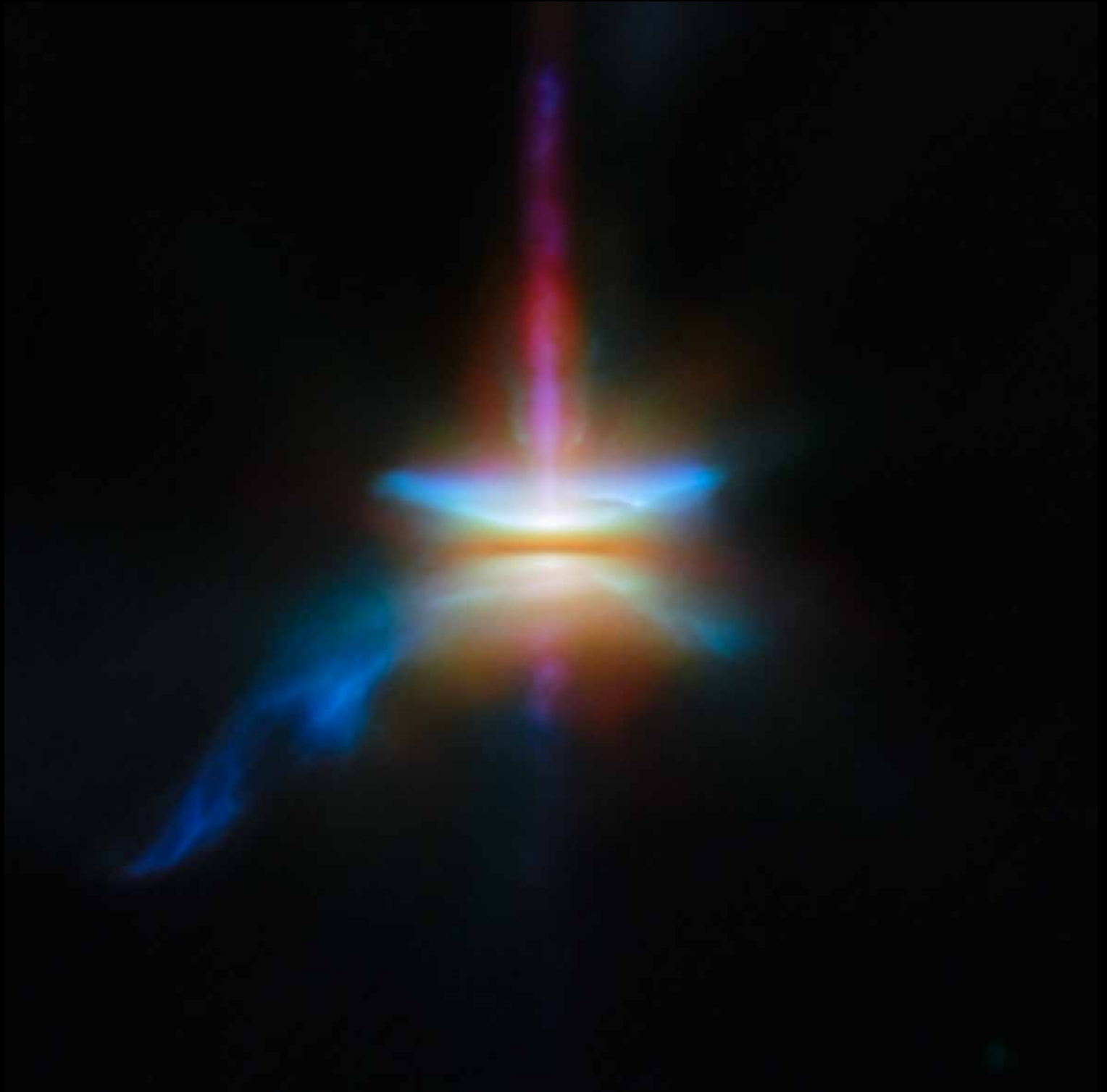


Volume 45.3

March 2025

Desert Sky Observer

Antelope Valley Astronomy Club



Desert Sky Observer

www.avastronomyclub.org

March 2025

Upcoming Events

March 8: Moonwalk @ PDW 6:30 pm
March 9: Daylight Saving Time begins
March 13/14: Total Lunar Eclipse viewing at SAGE
March 14: Club Meeting
March 29: DSSP/Messier Marathon
@ Red Cliffs
Every clear night: Personal Star Party

April 11: Club Meeting
April 19: Moonwalk @ PDW 8:00 pm
April 26: DSSP @ Chuchupate

Board Members

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Equipment & Library:
vacant
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Club Historian: vacant
history@avastronomyclub.org

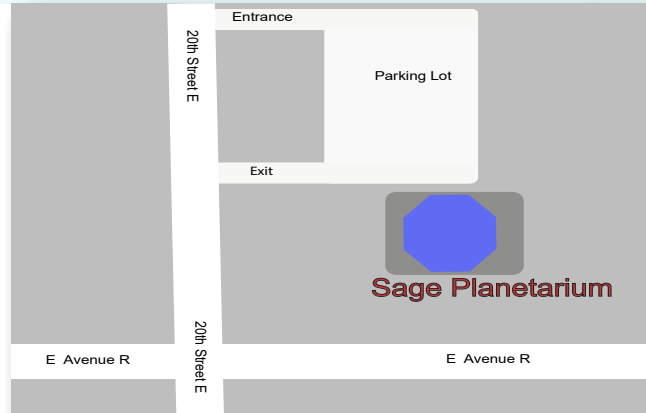
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Rose Moore (661) 972-1953

Astronomical League Coordinator:
Phil Wriedt (661) 917-4874
al@avastronomyclub.org



AVAC Calendar



Monthly Meetings

Monthly meetings are held at the **S.A.G.E. Planetarium** in Palmdale, the second Friday of each month except December. The meeting location is at the northeast corner of Avenue R and 20th Street East. Meetings start at 7 p.m. and are open to the public. *Please note that food and drink are not allowed in the planetarium.*

Membership

Membership in the Antelope Valley Astronomy Club is open to any individual or family.

The Club has three categories of membership.

- Family membership at \$30.00 per year.
- Individual membership at \$25.00 per year.
- Junior membership at \$15.00 per year.

Membership entitles you to ...

- The Desert Sky Observer -- monthly newsletter
- The AVAC Membership Manual.
- To borrow club equipment, books, videos, and other items.

AVAC
PO Box 8545
Lancaster, CA 93539-8545



www.avastronomyclub.org

Visit the Antelope Valley Astronomy Club website at www.avastronomyclub.org/
www.instagram.com/av_astronomyclub

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President's Message

By Phil Wriedt

Hey y'all

Our next Moonwalk is on March 8th. Sunset is at 5:56 pm and astronomical dusk is late at 7:18 pm. Saturn will only be up till 6:06 pm. It truly will be a Moonwalk as a 75% waxing Moon will be 2° north of Mars. Get there early so you can setup in daylight. If you have a telescope bring it, or if not, just come join the party at Prime Desert Woodland. Don't forget warm clothes, jackets, gloves, etc. Hopefully it will be warmer than a icebox. The more members there, the better it will be.

There is a Lunar eclipse on Thursday night March 13. We will gather at SAGE to hold a "Moon Party" and invite the public to watch the eclipse. The Moon steps into penumbra just before 9pm. Set up starts about 8:30 pm. So get there as soon as you can and set up without rushing. We'll go until, well everybody leaves.

The next night, the 14th, is our normal meeting night. We have a NASA astronomer who agreed to come back and speak about the stars. Please get your friends and neighbors and their kids to come listen to this speaker.

