Tri-Valley Stargazers

November 2023

PrimeFocus

WHEN:

November 17, 2023
Doors open at 7:00pm
Meeting at 7:30pm
Lecture at 8:00pm

WHERE:

Unitarian Church
1893 North Vasco Rd.
Livermore, CA 94551

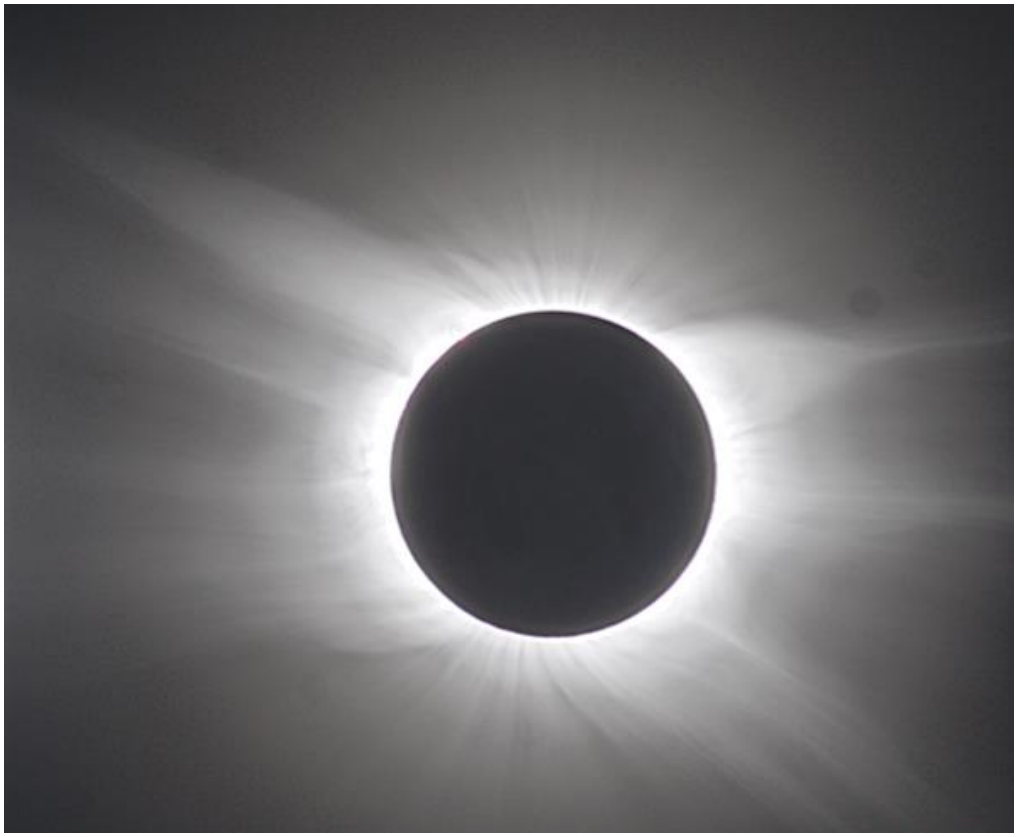
and via Zoom

TVS QR Code

INSIDE THIS ISSUE:

How to Photograph an Eclipse
Rob Hawley

This talk will focus on how to take pictures of the eclipse while still allowing you to enjoy the experience. It is based on a series of talks (including to TVS) he gave in 2016-17 prior to the last US eclipse and has been updated for the latest information. Taking photos of eclipses is harder than you think. I will discuss equipment, photographic techniques, and weather prospects.



Caption: High Dynamic Range (HDR) image of the 2006 Total Solar Eclipse from Libya. Credit: Rob Hawley (https://robhawley.net/pictures/rhn-slideshow/HDR_2006_161103-600.jpg)

Rob has been an active astronomer for 20 years. He has been treasurer of FPOA since 2010. So far, he has seen 16 total and two annular eclipses, and has plans in place for the next 2 totals. He is generally regarded as having taken some excellent eclipse and deep-sky astrophotos. He is also the author of CaptureEclipse (a MacOS program to automate eclipse photography). For more information, see: https://robhawley.net

H2O Update

TVS is purchasing and installing 5mph speed limit signs for the private road on H2O property. To ensure that we do not lose access to the site, all users of H2O are reminded to observe the speed limit.

