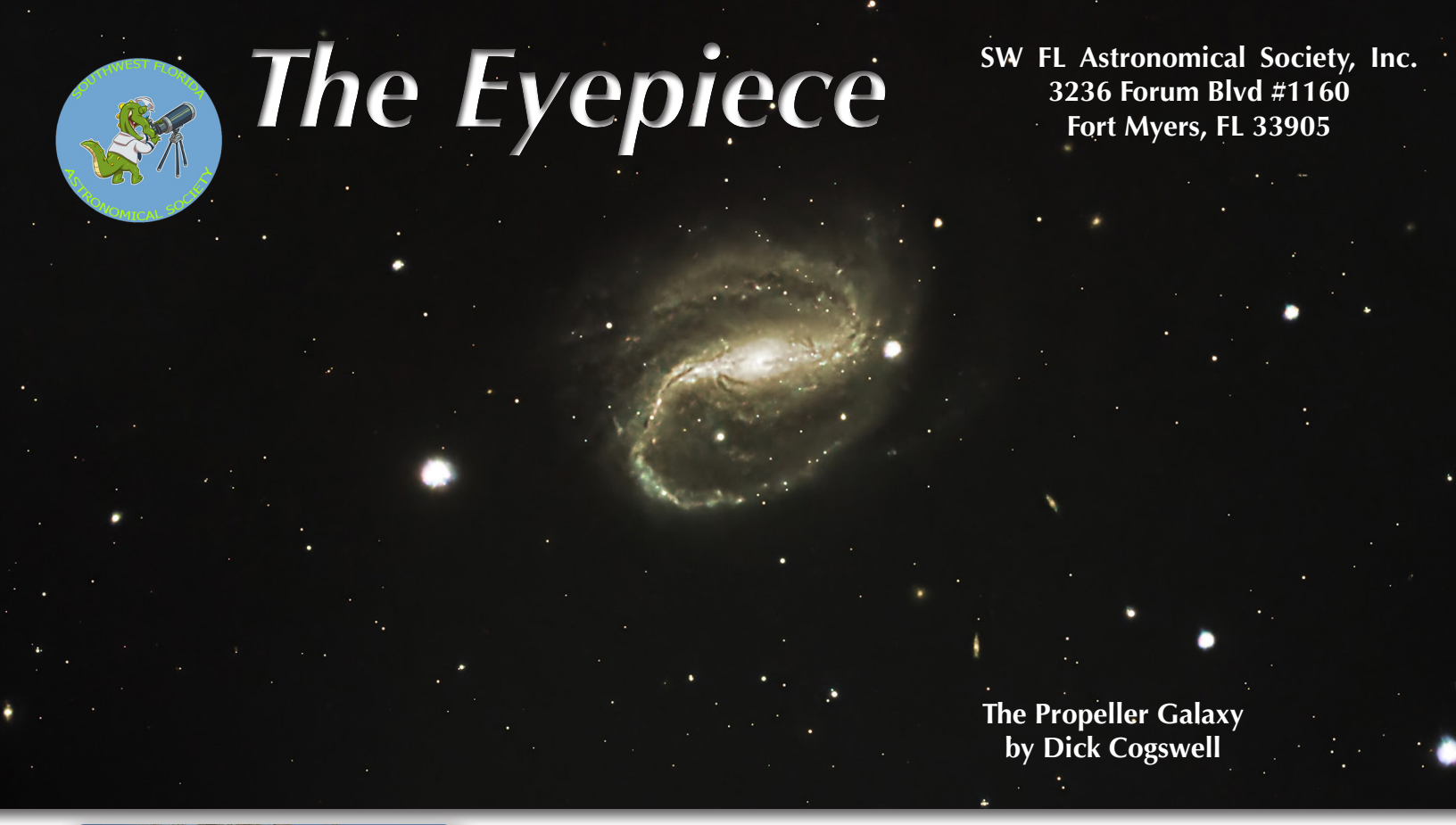
The Eyepiece

SW FL Astronomical Society, Inc.
3236 Forum Blvd #1160
Fort Myers, FL 33905



The Propeller Galaxy
by Dick Cogswell

Editor - Mike Jensen

GREETINGS & HAPPY NEW YEAR

I'm putting this edition out a bit early due to the holidays and travel. Please watch your email from Brian for any updates.

As we close 2024 and begin 2025 I want to thank some people who make our jobs easier. First, thanks to John Udart for hosting the Astro SIG meetings when I am traveling. I'll be traveling a bit more in 2025 so you may see John in the host's chair again. Thank you John! I also want to thank another member who does a lot of things not necessarily behind the scenes, but usually behind the screens and computers. Tom Klein does a great job with our computer and A/V set up and it would be hard to do a meeting without you Tom. Thanks very much!

I also want to thank our many astrophotographers for the amazing work they do, and for keeping me inspired! Wow!

Finally, I'd like to thank John MacLean for the amazing job he has done in spearheading our programs for the last several years. The speakers programs have revitalized our club. John is stepping back from that role, so we need someone, or several to help fill that role. John also acts as our club Treasurer and has done an exemplary job at that as well. Thanks John for all your hard work and efforts.

Time To Pay Your 2025 Membership Dues

Once again this year we offer a very affordable $30 family membership. To pay online, please click this link. You can also pay by check and mail it to:
Southwest Florida Astronomical Society
3236 Forum Blvd #1160
Fort Myers, FL 33905

Or pay in cash or check at the Jan. 2nd meeting.

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Monthly Meetings

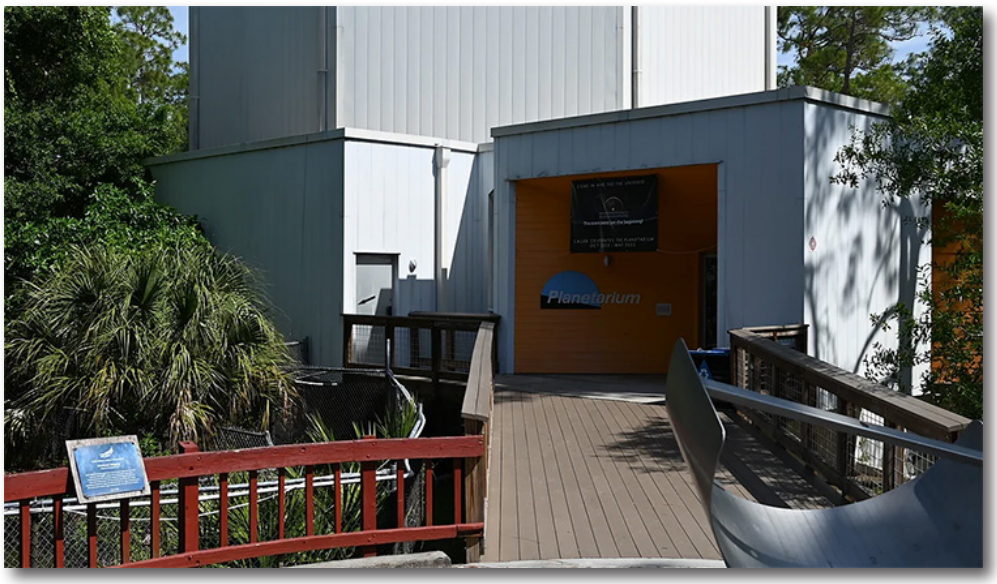
Our monthly meetings are held on the **first Thursday of each month**. **The meetings begin at 7:00pm**.

Here is the Zoom link:

https://zoom.us/j/97435302223?pwd=Y3A2dlk2Q3M2eG1ENTJuOXp4TEZEQT09

Passcode: 874185

Each meeting is usually a combined live and Zoom meeting.



The in person meeting is held at:
Calusa Nature Center/Planetarium
3450 Ortiz Ave,
Fort Myers, FL 33905

Below are the dates for the meetings of 2024:
Dec. 5, 2024
Jan. 2, 2025

Astro Sig Schedule 2025

All Meetings at 7:00pm

Jan. 21st
Feb. 18th

ASTRO SIG MEETING ZOOM LINK
NEW LINK

Astro SIG Zoom Mtg
https://us02web.zoom.us/j/82474761972?pwd=GIzPuNJ5STIZrdbcU6s15G8fLoLOlA.1

Meeting ID: 824 7476 1972
Passcode: 141773

2025 Observatory & Solar Dates

Below are the new schedules for the FSW Observatory and the Solar Observing events for the coming school year. Note that the observatory events will be the fourth Friday of each month, and the Solar observing events will be the second Saturday of each month at the indicated parks in Charlotte County.

FSW Observatory	Solar Observing	Park
Jan 24, 2025	Jan 11, 2025	Punta Gorda Library
Feb 28, 2025	Feb 8, 2025	Gilchrist
Mar 28, 2025	Mar 8, 2025	Ponce deLeon
Apr 25, 2025	Apr 12, 2025	Bayshore Live Oak
May 23, 2025	May 10, 2025	Gilchrist

President's Message

Brian Risley

This is a bit of an abbreviated message and newsletter due to travelling members and the holidays.

The important info is in here and any "Breaking News" will be sent by email.