On the 29th of March we will have our first Dark Sky Star Party of the year. This is the time of year when it is convenient to do a Messier Marathon. The idea is to locate every Messier object and point your telescope at it in one night. There are more than one list of the suggested order to hunt them down. At the meeting I'll have a handout of the list the Club uses. Rose will be getting the permit for the State Parks for us using the Red Cliffs parking lot. This is the day use parking lot EAST of the CA14. This is across the highway from the Ricardo Campground at Red Rock Canyon SP. Like the Moonwalks, don't forget warm clothes, food, water and toilet paper.

There are about 20 members who have yet to renew their membership. If you bump into them could you remind them to renew? We really want them to come back.

Keep Looking Up, Phil

On The Cover Note: North is 334.4° right of vertical RA: 4h 31' 37.49" DEC: 18° 12' 24.03" Dist: 477 ly Mag: 18.5 (Taurus)

This new NASA/ESA/CSA James Webb Space Telescope [Picture of the Month](#) presents HH 30 in unprecedented resolution. This target is an edge-on protoplanetary disc that is surrounded by jets and a disc wind, and is located in the dark cloud LDN 1551 in the Taurus Molecular Cloud.

Herbig-Haro objects are small nebulae found in star formation regions, marking the locations where gas outflowing from young stars is heated into luminescence by shockwaves. HH 30 is an example of where this outflowing gas takes the form of a narrow jet. The source star is located on one end of the jet, hidden behind an edge-on protoplanetary disc that the star is illuminating.

HH 30 is of particular interest to astronomers. In fact, the HH 30 disc is considered the prototype of an edge-on disc, thanks to its early discovery with the NASA/ESA Hubble Space Telescope. Discs seen from this view are a unique laboratory to study the settling and drift of dust grains.

An international team of astronomers have used Webb to investigate the target in unprecedented detail. By combining Webb's observations with those from the Hubble Space Telescope and the Atacama Large Millimeter/submillimeter Array (ALMA), the team was able to study the multiwavelength disc appearance of the system.

The long-wavelength data from ALMA trace the location of millimetre-sized dust grains, which are found in a narrow region in the central plane of the disc. The shorter-wavelength infrared data from Webb reveal the distribution of smaller dust grains. These grains are only one millionth of a metre across — about the size of a single bacterium. While the large dust grains are concentrated in the densest parts of the disc, the small grains are much more widespread.

From the Secretary

By Rose Moore

Members:

On Saturday March 8th we have a Prime Desert Moon Walk starting at 6:30pm; weather permitting. We will need members with telescopes to help at this event. Set up time is 30-60 mins prior to the event.

There will be a Lunar eclipse on Thursday March 13th. Jeremy says we can arrive about 8:30-9pm to set up at the SAGE planetarium parking lot. This will be open to the public; weather permitting. We'll need members with telescopes for this event. The eclipse begins about 8:57pm, maximum is at 11:58pm, and ends about 3am on early Friday morning.

Our club meeting for March is on Friday March 14th, starting at 7pm. We have astronomer Rémy Morgan returning and she will give a presentation on stars and their life cycles. If you would like to give a donation for the speaker, please see Rod before the meeting or at break. Come and enjoy our speaker's talk and support your club!

We have a dark sky star party on Saturday March 29th, and this will be our Messier Marathon. The location will be at Red Cliffs, weather permitting. I'll be obtaining the permit from the Park Rangers for this event. You may arrive mid-afternoon, or anytime before sunset to set up. There are vault toilets and no running water. Members should bring their own food, snacks, and drinks.

Further information on these events will be coming in emails prior to each event.

Coming up we have another PDW for April, and a speaker for our April meeting. I will be trying to book a date for a trip to Mt. Wilson this year, and will keep you posted.

Clear skies, Rose

On The Cover ... continued

These Webb observations were taken as part of the Webb GO programme #2562 (PI F. Ménard, K. Stapelfeldt), which aims to understand how dust evolves in edge-on discs like HH 30. Combined with the keen radio-wavelength eyes of ALMA, these observations show that large dust grains must migrate within the disc and settle in a thin layer. The creation of a narrow, dense layer of dust is an important stage in the process of planet formation. In this dense region, dust grains clump together to form pebbles and eventually planets themselves.

In addition to the behaviour of dust grains, the Webb, Hubble, and ALMA images reveal several distinct structures that are nested within one another. Emerging at a 90-degree angle from the narrow central disc is a high-velocity jet of gas. The narrow jet is surrounded by a wider, cone-shaped outflow. Enclosing the conical outflow is a wide nebula that reflects the light from the young star that is embedded within the disc. Together, these data reveal HH 30 to be a dynamic place, where tiny dust grains and massive jets alike play a role in the formation of new planets.

The annotated version of this image can be seen [here](#).

[Image Description: A close-in image of a protoplanetary disc around a newly formed star. Many different wavelengths of light are combined and represented by separate and various colours. A dark line across the centre is the disc, corresponding to the densest parts of the disc, made of opaque dust: the star is hidden in here and creates a strong glow in the centre. A band going straight up is a jet, while other outflows above and below the disc, and a tail coming off to one side.]

Links

- [Science paper](#)
- [Hubble, Webb NIRCам and MIRI, and ALMA images of HH 30](#)
- [Annotated image of HH 30's features](#)
- [Image on ESA website](#)
- [Video: Pan of HH 30](#)

Credit:

ESA/Webb, NASA & CSA, Tazaki et al.

AVAC Membership Renewal

It is that time year again, time to renew your AVAC Membership and HOORAY!!!; we are back in the newly cleaned and refurbished Sage Planetarium for our monthly meetings. We have had in person meetings for many months now that we are past Covid and it has been great. The Sage Planetarium is one of the club's most rewarding benefits.

It is very gratifying to see the early membership renewals. In these times of financial uncertainty our members are more than ever the lifeblood for the AVAC. That said, please worry not, financially the club is still solvent and we are able to meet all our obligations while providing for future club events and guest speakers etc.

Please remember that our meetings are open to the public and all will be welcome. So, if for any reason you are unable to renew your membership you are still welcome to attend and we look forward to seeing you all again.

For administrative reasons we encourage members to renew their membership in January. For myself the easiest way to renew my membership was through the AVAC website via our PayPal account. However you can renew at our monthly club meetings with good old cash or by check.

For those unable to attend our monthly meeting you can renew your membership through the mail by sending a check to the club's Post Office Box:

Antelope Valley Astronomy Club
PO BOX 8545
Lancaster, CA 93539-8545

For members less familiar with the club's website, it is actually fairly simple:

- Google Antelope Valley Astronomy Club and then open on the link.
- Click on MEMBER and then click on LOGIN.
- The default Member Name will be your Membership Number.
- If you had Signed Up on line you would have created a Password, but if you have forgotten it, use the Forgot Password link.
- Once you have Logged In, under Member click on Profile.
- Under Profile click on Membership.
- Under Your Current Membership click on Renew Now.
- You will have the choice of paying with a PayPal account or with a Credit Card.
- If you choose Credit Card PayPal will allow you to pay as a Guest

Thank you,

Rod Girard AVAC Treasurer

Space News

News from around the Net

A Rare Kind Of White Dwarf Could Foster Habitable Worlds

Extra amounts of an uncommon element — neon-22 — could re-energize some white dwarfs, and potentially make the systems habitable. Most Sun-like stars undergo a gradual death, exhausting their nuclear fuel and shedding their outer layers before cooling to form dense cores known as white dwarfs. The surrounding conditions are far from hospitable, with steadily dropping temperatures that likely offer nearby planets too little stability for life to survive. But a small percentage of white dwarfs seems to get a last gasp of energy — one that might enable habitability on the worlds around them, . . . appears in so-called Q-branch stars, .(continued at <https://skyandtelescope.org/astronomy-news/stellar-science/a-rare-kind-of-white-dwarf-could-foster-habitable-worlds/>)



