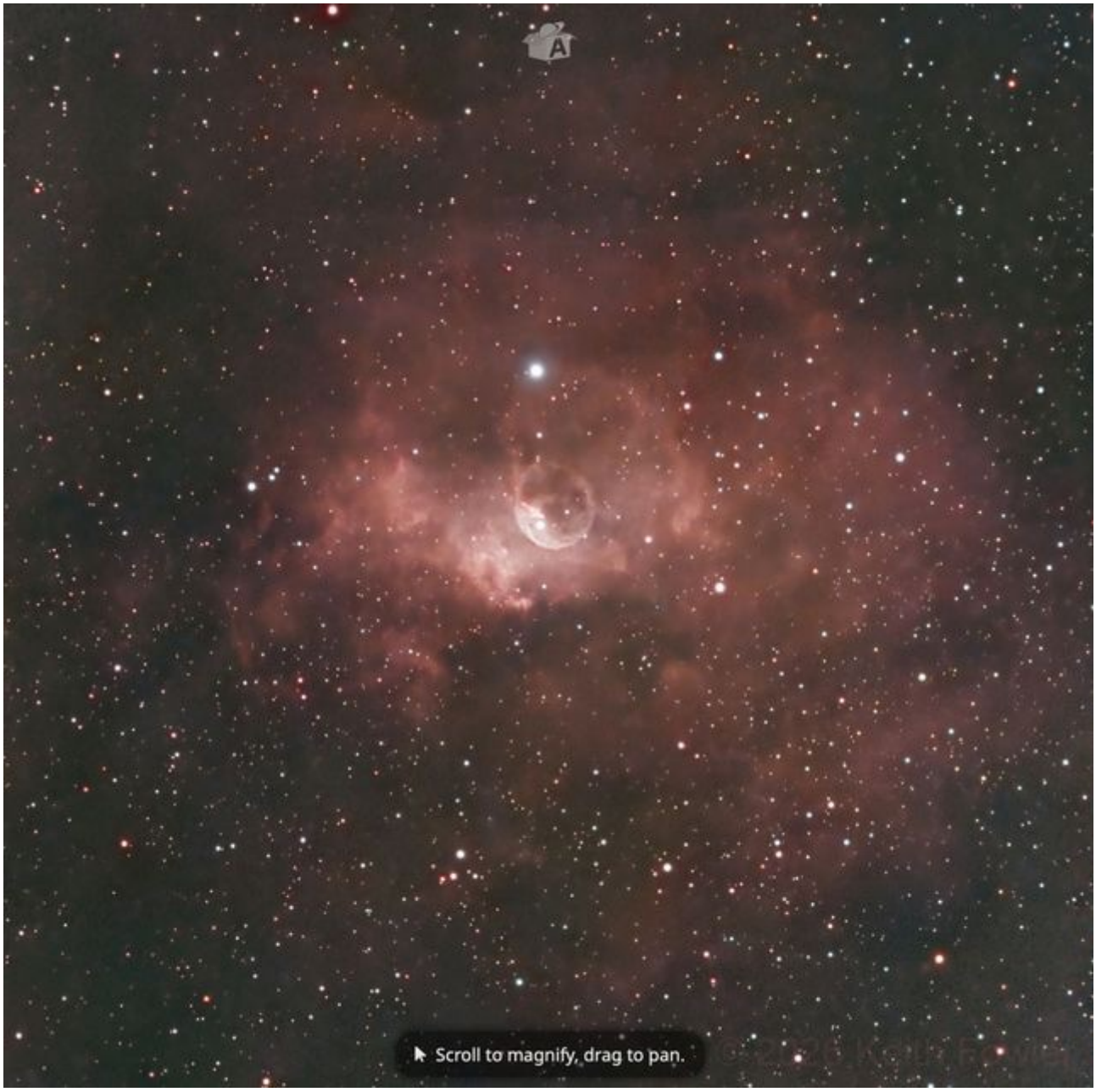


Aurora over Watton



Bubble time!

NGC 7635 The Bubble Nebula



Hugh Lodge

Tonight I went for a favourite of mine, Simeis 57 or DWB 111, The Propeller Nebula using manual J2000 RA and DEC.



