

# STRATFORD ASTRONOMY GROUP

JANUARY 9<sup>TH</sup>, 2024



# AGENDA

- Meet and Greet
- Club NEWS and Activities
- Club Q & A
- Equipment Lessons
- Software and Imaging Information
- Latest Astronomy NEWS
- What's UP this Month
- Show and Tell
- Astronomy Lessons
- Cosmology Lessons
- Conclusion

# MEET AND GREET

Welcome  
New Visitors

Regrets

# PREVIOUS MEETING REVIEW

Meeting  
attended by  
20:



Paul Bartlett  
Michael Burns  
Doug Fyfe  
Bob Greer  
Patrick Hayes  
Alex Huddleston  
Derek Huddleston  
Wolfgang & Dawn Keller  
Mary Montizambert  
Jim Nafziger  
David Orr  
Jamie Page  
Ken Roberts  
Peter Tenits

## CLUB NEWS AND ACTIVITIES

## Group Funds

**Total = \$1470.00**

- If you would like to contribute to the group, then please e-transfer Tim at:

[timannemariepauli@gmail.com](mailto:timannemariepauli@gmail.com)

or by cheques:

Tim Pauli  
96 Front Street  
Stratford, ON  
N5A4H2

# CLUB NEWS AND ACTIVITIES

## EQUIPMENT:

### STRATFORD ASTRONOMY CLUB EQUIPMENT

#### CLUB EQUIPMENT LOCATION:

Paul Bartlett is now storing all the group's equipment. If you wish to borrow an item, then please contact him at:

[1948paul.bartlett@gmail.com](mailto:1948paul.bartlett@gmail.com)

519-274-2010

**New Equipment Donation: Tim**

# UPCOMING MEETINGS

## NEXT MEETING DATES

Date	Start	End	Facility and Spaces
<del>September 12, 2023</del>	<del>7:00 PM</del>	<del>9:00 PM</del>	<del>St. Michael's CSS, Room 104</del>
<del>October 3, 2023</del>	<del>7:00 PM</del>	<del>9:00 PM</del>	<del>St. Michael's CSS, Room 104</del>
<del>November 7, 2023</del>	<del>7:00 PM</del>	<del>9:00 PM</del>	<del>St. Michael's CSS, Room 104</del>
<del>December 12, 2023</del>	<del>7:00 PM</del>	<del>9:00 PM</del>	<del>St. Michael's CSS, Room 104</del>
<del>January 9, 2024</del>	<del>7:00 PM</del>	<del>9:00 PM</del>	<del>St. Michael's CSS, Room 104</del>
February 6, 2024	7:00 PM	9:00 PM	St. Michael's CSS, Room 104
March 5, 2024	7:00 PM	9:00 PM	St. Michael's CSS, Room 104
April 2, 2024	7:00 PM	9:00 PM	St. Michael's CSS, Room 104
May 7, 2024	7:00 PM	9:00 PM	St. Michael's CSS, Room 104
June 4, 2024	7:00 PM	9:00 PM	St. Michael's CSS, Room 104

# CLUB NEWS AND ACTIVITIES

- **New Web site:** (<https://stratfordastronomy.com/>)
  - Tim Pauli - Owner/Administrator
  - Ken Roberts - technical contact
  - Tom Kimber - Administrator/Editor
  - Doug Fyfe - Administrator
  - Michael Burns- Administrator
  - Tom will build it on WordPress.
  
