



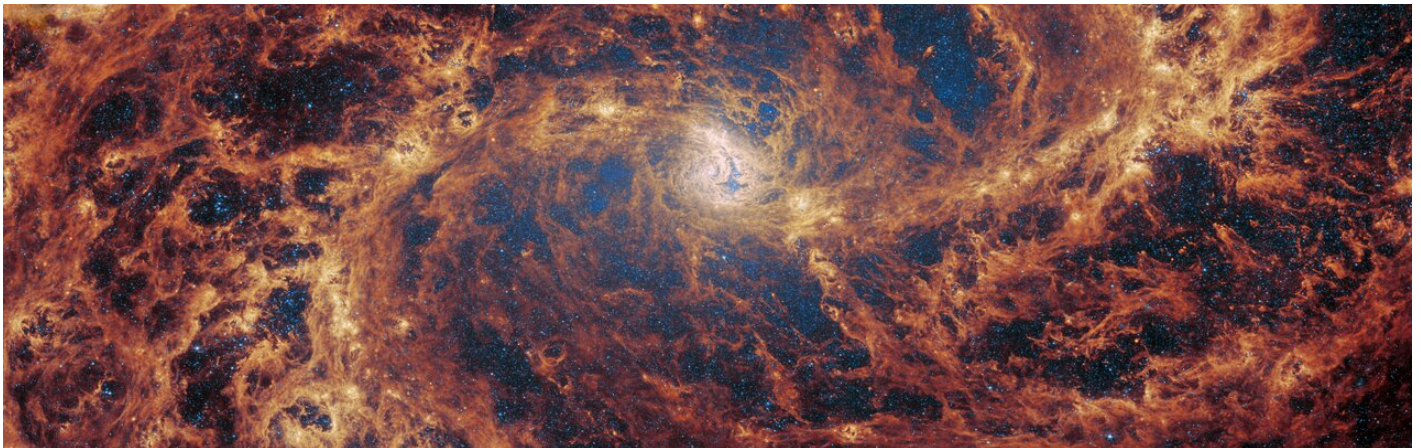
# OASI News

The newsletter of Orwell Astronomical Society (Ipswich)

## OASI Annual General Meeting

7.30pm, Monday 22<sup>nd</sup> January 2024, Newbourne Village Hall  
All Members are welcome to attend

All Committee positions are open for election. All the current Committee are willing to stand again, but there are vacancies for Newsletter Editor and Newbourne Convenor



A close-up view of barred spiral galaxy M83 taken with the Mid-InfraRed Instrument (MIRI) on board the JWST. Two spiral arms reach horizontally away from the core in the centre, merging into a broad network of gas and dust which fills the image. This material glows brightest orange along the path of the arms, and is darker red across the rest of the galaxy. Through many gaps in the dust, countless tiny stars can be seen, most densely around the core.

[image credit: ESA/Webb, NASA & CSA, A. Adamo (Stockholm University) and the FEAST JWST team]

Trustees: Mr Roy Adams Mr Neil Morley Mr David Payne

Honorary President: Dr Allan Chapman D.Phil MA FRAS

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"Credit" Martin Cook

# Society Notices

Dear Members,

So, we are about to welcome in a New Year, where did 2023 go!

Whilst it is great that we always have a healthy number of members attending our Newbourne meetings, it has been noticeable that attendances have seemed to have dropped at other meetings, particularly at our Wednesday meetings at Orwell Park. I know that we cannot offer tea and biscuits at Orwell Park, but when it is clear, we will always be observing through the historic Tomline Refractor. As a member of OASI, you are welcome at all our meetings, so it would be great to see a few of our newer members at Orwell Park.

If the weather is clear, I always like to see observing take place at our Newbourne meetings. We have a varied selection of telescopes on-site, which members are free to use. If you are unsure on how to operate any instrument, Roy Gooding will be providing practical tuition at our meeting on Monday 15 January.

Finally I would like to wish all OASI members and their families a Happy New Year and I look forward to seeing you in 2024.

Andy Gibbs, Chairman

## Society Contact details

Email queries: [info@oasi.org.uk](mailto:info@oasi.org.uk)

Facebook: Orwell Astronomical

Twitter: @OASIPswich

YouTube:  
<https://www.youtube.com/channel/UCHgxe3QAeRVWf7vkjKkCI2Q>

Members-only message board

<https://groups.io/g/OASI>

Observatory (meeting nights only)

07960 083714

**Please send material for the OASI  
web site and newsletter  
e.g. observations, notices of events,  
general interest articles, to  
[news@oasi.org.uk](mailto:news@oasi.org.uk)**