Euclid Discovers Einstein Ring Around Nearby Galaxy

A spectacular surprise has emerged in a routine scan of the cosmos: a nearly perfect “Einstein ring,” hidden in plain sight around a galaxy that astronomers had known about for more than a century. The discovery, made by the European Space Agency’s (ESA) Euclid mission, is a testament to both cosmic serendipity and the telescope’s sharp gaze. When examining early test images, Euclid Archive Scientist Bruno Altieri (ESA) noticed something unusual: a distorted, out-of-focus galaxy. He assumed it was just another calibration issue; nevertheless, something about this blurry feature piqued his curiosity. . . .(continued at <https://skyandtelescope.org/astronomy-news/euclid-discovers-einstein-ring-around-nearby-galaxy/>)



How Astronomers Make Deep Maps Of The Milky Way

Have you ever wondered how astronomers manage to map out the Milky Way when it’s so incredibly vast? One of the most powerful tools is something called 21cm radiation. Hydrogen, the most abundant element in the universe, plays a key role here. When the electrons in hydrogen atoms flip their spin direction, a specific type of electromagnetic radiation is emitted at a wavelength of 21 centimeters. The Milky Way galaxy is packed with hydrogen atoms, and these atoms are constantly emitting 21cm radiation. The best part is that this radiation can travel long distances through the interstellar dust. . . .(continued at <https://www.universetoday.com/170936/how-astronomers-make-deep-maps-of-the-milky-way/>)



Meet Almaaz, The Billy Goat Star

Almaaz, also called Epsilon Aurigae, is among the weirder stars of the night sky — a supergiant with a dust-enshrouded companion. The leftover debris fields of planet formation accompanies some stars, surrounding them in loosely organized collections of dust fragments and asteroids of shattered protoplanets. Vega is famous for its large debris field, and even the Sun has two minor fields, including the main asteroid belt between the orbits of Mars and Jupiter as well as the Kuiper Belt beyond Neptune’s orbit. But for sheer grandeur, the debris field orbiting the companion of Epsilon Aurigae — also named Almaaz — is certainly among the most impressive. . . .(continued at <https://skyandtelescope.org/astronomy-news/meet-almaaz-the-billy-goat-star/>)



A Spiral Structure In The Inner Oort Cloud

We typically think of the Oort cloud as scattered ice balls floating far from the sun, yet still tied to it gravitationally. Occasionally, some wayward gravitational perturbation will knock one of them a weird way and create a long-period comet, which might briefly delight us lowly humans by providing something interesting in the sky to look at. But what the Oort cloud actually looks like and how it is affected by forces greater than just our solar system has remained somewhat of a mystery. A new paper posted to the arXiv preprint server from researchers at the Southwest Research Institute . . . (continued at <https://phys.org/news/2025-02-spiral-oort-cloud.html>)



Space News

News from around the Net

We Know How Much Radiation Astronauts Will Receive, But We Don't Know How To Prevent It

The journey to Mars will subject astronauts to extended periods of exposure to radiation during their months-long travel through space. While NASA's Artemis 1 mission lasted only a matter of weeks, it provided valuable radiation exposure data that scientists can use to predict the radiation risks for future Mars crews. The measurements not only validated existing radiation prediction models but also revealed unexpected insights about the effectiveness of radiation shielding strategies too. Space radiation poses one of the most significant health risks for astronauts travelling. . . (continued at <https://www.universetoday.com/171059/we-know-how-much-radiation-astronauts-will-receive-but-we-dont-know-how-to-prevent-it/#more-171059>)



If You're Going To Call Aliens, Use This Number

Let's dive into one of those cosmic curiosities that's bound to blow your mind: how we might chat with aliens. And no, I'm not talking about elaborate coded messages or flashy signals. We're talking about something incredibly fundamental—21 cm radiation. If you're planning on having a conversation across the vastness of space, using light waves (electromagnetic radiation) is pretty much your go-to option. It's fast, reliable, and, well, it's the most practical way to shout out to other civilizations in the universe. . . . (continued at <https://phys.org/news/2025-02-youre-aliens.html>)



Spherex Space Telescope Will Seek Life's Ingredients

Where is all the water that may form oceans on distant planets and moons? The SPHEREx astrophysics mission will search the galaxy and take stock. Every living organism on Earth needs water to survive, so scientists searching for life outside our solar system are often guided by the phrase "follow the water." Scheduled to launch no earlier than Thursday, Feb. 27, NASA's SPHEREx (Spectro-Photometer for the History of the Universe, Epoch of Reionization, and Ices Explorer) mission will help in that quest. . . . (continued at <https://phys.org/news/2025-02-spherex-space-telescope-life-ingredients.html>)



NASA's Europa Clipper Uses Mars To Go The Distance

The orbiter bound for Jupiter's moon Europa will investigate whether the moon is habitable, but it first will get the help of Mars' gravitational force to get to deep space. On March 1, NASA's Europa Clipper will streak just 550 miles (884 kilometers) above the surface of Mars for what's known as a gravity assist — a maneuver to bend the spacecraft's trajectory and position it for a critical leg of its long voyage to the Jupiter system. The close flyby offers a bonus opportunity for mission scientists, who will test their radar instrument and thermal imager. Europa Clipper will be closest to the Red Planet at 12:57 p.m. EST, approaching it at about 15.2 miles per second (24.5 kilometers per second) relative to the Sun. . . . (continued at <https://www.jpl.nasa.gov/news/nasas-europa-clipper-uses-mars-to-go-the-distance/>)



Milky Way's Supermassive Black Hole Is More Active Than Previously Thought

The accretion disk orbiting Sagittarius A* is emitting a constant stream of flares with no periods of rest, according to an analysis of new data from the NASA/ESA/CSA James Webb Space Telescope; while some flares are faint flickers, lasting mere seconds, other flares are blindingly bright eruptions, which spew daily; there also are even fainter flickers that surge for months at a time. "Flares are expected to happen in essentially all supermassive black holes, but our black hole is unique," said Dr. Farhad Yusef-Zadeh, an astronomer at Northwestern University. "It is always bubbling with activity and never seems to reach a steady state." "We observed Sagittarius A* multiple times throughout 2023 and 2024, and we noticed changes in every observation." . . . (continued at <https://www.sci.news/astronomy/sagittarius-a-flares-13682.html>)



March's Night Sky Notes: Messier Madness

By Kat Troche, Astronomy Society of the Pacific, NASA Night Sky Network

March is the start of spring in the Northern Hemisphere; with that, the hunt for Messier objects can begin!



What Are Messier Objects?

During the 18th century, astronomer and comet hunter [Charles Messier](#) wanted to distinguish the 'faint fuzzies' he observed from any potential new comets. As a result, Messier cataloged 110 objects in the night sky, ranging from star clusters to galaxies to nebulae. These items are designated by the letter 'M' and a number. For example, the Orion Nebula is [Messier 42](#) or **M42**, and the Pleiades are [Messier 45](#) or **M45**. These are among the brightest 'faint fuzzies' we can see with modest backyard telescopes and some even with our eyes.

Stargazers can catalog these items on evenings closest to the new moon. Some even go as far as having "Messier Marathons," setting up their telescopes and binoculars in the darkest skies available to them, from sundown to sunrise, to catch as many as possible. Here are some items to look for this season:

[Messier 44](#) in **Cancer**: The Beehive Cluster, also known as Praesepe, is an open star cluster in the heart of the Cancer constellation. Use Pollux in Gemini and Regulus in Leo as guide stars. A pair of binoculars is enough to view this and other open star clusters. If you have a telescope handy, pay a visit two of the three galaxies that form the Leo Triplet - **M65** and **M66**. These items can be seen one hour after sunset in dark skies.