Key Things to know for January:

- General Member Meeting is Jan. 2nd - Dr. Mario Motta is our speaker on Light Pollution
- Please pay your dues for 2025. Click here to pay online.
- Solar Observing is scheduled for Jan. 11, but most of our harborside parks
- Moore Observatory Night Sky Observing is Jan. 24th
- Astro SIG meeting is Jan. 21 on Zoom

Club Officers & Positions

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Newsletter/Website/Astro SIG
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GUEST SPEAKER PRESENTATIONS SERIES

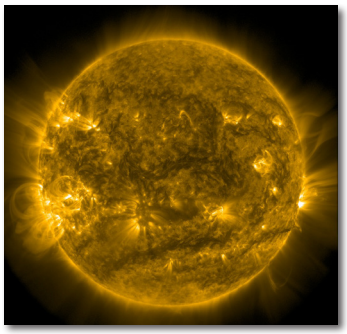
Here's our lineup for the "SWFAS Guest Speaker Presentations" series of talks. These will cover astronomical science and space exploration along with practical astronomy and astrophotography talks by various subject matter experts. We are lining up prominent scientists and researchers to explain the science and technology behind the exciting discoveries being made in recent years in astronomy.

The following presentations are already scheduled and we will be firming up talks in 2025 on a month-to-month basis.:

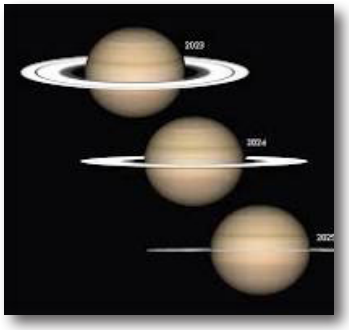
January 2, 2025 Light Pollution presented by our own Dr. Mario Motta.

Mario is one of our members as well as a well known speaker and expert on many things concerning astronomy. Recently Dr. Motta spoke with NPR about Light Pollution. Click here to see/listen to the interview.

Astronomy news items for 2025



- Solar Cycle 25: The solar maximum is expected in July 2025, with a peak of 115 sunspots. Solar Cycle 25 is expected to be similar in strength to cycle 24.
- Supermoons: There will be three supermoons in 2025, on October 7, November 5, and December 4. A supermoon occurs when the moon is at its closest point to Earth in its orbit.
- Planet visibility: Mars, Jupiter, Venus, and Saturn will be visible to the naked eye in early 2025. Neptune and Uranus will require a telescope or high-powered binoculars.
- DESI data release: The next two years of data collected by DESI will be released in spring 2025. DESI is collecting data from around 40 million galaxies and quasars.
- National Astronomy Meeting: Durham University will host the National Astronomy Meeting in 2025.
- Near-Earth asteroid sample return mission: China will launch a near-Earth asteroid sample return mission in 2025.
- Ice-hunting Lunar Trailblazer and IM-2: The Ice-hunting Lunar Trailblazer and IM-2 are nearly ready for launch in 2025. The IM-2 lunar lander will carry the Polar Resources Ice Mining Experiment-1 (PRIME-1), which is designed to search for water ice on the moon.
- Black Hole Week: Black Hole Week 2025 will be held May 5-9.



5 Celestial Events You Should Definitely Add to Your Travel Calendar

- Geminids Meteor Shower. December 13–14, 2024.
- Quadrantids Meteor Shower. January 2–3, 2025.
- Blood Moon. March 13–14, 2025.
- Lyrid Meteor Shower. April 15–29, 2025.
- Perseids Meteor Shower. August 12–13, 2025.

What is DESI?

The Dark Energy Spectroscopic Instrument (DESI)

The Dark Energy Spectroscopic Instrument (DESI) will measure the effect of dark energy on the expansion of the universe. It will obtain optical spectra for tens of millions of galaxies and quasars, constructing a 3D map spanning the nearby universe to 11 billion light years.

The DESI Survey is being conducted on the Mayall 4-meter telescope at Kitt Peak National Observatory near Tucson, Az. DESI is supported by the Department of Energy Office of Science to perform this Stage IV dark energy measurement using baryon acoustic oscillations and other techniques that rely on spectroscopic measurements.

DESI has created the largest 3D map of our universe. The Universe's expansion history is now known to better than 1% precision, yielding the best picture yet of how the universe has evolved over the past 11 billion years.

On April 4, 2024 DESI released a set of papers marking our first release of year one (Y1) results. This page contains summaries of our main results and a guide to the publications. The papers will be available on arXiv at 5pm PST on April 4, and until then are available here.

Helpful links

- A press release containing a high-level overview of their main results: https://newscenter.lbl.gov/2024/04/04/desi-first-results-make-most-precise-measurement-of-expanding-universe/
- A brief announcement on our webpage: https://www.desi.lbl.gov/2024/04/04/first-cosmology-results-from-desi-most-precise-measurement-of-the-expanding-universe/
- A list of current papers: https://data.desi.lbl.gov/doc/papers/
- For more background on DESI's science, see their public webpages.
- DESI's Y1 data is not yet public, but you can find their early data release and any updates on this site: https://data.desi.lbl.gov/doc/releases/

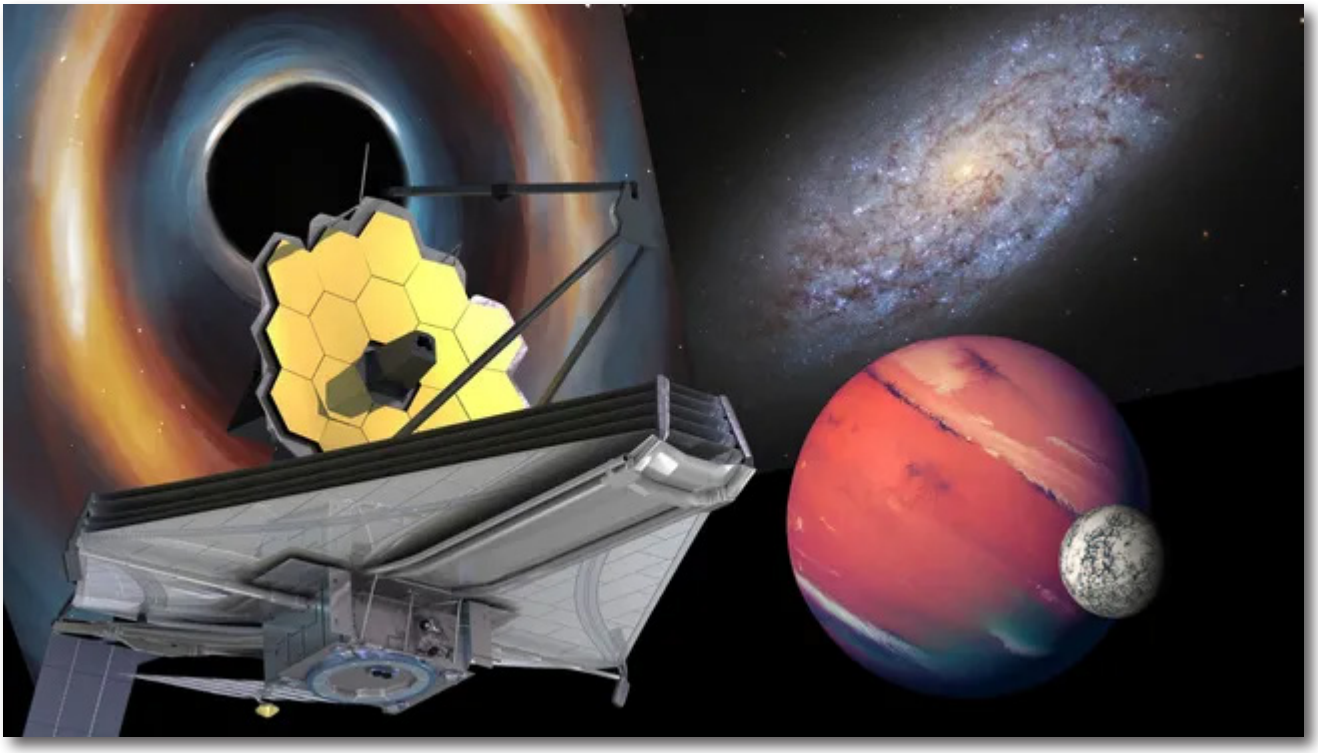
The Y1 results fall into seven main categories, three of these (highlighted in blue) are released on April 4:, BAO measurements with galaxies and quasars (DESI 2024 III), BAO with the Lyman-alpha forest (DESI 2024 IV), and cosmological inference from BAOs (DESI 2024 VI). This figure displays the publication organization with the results released on April 4 highlighted in blue, and summaries of each can be found below.

April 4 Paper Summaries
BAO Measurements from Galaxies and Quasars

Baryon Acoustic Oscillations (BAO) are a powerful tool to measure cosmic expansion through the "standard rulers" created by expanding overdensities from the early universe. Using galaxies as tracers of these overdensities, this set of papers describe DESI's galaxy BAO measurements. This is the largest dataset ever used to measure BAO, by both number of galaxies and volume. They are the most precise measurements of their kind, at 0.52%.

To continue reading about the DESI report, click here.

Webb Plans For 2025



In 2025, the James Webb Space Telescope plans to focus on studying exoplanets, their atmospheres, potential exomoons, supermassive black holes, distant galaxies from the early universe, and large-scale cosmic structures to investigate dark energy, all as part of its "Cycle 3" operations, which will run from July 2024 to June 2025; this includes further investigation of objects within our solar system like Saturn's moon Titan and the Kuiper Belt.

