The Los Angeles Astronomical Society

October, 2022
Volume 96, Issue 10

THE BULLETIN

In This Issue

"Science Night" is a fun-filled and educational public event hosted by the LAAS every October at the Garvey Observatory. All club members are invited to participate as guests or volunteers. Put on your favorite Halloween-themed outfits and stop by Garvey for a spook'tacular evening.

Learn more about this event by viewing the flyer on Page 3.

Upcoming Club Events

Board Meeting: Oct. 5

General Meeting: Oct. 17

Dark Sky Night: Oct. 22

No Family Night Scheduled

Please send articles of interest and images to communications@laas.org

Update Your Contact Information

Please send any contact info changes to the club secretary at

secretary@laas.org.

Garvey Nights -The Garvey Ranch Observatory is open to the public every Wednesday night from 7 PM to 10 PM, weather permitting. Masks are required inside the facilities.

WE ARE HAVING A STAR PARTY

Los Angeles Astronomical Society (LAAS) and Mountain High Resort is sponsoring a free public Star Party for the residents of the Tri-Community area on Saturday Evening October 1, from 7:00-10:00 PM at the North Lodge Resort parking lot, near Table Mountain Campground.

LAAS will supply numerous telescopes set up in the parking lot. The highlights in the sky for the evening are the Moon, Saturn and Jupiter and other bright celestial objects.

cbyrom484@yahoo.com

You're Invited To

SCIENCE NIGHT

A Safe Place For Space

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COLUMBIA MEMORIAL SPACE CENTER
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Saturday
October 29th
3PM - 9PM

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FREE EVENT!!!

For More Info Call
(213) 673 7355

Hosted by The Los Angeles Astronomical Society

www.LAAS.org www.safeplaceforspace.org

60 and 100 Nights Schedule for 2022

Mt. Wilson Observatory

Session Schedule - 2022

The dates above are **all** scheduled on Saturday nights and are **all** half-night events:

THE LAST TWO SESSIONS FOR 2022

Oct. 29

Nov. 19

The Cost per person, per session:

60 Inch Night - $65.00

100 Inch Night - $145.00 (Booked/Waiting List only)

There will be 20 people, per session.

How to Make a Reservation?

Please contact Darrell Dooley BEFORE you pay for your reservation.

Darrell is our Mt. Wilson Coordinator and the ONLY contact available.

Darrell's Email Address:

Mtwilsoncoordinator@laas.org

Darrell will answer all of your questions and concerns.

Reserve your spot by paying by credit cards or PayPal using the following link:

https://fs30.formsite.com/LAAS/MtWilson/index.html

Learn more about these incredible events by visiting Mt. Wilson Observatory's website:

https://www.mtwilson.edu/60-telescope/

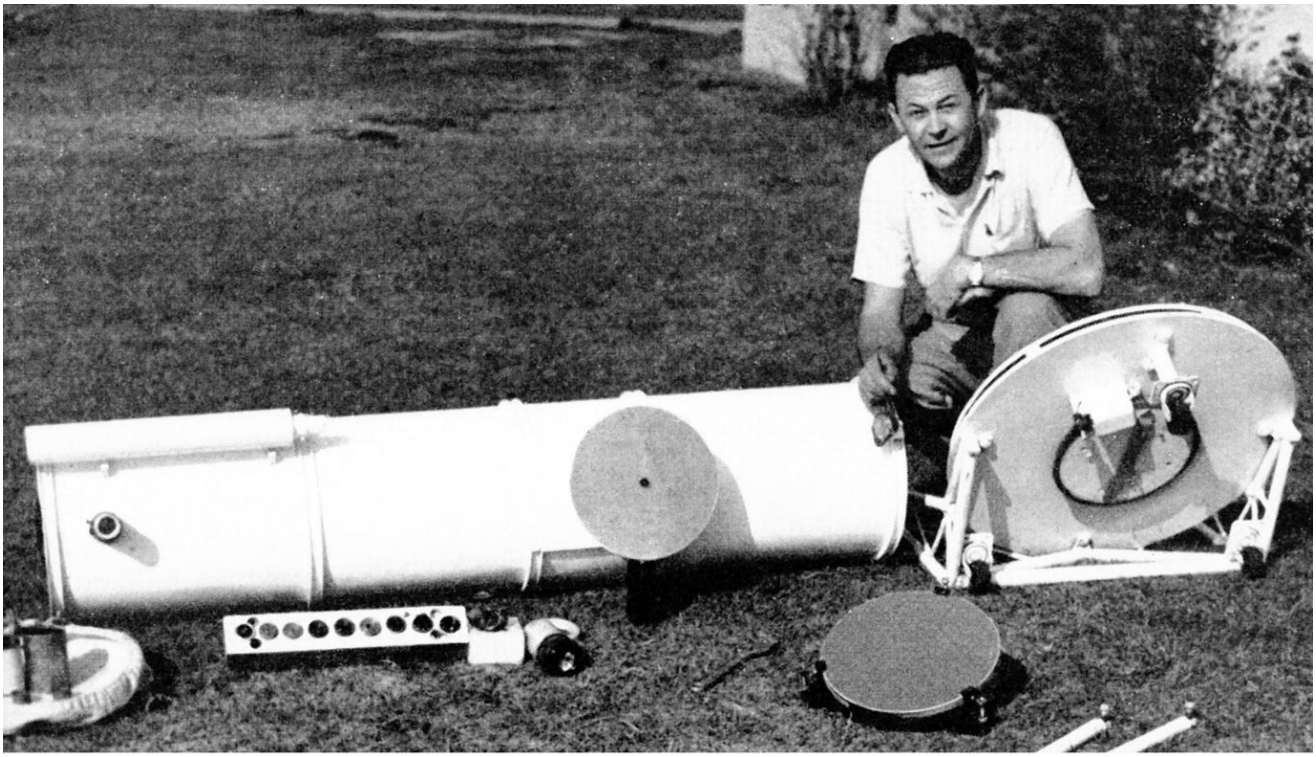
https://www.mtwilson.edu/100-telescope-observing/

