PrimeFocus

December 2024

WHEN:

December 20, 2024
Doors open at 6:30pm
Dinner at 7:00pm

WHERE:

Unitarian Church
1893 North Vasco Rd.
Livermore, CA 94551
and via Zoom

TVS QR CODE

INSIDE THIS ISSUE:

THE OUTGOING PRESIDENT'S THANK YOU
RON KANE

It is time for a new person to take over as the TVS club president and I want to thank Eric for stepping up. I have been the TVS president since November 2020 and look forward to new thinking for the club with having Eric take over.
COVID19 had forced us to move from "in person" to Zoom meetings in April 2020 and then in September we had the SCU fire that destroyed our roll-off roof observatory and two 18-inch telescopes. Roland was president at that time of turmoil and guided us through it successfully. I took over and we spent the next year avoiding unnecessary physical contact, using Zoom for meetings and enjoying astronomy individually.

During the past four years we continually grew membership while other groups experienced a decline. I think this is a complement to our members and our efforts to encourage amateur astronomy as a hobby and maybe a career. Thank you for welcoming the newer members and thank you to our long-time members in keeping TVS going.

Ron and his RedCat Telescope

We have more exciting events to anticipate. The construction of our observatory dome to house our CDK20, planning for a new roll-off roof observatory building and maybe a control room building. These are big things for TVS and because we're a club we need your help as volunteers and experts in a variety of areas going forward. Our outreach efforts have been a major part of our growth and your help there is necessary for continued success.

Past-President is a title to aspire to and I encourage others to consider attaining this title. I'll be around as we go forward, I support a couple of other committee positions and hope to continue them as well. Members give the club a purpose

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Thank You continued

and volunteers provide the actions to support our future. I hope that you will consider stepping up to support outreach as well as volunteer to take a Board or committee position. Your participation will help TVS move forward and provide greater benefit to members and the public.

Thanks for allowing me to be your president these past 4 years!

NEWS AND NOTES

2024 Meeting Dates

Club Meeting	Board Meeting	PrimeFocus Deadline
Dec. 20	Dec. 23	Dec. 3
Jan. 17	Jan. 20	Jan. 10
Feb. 21	Feb. 24	Feb. 8

Money Matters

As of the last Treasurer's Report on 9/23/24, our club's account balance is $46,625.85, this includes $13,104.47 in the H2O Rebuild fund.

TVS Welcomes New Members

TVS welcomes new members Muriel Holzer, Tushar Shanker, Victor Tyutyunov, Kris Jernstedt, Richard Khoo, Amar Chaudhari, and Ryan Kennedy. Please say hello and chat with him during our meetings.

2024 TVS Club Star Party Schedule

Save the dates for the 2024 Club Star Parties.

Del Valle star parties are also public outreach events. They are jointly hosted with the EBRPD and held at the Arroyo Staging Area (Coords: 37.6196638, -121.7528899). The public is invited for the first 1.5-2 hours, while club members can stay the remainder of the night.

Tesla Vintners star parties are open to only club members and their guests. These star parties end at midnight, but participants can leave earlier, should they wish.

H2O Open House star parties are open to only club members and their guests. The open house ends at midnight, and all participants are encouraged to stay the duration. The drive to H2O takes about 1 hour, and the caravan leaves promptly from the corner of Mines and Tesla Rds. No gas stations are available on the route, so be prepared. Admission is $3/car-bring exact change. H2O is a primitive site with two porta-potties. Bring water, food, and warm clothing, as needed. Red flashlights are to be used so observers can preserve their night vision.

CALENDAR OF EVENTS

December 20, 21, 27, 28, 7:30-10:30 PM *

What	Free Telescope Viewing
Who	Chabot Staff
Where	Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost	Free

Join Chabot astronomers on the Observatory Deck for a free telescope viewing! Weather permitting, this is a chance to explore stars, planets and more through Chabot's historic telescopes. Chabot's three large historic telescopes offer a unique way to experience the awe and wonder of the Universe. Three observatory domes house the Center's 8-inch (Leah, 1883) and 20-inch (Rachel, 1916) refracting telescopes, along with a 36-inch reflecting telescope (Nellie, 2003).

