

PrimeFocus



WHEN:

June 16, 2023
Set-up at 5:30pm
BBQ at 6:00pm

WHERE:

Unitarian Church
1893 North Vasco Rd.
Livermore, CA 94551

TVS QR Code



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Annual TVS BBQ

The June 16 meeting will be the annual TVS BBQ /Potluck. The BBQ starts at 6 PM. At 5:30pm we will need a few people to set-up tables and chairs. TVS will supply hamburgers, veggie burgers, hot dogs, soft drinks, and water. Members should bring something to share - appetizer, salad, main course sides, or dessert (enough for yourself and 6-8 others). After the BBQ, clean up will require a few people to help as well.

Please send an email to Ron Kane (president@trivalleystargazers.org) to let him know (1) Who and how many in your party are attending? (2) What you will bring to share? (3) Can you help with set up and or clean up?

Journal Club

What's Going On With AT2021LWX? By Saanika Kulkarni

For the majority of the 20th century, transient events, or events that appear only for a limited amount of time, like supernovae, were extremely difficult to detect with the given technology. However, with the advent of advanced facilities like the Zwicky Transient Facility (ZTF) in Pasadena and the Pan-STARRS survey telescopes, detecting transient events frequently has become commonplace. Recently, a fascinating object has caught worldwide attention: AT2021lwx. You might be blanking out, wondering what the seemingly complicated name stands for, or what has happened in order for it to gain this much popularity.



Caption: The Zwicky Transient Facility at Palomar Observatory (Image credit: IPAC/Caltech)

What is it? Is AT2021lwx a quasar? No. Is it a black hole? No. The truth is, we don't fully know. No host galaxy has been detected. Thus, at the distance of AT2021lwx, the host galaxy would have to be smaller/dimmer than the Milky Way. What we do know is that it's the brightest transient that we've ever detected, with a luminosity of 7×10^{45} erg/s (okay, Big number! Think about 1×10^{38} incandescent lightbulbs, with an average energy consumption of 60 watts per bulb!). So yeah, this is definitely a bright object! Dr. P. Wiseman at the University of Southampton led a [study](#) that concluded that AT2021lwx is likely the result of the "accretion of a large amount of gas (potentially a Giant Molecular Cloud) onto a SMBH (super massive black hole)," as opposed to a tidal disruption event between a SMBH and a star, or the turn on of an active galactic nuclei by the sudden accretion of gas.

News and Notes

2023 Meeting Dates

Lecture Meeting	Board Meeting	PrimeFocus Deadline
Jun. 16	Jun. 19	
Jul. 21	Jul. 24	Jul. 7
Aug. 18	Aug. 21	Aug. 4
Sep. 15	Sep. 18	Sep. 1
Oct. 20	Oct. 23	Oct. 6
Nov. 17	Nov. 20	Nov. 3
Dec. 15	Dec. 18	Dec. 1

Money Matters

As of the last Treasurer's Report on 05/22/23, our club's account balance is \$73,354.19. This includes \$43,139.47 in the H2O Rebuild fund.

TVS Welcomes New Member

TVS welcomes new member Jared Beckner. Please say hello and chat with him during our meetings.

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.

June 24: Del Valle Arroyo Staging Area, just past 5055 Arroyo Road, Livermore. Set up at 7:30pm, Public observing 8:30-10:00pm, TVS members can continue to observe after the public leaves.

July 5: Taylor Family Camp Go Beyond, 5555 Arroyo Rd., Livermore, Set up at 8:00pm, Observing 9:00-10:30pm. The campers are immunocompromised. All volunteers must be fully vaccinated and boosted for COVID-19, and will be subject to an onsite COVID test.

H2O Rebuild Update

Excavation and form building will be performed the week of

June 12. Then, on June 19, 10 cubic yards of cement will be delivered and poured. After the foundation has cured, the observatory building will be constructed using H-Blocks.

Barcroft High Altitude Star Party

Reservations for the Eastbay Astronomical Society's Barcroft High-Altitude Star Party are now open to members of the EAS, the Tri-Valley Stargazers, and the Mount Diablo Astronomical Society clubs. This year's event will be held from Sunday, August 13 through noon on Saturday, August 19 (with departure by noon on Saturday). That's six nights!

Before sending payments for reservations (\$90 per night, per person), even if you've been there before, please FIRST contact Don Saito (barcroft@eastbayastro.org) to ensure the dates you wish to attend are available. You will also be asked to read the Barcroft Writeup, as it provides the information you'll need to have a safe, comfortable stay, and what is expected of guests to this University of California research facility.

