

THE OBSERVER



NGC 6231(False Comet) - Michael A. Strecker

UPCOMING EVENTS:

- EVAC Riparian Star Party - July 12th*
- EVAC Monthly Meeting - July 19th*

Check out all of the upcoming club events in the Calendar on Page 12.

INSIDE THIS ISSUE:

From the Desk of the President

by Steve Bradshaw

During last month’s club meeting we had presentations from Lavi Berko on The Physics of Space Travel and from Tom Mozdzen and Rick Scott on Intensity Interferometry. Both presentations included some rather technical information. Those presentations made me realize, yet again, how impressed I am by the scientists and inventors of this world. Scientists and inventors have created incredibly clever ways to observe, measure, quantify, and determine the histories, properties, and behaviors of so many things in this universe.

Stop for a moment and consider Tom and Rick’s use of intensity interferometry and the equipment necessary to accomplish it. It’s all quite amazing.

Intensity interferometry uses twin telescopes with photon detectors to capture pairs of photons with specific characteristics from a distant star. Then, the observed properties and behavior of those photons is used to mathematically calculate the angular size of the star. Tom and Rick described the method as well as the equipment they use. I found the topic fascinating even if there were moments where I did not fully understand the supporting science. It is amazing that scientists can create something like intensity interferometry.

During the presentation, I found myself contemplating what had to be created before the creation of intensity interferometry. The entire method is based on math, so scientists had to create algebra, geometry and calculus to

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From the Desk of the President

by Steve Bradshaw

Continued from page 1

measure and describe the physical world. They also had to create probability and statistics math so that the data could be analyzed correctly and understood properly.

Then scientists and inventors had to create the necessary equipment. Ignoring for now all of Tom and Rick's other equipment, consider just one of their telescopes. To build a telescope humanity had to first determine the properties of light and how to manipulate light using lenses and mirrors. To create lenses and mirrors required someone to learn how to make glass and shape it appropriately. Modern telescopes commonly use a structure of metal and plastics to hold the lenses or mirrors in place so that required someone to develop metallurgy and plastics. To automatically track a star across the sky required the development of electronics. That required scientists and inventors to learn about electromagnetism and how to manipulate it. That resulted in the development of things including A/C and D/C generators and motors, transistors, resistors, capacitors, and integrated circuits. As you can easily see, there are a long line of things that had to be learned or invented before something else could be learned or invented.

The meeting just whetted my appetite for more astrophysical science. I went home that night and got lost in YouTube for hours. I stumbled onto some interesting things and if you permit me to consume another three minutes of your life, I would like to share one of my favorites with you. The topic was using pulsar timing arrays to measure gravitational waves. To understand pulsar timing arrays, you need to be somewhat familiar with gravitational waves and pulsars. If you already know these objects, then feel free to skip the next three paragraphs. If not, then read on.

Gravitational waves act like waves in water. As some type of mass disturbs water it creates waves that move through the water. The waves alternately compress and stretch the water. Similarly, when enough mass disturbs space, it can create gravitational waves that move through space. Those gravitational waves compress and stretch space itself.

Gravitational waves were predicted in 1915 by Einstein but were first detected in 2015 by the Laser Interferometer Gravitational-Wave Observatory (LIGO). LIGO operates on the principle that $\text{Speed} \times \text{Time} = \text{Distance}$. If Speed

or Time is changed, then Distance is also changed. LIGO features two, 2.5-mile-long laser beams oriented at right angles to each other, like the shape of an uppercase L. At LIGO each laser beam travels a fixed distance at the speed of light. The time it takes each beam to traverse its path and be reflected to the source is constantly measured. Because the speed of light is constant, if the travel time fluctuates it indicates that the distance has changed. The distance can change only if gravitational waves pass Earth and compress and stretch space itself. LIGO is an amazing accomplishment by scientists.