- **Post Christmas Get together:** Tim





## CLUB Q & A



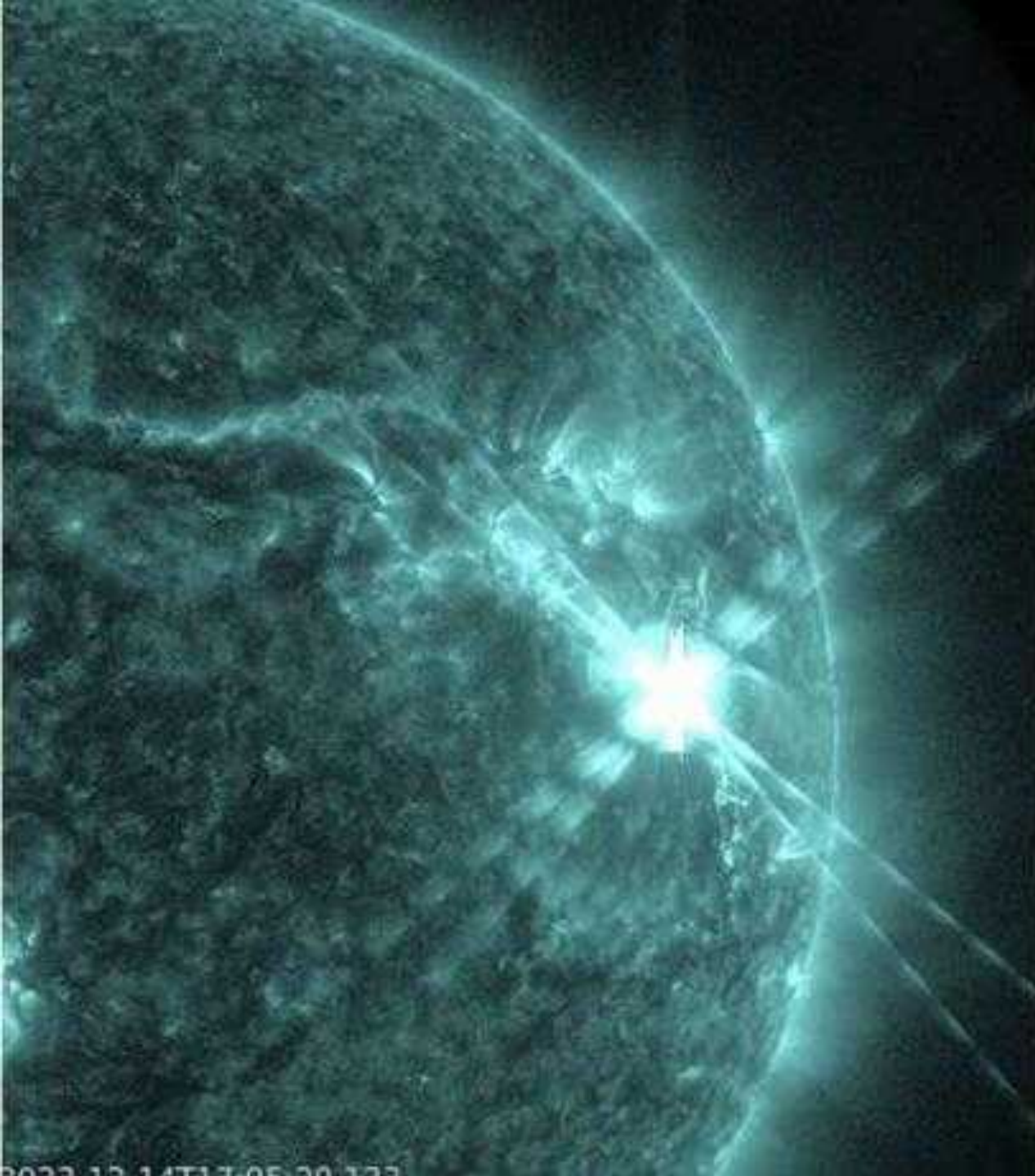
LATEST ASTRONOMY NEWS

DECEMBER



# DECEMBER 14 – NASA'S SPACE STATION LASER COMM TERMINAL ACHIEVES FIRST LINK

- A NASA technology experiment on the International Space Station completed its first laser link with an in-orbit laser relay system on Dec. 5, 2023. Together, they complete NASA's first two-way, end-to-end laser relay system..
- NASA's LCRD (Laser Communications Relay Demonstration) and the new space station demonstration, ILLUMA-T (Integrated LCRD Low Earth Orbit User Modem and Amplifier Terminal), successfully exchanged data for the first time. LCRD and ILLUMA-T are demonstrating how a user mission, in this case the space station, can benefit from a laser communications relay located in geosynchronous orbit.
- On Laser communications, also known as optical communications, uses infrared light rather than traditional radio waves to send and receive signals. The tighter wavelength of infrared light allows spacecraft to pack more data into each transmission. Using laser communications greatly increases the efficiency of data transfer and can lead to a faster pace of scientific discoveries.



## DEC 15TH: BIGGEST SOLAR FLARE IN YEARS TEMPORARILY DISRUPTS RADIO SIGNALS ON EARTH

- A NASA telescope has captured the biggest solar flare in years, which temporarily knocked out radio communication on Earth.
- The sun spit out the huge flare along with a massive radio burst on Thursday, causing two hours of radio interference in parts of the U.S. and other sunlit parts of the world. Scientists at the National Oceanic and Atmospheric Administration said it was the biggest flare since 2017, and the radio burst was extensive, affecting even the higher frequencies.
- The combination resulted in one of the largest solar radio events ever recorded, Shawn Dahl of NOAA's Space Weather Prediction Center said Friday.
- Multiple pilots reported communication disruptions, with the impact felt across the country, according to the space weather forecasting center. Scientists are now monitoring this sunspot region and analyzing for a possible outburst of plasma from the sun, also known as a coronal mass ejection, that might be directed at Earth. This could result in a geomagnetic storm, Dahl said, which in turn could disrupt high-frequency radio signals at the higher latitudes and trigger northern lights, or auroras, in the coming days.

