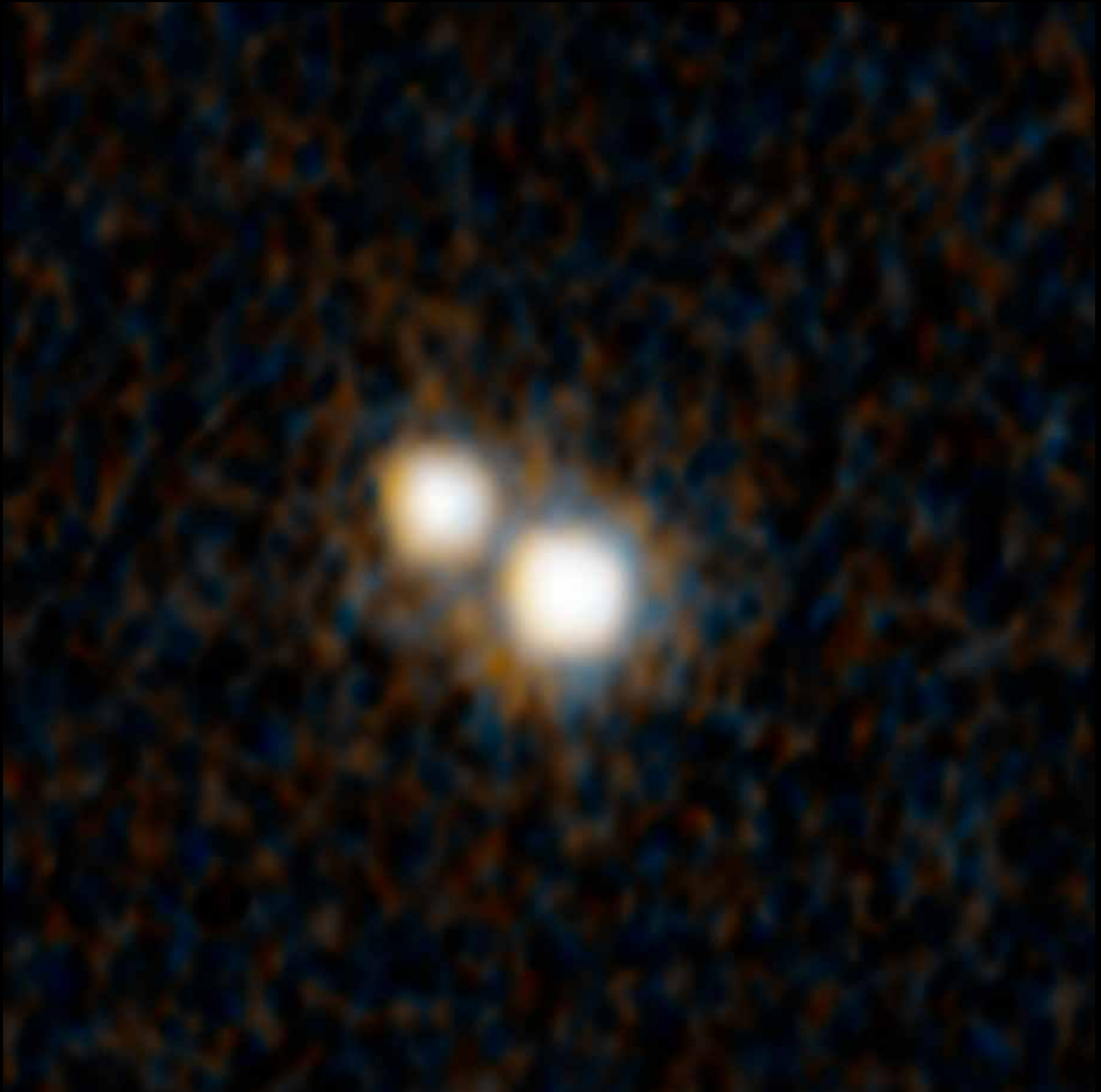


Volume 45.12

December 2025

Desert Sky Observer

Antelope Valley Astronomy Club



Desert Sky Observer

www.avastronomyclub.org

December 2025

Upcoming Events

December 6: Christmas Party

Every clear night: Personal Star Party

January 9: Club Meeting

January 24: Moonwalk @ PDW 6:00 PM  AVAC Calendar

February 7: Moonwalk @ PDW 6:30 PM

February 13: Club Meeting

Board Members

President: Phil Wriedt (661) 917-4874
president@avastronomyclub.org

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Secretary: Rose Moore (661) 972-1953
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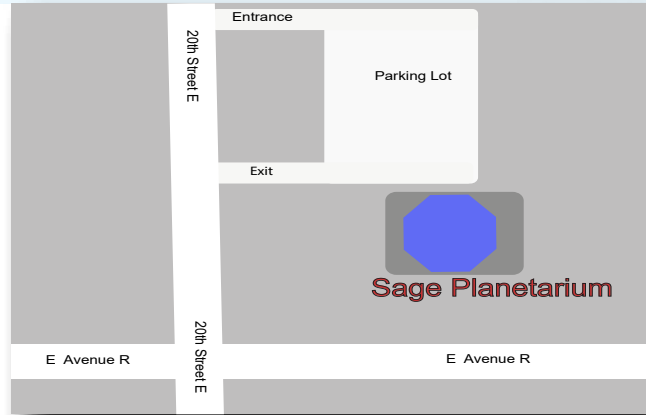
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vacant
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Club Historian: vacant
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Night Sky Coordinator:
Rose Moore (661) 972-1953

Astronomical League Coordinator:
Phil Wriedt (661) 917-4874
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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



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

www.avastronomyclub.org

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President's Message

By Phil Wriedt

Well that's all for this trip about the Sun,

On the 6th of December we will have our Christmas Party at Gino's in the Lancaster Marketplace, like we have for the past 8 years or so. Woodland Hills Camera (one of our sponsors), came through with a ZWO Seestar S50 telescope for the Grand Prize for our Christmas Party on December 6th. More information on the AVAC website.

Our last Moonwalk was on November 8th. Honestly I can't remember how many of the public came (I didn't write it down) but it was a good crowd for November. There were 6 members with telescopes.

Our next Moonwalk is on Saturday the 24th of January. Sunset will be at 5:14 pm (Daylight Saving time ends on March 7th) and astronomical dusk is at 6:41 pm. Saturn will set at 9:26 pm, and the 39% waning Moon will set at 11:33 pm; Jupiter will transit at 10:53 pm. Get there early so you can set up in daylight. If you get a telescope by then, bring it, or if not, just come join the party at Prime Desert Woodland; the more members there, the better it will be. Don't forget warm clothes, jackets, gloves, etc., it will be January, so be a Scout and Be Prepared. There is still a fair chance that a cold rain front could come through. Hopefully it will be a cloudless (and smokeless) night.

Our last DSSP was at Red Cliffs on November 22nd. The turnout was, I'm told, three members on a cloudless, virtually no wind, dark skies, and really cold night. Our next, Dark Sky Star Party, next year will be on the 21st of March at Red Rock State Park. This will be the best opportunity to do a Messier Marathon. We are planning to get campsites 1 & 2 because they aren't right up against the cliffs. This will ensure the greatest view of the sky.

After that, the next DSSP will be on April 18th, probably at Red Cliffs or Red Rock Canyon. This is alternate date for a Messier Marathon. Watch for the emails or for the text message to know what's happening.