[Messier 3](#) **Canes Venatici**: M3 is a globular cluster of 500,000 stars. Through a telescope, this object looks like a fuzzy sparkly ball. You can resolve this cluster in an 8-inch telescope in moderate dark skies. You can find this star cluster by using the star Arcturus in the Boötes constellation as a guide.

[Messier 87](#) in **Virgo**: Located just outside of Markarian's Chain, M87 is an elliptical galaxy that can be spotted during the late evening hours. While it is not possible to view the [supermassive black hole](#) at the core of this galaxy, you can see M87 and several other Messier-labeled galaxies in the Virgo Cluster using a medium-sized telescope.

[Messier 76](#) in **Perseus**: For a challenge, spot the Little Dumbbell Nebula, a planetary nebula between the Perseus and Cassiopeia constellations. With an apparent magnitude of 12.0, you will need a large telescope and dark skies. You can find both M76 and the famous [Andromeda Galaxy \(M31\)](#) one hour after sunset, but only for a limited time, as these objects disappear after April. They will reappear in the late-night sky by September.



M44 in Cancer and M65 and 66 in Leo can be seen high in the evening sky 60 minutes after sunset. Credit: Stellarium Web

Plan Ahead

When gearing up for a long stargazing session, there are several things to remember, such as equipment, location, and provisions:

- **Do you have enough layers to be outdoors for several hours?** You would be surprised how cold it can get when sitting or standing still behind a telescope!
- **Are your batteries fully charged?** If your telescope runs on power, be sure to charge everything before you leave home and pack any additional batteries for your cell phone. Most people use their mobile devices for astronomy apps, so their batteries may deplete faster. Cold weather can also impact battery life.
- Determine the **apparent magnitude** of what you are trying to see and the limiting magnitude of



Locate M3 and M87 rising in the east after midnight. Credit: Stellarium Web



Locate M76 and M31 setting in the west, 60 minutes after sunset. Credit: Stellarium Web

your night sky. You can learn more about apparent and limiting magnitudes with our [Check Your Sky Quality with Orion](#) article.

- When choosing a location to observe from, select an area you are familiar with and bring some friends! You can also [connect with your local astronomy club](#) to see if they are hosting any Messier Marathons. It's always great to share the stars!

You can see all 110 items and their locations with NASA's [Explore the Night Sky interactive map](#) and the [Hubble Messier Catalog](#), objects that have been imaged by the Hubble Space Telescope.

Additional Skywatching Resources

Plan your skywatching with help from our planner page, featuring daily stargazing tips courtesy EarthSky monthly sky maps, and videos from NASA/JPL. You can even find out how to spot the International Space Station! Both Astronomy and Sky and Telescope magazines offer regular stargazing guides to readers, both in print and online. Want to join a group of folks for a star party? Find clubs and astronomy events near you, and may you have clear skies!

This article is distributed by NASA Night Sky Network
The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach.
Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

A Fiery Rose Captured by Gemini South

[noirlab2507](#) — Photo Release 14 February 2025

The NGC 2040 star cluster fuels the growth of this cosmic flower as the stellar life cycle unfolds within it.



Displaying wispy layers of red, orange and yellow, the nebula encasing NGC 2040 resembles a vibrant rose in this image captured by the Gemini South telescope, one half of the International Gemini Observatory, which is supported in part by the U.S. National Science Foundation and operated by NSF NOIRLab. This nebulous flower showcases the dramatic story of stellar life, death and rebirth.

[NGC 2040](#) is a young [open cluster](#) of stars within the [Large Magellanic Cloud](#), a satellite galaxy of the Milky Way, located about 160,000 light-years from Earth. It is a type of star cluster known as an OB association because it contains more than a dozen stars of the [O and B spectral types](#). These stars lead short lives of only a few million years, during which they burn very hot before exploding as [supernovae](#). The energy released by the explosions of these massive stars feeds the formation of NGC 2040's structure, while the expelled material seeds the growth of the next generation of stars.

The veiled nebula's delicate structure, resembling a Valentine's Day rose, is revealed in this image captured with the [Gemini South telescope](#), one half of the [International Gemini Observatory](#), funded in part by the U.S. National Science Foundation and operated by NSF NOIRLab. The 8-meter optical/infrared telescope is perfectly suited to capturing both the bright stars and the diffuse glow of the cluster.

NGC 2040 contains mostly [hydrogen](#) and [oxygen](#) atoms. As these atoms are excited by the ultraviolet radiation from nearby massive stars, they emit light. This emitted light spans a range of wavelengths from the ultraviolet, through the visible, and into the infrared. Special filters on Gemini South then allow specific wavelengths, or colors, of this emitted light to pass through, like the deep red and orange of glowing hydrogen and the light blue of glowing oxygen. The bright white represents areas where there is an abundance of both.

NGC 2040 is so named because it is part of the [New General Catalogue](#) of deep sky objects, first compiled by John Dryer in 1888. More recent observations have revealed that it is part of a massive structure of interstellar gas known as LH 88, which is one of the largest active star-forming regions in the Large Magellanic Cloud. Over the next million years thousands of new stars will be born in the region.

Most of the stars in the Milky Way, including the Sun, likely formed within open clusters similar to NGC 2040. When the O and B stars end their lives as supernovae they will enrich the cluster with elements such as carbon, oxygen, and iron. Together with the bountiful hydrogen of the cluster, these elements provide the necessary ingredients for the formation of new stars, planets, and perhaps even life.

The bright stars seen in the image are widely separated, but their motions through space are similar, indicating that they have a common origin. The layered nebulous structures in LH 88 are the remnants of stars that have already died. The delicate leaves of the rose were formed by both the shockwaves from supernovae and the stellar winds of the O and B stars.

Taken as a whole, the rose of LH 88 tells a story of death and rebirth, where the dust of dead stars becomes the seeds of new stars and planetary systems. And like a rose the beauty of LH 88 is fleeting. Within a few million years — a brief moment of cosmic time — the gas and dust will be either gathered into young stars or cast off into interstellar space. The stars formed within the cluster will have moved on to their own journeys through their galaxy.

More information

[NSF NOIRLab](#), the U.S. National Science Foundation center for ground-based optical-infrared astronomy, operates the [International Gemini Observatory](#) (a facility of [NSF](#), [NRC-Canada](#), [ANID-Chile](#), [MCTIC-Brazil](#), [MINCyT-Argentina](#), and [KASI-Republic of Korea](#)), [NSF Kitt Peak National Observatory \(KPNO\)](#), [NSF Cerro Tololo Inter-American Observatory \(CTIO\)](#), the [Community Science and Data Center \(CSDC\)](#), and [NSF-DOE Vera C. Rubin Observatory](#) (in cooperation with [DOE's SLAC National Accelerator Laboratory](#)). It is managed by the [Association of Universities for Research in Astronomy \(AURA\)](#) under a cooperative agreement with [NSF](#) and is headquartered in Tucson, Arizona.

The scientific community is honored to have the opportunity to conduct astronomical research on I'oligam Du'ag (Kitt Peak) in Arizona, on Maunakea in Hawai'i, and on Cerro Tololo and Cerro Pachón in Chile. We recognize and acknowledge the very significant cultural role and reverence of I'oligam Du'ag to the Tohono O'odham Nation, and Maunakea to the Kanaka Maoli (Native Hawaiians) community.