The CLOSING date is the 15th day of the month

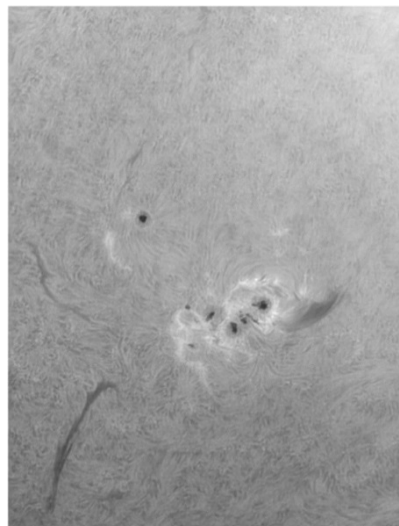
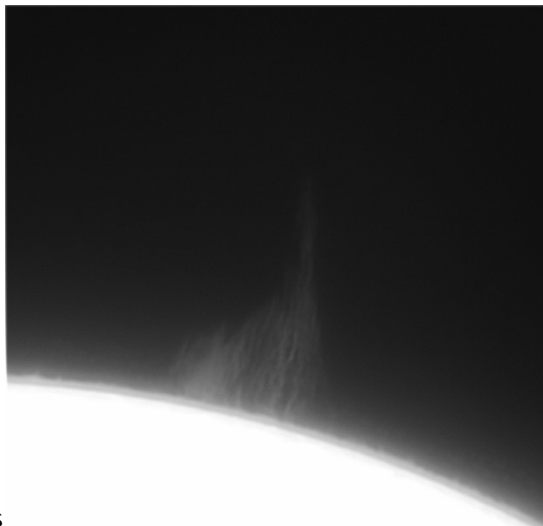
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The Sun on 28/11/2023 at 13:00UT in H-Alpha, using Lunt LS60THa/B1200 telescope and Zwo 178MM camera.

The enlarged images of the sunspots, prominences and filaments was taken using a 2.5x Barlow.

Good to see so many active regions of sunspots and very large prominences projecting from the surface.

Martin Cook





## Access into the School Grounds and Observatory Tower

Orwell Park School have changed our access route to the observatory.

The new route will be as follows:-

- Enter through gate 2 (gate 1 being the main gate) and park inside as per the attached map.
- Enter the school through the double black doors as indicated on the map. A key fob will be required to open the door.
- Continue straight through the next two sets of double doors.
- Turn left at the end of the short corridor then immediately right.
- Pass through the single door and on your left you will find the staircase leading to the observatory.
- On no account must you deviate from this route.

When leaving the observatory use the same route but in reverse. Please keep noise to a minimum as there are staff quarters nearby.



## Articles for OASI News

News, pictures and articles for this newsletter are always welcome. Details above.

Please send tables as separate files in one of the above formats.

If you don't feel up to writing a major article, perhaps you might write a short note for OASI News along the lines of "This month I have mostly been observing/constructing/mending/reading/etc."

The Newsletter archive is at [www.oasi.org.uk/NL/NL\\_form.shtml](http://www.oasi.org.uk/NL/NL_form.shtml)

**Authors, please note that your articles will be publicly available worldwide!**

## Reproducing articles from OASI News

If you plan to reproduce an article exactly as per OASI News then please contact the Editor – otherwise, as a matter of courtesy, please seek permission from and credit the original source/author. You may not reproduce articles for profit or other commercial purpose.

## Committee 2023

Chairman	AndyGibbs	Set overall agenda for OASI, Chair committee meetings, Press and publicity
Secretary	RoyGooding	Outreach meetings (jointly with Chairman), observatory decoration
Treasurer	PaulWhiting	Finance, Supervision of applications for grants. Visits by outside groups, Observatory tours, Public appreciation of astronomy, Outreach activities
Committee	James Appleton	Committee meeting minutes, Web site
	MartinCook	Membership, Tomline refractor maintenance & user testing
	Matt Leeks	Safety & security
	Peter Richards	Lecture meetings
	John Wainwright	Equipment curator
	Mike Whybray	Astronomy Workshops, Child protection officer, Orwell Park School Astronomy Club
	Andy Willshire	Librarian Newsletter, OASI @ Newbourne

For newsletter and Newbourne please contact Paul Whiting,

## Committee Meeting

The next Committee Meeting will be the AGM on **Monday 22<sup>nd</sup> January** at 7.30pm at Newbourne. All members welcome.

## Welcome to new members

Chris Court

## OASI and BAA Events

For the latest event details, please see [www.oasi.org.uk/Events/Events.php](http://www.oasi.org.uk/Events/Events.php)

There's a Google Calendar on the OASI web site with the latest dates.

If you want to easily add OASI Events to your own computer/phone/tablet calendar

application click this button on the website Events page (bottom right of the calendar)



or use this address to access this calendar from other calendar applications:

<https://calendar.google.com/calendar/ical/Ijhs9db7Incki4sojo7092vfvc%40group.calendar.google.com/public/basic.ics>

For other astronomy news and astro pictures try our

Twitter feed <https://twitter.com/OASlpswich>

Facebook page <https://www.facebook.com/pages/Orwell-Astronomical/158256464287623>

Date, Time & Location	Contact	Event
Weekly, every Wednesday, from 20:15 Orwell Park Observatory, Nacton	Martin Cook, Roy Gooding	Observatory open
Monday 15 <sup>th</sup> Jan from 19:30 Newbourne Village Hall	Paul Whiting	OASI@Newbourne “Hands on Setting up a Telescope” Workshop Beginners and new members welcome
Thursday 18 <sup>th</sup> Jan 20:00 Zoom	Paul Whiting	Monthly Zoom Meeting
Monday 22 <sup>nd</sup> Jan from 19:30 Newbourne Village Hall	Paul Whiting	OASI@Newbourne Beginners and new members welcome Sky Notes & Annual General Meeting

## OASI @ Newbourne

[newbourne@oasi.org.uk](mailto:newbourne@oasi.org.uk)