There is a possibility of a star party at a school on the March 19th. Watch for the email notice if it materializes.

Please come to these events, join the crowd! The more the merrier! Happy Holidays!

Keep Looking Up, Phil

On The Cover

Note: North is 0.9° right of vertical RA: 7h 49' 22.96" DEC: 22° 55' 12.06" (Gemini) $z=2.17$ (redshift) >15Gly

This image from the NASA/ESA Hubble Space Telescope shows a pair of [quasars](#) (known as J0749+2255) that existed when the Universe was just 3 billion years old. They are embedded inside a pair of colliding galaxies. The quasars are separated by less than the size of a single galaxy. Quasars are powered by voracious, supermassive [black holes](#) blasting out ferocious fountains of energy as they engorge themselves on gas, dust, and anything else within their gravitational grasp. The black holes will eventually merge.

This discovery required the combined power of the NASA/ESA Hubble Space Telescope and the W.M. Keck Observatories in Hawaii. Multi-wavelength observations from the International Gemini Observatory in Hawaii, NSF's Karl G. Jansky Very Large Array in New Mexico, and NASA's Chandra X-ray Observatory also contributed to understanding the dynamic duo. And, [ESA's Gaia space observatory](#) helped identify this double quasar in the first place.

Hubble shows, unequivocally, that this is indeed a genuine pair of supermassive black holes, rather than two images of the same quasar created by a foreground gravitational lens. And, Hubble shows a tidal feature from the merging of two galaxies, where gravity distorts the shape of the galaxies forming two tails of stars.

However, Hubble's sharp resolution alone isn't good enough to go looking for these dual light beacons. Researchers enlisted Gaia, which launched in 2013, to pinpoint potential double-quasar candidates. Gaia measures the positions, distances, and motions of nearby celestial objects very precisely. But in a novel technique, it can be used to explore the distant universe. Gaia's huge database can be used to search for quasars that mimic the apparent

[continued on page 9](#)

From the Secretary

By Rose Moore

Members:

Happy Holidays to you all!

We have our club Christmas Party on Saturday December 6th at Gino's Restaurant, starting at 6pm. There will be one more email reminder coming out after the Thanksgiving weekend. For those paying at the party, please pay Rod by cash or check. We will be having a raffle and prizes, so bring a little extra cash for the raffle! We hope to see you there!

Jeremy will be having a Prime Desert Moon Walk on December 6th starting at 5:30pm; weather permitting. Due to the Festival of Lights, there will be no telescopes that night.

We do not have a club meeting in December. Coming up in January, we have our first meeting on Friday January 9th. We will be working on getting a speaker.

Our first Prime Desert Moon Walk for January will be Saturday January 24th at 6pm. We will need members with telescopes for the event.

Coming up for 2026 will be more PDW Moon Walks, Sue's Paint Class in March, a school star party at Amargosa School in March, two lunar eclipses, dark sky star parties, and a possible trip to Mt. Wilson.

Everyone have a safe and wonderful holiday season: Happy Hanukkah, Merry Christmas and Happy New Year to all!!

Rose

Vice President's Report

By Matt Leone

This is my last report as Vice President.

On Thanksgiving night I had 30 guests looking at the Moon. It was a great night to look at the moon. I will still be running the Lunar club and the new dates for 2026 are February 21st, March 21st, June 20th, July 18th, August 15th, November 14th. We will be meeting at Prime Desert Woodland on K-8 will announce times soon.

This was a trying year for night observing, the weather was a pain in the tush. I am looking forward for a great year to observe the sky. I am planning to re-coat my mirror in January. Comet 24p will be going through Leo in December. Jupiter will be great in December thru March; Saturn and Neptune will be back in the sky next summer.

As some of you know I will be missing the Christmas party because its my wedding anniversary. Everyone have a great party and see you at the next meeting and looking forward for the painting class on March 19.

Matt

News from around the Net

ESCAPADE Mission Launches For A Long Trip To Mars

A small but unique mission to Mars is taking an innovative path to reach the Red Planet in late 2027. They're finally on their way. After a long series of delays and launch schedule shuffles, the Escape, Plasma Acceleration and Dynamics Explorers (ESCAPADE) are on their way to Mars. The pair of small satellites launched on Blue Origin's New Glenn rocket from the Cape Canaveral Space Force Station in Florida on Thursday, November 13th at 3:55 p.m. Eastern Standard Time (EST)/20:55 Universal Time (UT). This flight made it out on the third try this week: an initial launch attempt on November 9th was scrubbed due to multiple issues. . . . (continued at <https://skyandtelescope.org/astronomy-news/escapade-mission-launches-for-a-long-trip-to-mars/>)



Updates on Interstellar Comet 3I/ATLAS: NASA Images, Many Tails, and Non-gravitational Forces

Now that Comet 3I/ATLAS has emerged from the Sun's glare, its behavior is being monitored by every available observatory. Now that it's back in view after having been hidden behind the Sun, interstellar Comet 3I/ATLAS, only the third known object to have come from outside the solar system, is being intensely observed by telescopes around the world as well as in near and distant space. On November 19th, NASA released the best high-resolution images yet — those taken by the half-meter telescope on the Mars Reconnaissance Orbiter. . . . (continued at <https://skyandtelescope.org/astronomy-news/updates-on-interstellar-comet-3i-atlas-new-images-many-tails-and-non-gravitational-forces/>)



Hong Kong's Mission To Watch The Moon Get Bombarded

The Moon gets hit constantly. Without an atmosphere to burn up incoming debris, meteoroids strike the surface directly at hypersonic speeds, creating brief but intense flashes of light visible from Earth. These impacts, called transient lunar phenomena pose a serious threat to any infrastructure humanity builds there. Hong Kong's answer is Yueshan (meaning "moon flashes" in Chinese) a dedicated lunar orbiter that will provide the first continuous, long term monitoring of these impact events. China plans to establish a lunar research station as part of its. . . . (continued at <https://www.universetoday.com/articles/hong-kongs-mission-to-watch-the-moon-get-bombarded>)



A Natural Laboratory Of Spiralling Dust Shells

In multiple ways, the JWST is opening our eyes to the Universe. It's enriching our understanding of the cosmos by showing us things we didn't think were possible, and by uncovering more details in things that have been observed many times by lesser telescopes. One of these subjects is called Apep, a triple star system about 15,000 light years away. Apep is home to a binary pair of Wolf-Rayet stars and a third supergiant star. The WR stars orbit each other about once every two centuries, while the much smaller companion is about 1,700 au away and takes more than 10,000 years to complete a single orbit. . . . (continued at <https://www.universetoday.com/articles/a-natural-laboratory-of-spiralling-dust-shells>)



NASA's Roman Observatory Passes Spate Of Key Tests

NASA's nearly complete Nancy Grace Roman Space Telescope has made another set of critical strides toward launch. This fall, the outer portion passed two tests—a shake test and an intense sound blast—to ensure its successful launch. The inner portion of the observatory underwent a major 65-day thermal vacuum test, showing that it will function properly in space. As NASA's next flagship space telescope, Roman will address essential questions in the areas of dark energy, planets outside our solar system, and astrophysics. "We want to make sure Roman will withstand our harshest environments," said Rebecca Espina, a deputy test director at NASA's Goddard Space Flight Center in Greenbelt, Maryland. "From a mechanical standpoint, our heaviest loads and stresses come from launch, . . . (continued at <https://phys.org/news/2025-11-nasa-roman-observatory-spate-key.html>)



