ASTRONOMY CLUB OF TULSA
85 Yrs

OBSERVER

December 2022

Bringing Stars to the eyes of Tulsa since 1937

Editor – John Land

ASTRONOMY CLUB OF TULSA ANNUAL CLUB DINNER NOV 12

A great time of fellowship and fun was had by our members and their families

In this Issue

Astronomy Club Events

Check our website AstroTulsa.com events section for updates

Astronomy Club Meeting - Friday Dec 2 - 7:00 PM - IN PERSON club meetings.
At Jenks High School planetarium 105 E B Jenks OK - Guests Welcome

Guest Speaker Jonathan Fussel from ORU and a preview of new planetarium show "Eclipses Cross America" See EVENT DETAILS

Friday Dec 16 6:00 PM Members Only night * Gate opens after sunset
Open to members and their immediate family

Saturday Dec 17 4:30 to 9:30 PM Guest and Members Night –
Guest requested to RSVP - Gates Open near sunset

Winter Solstice Dec 21 at 3:48 PM - Longest Night of the year !

Astronomy Club Meeting - Friday Jan 6 - 7:00 PM - IN PERSON club meetings.
At Jenks High School planetarium 105 E B Jenks OK - Guests Welcome

Saturday Jan 14 4:30 to 9:30 PM Guest and Members Night –
Guest requested to RSVP - Gates Open near sunset

Friday Jan 20 6:00 PM Members Only night * Gate opens after sunset
Open to members and their immediate family

Our guest speaker will be Jonathan Fussell from ORU. Jonathan is finishing up his studies majoring in molecular biology, and dual minoring in biochemistry and psychology. Jonathan says he has been doing astronomy observing for over ten years. Jonathan is the president of the ORU Astronomy Club which he founded a couple of years ago. He has a fervent interest in the fields of astrobiology, astrochemistry, exoplanet hunting, and star formation. His senior research was on *"The Stellar Nucleosynthesis of Phosphorus as a Biosignature for Life in the Universe"*. "Stellar Nucleosynthesis" is the process by which stars form heavier atoms within their cores. He plans to continue his education toward a PhD in either Astronomy or Astrobiology

As an added attraction, **Dan Zielinski, the director of the Jenks High School Planetarium** has invited us to be the test audience for their **newest production** promoting the two solar eclipses coming to North America in 2023 and 2024. Entitled ***"Eclipses Cross America"*** with narration, score, and art provided by Jenks students… we look forward for December's meeting being the first showing of the planetarium's newest work and welcome any notes that can be given before it goes public in April. Astronomy Club of Tulsa has traditionally been the test audience for Jenks Planetarium's newest productions for several years

President's Message
John Land

Greetings to all our Astronomy Club of Tulsa Members and Guests.

Our annual club dinner was a great success. Forty four members and family enjoyed a time of visiting eating and playing an astronomy trivia quiz. I would like to thank all of you who pitched in to help set up, serve the food and clean up afterwards. There was plenty of Oklahoma Joes BBQ for all to enjoy and many of our members brough delicious desserts. A special thanks goes to board member Cathy Grounds for planning and procurring the decorations and creating the fun astronomy trivia quiz. I also would like to thank Beverly Swift for taking lots of pictures that you can see later in the newsletter. And a special thanks to our Dan Zielinski the Jenks Planetarium director for hosting us and helping us make this all possible.

Work is well under way on putting new metal flashing on the observatory dome. This project is long overdue to fix issues with water blowing into the dome. Thanks to our observatory manager, James Taggart, who has been coordinating with the work crew. If weather cooperates it should be completed by early Decemember.

Our new website design went LIVE November 4th. It has nice bright backgrounds. Easy to read and navigate links. Also the new design is compatible with mobile devices. We still are working on a few kinks and tweaks to make it better but it is much easier to manage than the old site.