Please visit: [East Bay Astronomical Society - Barcroft High Altitude Star Party](https://www.eastbayastro.org/barcroft-high-altitude-star-party)

Calendar of Events

June 16, 17, 23, 24, 30, July 1, 7, 8

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. Conditions can be unique to Chabot because of its unique location in Joaquin Miller Park. Before your visit, check out the [Weather Station](https://www.chabot.space/weather-station) to see the current conditions at Chabot.

For more information, see:

<https://chabot.space/events/events-listing/>

June 21, 7:00pm

What: Earth to Earth, Ashes to Ashes, Dust to Dust - the

continued on p.3

News and Notes (con't)

Birth and Death of Worlds
Who: Dr. Eugene Chiang (UC Berkeley)
Where: Foothill College, Smithwick Theater, 12345 El Monte Rd, Los Altos Hills, CA 94022
Cost: Free

For centuries we have known that Earth is only one of multiple worlds orbiting the Sun. Near the turn of the 21st century we discovered that our solar system is but one of countless others. Where did these planets come from? What are their fates, and ours? Dr. Chiang will describe the life cycle of planets, how they are born and die and are born again. The story follows microscopic grains of dust, from the dark and icy clouds of the Milky Way, to the fiery winds from planets burning in the glare of their stars.

For more information, see: <https://foothill.edu/astronomy/>

June 22, 6:00pm

What: Eclipses and Earth Science with the GLOBE Program
Who: Kristen Weaver (NASA)
Sponsor: NASA Night Sky Network
Online: <https://youtube.com/live/Uwrm-5ZTZ11>

Energy from the Sun warms our planet, and changes in sunlight can also cause changes in temperature, clouds, and wind. What happens when the Sun is blocked by the Moon during an eclipse? How will the eclipse affect these solar-powered processes? You can observe and report on these atmospheric changes with GLOBE Eclipse, a temporary tool in the GLOBE Observer app. In this webinar you will learn how the app works and the types of data you can collect, as well as supplemental

resources and materials available to support your programming during the upcoming solar eclipses.

For more information, see:

https://nightsky.jpl.nasa.gov/news-display.cfm?News_ID=707

June 27, 7:15pm-9:00pm

What: The James Webb Space Telescope: Conquering the Observable Universe
Who: Tim Thompson (JPL, Retired)
Where: Lindsay Wildlife Experience Community Room, 1931 First Avenue, Walnut Creek, CA 94597
Cost: Lecture: Free, see link below for parking info

No details available.

For more information, see: nightsky.jpl.nasa.gov/event-view.cfm?Event_ID=125700

July 7, 6:00pm-10:00pm

What: First Friday: Lifecycle of the Stars
Who: Chabot Staff
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: \$15 Adults, \$10 kids/seniors, \$5 Members

Join us for an evening of learning about the stellar processes that have shaped the evolution of galaxies and planetary systems as we explore the birth of stars.

Stars are born within the clouds of dust scattered throughout galaxies. From nebulas to supernovas and all the stages in

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TVS E-Group

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

Calendar of Events (con't)

between, you'll learn about the stars of the summer sky, how they are formed and evolve over their lifecycle.

Spend an evening that the whole family will enjoy with programs that include conversations with our expert astronomers, demonstrations on ultra-violet light and star formation, and hands-on activities like solar system bracelets, star life cycle crafts and more!

For more information, see:

<https://chabotspace.org/events/events-listing/>

July 15, 11:00am-2:00pm

What: Investigating Space: Revealing Star Formations
With The James Webb Space Telescope

Who: Chabot Staff

Where: Chabot Space and Science Center, 10000 Skyline
Blvd. Oakland, CA 94619

Cost: Included with General Admission

Explore the James Webb Space Telescope, which is the most ambitious, complex, and pioneering mission embarked upon by NASA, its international partners, and the Space Telescope Science Institute. In the short time this pioneering infrared space telescope has been operating it has expanded our knowledge of the lifespan and variety of star formations. Hear from the scientists who helped build and design it and the astronomers who are using it for research. Watch a Live Science theater show, see interactive astronomical demonstrations and hands-on activities fun for the whole family.