Links

- [Explore LH 88 in more detail](#)
- [Photos of the Gemini South telescope](#)
- [Videos of the Gemini South telescope](#)
- [Images taken with GMOS-S](#)
- [Images of GMOS-S](#)
- [Check out other NOIRLab Photo Releases](#)

Contacts

Josie Fenske
Jr. Public Information Officer
NSF NOIRLab
Email: josie.fenske@noirlab.edu

For sale: 4 inch Celestron Equatorial telescope. Includes mount, solar filter, finder scope, eyepieces, two inch diagonal, carrying bag. Few scratches on finish. Price: \$250. Email either Duane (gurba1826@gmail.com) or Rose (rmorion1@bak.rr.com)

Dark Sky Observing Sites

The Chuchupate parking lot is a half a mile beyond the Mt Pinos ranger station (on some maps The Chuchupate Ranger Sta.), the parking lot is also called Frazier Mountain trailhead.

To get there, take the Frazier Mountain Park RD east about 7 miles from I-5, to Lake Of The Woods, Turn left on Lockwood Valley Rd. (If you see Mike’s Pizza on your left you missed the turn) In less than a mile there is a road to the left, go past the ranger station, the parking lot is on the right. The Club gathers in the upper end of the lot. The Elevation is 5430 feet. There is a vault toilet. (link to GoogleMaps) [RX3R+3F, Frazier Park, CA 93225](#)



Mt Pinos is a parking lot at 8350 feet for the “Mt Pinos Nordic Base.” There is a vault toilet 300 yds to the east in the Chula Vista campground.

To get there: From I-5, get off at Frazier Mountain Park Rd and drive west about 7 miles to Mike’s Pizza/Market Deli at Lockwood Valley Rd. Keep on the main roadway (don’t turn left to go to Chuchupate). Continue past Mike’s Pizza on Cuddy Valley Rd (the road’s new name) about 5 miles. Continue straight (do not turn right on to Mil Potrero Hwy) for another 8 1/2 miles to the parking area.

Note: The entire drive from I-5 is uphill.

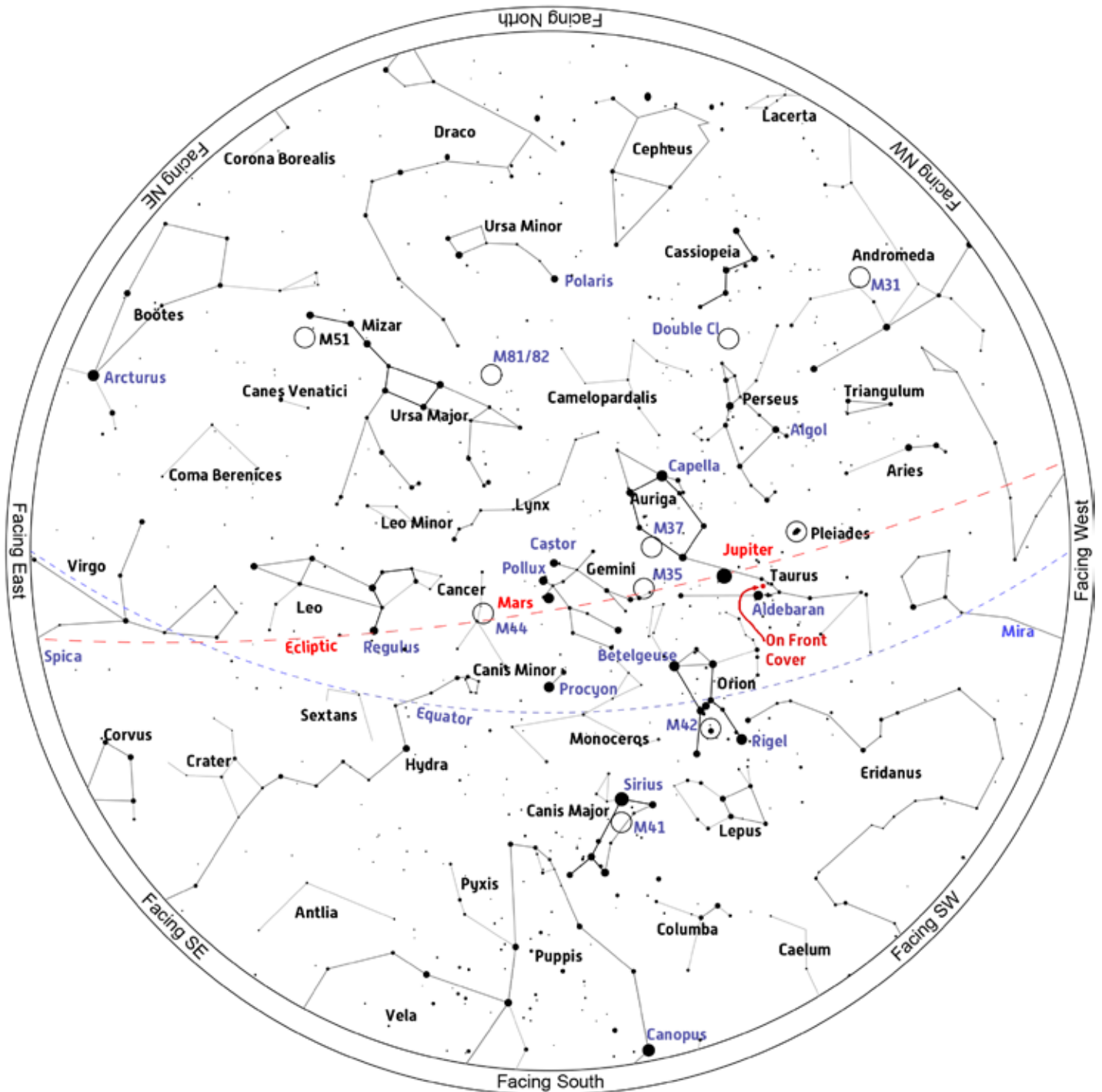
[RV7F+FF Frazier Park, California](#) (link to GoogleMaps)

The Red Cliffs Natural Area is part of **Red Rock Canyon State Park** is a day use area and is not for use by the public after dark. The Club gets a special permit for a star party and pays a fee.

To get there: Take the CA-14 north 25 miles past Mojave. You will see giant red cliffs on the right side and a small sign that says “Red Cliffs Natural Area” and a dirt road. (If you see the large sign for the Ricardo campground, you drove a mile too far). Follow the road to the large parking lot (that hasn’t been graded in a long time). Elevation is 2410 feet. There is a vault toilet. . . . (link to GoogleMaps). [926F+X5 Ricardo, California](#)



Sky Chart



Location: Palmdale, CA 93551
Latitude: 34° 36' N, longitude: 118° 11' W
Time: 2025 March 29, 20:00 (UTC -07:00)

Powered by: Heavens-Above.com

Solar System Summary

The **Sun** starts the month in central Aquarius ending the month in central Pisces.

The total **Lunar** umbra eclipse begins about 10:09 pm on the 13th, and ends 01:48 am on the 14th.

The Planets

Mercury starts the month coming from behind the Sun after its superior conjunction in February. On the 8th it achieves Greatest Elongation East of 18°, thereafter fading from sight before its inferior conjunction on the 23rd.

Venus while prominent in the evening sky, it is diving toward the Sun and inferior conjunction on the 22nd where it stays in the morning twilight till the first week of 2026

Mars starts the month in Gemini resumes it's normal eastward motion passing south of Pollux at the end of the month. The Moon passes by 1 $\frac{3}{8}$ ° north on the 8th (at 3 in the afternoon).

Jupiter has resumed normal motion heading east in Taurus, just south of the ecliptic. The first-quarter Moon passes by 4 $\frac{3}{4}$ ° north on the 6th (about 3 hrs after moonset).