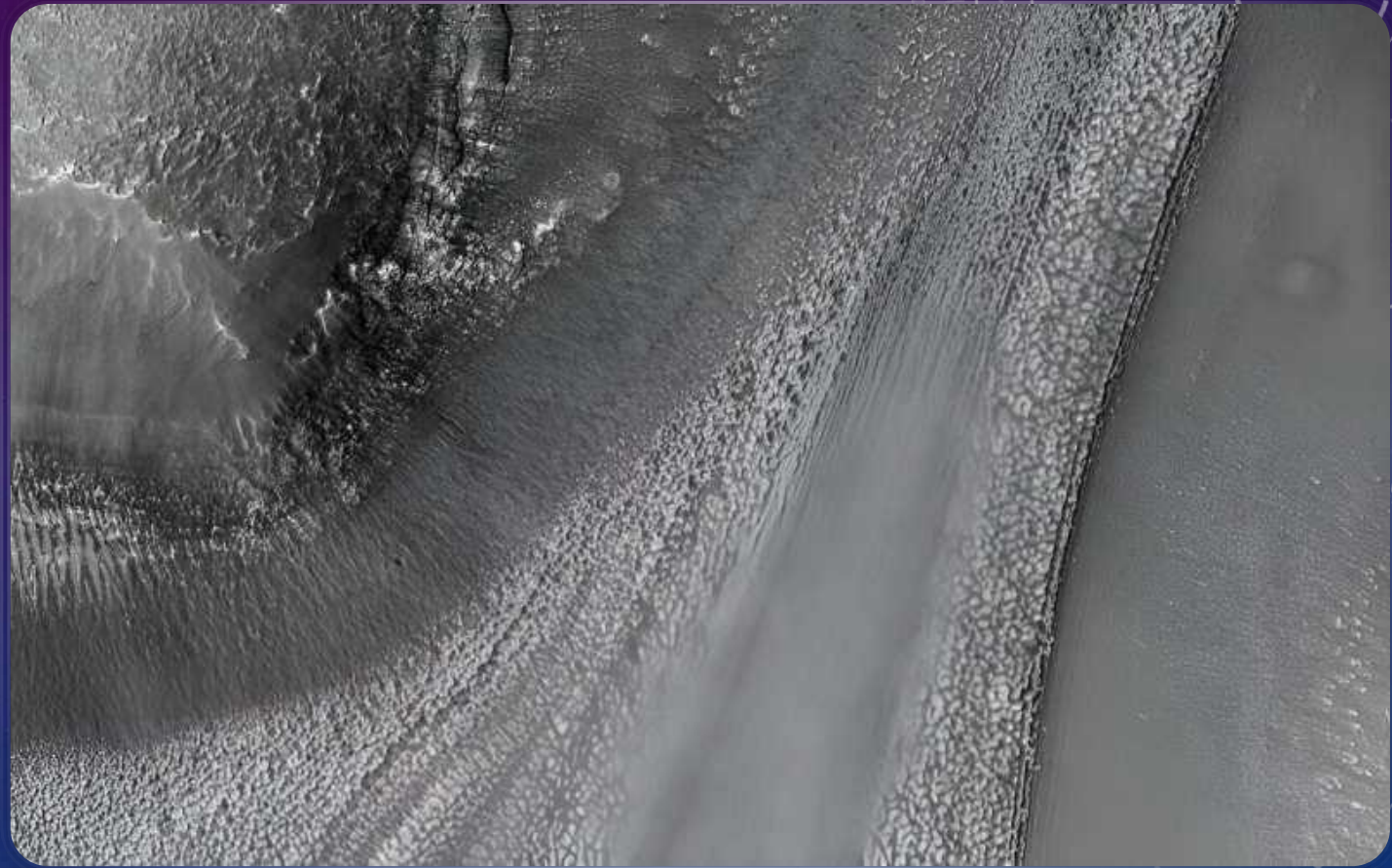
A dark field of stars with a prominent bright blue star circled in white. The background is a dense field of stars in various colors, including red, orange, yellow, and green. The circled star is a bright blue point source.

## DEC 15TH: NEW RED GALAXIES TURN OUT TO BE ALREADY KNOWN BLUE GALAXIES

- Not all discoveries turn out to be actual new discoveries. This was the case for the extremely red objects (EROs) found in James Webb Space Telescope (JWST) data. Analysis shows that they are very similar to blue-excess dust obscured galaxies (BluDOGs) already reported in Subaru Telescope data.
- Quasars, some of the brightest objects in the universe, are driven by a supermassive black hole with a mass that can reach more than a billion times that of the sun. These objects are the focus of much research, but how they form remains poorly understood.
- The prevailing theory is that they form in galaxies with clouds of gas and dust that obscure the growing quasar until it is powerful enough to blast away the clouds. If this is true, it should be able to catch the short timeframe where a quasar breaks out of its cloud.
- Because the transition period is short, it is necessary to observe a large number of pre-quasar candidates and hope to get lucky enough to catch a galaxy just as the quasar starts to break out. Looking at data from JWST, a group of extremely red objects (EROs) were identified as possible transitional quasars.
- But then researchers at the Subaru Telescope, a Japanese telescope in Hawai'i, noticed that even though they are called "red," EROs also have a significant blue component, similar to blue-excess dust obscured galaxies (BluDOGs) found in Big Data from the Subaru Telescope and described in a report last year.