Moving on to pulsars, a pulsar is the rapidly spinning core of a dead star that is made entirely of neutrons. A pulsar is extremely magnetic and emits two powerful radio jets from its magnetic poles. If by coincidence the poles and the spin of a pulsar are angled correctly, then it can send a rapidly repeating radio beam to Earth. A common analogy is that of the spinning light of a lighthouse that repeatedly sends a beam of light to a ship at sea. Pulsar radio pulses commonly arrive with atomic clock-like precision at intervals measured in milliseconds.

A pulsar timing array is a collection of pulsars surrounding Earth all at different distances and directions. Scientists can use them to measure gravitational waves. Similar in concept to the LIGO laser beams, scientists can measure the distance to each pulsar based on the timing of each received pulse. Because the speed of the radio waves is constant, if the timing of the pulses changes, then it indicates that the distance to the pulsar has changed. This change in distance indicates a passing gravitational wave. The advantage of a pulsar timing array over LIGO is the much longer baselines. LIGO's laser beams are only miles long whereas the lengths of the pulsar radio beams are measured in light years. The longer baselines enable scientists to measure much longer gravitational waves compared to LIGO. Kudos to the theoretical and experimental physicists who contributed to figuring out all of this.

I started this article by saying that I was impressed by the men and women of science. I am grateful for their work. They have improved many aspects of my daily life and have made it much more intellectually interesting as well. My thanks to them all.

Until next month,
Steve Bradshaw

EVAC Meeting Minutes for June 21st, 2024 at 07:00 P.M. AZ Time

by James Yoder

Meeting Minutes

YouTube: EVAC monthly meetings can be viewed on YouTube. Go to the [YouTube](#) website to play any of the meeting recordings or select this [link](#) for the current meeting recording.

Welcome

EVAC President Steve Bradshaw welcomed club members to the meeting and reviewed the agenda. New visitors were recognized and welcomed.

Announcements

Steve Bradshaw reviewed the following club business items:

- Basic astronomy classes such as [Beginners Guide to Small Telescopes](#) and [Planetary Imaging Primer](#) consist of ZOOM sessions and hands-on labs and are periodically available based on interest. Contact James Yoder (jty.astro@ArtCentrics.com) if you would like to be added to the waiting list for either class.
- To join the distribution list for EVAC announcements, go [here](#).
- Joining or renewing membership can be accomplished online [here](#).
- [EVAC Calendar](#) shows what events and meetings are slated for EVAC members.

The Backyard Astronomer

by Bill Dellings

The Scorpion's False Comet

I In the early 1980's I was at Glacier Point in Yosemite National Park (El. 7,214') participating in a five-night stargazing seminar given by Ron Oriti of Santa Rosa Community College. Ron knew I was an avid amateur astronomer and, puzzled by something he saw in Scorpius, asked me, "Bill, is there a comet out tonight?" I answered, "I don't think so Ron." To examine the mystery object more closely, we put our binoculars on it, and discovered it was mostly a 2.5-degree long clump of star clusters and two bright stars. Top to bottom, they are: Trumpler 24 (Tr 24), Collinder 316 (Cr 316), NGC 6631 and Zeta 1 and 2 Scorpii. To the naked eye (at least in a dark sky), they take on a remarkable resemblance to a comet.

The False Comet moniker is appropriate in two ways: the group has a slight curve to the northeast, like some comet

- Past newsletters can be accessed [here](#).
- Used equipment for sale can be viewed [here](#).
- Equipment that can be rented by members can be viewed [here](#).

Physics of Space Travel – Lavi Berko

A review of the physics required to understand space travel and some of the challenges associated interstellar travel. Some solutions such ion drives, solar sails, controlled nuclear explosions, wormholes, hyperdrives and gravity assist were discussed.

Using AstroPlanner – James Yoder

A brief review of AstroPlanner software and how it can be used to plan an observation or imaging session tailored to your needs.