Space News

News from around the Net

The Sun Left Home In A Hurry

By exploring the edge of the solar system, astronomers have estimated how long our star stuck around its siblings after birth. By simulating how the orbits of distant solar system objects were altered by close encounters with other stars early in the Sun's life, astronomers have placed tight constraints on how long our home star stuck around its siblings after birth. Though our Sun currently travels on a solitary trajectory through the galaxy, its earliest childhood was not spent so lonely. Instead, the Sun was likely born as part of a litter of many other stars all collapsing out of the same cloud of precursor gas and dust. . . . (continued at <https://skyandtelescope.org/astronomy-news/the-sun-left-home-in-a-hurry/>)



Hubble Captures Puzzling Galaxy

This NASA/ESA Hubble Space Telescope image features a galaxy that's hard to categorize. The galaxy in question is NGC 2775, which lies 67 million light-years away in the constellation Cancer (the Crab). NGC 2775 sports a smooth, featureless center that is devoid of gas, resembling an elliptical galaxy. It also has a dusty ring with patchy star clusters, like a spiral galaxy. Which is it: spiral or elliptical — or neither? Because we can only view NGC 2775 from one angle, it's difficult to say for sure. Some researchers classify NGC 2775 as a spiral galaxy because of its feathery ring of stars and dust, while others classify it as a lenticular galaxy. Lenticular galaxies have features common to both spiral and elliptical galaxies. (continued at <https://www.nasa.gov/image-article/hubble-captures-puzzling-galaxy/#:~:text=The%20galaxy%20in%20question%20is,clusters%2C%20like%20a%20spiral%20galaxy>)



Mars Has Lightning, Scientists Prove

For years scientists have suspected that Mars has lightning and electrical activity. A study now confirms it: particles in the dusty Martian atmosphere rub against one another, building up electrical charge that discharges in the form of lightning. Aside from Earth, lightning and electric activity were only known to occur on Saturn and Jupiter. On Earth, wind-blown dust and sand particles can become electrified because of a process called triboelectrification, or the transfer of charge between two objects when they rub against each other, a result of friction. Mars's atmosphere has dust and sand and is prone to dust devils and dust storms. . . . (continued at <https://www.scientificamerican.com/article/mars-has-lightning-scientists-prove/>)



Mars Sample That May Contain Evidence Of Life Might Never Come Home

NASA spent years and billions of dollars collecting Martian samples to bring home. Now they might be stranded. Right now one of the most advanced planetary explorers ever built is scouring the surface of Mars. Supported by a team of hundreds of scientists back on Earth, the Perseverance rover has traveled nearly the distance of a marathon to answer some of the biggest questions about our neighboring world: One rock visited by Perseverance, called Cheyava Falls, is speckled with iron-rich minerals that might be able to answer these questions,. . . . But Cheyava Falls's ride to our planet might have fallen through. . . . (continued at <https://www.scientificamerican.com/article/nasas-mars-sample-return-mission-in-jeopardy-as-u-s-considers-abandoning/>)



View Interstellar Comet 3I/ATLAS Through NASA's Multiple Lenses

NASA is in the midst of an unprecedented solar system-wide observation campaign, turning its spacecraft and space telescopes to follow comet 3I/ATLAS, the third known interstellar object to pass through our solar system. Twelve NASA assets have captured and processed imagery of the comet since it was first discovered on July 1, and several others will have opportunities to capture more images as the comet continues to pass through our solar system. By observing the comet from so many locations, NASA has an opportunity to learn about the ways that 3I/ATLAS differs from our solar system's home-grown comets and give scientists a new window into how the compositions of other systems (continued at <https://science.nasa.gov/solar-system/view-interstellar-comet-3i-atlas-through-nasas-multiple-lenses/>)



Building Your Eyepiece Collection: How To Upgrade And Choose Eyepieces

Tom Koonce - Antelope Valley Astronomy Club - December, 2025

If you've spent some good nights under the stars with your telescope's original eyepieces and are ready for an upgrade, you're not alone. For amateur astronomers, investing in the right eyepieces pays off for years, and will work with future telescopes as you level up your gear. Let's walk through the essentials of choosing eyepieces, keeping things clear and practical.

Try Before You Buy

Before shelling out for a new eyepiece, nothing beats trying it out yourself. Club star parties are ideal for this. These events are a terrific opportunity to look through different eyepieces owned by fellow members. If you're curious about a particular eyepiece, ask someone if you can borrow it for a few moments and try it on your own scope. This way, you'll know if the view fits your needs before spending money. Once you've found an eyepiece that delivers the experience you want, you can confidently shop for your own.

Balancing Affordability, Quality, and the Viewing Experience

Eyepieces come in a wide range of prices and levels of quality, so it's smart to balance your budget with your expectations. Entry-level 1.25" eyepieces (typically a 25 mm and 15 mm Plössl) are included with new telescopes or sometimes passed on as gifts. New entry level eyepieces can cost up to \$75, and premium 2" eyepieces can run several hundred dollars, especially those designed specifically for planetary or deep sky viewing. Most eyepieces fall somewhere between these two extremes. Paying more often means better features and performance, but you don't always need the most expensive option.

Modern eyepieces from reputable brands have excellent build quality and multi-coated lenses that boost durability and image clarity. Avoid generic or plastic eyepieces because they're rarely worth the money and usually don't last. For the best viewing experience, keep an eye out for eyepieces with high visual contrast, which helps faint objects pop against dark backgrounds. Eyepieces with higher contrast reveal subtle details and make observing more enjoyable.

The Apparent Field of View (AFOV) of an eyepiece is another major factor for consideration. AFOV tells you how much sky you'll see through the eyepiece. Plössl eyepieces often provide about 50°, while newer modern designs can reach 110° or more, giving you a truly immersive experience. Eye relief, the distance between the eyepiece lens and your eye, is especially important if you wear glasses. Look for at least 15 mm of eye relief, and 20 mm or 22 mm is even better for comfort. Even without glasses, adequate eye relief means you won't have to press your eye against the lens or worry about smudges. Major brand eyepieces are threaded for filters, which can help you observe nebulae, planets, and lunar features, enhancing contrast or extra detail. Having filter threads is a handy feature you'll appreciate as you get deeper into astronomy.

Understanding Magnification: Realistic Expectations and Formulas

When choosing eyepieces, remember that useful telescope magnification depends on your telescope's quality, size, and the atmosphere—not exaggerated marketing claims. Excessive magnification leads to blurry, faint images. Understanding this helps you select effective eyepieces and avoid disappointment.

The basic formula for magnification is straightforward: divide your telescope's focal length by the eyepiece's focal length. For example, a telescope with a 700 mm focal length and a 20 mm eyepiece gives you 700 divided by 20, or 35X magnification. You'll find the focal length printed on the side of the eyepiece and on your telescope or listed online. Keep these numbers handy for quick reference.

To figure out a conservative value for your telescope's maximum useful magnification, multiply the diameter of your primary lens or mirror (in inches) by 25. So, if your scope has a 60 mm lens, which is 2.36 inches, the practical maximum is 2.36 times 25, or about 59X. Going beyond this usually means more distortion and less

light, not better detail. And regardless of a telescope's size, atmospheric conditions put the practical upper limit on magnifications between 200X and 300X, and you'll only reach that on rare, clear, stable, dark nights.