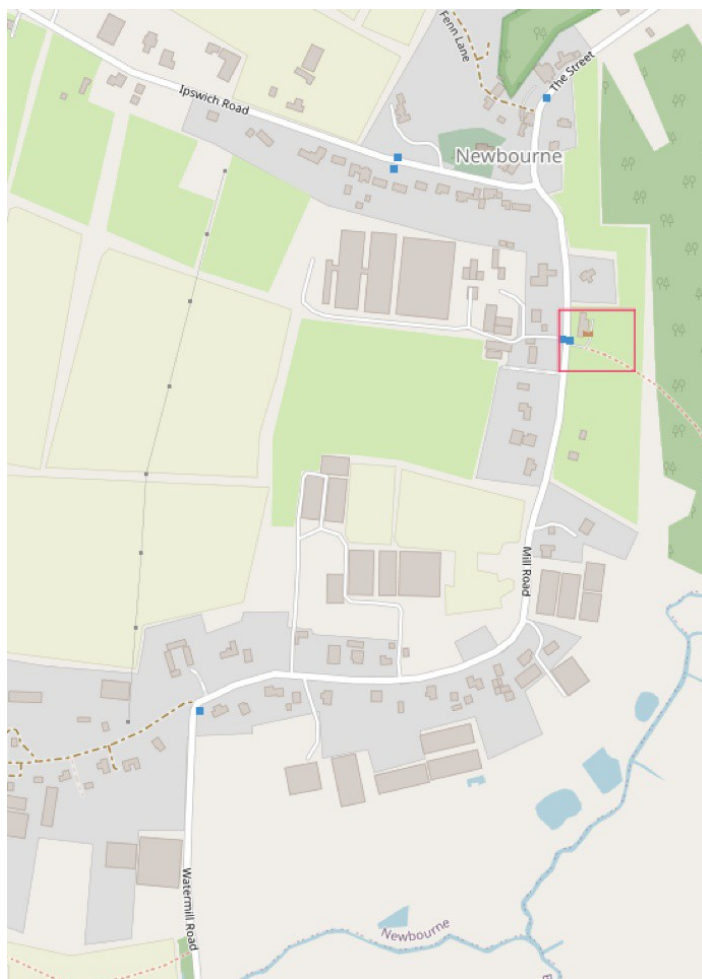
We meet at Newbourne Village Hall,  
Mill Lane, IP12 4NP on the 2nd and 4th  
Mondays from 19:30.

**Visitors are welcome but we do ask you  
to join the Society after two visits.**

<http://www.oasi.org.uk/OASI/Membership.php>

### Newbourne dates for 2024

January	15 <sup>#</sup> (W)	22 (S/AGM)
February	12	26 (S/T)
March	11	25 (A/S)
April	01 <sup>#</sup>	22 (S)
May	06 <sup>#</sup>	27 (A/S)
June	10	24 (S)
July	08	22 (A/S)
August	12	26 (S)
September	09	23 (A/S)
October	14	28 (S)
November	11	25 (A/S)
December	09 (Q)	



We open up for all meetings at 7:30pm. Astro News (A) / Star Guide (S) at 7:45pm followed by any Talks (T), Workshops (W) and occasional Quiz (Q). # indicates a change to the normal monthly pattern.

Telescope Workshop – Monday January 15<sup>th</sup> : “Hands on Setting up a Telescope”, Roy Gooding  
Newbourne Talk – Monday February 26<sup>th</sup>: “The Future of Astronomy”, Paul Whiting

## BAA news & webinars

For full details of all meetings or cancellations, please go to <https://britastro.org/events/future-events>

Saturday 20<sup>th</sup> Jan 2024 14:30-18:00 Preliminary Meeting Programme:  
Mike Frost – Eclipse and Revelation  
Stephen Ramsden – The Beauty of Light (remote presentation from Atlanta)  
Nick James – Sky Notes

Venue: *INSTITUTE OF PHYSICS, 37 Caledonian Road, London, N1 9BU*

Wednesday 27<sup>th</sup> Mar 2024 17:30-20:00 BAA Meeting

Venue: *INSTITUTE OF PHYSICS, 37 Caledonian Road, London, N1 9BU*

Friday-Sunday 12-14<sup>th</sup> Apr BAA Winchester Weekend

Venue: *Sparsholt College, Winchester*

Saturday 11<sup>th</sup> 2024 May BAA Spring Meeting, Greenock

Saturday 18<sup>th</sup> May 2024 10:00-17:00 Historic Section Meeting, Ipswich

Venue: *Museum Street Methodist Church, Ipswich (tbc)*

Wednesday 5<sup>th</sup> June 2024 17:30-20:00 BAA Meeting & George Alcock Lecture

Venue: *INSTITUTE OF PHYSICS, 37 Caledonian Road, London, N1 9BU*

September (dates tba) BAA Autumn Meeting

Venue: *Rutherford Appleton Laboratory*

Wednesday 30<sup>th</sup> October 2024 17:30-20:00 BAA Meeting & AGM

Venue: *INSTITUTE OF PHYSICS, 37 Caledonian Road, London, N1 9BU*

## The BAA Radio Astronomy Section

The BAA Radio Astronomy Section have been enjoying talks, seminars and tutorials via Zoom and these are available on the BAA YouTube channel

<https://www.youtube.com/user/britishastronomical/playlists>.

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## Hands on Setting up a Telescope

### Workshop at Newbourne 15<sup>th</sup> January Roy Gooding

Roy plans to run a workshop on “Hands on Setting up a Telescope” primarily for new members, or those not so new, who may not have had any experience in assembling an equatorially mounted telescope.

## The Night Sky in January 2024

All event times are for the location of Orwell Park Observatory 52.0096°N, 1.2305°E. Times are **GMT** unless otherwise stated.