Key points about James Webb's 2025 plans:

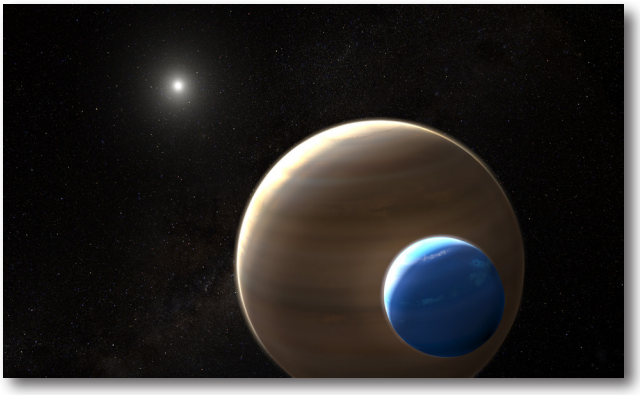
Some of the JWST's third-year targets include potential exomoons, or moons that surround exoplanets, exoplanets themselves in conjunction with their atmospheres, supermassive black holes and even distant galaxies that existed during the dawn of time. The JWST will also study large-scale structures in the cosmos to reveal details about the accelerating expansion of the universe and dark energy, the mysterious force that drives such movement.

Cycle 3 observations:
The majority of Webb's observing time in 2025 will be dedicated to Cycle 3 programs, which will involve a large number of General Observer (GO) proposals from various scientists.

Exoplanet research:
A significant focus will be on studying exoplanets, including their atmospheres and potential moons, by observing them as they transit across their host stars. One of the teams lucky enough to get time with the JWST during Cycle 3 will be searching for moons outside the solar system. These are known as extra-solar moons, or simply, "***exomoons.***"

David Kipping, an assistant professor of astronomy at Columbia University, is part of the team that hopes to find moons around the exoplanet Kepler-167e in particular. This gas giant is around the size and mass of Jupiter and is located 1,115 light-years from Earth.

"We're thrilled to get one of our proposals accepted!" Kipping told Space.com. "Our exomoon search around Kepler-167e was accepted, and it's the best target we've ever had for moon hunting."



Thus far, exomoons have proved an elusive subject for astronomers because they are hunted using the same light-blocking technique employed to spot exoplanets around stars. However, this technique is difficult enough when looking for large worlds beyond Earth — searching for little exomoons with it is immensely challenging. Not only would exomoons block far less light than the exoplanets they orbit would, but they'd also need to be in the right position at the right time.

An exomoon that's detectable would have to be orbiting its planet precisely as that planets crosses, or "transits," the face of its parent star to obscure some light when viewed from our vantage point in the cosmos. That obstruction would be detected by scientists' equipment, which would allow them to reverse-calculate that an exoplanet (or potentially exomoon) gave rise to it.

Kipping is hoping that, by focusing on Kepler-167e with the JWST's Near Infrared Imager and Slitless Spectrograph (NIRISS), he and his team can make the first undisputed detection of an exomoon. "This is hopefully just the beginning of the exomoon revolution. New worlds that will surely hold some remarkable secrets," Kipping said.

Of course, the JWST's Cycle 3 GO projects also include a wealth of investigations focusing on exoplanets themselves and not just their potential moons. This includes a few that wish to determine whether some exoplanets have the conditions needed to support life as we know it.

Among those exoplanet habitability projects is one called "Constraining the atmosphere of the terrestrial exoplanet TOI-4481b." This will use the JWST's Mid-Infrared Instrument (MIRI) for 16 hours to determine if a roughly Jupiter-mass exoplanet, which orbits a star around half as massive as the sun that sits some 39 light-years away, has been able to hang on to its atmosphere.

The result could serve as a first step in understanding the habitability of rocky planets and establishing whether M-type stars, also known as red dwarfs, have terrestrial planets with significant atmospheres. This is important in the search for life beyond Earth because red dwarfs are the most common stars in the Milky Way.

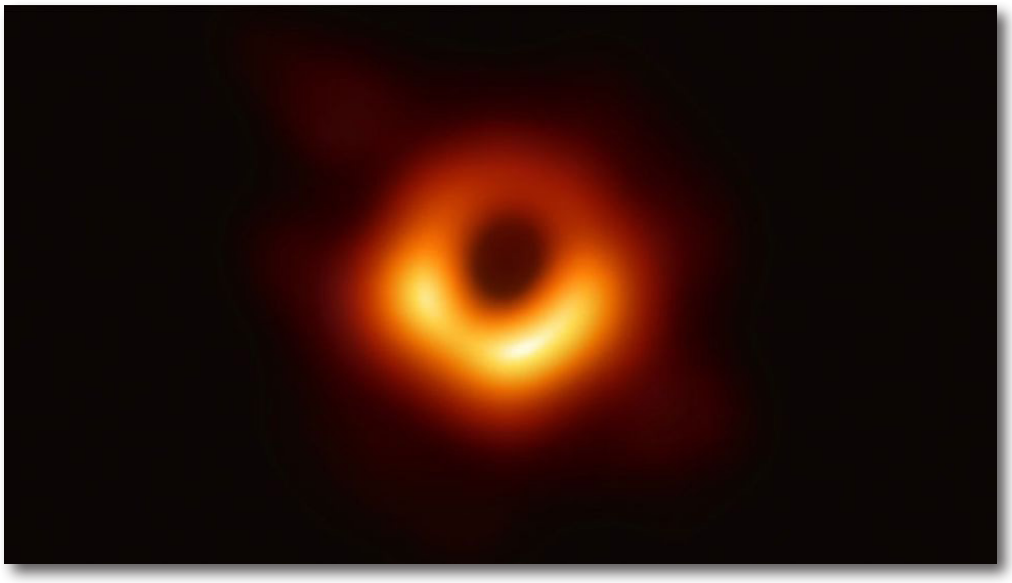
Early universe studies:
Webb will continue to observe extremely distant galaxies formed shortly after the Big Bang, providing insights into the early universe.

Solar system targets:
Investigations of objects within our solar system like Saturn's moon Titan and the Kuiper Belt are also planned.
Data analysis and release:

Seeking out supermassive black holes
Astronomers widely believe the majority of our universe's large galaxies have supermassive black holes in their hearts with masses as great as millions, or even billions, of suns. Some of these supermassive black holes are actively swallowing gas and dust that surrounds them in disks of matter called accretion disks.

These monster black holes' gravitational influences are thought to heat the material in those accretion disks, causing them to emit bright radiation across the electromagnetic spectrum and create regions called Active Galactic Nuclei (AGN). Additionally, any matter that isn't swallowed by the black hole can be channeled to its poles, where it is blasted out as jets of particles traveling at speeds approaching light. When that happens, the

phenomenon is a called a quasar.



The violent conditions of these events make AGNs and quasars the brightest objects in the universe, often luminous enough to outshine the combined light of every star in the galaxies around them. Our theoretical understanding of supermassive black holes has burgeoned since the Event Horizon Telescope (EHT) revealed the first image of a black hole, the supermassive black hole at the heart of the galaxy Messier 87 (M87), in 2019.

And the JWST's Cycle 3 missions will further contribute to this knowledge.

The JWST Cycle 3 supermassive black hole observation programs include the investigation of quasars in the early universe and the nature of the first black holes. Scientists hope to understand how those black holes may have influenced the growth of galaxies over billions of years.

The JWST's observations of supermassive black holes in the early universe could also reveal how these cosmic titans grew to the tremendous masses scientists observe — before the universe was even 1 billion years old. Such a question can be answered by using MIRI to investigate if a giant molecular cloud that existed around 13.2 billion years ago could have directly collapsed, birthing a "heavy black hole seed" that would account for a rapid growth mechanism.

Xavier Calmet is a researcher at the University of Sussex who investigates the intersection between black holes and quantum mechanics. He told Space.com he is particularly excited to see the JWST focusing on supermassive black holes and AGNS.

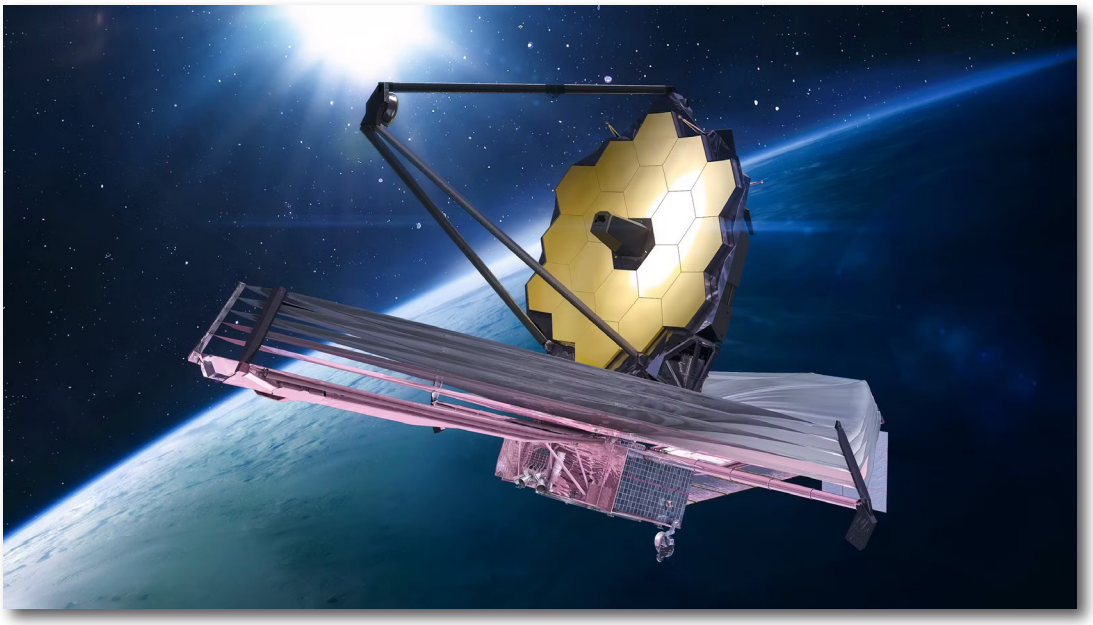
"The JWST Cycle 3 projects are very exciting," Calmet explained. "Given my own research interests, I am particularly eager to see what we will learn about black holes."