For more information, see:

<https://chabotspace.org/events/events-listing/>

July 17, 7:30pm

What: How the James Webb Space Telescope is
Transforming Astronomy

Who: Dr. Stefanie Milam (NASA/GSFC)

Where: Golden Gate Park, 55 Music Concourse Drive,
San Francisco

Cost: Members and Seniors \$12, Guests \$15

Since the first public release of images obtained with the James Webb Space Telescope in July 2022, this observatory has been pushing the current state of knowledge from the farthest reaches of the Universe to some of the closest objects we can observe in the Solar System. The detection of the first galaxies after the Big Bang was the driver for the massive space telescope—and although that goal remains the quest of many astronomers, JWST has also contributed to new understandings about extrasolar planets, star formation and evolution, and phenomena much closer to home.

We are now seeing the Universe, the Milky Way Galaxy, and the Solar System in a whole new light! This presentation will

highlight some of the spectacular discoveries already being made with JWST in its first year of science.

For more information, see: [Benjamin Dean Astronomy Lecture](#)

July 18, 6:00pm

What: Europa Clipper Update

Who: Dr Cynthia B. Philips

Sponsor: NASA Night Sky Network

Online: <https://youtube.com/live/RnnLJBLRBCA>

No details available.

For more information, see:

https://nightsky.jpl.nasa.gov/news-display.cfm?News_ID=707

AT2021LWX (con't)

Why is this significant to us? AT2021lwx is significant to us for various reasons: one, we haven't observed another transient that shines for nearly as long as this one does. For context, AT2021lwx has been shining brightly for 3 years compared to a few months for most supernovae. Second, this event occurred about 8 billion years ago (redshift factor or $z=0.9945$), which means that the universe was still relatively young when this event occurred. This brings up a multitude of questions: (1) Which conditions were present in the early universe which allowed for this much energy to be released? (2) Is AT2021lwx the first of its kind in the universe? and (3) What kind of work will astrophysicists do to better understand objects like AT2021lwx?

Looking toward the new generation As more and more advanced telescopes and facilities open for observation, the influx of data is making it easier for astronomers to create new algorithms to sort through data. Although AT2021lwx is the first of its kind to be discovered, it will certainly not be the last!

For more information, see:

<https://www.scientificamerican.com/article/largest-ever-cosmic-explosion-has-raged-for-years/>

TVS Astrophotography: The Iris Nebula

By Michaël Uyttersprot



Caption: Michaël Uyttersprot (Mich) imaged the Iris Nebula (NGC7023/LBN 487) using a Williams Optics GT81 using a ZWO ASI2600MM camera. Luminance exposures were 60 x 180 sec and 60 x 30 sec (to get finer stars to overlay the longer L exposures), RGB (20 x 30 sec, each).

What's Up

By Ken Sperber (adapted from S&T)

All times are Pacific Daylight Time

June

- 13 Tue Venus visits the Beehive Cluster (M44) with Mars $\sim 6^\circ$ to their upper left (Evening)
- 14 Wed The crescent Moon and Jupiter rise in tandem, separated by $\sim 2^\circ$ (Morning)
- 16 Fri The thin crescent Moon rises in the ENE, trailing the Pleiades (M45) and preceding Mercury (Dawn)
- 17 Sat New Moon (9:37pm)**
- 19 Mon The Moon forms a triangle with Castor and Pollux low in the WNW (Dusk)
- 21 Wed Northern Hemisphere Summer Solstice (10:58am)**
- 21 Wed The crescent Moon, Venus, and Mars form a tight triangle (Dusk)
- 22 Thu The Moon is $\sim 5.5^\circ$ to the right of Regulus, with Mars and Venus to their lower right (Evening)
- 26 Mon First-Quarter Moon (12:50am)**
- 27 Tue In the SSW, the Moon is $\sim 3^\circ$ to the upper left of Spica (Dusk)
- 28 Wed In the west, Mars and Venus are separated by $\sim 3.5^\circ$ (Evening)
- 30 Fri In the south, the Moon is $\sim 2.5^\circ$ right of Antares (Evening)