### Sun, Moon and planets

Sources: <http://heavens-above.com/PlanetSummary.aspx> <http://heavens-above.com/moon.aspx>

### January 2024

Object	Date	Rise	Set	Mag.	Notes
Sun	1	08:03	15:54		
	31	07:37	16:40		
Moon	1	21:46	11:02		Apogee 01 January 15:29; 29 January 08:15 Last Quarter 04 January 03:33 New Moon 11 January 11:57
	31	23:03	09:38		Perigee 13 January 10:36 First Quarter 18 January 03:53 Full Moon 25 January 17:54
Mercury	1	06:31	14:45	0.6	
	31	07:00	14:45	-0.2	
Venus	1	05:00	13:34	-3.9	
	31	06:03	13:49	-3.9	
Mars	1	07:20	14:42	1.4	
	31	06:51	14:31	1.3	
Jupiter	1	12:22	02:32	-2.4	
	31	10:26	00:43	-2.2	
Saturn	1	10:38	20:30	0.9	
	31	08:45	18:51	1.0	
Uranus	1	12:46	03:54	5.7	
	31	10:47	01:54	5.7	
Neptune	1	11:12	22:37	7.9	
	31	09:15	20:43	7.9	

### Occultations during January 2024

[https://iota-es.de/moon/grazing\\_descr%101.html](https://iota-es.de/moon/grazing_descr%101.html) and <http://www.lunar-occultations.com/iota/bstar/bstar.htm>

Observers are encouraged to download and install the **Occult** software program [Windows only] to generate predictions for their own particular site coordinates.



## Meteor showers during January 2024

Shower	Normal limits	Maximum	ZHR at Max	Notes
Quadrantids	28/12/23 – 12/01/24	03/01/24	120	Bluish- or yellowish-white meteors with fine trains
Alpha Centaurids	28/01/24 – 21/02/24	08/02/24	6	Quite fast meteors

See also <https://www.rmg.co.uk/stories/topics/meteor-shower-guide>

For radio observation, use reflections from Graves Radar on 143.049MHz or the Brams transmitter in Belgium on 49.97MHz and UK GB3MBA on 50.408MHz <https://www.ukmeteorbeacon.org/Home>

See also [https://www.popastro.com/main\\_spal/meteor/radio-meteor-observing-2020/](https://www.popastro.com/main_spal/meteor/radio-meteor-observing-2020/).

## Comets

Source : <https://heavens-above.com/Comets.aspx> on 18/12/23.

Comet	Brightness	Date of last reported observation	Angular separation from Sun	Constellation
62P Tsuchinshan	7.7	2023-Dec-16	108°	312° (NW)
12P Pons-Brooks	9.2	2023-Dec-15	64°	199° (SSW)

## Visible ISS passes >30° max altitude for January 2024

Source: <http://heavens-above.com/PassSummary.aspx?satid=25544>

Times are **GMT**.

Predictions are approximate (18/12/23) due to craft adjustments. Check the day before.

Date	Bright-ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
19-Jan	-2.9	18:06:57	10°	SW	18:10:02	35°	SSE	18:10:38	32°	SE
20-Jan	-2.6	18:53:30	10°	WSW	18:55:51	42°	WSW	18:55:51	42°	WSW
21-Jan	-3.5	18:03:52	10°	WSW	18:07:09	58°	SSE	18:08:12	37°	ESE
22-Jan	-3	17:14:18	10°	SW	17:17:29	43°	SSE	17:20:30	11°	E
22-Jan	-3.1	18:50:40	10°	W	18:53:19	53°	W	18:53:19	53°	W
23-Jan	-3.8	18:00:55	10°	WSW	18:04:14	79°	S	18:05:35	33°	E
24-Jan	-3.6	17:11:11	10°	WSW	17:14:28	67°	SSE	17:17:48	10°	E
24-Jan	-3.4	18:47:46	10°	W	18:50:39	64°	W	18:50:39	64°	W
25-Jan	-3.8	17:57:57	10°	W	18:01:17	87°	S	18:02:54	28°	E

26-Jan	-3.7	17:08:06	10°	W	17:11:27	84°	S	17:14:47	10°	E
26-Jan	-3.6	18:44:44	10°	W	18:47:58	65°	SSW	18:47:58	65°	SSW
27-Jan	-3.7	17:54:53	10°	W	17:58:13	78°	S	18:00:15	22°	ESE
28-Jan	-2.9	18:41:39	10°	W	18:44:50	42°	SSW	18:45:23	38°	S
29-Jan	-3.2	17:51:43	10°	W	17:55:00	56°	SSW	17:57:47	13°	ESE
31-Jan	-2.2	17:48:31	10°	W	17:51:35	34°	SSW	17:54:38	10°	SE

## Starlink passes

<https://heavens-above.com/AllPassesFromLaunch.aspx>

For a dynamic 3-D display, see <https://heavens-above.com/StarLink.aspx>

## Bill Barton's Radio Broadcast

ICRFM (Ipswich Community Radio) 105.7 MHz at about 08:25 in the morning of the first Wednesday of each month. I aim to cover what there is to see in the sky and then a little bit on something topical. ICRFM is also available to listen to over the Internet and there is a listen again option on their website. <http://www.icrfm.com>

## Forthcoming Outreach Programmes

All members are welcome to come along and help out at these events – you don't need to be an expert in the subject. Just respond to the email call for help prior to the event.

Please note that not all events are open to the public.