The James Webb Space Telescope goes big

One of the primary roles of the JWST is investigating objects in the early universe. The powerful space telescope has this capacity because the expansion of the universe stretches wavelengths of light from distant objects as this light travels toward us, moving the wavelengths toward the "red end" of the electromagnetic spectrum.

The longer that light has traveled to reach us, the more redshifted the light has become. This means light that has been traveling for around 12 billion years is extremely redshifted, all the way into the infrared region of the electromagnetic spectrum and outside the visible range we can see with the unaided eye. Effectively, infrared light is invisible to us. The JWST, however, is capable of observing this infrared light and thus helps to investigate the first stars and earliest galaxies, something it will continue to do in 2025 with several Cycle 3 GO projects.

Luz Angela Garcia is a cosmologist at the Universidad ECCI in Columbia who focuses on how dark energy expands the cosmos at an accelerating rate, which in turn helps with investigations regarding the universe's



evolution. She is particularly enthusiastic about GO projects that will look at an era of cosmic evolution called the epoch of reionization, which occurred around 500 million years after the Big Bang.

During this period, neutral atoms of hydrogen populating the cosmos were ionized by radiation that stripped away their electrons and left them as ionized hydrogen, or hydrogen ions. Studying high-redshift galaxies can reveal more about this crucial stage in cosmic evolution, including how the first galaxies acted as the source of this ionizing radiation.

"Some of the proposals that catch my interest are 'Understanding galaxy formation at cosmic dawn,' 'Galactic Winds in the Early Universe' and 'Dead or alive? Unveiling the nature of massive galaxies in the early Universe,'" Garcia told Space.com. "All of these accepted projects seek to identify and characterize galaxies that are the drivers of the epoch of reionization.

"Most of these proposals focus on studying the properties of the first galaxies in the universe — very high-redshift systems that need spectroscopic confirmation."

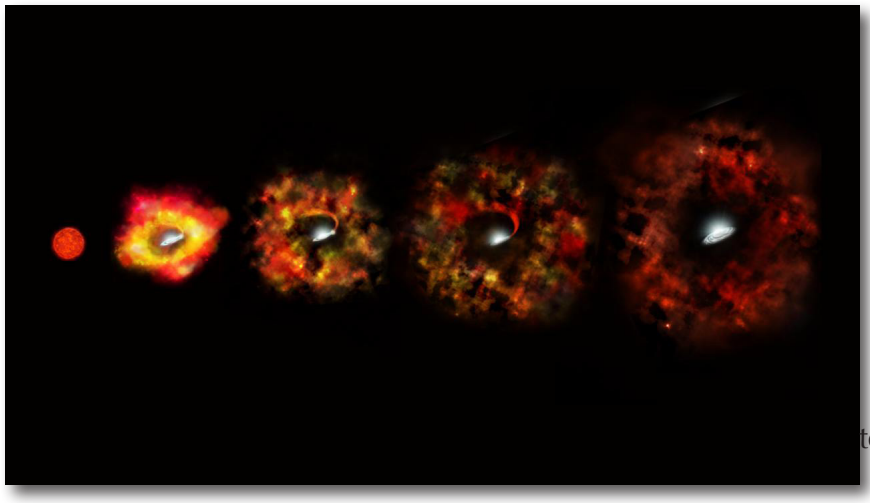
This is just the tip of the celestial iceberg when it comes to the range of topics Cycle 3 GO projects will cover. Between 2024 and 2025, astronomers will also train telescopes on distant stars to better understand stellar physics and populations, as well as examine the gas that exists between stars that can become the building blocks of the next generation of stars and planets.

Though the JWST was designed with the study of distant objects in mind, Cycle 3 will also see the observatory used to study bodies within our own solar system. These will include hunting for the source of gas plumes coming from Saturn's moon Enceladus, investigating the dynamics of the Uranus' rings and characterizing icy objects that exist in the Kuiper Belt at the very edge of the solar system.

Looking beyond JWST Cycle 3, the call for Cycle 4 GO proposals will go out on August 1, 2024, with a deadline set for Oct. 16 this year. The Cycle 4 Telescope Allocation Committee (TAC) review will run between Feb. 3 and Feb.12, 2025, with selections revealed around March 5 next year. JWST Cycle 4 GO programs will then begin making observations of the cosmos on July 1, 2025.

A full list of accepted Cycle 3 JWST programs is available on the STScI website.

M31 Dissapearing Star



A Star Disappeared in Andromeda, Replaced by a Black Hole

From UniverseToday.com

Massive stars about eight times more massive than the Sun explode as supernovae at the end of their lives. The explosions, which leave behind a black hole or a neutron star, are so energetic they can outshine their host galaxies for months. However, astronomers appear have spotted a massive star that skipped the explosion and turned directly into a black hole.

Stars are balancing acts between the outward force of fusion and the inward force of their own gravity. When a massive star enters its last evolutionary stages, it begins to run out of hydrogen, and its fusion weakens. The outward force from its fusion can no longer counteract the star's powerful gravity, and the star collapses in on itself. The result is a supernova explosion, a calamitous event that destroys the star and leaves behind a black hole or a neutron star.

However, it appears that sometimes these stars fail to explode as supernovae and instead turn directly into black holes.

New research shows how one massive, hydrogen-depleted supergiant star in the Andromeda galaxy (M31) failed to detonate as a supernova. The research is "The disappearance of a massive star marking the birth of a black hole in M31." The lead author is Kishalay De, a postdoctoral scholar at the Kavli Institute for Astrophysics and Space Research at MIT.

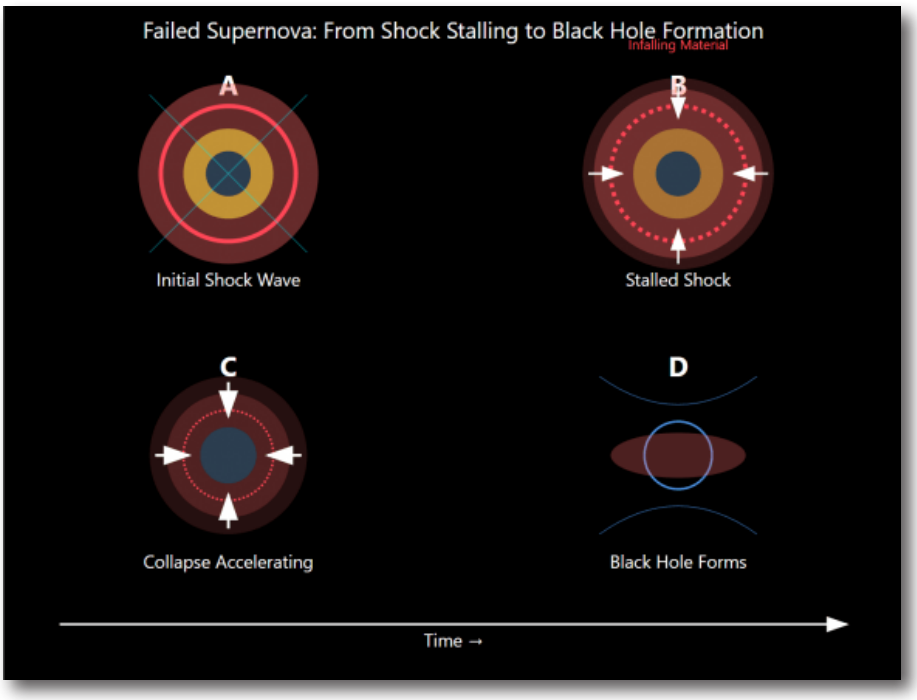
These types of supernovae are called core-collapse supernovae, also known as Type II. They're relatively rare, with one occurring about every one hundred years in the Milky Way. Scientists are interested in supernovae because they are responsible for creating many of the heavy elements, and their shock waves can trigger star formation. They also create cosmic rays that can reach Earth.

This new research shows that we may not understand supernovae as well as we thought.

The star in question is named M31-2014-DS1. Astronomers noticed it brightening in mid-infrared (MIR) in 2014. For one thousand days, its luminosity was constant. Then, for another thousand days between 2016 and 2019, it faded dramatically. It's a variable star, but that can't explain these fluctuations. In 2023, it was undetected in deep optical and near-IR (NIR) imaging observations.

The researchers say that the star was born with an initial mass of about 20 stellar masses and reached its terminal nuclear-burning phase with about 6.7 stellar masses. Their observations suggest that the star is surrounded by a recently ejected dust shell, in accordance with a supernova explosion, but there's no evidence of an optical outburst.

"The dramatic and sustained fading of M31-2014-DS1 is exceptional in the landscape of variability in massive, evolved stars," the authors write. "The sudden decline of luminosity in M31-2014-DS1 points to the cessation of nuclear burning together with a subsequent shock that fails to overcome the infalling material." A supernova explosion is so powerful that it completely overcomes infalling material.



"Lacking any evidence for a luminous outburst at such proximity, the observations of M31-2014-DS1 bespeak signatures of a 'failed' SN that leads to the collapse of the stellar core," the authors explain.

What could make a star fail to explode as a supernova, even if it's the right mass to explode?