M31 Andromeda Galaxy



How could I resist tonight's Harvest full Moon. It was so beautiful. Am I a lunatic?

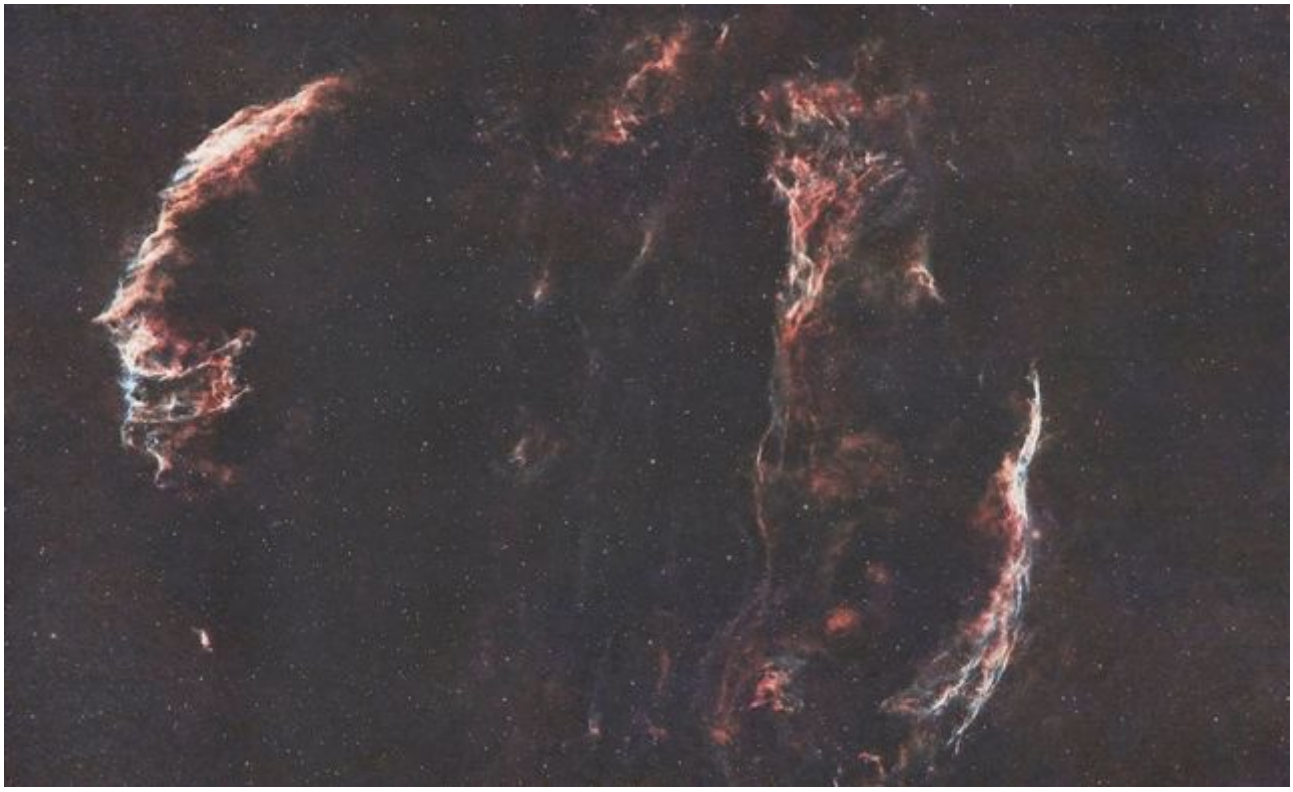


Moon
0.07 s | 2026.09.26 22:15

DWARF 3
1/640s 0 VIS

Tonight I applied 3 hours to C33 and C34 in a mosaic 1.2X1.3 to capture the whole Veil Nebula.

The final images the starless image that was enhanced in Snapseed adjusting brightness and contrast and adding it back onto the star reduced image.



Roger Hyman

A 66% waxing gibbous Moon captured with a William optics GT71, Televue x2.5 PowerMate and Player One Saturn C camera.

Processed in Autostakkert (best 35% of 2,000 frames), ImPPG and Photoshop.