*Thursday February 22<sup>nd</sup> 2024 Norwich Science Festival, The Forum, Norwich*

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## Members' Observations

### Mike Whybray

I was in Finland (Rovaniemi in Lapland) 15-22nd November. Although aurora were happening we never saw any due to cloud or mist cover most of the time. However we did visit Santa Claus and did other good things!

On return to the UK, last night (25th) my Aurorawatch app pinged just as we were about to go out. So I hastily set up my camera in the back garden at Nacton. I didn't see anything by eye but my camera caught something, attached.

Canon EOS 550D, 14 mm Samyang F2.8 lens. ISO 1600, 8 second exposures looking roughly North. Gamma adjusted to 0.5 to suppress the rather bright sky (almost full moon), then downsampled by 2x.



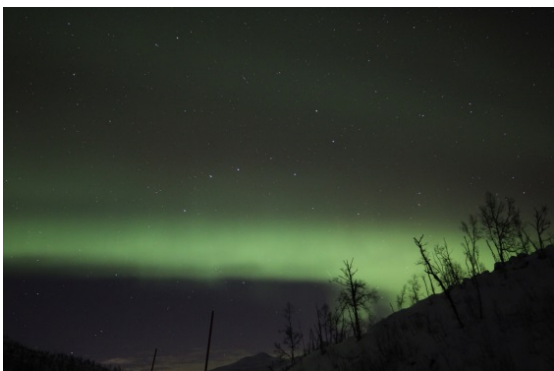
### **Andy Gibbs**

I have attached a few photos from my recent cruise to the Arctic Circle, In search of the Northern Lights. In total, the Aurora was observed on four separate occasions, twice from our ship and twice from organised excursions.

The first two images were taken on Friday 17 November, on an excursion from Tromsø. The weather was not great with persistent heavy snow, but we travelled 100km south east to Skibotn, where we fortunately, found some gaps in the cloud and the aurora on display.

The final two images were taken on Sunday 19 November, on an excursion from Narvik. This time we were blessed with clear skies, however, although the Kp index was forecast to peak at 5, the all-important Bz value was not so favourable, (this ideally has to turn southward). We headed east from Narvik towards the Abisko National Park in Sweden, however during our journey the aurora started to appear, so the driver stopped our coach for a photo opportunity in a lay-by off the E10 road on the Norwegian side of the border.

I used a Canon 1200D camera with a Samyang 14mm f2.8 lens, 10 second exposures ISO1600.



## Nigel Evans : Lost - One Toolbag

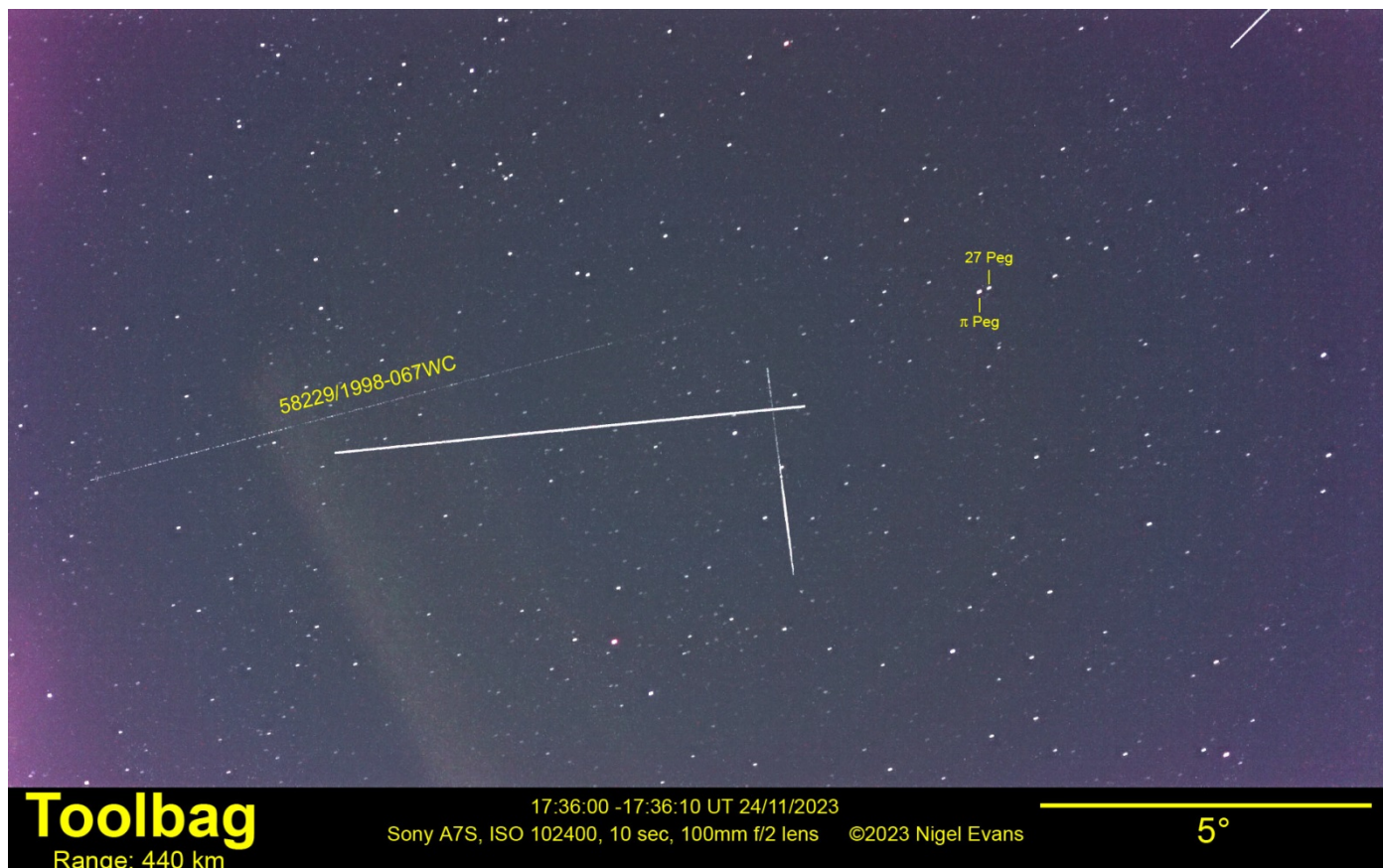
The ISS has been in the news recently. On a spacewalk on November 1, a toolbox was accidentally released and is now in an orbit separate from the ISS. An observing opportunity!