July

- 1 Thu In the west, Venus and Mars are $\sim 3.5^\circ$ apart (Dusk; see p. 46 of July S&T)
- 3 Mon Full Moon (4:39am)**
- 6 Thu Earth at aphelion, farthest from the Sun: 3.4% farther than at January perihelion
- 6 Thu In the ESE, the waning gibbous Moon and Saturn rise in tandem, separated by $\sim 3^\circ$ (Evening)
- 9 Sun Last-Quarter Moon (6:48am)**
- 9 Sun In the west, Mars and Regulus are separated by $\sim 1^\circ$, with Venus $\sim 4.5^\circ$ to their lower right (Dusk)
- 11 Tue In the east, the rising crescent Moon leads Jupiter's rise above the horizon by $\sim 6^\circ$ (Morning)
- 12 Wed In the east, Jupiter leads the rising crescent Moon by $\sim 6^\circ$ (Morning)
- 13 Thu In the ENE, the Pleiades (M45) lead the rising crescent Moon by $\sim 2^\circ$ (Morning)
- 17 Mon New Moon (11:32am)**
- 19 Wed Near the western horizon, the crescent Moon, Mars, Venus, and Mercury form a rhomboid (Dusk)
- 20 Thu In the west, the Moon, Venus, and Mars form a triangle near Regulus (Dusk)
- 22 Sat In the west, Mars, Venus, and Mercury arc around Regulus (Dusk)
- 24 Sun In the WSW, the Moon and Spica, separated by $\sim 2^\circ$, sink toward the horizon (Evening)
- 25 Mon First-Quarter Moon (3:07pm)**
- 28 Thu In the west, Mercury and Regulus are separated ~ 10 arc minutes. Use binoculars for the best view (Dusk)
- 28 Thu In the SSW, the Moon is $\sim 5^\circ$ left of Antares (Evening)
- 30 Sat The Southern Delta Aquariid Meteor Shower peaks on Saturday morning

NASA Night Sky Notes



Look Up in the Sky – It’s a Bird

By Theresa Summer

Bird constellations abound in the night sky, including **Cygnus**, the majestic swan. Easy to find with its dazzling stars, it is one of the few constellations that look like its namesake and it is full of treasures. Visible in the Northern Hemisphere all summer long, there’s so much to see and even some things that can’t be seen. To locate Cygnus, start with the brightest star, **Deneb**, also the northeastern most and dimmest star of the Summer Triangle. The Summer Triangle is made up of three bright stars from three different constellations – read more about it in the September 2022 issue of Night Sky Notes. “Deneb” is an Arabic word meaning the tail. Then travel into the triangle until you see the star **Albireo**, sometimes called the “beak star” in the center of the summer triangle. Stretching out perpendicular from this line are two stars that mark the crossbar, or the wings, and there are also faint stars that extend the swan’s wings.

From light-polluted skies, you may only see the brightest stars, sometimes called the Northern Cross. In a darker sky, the line of stars marking the neck of the swan travels along the band of the **Milky Way**. A pair of binoculars will resolve many stars along that path, including a sparkling open cluster of stars designated **Messier 29**, found just south of the swan’s torso star. This grouping of young stars may appear to have a reddish hue due to nearby excited gas.



Caption: Look up after sunset during summer months to find Cygnus! Along the swan’s neck find the band of our Milky Way Galaxy. Use a telescope to resolve the colorful stars of Albireo or search out the open cluster of stars in Messier 29. Image created with assistance from Stellarium: stellarium.org

Let’s go deeper. While the bright beak star Albireo is easy to pick out, a telescope will let its true beauty shine! Like a jewel box in the sky, magnification shows a beautiful visual double star, with a vivid gold star and a brilliant blue star in the same

field of view. There’s another marvel to be seen with a telescope or strong binoculars – the Cygnus Loop. Sometimes known as the **Veil Nebula**, you can find this supernova remnant (the gassy leftovers blown off of a large dying star) directly above the final two stars of the swan’s eastern wing. It will look like a faint ring of illuminated gas about three degrees across (six times the diameter of the Moon).

Speaking of long-dead stars, astronomers have detected a high-energy X-ray source in Cygnus that we can’t see with our eyes or backyard telescopes, but that is detectable by NASA’s Chandra X-ray Observatory. Discovered in 1971 during a rocket flight, Cygnus X-1 is the first X-ray source to be widely accepted as a black hole. This black hole is the final stage of a giant star’s life, with a mass of about 20 Suns. Cygnus X-1 is spinning at a phenomenal rate – more than 800 times a second – while devouring a nearby star. Astronomically speaking, this black hole is in our neighborhood, 6,070 light years away. But it poses no threat to us, just offers a new way to study the universe.



Caption: While the black hole Cygnus X-1 is invisible with even the most powerful Optical telescope, in X-ray, it shines brightly. On the left is the optical view of that region with the location of Cygnus X-1 shown in the red box as taken by the Digitized Sky Survey. On the right is an artist’s conception of the black hole pulling material from its massive blue companion star.

Credit: NASA/CXC chandra.harvard.edu/photo/2011/cygx1/)

Check out the beautiful bird in your sky this evening, and you will be delighted to add Cygnus to your go-to summer viewing list. Find out NASA’s latest methods for studying black holes at www.nasa.gov/black-holes.

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.