Supernovae are complex events. The density inside a collapsing core is so extreme that electrons are forced to combine with protons, creating both neutrons and neutrinos. This process is called neutronization, and it creates a powerful burst of neutrinos that carries about 10% of the star's rest mass energy. The outburst is called a neutrino shock.

Neutrinos get their name from the fact that they're electrically neutral and seldom interact with regular matter. Every second, about 400 billion neutrinos from our Sun pass right through every person on Earth. But in a dense stellar core, the neutrino density is so extreme that some of them deposit their energy into the surrounding stellar material. This heats the material, which generates a shock wave.

The neutrino shock always stalls, but sometimes it revives. When it revives, it drives an explosion and expels the outer layer of the supernova. If it's not revived, the shock wave fails, and the star collapses and forms a black hole.

In M31-2014-DS1, the neutrino shock was not revived. The researchers were able to constrain the amount of material ejected by the star, and it was far below what a supernovae would eject. "These constraints imply that the majority of stellar material (?5 solar masses) collapsed into the core, exceeding the maximum mass of a neutron star (NS) and forming a BH," they conclude. About 98% of the star's mass collapsed and created a black hole with about 6.5 solar masses.

M31-2014-DS1 isn't the only failed supernova, or candidate failed supernova, that astronomers have found. They're difficult to spot because they're characterized by what doesn't happen rather than what does. A supernova is hard to miss because it's so bright and appears in the sky suddenly. Ancient astronomers recorded several of them.

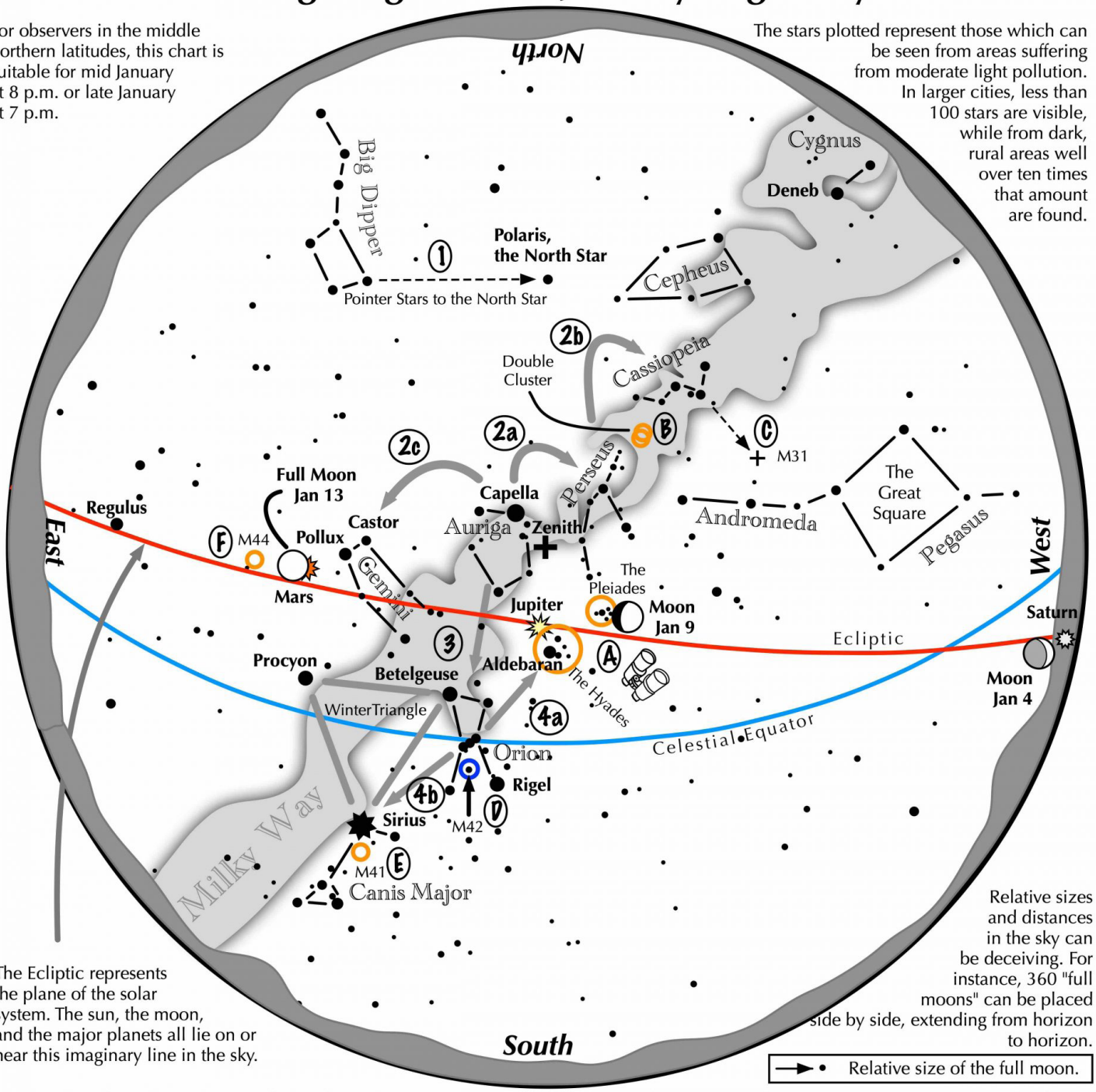
In 2009, astronomers discovered the only other confirmed failed supernova. It was a supergiant red star in NGC 6946, the "Fireworks Galaxy." It's named N6946-BH1 and has about 25 solar masses. After disappearing from view, it left only a faint infrared glow. In 2009, its luminosity increased to a million solar luminosities, but by 2015, it had disappeared in optical light.

A survey with the Large Binocular Telescope monitored 27 nearby galaxies, looking for disappearing massive stars. The results suggest that between 20% and 30% of massive stars can end their lives as failed supernovae. However, M31-2014-DS1 and N6946-BH1 are the only confirmed observations.

Navigating the mid January Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid January at 8 p.m. or late January at 7 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→• Relative size of the full moon.

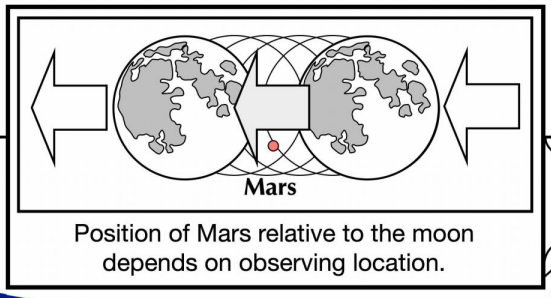
Navigating the winter night sky: Simply start with what you know or with what you can easily find.

1. Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
2. Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next Jump southeastward from Capella to the twin stars Castor and Pollux of Gemini.
3. Directly south of Capella stands the constellation of Orion with its three Belt Stars, its bright red star Betelgeuse, and its bright blue-white star, Rigel.
4. Use Orion's three Belt stars to point to the red star Aldebaran, then to the Hyades, and the Pleiades star clusters. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius.

Binocular Highlights

A: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **B:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** M42 in Orion is a star forming nebula. **E:** Look south of Sirius for the star cluster M41. **F:** M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.

If you can see only one celestial event this January, see this one.



Position of Mars relative to the moon depends on observing location.

Lunar occultation of Mars across the contiguous United States: Jan. 13. Extreme southern US sees Mars move behind the southern portion of the moon, and the northern US sees the planet move behind the northern portion of the moon.

Be sure to use binoculars!

Occultations demonstrate the moon's eastward orbital motion as Earth's rotation causes it to move in a westward arc across the night night sky.

Full Moon occults Bright Mars

In the evening hours of **January 13**, the brilliant full moon passes in front of bright Mars, which is near opposition. It may not be easy to spot because of the moon's bright glare!, but give it a try!

Approximate local times of disappearance and reappearance.
Begin viewing ten minutes before your estimated time. Mars' time and position of reappearance is difficult to judge since the planet lies concealed behind the moon beforehand.

City	Disappearance	Reappearance
Albuquerque	**6:51 pm**	**7:52**
Augusta	**9:29**	**10:44**
Atlanta	**9:06**	**10:13**
Boise	**7:06**	**7:49**
Boston	9:26	10:42
Chicago	**8:08**	**9:16**
Dallas	**7:54**	**8:57**
Denver	**6:57**	**7:57**
Kansas City	**8:00**	**9:06**
Memphis	**8:00**	**9:07**
Minneapolis	**8:08**	**9:10**
Los Angeles	5:51	6:45
Miami	**9:30**	**9:53**
New Orleans	**8:00**	**8:59**
New York	9:21	10:37
Phoenix	**6:49**	**7:48**
Salt Lake City	**6:59**	**7:52**
San Antonio	**7:52**	**8:50**
San Diego	**5:49**	**6:45**
San Francisco	**5:58**	**6:45**
Seattle	**6:23**	**6:39**
Washington DC	**9:16**	**10:31**

What's Up, Doc? †

January 2025

Dr. Aaron B. Clevenson, Observatory Director, Insperity Observatory

This document tells you what objects are visible this next month for many of the Astronomical League Observing Programs. If you are working on one of the more advanced Observing Programs, then I assume that you are also probably tracking where your objects are all the time. This concentrates on the more common and starter level Observing Programs. This information is based on 9 PM Eastern Time.