Building a Balanced Eyepiece Collection

When building your collection, aim for eyepieces that provide magnifications spaced about 50X apart. This avoids overlapping and gives you a range of views for different objects and conditions. For example, there's little reason to have both a 20 mm and an 18 mm eyepiece unless they have other standout features from one another. Depending upon your telescope's Focal Length, A spread of eyepieces delivering around 30X, 50X, 100X, 150X, 200X, and 250X covers most observing needs up to your telescope's practical maximum.

One handy method for managing your set is to make a graph for your telescope plotting Eyepiece Focal Length vs. Telescope Magnification. Place a point on the graph for each eyepiece you own, and you'll see where you have a smooth range of magnifications, gaps or even overlap. Selecting eyepieces that fill in those gaps will give you more flexibility for different targets and conditions.

Eyepiece Coatings: What to Look For

Optical coatings have a significant impact on image quality. The best eyepieces are specified as "Fully Multi-Coated," which means every optical surface inside has anti-reflective coatings. These coatings boost contrast and minimize internal reflections, helping you get the sharpest possible views. If they are specified as just "Multi-Coated," this usually means only the outside surfaces are treated. It's better than nothing, but uncoated internal surfaces can cause light loss, lower contrast, and internal reflections, so pay attention when shopping. Fully Multi-Coated optics deliver superior performance.

Types of Eyepieces: From Classic to Modern

Eyepieces have come a long way, and you'll find several main types on the market. Older designs like Kellner, Erfle, and Orthoscopic (Ortho) offer varying levels of sharpness and have a loyal following. Brands such as Baader Planetarium, Celestron, and University Optics have produced many of these classics, though Kellners are mostly outdated now.

The Plössl design eyepiece features four optical elements, and it has become a versatile favorite. With a 50° AFOV and solid performance, Plössls from brands like Celestron, Explore Scientific, Tele Vue, Baader Planetarium, and Meade (only available used) are reliable choices for many scopes and viewing situations.

Modern multi-element Erfle-derivative eyepieces use advanced lens groupings and coatings to deliver wider fields of view and flatter high contrast images. Designs based on modified Erfle or Nagler types come from lines such as the Celestron Ultima series, Pentax XW series, Explore Scientific 82° Series, Tele Vue Naglers, Baader Hyperion series, and William Optics Swan series. These models can be pricier, but they offer excellent contrast, edge-to-edge sharpness, and a truly immersive experience.

Buying New or Used Eyepieces

There's no single "best" way to buy eyepieces but buying used from a fellow club member has big advantages. You can try before you buy and know exactly what you're getting. If you're looking online, stick to listings with clear, up-close photos from all sides, top and bottom, descriptions of clean optics, minimal barrel marks, and that even include the original packaging and end caps. Astronomy-focused sites like Astromart.com and Cloudynights.com are usually safer and better moderated than general marketplaces. Astromart charges a small membership fee to buy or sell and is closely monitored to keep scammers away.

If an eyepiece isn't pristine, remember that scratches on the coatings and glass are permanent, but barrel marks don't affect performance at all. Surface dust, fingerprints, eyelash makeup, and oils can be carefully cleaned off, but avoid eyepieces with *any* internal dirt or rattling when you shake it. These have been mishandled or disassembled at some point. eBay.com and Amazon.com sometimes have good deals, especially on open box items, though results on Facebook Marketplace, eyepiece purchases are mixed, sadly leaning towards negative experiences.

Barrel Diameter and Weight Considerations

Eyepiece barrel size matters, both for compatibility and performance. If your telescope only accepts 0.965" eyepieces, consider buying an adapter so you can use the more common and higher-quality 1.25" eyepieces going forward. There's a noticeable boost in image quality when you move to the 1.25" standard used by most amateur astronomers. These adapters come in various levels of quality and construction. Get one made from metal with a decent set screw. For example: the 'Blue Fireball 0.965" to 1.25" Eyepiece Adapter' from Agena Astro is about \$24 and there's one from Astromania that costs about the same. Amazon and eBay may offer these adapters too.

Unless you have a specific reason to upgrade, building out a solid 1.25" eyepiece collection first is usually your best bet. 2" eyepieces allow for bigger lens elements and additional photons, but they're heavier, more expensive, require different accessories, and will require rebalancing your telescope setup, refractor, or reflector. Stick with 1.25" eyepieces until you're ready to invest in 2" models and the necessary larger, upgraded accessories.

If you have a Schmidt-Cassegrain telescope (SCT), pay attention to eyepiece weight. Heavy eyepieces, especially when used with a diagonal, can cause rotation around the focuser if your visual back or focuser set screws aren't sturdy, and a rapid heavy weight shift might even affect your mount's stability. Consider upgrading to a heavy-duty visual back and diagonal. Brands like Tele Vue offer models (Tele Vue 2" Everbrite Diagonal with SCT Adapter (screw in Visual Back) and 2" to 1.25" Adapter from High Point Scientific) designed to handle the weight so you can use larger eyepieces safely, even when pointing your SCT straight up. You'll still be able to use all your 1.25" eyepieces with this setup.

Using "Astronomy.Tools" to Compare Eyepieces

As you expand your eyepiece collection, online tools are incredibly useful. Free websites like https://astronomy.tools/calculators/field_of_view/ let you compare magnification and apparent field of view for different night sky objects and eyepieces. Enter your telescope's details, choose a target object, and see a rendering of how the various eyepieces you select will frame it. This helps make sure you don't end up with overlapping views and can print or save your comparisons for reference.

Armed with these tips, you're ready to find the eyepieces that will make your observing sessions richer and more enjoyable. Remember to 'try before you buy' when possible, balance cost and quality, and use the free online tools to tailor your collection to your favorite objects and skies.

Clear skies and happy stargazing!

On The Cover. . . Continued

motion of nearby stars. The quasars appear as single objects in the Gaia data because they are so close together. However, Gaia can pick up a subtle, unexpected "jiggle" that mimics an apparent change in position of some of the quasars it observes. In reality, the quasars aren't moving through space in any measurable way. Instead, their jiggle could be evidence of random fluctuations of light as each member of the quasar pair varies in brightness on timescales of days to months, depending on their black hole's feeding schedule. This alternating brightness between the quasar pair is similar to seeing a railroad crossing signal from a distance. As the lights on both sides of the stationary signal alternately flash, the sign gives the illusion of "jiggling."

Because Hubble peers into the distant past, this double quasar no longer exists. Over the intervening 10 billion years, their host galaxies have likely settled into a giant elliptical galaxy, like the ones seen in the local universe today. And, the quasars have merged to become a gargantuan, supermassive black hole at its centre. The nearby giant elliptical galaxy, M87, has a monstrous black hole weighing 6.5 billion times the mass of our Sun. Perhaps this black hole was grown from one or more galaxy mergers over the past billions of years.

These results are featured in the paper published on 5 April 2023 in the journal Nature.