This month we will begin planning team meetings for hosting the MidStates regional astronomy convention in June 2023. Volunteers will be needed for work days at the observatory. Publicity about the event, Setting up registration, Planning snacks food for guests, Decorating for our Keynote speaker banquet, contacting astronomy vendors to come to our event and also securing door prizes during the event.

So you can see it is going to take many dedicated volunteers to pull all this together and make this a memoriable event for both our own members and out of town guests.
To volunteer contact astrotulsa.pres@gmail.com

Let us continue our 85 years of
"Bringing Stars to the Eyes of Tulsa since 1937"

John Land - President

Note – See the Treasurer report page 12 for new rates and details to make or renew subscriptions to Sky & Telescope or Astronomy Magazine.

Click on these images to links on the Internet

Good To Stargaze ™

Tulsa National Weather Service

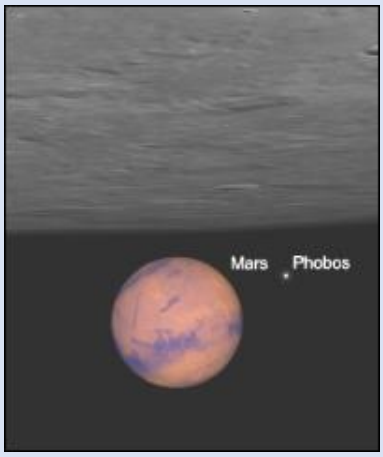
See Website Observation Station for a collection of Interactive Sky Watching Tools
Moon phases - Sun rise & Set - Make your own custom interactive sky chart and more
Great website for printable Finder Charts of Solar System objects https://in-the-sky.org/

December - Moon Phases - - Full Dec 7 - - 3rd Q Dec 16 - - New Dec 23 - - 1st Q Dec 29

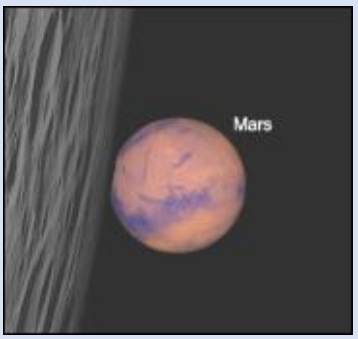
December Planets – We experience our EARLIEST SUNSETS the first week of December as it sets about 5:08 PM each evening. By the end of the month, it sets later but the time of Sunrise is also later. Our **Longest Night Dec 21** has Sunset at 5:12 PM and sunrise on the 22nd at 7:30 AM. **14 Hrs 28 Mins** (*FYI – Sunrise will be 8:30 AM in Dec 2023 if our foolish politicians insist on making Daylight Savings time all year long. Hope they all enjoy starting Rush Hour TWO HOURS before DAWN on icy roads !)*

All FIVE NAKED EYE PLANETS will be visible in December. On Dec 1 **Jupiter** will be just 3O above the moon in the constellation of Pisces. **Saturn** is 40 O lower to the west in Capricorn. At sunset **Mars** is rising in the NE. At magnitude -1.8 it shines like a reddish orange "Christmas beacon in the constellation of Taurus. Watch Mars this month has its retrograde motion carries it westward above the orange star Aldebaran. As the month opens **Venus** and **Mercury** are still hugging the SW horizon at sunset. By Dec 15 you should be able to pick them out with binoculars in the evening twilight about 7 O above the horizon. **Mercury** reaches it greatest evening separation from the Sun on Dec 21 but is still less low in the SW. On Christmas eve look for a thin crescent moon to join the pair of planets about 8O up in the SW. Venus and Mercury are in conjunction 1.5O apart the evenings of Dec 29 & 30. The last week of 2022 you have the opportunity to see all five visible planets in the sky at the same time. Starting with Venus and Mercury low in the SW. Then Saturn and Jupiter moving eastward along the ecliptic. And finally bright Mars shining in the East. The moon passes Saturn on the 26th and Jupiter on the 29th.
If you consult a star chart Neptune and Uranus are still accessible for telescopic viewing.