News and Notes

2023-2024 Meeting Dates

Lecture Meeting	Board Meeting	PrimeFocus Deadline
Nov. 17	Nov. 20	
Dec. 15	Dec. 18	Dec. 1
Jan. 19	Jan. 22	Jan. 5
Feb. 16	Feb. 19	Feb. 2
Mar. 15	Mar. 18	Mar. 1
Apr. 19	Apr. 22	Apr. 5
May 17	May 20	May 3
Jun. 21	Jun. 24	Jun. 7
Jul. 19	Jul. 22	Jul. 5
Aug. 16	Aug. 19	Aug. 2
Sep. 20	Sep. 23	Sep. 6
Oct. 18	Oct. 21	Oct. 4
Nov. 15	Nov. 18	Nov. 1
Dec. 20	Dec. 23	Dec. 6

Money Matters

As of the last Treasurer's Report on 10/23/23, our club's account balance is $50,171.73. This includes $21,144.47 in the H2O Rebuild fund.

TVS Elections in November

TVS will be electing new members for the board. The slate of candidates is:

President: Ron Kane
Vice-President: Eric Dueltgen
Secretary: Dave Lackey
Treasurer: John Forrest

Please nominate candidates to replace members who will be retiring this year, namely for the positions of President and Secretary. Contact any club officer with your suggestions, including self-nomination. This is your opportunity to impact the future direction of the club!

TVS Welcomes New Members

TVS welcomes new members Vladimir Afanasiev, Ray Brown, Kelli DeMartin, Hillary Hodge, Linda Jimerson, Alan Lewis, Susan Lewis, Sophear Nam, Bob Schiff, Nakul Sharma, and Sherif Tawdros. Please say hello and chat with them during our meetings.

Time to Renew Club Membership for 2024

Now is a great time to become part of TVS. Membership is open to anyone with an interest in astronomy. Amateurs and professionals are equally welcome; skilled amateurs comprise most of the membership. You do not have to own a telescope to become a member.

Those renewing their club membership are encouraged to do so by using the online application before the end of December. Normally our memberships are only good for the calendar year, but anyone joining after October 1st will be given a membership for the remainder of 2023 and all of 2024.

The regular club membership remains a bargain at $30. Student membership (full-time High School or College student) is only $10! To become a key holder to H2O, you must be 18 or older. There is a one-time $20 Key deposit and a $10 annual access fee.

You can join TVS or renew your membership online at: http://www.trivalleystargazers.org/membership.shtml After filling out the application form you are connected to the PayPal payment form. You do not need to have a PayPal account to pay online, since PayPal will accept credit cards. Everyone is encouraged to use the online application. Alternatively, you can mail in the Membership Application on the last page of this newsletter along with a check to the Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551-2476. Note that TVS will not share your information with anyone. We only use the e-mail address to notify you when the newsletter becomes available.

All members agree to hold the 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.

2023 Club Star Party Schedule

Save the dates for the 2023 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. 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.

November 16: Public Star Party, Pleasanton Library, 400 Old Bernal Ave., Pleasanton. Set-up at 5pm, Observing 6pm-8pm.

November 19: Outreach Event at Camp Arroyo, 5535 Arroyo Rd., Livermore. Set-up at 6:30pm, Observing 7:30pm. **Note: The campers are immunocompromised, so all TVS volunteers will need an onsite COVID- test (provided by the camp). Please do not come if you do not feel well.**

Calendar of Events

November 18, 24, 25, December 1, 2, 8, 9
7:30pm-10:30pm

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. Before your visit, check out the Weather Station to see the current conditions at Chabot.

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

November 18, 10:00am-4:00pm

What: Celebrating Indigenous Peoples
Who: Local Indigenous Artists, Storytellers, Scientists
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: $15 Adults, $5 Youth, Members Free

Join Chabot Space & Science Center as we partner with local Indigenous artists, storytellers, scientists, and business owners to celebrate Native American Heritage Month with our community. Learn about star stories of the night sky that the local Ohlone people have passed down over many generations. Enjoy art and music created by local Indigenous artists. The Planetarium shows for the day will feature Indigenous stories and videos.

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

November 25, 6:00pm-8:00pm

What: Family Astronomy: The Moon and Tides
Who: Local Indigenous Artists, Storytellers, Scientists
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: $25 Adults, $15 Youth

Join us on an exciting and educational adventure as we delve into the captivating relationship between the Moon and tides. Discover how these celestial bodies influence the ebb and flow of our planet's oceans in this interactive and hands-on workshop. Guests will receive complimentary cider, hot chocolate, and cookies. (Program does not include after-hours general admission or the planetarium.) Public telescope viewing will begin at 7:30pm.