The partial Lunar Eclipse as seen in Somerset,UK at 05:00GMT



A Tuesday afternoon 21% waxng crescent Moon captured with a William optics GT71, Televue x2.5 PowerMate and Player One Saturn C camera.

Processed in Autostakkert (best 35% of 2,000 frames), ImPPG and Photoshop.

Not much contrast to get this late in the afternoon.



Frank Dutton



A very quiet Sun today for sunspots but active with plenty of flares across the surface..



James Beeston

My latest effort in processing 71 x 30s lights of M27 in Pixinsight. No calibration frames. Celestron 8" EdgeHD @ f7, l-eXtreme filter, Nikon D810A camera. Necton, 11-13 August.



Mick Ladner

Last night’s image with my Dwarf 3.

The Western Veil, part of the Cygnus Loop.

260 x 30 second exposures @ 60 gain, duo band filter, eq mode.

Processed using Stellar Studio.



Gary Vatcher

Looks like a few of us were looking at the Pac-Man Nebula last night.

Having only got my S50 two weeks back this is my first attempt at the Pac-Man.

60 mins exposure

367 subs

10 sec

Stacked in Seestar



David Bryant

The Moon and Mars.



The Moon and Jupiter

A spectacular conjunction of the Moon and the gas giant planet Jupiter, close together in the morning sky just before sunrise (Mars was nearby too!) Three of Jupiter's moons can be made out if you look closely!