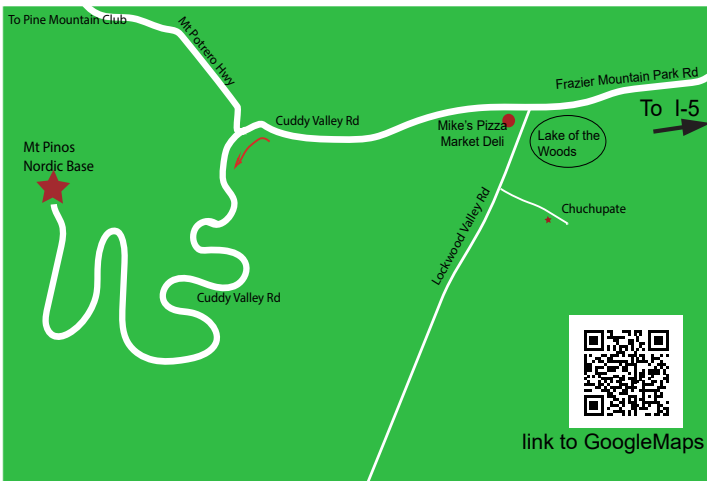
[Image description: A close-up image of a dual quasar system is shown. They appear as two large, white blurry circles in the centre of the image.]

Credit: NASA, ESA, Yu-Ching Chen (UIUC), Hsiang-Chih Hwang (IAS), Nadia Zakamska (JHU), Yue Shen (UIUC)

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: Almost the entire drive from I-5 is uphill.

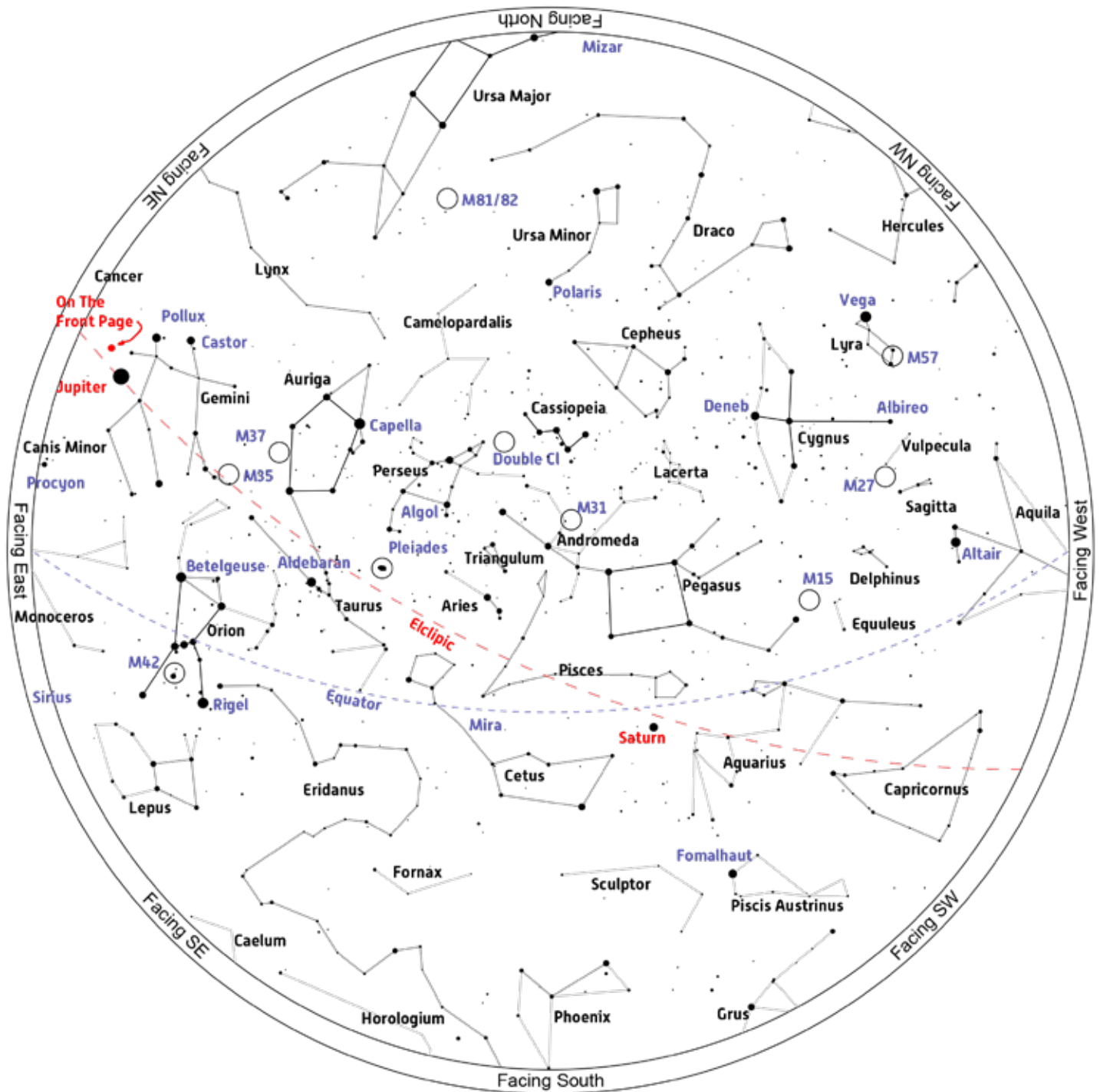
[RV7F+FF Frazier Park, California](#) (link to GoogleMaps)

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 December 20, 19:00 (UTC -08:00)

Powered by: Heavens-Above.com

Solar System Summary

The **Sun** starts the month in eastern Ophiuchus ending the month after passing half way across Sagittarius .

The Planets

Mercury ends it's stay in the morning sky. On the 7th it achieves GWE of 21°. For the rest of the month it falls back toward the rising Sun.

Venus in the morning twilight, while in Ophiuchus, continues its fall back toward the Sun getting ready for its conjunction on January 5.

Mars is increasingly difficult to locate in the evening twilight as it falls toward the setting Sun. On January 8 Mars enters solar conjunction and bursts into the morning twilight.

Jupiter is in Gemini moving in retrograde motion rising 3 hours after sunset. Jupiter will be at opposition on January 10.

Saturn moving again in normal motion in the northeast Aquarius the entire month at mag 1.0. On the early evening of the 26th the 41% waxing Moon passes 3° to the north, near zenith.

Uranus just past opposition, moving in retrograde motion at mag 5.6 in eastern Taurus, less than 5° south of the Pleiades.

Neptune stops its retrograde motion on the 9th, and thereafter resumes normal motion in southern Pisces at mag 7.9. The 45% waxing Moon passes less than 3° north on the 27th (at noon). Saturn is closing from the SW.

Dwarf Planets

134340 Pluto still moving normally in western Capricorn (5° in the next 3 years), at mag 14.5. On the 22nd (at noon) Pluto is eclipsed by the 7% waxing Moon.