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

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Palomar Observatory: An Engineering Marvel, Part 3: A Man, A Vision, and A Legacy; By Saanika Kulkarni

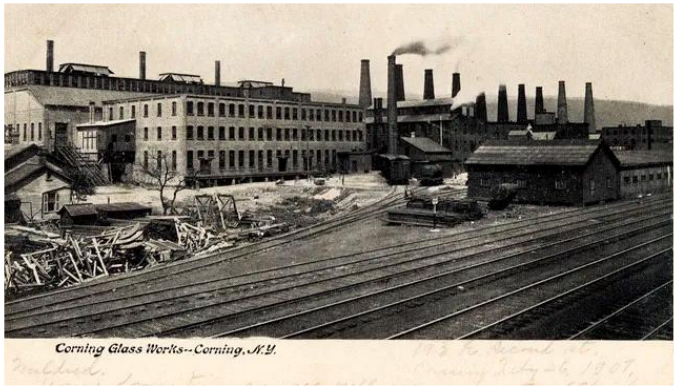
Writing this three-part series has been really eye-opening to me because I've learned so much about three amazing observatories simply by visiting and taking interest in their history. So, without further ado, let me introduce George Ellery Hale's last observatory, Palomar! Located just outside of San Diego and completed in 1949, Palomar is no doubt an engineering marvel full of innovation.

The Hale Telescope

My visit to the Palomar Observatory offered me an opportunity to explore the awe-inspiring Hale Telescope, which reigns supreme as the largest and most iconic facility atop Palomar Mountain. The centerpiece of this astronomical haven, the Hale Telescope, boasts a colossal 200-inch primary mirror—a groundbreaking innovation of its time that captured the imagination of astronomers and stargazers alike. The story behind this remarkable mirror's creation is one of ingenuity and determination. The journey began when it became evident that a mirror of such scale had never been attempted before. The task of crafting this optical marvel initially fell upon the renowned St. Gobain Glass Works in France, responsible for casting the legendary 100-inch mirror at Mt. Wilson. However, even their expertise could not provide a mold capable of accommodating a 200-inch mirror, presenting an unexpected challenge.

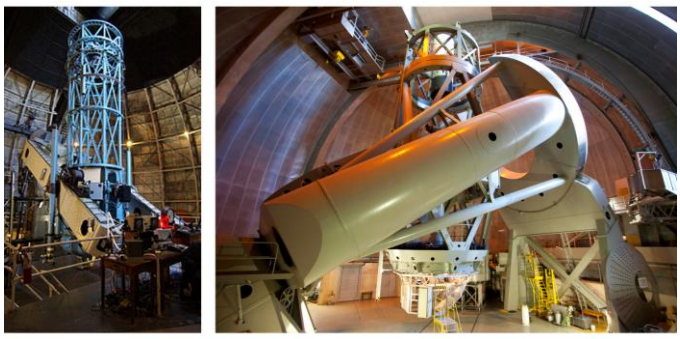
Enter the Corning Glass Company, a distinguished establishment based in New York and already renowned for its mastery of glass mirrors. It was to Corning that George Ellery Hale, the visionary behind the Hale Telescope, turned with high hopes and a vision of pushing the boundaries of astronomical observation. Hale was driven not only by the desire to achieve this monumental feat but also by the need to do so cost-effectively. The standard material for mirrors of that era was low-expansion solid glass, an option both costly and incredibly heavy. Searching for an alternative, numerous suggestions were made, with some advocating for the use of quartz due to its lightweight and heat-resistant properties. However, Hale deemed quartz to be too extravagant for his ambitions.

Ultimately, he set his sights on a material that would balance both affordability and practicality: Pyrex. This innovative choice marked a pivotal moment in the telescope's development. Pyrex, while lighter and cost-effective, presented a unique challenge. If it cooled too quickly during the casting process, it risked developing cracks that would render the entire mirror unusable. This hurdle necessitated an elaborate solution. The skilled artisans at the Corning Glass Company embarked on a remarkable undertaking, allowing the massive Pyrex mirror to cool for an astonishing ten months in a highly controlled environment. The temperature-regulated room and mold were essential to ensuring the mirror's integrity.