Andy Weller

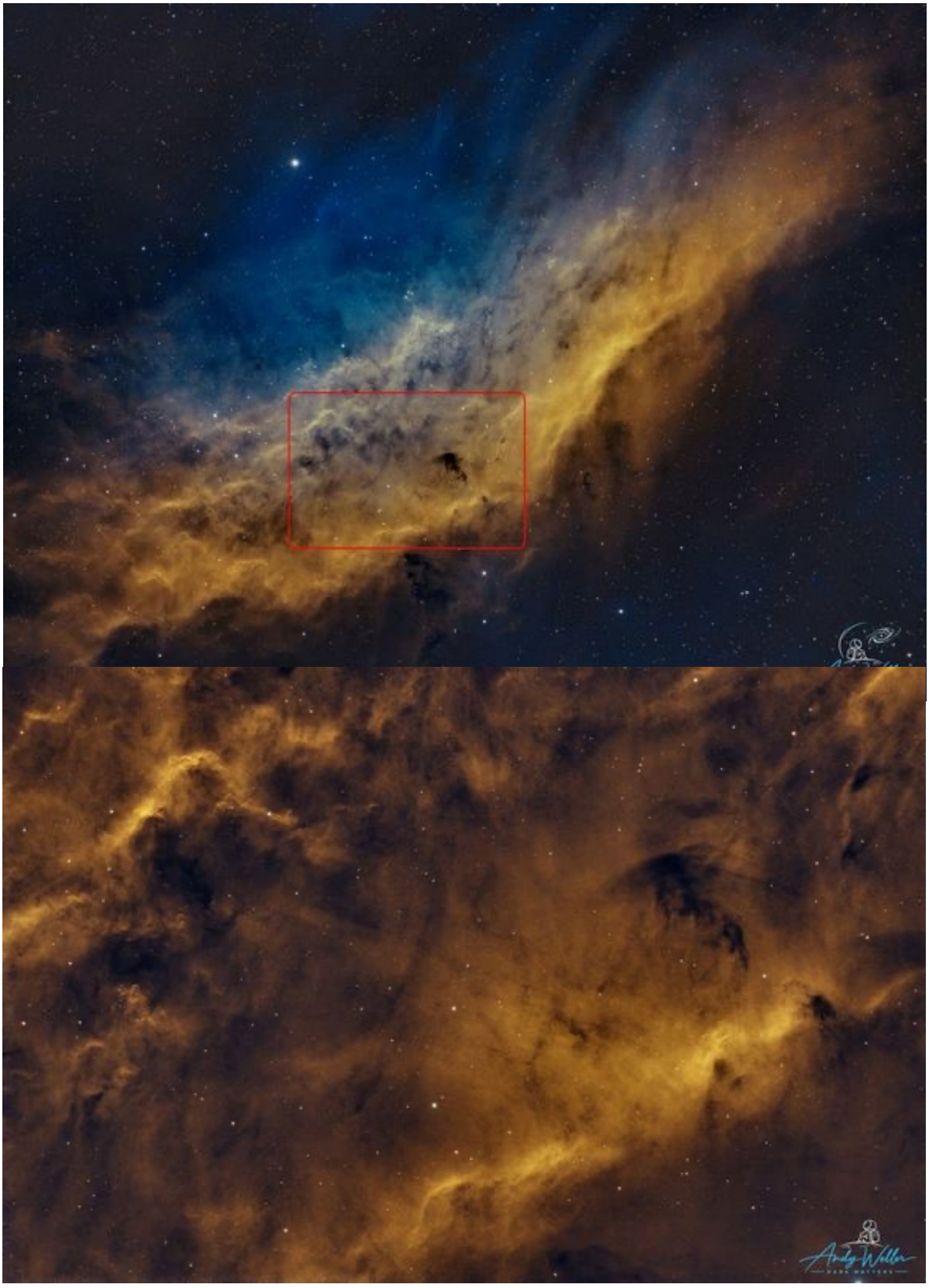
Flame and Tadpole Nebula in Auriga

Again taken with my WOGT81 IV frac in HOO.



Managed to get the 11" SCT out last night to dive a bit deeper into the California Nebula. I've marked the framed area on the widefield shot I took at Kelling last week with the 81mm refractor.

I really enjoy capturing these close-up detail shots. Nebulae are so fractal, and there's always more to see the deeper you go.



Lee Woodward

Sharpless 155 The Cave Nebula



Sharpless 101 The Tulip Nebula



Neutrinos and the 2026 Nobel Prize

Dan Self

In 1835 the astronomer and philosopher Auguste Comte said "we would never know how to study by any means their chemical composition." Soon thereafter came Spectroscopy and much later Cecilia Payne-Gapochkin used of light from stars revealed their chemical composition of predominantly hydrogen and helium. The 20th century world of particle physics has since connected itself firmly with the cosmos and as an avid astronomer it always catches my attention.

Recently, it took centre stage as the 2026 Nobel Prize in Physics was awarded to Belgian-American physicist Francis Halzen for his groundbreaking discovery of high-energy cosmic neutrinos. Lucky him, he gets to keep all the 12 million Swedish Kronor. Halzen was the principal investigator of the IceCube Neutrino Observatory, which successfully transformed a cubic kilometre of deep, pristine Antarctic ice into the world's largest particle detector. This massive achievement has helped usher in a new era that's been aptly named multimessenger astronomy, allowing scientists to view the universe through different media, in this case, matter rather than just light.

What Are Neutrinos?

Neutrinos are subatomic particles that are often talked about as "ghost particles". They are nearly massless, carry no electrical charge, and travel at near-light speed. They barely interact with matter due to having zero coupling with electromagnetic force. Yet they are the most common massive particles in the universe. Billions pass through an area the size of a fingernail every second - completely unnoticed, undetectable, uninteracting.

Most neutrinos that pass through Earth come from our Sun. However, high-energy variants come from the deepest, most violent corners of space. Their only interaction with matter is via the weak nuclear force, the vast majority of them pass through entire planets without leaving a trace. The weak nuclear force, for those interested, is mediated by the W+, W- and Z bosons (particles), all of which are extremely massive, and only exist at the very high energies required to make that mass (remember, $E=mc^2$). According to Heisenberg's Uncertainty principle, in quantum mechanics, energy can be 'borrowed' from the vacuum for short times. This incredibly short time means the virtual particle barely exists, and any interaction occurs with a ridiculously small probability. These are also the bosons responsible for nuclear particles transmuting into one another in the process of radioactive decay. Thank God for these boson masses, as without their value being what it is, every atom would collapse into the most stable element, Iron or perhaps fusion would not work to produce Carbon.

How the IceCube Observatory Works

To catch a ghost, you need an extraordinarily large trap (not the Ghostbusters style ones that suck them in). If their interaction strength is a gazillionth that of a regular particle, and we expand our

search to encompass quadrillions of them, and wait, we are eventually likely to see some. Professor Halzen realized that the crystal-clear glacial ice at the South Pole was the perfect medium to fulfil these criteria and detect these elusive wanderers.