As I wrote last month **MARS** December 2022 is the best time to observe Mars. It is closest to the Earth at midnight Dec 7th at opposition at mag -1.9 and an apparent diameter of 17.1 arcsec. Patience and persistence are the key to see Mars surface details. Plan several observing sessions now through New Year. **See more about December planet events at EarthSky December 2022**



Lunar Occultation of Mars
Weds December 7



On Weds Dec 7 the Full Moon will pass directly in front of Mars. An event called an Occultation. You'll need to get outside by at least 8:40 PM and start watching as the moon slips closer and closer to Mars. About 8:54 Mars will start to slip behind the moon taking about a minute to do so. Start watching again about 8:35 near the 3 O'Clock positon for it to reappear from behind the moon about 8:40. Since the moon is so close to us, your time will vary a few minutes due to parallax. You can watch naked eye but binoculars of moderate power telescope will enhance the view.

For an annimation and more time details see https://www.shadowandsubstance.com/

Sneezing's Greetings!

By Brad Young

What some call the best part of the observing year has passed us now. From the end of Dog Days on August 11th until November 11th, the period of late summer to Veteran's Day is a great season for astronomy outdoors. In Oklahoma, hot short nights short earlier in the summer can be an issue. But during the glory months of August, September, and October, we have cooler weather with clear blue skies, lower humidity, and plenty of star parties.

Then, sometime after Halloween, we get our real first cold front, often followed by dreary cold rain. Everybody catches a cold. We've all known winter was coming. Slowly each evening we noticed that first Spica and then Scorpius were no longer there in the dusk. At midnight, instead of the Summer Triangle still being up, only the Winter Cross of Cygnus stood in the northwest. Or you noticed the Sun getting lower and setting further south every night. The big jolt came with the change back to Standard Time. But this was just a reminder that we had been fooling ourselves for almost eight months. We humans decided we wanted time to be different and so we gave up sleep to have sunshine deeper into the night. Finally, around Halloween it is obvious we can no longer keep up the charade and have kids walking to school in the dark.

So, is late autumn the end of astronomy? Not necessarily. After we become acclimated to the cold, winter in Oklahoma can often be a great time to observe too. The long nights are sometimes clear as a bell with low humidity producing great transparency. You can start observing right after dinner and be done and in bed by midnight after a long productive session. Think of it as changing from trout fishing to ice fishing. You need different clothing and equipment, but it can be just as enjoyable.

Astronomy during the winter can be a matter of waiting for the right night or looking into alternative methods. For instance, the sun can be a good target for solar astronomy during the winter during the warmest part of the day. Radio astronomy doesn't care what time of day it is. And when it's

just to cloudy or frigid to be outside it's a great time to plan for when the next decent night does arrive so that you'll be prepared to make every moment count when they come. You can reflect on the season just passed and figure out what you enjoyed the most. Are there things you want to do more of next year or do more of right now? Is there any information you need to be prepared for what's next?

Sometimes, nothing beats a warm night under the stars where you can fall asleep in your lawn chair and wake up at dawn was just a slight chill. But there is something to be said for bundling up and going out under the winter sky with the brightest stars and some of the nicest deep sky sights you're going to see. Orion stands high in the south, with all the Fall constellations chock full of galaxies still visible in the West. The Milky Way passes from straight overhead down through Canis Major to the southern horizon. And if you do stay out late, you can see the Big Dipper rising again and Leo tempting you to look for more galaxies. This winter will feature Jupiter and Saturn in the evenings, and Mars at opposition right around the Holidays.

Astronomy doesn't have to be just a warm weather sport.
You can get out and enjoy it even in the off season.