Are the skies clear for viewing tonight? Viewing can be impacted by rain, clouds, humidity and other weather conditions. Conditions can be unique to Chabot because of its unique location in Joaquin Miller Park. Before your visit, check out the Weather Station to see the current conditions at Chabot.

* Please note that at the time of publication that the January 2025 Event Calander has not been released

For more information, see:
https://chabotspace.org/events/events-listing/

JAMES WEBB SPACE TELESCOPE CHALLENGES THE STANDARD MODEL
SAANIKA KULKARNI

Recent observations by a team from Case Western Reserve University using the James Webb Space Telescope (JWST) have sent ripples through the scientific community, challenging key aspects of the standard cosmological model. The data reveals galaxies in the early universe that are far brighter and more massive than previously predicted, prompting a reevaluation of the mechanisms underlying galaxy formation and evolution.

The standard cosmological model, also known as the Lambda Cold Dark Matter (λCDM) model, is the leading theoretical framework for understanding the universe's origin, composition, and evolution. It posits that the universe began 13.8 billion years ago in a hot, dense state, expanding ever since in a process known as the Big Bang. The model explains the universe's structure and growth through components like dark energy (λ), which drives accelerated expansion and makes up 68% of the cosmos, and cold dark matter (CDM), which constitutes 27% and is vital for forming large-scale structures like galaxies. The remaining 5% consists of ordinary matter, such as stars and planets. General relativity underpins the model, describing how matter and energy interact with spacetime, while the cosmic microwave background (CMB) provides critical evidence, revealing the universe's early state and validating key predictions.

This model also incorporates Hubble's law, which describes the universe's ongoing expansion, and accounts for the formation of cosmic structures through gravitational interactions starting from early density fluctuations. Despite its success, λCDM faces challenges, including the enigmatic nature of dark energy and dark matter and anomalies like the Hubble tension—a discrepancy in the measured expansion rate of the universe.

Unexpected Luminosity and Mass

The JWST's unprecedented ability to detect faint light from distant objects has revealed early galaxies that defy expectations. Many of these galaxies, formed within the first billion years after the Big Bang, are surprisingly luminous and massive. According to the standard model, these galaxies should still be in their nascent stages, with limited star formation and low stellar mass. However, the JWST data suggests otherwise: star formation in the early universe was far more efficient than anticipated, leading to the rapid buildup of stellar mass.

The significance of these observations lies in their ability to probe cosmic epochs that were previously inaccessible. The high luminosity of these galaxies suggests the presence of massive, mature stars much earlier than expected. Additionally, their structures hint at the early formation of dense galactic cores, which may have played a critical role in the rapid aggregation of matter.

Implications for the Standard Model

The standard cosmological model, which includes the Lambda Cold Dark Matter (λCDM) framework, has long provided a comprehensive explanation for the evolution of the universe. However, the JWST's findings challenge some of its assumptions:

1. Star Formation Efficiency: The data implies that early galaxies converted gas into stars at a much higher rate than models predict. This could indicate previously unknown processes driving star formation in the early universe. Furthermore, the rapid cooling of primordial gas clouds may have facilitated accelerated star formation.
2. Massive Galaxies at Early Times: The discovery of these massive galaxies suggests that galaxy formation began earlier and proceeded more rapidly than expected. This finding requires adjustments to the timelines and mechanisms described in the standard model. The existence of such galaxies also raises questions about the availability of raw materials like hydrogen and helium in the early universe.
3. Dark Matter and Feedback Mechanisms: The rapid growth of these galaxies raises questions about the role of dark matter halos and feedback from supernovae or active galactic nuclei, which are thought to regulate star formation. The observed galaxies appear to contradict these regulatory processes, indicating gaps in current understanding. The interaction between baryonic matter and dark matter during these early times may need to be reexamined to account for such anomalies.