Caption: Corning Glass Works in 1907. Credit: Star Gazette

The anxiety was palpable among the Palomar team as the moment of truth arrived. The initial cast attempt ended in disappointment, with the mirror bearing the marks of imperfections and cracks. Yet, in the face of adversity, the team persevered, and a second cast attempt was made. This time, the stars aligned, and the mirror emerged intact, ready to undergo the meticulous polishing process. Once completed, this engineering marvel began its journey, carefully packaged and transported via railroad from its birthplace in New York to its final destination in Pasadena, where it would become the crowning jewel of the Hale Telescope.



Caption: Hooker Telescope Yolk mount (left). Credit: Wikipedia. Hale Telescope Horseshoe mount. Credit: Caltech Astronomy

The Hale Telescope at Palomar Observatory boasts yet another distinguishing feature that sets it apart from its counterparts in the world of astronomical instrumentation—its ingenious Horseshoe mount. While the Yolk mount, famously employed by Mt. Wilson's Hooker Telescope, has its own merits, the Hale Telescope's horseshoe mount offers unique advantages that make it a valuable asset in the realm of astronomical observation.

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Palomar Observatory (con't)

The concept of a horseshoe mount might conjure images of its namesake, but in the context of the Hale Telescope, it represents a remarkable feat of engineering and design. The horseshoe-shaped framework that cradles the telescope allows for a level of flexibility and adaptability that is truly exceptional. In contrast, the Hooker telescope's Yolk mount, while a technological marvel in its own right, is more restrictive in terms of its viewing capability near the horizon.

One of the key benefits of the Hale Telescope's horseshoe mount is its ability to overcome the limitations associated with the Hooker mount. The Hooker telescope's Yolk design, with its pivot point located high above the mirror, can hinder observations near the horizon. This limitation arises because the telescope's bulk can obstruct the view, especially when attempting to observe objects that appear close to the Earth's horizon.

In contrast, the Horseshoe mount of the Hale Telescope allows for a greater degree of maneuverability. The telescope can be tilted and positioned in such a way that it can effectively observe celestial objects that are closer to the horizon, eliminating the obstruction problem experienced by the Hooker telescope. This enhanced viewing capability near the horizon is of particular significance, as it expanded the range of celestial objects that astronomers can study, making it especially valuable for various types of astronomical research and observations.

Hale's Final Vision

Despite the immense challenges and personal sacrifices that George Ellery Hale endured during the construction of the Palomar Observatory, his unwavering dedication to advancing our understanding of the universe left a lasting legacy that continues to inspire and shape the field of astronomy to this day. Hale's vision, tenacity, and relentless pursuit of knowledge have left an indelible mark on the world of astronomical research and exploration. Hale's dream of Palomar Observatory and its groundbreaking Hale Telescope was not only a testament to his remarkable scientific acumen but also his incredible determination. The toll it took on his health, both physically and mentally, is a poignant reminder of the sacrifices often made in the name of scientific progress. The years of isolation and the ever-present darkness of the night sky, while essential for his work, had their own profound impact on his well-being.

His struggles with depression, schizophrenia, and insomnia are a testament to the weighty burden that came with his visionary pursuits. However, Hale's grit, determination, and passion for the stars above propelled him through the challenging journey of constructing the Palomar Observatory. Tragically, George Ellery Hale did not live to witness the fruition of his remarkable creation. He passed away in 1939, a decade before the observatory commenced its observations in 1949. It is a poignant reminder of the sacrifices and dedication of scientists who often toil tirelessly, with a vision extending far beyond their own lifetimes.

Hale's legacy, however, lives on. The Palomar Observatory remains a symbol of his enduring commitment to advancing the frontiers of human knowledge. It serves as a beacon for future generations of astronomers and researchers who continue to explore the cosmos and unlock its mysteries. The groundbreaking work conducted at Palomar continues to push the boundaries of our understanding, and it stands as a fitting tribute to the brilliance and indomitable spirit of its visionary founder, George Ellery Hale. Though he may not have lived to see his creation fully realized, his impact on the world of astronomy endures as a shining star in the firmament of human achievement.

TVS: Annular Solar Eclipse

Caption: John Barclay imaged the eclipse from Winnemucca.

Caption: Ken Sperber imaged the eclipse from Flagstaff, AZ. Using a Takahashi FS-102 with a white light solar filter, he captured 2 sunspot groups in this crop of an eyepiece projection cell phone photo.