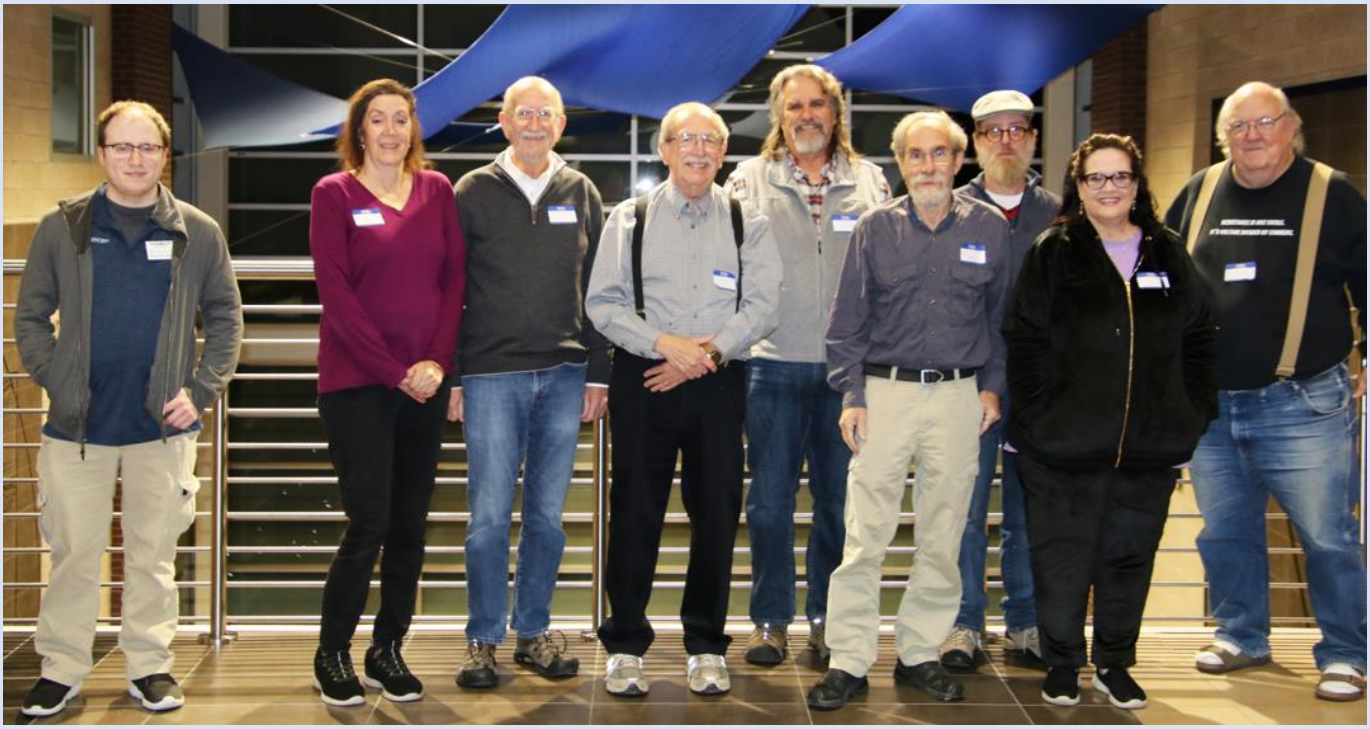
References:

https://www.publicdomainpictures.net/pictures/280000/velka/autumn-trees-and-blue-sky-1538652120RIC.jpg

https://cosmicpursuits.com/2017/winter-milky-way-over-cathedral-rock-sedona-arizona/

https://www.cornwalllive.com/news/cornwall-news/video-shows-childrens-dangerous-walk-215020

Images from our Astronomy Club Dinner



Board & Officers – L > R Bryan Kyle, Cathy Grounds, Don Bradford, John Land, Jerry Cassity, Skip Whitehurst, James Taggart, Tamara Green & Dana Swift

Peter, Chris & Shealyn serving members eager to enjoy the food.