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TVS E-Group
To Join the TVS E-Group just send an email to TVS at info@trivalleystargazers.org asking to join the group. Make sure you specify the email address you want to use to read and post to the group.

TVS ASTROPHOTOGRAPHY

Beautiful Downtown Auriga: A Widefield View, by Kevin McLoughlin
For a full resolution image see https://www.astrobin.com/j0wm73/B/

M31, The Andromeda Galaxy, by John Barclay

Melotte 15, by Scott Schneider
For a full resolution image see https://www.astrobin.com/hvu6ro/D/

The Christmas Cluster, by Imran Badr
For a full resolution image see https://www.astrobin.com/mqqweq/B/

WHATS UP

Adapted from Sky & Telescope

All times are Pacific Standard Time

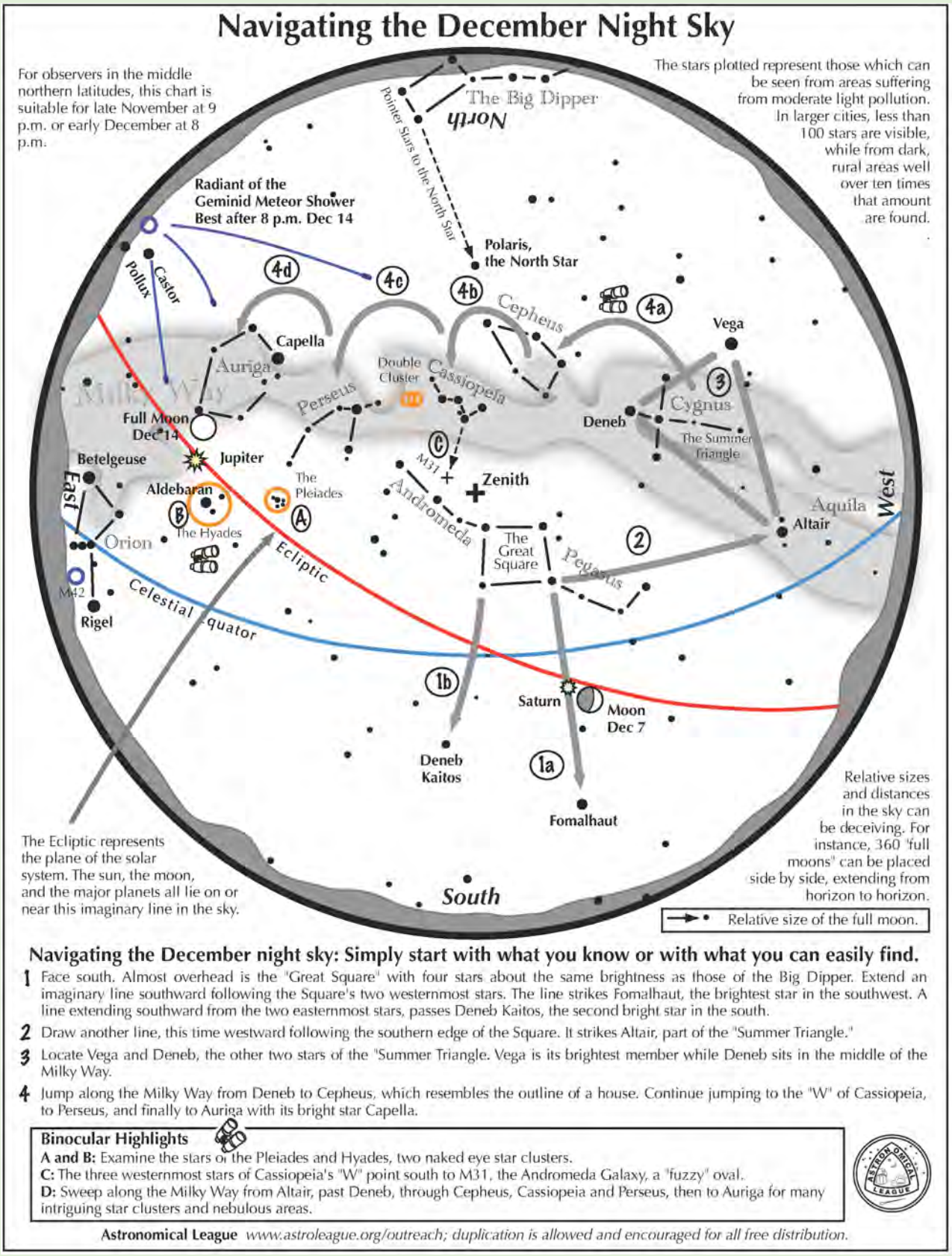
December 2024

21	Sat	Longest night of the year
22	Sun	Moon is at third quarter
24	Tue	At dawn, looking southeast crescent moon is about 3° upper right of Spica.
28	Sat	At dawn, thin lunar crescent is ½° right of Antares with Mercury a bit to the left of the pair
30	**Mon**	**New Moon**

January 2025

1	Wed	Algol shines at minimum brightness from about 10:53pm to 1:53am (1/2/25)
2-3	Thu-Fri	Quadrantid Meteor Shower peaks
4	Sat	At Dusk, looking south-southwest, Moon is 3° upper left of Saturn
6	Mon	Moon is at first quarter
9	Thu	Waxing Gibbous Moon visits the Pleiades
13	**Mon**	**Full Moon**
15-16	Wed-Thu	Mars at opposition
17-18	Fri-Sat	At dusk, looking southwest, Venus about 2° Left-lower left of Saturn

NAVIGATING THE NIGHT SKY FOR DECEMBER



Download pdf here: https://www.astroleague.org/wp-content/uploads/2024/11/2024-December.pdf

NASA NIGHT SKY NOTES

SPOT THE KING OF PLANETS

By Dave Prosper; Updated by Kat Troche of the Astronomical Society of the Pacific.