THE LAAS, SPUTNIK AND PROJECT MOONWATCH

by Lewis Chilton, LAAS Historian

Project Moonwatch (also known as Operation Moonwatch or, simply, Moonwatch) was an amateur science program initiated by the Smithsonian Astrophysical Observatory (SAO) in 1956. The SAO organized Moonwatch as part of the International Geophysical Year (IGY). Its initial goal was to enlist the aid of amateur astronomers and other citizens who would help professional scientists spot and track the first artificial satellites. Until professionally manned optical tracking stations came on-line in 1958, this network of amateur scientists and other interested citizens played a crucial role in providing orbital information on the world's first man-made satellites.

Clarke Harris, who joined the LAAS in 1950 and was its president in 1954, was appointed by the LAAS Board of Directors in 1956 to head a Project Moonwatch team composed of member volunteers. In November, Harris announced that the 7-Up Bottling Company was eager to host and finance a Moonwatch station on the roof of its building at 53rd and Alameda streets in the city of Vernon.



Clarke Harris, a talented telescope maker, is shown with one of his twin 12-inch reflectors in 1955. LAAS president in 1954, he volunteered to head the club's Project Moonwatch team in 1956. (This image appeared in the March, 1956 *Sky & Telescope* magazine, p. 229.)

Although LAAS records from the 1950s are spotty at best, they nevertheless provide us with two actual snapshots of LAAS participation in the Moonwatch program (see images below). LAAS Moonwatch team members, totaling twenty and headed by Harris, included Leif Robinson, John Gothard, James Grill, Fred Eiserling, Pat Lowry, Jack Eastman, Ed Edwards, Mike Gardner, Robert Heath and Carl DuNah, Jr.

I

n April, 1957, Harris announced that Moonwatch telescopes would be purchased from the Edmund Scientific Company, and by September the satellite observing station was nearly completed.

In a recent email, Jack Eastman expressed kudos to 7-Up for ponsoring the LAAS Moonwatch team and believes the team probably drank its weight in 7-Up. Jack couldn't recall what and how many observations were made over the time they had this facility in operation, but a great time was had by all!

Mike Gardner's memory was better. He recalled in an email that theteam was perched atop the 7-Up building in Los Angeles and that anumber of participants were or had been members of the [Manhattan Beach] Mira Costa High School astronomy club [Jack Eastman, Ed Edwards, Pat Lowry, and Mike Gardner].

Mike informs us that there were 8 to 10 small telescopes deployedalong the central meridian (CM) of the sky, each pointing to a different portion of it, with a bit of overlap between adjacent telescopes. Each telescope reached per-haps 8 th or 9 th magnitude and had a single crosshair aligned with the CM. With a volunteer manning each scope,the region of the sky where Sputnik was expected to cross the CM had complete coverage..

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OPTICS: The Satellite Scope has two important optical characteristics: A wide (51-mm.) diameter, low-reflection-coated objective lens. A six-element extremely wide-field, coated Erfle eyepiece that, in combination with the objective, gives 5.5 power with a big 12° field and over 7-mm. exit pupil.