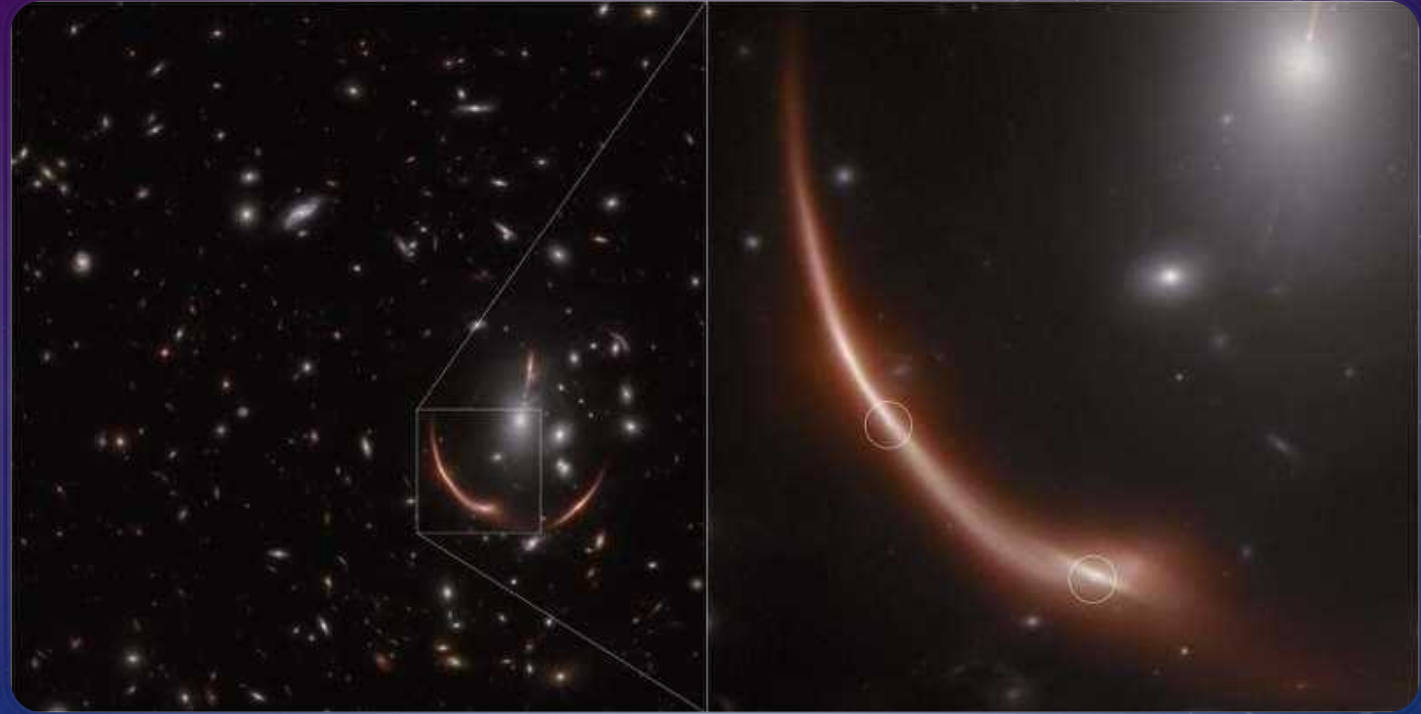
# DEC 19TH: IMAGE: ICE FLOWS ON MARS

- On Aug. 18, 2023, the Mars Reconnaissance Orbiter (MRO) captured ridged lines carved onto Mars' landscape by the gradual movement of ice. While surface ice deposits are mostly limited to Mars' polar caps, these patterns appear in many non-polar Martian regions.
- As ice flows downhill, rock and soil are plucked from the surrounding landscape and ferried along the flowing ice surface and within the icy subsurface. While this process takes perhaps thousands of years or longer, it creates a network of linear patterns that reveal the history of ice flow.
- The MRO has been studying Mars since 2006. Its instruments zoom in for extreme close-up photography of the Martian surface, analyze minerals, look for subsurface water, trace how much dust and water are distributed in the atmosphere, and monitor daily global weather. These studies are identifying deposits of minerals that may have formed in water over long periods of time, looking for evidence of shorelines of ancient seas and lakes, and analyzing deposits placed in layers over time by flowing water.

