

SKYWATCHER NEWSLETTER



LATEST NEWS

Every week it seems a fascinating new image and discovery has emerged from the JWST mission. Space.com recently reported the following.

Using the James Webb Space Telescope (JWST), astronomers have observed the luminous cloud of material that surrounds a newborn star, cocooning it in a crib of gas and dust. These so-called Herbig-Haro objects are created when stellar winds and jets of gas billow from newborn stars, causing shockwaves that slam into the gas and dust from which the star was born at high speeds.

This particular Herbig-Haro object, which can be seen dominating the bottom half of this stunning new JWST image, captured with the telescope's Near-InfraRed Camera (NIRCam) instrument, is designated HH 797. The stellar "cocoon" is located around 1,000 light-years away, close to the young open star cluster IC 348, which itself is situated at the eastern edge of the Perseus dark cloud complex. Read more at: <https://www.space.com/james-webb-space-telescope-herbig-haro-object-nov-2023>

Until next month... SLK



A Flame in the Sky – the Orion Nebula

By: Kat Troche

It's that time of year again: winter! Here in the Northern Hemisphere, the cold, crisp sky offers spectacular views of various objects, the most famous of all being Orion the Hunter.

As we've previously mentioned, Orion is a great way to test your sky darkness. With your naked eye, you can easily spot this hourglass-shaped constellation. Known as an epic hunter in Greco-Roman, Orion and all its parts have had many names and meanings across many cultures. In Egyptian mythology, this constellation represented the god Sah. The Babylonians referred to it as The Heavenly Shepard. In most cultures, it is Orion's Belt that has many stories: Shen in Chinese folklore, or Tayamnicankhu in Lakota storytelling. But the Maya of Mesoamerica believed that part of Orion contained The Cosmic Hearth – the fire of creation.

1,500 light years away from Earth sits the star-forming region and crown jewel of Orion – Messier 42 (M42), the Orion Nebula. Part of the "sword" of Orion, this cloud of dust and gas sits below the first star in Orion's Belt, Alnitak, and can easily be spotted with the naked eye under moderate dark skies. You may also use binoculars or a telescope to resolve even more details, like the Trapezium: four stars in the shape of a baseball diamond. These young stars make up the core of this magnificent object.



Of course, it's not just for looking at! M42 is easily one of the most photographed nebulae around, by astrophotographers here on the ground, large ground-based observatories, and space telescopes alike. It has long been a place of interest for the Hubble, Spitzer, and Chandra X-ray Space Telescopes, with James Webb Space Telescope joining the list in February 2023. Earlier this year, NASA and the European Space Agency released a new photo of the Orion Nebula taken from JWST's NIRCam (Near-Infrared Camera), allowing scientists to image this early star forming region in both short and long wavelengths.

But stars aren't the only items photographed here. In June 2023, JWST's NIRCam and MIRI (mid-infrared instrument) imaged a developing star system with a planetary disk forming around it. That's right – a solar system happening in real time – located within the edges of a section called the Orion Bar. Scientists have named this planet-forming disk d203-506, and you can learn more about the chemistry found here. By capturing these objects in multiple wavelengths of light, we now have even greater insight into what other objects may be hiding within these hazy hydrogen regions of our night sky.



Credit: Stellarium Web

LOCAL EVENTS

- Dec 20 - CADAS - Christmas Social and members' short talks
 - Jan 2 - WAS - Professor David Rothery – Mercury & the BepiColombo mission
 - Jan 17 - Fordingbridge Astronomers (FA) - Meteors and Meteor Hunting by Mark McIntyre
 - Jan 20 - WAS - Durlston Event at 7.30pm
 - Feb 6 - WAS - Professor Malcolm MacCallum – Black Holes
- More to come in 2024!

VISIT OUR WEBSITE FOR THE LATEST CLUB INFORMATION



WEYMOUTH ASTRONOMY

SKYWATCHER NEWSLETTER



SPACE X AURORAS: 21 Nov 2023
spaceweather.com



There's a new phenomenon in the night sky: "SpaceX auroras." They're red, roughly spherical, and visible to the naked eye for as much as 10 minutes. "We are seeing 2 to 5 of them each month," reports Stephen Hummel of the McDonald Observatory in Texas, who photographed this example on Nov. 3rd:

Spoiler alert: They're not auroras. The bright red balls are caused by SpaceX rockets burning their engines in the ionosphere.

The phenomenon is closely related to something we reported earlier this year. Falcon 9 rockets leaving Earth can "punch a hole in the ionosphere." The ionosphere is a layer of ionized gas surrounding our planet; it is crucial to over-the-horizon shortwave radio communication and can affect the quality of GPS signals. Water-filled rocket exhaust can quench local ionization by as much as 70%, erasing the ionosphere along the rocket's path. For reasons having to do with chemistry, ionospheric holes emit a red glow (630 nm).