Enjoying eating together

Decorating tables

Club gave a Solar System Globe to Dan

Members broke up into teams based on their Birth Month to solve a challenging astronomy Trivia Quiz

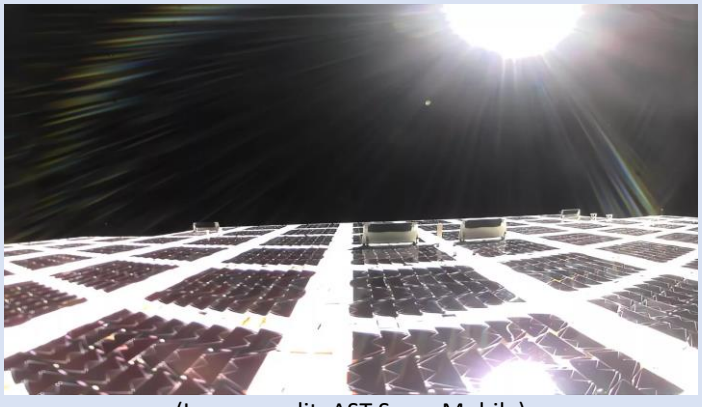
Analyzing the Deployment of Blue Walker 3

By Brad Young

I have the pleasure of being a member of the International Astronomical Union Center for the Protection of Dark and Quiet Skies (CPS). The main purpose of this workgroup is to monitor and advise on the megaconstellations of satellites that are being launched by several entities. The concern in the astronomical community began with the launch of the Starlink satellites. With these and other launches, the number of satellites in low earth orbit have increased dramatically over the past few years, with no sign of slowing.

The possible deleterious effect on optical and radio astronomy is alarming, in that we might be losing our ability to observe using multi-million-dollar telescopes and watch for incoming near-earth objects (NEOs). Early results show little effect. However, those results were based on the relatively faint Starlinks, which were adapted by SpaceX for the express purpose of dimming their appearance. SpaceX has been responsive to the concerns of the astronomy community, but it is unclear if other operators will be as concerned.

Lately, the focus has been the prototype Blue Walker 3 launched in September 2022 by AST Space Mobile and recently fully deployed on orbit. The deployment unfolded an antenna array that is 693 square feet, the size of a small apartment and the largest commercial communications array in low earth orbit.



(Image credit: AST SpaceMobile)

Because of the size of the array, the CPS is concerned that if the entire constellation of Blue Birds (the larger production model) is launched, which totals 168 satellites, the effect on optical and radio astronomy would be perilous.

To quantify the effect, the group has been observing Blue Walker 3 and recording its brightness before and after the deployment of the array. Several observatories and individuals across the globe have monitored the satellite before and after deployment of the array and the news is not good. The pre-deployment satellite appeared as a dim object, usually requiring binoculars to see, on a level with the post-darkening Starlinks.

TABLE ONE BRIGHTNESS CHANGE OBSERVATIONS

UTC Date	UTC Time	Magnitude	Range (km)	Phase	Standard Magnitude
10/3/2022	2:59:45	5.7	1867	128	3.31
10/4/2022	1:08:36	7.4	1110	122	6.35
10/5/2022	2:26:20	4.6	1107	120	3.63
10/7/2022	1:51:15	7.5	1006	123	6.63
10/8/2022	1:33:16	5.9	1048	125	4.87
10/9/2022	1:14:56	5.8	1125	136	4.17
10/10/2022	1:57:04	5.2	1159	138	3.40
10/23/2022	10:48:00	7.0	872	126	6.33
				AVERAGE STANDARD MAGNITUDE	**5.06**
11/12/2022	11:22:00	1.4	644	75	2.61
11/20/2022	0:37:00	1.4	869	79	1.89
11/21/2022	0:21:00	1.8	843	21	2.89
11/22/2022	0:02:22	2.0	771	32	3.23
11/22/2022	23:42:00	2.7	990	99	2.54
11/23/2022	1:21:00	3.6	1199	122	2.39
11/26/2022	0:28:00	3.7	1336	83	3.20
				AVERAGE STANDARD MAGNITUDE	**2.68**

All observations above by author; these calculations use a simplistic model that may be too conservative in predicting the optical behavior of the large array when reflecting light

After deployment of the array, the standard magnitude jumped by a factor of 9. Standard magnitude is a measure of brightness used by astronomers as a basis to compare different satellites. On a well-placed pass, this means Blue Walker 3 will typically appear as bright as a first magnitude star, with only 18 stars in the sky that are brighter. There are only a few other satellites this bright, notably ISS and CSS (the new Chinese Space Station). A press release from the IAU explains the situation further.