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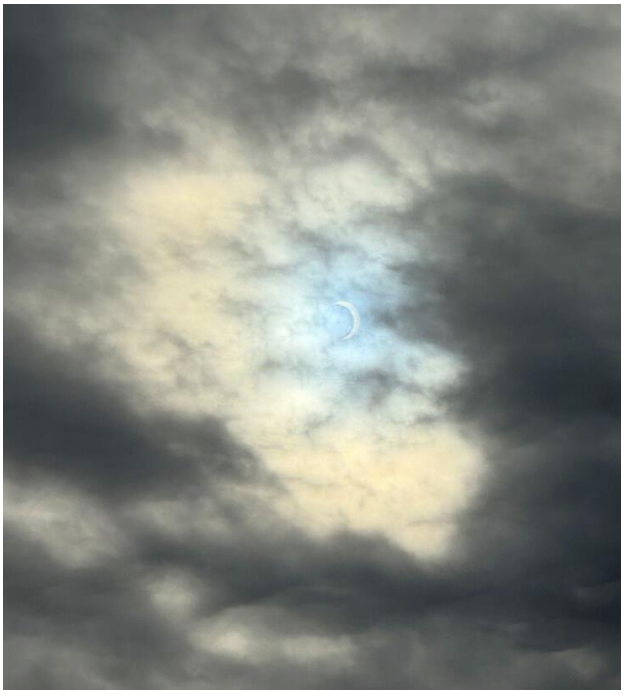
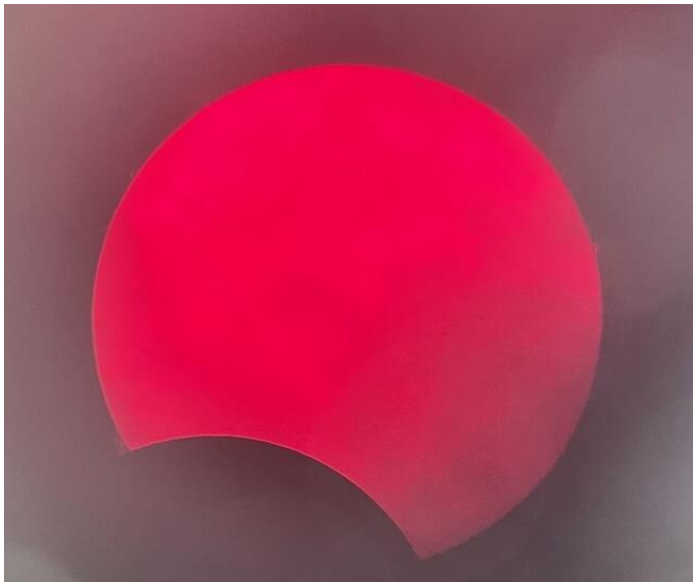
TVS Astrophotography: Annular Solar Eclipse (con't)





Caption: TVS members far and wide persevered to observe the October 14, 2023 Annular Solar Eclipse, though for most observers the eclipse was partial. Top row: Jenny Siders, Faculty member at Las Positas College, organized a public observing event at Las Positas College in cooperation with TVS. There was a large turnout with the partial solar eclipse visible through the clouds. The event was highlighted in *The Independent* (The-Independent-Solar-Eclipse-Las-Positas-TVS). Image Credits: Ross Gaunt. Bottom-left: Gopal K imaged the eclipse through clouds from Battle Mountain, Nevada. Bottom-right: Dwight Lanpher observed the partial eclipse from *Stars Over Katahdin* in Stacyville, Maine. He used a Lunt LS152 Hydrogen-alpha telescope, which revealed prominences around the solar limb, noticeable at the 2 o'clock and 8 o'clock positions in this eyepiece projection cell phone photo taken by Terri-Ann Anderson.

What's Up By Ken Sperber (adapted from S&T)

All times are Pacific Standard Time

November

13	**Mon**	**New Moon (1:27am)**
17-	Fri-	The Leonid meteor shower peaks the night of Nov. 17-18 (All Night)
20	**Mon**	**First-Quarter Moon (2:50am)**
20	Mon	In the SSE, the Moon is ~5° to the lower left of Saturn (Dusk)
21	Tue	Algol shines at minimum brightness for ~2 hours centered on 7:55pm PST (Evening)
25	Sat	Near the western horizon, the Moon and Jupiter are separated by ~2° (Morning)
26	Sun	In the SE, the Moon is ~1° below M45, The Pleiades (Evening)
27	**Mon**	**Full Moon (1:16am)**
29	Wed	In the ESE, Venus and Spica rise together separated by ~4° (Morning)
30	Thu	In the ENE, the Moon is ~2° below right of Pollux, forming a line with Castor (Evening)