Intensity Interferometry to Measure Stellar Diameters Using 10" Telescopes – Tom Mozdzen and Rick Scott

Tom and Rick discussed an experiment they have been working on to measure stellar diameters utilizing two 10" telescopes and taking advantage of the properties of light to determine the diameter of stars. Two techniques of interferometry were discussed; The Michelson Stellar Interferometer method and Intensity Interferometer method.

tails. Secondly, it's brightness generally declines as you move from the "nucleus" (Zeta 1 and 2), the "coma" (NGC 6231) and fans out like a comet tail (Cr 316 and Tr 24). How cool is that!

This unique "object" can be found three degrees due south of the wide optical double Mu Scorpii 1 and 2 (separation 346" or 5.76') near the bottom of the Scorpion's body just before it begins to bend upwards to its Stinger (Upsilon and Lambda, the "Cat's Eyes"). I'm a big fan of open star clusters, but NGC 6231 is unique in that its stars sparkle like no other cluster I've seen. They just seem to smolder in a wave-like fashion, probably due to the cluster's low elevation, requiring its light to travel a long path through our turbulent atmosphere. Whatever the reason, it's fascinating to witness! It's like a basket of undulating-colored jewels. NGC 6231 is about 6,000 light years away and comprised of about 100 stars of varying brightness.