But the true scale of the problem is that the production objects (Blue Birds) will be even larger, therefore almost certainly brighter. And there will be 168 of them in orbit. The cell phone system will require at least two of the satellites to be always in your sky to maintain call quality. During the summer, temperate zone areas (where most professional telescopes are installed) will see these crossing the sky nearly all night, requiring constant monitoring of them to avoid ruining images. Since they are 100 times brighter than Starlinks, there is real danger of damaging sensitive CCD and other imaging devices.

Because of these critical issues, the IAU CPS has accelerated its goal to contact AST Space Mobile and find a solution. We are also involved in several other efforts to protect the night sky from what is becoming a real danger. Besides seeking a viable engineering solution to the problem, we are also engaging governments to modernize space policy and licensure to consider the effect of megaconstellations and bright objects. The effect on radio astronomy is also a major unknown, and the CPS is also working to address this issue.

Steps in the right direction include the formation of an office within the FCC (Federal Communications Commission – licensing agent for all satellites in the US) dedicated to space licensure. Previously, there had been no specific group charged with considering the effect on the night sky, only the communications concerns such as frequencies used etc.

The CPS will continue to monitor Starlinks and the Blue Walker / Blue Bird flock. We must also prepare for other systems that have been announced such as Secure Connectivity System by the EU, and Guowang by China. Lessons learned now and systems put in place to determine brightness and work within international law may help mitigate the damage.

If you would like to contribute your observations to the scientific study, consider becoming an affiliated member of the CPS by applying here. Visual reports can be made via SatHub and images collected at Trailblazer. Satflare.com has a report generator and database of observations.

Read my article on how to observe satellites and drive their brightness to a fair accuracy. Or, if you would just like to see Blue Walker 3 for yourself, you can find its passes on Heavens Above and several other sources. If you have any questions about observing the spacecraft or what the CPS is trying to do, be sure to contact me via my website.

A video of Trailblazer passing Deneb by Kevin Fetter

The much beloved Guy Ottewell's Astronomical Calendar 2023 is now available in Digital $ 12 or Print form $ 21

It has 139 pages, and hundreds of illustrations, including charts and 3-D views of space. For each month there are 6 pages, with about 50 events, sky dome, diagram of where the planets are in their orbits, and 20 of the most interesting sky scenes. Then there are several-page sections on the Sun and seasons; the Moon; eclipses; occultations; each planet; asteroids; meteor showers.

Associate Treasurer Report
Mike Blaylock

As November 24, we had 192 members - 45 New members for 2022
We welcome this month's newest members - **Stanley Miller, Ken McWatters, and Michael Smith. Hello and welcome to ACT !**

Have you changed you Contact Information? Email, Phone, Postal Address ?
Please help us to maintain our records by sending an email to AstroTulsa.Tres@gmail.com

Accounts as of November 24, 2022
Checking: $ 4,086.97
Savings: $ 5,788.78
Investments: $ 30,843.00 (Value tends to fluctuate with markets).

You can JOIN or RENEW memberships or magazine subscriptions ONLINE using ANY MAJOR CREDIT CARD. The transactions are processed through PayPal but you Do Not need a PayPal account.
Fill out the registration form at **https://www.astrotulsa.com/join**
Click Submit and you will be given the choice of either MAILING in your dues with a check or paying online with most major credit cards. A modest processing fee is added to online transactions.

Membership rates for **2023** are as follows:
Adults: $ 45 per year, includes Astronomical League Membership.
Sr. Adult: $ 35 per year for those 65 or older, includes Astro League Membership.
Students: $ 30 with League membership; Students: $ 25 without League membership.
Additional Family membership: $ 20 with voting rights and League membership.
$ 15 with voting rights but without League Membership.
The regular membership allows all members in the family to participate in club events but only ONE Voting Membership and one Astronomical League membership.