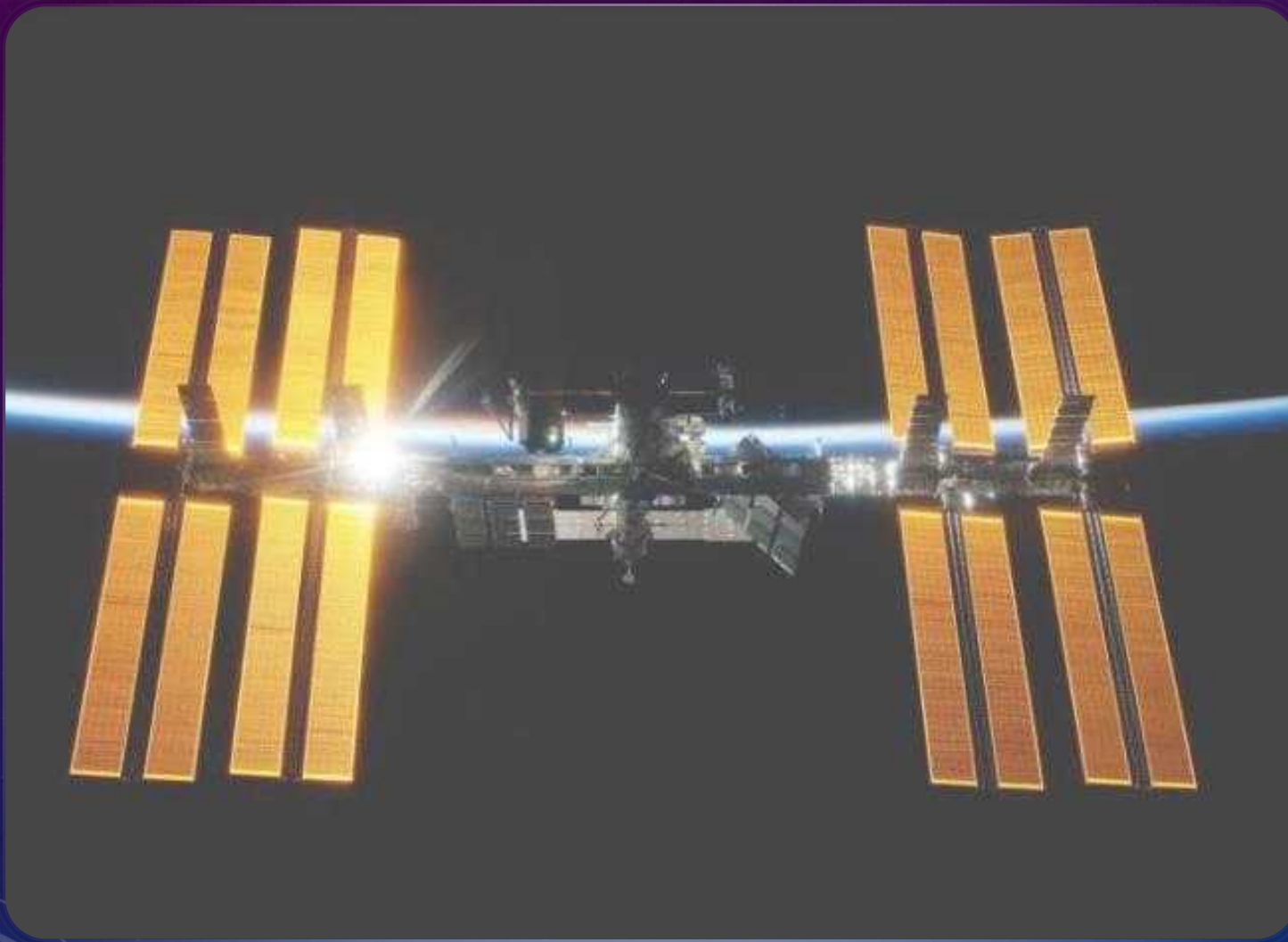


## DEC 21<sup>ST</sup>: WEBB SPOTS A SECOND LENSED SUPERNOVA IN A DISTANT GALAXY

- In November 2023, the James Webb Space Telescope observed a massive cluster of galaxies named MACS J0138.0-2155. Through an effect called gravitational lensing, first predicted by Albert Einstein, a distant galaxy named MRG-M0138 appears warped by the powerful gravity of the intervening galaxy cluster. In addition to warping and magnifying the distant galaxy, the gravitational lensing effect caused by MACS J0138 produces five different images of MRG-M0138.
- In 2019, astronomers announced the surprising find that a stellar explosion, or supernova, had occurred within MRG-M0138, as seen in images from NASA's Hubble Space Telescope taken in 2016.
- When another group of astronomers examined the 2023 Webb images, they were astonished to find that the same galaxy is home to a second supernova seven years later. Justin Pierel (NASA Einstein Fellow at the Space Telescope Science Institute) and Andrew Newman (staff astronomer at the Observatories of the Carnegie Institution for Science) tell us more about the first time that two gravitationally lensed supernovae were found in the same galaxy.



## DEC 28<sup>TH</sup>: RUSSIA, NASA AGREE TO CONTINUE JOINT ISS FLIGHTS UNTIL 2025



- Russian and US space agencies have agreed to keep working together to deliver crews to the International Space Station (ISS) until at least 2025, Russian corporation Roscosmos said Thursday.

- The space sector—including its so-called cross-flights that involve sending crews from different nationalities on one spacecraft—is a rare area of cooperation remaining between Moscow and Washington since Russia sent troops to Ukraine.

- "An agreement was reached to continue cross-flights until 2025 inclusive," Roscosmos said in a [press release](#).

- The decision was taken "to maintain the reliability of the ISS as a whole," it added.

- It also aims "to guarantee the presence of at least one representative of Roscosmos on the Russian segment and the presence of at least one representative of NASA on the American segment."