"SpaceX auroras" are exactly the same--except instead of rockets going up, they are caused by rockets coming down. The second stage of the Falcon 9 rocket burns its engines in order to de-orbit and return to Earth, creating an ionospheric hole as it descends.

Right: The night launch of this Falcon 9 rocket on Nov. 3, 2023, produced a red glow over McDonald Observatory in Texas.

"We first noticed these SpaceX de-orbit burns over the McDonald Observatory in February 2023," says Boston University space physicist Jeff Baumgardner, who has been studying ionospheric holes for more than 40 years. "The engine burns are only about 2 seconds long, just enough delta V to bring the second stage down over the south Atlantic Ocean. These burns happen ~90 minutes (~one orbital period) after launch. During the burn, the engine releases about 400lbs of exhaust gasses, mostly water and carbon dioxide. All this happens at ~300km altitude, near the peak of the ionosphere, so a significant hole is made."

"The resulting 'auroras' can be very bright, easily visible with the naked eye and much brighter than Starlink satellites themselves, although only for a few seconds," notes Hummel.

The question is, are SpaceX auroras good or bad? Hummel is the McDonald Observatory Dark Skies Sr. Outreach Program Coordinator, so naturally he's concerned about the effect these events may have on observational astronomy.

"The frequency of these red clouds could increase as SpaceX targets more launches in the future," says Hummel. "Their impact on astronomical science is still being evaluated. Starlink satellites are a known issue, but the effects of the rocket launches themselves are a growing area of attention."

For Jeff Baumgardner, who has his own dedicated camera at McDonald, the events are a golden opportunity for research.

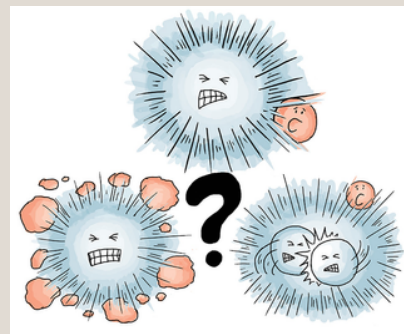
"The saying 'one person's signal is another person's noise' is appropriate here," says Baumgardner. "We are delighted with the rocket burns. They give us an opportunity to explore how space traffic affects the ionosphere. The ionospheric density is different night to night, so we can learn something about the efficiency of the chemistry by observing many events."

Other sky watchers are beginning to see SpaceX auroras as well. Are you one of them?



Happy Holidays to everyone of the Weymouth Astronomy Club!

Very best wishes for a bright 2024!



WAC Upcoming Events

JAN 12 - MEMBERS 10 MINUTE TALKS

FEB 9 - BRAD GIBSON - BAD ASTRONOMY AT THE MOVIES

MAR 8 - FABIO SILVA - ASTRONOMY AT THE TIME OF STONEHENGE

MORE TO COME IN 2024!!



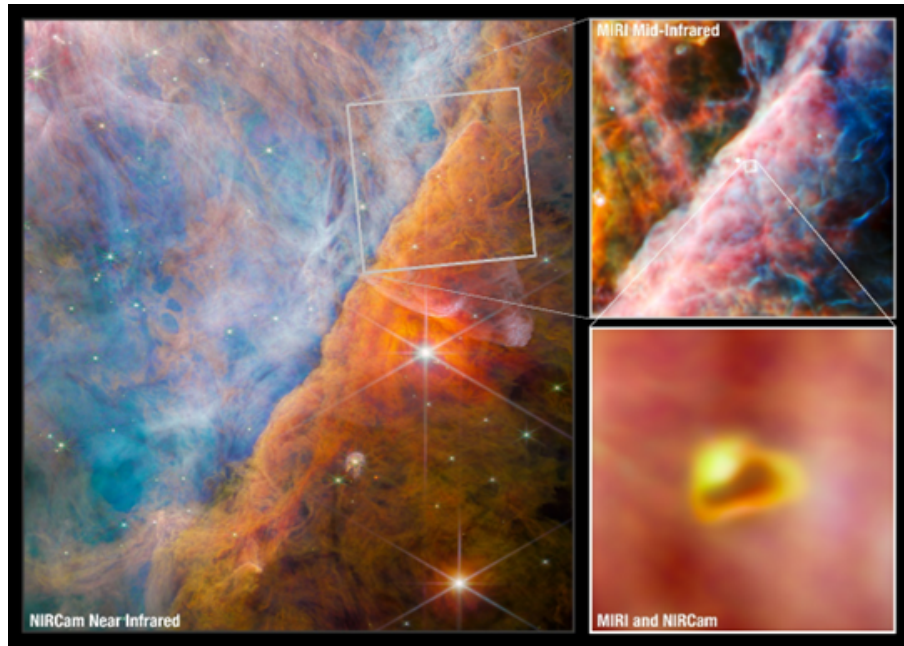
WEYMOUTH ASTRONOMY

Continued from page 1:

In addition to our Dark Sky Wheel, a fun presentation you can share with your astronomy club would be our [Universe Discovery Guide: Orion Nebula, Nursery of Newborn Stars](#) activity. This will allow you to explain to audiences how infrared astronomy, like JWST, helps to reveal the secrets of nebulae. Or, you can use public projects like the NASA-funded [MicroObservatory](#) to capture M42 and other objects.