December

1	Fri	Low in the SE, Venus is ~4.5° to the left of Spica (Dawn)
3	Sun	In the ESE, the Moon and Regulus are separated by ~3.5° (Evening)
4	**Mon**	**Last-Quarter Moon (9:49pm)**
8	Fri	In the SE, the crescent Moon is ~2° above Spica (Dawn)
9	Sat	In the SE, the crescent Moon is ~3.5° from Venus (Dawn)
11	Mon	Algol shines at minimum brightness for ~2 hours centered on 9:38pm PST (Evening)
12	**Tue**	**New Moon (3:32pm)**
13-	Wed-	The Geminid meteor shower peaks the night of Dec. 13-14 (All Night)
14	Thu	Algol shines at minimum brightness for ~2 hours centered on 6:27pm PST (Evening)
17	Sun	In the SW, the crescent Moon is ~2.5° to the lower left of Saturn (Evening)
19	**Tue**	**First-Quarter Moon (10:39am)**
21	Thu	In the SW, the Moon is ~6° to the lower right of Jupiter (Evening)
21	Thu	The longest night of the year in the Northern Hemisphere; Winter Solstice (7:27pm)
26	**Tue**	**Full Moon (4:33pm)**
28	Thu	In the West, the Moon is ~2° from Pollux, the brighter of the Gemini Twins (Dawn)
29	Fri	The Moon is ~3.5° to the right of M44, the Beehive Cluster (Dawn)
31	Sun	In the WSW, the Moon is ~2.5° to the upper right of Regulus (Dawn)
31	Sun	Algol shines at minimum brightness for ~2 hours centered on 11:23pm PST (Evening)

Calendar of Events (con't)

December 4, 7:30pm

What: The Remarkable Death of a Massive Star
Who: Dr. Carl Fields (Los Alamos National Laboratory)
Where: Golden Gate Park, 55 Music Concourse Drive, San Francisco
Cost: Members and Seniors $12, Public $15

The explosion of a massive star can produce ripples through spacetime and drive the creation of the elements needed for life. Their deaths can also give birth to a neutron star or black hole, providing clues into the evolution of galaxies. However, the chaotic nature of massive stars presents a challenge to interpreting their observed properties. Recent technological advancements allow us to now produce state-of-the-art computational simulations of the transient fate of a massive star. These simulations can unlock secrets about the violent nuclear fusion occurring deep within these stars, a region inaccessible to direct observation. In this talk, Dr. Fields will present recent results of hydrodynamic simulations of massive stars in the final moments proceeding and during their catastrophic fates.

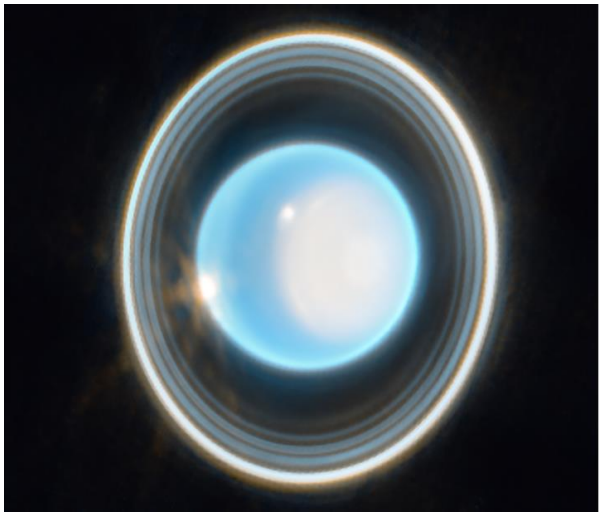
For more information, see: Benjamin Dean Astronomy Lecture