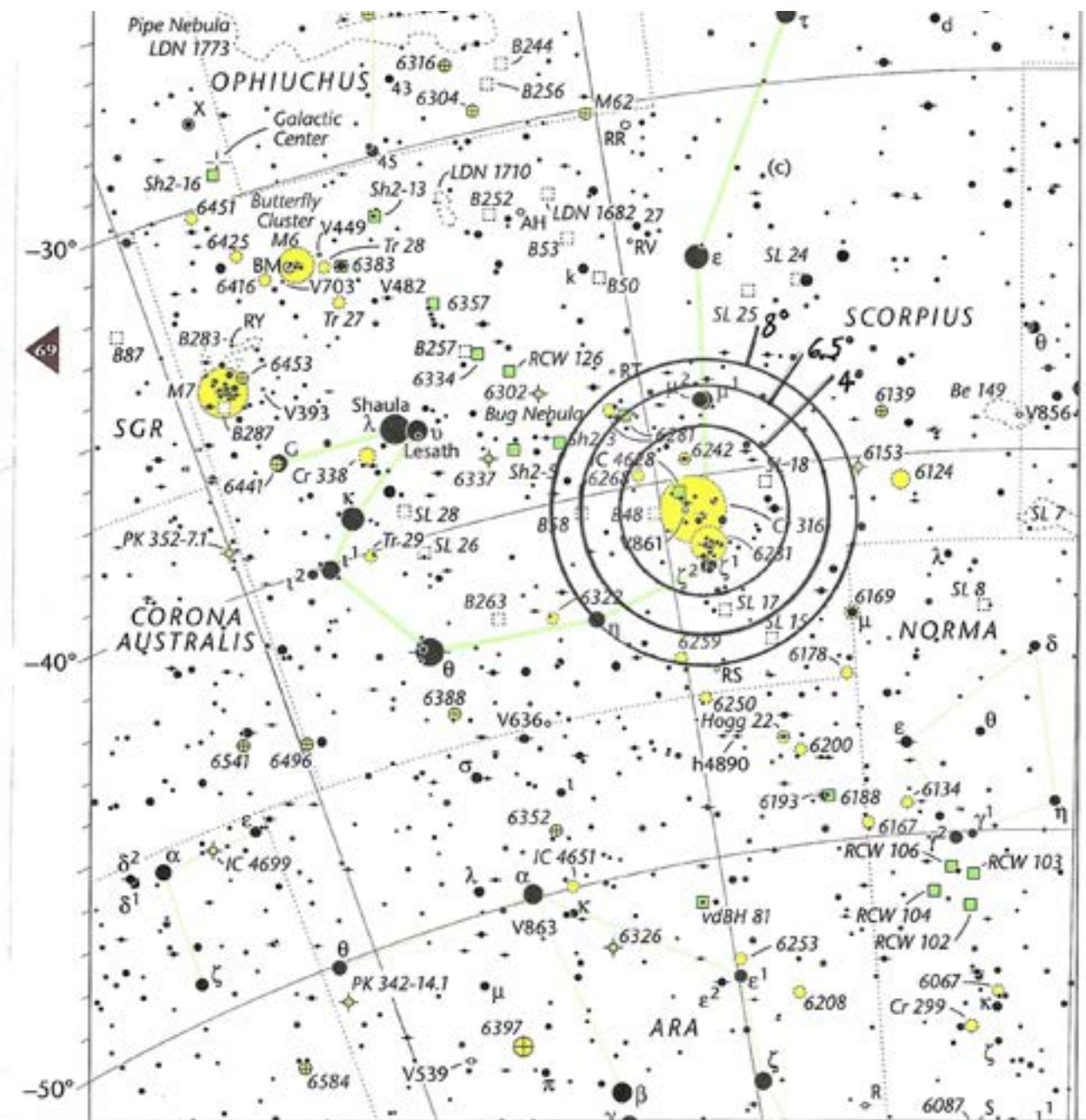
The Backyard Astronomer

by Bill Dellinges

Continued from page 3

Since I first discovered the False Comet, I can't help but spot it in Milky Way panoramic images or the real thing if Scorpius is scurrying about. It's an old friend I return to every summer. I recently observed the False Comet with three different tripod mounted binoculars to see which might render the best view of this object. For the shoot-out, I pressed into service my 8x42 (8.3° field), 10x50 (6.5°) and 16 x70 (4.1°) binoculars. All three got the job done but my favorite view was in the 16x70. Why? The components of the False Comet measure about 2.5 degrees in length, so the 16x70's 4.1° field not only scooped up the prime

suspects with room to spare, but also had the advantages of more power and light grasp. Which simply put, gave the scene more wow factor. I end by sharing two factoids about the False Comet I gleaned from a Sue French column in Sky & Telescope. 1) The term False Comet is attributed to amateur astronomer Alan Whitman who, at a 1983 Texas Star Party, thought that small piece of Milky Way looked like a comet. 2) Though NGC 6231 appears small and not terribly bright, if it was the same distance from us as the Pleiades, its star's brightness would rival Sirius. Now that would be a sight to behold!



What's Up - Some Astronomical Events of Note for July 2024

by James Yoder

Here we make note of some interesting astronomical occurrences for the month that are visible from the Phoenix Metro area. Events we are on the lookout for include:

- [Transits](#) – When a celestial body passes directly between a larger body and the observer. For example when one of the inner planets such as Venus passes in front of the Sun ([image](#)).
- [Eclipses](#) – Specifically we are focused on [Lunar Eclipses](#) (where the Earth passes between the Sun and the Moon) and [Solar Eclipses](#) (where the Moon passes between the Sun and the Earth).
- [Comets](#) – For the comets we are focused on bright comets ([image1](#), [image2](#)) or ones that may have a near miss with other astronomical objects such as globular clusters, planets, nebula, etc ([image](#)).
- Planet Activity – [Oppositions](#), [Conjunctions](#) ([image1](#)) and [Occultations](#) ([image2](#)) of note that may be an opportunity for observation or photography. For Jupiter, we also note when multiple moon shadow transits are visible.
- Visually Interesting astronomical alignments such as Moon & planets arrangement in the morning or evening sky([image1](#)).

Equipment Requirements are noted as follows:

- NE – **N**aked **E**ye event, no equipment needed to appreciate this.
- BI – A decent pair of **B**inoculars are recommended.
- CT – **C**amera on a **T**ripod can be used to capture this event.
- TS – **T**elescope is required to view this event.

Date	Event	Time	Equipment	Images	Ref	Comments
07/05	New Moon	All Night	N/A			
07/07	Mercury PM sighting	Sunset	NE, BI	1	1	Since Mercury is so close to the sun, it is generally difficult to spot in the sky. However, this evening, it will appear 12° above the western horizon directly below the moon after sunset.
07/15	Mars-Uranus Appulse	5:00 AM	TS	1, 2	1	
07/21	Full Moon	All Night	N/A			Buck Moon: Naming full moons is silly, but it makes the news a lot of times.
07/29	Delta Aquarids (25)	Morning Hours	NE		1	Delta Aquarids meteor shower with expected peak shower rate of 25 meteors/hour in the late hours of July 28th to the morning of July 29th. Where in the sky the appearance of falling stars from this shower cannot be predicted if you trace its trail back it should trace back to the constellation Aquarius .