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Mike continued, "Our job as observers was to shout out a single word if we saw Sputnik in our telescopes. When the satellite first entered the telescope's field of view, we were to shout 'SEE.' If it transited the crosshairs, we were to shout 'CENTER,' and whether or not it transited the crosshairs, we were to shout out 'SAW' as it exited the field of view."

"I still remember the night that Sputnik came into my [telescope's field of] view and I observed all three events." Another observer close by shouted out SEE and SAW but not CENTER because Sputnik hadn't transited his crosshairs." A tape recorder captured the voices of the volunteers during the Sputnik flyovers as WWV time signals were simultaneously recorded.

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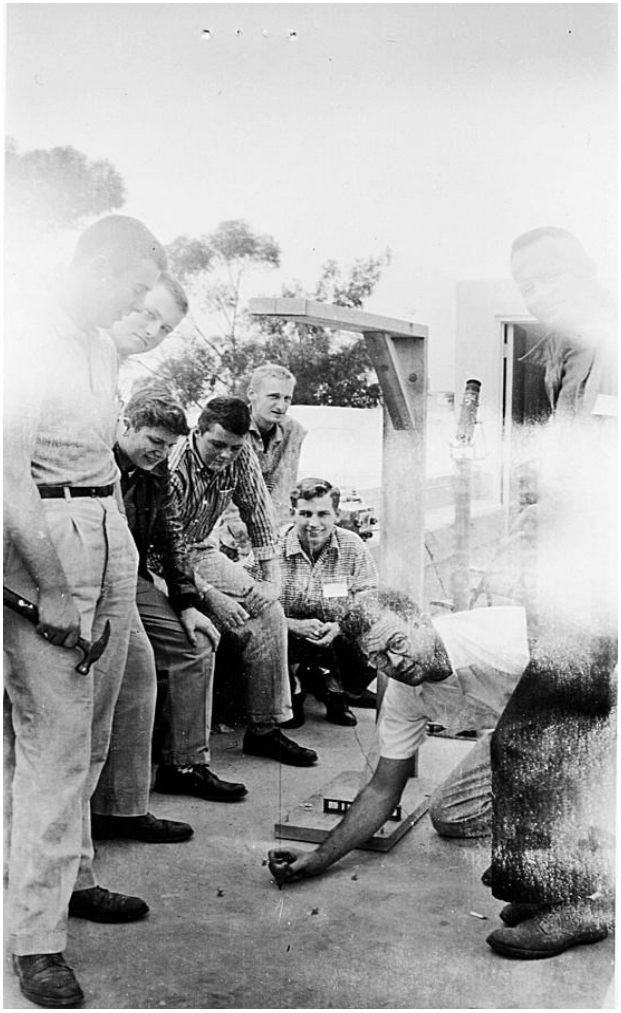


Both Mike and Jack recalled the night they and others of the team witnessed two airplanes collide in midair. At 7:13 p.m. on Saturday, February 1, 1958, after completing their observations of Sputnik, they saw a flash in the sky to the southeast below the nearly full moon. Two military aircraft had collided over Santa Fe Springs only about 10 miles away resulting in the loss of many lives. It was national front-page news the following day.

In March of 1958, with professionally manned tracking stations employing the new Baker-Nunn Satellite Tracking Cameras replacing the volunteers of Project Moonwatch, Harris announced that the LAAS Moonwatch team would soon be disbanded. Although a final date was not mentioned, an article by LAAS vice-president Leif Robinson in the July, 1958 *Griffith Observer magazine infers that the Moonwatch operation was still ongoing when he described - in the present tense - that the LAAS Moonwatch station is entirely manned by LAAS volunteers, sometimes 'til 5 o'clock in the morning.*

Could the LAAS Moonwatch team of 1957-1958 have foreseen the day, some 64 years later, when Elon Musk's Starlink satellites would nearly cover the sky?

The James Webb Telescope

By Michael Gardner

Wow! The James Webb Space Telescope (JWST) gives us such amazing pictures. People are asking, "Why haven't we seen anything like these before?" Let's dig into that question a bit.

You've seen rainbows in the sky with their colors spread from red to violet. That's one way nature has of showing us the composition of the white light we see. But seen another way, those rainbow colors are the limit of our visual acuity. The visible light that humans share is only a tiny portion of all the light or energy (those are equivalent) produced by our sun, the stars and other objects in the universe.

Light travels in waves. These waves resemble the motion of a snake moving on the sand, or waves in the ocean. For some light waves, the distance between one peak to the next may be many miles long, yet for others that distance is but a small fraction of the diameter of the atom. On that latter scale, the portion of light we humans see in the visual range is less than the diameter of a human hair. Tell that to the person who cuts and arranges your hair the next time you see them.