Naked-Eye Observing Programs

Meteors – any night, any time, anywhere; the darker the sky the better. Major showers are in **BOLD**:

Shower	Duration	Maximum	Type
Quadrantids	**1/1 to 1/10**	**1/3**	**Major**
Zeta Aurigids	12/11 to 1/21	12/31 & 1/1	Minor
January Bootids	1/9 to 1/18	1/16 to 1/18	Minor
Alpha Centaurids	1/28 to 2/21	2/8	Minor
Delta Cancrids	12/14 to 2/14	1/17	Minor
Canids	1/13 to 1/30	1/24 & 1/25	Minor
Eta Carinids	1/14 to 1/27	1/21 & 1/22	Minor
Eta Craterids	1/11 to 1/22	1/16 & 1/17	Minor
January Draconids	1/10 to 1/24	1/13 to 1/16	Minor
Rho Geminids	12/28 to 1/28	1/8 & 1/9	Minor
Alpha Hydrids	1/15 to 1/30	1/20 & 1/21	Minor
Alpha Leonids	1/13 to 2/13	1/24 to 1/31	Minor
Gamma Velids	1/1 to 1/17	1/5 to 1/8	Minor

Constellations, Northern Skies – any night, any time, anywhere, the darker the sky the better.

Last Chance: Cygnus, Lyra, Vulpecula, Sagitta, Delphinus, Equuleus, Aquarius, Piscis Austrinus.
Transit: Camelopardalis, Perseus, Aries, Taurus, Eridanus, Fornax.
New Arrivals: Lynx, Ursa Major, Leo Minor, Cancer, Canis Minor, Monoceros, Canis Major, Columba.

Binocular Observing Programs

Binocular Messier – Monthly highlights include:

Easy – 31, 34, 35, 36, 37, 38, 39, 41, 42, 44, 45, 46, 47, 48, 50, 52, 67, 103
Medium – 33, 78, 79, 81, 82
Hard – 1, 32, 97
Big Binoculars – 77, 108, 110

Deep Sky Binocular – Monthly highlights include:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 55, 56, 57, 58, 59, 60

Other Observing Programs

Messier In addition to those listed under Binocular Messier, check out: 43, 74, 76

Caldwell

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 23, 24, 25, 28, 30, 31, 33, 39, 41, 43, 44, 46, 49, 50, 51, 54, 56, 58, 62, 64, 65, 67, 70, 73

Double Star

2, 3, 5, 6, 8, 16, 19, 21, 23, 24, 27, 28, 30, 32, 33, 34, 40, 42, 46, 47, 49, 50, 53, 55, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 85, 89, 95, 99

Solar System and Lunar Observing Programs

Solar System – These are the tasks that can be done this month: (all times are Eastern Time)

Sun – Any clear day is a good time to get those sunspots.

Sunset is 1647 by mid-month.

Moon:

The Maria requirement can be done any time the moon is visible. Look after 1/6 and before 1/22 for the fullest views.

The Highlands requirement can be done at the same time.

The Crater Ages requirement is best done on 1/5 or 1/6.

The Scarps requirement is best done on 1/7.

Occultations occur all the time, the bright ones can be found on the internet. Objects disappear on the East side of the moon.

Mercury, and Venus are not visible in the evening skies.

Mars is in Sagittarius and set at 1704 mid-month.

Jupiter is in Gemini and rises at 1853 mid-month.

Saturn is in Aquarius and is up all evening mid-month.

Uranus is in Taurus and is up all evening mid-month.

Neptune is in Pisces and is up all evening mid-month.

Pluto in is Capricornus and sets at 1927 mid-month.

Asteroids – Course Plotting and Measuring Movement requirements can be done at any time on any asteroid. See above to identify the bright ones this month.

Lunar (all times are Eastern Time)

Key timings are indicated below: (New Moon, 1/29 at 1500)

4 days, 1/3 7 days, 1/6 10 days, 1/9 14 days, 1/13

Old moon in new moons arms – before 1227 on 1/2, 10 % illuminated. (72 hr > New)

New moon in old moons arms – after 1500 on 1/26, 10 % illuminated. (72 hr < New)

Waxing Crescent – before 1227 on 1/1 and 1500 on 1/31, 4 % illuminated. (40 hr > New)

Waning Crescent – after 1500 on 1/27, 4 % illuminated. (48 hr < New)

Astronomical Events

- 1/3 – Quadrantids Meteor Shower
- 1/4 - Lunar Occultation of Saturn
- 1/5 – Lunar Occultation of Neptune
- 1/7 – Lunar Perigee
- 1/10 – Venus at Greatest Elongation East
- 1/11 – Venus at Dichotomy
- 1/13 – Moon and Mars Conjunction (13')
- 1/13 – Moon occults Mars
- 1/15 – Mars at Opposition
- 1/20 – Lunar Apogee
- 1/21 – Pluto at solar Conjunction
- 1/30 – Uranus returns to Prograde Motion
- 1/31 – Lunar Occultation of Saturn

* - Although some clubs are not detailed in this **"What's Up Doc?"** handout, you can get information on many of their objects by using the **"What's Up Tonight, Doc?"** spreadsheet (version 4.1). To get your copy, talk to the Doc, Aaron Clevenson, by sending an email to aaron@clevenson.org. It is also available through the AL website.

† - "What's Up Doc?" is used with permission from Warner Bros. Entertainment Inc.

To be added to our monthly distribution list, send an email to aaron@clevenson.org and ask to be added.

Insperity Observatory, 2505 S. Houston Avenue, Humble, TX: www.humbleisd.net/observatory

What's Going On in the SIG Group?

By Mike Jensen,
SIG Founder/Leader

Every month we get together on a Zoom call with a pretty loose agenda and manage to have an absolute blast talking about Astrophotography. I hope you'll join us if you're interested in Astrophotography.

There are many who are on the SIG email list but many fewer who actually join the meeting. We'd love to have you join us, and at some point I will begin removing non-participating members from the email list to protect our participating members who send out their images for critique and feedback.

Medulla Nebula- Abell 85 or LBN 576 in Cassiopeia by Dick Cogswell
Brand/Type of Telescope/Lens: iStar 140
Mount: AP 1100AE
Exposures: 1220 4 and 5 minute exposures, Ha, SII and OIII
Processing Software: APP, PI and PS
Here's the story: The nebula is the apparent size of the full moon, but exceedingly faint in a telescope. It is the expanding gas shell left after a supernova exploded around 10,000 years ago, well before my time. It also glows in x-ray light, which no one can explain (try harder). One theory is that a pulsar was created with huge stellar wind, and recently a pulsar may have been detected.

Astro SIG Images

NGC 2207 by Dick Cogswell
Brand/Type of Telescope/Lens: C-14 Edge at 2750 mm f/l
Mount: AP 1100AE
Exposures: 259 4 minute exposures, LRGBHa combined
Processing Software: APP, PI and PS
Here's the story: NGC 2207 and IC 2163 are a pair of colliding spiral galaxies about 80 million light-years away in the constellation Canis Major. The larger spiral, NGC 2207, is classified as an intermediate spiral galaxy exhibiting a weak inner ring structure around the central bar. The smaller companion spiral, IC 2163, is classified as a barred spiral galaxy that also exhibits a weak inner ring and an elongated spiral arm that is likely being stretched by tidal forces with the larger companion. Both galaxies contain a vast amount of dust and gas, and are beginning to exhibit enhanced rates of star formation, as seen in infrared images. Five supernovae have been observed in NCG 2207 and three in IC 2163. NGC 2207 is in the process of colliding and merging with IC 2163. But unlike the Antennae or the Mice Galaxies, they are still two separate spiral galaxies. They are only in the first step of colliding and merging, with NGC 2207 being in the process of tidally stripping IC 2163. Soon they will collide, probably looking a bit more like the Mice Galaxies. In about a billion years' time they are expected to merge and become an elliptical galaxy or perhaps a disk galaxy. I'll try to image it again once that occurs, and send it around again.

You can see a very faint blur on the right side of the galaxies, seemingly a massive number of stars being torn away in the process. There are at least 8 very faint galaxies in the background.

MGC 1365 The Great Barred Spiral by Dick Cogswell
Brand/Type of Telescope/Lens: C-14 Edge at 2750mm f/l
Mount: AP 1100AE
Exposures: 260 4 minute exposures, in LRGBHa

Processing Software: APP, PI and PS
Here's the story: This is a large galaxy in the constellation Fornax about 74 million light years away. The two outer arms spread about 300,000 light years across. The outer parts of the bar make one rotation around the core in 350 million years. The core is thought to contain a supermassive black hole that is 2 million times the mass of our sun.