These events and others throughout the year can be viewed on my webpage [here](#), Happy hunting!

Deep Sky Imaging Target Highlights for July 2024

by James Yoder

The average low [temperature](#) for July in the Phoenix metro area is 83° F. July 5th is a new moon with Astronomical dusk at 9:23 pm and Astronomical dawn at 3:43 am, giving us 6:20 hours of imaging time.

In this month's list there are over 125 object/configuration combinations provided of just about every class of deep sky object including 24 Globulars, 34 Planetary Nebulas, 30 Nebulas, 20 Dark Nebula, 12 Open Clusters and 5 Galaxies/ Galaxy Clusters.

Bright Moon Targets – These are small targets that have a high surface brightness, these would be globular clusters and Planetary Nebula, that with appropriate filters can likely be imaged even in a near full moon situation.

The [Prospective Imaging Objects Guide](#) (PDF download) covers objects that reach their highest point in the sky and cross the meridian (aka Transit) sometime between Astronomical Dusk to Dawn. We will be highlighting objects that transit roughly between 10pm and 2am. This ensures maximum imaging time over the month.

Happy Hunting!

Some Highlighted Targets (Most of these objects were imaged in Chandler)

Configuration	Page	Object(s)	Type	Image Link
Hyperstar	10	Pipe Nebula (LDN 1773)	Dark Nebula	43 min
Hyperstar	15	Lagoon Region (M8, M-20, etc)	Nebula	368 min
Focal Reducer	17	IC-1274	Nebula and Dark Nebula	230 min
Primary Focus (Moon)	7	M-10	Globular Cluster	452 min
Primary Focus	13	Praying Matis Nebula (B-84)	Dark Nebula	180 min
Primary Focus (Moon)	13	Box Nebula (NGC-6445)	Planetary Nebula	148 min

Resources:

- [ArtCentrics.com](#) – [July Potential Targets Guide](#) (PDF download)
- [Telescopius](#) – Lookup objects, plan imaging session.
- [Field of View Calculator](#) – Test Different Telescope, camera & eyepiece combinations.
- [Astrometry.net](#) – Solve images captured by your system. Get image RA/DEC, pixel scale, image size, orientation of the image you have taken.

EVAC Outreach Events

by Jake LeAncala

July Outreach Events:

- July 10th - Larry Murphy Park Star Party
- July 12th – 2nd Friday Star Party.

Details can be found on the EVAC website. Just go to www.evaconline.org/events-meetings. Click on the calendar entry for location and times. Contact [Jake LeAncala](#), (EVAC's Events Coordinator), if you can volunteer

at an event. It helpful to know who is coming so we can tell you where the observing field is located and how to gain access.

Find Out What's Happening – Join EVAC-Announce List

If you would like to receive email announcements about EVAC meetings and activities, please join the EVAC–Announce mailing list. Click on the link below to subscribe. Enter your full email address in the box titled User Options and press OK. You will receive a confirmation email. Your privacy is respected by EVAC and we will never sell your email address, or use it for non-club relevant solicitations. This mailing list is designed for communication from EVAC, and does not enable users to respond to the message. If you wish to contact club officers, please use the list in the Contact-Us area on the Home page of our EVAC website. To subscribe to the EVAC–Announce mail group click: <http://www.freelists.org/list/evac-announce>. To unsubscribe use the same link, enter your email address and select Unsubscribe from the “Choose An Action” list. Another list to consider is AZ-Observing@groups.io, simply click on this link <https://groups.io/g/AZ-Observing> and follow the instructions. EVAC also has a Facebook Group where members may share ideas, photos, and Astronomy related information. Click on the link to join: [East Valley Astronomy Facebook Group](#).