Saturn still moving normally in Aquarius is achieving solar conjunction on the 11th. On the 22nd Earth passes through to the south side of Saturn's ring plane.

Uranus continues moving eastward from Aries, at mag 5.8, and into eastern Taurus.

Neptune is moving in normal motion near the southern border in Pisces at 7.9, and passes solar conjunction on the 19th

Dwarf Planets

134340 Pluto spends the month in normal motion, moving toward the center of Capricorn, at mag 14.5.

1 Ceres spends the month moving east in southern Aquarius at mag 9.2,

2 Pallas is in normal motion passing from northern Aquila and into Delphinus at magnitude 10.4.

3 Juno begins it's half yearlong retrograde loop just south of Yed Prior in Ophiuchus at mag 10.5.

4 Vesta begins it's retrograde loop in Libra, less than 15° east of Juno at mag 7.3 .

Moon Phases



First Qtr
Mar 6

Full
Mar 13

Third Qtr
Mar 22

New
Mar 29

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
3/1/2025	07:21	20:06	06:21	17:49
3/5/2025	09:41	00:51	06:16	17:52
3/10/2025	15:42	05:27	07:09	18:56
3/15/2025	20:36	07:38	07:02	19:00
3/20/2025	00:30	10:07	06:55	19:04
3/25/2025	04:42	15:06	06:48	19:08
3/30/2025	07:18	21:09	06:41	19:12

Planet Data*

March 1

	Rise	Transit	Set	Mag	Phase%
Mercury	07:03	13:04	19:06	-0.99	74.3
Venus	07:11	13:42	20:13	-4.55	14.2
Mars	13:08	20:29	03:53	-0.28	93.3
Jupiter	10:49	17:56	01:06	-2.37	99.1
Saturn	06:55	12:42	18:29	1.14	99.9

March 15

	Rise	Transit	Set	Mag	Phase%
Mercury	07:27	13:38	20:08	1.40	16.9
Venus	06:59	13:30	20:00	-4.23	3.2
Mars	13:24	20:42	04:03	0.08	91.9
Jupiter	11:00	18:07	01:18	-2.27	99.1
Saturn	07:05	12:53	18:42	1.15	100.

March 30

	Rise	Transit	Set	Mag	Phase%
Mercury	06:08	12:14	18:19	3.35	4.8
Venus	05:42	12:00	18:18	-4.19	2.8
Mars	12:44	19:58	03:15	0.43	90.5
Jupiter	10:05	17:13	00:21	-2.17	99.2
Saturn	06:07	11:58	17:48	1.19	99.9

*All time mentioned are local and approximate.

*Sun, Moon and Planetary date based on Quartz Hill, CA

Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Deep Sky Star Party or the Saturday nearest the New Moon, in this case March 29, 2025. The list is sorted by the transit time of the object.

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC147	C17	E Gal	Cas	00h 33m 12s	+48° 30.0'	9.3	03:29	13:03	22:37
NGC190		Galaxy	Psc	00h 38m 55s	+07° 03.7'	14.0	06:46	13:08	19:31
M110	Satellite Of Andromeda Galaxy	Galaxy	And	00h 40m 22s	+41° 41.1'	8.9	04:32	13:10	21:48
NGC210		Galaxy	Cet	00h 40m 35s	-13° 52.3'	10.9	07:47	13:10	18:33
NGC206	V-36	Neb	And	00h 40m 36s	+40° 44.0'		04:38	13:10	21:42
Arp168	M32	Galaxy	And	00h 42m 41s	+40° 51.0'	9.0	04:40	13:12	21:44
M32	Satellite Of Andromeda Galaxy	Galaxy	And	00h 42m 42s	+40° 51.9'	9.1	04:40	13:12	21:45
M31	Andromeda Galaxy	Galaxy	And	00h 42m 44s	+41° 16.1'	4.3	04:37	13:12	21:47
NGC246	C56	P Neb	Cet	00h 47m 00s	-11° 53.0'	10.9	07:47	13:16	18:46
NGC254		Galaxy	Scl	00h 47m 28s	-31° 25.2'	11.8	08:54	13:17	17:40
NGC288		Globular	Scl	00h 52m 45s	-26° 35.0'	8.1	08:40	13:22	18:04
NGC281	PacMan Nebula	Open	Cas	00h 52m 54s	+56° 37.4'	7.0	Circ	13:22	Circ
IC59	Gamma Cassiopeiae Nebula	Neb	Cas	00h 57m 29s	+61° 08.6'		Circ	13:27	Circ
IC63	Gamma Cassiopeiae Nebula	Neb	Cas	00h 59m 29s	+60° 54.7'		Circ	13:29	Circ
C51	IC1613	IrrGal	Cet	01h 04m 48s	+02° 07.0'	9.3	07:26	13:34	19:43
NGC474		Galaxy	Psc	01h 20m 07s	+03° 24.9'	11.1	07:37	13:50	20:02
NGC485		Galaxy	Psc	01h 21m 28s	+07° 01.0'	14.0	07:28	13:51	20:13
M103	NGC581	Open	Cas	01h 33m 23s	+60° 39.0'	7.0	Circ	14:03	Circ
NGC598	Triangulum Galaxy	Galaxy	Tri	01h 33m 51s	+30° 39.6'	5.7	06:22	14:03	21:44
NGC604	III-150	Neb	Tri	01h 34m 33s	+30° 47.0'		06:23	14:04	21:45
M74	The Phantom	Galaxy	Psc	01h 36m 42s	+15° 47.0'	9.8	07:18	14:06	20:54
M76	Little Dumbbell Nebula	P Neb	Per	01h 42m 18s	+51° 34.2'	12.0	03:57	14:12	00:26
NGC651	Apple Core Nebula [2]	P Neb	Per	01h 42m 21s	+51° 34.1'	12.2	03:58	14:12	00:26
NGC637		Open	Cas	01h 43m 04s	+64° 02.4'	8.2	Circ	14:13	Circ
NGC654		Open	Cas	01h 44m 00s	+61° 53.0'	6.5	Circ	14:13	Circ
NGC720		Galaxy	Cet	01h 53m 00s	-13° 44.3'	10.2	08:59	14:22	19:46
NGC780		Galaxy	Tri	02h 00m 35s	+28° 13.5'	14.0	06:59	14:30	22:01
NGC784		Galaxy	Tri	02h 01m 17s	+28° 50.2'	11.8	06:57	14:31	22:04
NGC821		Galaxy	Ari	02h 08m 21s	+10° 59.6'	10.8	08:04	14:38	21:12
Baily191	NGC884	Open	Per	02h 22m 18s	+57° 08.1'	4.0	Circ	14:52	Circ
IC1795		Neb	Cas	02h 26m 32s	+62° 02.4'		Circ	14:56	Circ
NGC936		Galaxy	Cet	02h 27m 37s	-01° 09.3'	10.1	08:58	14:57	20:57
NGC943	Arp309	Galaxy	Cet	02h 29m 09s	-10° 49.0'	11.4	09:26	14:59	20:31
NGC956		Open	And	02h 32m 30s	+44° 35.6'	9.0	06:04	15:02	00:00
IC1805	Heart Nebula	Open	Cas	02h 32m 47s	+61° 27.6'	6.5	Circ	15:02	Circ