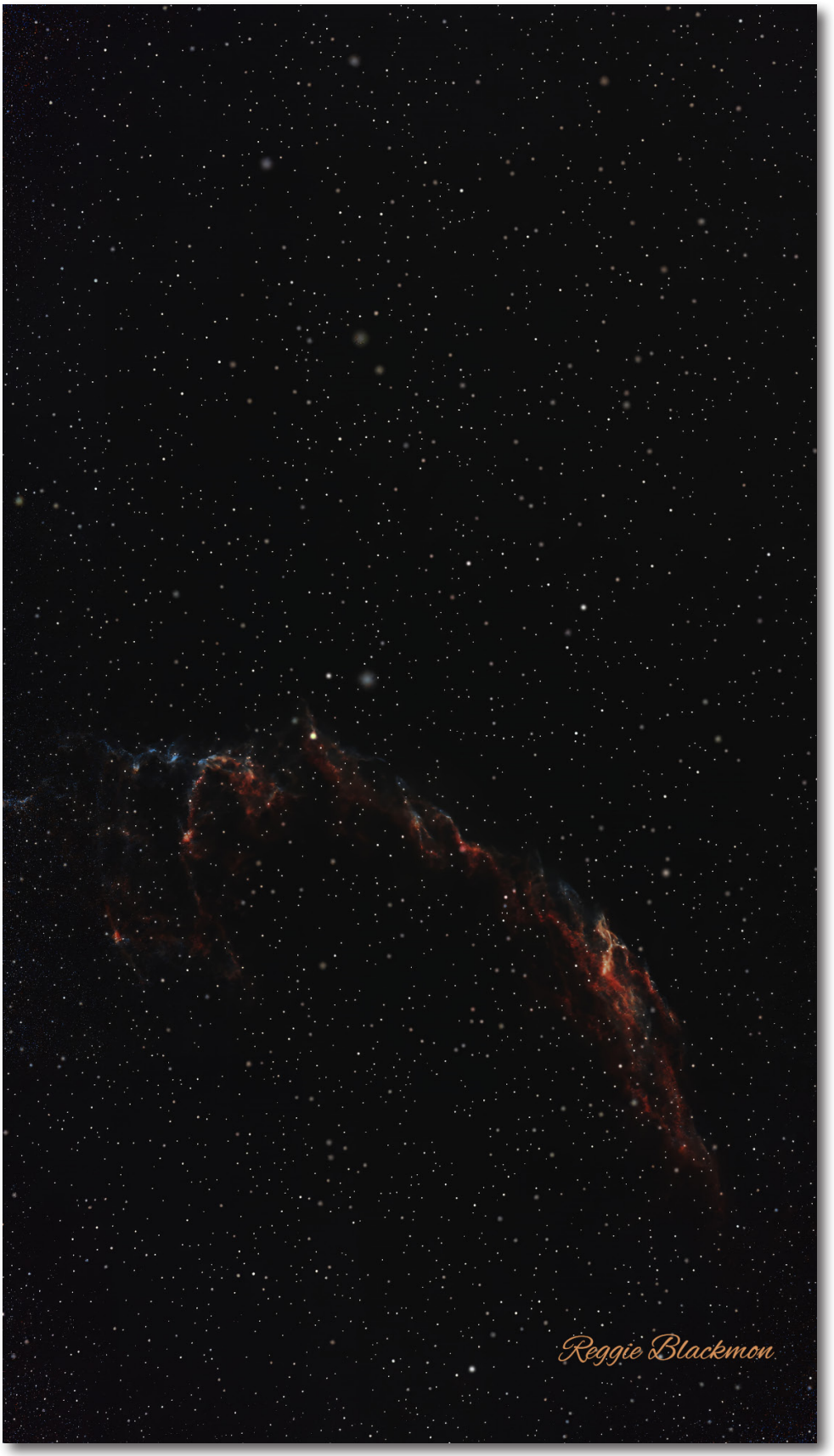
This galaxy has a wonderful barred shape, but it is a very difficult object to image from Florida as it never rises to more than 26 degrees above the horizon, and thus is in very thick air, so this does not show too much detail. However, one can readily see the huge dust lane running through the core.

NGC 7479 The Propeller Galaxy by Dick Cogswell
Brand/Type of Telescope/Lens: C-14 Edge at 2750mm f/l
Mount: AP 1100AE
Exposures: 180 4 minute exposures, in LRGBHa

Processing Software: APP, PI and PS
Here's the story:

The Propeller Galaxy, also known as NGC 7479, is a barred spiral galaxy in the constellation Pegasus. It is approximately 105 million light-years away and has a diameter of 70 light-years. It was discovered by William Herschel in 1784. Its distinctive shape reminded Herschel of the propeller on Pegasus, which enables the flying horse to fly. The shape is due to dust lanes and star formation.

The Propeller Galaxy emits a jet of radiation in radio wavelengths that bends in the opposite direction to the stars and dust in the arms of the galaxy. Hidden within the galaxy's core lies a supermassive black hole that feeds on large quantities of gas. The galaxy has been the site of two recent supernovae, one in 1990 and another in 2009.



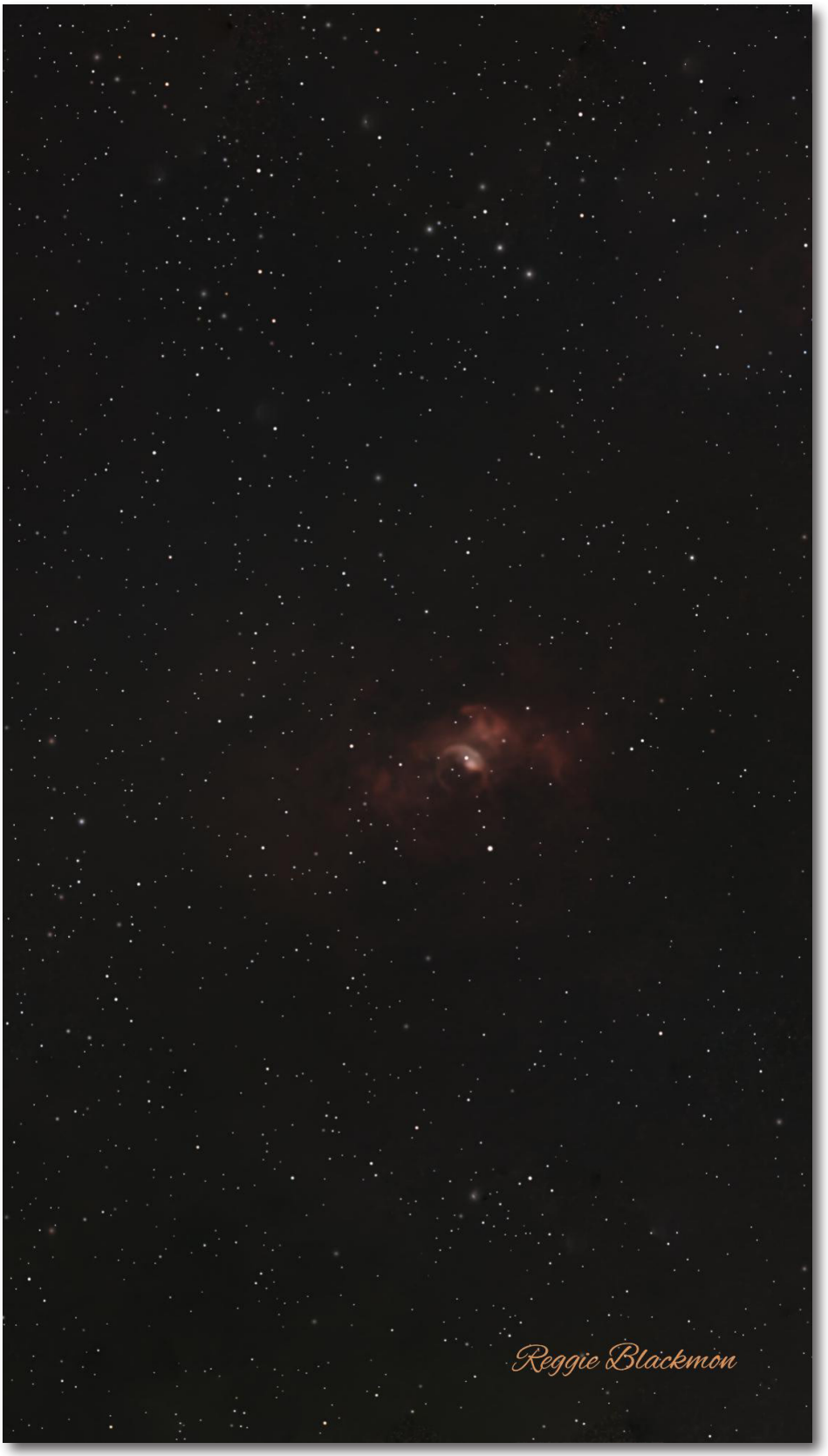
NGC 6992 - Eastern Veil Nebula
by Reggie Blackmon

Brand/Type of Telescope/Lens: Zwo/Seestar S50/50mm/250mm
Mount: Alt-Az go-to
Exposures: 476 10 sec exposures shot in mosaic, OIII 30nm/ Ha 20nm filter

Processing Software: Siril, Gimp, Aiarty

Here's the story: NGC 6992, a part of the Eastern Veil Nebula, is located 2400 light-years away in the constellation of Cygnus. This cloud of heated and ionized gas and dust is a part of a larger structure called the Veil Nebula or the Cygnus Loop, which is the remnant of a supernova explosion that occurred between 10,000 and 20,000 years ago. The Veil Nebula also includes the Witch's Broom Nebula as well as Pickering's Triangle.