1 Ceres spends the month resumes normal motion moving across Cetus at mag 8.8.

2 Pallas moves normally in eastern Aquarius, 4° south of M2, at the end of the month, at magnitude 10.4.

3 Juno continues moving normally from southern Ophiuchus into Serpens Cauda at mag 11.2.

4 Vesta moves in normal motion from across central Sagittarius at mag 8.

Moon Phases



First Qtr Dec 27 Full Dec 4 Third Qtr Dec 11 New Dec 19

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
12/1/2025	14:05	02:48	06:41	16:41
12/5/2025	17:24	07:51	06:45	16:41
12/10/2025	23:10	11:34	06:49	16:42
12/15/2025	03:02	13:39	06:52	16:43
12/20/2025	07:46	17:14	06:55	16:45
12/25/2025	10:42	22:24	06:57	16:48
12/30/2025	13:14	02:54	06:59	16:51

Planet Data*

December 1

	Rise	Transit	Set	Mag	Phase%
Mercury	05:08	10:27	15:45	-0.03	40.7
Venus	06:08	11:06	16:12	-3.93	98.9
Mars	07:33	12:25	17:17	1.34	99.6
Jupiter	19:47	02:45	10:01	-2.57	99.6
Saturn	13:03	18:54	00:48	1.04	99.7

December 15

	Rise	Transit	Set	Mag	Phase%
Mercury	05:21	10:27	15:33	-0.49	80.7
Venus	06:30	11:25	16:21	-3.93	99.6
Mars	07:25	12:16	17:06	1.27	99.8
Jupiter	18:47	01:56	09:02	-2.64	99.8
Saturn	12:09	18:00	23:51	1.10	99.7

December 30

	Rise	Transit	Set	Mag	Phase%
Mercury	06:08	11:01	15:53	-0.54	94.5
Venus	06:56	11:49	16:42	-3.92	99.9
Mars	07:14	12:06	16:58	1.20	99.9
Jupiter	17:39	00:50	07:56	-2.67	99.9
Saturn	11:11	17:03	22:55	1.13	99.8

*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 December 20, 2025. The list is sorted by the transit time of the object.

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6694		Open	Sct	18h 45m 18s	-09° 23.0'	8.0	07:10	12:46	18:22
IC4776		P Neb	Sgr	18h 45m 51s	-33° 20.5'	12.0	08:32	12:47	17:01
Barnard318		DkNeb	Sct	18h 49m 42s	-06° 23.0'		07:05	12:50	18:35
M11	Wild Duck Cluster	Open	Sct	18h 51m 05s	-06° 16.1'	7.0	07:07	12:52	18:37
M57	Ring Nebula	P Neb	Lyr	18h 53m 35s	+33° 01.7'	9.5	05:03	12:54	20:45
Barnard117		DkNeb	Sct	18h 53m 43s	-07° 24.0'		07:12	12:54	18:36
NGC6715		Globular	Sgr	18h 55m 03s	-30° 28.7'	7.7	08:29	12:56	17:23
NGC6717	III-143	Globular	Sgr	18h 55m 06s	-22° 42.0'	9.2	08:00	12:56	17:51
Barnard122		DkNeb	Sct	18h 56m 48s	-04° 45.0'		07:08	12:58	18:47
Barnard123		DkNeb	Sct	18h 57m 39s	-04° 43.0'		07:09	12:58	18:48
NGC6723		Globular	Sgr	18h 59m 33s	-36° 37.9'	7.3	09:01	13:00	17:00
Barnard128		DkNeb	Aql	19h 01m 40s	-04° 34.0'		07:12	13:02	18:52
NGC6729	C68	BrNeb	CrA	19h 01m 54s	-36° 57.0'		09:05	13:03	17:01
Barnard326		DkNeb	Aql	19h 03m 00s	-00° 23.0'		07:02	13:04	19:05
NGC6749		Globular	Aql	19h 05m 15s	+01° 54.0'	11.1	06:58	13:06	19:14
Barnard329		DkNeb	Aql	19h 06m 59s	+03° 11.0'		06:56	13:08	19:19
NGC6760		Globular	Aql	19h 11m 12s	+01° 01.8'	9.1	07:06	13:12	19:18
Abell56		P Neb	Aql	19h 13m 07s	+02° 52.8'	12.4	07:03	13:14	19:25
NGC6772		P Neb	Aql	19h 14m 36s	-02° 42.4'	14.0	07:20	13:15	19:11
Barnard138		DkNeb	Aql	19h 16m 00s	+00° 13.0'		07:13	13:17	19:20
M56	NGC6779	Globular	Lyr	19h 16m 36s	+30° 11.0'	9.5	05:38	13:17	20:56
NGC6778		P Neb	Aql	19h 18m 25s	-01° 35.7'	13.0	07:21	13:19	19:17
Abell61		P Neb	Cyg	19h 19m 10s	+46° 14.5'	13.0	04:08	13:20	22:32
Barnard140		DkNeb	Aql	19h 19m 49s	+05° 13.0'		07:03	13:21	19:38
NGC6790		P Neb	Aql	19h 22m 57s	+01° 30.8'	10.0	07:17	13:24	19:31
NGC6803		P Neb	Aql	19h 31m 16s	+10° 03.3'	11.0	07:01	13:32	20:03
NGC6804		P Neb	Aql	19h 31m 35s	+09° 13.5'	12.0	07:04	13:32	20:01
Abell62		P Neb	Aql	19h 33m 18s	+10° 37.0'	13.0	07:01	13:34	20:07
NGC6807		P Neb	Aql	19h 34m 34s	+05° 41.0'	14.0	07:17	13:35	19:54
M55	NGC6809	Globular	Sgr	19h 40m 00s	-30° 57.7'	7.0	09:16	13:41	18:06
NGC6813		Neb	Vul	19h 40m 22s	+27° 18.5'		06:14	13:41	21:09
NGC6820		Neb	Vul	19h 42m 28s	+23° 05.2'		06:31	13:43	20:55
NGC6818	Little Gem	P Neb	Sgr	19h 43m 58s	-14° 09.1'	10.0	08:22	13:45	19:07
NGC6826	Blinking Planetary	P Neb	Cyg	19h 44m 48s	+50° 31.0'	8.8	03:47	13:46	23:44
Abell65		P Neb	Sgr	19h 46m 34s	-23° 08.2'	13.1	08:53	13:47	18:41
NGC6838		Globular	Sge	19h 53m 46s	+18° 46.6'	8.3	06:57	13:54	20:52
NGC6842		P Neb	Vul	19h 55m 02s	+29° 17.3'	14.0	06:21	13:56	21:31