Fortunately the news stories gave the identifiers suitable for nerds - 58229/1998-067WC. Currently the ISS has passes in the evenings and this tool-bag will be in a very similar orbit. However it was also stated that the bag is below naked eye visibility

The weather in Suffolk has been rubbish for the last few weeks and last night was not particularly promising - patchy clouds and quite windy. The moon also lit up the sky. The pass last night was predicted to reach 72 degrees while passing through Pegasus. In order to catch something that is moving in low Earth orbit I chose to use a Sony A7S in video mode with a high ISO and a lens fully open. This was placed on a static tripod. This was set running while I watched for it with binoculars. I saw many candidates for the elusive bag but I suspect most were Starlink.

So what did I record? 231124 Toolbag NSE.jpg show a composite from 10 seconds of video footage. There are 3 other satellites that I could not be bothered to identify. However, very close to the predicted track, was a fainted tumbling object, shining somewhere between 7 and 8 magnitude. Meanwhile 231124 toolbag NSE.mp4 has been stacked to follow the bag, firstly as a live-rate video of it passing amongst the stars, followed by a stacked version that runs at 5x live rate.

[Note: the videos can be found on the OASI website. Ed.]





## John Hughes : Sh2-171 (NGC 7822), located in the Cepheus.

After a lull in imaging I decided to seek some inspiration to get back behind the telescope by reviewing some fantastic images on Astrobin. Having been re-invigorated I decided I needed to change things up a bit and incorporated some changes to my data acquisition by switching from Sequence Generator Pro to NINA. The latter required some investment in time to learn the software and incorporate my equipment; however, it has been a joy to use.

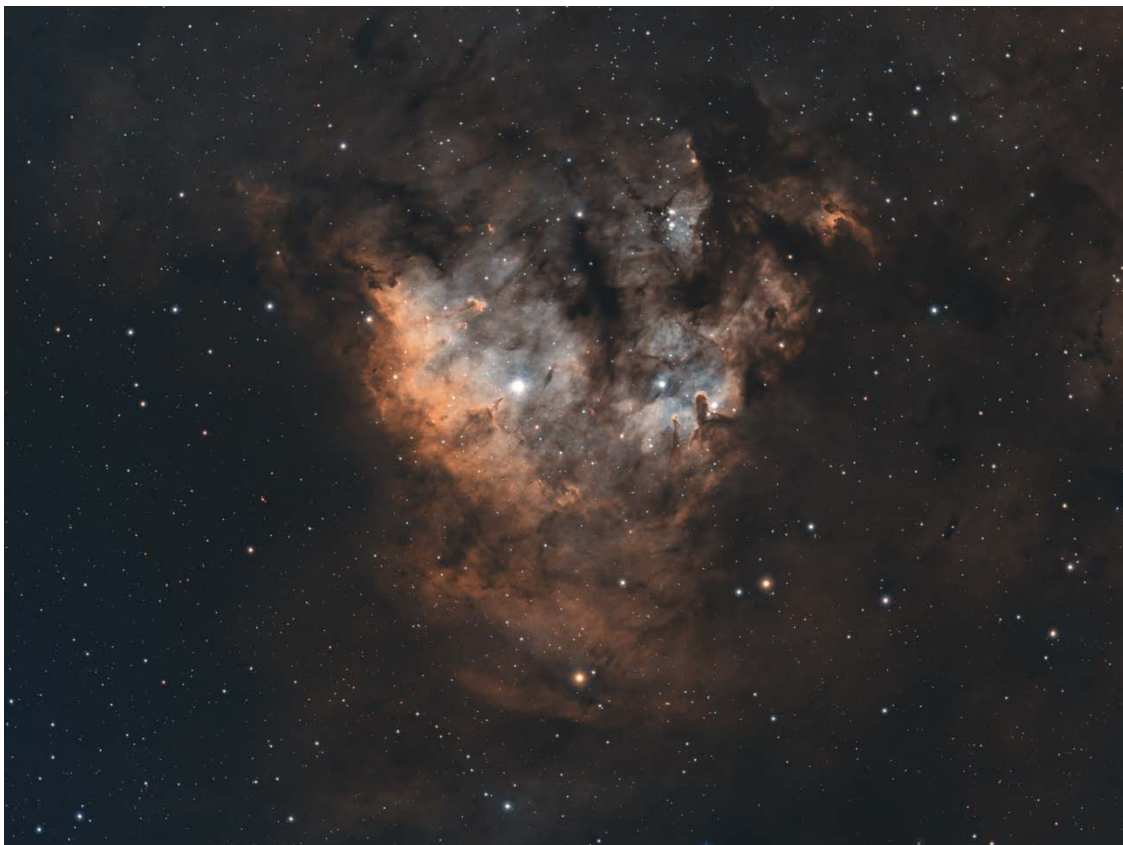
I needed to test out my settings in NINA so chose Sh2-171 as at this time of year it is close to crossing the Meridian and I needed to ensure my settings wouldn't cause the scope to crash into anything. I also needed to test the plate solving software, connection to Stellarium, slewing to targets as well as auto focus.