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ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC1052		Galaxy	Cet	02h 41m 05s	-08° 15.3'	10.6	09:31	15:11	20:50
M34	Spiral Cluster	Open	Per	02h 42m 05s	+42° 45.6'	6.0	06:27	15:12	23:56
M77	Cetus A	Galaxy	Cet	02h 42m 41s	-00° 00.8'	9.7	09:09	15:12	21:15
NGC1084		Galaxy	Eri	02h 46m 00s	-07° 34.6'	10.6	09:34	15:15	20:57
IC1848	Soul Nebula	Open	Cas	02h 51m 18s	+60° 24.4'	6.5	Circ	15:21	Circ
NGC1156		Galaxy	Ari	02h 59m 42s	+25° 14.2'	11.7	08:09	15:29	22:49
NGC1201		Galaxy	For	03h 04m 08s	-26° 04.1'	10.6	10:50	15:34	20:17
NGC1175		Galaxy	Per	03h 04m 32s	+42° 20.3'	12.8	06:52	15:34	00:16
HR963	Alp For	Dbl	For	03h 12m 04s	-28° 59.2'	3.9	11:09	15:42	20:14
NGC1316	Fornax A	Galaxy	For	03h 22m 42s	-37° 12.4'	8.9	11:55	15:52	19:49
Barnard202	B202	DkNeb	Ari	03h 25m 38s	+30° 16.0'		08:16	15:55	23:34
Barnard204	B204	DkNeb	Ari	03h 28m 29s	+30° 11.0'		08:19	15:58	23:37
NGC1350		Galaxy	For	03h 31m 08s	-33° 37.7'	10.5	11:47	16:01	20:14
Barnard1	B1	DkNeb	Per	03h 32m 57s	+31° 09.0'		08:19	16:02	23:45
Barnard2	B2	DkNeb	Per	03h 33m 31s	+32° 19.0'		08:15	16:03	23:51
Barnard3	B3	DkNeb	Per	03h 40m 01s	+31° 58.0'		08:23	16:09	23:56
NGC1407		Galaxy	Eri	03h 40m 12s	-18° 34.8'	9.8	11:01	16:10	21:19
IC347		Galaxy	Eri	03h 42m 32s	-04° 17.9'	13.0	10:21	16:12	22:03
NGC1448		Galaxy	Hor	03h 44m 32s	-44° 38.6'	11.0	13:02	16:14	19:26
IC348		Open	Per	03h 44m 34s	+32° 09.7'	7.3	08:27	16:14	00:01
M45	Pleiades, Seven Sisters, Subaru	Open	Tau	03h 47m 30s	+24° 07.0'	1.6	09:01	16:17	23:33
Barnard5	B5	DkNeb	Per	03h 47m 53s	+32° 53.0'		08:27	16:17	00:08
NGC1461		Galaxy	Eri	03h 48m 27s	-16° 23.5'	11.7	11:02	16:18	21:34
IC353		Neb	Tau	03h 53m 00s	+25° 48.0'		09:01	16:22	23:44
IC2003		P Neb	Per	03h 56m 22s	+33° 52.5'	13.0	08:31	16:26	00:21
NGC1499	California Nebula	Neb	Per	04h 03m 14s	+36° 22.0'		08:26	16:33	00:40
NGC1515		Galaxy	Dor	04h 04m 03s	-54° 06.0'	11.0	15:13	16:33	17:53
NGC1496		Open	Per	04h 04m 32s	+52° 39.7'	10.0	06:00	16:34	03:08
NGC1502		Open	Cam	04h 07m 50s	+62° 19.8'	5.7	Circ	16:37	Circ
IC360		Neb	Tau	04h 09m 00s	+26° 06.0'		09:16	16:38	00:01
NGC1514	Crystal Ball Nebula	P Neb	Tau	04h 09m 17s	+30° 46.5'	10.0	08:57	16:39	00:20
NGC1513		Open	Per	04h 09m 57s	+49° 30.8'	8.4	06:54	16:39	02:25
IC359		Neb	Tau	04h 12m 28s	+27° 42.1'		09:13	16:42	00:11
NGC1535		P Neb	Eri	04h 14m 16s	-12° 44.3'	10.0	11:17	16:44	22:10
Barnard10	B10	DkNeb	Tau	04h 18m 41s	+28° 16.0'		09:17	16:48	00:19
NGC1545		Open	Per	04h 20m 57s	+50° 15.2'	6.2	06:55	16:50	02:45
NGC1582		Open	Per	04h 31m 53s	+43° 49.0'	7.0	08:09	17:01	01:54
NGC1560		Galaxy	Cam	04h 32m 48s	+71° 52.7'	11.5	Circ	17:02	Circ

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ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
IC2087		Neb	Tau	04h 40m 00s	+25° 44.5'		09:48	17:09	00:31
Barnard23	B23	DkNeb	Tau	04h 40m 33s	+29° 52.0'		09:32	17:10	00:48
NGC1624		Open	Per	04h 40m 36s	+50° 27.6'	10.4	07:12	17:10	03:08
NGC1640		Galaxy	Eri	04h 42m 14s	-20° 26.0'	11.7	12:09	17:12	22:15
NGC1647		Open	Tau	04h 45m 55s	+19° 06.8'	6.4	10:17	17:15	00:14
IC2118	Witch Head Nebula	Neb	Eri	05h 04m 54s	-07° 15.0'		11:52	17:34	23:17
NGC1851		Globular	Col	05h 14m 06s	-40° 03.0'	7.3	14:02	17:44	21:25
IC405	Flaming Star Nebula	Neb	Aur	05h 16m 29s	+34° 21.3'		09:49	17:46	01:43
M79	NGC1904	Globular	Lep	05h 24m 11s	-24° 31.4'	8.5	13:04	17:54	22:43
M38	Starfish Cluster	Open	Aur	05h 28m 40s	+35° 50.8'	7.0	09:54	17:58	02:03
M1	Crab Nebula	SNR	Tau	05h 34m 32s	+22° 00.8'	8.4	10:56	18:04	01:12
M42	Great Orion Nebula	Open+D Neb	Ori	05h 35m 16s	-05° 23.4'	4.0	12:17	18:05	23:52
M43	De Mairan's Nebula	D Neb	Ori	05h 35m 31s	-05° 16.0'	9.0	12:17	18:05	23:53
M36	Pinwheel Cluster	Open	Aur	05h 36m 18s	+34° 08.3'	6.5	10:09	18:06	02:02
M78	NGC2068	D Neb	Ori	05h 46m 45s	+00° 04.8'	8.0	12:13	18:16	00:19
M37	Salt-and-pepper Cluster	Open	Aur	05h 52m 18s	+32° 33.2'	6.0	10:33	18:22	02:11
M35	NGC2168	Open	Gem	06h 09m 00s	+24° 21.0'	5.5	11:22	18:38	01:55
M41	Little Beehive	Open	CMa	06h 46m 01s	-20° 45.3'	5.0	14:13	19:15	00:17
M50	Heart-shaped Cluster	Open	Mon	07h 02m 42s	-08° 23.0'	7.0	13:53	19:32	01:11
M47	NGC2422	Open	Pup	07h 36m 35s	-14° 29.0'	4.5	14:44	20:06	01:28
M46	NGC2437	Open	Pup	07h 41m 46s	-14° 48.6'	6.5	14:51	20:11	01:32
M93	NGC2447	Open	Pup	07h 44m 30s	-23° 51.4'	6.5	15:22	20:14	01:05
M48	NGC2548	Open	Hya	08h 13m 43s	-05° 45.0'	5.5	14:56	20:43	02:30
M44	Beehive Cluster	Open	Cnc	08h 40m 24s	+19° 40.0'	4.0	14:09	21:10	04:10
M67	King Cobra	Open	Cnc	08h 51m 18s	+11° 48.0'	7.5	14:44	21:21	03:57
M81	Bode's Galaxy	Galaxy	UMa	09h 55m 33s	+69° 03.9'	7.8	Circ	22:25	Circ
M82	Cigar Galaxy	Galaxy	UMa	09h 55m 53s	+69° 40.8'	9.2	Circ	22:25	Circ
M95	NGC3351,UGC5850	Galaxy	Leo	10h 43m 58s	+11° 42.2'	10.6	16:37	23:13	05:49
M96	NGC3368	Galaxy	Leo	10h 46m 46s	+11° 49.2'	10.1	16:40	23:16	05:53
M105	NGC3379	Galaxy	Leo	10h 47m 50s	+12° 34.9'	10.5	16:39	23:17	05:56
M108	NGC3556	Galaxy	UMa	11h 11m 31s	+55° 40.4'	10.6	Circ	23:41	Circ
M97	Owl Nebula	P Neb	UMa	11h 14m 48s	+55° 01.1'	12.0	Circ	23:44	Circ
M65	Leo Triplet	Galaxy	Leo	11h 18m 56s	+13° 05.5'	10.1	17:08	23:48	06:28
M66	Leo Triplet	Galaxy	Leo	11h 20m 15s	+12° 59.4'	9.7	17:10	23:50	06:29
M109	NGC3992	Galaxy	UMa	11h 57m 36s	+53° 22.4'	10.6	13:36	00:27	11:18
M98	NGC4192	Galaxy	Com	12h 13m 48s	+14° 54.0'	10.9	17:58	00:43	07:29
M99	Virgo Cluster Pinwheel	Galaxy	Com	12h 18m 50s	+14° 25.0'	10.4	18:04	00:48	07:32
M106	NGC4258	Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	15:27	00:48	10:10
M61	Swelling Spiral	Galaxy	Vir	12h 21m 55s	+04° 28.3'	10.1	18:36	00:51	07:07