Now, think about that red portion of the rainbow spectrum I mentioned above. The Webb Telescope collects light much redder than we humans can see. These waves are much longer than red visible light. We can feel and even emit this "light;" which we call heat. The optical range for the Webb telescope includes the near and mid infrared portion of the electromagnetic spectrum, EMS. For comparison, the Hubble space telescope captures light in the range of the near ultraviolet, through the visual, to the near infrared region. These longer wave lengths the Webb telescope sees bypasses the dust and gas in the universe that the Hubble telescope observes

Another difference between the two telescopes is in the size of their primary mirrors. For astronomers, it is not the diameter that's key, but rather the mirror's surface area. The Webb telescope is nearly six times larger in surface area and one hundred times more powerful than the Hubble Telescope. This allows the JWST to see much fainter objects, and therefore objects further away. Hopefully, this will enable us to see far back in time, when the first stars and galaxies were forming, and the beginning of the universe, 13.7 billion years ago

The designers and builders of the Webb telescope had to overcome many optical and engineering obstacles, the understatement of this article. I want to tell you about two of those obstacles. First, crafting an optical surface that would reflect only infrared light; and second, positioning the telescope where it could capture the infrared light so it could do the science.

Each of the eighteen hexagonal, six-sided, mirror segments are made from beryllium, a strong, lightweight metal, and each segment is coated in gold. Why gold? The gold surface nicely reflects the infrared light, and gold adheres well to the beryllium. The weight of all the gold used in coating the twenty-five square meter surface was a bit over forty-five grams, or about the weight of a golf ball.

The back side of all eighteen mirror segments were ground away, leaving the gold-plated beryllium surface just a few millimeters thick. The grinding was done to greatly reduce the overall weight of the roughly 6.5-meter diameter of the whole Webb telescope mirror. Each of the eighteen mirrors weighs about 46 pounds on Earth.

The other problem for the Webb team was finding a stable location in space cold enough for the telescope to function properly. The JWST is a heat-seeking machine, and that means heat other than what itself has. If the Webb is over heated then it becomes an expensive heap. There is an instrument onboard that maintains the Webb telescope at minus 266 degrees Celsius, just a little above absolute zero (kelvin) or −273.15 °C.

Continued on next page

The Webb is in orbit, circling about one million miles from our planet. It is positioned along a straight line, beginning at the sun's center, passing through Earth's center, and extending one million miles beyond that, where it remains in near stable orbit, out where the ambient temperature is already cold, but still needs the help of the onboard instrument. If you're curious, or even if you're not, this stable point is called the Second Legrange point, L_2, a special-case solution to the three-body orbiting problem where two of the three bodies, sun and earth, greatly overwhelm the mass of a third body, the Webb telescope.

We have just received the first few pictures from the JWST. They have all been "WOW" reactions. Check out the latest results from the NASA web site listed below. Keep looking up.

Credits: NASA, ESA, CSA, and STScI

Click here to earn more about this image

Follow these links to learn more about the James Webb Space Telescope:

Mikulski Archive for Space Telescopes

First Images from the JWST:

https://www.nasa.gov/webbfirstimages

Fomalhaut: Not So Lonely After All

By David Prosper

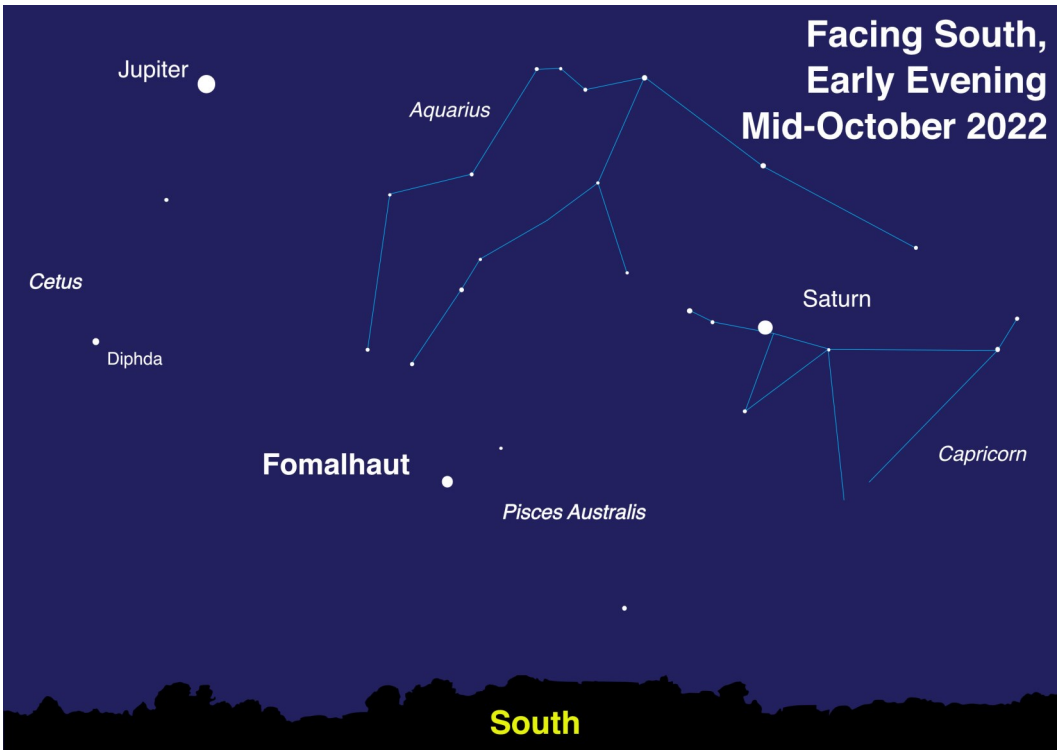
Fall evenings bring a prominent visitor to southern skies for Northern Hemisphere observers: the bright star Fomalhaut! Sometimes called “The Autumn Star,” Fomalhaut appears unusually distant from other bright stars in its section of sky, leading to its other nickname: “The Loneliest Star.” Since this star appears so low and lonely over the horizon for many observers, is so bright, and often wildly twinkles from atmospheric turbulence, Fomalhaut’s brief but bright seasonal appearance often inspires a few startled UFO reports. While definitely out of this world – Fomalhaut is about 25 light years distant from us – it has been extensively studied and is a fascinating, and very identified, stellar object.

Fomalhaut appears solitary, but it does in fact have company. Fomalhaut’s entourage includes two stellar companions, both of which keep their distance but are still gravitationally bound. Fomalhaut B (aka TW Piscis Austrini, not to be confused with former planetary candidate Fomalhaut b*), is an orange dwarf star almost a light year distant from its parent star (Fomalhaut A), and Fomalhaut C (aka LP 876-10), a red dwarf star located a little over 3 light years from Fomalhaut A! Surprisingly far from its parent star – even from our view on Earth, Fomalhaut C lies in the constellation Aquarius, while Fomalhaut A and B lie in Piscis Australis, another constellation! – studies of Fomalhaut C confirm it as the third stellar member of the Fomalhaut system, its immense distance still within Fomalhaut A’s gravitational influence. So, while not truly “lonely,” Fomalhaut A’s companions do keep their distance.

Fomalhaut’s most famous feature is a massive and complex disc of debris spanning many billions of miles in diameter. This disc was first detected by NASA’s IRAS space telescope in the 1980s, and first imaged in visible light by Hubble in 2004. Studies by additional advanced telescopes, based both on Earth’s surface and in space, show the debris around Fomalhaut to be differentiated into several “rings” or “belts” of different sizes and types of materials. Complicating matters further, the disc is not centered on the star itself, but on a point approximately 1.4 billion miles away, or half a billion miles further from Fomalhaut than Saturn is from our own Sun! In the mid-2000s a candidate planetary body was imaged by Hubble and named Fomalhaut b. However, Fomalhaut b was observed to slowly fade over multiple years of observations, and its trajectory appeared to take it out of the system, which is curious behavior for a planet. Scientists now suspect that Hubble observed the shattered debris of a recent violent collision between two 125-mile wide bodies, their impact driving the remains of the now decidedly non-planetary Fomalhaut b out of the system! Interestingly enough, Fomalhaut A isn’t the only star in its system to host a dusty disc; Fomalhaut C also hosts a disc, detected by the Herschel Space Observatory in 2013. Despite their distance, the two stars may be exchanging material between their discs - including comets! Their co-mingling may help to explain the elliptical nature of both of the stars’ debris discs. The odd one out, Fomalhaut B does not possess a debris disc of its own, but may host at least one suspected planet.