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December 2025

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
HR7619	HD189037	Mult	Cyg	19h 55m 38s	+52° 26.3'	4.9	03:26	13:56	00:26
Abell66		P Neb	Sgr	19h 57m 32s	-21° 36.6'	14.1	08:59	13:58	18:57
Barnard144	Fish on the platter nebula	DkNeb	Cyg	19h 58m 00s	+35° 20.0'		05:57	13:59	22:01
NGC6853	Dumbbell Nebula	P Neb	Vul	19h 59m 36s	+22° 43.2'	8.1	06:49	14:00	21:11
NGC6857	III-144	Neb	Cyg	20h 02m 48s	+33° 31.4'	11.4	06:10	14:04	21:57
IC4954		Neb	Vul	20h 04m 45s	+29° 15.1'		06:30	14:05	21:41
M75	NGC6864	Globular	Sgr	20h 06m 05s	-21° 55.3'	9.5	09:09	14:07	19:05
Barnard342		DkNeb	Cyg	20h 09m 30s	+41° 12.0'		05:36	14:10	22:45
NGC6885	20 Vulpeculae Cluster	Open	Vul	20h 12m 00s	+26° 29.0'	5.9	06:48	14:13	21:37
NGC6891		P Neb	Del	20h 15m 09s	+12° 42.2'	12.0	07:37	14:16	20:55
NGC6894		P Neb	Cyg	20h 16m 24s	+30° 33.9'	14.0	06:37	14:17	21:58
IC4997		P Neb	Sge	20h 20m 09s	+16° 43.9'	12.0	07:30	14:21	21:12
Barnard345	B345	DkNeb	Cyg	20h 21m 00s	+46° 33.0'		05:07	14:22	23:37
NGC6913	Cooling Tower	Open	Cyg	20h 23m 57s	+38° 30.5'	6.6	06:06	14:25	22:43
Abell70		P Neb	Aql	20h 31m 33s	-07° 05.3'	14.3	08:49	14:32	20:15
Barnard348	B348	DkNeb	Cyg	20h 34m 00s	+42° 05.0'		05:54	14:35	23:15
NGC6940		Open	Vul	20h 34m 26s	+28° 17.0'	6.3	07:04	14:35	22:06
NGC6960	Filamentary Nebula	Neb	Cyg	20h 45m 58s	+30° 35.6'		07:06	14:47	22:27
IC5068		Neb	Cyg	20h 50m 29s	+42° 28.6'		06:08	14:51	23:34
NGC6979	II-206	Neb	Cyg	20h 51m 00s	+32° 09.0'	11.0	07:04	14:52	22:39
IC5070	Pelican Nebula [2]	Neb	Cyg	20h 51m 00s	+44° 24.1'		05:55	14:52	23:49
NGC6981		Globular	Aqr	20h 53m 28s	-12° 32.2'	9.4	09:27	14:54	20:21
IC5076		Neb	Cyg	20h 55m 33s	+47° 23.7'		05:34	14:56	00:19
IC1340		Neb	Cyg	20h 56m 08s	+31° 02.8'		07:14	14:57	22:39
NGC6992	Cirrus Nebula [2]	Neb	Cyg	20h 56m 19s	+31° 44.6'		07:12	14:57	22:43
NGC6996	VIII-58	Open	Cyg	20h 56m 30s	+44° 38.0'	10.0	05:58	14:57	23:56
NGC6997		Open	Cyg	20h 56m 39s	+44° 37.9'	10.0	05:59	14:57	23:56
Barnard352	B352	DkNeb	Cyg	20h 57m 10s	+45° 53.0'		05:49	14:58	00:07
Barnard354	B354	DkNeb	Cep	20h 58m 00s	+58° 09.0'		Circ	14:59	Circ
NGC7000	C20,Gulf of Mexico	BrNeb	Cyg	20h 58m 48s	+44° 20.0'		06:03	15:00	23:56
M73	NGC6994	Open+Asterism	Aqr	20h 58m 56s	-12° 38.1'	9.0	09:33	15:00	20:27
NGC7006	C42	Globular	Del	21h 01m 30s	+16° 11.0'	10.6	08:13	15:02	21:52
NGC7009	C55,Saturn Nebula	P Neb	Aqr	21h 04m 12s	-11° 22.0'	8.0	09:34	15:05	20:36
NGC7027		P Neb	Cyg	21h 07m 02s	+42° 14.1'	10.0	06:26	15:08	23:49
Barnard151	B151	DkNeb	Cep	21h 08m 13s	+56° 19.0'		Circ	15:09	Circ
IC1369		Open	Cyg	21h 12m 09s	+47° 46.1'	6.8	05:46	15:13	00:39
Barnard153	B153	DkNeb	Cep	21h 21m 03s	+56° 26.0'		Circ	15:22	Circ
NGC7076		Neb	Cep	21h 26m 24s	+62° 53.5'		Circ	15:27	Circ
NGC7078	Great Pegasus Cluster	Globular	Peg	21h 29m 58s	+12° 10.0'	6.4	08:53	15:31	22:08

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December 2025

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M39	NGC7092	Open	Cyg	21h 31m 42s	+48° 25.0'	5.5	05:59	15:32	01:06
M2	NGC7089	Globular	Aqr	21h 33m 27s	-00° 49.3'	7.5	09:34	15:34	21:35
IC1396	Elephant Trunk	Open	Cep	21h 38m 58s	+57° 29.3'	3.5	Circ	15:40	Circ
NGC7099		Globular	Cap	21h 40m 22s	-23° 10.7'	7.5	10:47	15:41	20:35
NGC7128		Open	Cyg	21h 43m 57s	+53° 42.9'	9.7	04:44	15:45	02:46
NGC7142		Open	Cep	21h 45m 09s	+65° 46.5'	9.3	Circ	15:46	Circ
NGC7139	III-696	P Neb	Cep	21h 46m 08s	+63° 47.5'	13.3	Circ	15:47	Circ
Barnard166		DkNeb	Cep	21h 51m 05s	+60° 05.0'		Circ	15:52	Circ
Barnard168		DkNeb	Cyg	21h 53m 20s	+47° 16.0'		06:33	15:54	01:16
IC5146	Cocoon Nebula	Open	Cyg	21h 53m 29s	+47° 16.0'	7.2	06:33	15:54	01:16
IC1434		Open	Lac	22h 10m 42s	+52° 51.0'	9.0	05:33	16:11	02:50
NGC7245		Open	Lac	22h 15m 11s	+54° 20.6'	9.2	04:49	16:16	03:43
NGC7232		Galaxy	Gru	22h 15m 38s	-45° 51.0'	13.0	13:14	16:16	19:19
NGC7261		Open	Cep	22h 20m 06s	+58° 03.0'	8.4	Circ	16:21	Circ
NGC7293	C63,Helix Nebula	P Neb	Aqr	22h 29m 36s	-20° 48.0'	7.3	11:28	16:30	21:32
NGC7380		Open	Cep	22h 47m 21s	+58° 07.9'	7.2	Circ	16:48	Circ
C9	Sh2-155,Cave Nebula	BrNeb	Cep	22h 56m 48s	+62° 37.0'		Circ	16:58	Circ
IC1470		Neb	Cep	23h 05m 10s	+60° 14.6'		Circ	17:06	Circ
NGC7492		Globular	Aqr	23h 08m 27s	-15° 36.6'	11.5	11:51	17:09	22:27
HR8872	Omi Cep,	Triple	Cep	23h 18m 38s	+68° 06.6'	4.8	Circ	17:19	Circ
IC5308		Galaxy	Gru	23h 19m 21s	-42° 15.4'	12.0	13:52	17:20	20:48
M52	The Scorpion	Open	Cas	23h 24m 48s	+61° 35.6'	8.0	Circ	17:26	Circ
NGC7662	C22,Blue Snowball	P Neb	And	23h 25m 54s	+42° 33.0'	8.3	08:43	17:27	02:10
NGC7686		Open	And	23h 30m 07s	+49° 08.0'	5.6	07:50	17:31	03:12
IC5332		Galaxy	Scl	23h 34m 27s	-36° 06.0'	10.6	13:33	17:35	21:37
NGC7785		Galaxy	Psc	23h 55m 19s	+05° 54.9'	11.6	11:37	17:56	00:15
HR9071	Sig Cas	Triple	Cas	23h 59m 01s	+55° 45.3'	4.9	Circ	18:00	Circ
NGC7822		Neb	Cep	00h 03m 36s	+67° 09.0'		Circ	18:04	Circ
NGC55	C72	S Gal	Scl	00h 14m 54s	-39° 11.0'	7.9	14:29	18:16	22:02
NGC129		Open	Cas	00h 30m 00s	+60° 13.1'	6.5	Circ	18:31	Circ
NGC133		Open	Cas	00h 31m 19s	+63° 21.0'	9.0	Circ	18:32	Circ
NGC146		Open	Cas	00h 33m 03s	+63° 18.0'	9.1	Circ	18:34	Circ
NGC147	C17	E Gal	Cas	00h 33m 12s	+48° 30.0'	9.3	09:00	18:34	04:08
NGC190		Galaxy	Psc	00h 38m 55s	+07° 03.7'	14.0	12:17	18:40	01:02
M110	Sat Of Andromeda Galaxy	Galaxy	And	00h 40m 22s	+41° 41.1'	8.9	10:03	18:41	03:19
NGC210		Galaxy	Cet	00h 40m 35s	-13° 52.3'	10.9	13:18	18:41	00:05
NGC206	V-36	Neb	And	00h 40m 36s	+40° 44.0'		10:10	18:41	03:13
Arp168	M32	Galaxy	And	00h 42m 41s	+40° 51.0'	9.0	10:11	18:43	03:16
M32	Sat Of Andromeda Galaxy	Galaxy	And	00h 42m 42s	+40° 51.9'	9.1	10:11	18:43	03:16