Learn more about what to spy in the winter sky with our upcoming mid-month article on the [Night Sky Network page](#) through NASA's website!

Credit: ESA/Webb, NASA, CSA, M. Zamani (ESA/Webb), PDRs4ALL ERS Team



PRACTICAL OBSERVING



Images above were taken by Torcuill Torrance from a layby in Aberdeenshire. The upper image is straight out of the camera and the lower after processing. A great example of what can be achieved with a DSLR on a tripod.



1 December - fortunately a clear night coincided with a sudden notification from AuroraWatchUK that the magnetic disturbance of 233nT G3 class event prompting an amber alert for the UK. Several of the Aberdeen Astronomical Society dashed out to capture the sight. As usual, it was not visible to the naked eye depending on light pollution but cameras easily captured this. Above: images from the city of Aberdeen taken with a DSLR and 8s exposures. Minor adjustments to the images in PS. Images by S Karl.



WEYMOUTH ASTRONOMY

Skymaps.com—Feel free to download the full article directly each month.

The Evening Sky Map

FREE! EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

Sky Calendar – December 2023

- 2 Moon near Beehive cluster M44 at 8h UT (morning sky).
- 4 Moon near Regulus at 5h UT (morning sky).
- 4 Mercury at greatest elongation east at 14h UT (21° from Sun, evening sky). Mag. -0.4.
- 4 Moon at apogee (farthest from Earth) at 19h UT (distance 404,346km; angular size 29.6').
- 5 Last Quarter Moon at 5:51 UT.
- 8 Moon near Spica at 17h UT (morning sky).
- 9 Moon near Venus at 15h UT (42° from Sun, morning sky). Mag. -4.1.
- 12 New Moon at 23:31 UT. Start of lunation 1249.
- 14 Moon near Mercury at 6h UT (16° from Sun, evening sky). Mag. 0.6.
- 14 Geminid Meteor Shower peaks in a broad maximum centred at 19h UT. Active December 4–17. Produces bright, medium-speed meteors at its peak (up to 80 meteors/hour). The best and most reliable of the major annual showers. A Moon-free sky will ensure ideal viewing conditions.
- 16 Moon at perigee (closest to Earth) at 18:44 UT (distance 367,901km; angular size 32.5').
- 18 Moon near Saturn at 1h UT (evening sky). Mag. 0.9.
- 19 First Quarter Moon at 18:39 UT.
- 21 Asteroid 4 Vesta at opposition at 12h UT. Mag. 6.4.
- 22 December solstice at 3:28 UT. The time when the Sun reaches the point farthest south of the celestial equator marking the start of winter in the Northern Hemisphere and summer in the Southern Hemisphere.
- 22 Moon near Jupiter at 13h UT (evening sky). Mag. -2.7.
- 22 Mercury at inferior conjunction with the Sun at 19h UT. The innermost planet passes into the morning sky.
- 24 Moon near the Pleiades at 10h UT (evening sky).
- 27 Full Moon at 0:33 UT.
- 29 Moon near Beehive cluster M44 at 16h UT (morning sky).

More sky events and links at <http://Skymaps.com/skycalendar/>
 All times in Universal Time (UT). (USA Eastern Standard Time = UT – 5 hours.)

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 Freely shared with sky watchers worldwide since January 2000
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NORTHERN HEMISPHERE

DECEMBER 2023

SKY MAP SHOWS HOW THE NIGHT SKY LOOKS

EARLY DEC 8 PM
LATE DEC 7 PM

SKY MAP DRAWN FOR A LATITUDE OF 40° NORTH AND IS SUITABLE FOR LATITUDES UP TO 15° NORTH OR SOUTH OF THIS

Use the Big Dipper to find Polaris, the North Star. The terminal pointer stars on the handle of the Big Dipper are the 'arrow' and 'guard' stars. The 'arrow' star points to Polaris. The 'guard' stars are the two stars that form the 'knee' of the Big Dipper. The 'arrow' star is the star at the end of the handle of the Big Dipper. The 'guard' stars are the two stars that form the 'knee' of the Big Dipper.

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Symbols

- Galaxy
- Double Star
- Variable Star
- Diffuse Nebula
- Planetary Nebula
- Open Star Cluster
- Globular Star Cluster

Star Magnitudes

- 1
- 0
- 1
- 2
- 3
- 4

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