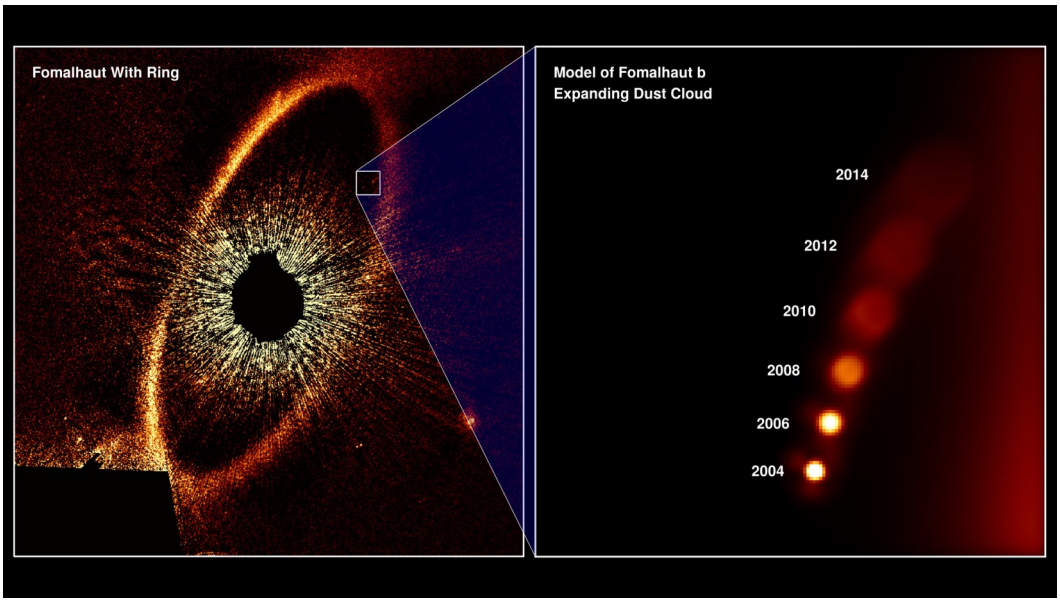
While Hubble imaged the infamous “imposter planet” of Fomalhaut b, very few planets have been directly imaged by powerful telescopes, but NASA’s James Webb Space Telescope will soon change that. In fact, Webb will be imaging Fomalhaut and its famous disc in the near future, and its tremendous power is sure to tease out more amazing discoveries from its dusty grains. You can learn about the latest discoveries from Webb and NASA’s other amazing missions at nasa.gov..

Astronomers use capital letters to label companion stars, while lowercase letters are used to label planets.



Sky map of the southern facing sky for mid-latitude Northern Hemisphere observers. With Fomalhaut lying so low for many observers, its fellow member stars in the constellation Piscis Australis won't be easily visible for many without aid due to a combination of light pollution and atmospheric extinction (thick air dimming the light from the stars). Fomalhaut is by far the brightest star in its constellation, and is one of the brightest stars in the night sky. While the dim constellations of Aquarius and Capricorn may also not be visible to many without aid, they are outlined here. While known as the "Loneliest Star," you can see that Fomalhaut has two relatively close and bright visitors this year: Jupiter and Saturn!

Illustration created with assistance from Stellarium



The magnificent and complex dust disc of the Fomalhaut system (left) with the path and dissolution of former planetary candidate Fomalhaut b displayed in detail (right).

Image credits: NASA, ESA, and A. Gáspár and G. Rieke (University of Arizona)
Source: https://www.nasa.gov/feature/goddard/2020/exoplanet-apparently-disappears-in-latest-hubble-observations

Public Star Party At Mt. Wilson Observatory

By Mark McGuire

Thanks to everyone who volunteered up at Mount Wilson this past Saturday, It was my first time ever up to MWO.
Had the best time with fantastic views of Saturn and Jupiter, the best I had ever seen. So many wonderful people and it was great to reconnect after all we have been through.

Image Credit: Scott McGuire/LAAS– Aug. 2022

Learn more about Mt. Wilson Observatory at

www.mtwilson.edu

Monthly Sky Report for October

By Dave Nakamoto

Saturn continues its appearance in the evening sky, followed by Jupiter.

Saturn rises at 4:20 p.m., PDT, on the 1st, and at 2:22 p.m., PDT, on the 31st, so it's available almost all night long. It appears as a fairly bright "star" in the east as evening starts. The rings are obvious at low magnifications. Higher magnifications are needed to see the Saturnian moons. Titan is the brightest, followed by Rhea, Tethys, and Dione.

Technically, Neptune rises next at 5:56 p.m., PDT, on the 1st and at 3:56 p.m., PDT, on the 31st. A telescope is needed to show it, as it's over six times fainter than what the eye can see. For those interested in trying to see the planet, Neptune is located at Right Ascension 23h 37m and a declination of -3° 47'. You'll need high magnifications of 100x or more because the disk is very small.