The image was captured across the nights of 30 November and 5 December 2023 using the following:

- William Optics Z103 refractor.
- ZWO ASI1600mm Pro Cool camera.
- Chroma 3nm H $\alpha$  and OIII filters.
- SkyWatcher EQ6R Pro mount
- 51 x 300s in H $\alpha$
- 35 x 300s in OIII

The image is presented in the HOO palette.

Incidentally, my EQ6R Pro mount has now been sitting outside under a telegizmo cover for nearly 3 years and touch wood has not skipped a beat. If anyone is looking for a decent outdoor cover you will be hard pressed to find better. Moisture and dew need managing so if anyone wants to explore this further please let me know and I will be happy to share my thoughts.



## **Artificial Intelligence (A.I.) and Quantum Computers. from Machine Learning to Bits and Qubits.**

Andy Willshire

Artificial intelligence (A.I.) and quantum computing, it is suggested, are the way for the future. The former is a technology that is rapidly changing and will probably influence the future of all human life, the latter will control the speed of resolution. If you take a few minutes to consider the multitude of tasks that you would like made easier for you to do, this would probably be where artificial intelligence would be able to play a major part.

Just think about where artificial intelligence could be utilised in the future. It wouldn't take you very long to have a comprehensive list.

Consider medicine. A.I. could help in all aspects, from controlling surgical techniques, diagnosing medical conditions, screening cancer tests and checking X-rays, to sending out clinic appointments. If you look up and down a high street in a busy town, there would be many shops and firms that A.I. would benefit and in some cases are already benefitting. Banks, transport systems and stock checking are just a few that spring to mind. Taking a wider view of society, large corporations are already putting huge amounts of funding into A.I. firms to create bigger and improved products and systems. This means that changes, such as in transportation, education, health and manufacturing will appear on the horizon. By increasing the input of data into A.I., the more the systems will be able to do for us. Of course, the cry will go up about these systems taking away human jobs. Initially there will have to be retraining courses for those whose jobs have been taken over, but consider all of the tasks that will necessitate the human hand to perform, within the A.I. network, from projects to programming. It has been suggested that within several years many millions of jobs will have been created just to keep the industry moving forward. Let's face it, if one large firm has A.I. and is moving into the future faster, then so will most of the others, price notwithstanding. If this new future is coupled with quantum computers then magical things could happen. Everything that requires algorithms and/or data sets to function will find that answers will be computed and systems will run very much quicker. This will also mean that speedy results from state of the art sensors will give early warnings of climate and habitat problems.

How intelligent can A.I. get? Can we program cognition? Manufacturing a fully intelligent A.I. system with a procedural memory is perhaps well into the future, especially when you consider the complexity of the human brain, with its cells and chemicals. However, an A.I. designing another A.I. may get closer than we think, although to become sentient could be a step too far.

In order to fulfil our A.I. wishes, we require, as has been put forward earlier, much faster computational ability. This at present would entail the coupling of many super fast computers together. This however would probably not eventually be fast enough, so we arrive at the quantum computer, which is still partially in its theoretical stage, but advancements are being made at breakneck speed.

What is a quantum computer? This next section is a short insight into its origin, physics and its future.

Quantum theory was proposed in 1900 with a presentation by Max Plank, in which he proposed that energy and matter subsist as separate units. Plank became a professor of theoretical physics in 1892 at the Frederick-Wilhelms-Universitat in Berlin. In 1896 one of his colleagues William Wein produced a formula known as Wein's displacement law, which by 1900 other scientists had found was only sound at high frequencies. This indicates that the black-body curve for different temperatures will crest at different wavelengths, being inversely proportional to the temperature. Plank attempted to trace back this law using the second law of thermodynamics:

“The second law of thermodynamics states that the total entropy of an isolated system can never decrease over time, and is constant only if all processes are reversible.”

Referenced from: [https://en.wikipedia.org/wiki/Second\\_law\\_of\\_thermodynamics](https://en.wikipedia.org/wiki/Second_law_of_thermodynamics)

In 1897 Plank published his Treatise on Thermodynamics and in 1899 proposed a formula that answered questions that were raised by black-body radiation. This specified that ( $E=Nhf$ . Energy=Integer\*constant\*frequency). This ‘Plank’constant was later considered fundamental and is used today as a physical stable formula. He described energy as being emitted in small packages which he called ‘quanta’. This new energy theory allowed Einstein to establish his Theory of Relativity. It wasn’t until the 1980’s under the guidance of the American physicist Paul Benioff, that quantum computing began to look feasible. He proposed to utilise the mathematics of the Turing machine to fabricate a quantum mechanical model. The Turing machine was formulated as a mathematical instrument that could never be wrong and would unvaryingly identify tasks that on paper could not be demonstrated as either true or false. However although there have been many research studies performed since this date; the ‘Holy Grail’ of coherence has become very illusive.