Jupiter is our solar system's undisputed king of the planets! Jupiter is bright and easy to spot from our vantage point on Earth, helped by its massive size and banded, reflective cloud tops. Jupiter even possesses moons the size of planets: Ganymede, its largest, is bigger than the planet Mercury. What's more, you can easily observe Jupiter and its moons with a modest instrument, just like Galileo did over 400 years ago.

NASA's Juno mission captured this look at the southern hemisphere of Jupiter on Feb. 17, 2020, during one of the spacecraft's close approaches to the giant planet. This high-resolution view is a composite of four images captured by the JunoCam imager and assembled by citizen scientist Kevin M. Gill. Credit: NASA, JPL-Caltech, SwRI, MSSS | Image processing by Kevin M. Gill, © CC BY

Jupiter's position as our solar system's largest planet is truly earned; you could fit 11 Earths along Jupiter's diameter, and in case you were looking to fill up Jupiter with some Earth-size marbles, you would need over 1300 Earths to fill it up – and that would still not be quite enough! However, despite its formidable size, Jupiter's true rule over the outer solar system comes from its enormous mass. If you took all of the planets in our solar system and put them together, they would still only be half as massive as Jupiter all by itself. Jupiter's mighty mass has shaped the orbits of countless comets and asteroids. Its gravity can fling these tiny objects towards our inner solar system and also draw them into itself, as famously observed in 1994 when Comet Shoemaker-Levy 9, drawn towards Jupiter in previous orbits, smashed into the gas giant's atmosphere. Its multiple fragments slammed into Jupiter's cloud tops with such violence that the fireballs and dark impact spots were not only seen by NASA's orbiting Galileo probe but also by observers back on Earth!