Join Online – Add or renew magazine subscriptions. https://www.astrotulsa.com/join

MAGAZINE SUBSCRIPTION RATES and PROCESS has CHANGED !

You can get a discount rate as a Astronomy Club member. However, you will need to do so directly using their discount rate web links. Both Sky & Telescope and Astronomy have options for DIGITAL as well as PRINT subscriptions.

For club member's Discount subscription rates to **Sky and Telescope magazine** go to **this page**
For club member's Discount subscription rates to **Astronomy magazine** go to **this page**
Use the DISCOUNT RATE LINKS above instead of their regular subscription pages to MAKE or RENEW your subscription.
If you need assistance, contact our club treasurer at **astrotulsa.tres@gmail.com**

Binoculars: A Great First Telescope

David Prosper

Do you want to peer deeper into the night sky? Are you feeling the urge to buy a telescope? There are so many options for budding astronomers that choosing one can be overwhelming. A first telescope should be easy to use and provide good quality views while being affordable. As it turns out, those requirements make the first telescope of choice for many stargazers something unexpected: a good pair of binoculars!

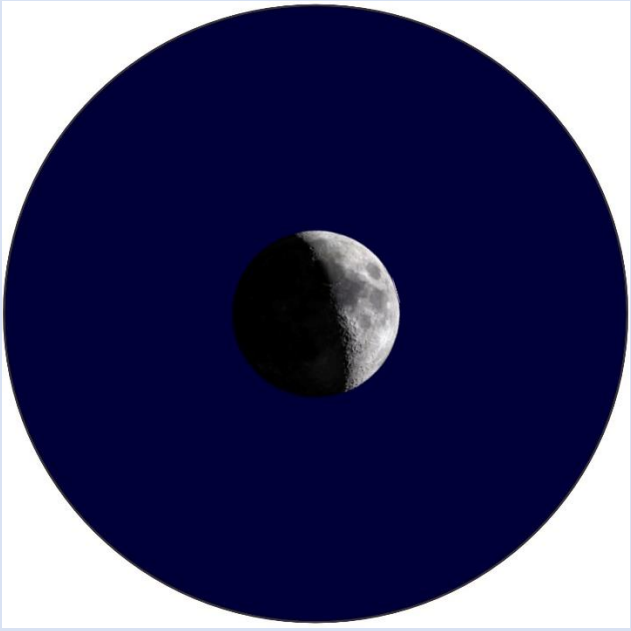
Binoculars are an excellent first instrument because they are generally easy to use and more versatile than most telescopes. Binoculars can be used for activities like stargazing and birdwatching, and work great in the field at a star party, along the hiking trail, and anywhere else where you can see the sky. Binoculars also travel well, since they easily fit into carry-on luggage – a difficult feat for most telescopes! A good pair of binoculars, ranging in specifications from 7x35 to 10x50, will give you great views of the Moon, large open star clusters like the Pleiades (M45), and, from dark skies, larger bright galaxies like the Andromeda Galaxy (M31) and large nebulae like the Orion Nebula (M42). While you likely won't be able to see Saturn's rings, as you practice your observing skills you may be able to spot Jupiter's moons, along with some globular clusters and fainter nebulae from dark sites, too.

What do the numbers on those binocular specs actually mean? The first number is the magnification, while the second number is the size in millimeters (mm) of the lenses. So, a 7x35 pair of binoculars means that they will magnify 7 times using lenses 35 mm in diameter. It can be tempting to get the biggest binoculars you can find, but try not to get anything much more powerful than a 10x50 pair at first. Larger binoculars with more power often have narrower fields of vision and are heavier; while technically more powerful, they are also more difficult to hold steadily in your hands and "jiggle" quite a bit unless you buy much more expensive binoculars with image stabilization or mount them to a tripod.