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December 2025

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M31	Andromeda Galaxy	Galaxy	And	00h 42m 44s	+41° 16.1'	4.3	10:08	18:43	03:18
NGC246	C56	P Neb	Cet	00h 47m 00s	-11° 53.0'	10.9	13:18	18:48	00:17
NGC254		Galaxy	Scl	00h 47m 28s	-31° 25.2'	11.8	14:25	18:48	23:11
NGC288		Globular	Scl	00h 52m 45s	-26° 35.0'	8.1	14:12	18:53	23:35
NGC281	PacMan Nebula	Open	Cas	00h 52m 54s	+56° 37.4'	7.0	Circ	18:54	Circ
IC59	γ Cassiopeiae Nebula	Neb	Cas	00h 57m 29s	+61° 08.6'		Circ	18:58	Circ
IC63	γ Cassiopeiae Nebula	Neb	Cas	00h 59m 29s	+60° 54.7'		Circ	19:00	Circ
C51	IC1613	IrrGal	Cet	01h 04m 48s	+02° 07.0'	9.3	12:57	19:06	01:14
NGC474		Galaxy	Psc	01h 20m 07s	+03° 24.9'	11.1	13:09	19:21	01:33
NGC485		Galaxy	Psc	01h 21m 28s	+07° 01.0'	14.0	13:00	19:22	01:45
M103	NGC581	Open	Cas	01h 33m 23s	+60° 39.0'	7.0	Circ	19:34	Circ
NGC598	Triangulum Pinwheel	Galaxy	Tri	01h 33m 51s	+30° 39.6'	5.7	11:54	19:35	03:15
NGC604	III-150	Neb	Tri	01h 34m 33s	+30° 47.0'		11:54	19:35	03:17
M74	The Phantom	Galaxy	Psc	01h 36m 42s	+15° 47.0'	9.8	12:49	19:37	02:26
M76	Little Dumbbell Nebula	P Neb	Per	01h 42m 18s	+51° 34.2'	12.0	09:29	19:43	05:57
NGC651	Apple Core Nebula [2]	P Neb	Per	01h 42m 21s	+51° 34.1'	12.2	09:29	19:43	05:57
NGC637		Open	Cas	01h 43m 04s	+64° 02.4'	8.2	Circ	19:44	Circ
NGC654		Open	Cas	01h 44m 00s	+61° 53.0'	6.5	Circ	19:45	Circ
NGC720		Galaxy	Cet	01h 53m 00s	-13° 44.3'	10.2	14:30	19:54	01:17
NGC780		Galaxy	Tri	02h 00m 35s	+28° 13.5'	14.0	12:30	20:01	03:32
NGC784		Galaxy	Tri	02h 01m 17s	+28° 50.2'	11.8	12:29	20:02	03:35
NGC821		Galaxy	Ari	02h 08m 21s	+10° 59.6'	10.8	13:35	20:09	02:43
Baily191	NGC884	Open	Per	02h 22m 18s	+57° 08.1'	4.0	Circ	20:23	Circ
IC1795		Neb	Cas	02h 26m 32s	+62° 02.4'		Circ	20:27	Circ
NGC936		Galaxy	Cet	02h 27m 37s	-01° 09.3'	10.1	14:29	20:28	02:28
NGC943	Arp309	Galaxy	Cet	02h 29m 09s	-10° 49.0'	11.4	14:58	20:30	02:02
NGC956		Open	And	02h 32m 30s	+44° 35.6'	9.0	11:35	20:33	05:32
IC1805	Heart Nebula	Open	Cas	02h 32m 47s	+61° 27.6'	6.5	Circ	20:33	Circ
NGC1052		Galaxy	Cet	02h 41m 05s	-08° 15.3'	10.6	15:02	20:42	02:21

And - Andromeda
Ant - Antlia
Aps - Apus
Aql - Aquila
Aqr - Aquarius
Ara - Ara
Ari - Aries
Aur - Auriga
Boo - Bootes
Cae - Caelum
Cam - Camelopardis
Cap - Capricornus
Car - Carina
Cas - Cassiopeia
Cen - Centaurus
Cep - Cepheus
Cet - Cetus
Cha - Chamaeleon

Cir - Circinus
CMa - Canis Major
CMi - Canis Minor
Cnc - Cancer
Col - Columba
Com - Coma Berenices
CrA - Corona Australis
CrB - Corona Borealis
Crt - Crater
Cru - Crux
Crv - Corvus
CVn - Canes Venatici
Cyg - Cygnus
Del - Delphinus
Dor - Dorado
Dra - Draco
Equ - Equuleus
Eri - Eridanus

For - Fornax
Gem - Gemini
Gru - Grus
Her - Hercules
Hor - Horologium
Hya - Hydra
Hyi - Hydrus
Ind - Indus
Lac - Lacerta
Leo - Leo
Lep - Lepus
Lib - Libra
LMi - Leo Minor
Lup - Lupus
Lyn - Lynx
Lyr - Lyra
Men - Mensa
Mic - Microscopium

Mon - Monoceros
Mus - Musca
Nor - Norma
Oct - Octans
Oph - Ophiuchus
Ori - Orion
Pav - Pavo
Peg - Pegasus
Per - Perseus
Phe - Phoenix
Pic - Pictor
PsA - Pisces Austrinus
Psc - Pisces
Pup - Puppis
Pyx - Pyxis
Ret - Reticulum
Scl - Sculptor
Sco - Scorpion

Sct - Scutum
Ser - Serpens
Sex - Sextans
Sge - Sagitta
Sgr - Sagittarius
Tau - Taurus
Tel - Telescopium
Tra - Triangulum Australe
Tri - Triangulum
Tuc - Tucana
UMa - Ursa Major
UMi - Ursa Minor
Vel - Vela
Vir - Virgo
Vol - Volans
Vul - Vulpecula

Greek Alphabet
α - alpha
β - beta
γ - gamma
δ - delta
ε - epsilon
ζ - zeta
η - eta
θ - theta
ι - iota
κ - kappa
λ - lambda
μ - mu
ν - nu
ξ - xi
ο - omicron
π - pi
ρ - rho
σ - sigma
τ - tau
υ - upsilon
φ - phi
χ - chi
ψ - psi
ω - omega

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