## JAN 4<sup>TH</sup>: NEW IMAGES REVEAL WHAT NEPTUNE AND URANUS REALLY LOOK LIKE

Early Voyager 2 Images



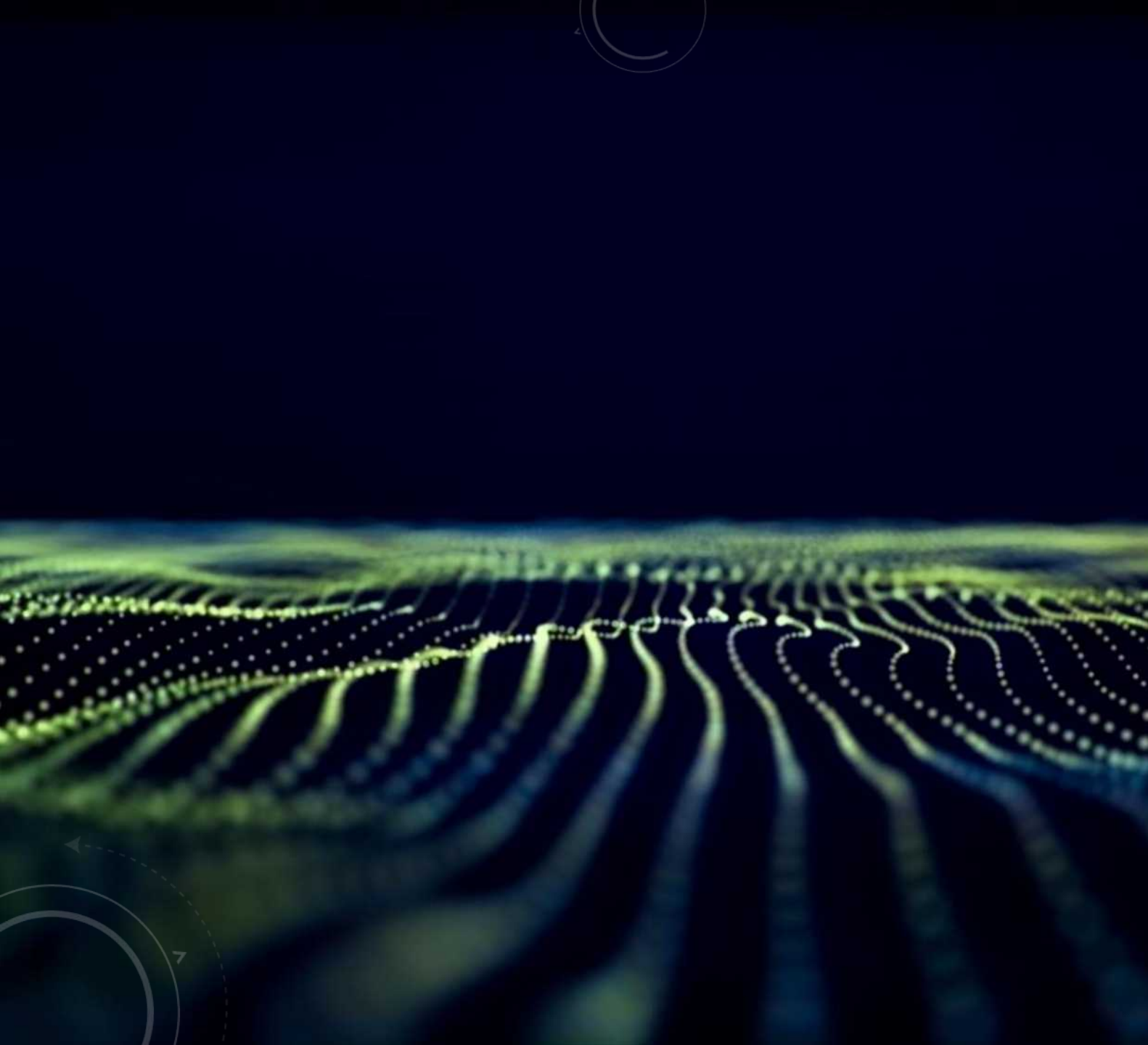
Images reprocessed in this study



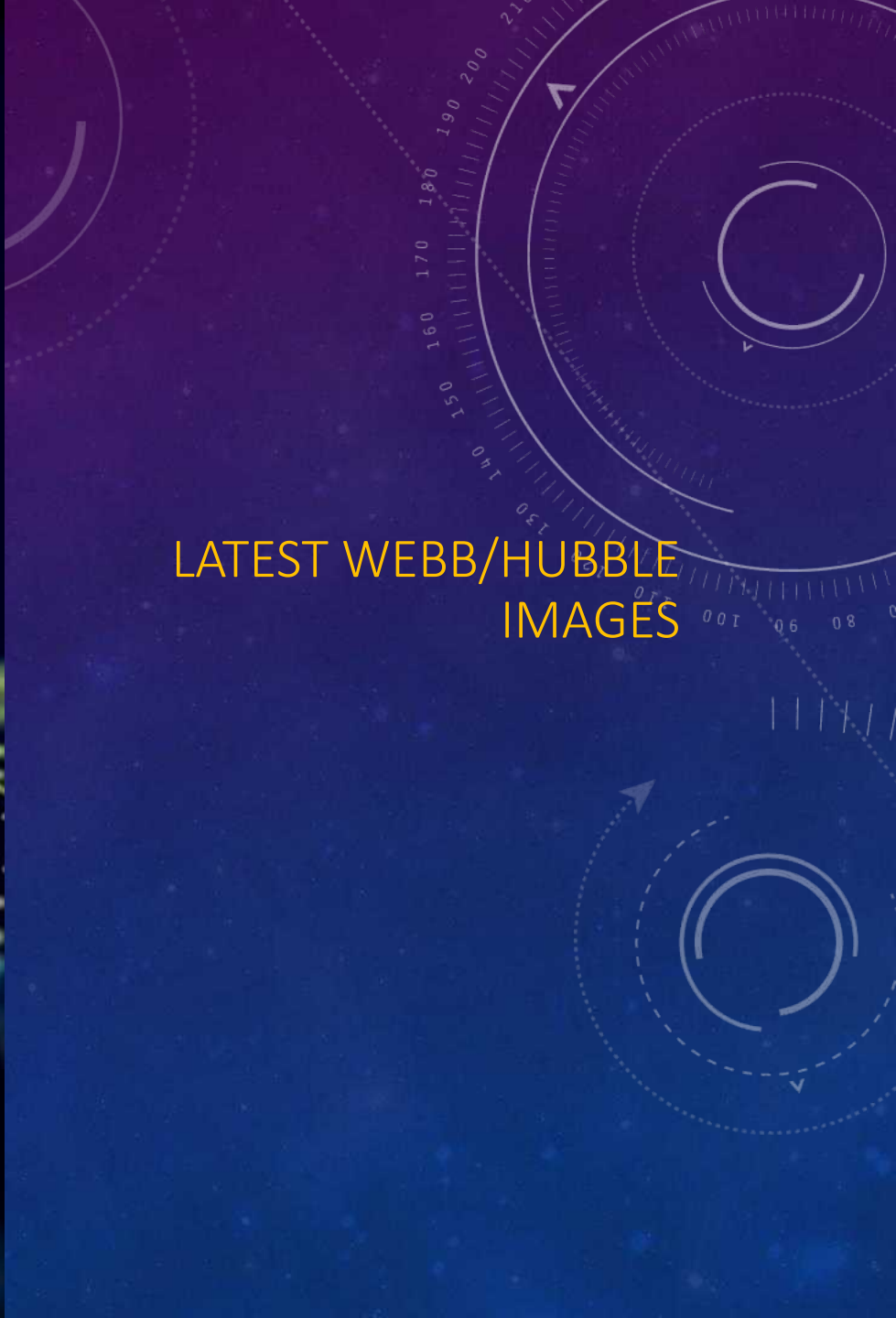
- Neptune is fondly known for being a rich blue, and Uranus green—but a new study has revealed that the two ice giants are actually far closer in color than typically thought.

- The correct shades of the planets have been confirmed with the help of research led by Professor Patrick Irwin from the University of Oxford, which has been published today in the *Monthly Notices of the Royal Astronomical Society*.

- He and his team found that both worlds are in fact a similar shade of greenish blue, despite the commonly-held belief that Neptune is a deep azure and Uranus has a pale cyan appearance.