Would it surprise you that amazing views of some astronomical objects can be found not just from giant telescopes, but also from seemingly humble binoculars? Binoculars are able to show a much larger field of view of the sky compared to most telescopes. For example, most telescopes are unable to keep the entirety of the Pleiades or Andromeda Galaxy entirely inside the view of most eyepieces. Binoculars are also a great investment for more advanced observing, as later on they are useful for hunting down objects to then observe in more detail with a telescope.

If you are able to do so, real-world advice and experience is still the best for something you will be spending a lot of time with! Going to an in-person star party hosted by a local club is a great way to get familiar with telescopes and binoculars of all kinds. – just ask permission before taking a closer look! Inspire your binocular stargazing sessions with NASA's latest discoveries at nasa.gov.

The two most popular types of binocular designs are shown here: **roof-prism** binoculars (*left*) and **porro-prism** binoculars (*right*). Roof prisms tend to be more compact, lighter, and a bit more portable, while porro-prisms tend to be heavier but often offer wider views and greater magnification. What should you choose? Many birders and frequent fliers often choose roof-prism models for their portability. Many observers who prefer to observe fainter deep-sky objects or who use a tripod with their observing choose larger porro-prism designs. There is no right answer, so if you can, try out both designs and see which works better for you.



A pair of good binoculars can show craters on the Moon around 6 miles (10 km) across and larger. How large is that? It would take you about two hours to hike across a similar-sized crater on Earth. The “Can You See the Flag On the Moon?” handout showcases the levels of detail that different instruments can typically observe on the Moon, available at **bit.ly/flagmoon**. *Moon image courtesy Jay Tanner*

You are invited to come join us to learn more about
Astronomy and view the wonderful sights in the night sky.
Check the EVENTS section at https://www.astrotulsa.com/

During the school year our club holds a
Monthly General Club meetings at
Jenks Public Schools Planetarium
205 East B St, Jenks, OK
Located North of the intersection of
1st and B St

Meetings begin at 7:00 PM

When you enter the building lobby,
take the elevator to the 3rd floor.
Click for Google Map Link

ASTRONOMY CLUB OBSERVATORY
Located on a hilltop about 25 miles SW of Tulsa
Features: classroom, restroom, dome with 14-inch telescope and an acre to set up your telescopes.

Weather permitting, we host two types of observing nights.

GUEST OBSERVING NIGHT – RSVP requested
This event is open to our Guest – both individuals and families as well as our regular members.
Several of our club members set up telescope for public viewing.
***** Groups need to make separate arrangements.

MEMBERS OBSERVING NIGHT usually on a Friday near new moon
Reserved for club members and their families to allow them to pursue observing projects.
The Observatory is ONLY OPEN for SCHEDULED EVENTS.

Check the EVENTS section at https://www.astrotulsa.com/
Follow our map directions DO NOT USE GPS

Two Options for travel to the observatory

MOSTLY PAVED ROADS – Hwy 75 to 201st St S – through Mounds OK

Most DIRECT ROUTE – Hwy 75 to 241st St S – some coarse gravel & dirt roads

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SIDEWALK ASTRONOMY – Open Position

PR AND OUTREACH – Open Position

GROUP DIRECTOR – Open Position

NIGHT SKY NETWORK – Open Position

WEBMASTER JENNIFER JONES

Enjoy at Planetarium Show at Jenks High School

JENKS PLANETARIUM

Jenks High School Campus
205 East B Street, Jenks

TICKETS are $7

Purchase online at
jenkscommunityed.com
or call 918-298-0340

2022 Go to Show Schedule
Click the Date Column to sort them by show date

Most Shows take place on
Tuesday evenings from 7:00 PM to 8:00 PM
a few on Saturday

Do you have ideas for our club In Person or ZOOM Meetings?

Want to share an observing experience or astrophoto.
Know someone willing to be a Guest presenter?

We would also welcome YOU to do a short 5-10 minute section of interest or new equipment you'd like to review.

Create a Cartoon on a Space Theme

Contact our Editor John Land