Jupiter is the next planet visible to the unaided eye. The planet rises at 6:22 p.m., PDT, on the 1st and at 3:15 p.m., PDT, on the 31st. It's the brightest "star" in the east as evening starts. Even a small telescope will show the disk and perhaps the four bright Galilean moons, but larger telescopes will show more on the Jovian disk. Sometimes a Galilean moon passes in front of Jupiter, and then it and perhaps its shadow will be visible on the Jovian disk.

Uranus rises at 8:23 p.m., PDT, on the 1st and at 6:22 p.m., PDT, on the 31st. On the 15th, Uranus is located at Right Ascension 3h 2m and declination +16° 48'. Like Neptune, it is very small, so even with high magnifications its disk is barely visible.

Mars is next to rise at 10:20 p.m., PDT, on the 1st, and at 8:39 p.m., PDT, on the 31st. It slowly approaches the earth until on December 7th it will be only 38.6 million miles away. As it approaches earth, Mars will slowly appear larger.

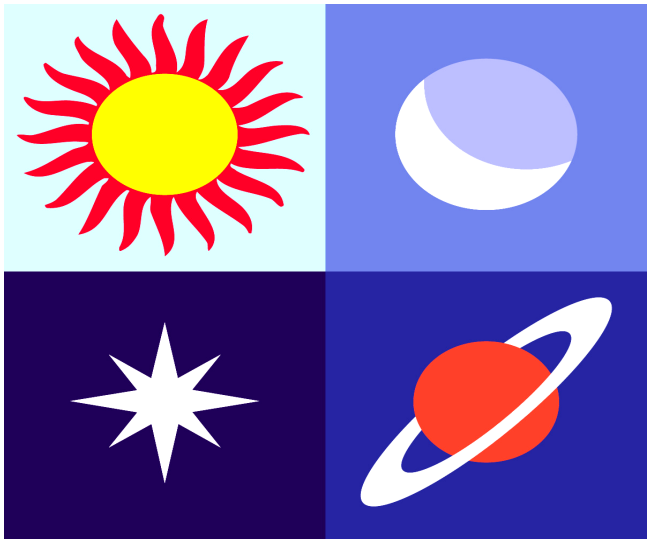
Mercury is next to rise in the east, but very early in the morning. On the 1st, Mercury will rise at 5:43 a.m., PDT, and the sun rises at 6:48 a.m., PDT, it will appear during twilight. On the 31st, Mercury rises at 6:47 a.m., PDT, and the sun rises 7:12 a.m., PDT, less than half an hour later, so it will not be visible.

Venus is too close to the sun all month long and cannot be observed. Do not try and see any planet when it is close to the sun as damage to the eyes can result.

The Orionid meteor shower is active from October 2 to November 7. The Orionids peak on the morning of the 21st. The rates will be about 19 meteors per hour. The meteors appear to stream from the area of the upraised club in the constellation Orion the Hunter.

David Nakamoto has been observing the heavens through various scopes since he was in the 5th grade. You can contact Dave by email at:

dinakamoto@hotmail.com.



Almanac

October 7 - **Draconids Meteor Shower.** The Draconids is a minor meteor shower producing only about 10 meteors per hour. It is produced by dust grains left behind by comet 21P Giacobini-Zinner, which was first discovered in 1900. The Draconids is an unusual shower in that the best viewing is in the early evening instead of early morning like most other showers. The shower runs annually from October 6-10 and peaks this year on the the night of the 7th. The first quarter moon will block out all but the brightest meteors this year. If you are patient, you may still be able to catch a few good ones. Best viewing will be in the early evening from a dark location far away from city lights. Meteors will radiate from the constellation Draco, but can appear anywhere in the sky.

October 8 - **Mercury at Greatest Western Elongation.** The planet Mercury reaches greatest western elongation of 18 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the morning sky. Look for the planet low in the eastern sky just before sunrise..

October 9 - **Full Moon.** The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 20:55 UTC. This full moon was known by early Native American tribes as the Hunters Moon because at this time of year the leaves are falling and the game is fat and ready to hunt. This moon has also been known as the Travel Moon and the Blood Moon.

October 21, 22 - **Orionids Meteor Shower.** The Orionids is an average shower producing up to 20 meteors per hour at its peak. It is produced by dust grains left behind by comet Halley, which has been known and observed since ancient times. The shower runs annually from October 2 to November 7. It peaks this year on the night of October 21 and the morning of October 22. The thin, crescent moon will leave mostly dark skies for what should be a good show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Orion, but can appear anywhere in the sky.