This is where his efforts are deserved. To push through a project of this scale, in this location is brave and ambitious. He developed a 3D array of light detectors that Scientists set into deep holes into the ice using hot water drills. They lowered cables containing thousands of basketball-sized light sensors into a cubic kilometre block of ice. On rare occasions, a high-energy cosmic neutrino hits an atom inside the water ice. It was not known well how or if it was possible to detect the neutrino signal from the noise. Almost all experiments have an initially unknown, background level of detection from spurious environmental factors, like heat, radioactivity, or electronic noise. The team needed to work hard to understand the instrumental signals after its deployment.

The physics is the awesome part. Neutrinos weak interaction couples them with other particles called leptons, of which the common or garden electron is one. The other two charged leptons are of different “flavour” and are called the muon and tau (for some reason not often called a tauon), they are much, much more massive than the electron and only last microseconds and picoseconds respectively. The vast energy of the original neutrino means the lepton is moving faster than the speed of light in ice. This is the genius in the design. Anything moving faster than the speed of light in that medium produces Cherenkov Light, an eerie flash of blue. The multiple sensors capture this glow to trace the particle’s energy, and precise directional origin. Different flavours of charged lepton exhibit very different patterns of light emission, with the muon being the type for detecting direction of origin often to better than a degree of angle. Electrons scatter causing a spherical ball of light, and taus are too massive and so decay too quickly. The direction from the muons was reconstructed and compared to the solar direction and thus used to produce an image of the Sun taken through the Earth!

Why This Discovery Changed Astronomy

Traditionally, humanity has mapped the night sky using telescopes that capture electromagnetic radiation, like visible light, X-rays, or infrared rays. However, cosmic light can be blocked by thick clouds of interstellar dust. Cosmic rays—charged particles like protons—are bent out of shape by magnetic fields, distorting their true point of origin.

Neutrinos change everything. Because they are completely unbothered by magnetic fields or dense matter, they travel in a straight line from their source directly to Earth. Tracking them back to their origin has allowed researchers at IceCube to pinpoint monstrous cosmic engines, including blazars (supermassive black holes shooting massive particle jets straight toward Earth).

To me, this cosmic breakthrough represents a major milestone in our exploration of the universe. By mapping the universe with neutrinos alongside light and gravitational waves, we are now uncovering some new cosmic secrets that were once entirely invisible! Indeed, future neutrino detection could reveal a CNB – a Cosmic Neutrino Background that originated very close in time to the Big Bang.

Dan Self

For Sale or Wanted

This section is for the sale of Astronomical items and any wants from members. Details of items for sale (With photographs where applicable) should be forwarded to the newsletter editor at newsletter@brecklandastro.org.uk

It is suggested that a donation of 5% of the final sale price be given to the Society to assist with funds. If sellers do not wish to make their contact details public, then please make this known and the editor will field any enquiries on a box number system. Please send any sales details to the editor before the 26th of the month for inclusion in the next issue.

Please ensure that if any item is sold by another means prior to publication that the editor is advised so it can be removed to avoid confusion.

Alan Osborn (former BAS member) has some equipment for sale as follows:

Celestron 114 Astromaster
Newtonian + equatorial mount
includes redspot finder, instruction manual.

Eyepieces:
10mm +20mm
20mm erecting
2x barlow

Price £50

01953 884681

BRECKLAND ASTRONOMICAL SOCIETY

Charity No.1044478 www.brecklandastro.org.uk

Affiliated to the British Astronomical Association and the Federation of Astronomical Societies

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Our 2026 Child Protection Policy and Observatory Risk Assessment can be viewed on our website in their entirety here:

Child Protection Policy 2026: https://www.brecklandastro.org.uk/child-protection-policy/

Observatory Risk Assessment 2026: https://www.brecklandastro.org.uk/observatory-risk-assessment/

Equipment available for loan to Members

As well as our fantastic library members of the society can borrow our equipment. Here is an equipment list that can be used or borrowed by members, subject to personal responsibility for replacement value. Discuss your plans with one of the regulars first, as it is not easy for beginners to use some of this kit. We are here to help show you how to use it, when the weather holds up, then you will need to sign it out and get approval by a member of the committee. We can discuss a reasonable term.