When I saw NGC 6992 in the Sky-Atlas, it looked to me like a space serpent. So...I shot it. :-)



NGC 7635 - Bubble Nebula by Reggie Blackmon

Brand/Type of Telescope/Lens: Zwo/Seestar S50/50mm/250mm
Mount: Alt-Az go-to

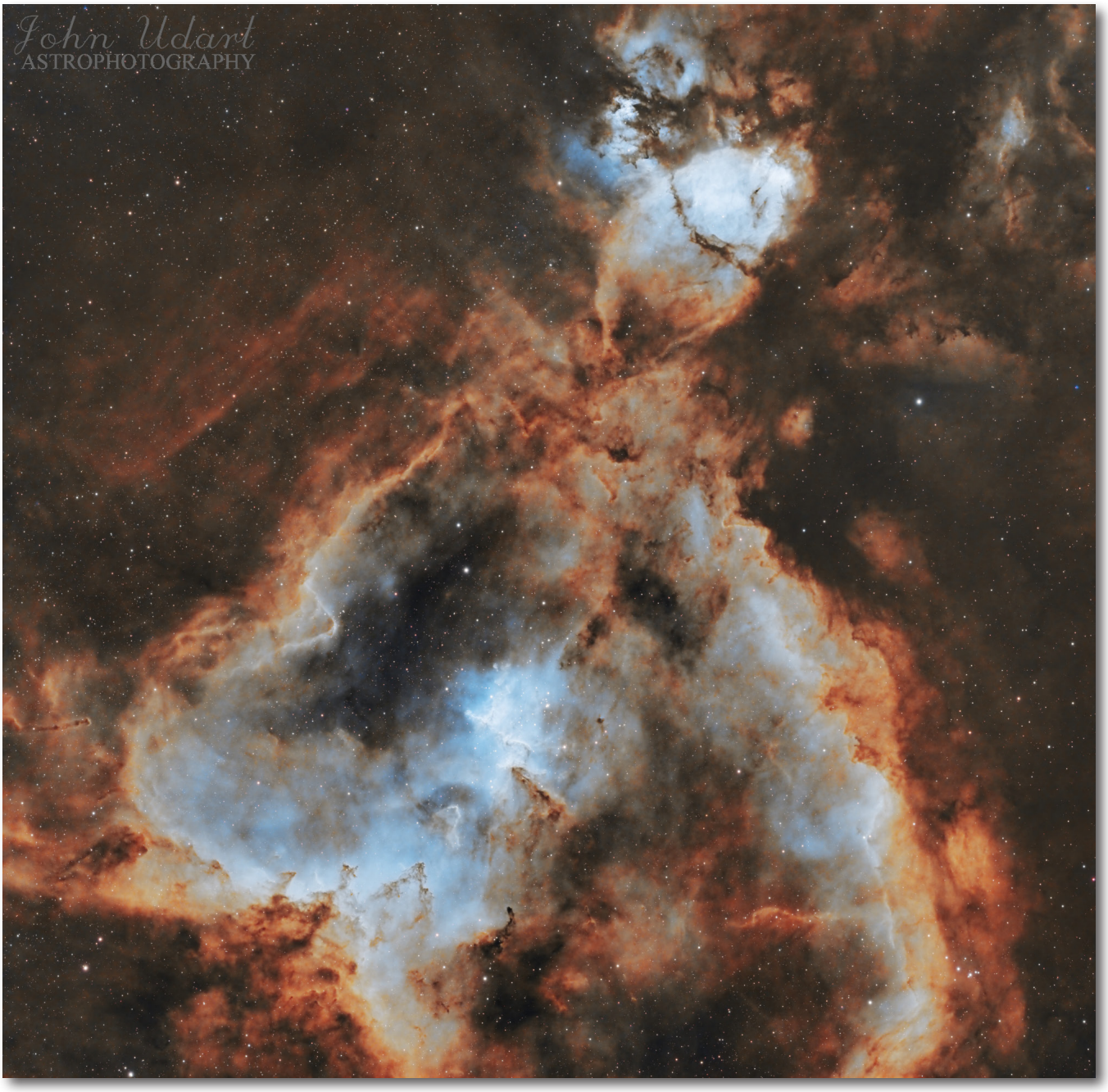
Exposures: 382 10 sec exposures shot in mosaic, OIII 30nm/ Ha 20nm filter

Processing Software: Siril, GraX-pert, Aiarty
Here's the story:

NGC 7635, also known as the Bubble Nebula, Sharpless 162, or Caldwell 11, is an H II region[1] emission nebula in the constellation Cassiopeia. It lies close to the open cluster Messier 52. The "bubble" is created by the stellar wind from a massive hot, 8.7[1] magnitude young central star, SAO 20575 (BD+60°2522).[7] The nebula is near a giant molecular cloud which contains the expansion of the bubble nebula while itself being excited by the hot central star, causing it to glow.[7] It was discovered in November 1787 by William Herschel.[5]

[1]SIMBAD (February 23, 2007). "Results for NGC 7635". SIMBAD, Centre de Données Astronomiques de Strasbourg.
[7]Nemiroff, R.; Bonnell, J., eds. (July 16, 2004). "The Bubble". Astronomy Picture of the Day. NASA.
[5]"NGC-IC Project Database". Archived from the original on 2001-09-04.

NGC 7635 showed up on my Sky-Atlas recommended shoot list and it look intriguing.



The Heart Nebula by JOHN UDART
Brand/Type of Telescope/Lens: William Optics GT71, 71mm Lens, 336mm Focal Length
Mount: Sky-Watcher EQ6-R Pro
Exposures: Subs: 375, Exposure Length: 5 min., Integration Time: 31.25 hours
Camera: ASI533MC-Pro, Filter: Optolong L-eXtreme

Processing Software: PixInsight

Here's the story: The Heart Nebula is an emission nebula, 7500 light years away from Earth and located in the Perseus Arm of the Galaxy in the constellation Cassiopeia. There were a couple of clear nights mid-November then a string of seven clear nights from November 22 to November 28 that provided ample opportunity to gather a significant amount of data on this and a second target each night. The imaging experience over those seven nights was uneventful, which, in astro talk, means great!

NGC 2264 by JOHN UDART
Brand/Type of Telescope/Lens: William Optics GT71, 71mm Lens, 336mm Focal Length
Mount: Sky-Watcher EQ6-R Pro
Exposures: Subs: 302, Exposure Length: 5 min., Integration Time: 25 hours
Camera: ASI533MC-Pro, Filter: Optolong L-eXtreme
Processing Software: PixInsight
Here's the story:NGC 2264 is the designation number of the New General Catalogue that identifies two astronomical objects as a single object: the Cone Nebula, and the Christmas Tree Cluster. Two other objects are within this designation but not officially included, the Snowflake Cluster, and the Fox Fur Nebula. All the objects are in the Monoceros constellation and are located about 2,300 light-years from Earth.
After imaging the Heart Nebula on those nights as previously mentioned, NGC 2264 was designated as the second target in the sequence set up in N.I.N.A. Around 1am, the mount would slew over and begin taking 300 second exposures until the end of astronomical dark. I really can't describe the imaging experience because I was mostly asleep during this time. I can say, however, that I was happy each morning upon waking to find the mount parked and in the home position.

Membership Meeting Minutes

Southwest Florida Astronomical Society Dec. 5, 2024

Southwest Florida Astronomical Society Membership meeting minutes for December 5, 2024 at the Caloosa Planetarium

Vice President Michael Jensen started the meeting promptly at 7 PM by advising that President Risley could not make the meeting and then stated that the Internet connection at the Planetarium was not functioning, thus only the 26 in person participants will be able to view the speaker's presentation.

Mike and the club wish to express their deepest thanks for the devotion and time Tom Klein has given to helping to set up and run the A/V system, especially for tonight's meeting.
Mike apologized for the inconvenience and asked for new participants and members to rise and introduce themselves. Jim Vaughn, retired and lives in Cape Coral; Bill Harmon, founding father of the Caloosa Nature Center and his wife; Chet Schubert; Eva Harrington, student at FGCU enrolled in science classes; and Tim Lilly, former member who has decided to rejoin. Mike then introduced our speaker for the evening. Gregory T. Shanos RH, PharmD, ALPO member & MASA/JPL Solar ambassador.

PROGRAM: The Smart Scope Revolution. A review of all brands and specifically the Seestar S50.
The Seestar 50, Dwarf, Vaonis, Unistellar Odyssey, and Celestron Origin were competing to take over a market that is lower in costs, easier to set up for viewing, and instructs the user on the sky, solar, planetary, deep space and natural settings. Not to replace the mainstay type telescope market but to supplement them. Greg reviewed the accessories and main screen of the Seestar 50, the setup sequence and advantages of the scope.
Greg then presented multiple views from himself and others that utilize the Seestar 50. Lunar X&V, lunar eclipses, solar events, deep sky objects, open star clusters, nebulosity, galaxies, and the processing methods. Many questions were asked and answered. Greg was applauded for his efforts.

Vice President Jensen advised that only 44 members have voted on the 2025 budget and election of o□cers. He stated that we must have 56 votes and requested those in the audience that have not voted to please get with Dan Dannenhauer to voice your vote..5 did. So we are at 49.

OUTREACH EVENTS: Given circumstances, Vice President Jensen said that he would present said events.
FSW Moore Observatory will hold their event on 12/27/24.
Charlotte Monthly Solar Viewing will be held on 12/14/24 from 9AM until Noon.
Seahawk Park Star Parties at dusk on 12/7/24.

OFFICER AND COMMITTEE REPORTS:
Vice President Jensen advised that Mario Motta would be our guest speaker on January 2, 2025 discussing Light Pollution. He requested that all items that members want in the Newsletter submit them by this Saturday given Mike's travel schedule, including the minutes. Mike stated that, given circumstances, we would skip the other reports except the minutes and asked Dan Dannenhauer to present such. Dan asked for an edited motion on approval of the minutes, those edits were made by President Risley commenting that the Seahawk Park viewing had 100 or more participants and was not cancelled but was successful……with those alterations to the minutes, motion was made by Tony Costanzo, seconded by Jim Vaughn and approved without objection.

Vice President Jensen asked if anyone had any comments, new or old business? He thanked Tom Klein for working the computer and requested that Tom and Dan get with Heather to become knowledgeable on light controls. Mike than asked for a motion to adjourn…..So moved by Sean Dey, seconded by Tony Costanzo and passed unanimously.