At present there are several representations of quantum computing, with the forerunner described as the quantum circuit, which is based on the Qubit (quantum bit). These qubits are comparable in certain respects to the standard bit in a traditional computer. The difference between the two is that a conventional bit is based on binary logic. It is annotated as logical high being binary 1 and logical low given binary 0. These bits 1 and 0 have different representations in various electronic integrated circuits, such as CMOS and TTL, whereas Qubits can either be in 1 or 0 quantum state or a superposition of the 1 and 0 state. In quantum mechanics, superposition exists when two or more quantum states are added together, giving another logical quantum state.

This means that as a quantum bit it can exist in both states at the same time, so if three qubits are available, they can store eight bits of data at the same time: four qubits will store 16 data inputs at the same time. It is when large numbers are used for example  $2^{84}$ , that this type of computer will come into its own in sheer speed of calculation, making it much faster than a standard computer. This is considered to be in the 10 teraflop range. In this case it would have the potential to perform  $1.93 * 10^{25}$  calculations in a single action.

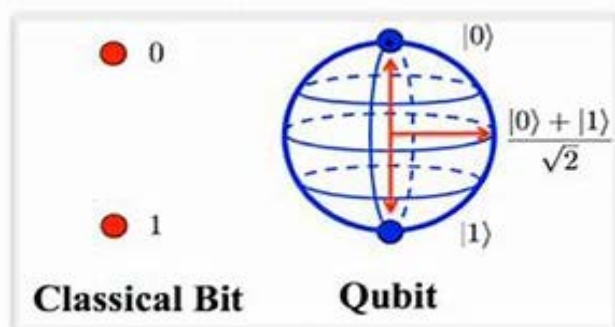


Image credit: University of Strathclyde. Mathematical representation of a Qubit.

In classical computing the truth variables, true and false are given numerical values 0 and 1. This is described as Boolean algebra or Binary algebra and is utilised in logical manipulations. Within a computer system there are hosts of transistors and capacitors that can be only in one state, either 1 or 0. There is a finite speed at which switching of these devices can be performed. This is one of the handicaps of this type of computer as both physical and electronic limits are reached. As described earlier the quantum computer with a two mode logic gate is able to transform into a superposition of 0 and 1. Elementary particles can also be coerced into use, by making them polarized and annotating them as zeroes or ones. How these particles behave is the crux of quantum computing, with superposition and entanglement being two of the major features.

If interference peaks are obtained from an electron beam used in a double slit investigation, the wave characteristics observed depict that of a quantum system. The key point of quantum superposition is that if a physical system can be in any one of many set ups, the most probable will be an amalgam of them all, with each segment being registered as a complex number.

Quantum entanglement is a physical event that happens when at least a pair, or a group of particles are generated and then interact in such a way that it is impossible to express the state of the others from an individual point of view. However a quantifiable measurement of the whole system can be ascertained. Qubits that are separated by considerable distances are permitted by quantum entanglement to interact instantly. Entanglement will remain for as long as the particles remain isolated.

Quantum physics will allow quantum computing to forge ahead when compared to a classical computer especially in the processing power of numbers. A great amount of experimental work has been accomplished by targeting the qubit. By improving this device, the change from transistor will be seamless. The generation of a superconducting qubit, which is based on microfabrication apparatus and electrical management, is among the avenues being explored. This will provide the function to house many qubits in one single processor, especially as coherence times have been upgraded. So how do we control these superconducting qubits? The answer is to use intricate pulsed microwave signals on numerous channels with exacting synchronization. If additional numbers of qubits and channels are added, a greater number of electronic comparison controls are required.

At this stage in the gestation of the quantum computer a myriad of problems have occurred with the following causing scientists the maximum amount of insomnia. Decoherence or interference can cause quantum systems to collapse; error rectification of qubits is critical, with failure causing computational collapse, and output data retrieval can jeopardize disc corruption. Oh! I had almost forgotten the cost. If you would like to pre-order a 12 qubit one, it's going for about 10 million dollars. Get saving!!.

Essentially, the ability of a system to interpret a qubit's quantum condition, is one of the prime incentives of quantum computing design, and the corner stone for progress into the future

However, at this point in the century numerous conglomerates are working to provide solutions in all aspects of production. They hope to merge the frontiers in Human advancement in both A.I. and quantum computing, in complex problem solving and data analysis optimization. It is hoped that this will unlock most enigmas. With A.I. mimicking human intelligence and quantum computing setting tremendous speeds for data interpretation, human quality of life may be revolutionised. Perhaps technology and science will be reshaped for generations to come.

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**Answer to December's mathematical teaser:**

Taking the first square with the letter G and numbers 13,23,25.

Add numbers together ie.  $13+23+25 = 61$ . Take each digit of answer and add them together.  $6+1 = 7$ . 7th letter of alphabet is G. The remaining squares are calculated identically.

In the two squares with the ?. The first square with the figures  $10+15+21 = 46$ .

$4+6 = 10$ . 10th letter is J.

The middle small square is as follows. Calculate the numbers that reflect the letters station in the alphabet.

$G=7, M=13, K=10, J=11$ . Total = 41.  $4+1 = 5$ . 5th letter in the alphabet is E.

**Next Month's little task for the brain cells.**

What number should be substituted for ?

$$18+16 = 114$$

$$14+11 = 74$$

$$12+9 = 60$$

$$20+15 = ?$$