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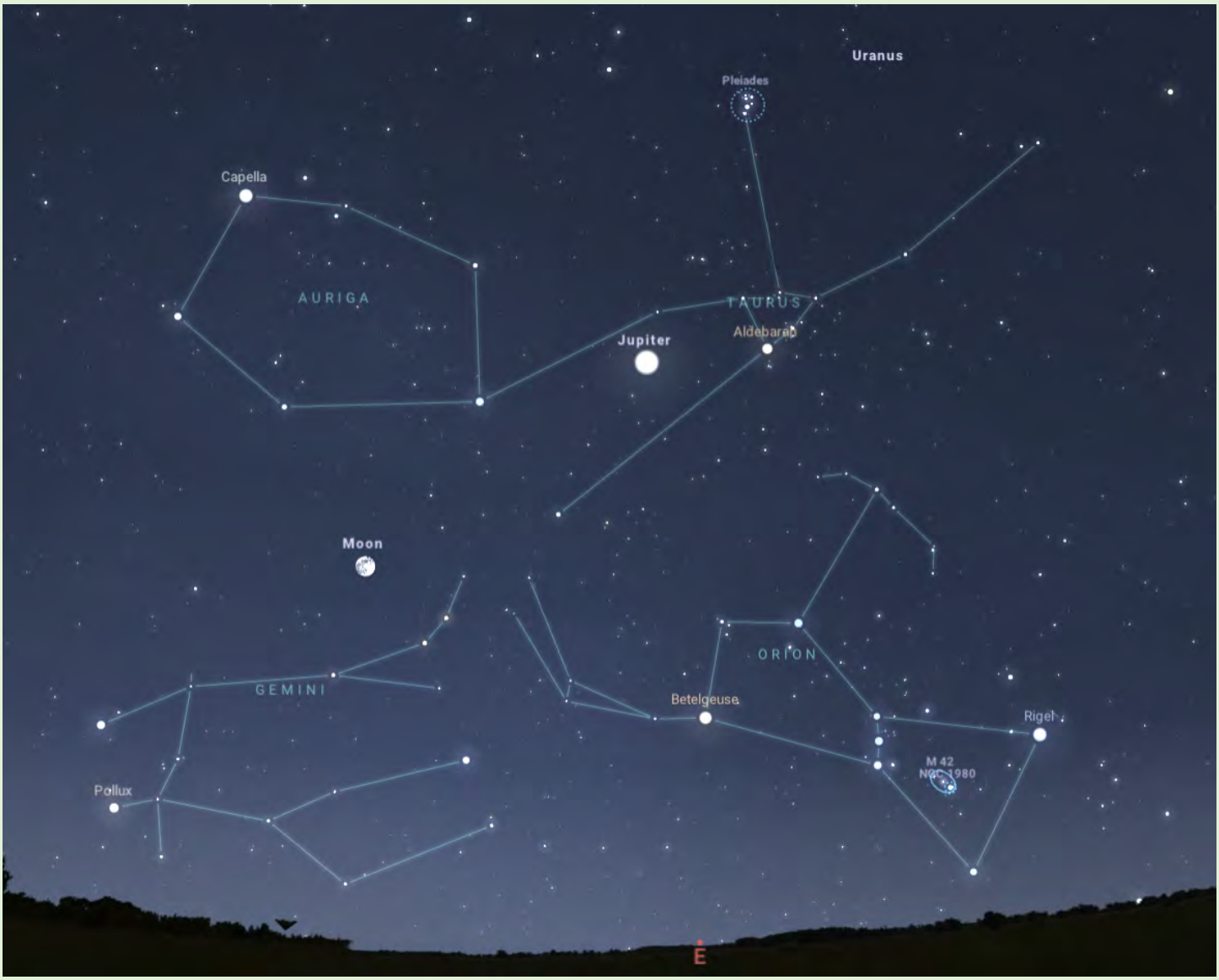