LATEST WEBB/HUBBLE  
IMAGES



# Webb rings in holidays with ringed planet Uranus



# Hubble presents a holiday globe of stars



# Hubble captures throng of spiral galaxies



# JWST sets a new record, sees newly forming stars in the Triangulum galaxy



WHAT'S UP

# STRATFORD ASTRONOMY GROUP

WHAT'S UP FOR JANUARY



<< December

January 2024

February >>

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
31  Waning gibbous Visible: 74% ↓ Age: 19.80 days	1  Waning gibbous Visible: 74% ↓ Age: 19.80 days	2  Last quarter Visible: 68% ↓ Age: 20.68 days	3  Last quarter Visible: 67% ↓ Age: 21.57 days	4  Last quarter Visible: 47% ↓ Age: 22.47 days	5  Last quarter Visible: 37% ↓ Age: 23.39 days	6  Waning crescent Visible: 28% ↓ Age: 24.32 days
7  Waning crescent Visible: 19% ↓ Age: 25.29 days	8  Waning crescent Visible: 12% ↓ Age: 26.30 days	9  Waning crescent Visible: 6% ↓ Age: 27.34 days	10  New Visible: 2% ↓ Age: 28.42 days	11  New Visible: 1% ↓ Age: 29.52 days	12  New Visible: 2% ↑ Age: 1.12 days	13  Waxing crescent Visible: 6% ↑ Age: 2.25 days
14  Waxing crescent Visible: 13% ↑ Age: 3.38 days	15  Waxing crescent Visible: 22% ↑ Age: 4.50 days	16  Waxing crescent Visible: 32% ↑ Age: 5.60 days	17  First quarter Visible: 43% ↑ Age: 6.68 days	18  First quarter Visible: 54% ↑ Age: 7.73 days	19  First quarter Visible: 65% ↑ Age: 8.76 days	20  Waxing gibbous Visible: 76% ↑ Age: 9.76 days
21  Waxing gibbous Visible: 83% ↑ Age: 10.75 days	22  Waxing gibbous Visible: 90% ↑ Age: 11.72 days	23  Waxing gibbous Visible: 96% ↑ Age: 12.67 days	24  Full moon Visible: 99% ↑ Age: 13.61 days	25  Full moon Visible: 100% Age: 14.54 days	26  Full moon Visible: 100% ↓ Age: 15.45 days	27  Waning gibbous Visible: 98% ↓ Age: 16.35 days
28  Waning gibbous Visible: 94% ↓ Age: 17.25 days	29  Waning gibbous Visible: 88% ↓ Age: 18.13 days	30  Waning gibbous Visible: 81% ↓ Age: 19.02 days	31  Waning gibbous Visible: 73% ↓ Age: 19.91 days	1 	2 	3 

# HEY, THERE BE A MOON OVERHEAD

## MOON PHASES FOR THE MONTH OF DECEMBER



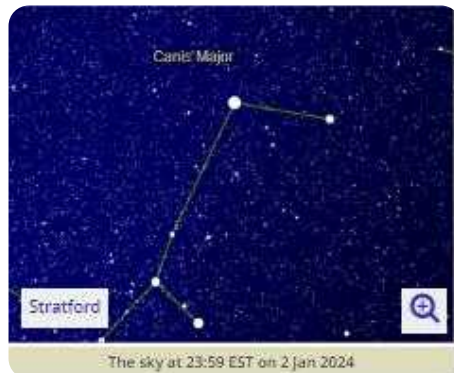
## « January 2024 »

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	<b>1</b> <u>The Moon at apogee</u>	<b>2</b> <u>The cluster Messier 41 is well placed</u> <u>The Earth at perihelion</u>	<b>3</b> <u>Moon at Last Quarter</u>	<b>4</b> <u>Quadrantid meteor shower 2024</u>	<b>5</b>	<b>6</b>
<b>7</b> <u>Mercury at dichotomy</u> <u>Mercury at highest altitude in morning sky</u>	<b>8</b> <u>Lunar occultation of Antares</u> <u>Conjunction of the Moon and Venus</u>	<b>9</b> <u>Conjunction of the Moon and Mercury</u>	<b>10</b> <u>Conjunction of the Moon and Mars</u> <u>The Moon at perihelion</u>	<b>11</b> <u>New Moon</u>	<b>12</b> <u>Mercury at greatest elongation west</u>	<b>13</b> <u>The Moon at perigee</u>
<b>14</b> <u>Conjunction of the Moon and Saturn</u> <u>Close approach of the Moon and Saturn</u>	<b>15</b> <u>Lunar occultation of Neptune</u> <u>The cluster Messier 47 is well placed</u> <u>NGC 2403 is well placed</u>	<b>16</b> <u>Conjunction of Venus and Ceres</u>	<b>17</b> <u>The cluster NGC 2451 is well placed</u> <u>Moon at First Quarter</u>	<b>18</b> <u>Close approach of the Moon and Jupiter</u> <u>Conjunction of the Moon and Jupiter</u>	<b>19</b> <u>γ-Ursae Minorid meteor shower 2024</u> <u>Asteroid 354 Eleonora at opposition</u>	<b>20</b> <u>Close approach of the Moon and M45</u> <u>134340 Pluto at solar conjunction</u> <u>The cluster NGC 2516 is well placed</u>
<b>21</b>	<b>22</b> <u>Lunar occultation of Beta Tauri</u>	<b>23</b>	<b>24</b> <u>The cluster NGC 2547 is well placed</u>	<b>25</b> <u>Full Moon</u>	<b>26</b> <u>The Moon at aphelion</u>	<b>27</b> <u>Uranus ends retrograde motion</u> <u>Conjunction of Mercury and Mars</u> <u>Close approach of Mercury and Mars</u>
<b>28</b>	<b>29</b> <u>The Moon at apogee</u>	<b>30</b>	<b>31</b> <u>The Beehive cluster is well placed</u> <u>The Omicron Velorum cluster is well placed</u>			

THE SKY ON 2 JANUARY 2024

Sunrise	07:54	 <p>Waning Gibbous 54% 21 days old</p>	Planets			
Sunset	16:58		Rise	Culm.	Set	
Twilight ends	18:41		Mercury	06:20	11:01	15:43
Twilight begins	06:10		Venus	05:00	09:47	14:34
			Moon	22:37	05:13	11:38
		Mars	07:04	11:28	15:53	
		Jupiter	12:58	19:48	02:38	
		Saturn	10:40	15:58	21:15	

All times shown in EST.