October 25 - **New Moon.** The Moon will located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 10:49 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

October 25 - **Partial Solar Eclipse.** A partial solar eclipse occurs when the Moon covers only a part of the Sun, sometimes resembling a bite taken out of a cookie. A partial solar eclipse can only be safely observed with a special solar filter or by looking at the Sun's reflection. This partial eclipse will be best seen in parts of western Russia and Kazakhstan. It will be best seen from central Russia with over 80% coverage

Source: Sea And Sky Reference Guide 2022

Curious about the objects in tonight's sky? Click on the link below to learn more.

Time & Date - Los Angeles, CA.

October 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1 Outreach Downey
2	3	4	5 Board Mtng Garvey Nights	6	7	8
9 Outreach Agoura Hills	10	11	12 Garvey Night	13	14	15
16	17 General Meeting	18	19 Garvey Night	20	21	22 Dark Sky Night
23	24	25	26 Garvey Night	27	28 Outreach Arcadia	29 **Science Night** 60 Inch Night
30	31 					

Meet The New Members

Surendra Adhikari	Bill Chen	Pranil Ghosh	Holly Miller	Toby Heller
George Azar	Kang Chua	Rick Gonzalez	Alex Rebollo	Tim Jones
Alfredo Berjarano	Alvaro Donadelli	Catherine Haight	Steve Smith	
Karen Bowland	Shawna Du	Sarine Karadolian	Evita Wagner	**Welcome to all of the new family members, too!!!**
Mark Brower	Preston Dyches	Nick McCarthy	Isabelle Wright	
Simon Cao	Steven Gaffney	Kathy McConkey	Eric Yuan	

LAAS Board Meetings

.Due to the pandemic, all Board Meetings are now held online, live on Zoom. Please check the information posted in the IO Group Forum for any current news related to these meetings. If you wish to attend a board meeting, please send a request to secretary@laas.org for a link to Zoom.

Volunteer Opportunities

Every LAAS member is a volunteer at some point. Some members volunteer to share telescopes with the public, while others tackle administrative duties, help out at our community and public events, or join a club committee. Taking photos at our events and writing articles about events for our club newsletter are great ways to volunteer and become more involved in the LAAS as a member.

Volunteers are always welcome to write articles for our monthly newsletter or share images captured of the night sky. Members are also welcome to come up with new ideas and future activities for the membership which can be shared in Board meetings. If you are artistic and enjoy creating posters or flyers, or printable astro-educational handouts for further star parties, please let us know.

Time To Renew Your Membership?

Please remember to renew your membership once you receive notice from the Club Secretary in your email inbox. The secretary will send you a link to a form created just for you for your renewal.

Please send any new contact information to the club secretary at secretary@LAAS.org.

LAAS Outreach Program

The mission of LAAS is to promote interest in and advance the knowledge of astronomy, optics, telescope making and related subjects. In furtherance of its mission, LAAS conducts public star parties and other outreach events that are intended to enhance the public's understanding of astronomy and its enjoyment and appreciation of the beauty and wonders of our universe.

We provide outreach events at local schools, Griffith Observatory, Mt. Wilson Observatory, various state and county parks, and community events.
Join our Outreach team of volunteers today.
Contact Heven Renteria, our Outreach Coordinator at Outreach@LAAS.org for more information.

Want to include astronomy outreach at your school's science night or open house? Follow the link below to access the request form:

Outreach Request Form

LAAS Club Merchandise

LAAS T-Shirts, Hoodies, mugs, and more!

To find new merchandise from our store, please use the following link: **Shop Here**

Please note all prices listed are subject to change and include all shipping and handling costs. All items will be shipped directly to the address you provide on your order form.

LAAS Hoodie

Amazon Smiles

The LAAS is now listed on Amazon Smiles. When you purchase any goods on Amazon.com, Amazon will donate a small percentage of the funds they receive from you, back to the LAAS. Here's some information to help bring in funds for our club projects:

What is AmazonSmile?

AmazonSmile is a simple and automatic way for you to support your favorite charitable organization every time you shop, at no cost to you, with the added bonus that Amazon will donate a portion of the purchase price to your favorite charitable organization., such as the LAAS!

Learn more by following this link:

http://smile.amazon.com/

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John O'Bryan, Jr.

Astronomy Magazine Discounts

Discounts for astronomy magazines can be found on the internet. Look for the best deals possible. Send a copy of your LAAS membership card with your check or payment to receive a club member discount.

Astronomy magazine

As a member of the Night Sky Network, you may use the above link to renew your Astronomy Magazine subscription (or enter a new subscription) at the club discount rate. If this is a renewal, Astronomy Magazine will match your entered name and address and extend your subscription. For inquiries, please contact Astronomy Magazine customer service & sales at 1-800-533-6644.

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Find astronomy outreach activities by visiting NASA's Night Sky Network:

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