NASA Night Sky Notes

Spy the Seventh Planet, Uranus

By Liz Kruesi

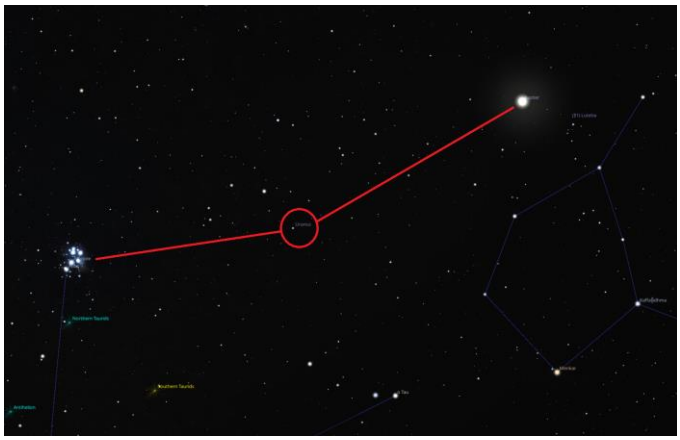
You might be familiar with Saturn as the solar system's ringed planet, with its enormous amount of dust and ice bits circling the giant planet. But Uranus, the next planet out from the Sun, hosts an impressive ring system as well. The seventh planet was the first discovered telescopically instead of with unaided eyes, and it was astronomer extraordinaire William Herschel who discovered Uranus March 13, 1781. Nearly two centuries passed before an infrared telescope aboard a military cargo aircraft revealed the planet had rings in 1977.[1]



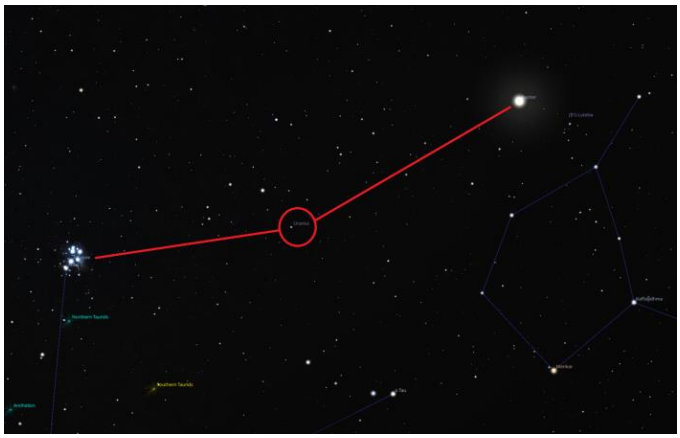
Caption: Uranus hosts 13 faint rings, 11 of which are visible in this JWST image. The planet was 19.67 times the Earth-Sun distance from our planet (1.83 billion miles) when JWST captured exposures through two near-Infrared filters on February 6, 2023. The white region in the right side of Uranus is one of the planet's polar caps. This icy world orbits the Sun differently from the rest of the solar system's planets – Uranus rolls along on its side.

Since that discovery, multiple observatories have revealed more details of Uranus and its ring system. Most recently, the NASA-led JWST space observatory captured the planet and its rings in detail. This recent image combines just 12 minutes of exposure in two filters to reveal 11 of the planet's 13 rings. Even some of the planet's atmospheric features are visible in this image. Even with advanced imaging like that from JWST, much of Uranus remains a mystery, including why it orbits the Sun on its side. This is because only one spacecraft has ever visited this planet: NASA's Voyager 2, which flew by the distant planet in the mid-1980s.[2]

Planetary scientists are hoping to change that soon, though. Scientists recommended in a =f\ released last year from the National Academies of Sciences, Engineering, and Medicine that Uranus be the focus on the next big planetary science spacecraft mission. Such a large-scale mission would gain insight into this icy giant planet and the similar solar system planet, Neptune.



Caption: Sky map picturing M45, Uranus, and Jupiter. Stellarium



Caption: *Sky map picturing M45 and Uranus. Stellarium*

If you want to catch a view of Uranus with your own eyes, now is prime time to view it. This ice giant planet lies perfectly positioned in mid-November, at so-called "opposition," when its position in its orbit places it on the other side of the Sun from Earth. That location means our star's light reflects off Uranus' icy atmosphere, and the planet appears as its brightest.

To find it, look overhead just after midnight on November 13. Uranus will lie about halfway between the brilliant planet Jupiter and the diffuse glow of the Pleiades star cluster (M45). While Uranus may look like a bright blinking star in the night sky, its blue-green hue gives aways its identity. Binoculars or a telescope will improve the view.

[1]For more about the infrared scope: https://web.archive.org/web/20230429120852/https://www.nasa.gov/vision/universe/watchtheskies/kuiper.html

[2]See more about the flyby at: https://www.nasa.gov/history/35-years-ago-voyager-2-explores-uranus/

For more about this oddball planet, visit NASA's Uranus page.

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.