## JANUARY 2<sup>ND</sup> : THE CLUSTER MESSIER 41 IS WELL PLACED

- The open star cluster M41 (NGC 2287; mag 4.5) in Canis Major will be well placed in the evening sky in coming weeks. On 2 January it will reach its highest point in the sky at around midnight local time, and on subsequent evenings it will culminate four minutes earlier each day.

- From Stratford , it is visible between 22:11 and 02:37. It will become accessible at around 22:11, when it rises to an altitude of 18° above your south-eastern horizon. It will reach its highest point in the sky at 00:24, 25° above your southern horizon. It will become inaccessible at around 02:37 when it sinks below 18° above your south-western horizon.

# SUN, 07 JAN 2024 AT 03:06 EST

## Mercury at Dichotomy



THE SKY ON 7 JANUARY 2024	
Sunrise	07:54
Sunset	17:03
Twilight ends	18:45
Twilight begins	06:11

	<b>Planets</b>
Waning Crescent	
16%	
26 days old	

	Rise	Culm.	Set
Mercury	06:12	10:50	15:29
Venus	05:11	09:53	14:35
Moon	04:03	08:47	13:23
Mars	07:01	11:25	15:49
Jupiter	12:38	19:29	02:19
Saturn	10:22	15:40	20:58

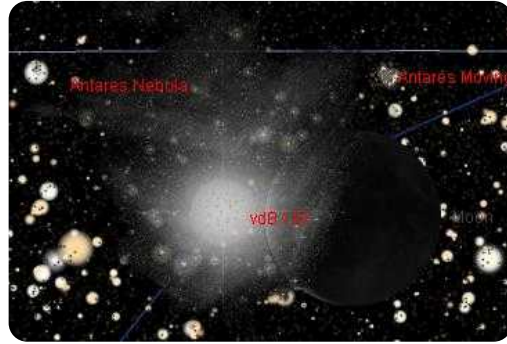
All times shown in EST.

Mercury will reach half phase (dichotomy) in its Dec 2023–Feb 2024 morning apparition. It will be shining brightly at mag -0.2.

From Stratford, this apparition will be well placed but tricky to observe, reaching a peak altitude of  $14^\circ$  above the horizon at sunrise on 8 Jan 2024.

Mercury will brighten rapidly at the start of its morning apparition as it emerges from inferior conjunction. Prior to its apparition, it passed between the Earth and Sun, at which time it had its unilluminated side turned towards the Earth and so appeared as a thin, barely illuminated crescent. As the apparition proceeds, this crescent waxes and becomes gibbous.

Since Mercury can only ever be observed in twilight, it is particularly difficult to find when it is in a thin crescent phase. Thus, it will be significantly easier to see in the days after it reaches its highest point in the sky – when it will show a gibbous phase – than in the days beforehand.



## MON, 8 JAN AT 09:25 EST TO 10:38 EST LUNAR OCCULTATION OF ANTARES

- The Moon will pass in front of Antares (Alpha Scorpii), creating a lunar occultation visible from the western Contiguous United States and north-western Mexico. Although the occultation will only be visible across part of the world – because the Moon is so close to the Earth that its position in the sky varies by as much as two degrees across the world – a close conjunction between the pair will be more widely visible.

- The occultation will be visible from Stratford. It will begin with the disappearance of Antares (Alpha Scorpii) behind the Moon at 09:25 EST, though in daylight. Its reappearance will be visible at 10:38 EST, though in daylight.

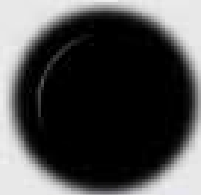
### THE SKY ON 8 JANUARY 2024

Sunrise  
07:53

Sunset  
17:04

Twilight ends  
18:46

Twilight begins  
06:11



Waning  
Crescent

7%


27 days old

#### Planets

	Rise	Culm.	Set
Mercury	06:11	10:49	15:27
Venus	05:13	09:54	14:35
Moon	05:16	09:41	14:01
Mars	07:00	11:24	15:48
Jupiter	12:34	19:25	02:16
Saturn	10:18	15:36	20:54

All times shown in EST.

THE SKY ON 14 JANUARY 2024

Sunrise	07:52	 Waxing Crescent 15% 3 days old	Planets			
Sunset	17:10		Rise	Culm.	Set	
Twilight ends	18:52		Mercury	06:17	10:50	15:23
Twilight begins	06:10		Venus	05:26	10:02	14:38
			Moon	10:15	15:40	21:16
		Mars	06:56	11:20	15:45	
		Jupiter	12:11	19:02	01:53	
		Saturn	09:56	15:15	20:34	
		All times shown in EST.				



## SUN, 14 JAN 2024 AT 04:33 EST CONJUNCTION OF THE MOON AND SATURN

- The Moon and Saturn will share the same right ascension, with the Moon passing  $2^{\circ}08'$  to the south of Saturn. The Moon will be 3 days old.
- At around the same time, the two objects will also make a close approach, technically called an appulse.
- From Stratford, the pair will become visible at around 17:52 (EST),  $24^{\circ}$  above your south-western horizon, as dusk fades to darkness. They will then sink towards the horizon, setting 3 hours and 24 minutes after the Sun at 20:34.
- The Moon will be at mag -10.5, and Saturn at mag 0.8, both in the constellation Aquarius.
- The pair will be too widely separated to fit within the field of view of a telescope, but will be visible to the naked eye or through a pair of binoculars.



# SHOW AND TELL

The background is a dark blue gradient with a subtle pattern of white stars and technical diagrams. On the right side, there are several circular diagrams resembling gauges or dials with numerical scales (e.g., 100, 120, 140, 160, 180, 200) and arrows. Some diagrams have dashed lines, while others have solid lines. The overall aesthetic is futuristic and technical.

# COSMOLOGY TALK