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ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M40	Winnecke 4	Dbl+Asterism	UMa	12h 22m 12s	+58° 05.0'	8.7	Circ	00:52	Circ
M100	Mirror of M99	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	18:04	00:52	07:41
M84	NGC4374	Galaxy	Vir	12h 25m 04s	+12° 53.2'	10.2	18:15	00:54	07:34
M85	NGC4382	Galaxy	Com	12h 25m 24s	+18° 11.4'	10.0	17:59	00:55	07:51
M86	NGC4406	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	18:16	00:56	07:35
M49	NGC4472	Galaxy	Vir	12h 29m 47s	+08° 00.0'	9.3	18:34	00:59	07:24
M87	Smoking Gun	Galaxy	Vir	12h 30m 49s	+12° 23.4'	9.6	18:22	01:00	07:38
M88	NGC4501	Galaxy	Com	12h 31m 59s	+14° 25.2'	10.2	18:17	01:01	07:46
M91	Missing Messier Object	Galaxy	Com	12h 35m 27s	+14° 29.7'	10.9	18:21	01:05	07:49
M89	NGC4552	Galaxy	Vir	12h 35m 40s	+12° 33.3'	10.9	18:27	01:05	07:44
M90	NGC4569	Galaxy	Vir	12h 36m 50s	+13° 09.7'	10.2	18:26	01:06	07:47
M58	NGC4579	Galaxy	Vir	12h 37m 44s	+11° 49.1'	10.4	18:31	01:07	07:43
M68	NGC4590	Globular	Hya	12h 39m 28s	-26° 44.5'	9.0	20:28	01:09	05:50
M104	Sombrero Galaxy	Galaxy	Vir	12h 39m 59s	-11° 37.3'	9.2	19:39	01:09	06:39
M59	NGC4621	Galaxy	Vir	12h 42m 02s	+11° 38.7'	10.7	18:36	01:11	07:47
M60	NGC4649	Galaxy	Vir	12h 43m 40s	+11° 33.1'	9.8	18:38	01:13	07:49
M94	Croc's Eye Galaxy	Galaxy	CVn	12h 50m 53s	+41° 07.1'	8.9	16:46	01:20	09:54
M64	Black Eye Galaxy	Galaxy	Com	12h 56m 44s	+21° 41.0'	9.3	18:19	01:26	08:33
M53	NGC5024	Globular	Com	13h 12m 55s	+18° 10.1'	8.5	18:47	01:42	08:38
M63	Sunflower Galaxy	Galaxy	CVn	13h 15m 49s	+42° 01.7'	9.3	17:05	01:45	10:25
NGC5139	Omega Centauri	Globular	Cen	13h 26m 48s	-47° 29.0'	3.6	23:07	01:56	04:45
NGC5169		Galaxy	CVn	13h 28m 10s	+46° 40.3'	14.0	16:42	01:58	11:14
NGC5204		Galaxy	UMa	13h 29m 36s	+58° 25.1'	11.3	Circ	01:59	Circ
M51	Whirlpool Galaxy	Galaxy	CVn	13h 29m 52s	+47° 11.7'	8.9	16:39	01:59	11:20
Arp85	M51B	Galaxy	CVn	13h 29m 58s	+47° 16.0'	9.6	16:38	01:59	11:21
M83	Southern Pinwheel Galaxy	Galaxy	Hya	13h 37m 00s	-29° 51.8'	8.0	21:37	02:06	06:36
M3	NGC5272	Globular	CVn	13h 42m 11s	+28° 22.5'	7.0	18:40	02:12	09:43
M101	Pinwheel Galaxy	Galaxy	UMa	14h 03m 13s	+54° 20.9'	8.2	15:06	02:33	14:00
M102	Spindle Galaxy (duplicate of M101?)	Galaxy	Dra	15h 06m 30s	+55° 45.7'	10.8	Circ	03:36	Circ

And - Andromeda	Cep - Cepheus	Cyg - Cygnus	Leo - Leo	Pav - Pavo	Sge - Sagitta
Ant - Antlia	Cet - Cetus	Del - Delphinus	Lep - Lepus	Peg - Pegasus	Sgr - Sagittarius
Aps - Apus	Cha - Chamaeleon	Dor - Dorado	Lib - Libra	Per - Perseus	Tau - Taurus
Aql - Aquila	Cir - Circinus	Dra - Draco	LMi - Leo Minor	Phe - Phoenix	Tel - Telescopium
Aqr - Aquarius	CMA - Canis Major	Equ - Equuleus	Lup - Lupus	Pic - Pictor	TrA - Triangulum Australe
Ara - Ara	CMi - Canis Minor	Eri - Eridanus	Lyn - Lynx	PsA - Pisces Austrinus	
Ari - Aries	Cnc - Cancer	For - Fornax	Lyr - Lyra	Psc - Pisces	Tri - Triangulum
Aur - Auriga	Col - Columba	Gem - Gemini	Men - Mensa	Pup - Puppis	Tuc - Tucana
Boo - Bootes	Com - Coma Berenices	Gru - Grus	Mic - Microscopium	Pyx - Pyxis	UMa - Ursa Major
Cae - Caelum	CrA - Corona Australis	Her - Hercules	Mon - Monoceros	Ret - Reticulum	UMi - Ursa Minor
Cam - Camelopardis	CrB - Corona Borealis	Hor - Horologium	Mus - Musca	Scl - Sculptor	Vel - Vela
Cap - Capricornus	Crt - Crater	Hya - Hydra	Nor - Norma	Sco - Scorpius	Vir - Virgo
Car - Carina	Cru - Crux	Hyi - Hydrus	Oct - Octans	Sct - Scutum	Vol - Volans
Cas - Cassiopeia	Crv - Corvus	Ind - Indus	Oph - Ophiuchus	Ser - Serpens	Vul - Vulpecula
Cen - Centaurus	CVn - Canes Venatici	Lac - Lacerta	Ori - Orion	Sex - Sextans	

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