Refractors:

William Optics Megrez 102 S.V. F7 D102mm f/7 and reducer to f/5.6 – this may be unavailable soon.
William Optics GT-102 2019 D102mm F703mm f/6.9
Vixen 4" Refractor f/9

SCT/Maks:

Celestron C925 Starbright F10 SCT FL D234.95mm F2350mm f/10 Refractor – preferably this should not be taken off the premises.
Celestron C8 SCT D203.2mm F2000mm f/10 Refractor (orange tube)
Meade LX200R SCT D203.2mm F2000mm f/10
Konus Motormax-90 Maksutov-Cassegrain 90mm F1200mm f/13 #1795
Meade ETX125 D127mm F1900mm f/15 Maksutov-Cassegrain Reflector
Mak-Newt:
Skywatcher 190MN DS Pro Maksutov-Newtonian Optical Tube Assembly D190mm F1000mm

Dobsonians:

Skywatcher Skyliner 200mm F1200mm Dobsonian Reflector
Helios D200mm F1000mm Dobsonian Reflector
8-inch Dobsonian (turquoise tube, hand-made)

Solarscope:

Coronado Solarmax 40
Meade 8x50mm Guide Scope

Binoculars:

Vanguard KR-7500 7X50mm Field 7 degrees Binoculars – a little out
Konus #2253 7x50 Field 6.8º Binoculars
Chinon RB Optics 8-20 x 50 HB Zoom Binoculars
Prinzlux 10x50 Binoculars – needs optically cleaning

Mounts:

Berlebach Planet Tripod with Double Clamps
Orange EQ4 telescope mount
Skywatcher SynScan EQ5 Equatorial Mount & Tripod
SynScan mount controller
Meade LXD German Equatorial Mount & Autostar Controller
SynScan mount controller
iOptron IEQ45 Mount and Pier
iOptron Go2Nova mount controller

Eyepieces:

Tele Vue Delos 17.1mm 2"
Antares Speers-Waler 4.9mm SWA Series 2 2"
Antares Speers-Waler 9.4mm SWA Series 3 2"
Meade Ultra Wide Angle 14mm 1.25/2"

Antares W70 Series 8.6mm
Meade Super Wide Angle 18mm 1.25"
Celestron 32mm Plossl 1.25"
Celestron 26mm Plossl 1.25"
Antares 17mm Plossl FMC 1.25"
Intes-Micro Q74 WA 21mm 1.25"
Orion (Or) Circle-T 9mm 1.25"
Vixen K 18mm 1.25"
Fullerscope K 25mm 1.25"
66 Ultrawide 20mm Long Eye Relief 1.25"
Or 6mm 1.25"
Plossl 40mm Multi-coated
Plossl 17mm Multi-coated
14mm (7mm 21mm) 1.25"
Super 20mm 1.25"
Soligor PE-6mm 1.25"
Super Plossl 32mm 1.25"
Lanthanum LV 2.5mm 45 degree 20mm 1.25"
Televue 2x Barlow 1.25"
Televue 2.5x Barlow Powermate 1.25"
2x Barlow Lens
Meade Telenegative 2x Barlow 1.25"

Telescope accessories:

William Optics AFR-IV Adjustable Flattener Reducer
Meade Zero Image-Shift Microfocuser
Meade 4000 Series f6.3 Focal Reducer
Meade 4000 series f3.3 CCD Focal Reducer with T-Adapter
Celestron Reducer/Corrector f6.3 (Model: 94175)
Tamron Adaptall-2 Custom Mount

Eyepiece accessories and filters:

Meade Electronic Eyepiece
Meade Illuminated Reticle MA12mm
Celestron Radial Guider (#94176)
Light Pollution Filter 1.25"
Meade #908 O-III Nebular Filter
Variable Polarizing Filter #3
Baader Planetarium Contrast-Booster Filter (#2458360) 1.25"
Celestron Colored Eyepiece Filters (#25 Red, #38A Blue, #47 Violet, #53 L Green)
Baader G-CCD Filter 1.25" (Cat: 2458470G)
Baader R-CCD Filter 1.25" (Cat: 2458470R)
Baader B-CCD Filter 1.25" (Cat: 2458470B)
Baader UV/IR Cut/L-Filter 1.25" (Cat: 2459207A)
Baader H-alpha 7nm CCD Narrowband-Filter 1.25" (Cat: 2458382)
Baader O-III 8.5nm CCD Narrowband-Filter 1.25" (Cat: 2458435)
Baader S-II 8nm CCD Narrowband-Filter 1.25" (Cat: 2458430)
Baader H-beta 8.5nm CCD Narrowband-Filter 1.25" (Cat: 2458425)
Astronomik L-RGB Type 2c Filterset 1.25" (4 filters, Cat: 10220125)
Astronomik CLS-Filter 2" (Cat: 10213200)
Astronomik CLS-Filter 1.25" (Cat: 10213125)
Astronomik CLS CCD-Filter 1.25" (Cat: 10208125)
Star Analyser 100 (Model: PHEL-SA100) – produces spectra

Cameras:

Atik Focal Reducer 58mm
Atik 383L + FW 11/4"+Filters
Atik Infinity Camera
Atik 314L+ CCD Camera (SNI1003041)
Atik One 6.0 Monochrome CCD Camera (SN: 1191452-0093)
Atik 460EX Color (SN21223-26)
ZWO ASI290MM Mini USB 2.0 Monochrome Small Format CMOS Camera
Imaging Source DBK21AU618.AS 640x480 USB2 planetary camera

STV (‘vintage video CCD AV camera) and Filter Wheel
Astrovid 2000 (‘vintage’ CCD camera)
Nikon D100 DSLR
Sigma EX DG Macro 105mm 1:2.8 DLSR Lens
Geoptik CCD Adapter x Canon (Model: 30A189)

Gresham Lectures

Professor Chris Lintott, a two time speaker at Breckland Astronomical Society, and presenter of the Sky at Night, is the current Gresham Professor. He has done a wonderful long educative and accessible series of lectures about current Astronomy and how it got where it is.

I was particularly taken by the one about Cosmic Inflation from 6 October 2026.

Cosmology's Mad Idea: Inflation & the Creation of Our Universe - Chris Lintott (Gresham Podcast audio)

Cosmology's Mad Idea: Inflation & the Creation of Our Universe - Chris Lintott (Youtube with video)

Check out the channel here:

(36) Seeing the Universe - YouTube

And the General Gresham Lectures (all sciences and subjects):

(36) Gresham College - YouTube

Astrophysics Quiz Answers

Here are the answers to Dan's Astrophysics quiz. How did you do?

Answers: 1. A 2. B 3. C 4. D 5. A 6. B 7. C 8. D 9. C 10. B

Contacts

Chair Dan Self
Contact chairman@brecklandastro.org.uk

Observatory/Visits Justin Peerson
Contact visitors@brecklandastro.org.uk

Webmaster Andrew Luck (temporary)
Contact webmaster@brecklandastro.org.uk

Newsletter Rebecca Greef
Contact newsletter@brecklandastro.org.uk

Membership/Treasurer Keith Fowler
Contact treasurer@brecklandastro.org.uk

Secretary John Copsey
Contact secretary@brecklandastro.org.uk

Please check with any of the contacts before visiting the observatory.

Please ensure you are wearing appropriate footwear and clothing and bring a torch (preferably one showing a RED light).

Breckland Astronomical Society Events – 2026/27

7:30pm Great Ellingham Recreation Centre, Watton Road, Great Ellingham, Attleborough, Norfolk

between NR17 1HZ and 1HX

£3 over 18s *what3words: octopus.vibrates.hubcaps*

Friday November 14	**A Lesson In Astronomy**	Karenmae Bloom BAS
Friday November 27	**Public Open Evening**	Observatory
Friday December 11	**What actually is a LASER?**	Richard Harmon BAS
Tuesday December 29	**Public Open Evening (Tuesday)**	Observatory
Friday January 8	**The Sun's Sisters**	Dr Paul Fellows MBE
Friday January 29	**Public Open Evening**	Observatory
Friday February 12	**The Chemistry of the Cosmos**	Dr Dan Self BAS
Friday February 26	**Public Open Evening**	Observatory
Friday March 12	**Supermassive Black Holes & Quasars**	Dr Sandro Tachelli IoA
Friday March 26	**Public Open Evening**	Observatory