Look for Jupiter near the Eye of the Bull, Aldebaran, in the Taurus constellation on the evening of December 15, 2024. Binoculars may help you spot Jupiter's moons as small bright star-like objects on either side of the planet. A small telescope will show them easily, along with Jupiter's famed cloud bands. How many can you count? Credit: Stellarium Web

Saturn's moon Enceladus was also explored by the Cassini mission, revealing plumes of ice that erupt from below the surface, adding to the brilliance of Saturn's rings. Much like our own Moon, Enceladus remains tidally locked with Saturn, presenting the same side towards its host planet at all times.

Jupiter is easy to observe at night with our unaided eyes, as well-documented by the ancient astronomers who carefully recorded its slow movements from night to night. It can be one of the brightest objects in our nighttime skies, bested only by the Moon, Venus, and occasionally Mars, when the red planet is at opposition. That's impressive for a planet that, at its closest to Earth, is still over 365 million miles (587 million km) away. It's even more impressive that the giant world remains very bright to Earthbound observers at its furthest distance: 600 million miles (968 million km)! While the King of Planets has a coterie of 95 known moons, only the four large moons that Galileo originally observed in 1610 – Io, Europa, Ganymede, and Calisto – can be easily observed by Earth-based observers with very modest equipment. These are called, appropriately enough, the Galilean moons. Most telescopes will show the moons as faint

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star-like objects neatly lined up close to bright Jupiter. Most binoculars will show at least one or two moons orbiting the planet. Small telescopes will show all four of the Galilean moons if they are all visible, but sometimes they can pass behind or in front of Jupiter or even each other. Telescopes will also show details like Jupiter's cloud bands and, if powerful enough, large storms like its famous Great Red Spot, and the shadows of the Galilean moons passing between the Sun and Jupiter. Sketching the positions of Jupiter's moons during the course of an evening – and night to night – can be a rewarding project! You can download an activity guide from the Astronomical Society of the Pacific at bit.ly/drawjupitermoons

Now in its eighth year, NASA's Juno mission is one of just nine spacecraft to have visited this impressive world. Juno entered Jupiter's orbit in 2016 to begin its initial mission to study this giant world's mysterious interior. The years have proven Juno's mission a success, with data from the probe revolutionizing our understanding of this gassy world's guts. Juno's mission has since been extended to include the study of its large moons, and since 2021 the plucky probe, increasingly battered by Jupiter's powerful radiation belts, has made close flybys of the icy moons Ganymede and Europa, along with volcanic Io. What else will we potentially learn in 2030 with the Europa Clipper mission?

Find the latest discoveries from Juno and NASA's missions to Jupiter at science.nasa.gov/jupiter/

Originally posted by Dave Prosper: February 2023

Last Updated by Kat Troche: November 2024

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

Tri-Valley Stargazers
P.O. Box 2476
Livermore, CA 94551
www.trivalleystargazers.org

Tri-Valley Stargazers Membership Application

Contact information:

Name: _____ Phone: _____

Street Address: _____

City, State, Zip: _____

Email Address: _____

Status (select one): _____ New member _____ Renewing or returning member

Membership category (select one): Membership term is for one calendar year, January through December.

_____ Student member ($10). Must be a full-time high-school or college student.

_____ Regular member ($30).

Hidden Hill Observatory Access (optional): Must be 18 or older.

_____ One-time key deposit ($20). This is a refundable deposit for a key to H2O. New key holders must first hear an orientation lecture and sign a usage agreement form before using the observing site.

_____ Annual access fee ($10). You must also be a key holder to access the site.

Donation (optional):

_____ Tax-deductible contribution to Tri-Valley Stargazers

Total enclosed: $ _____

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function. TVS will not share information with anyone except as detailed in our Privacy Policy (http://www.trivalleystargazers.org/privacy.shtml).

Mail this completed form along with a check to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551.