The Gilbert Rotary Centennial Observatory (GRCO) also has a Facebook Group. To visit, please click on [Gilbert Rotary Centennial Observatory - GRCO](#). The Observatory is open on Friday and Saturday from sunset until 9:30pm. We need volunteers. Training is provided. Help us engage the community in the wonders of the night sky. Email grco@evaconline.org for information.

Used Equipment For Sale at Great Prices

The East Valley Astronomy Club (EVAC) has just posted used astronomy equipment for sale:

- Sales are “As is”
- Pickup only.

Contact the EVAC Property Director (James Yoder) at properties@evaconline.org for more details and to answer any questions.

Detailed information on products being offered can be found on the EVAC Sales webpage [HERE](#). This page includes a brief description of the items, photos and references (i.e. users manuals, ect.)

Equipment being offered for sale this month include:

- **Celestron 9.25” Carbon Fiber Schmidt-Cassegrain Telescope** in fair condition (Sale Price = \$1,175)
- **Celestron 8SE Schmidt-Cassegrain GoTo Telescope** in fair condition (Sale Price = \$675)
- **Celestron 5SE Schmidt-Cassegrain GoTo Telescope** in Excellent condition (Sale Price = \$400)
- **TeleVue/Coronado 79mm Refractor Telescope** in good condition (Sale Price = \$1,600)
- **Eyepieces** – A large collection of just about every type and price point eyepieces
- **Bino Viewers** – 3 different types a price points from \$50 to \$925

New Moon on July 5th at 14:53

First Quarter Moon on July 13th at 15:48

Full Moon on July 21st at 03:17

Third Quarter Moon on July 27th at 19:51

EVAC Equipment Rental Program

The East Valley Astronomy Club (EVAC) is introducing a rental program for EVAC Members. Details on terms and equipment can be found on the [EVAC Rental page](#). Each item below rents for \$25/week for up to 4 weeks. Currently the following items are available for rent:

- **Celestron C-8 with Nexstar GoTo Mount** - Everything you need to beginning exploring the night sky.
- **ZWO Seestar S50 All-in-One Smart Telescope** - Everything you need to image the Sun, Moon and some bright deep sky objects. Extremely user friendly.
- **10" Dobsonian Telescope** - Everything you need to beginning exploring the sky.
- **Visual Filters for Deep Sky Objects** - 15 different filters to try before you buy.
- **Imaging Kit for Planetary & Moon Imaging** - Everything you need to capture and process images except the telescope.

Telescopes come with all equipment needed for observation (i.e. eyepieces, finder scope, power supply, etc.) Contact the EVAC Property Director (James Yoder) at properties@evaconline.org for more details and to answer any questions.

Classified Ads

The following Non-EVAC equipment is for sale. Visit the [sales page](#) for more details and contact information.

EVAC is not responsible and does not endorse any of this equipment.

David Hopper:

- Celestron C90 Spotting Scope - \$160.

James Yoder:

- Celestron NexStar 127SLGoto Telescope - \$400.
- Celestron NexStar 130SLT Goto Telescope - \$300.
- Celestron StarSense Explorer DX130AZ - \$250.
- 4.5" Newtonian on Alt/Az Mount - \$50.

Brian Rucker:

- Orion X12i 12" Dobsonian - \$1,300.

Bill Frazer Astronomy Gear Collection:

- Lunt Solar Binoculars - \$45.
- Meade 8" LX90 ACF SCT Telescope, GoTo Mount - Sale Price \$550.
- Miyachi 100mm 20x Fluorite Binoculars and Mount - Sale Price \$680.
- Sky-Watcher AZ-GTi GoTo Mount - \$170.
- A large selection of eyepieces including: Baader, TeleVue, Celestron, Explorer Scientific, and others.
- Other Equipment including: Observing Chair, Laser Finder, Star Diagonals, Equipment Case, Filters.

Fred Milenovich Gear Collection:

- Takahashi e-200 Astrograph Telescope - \$3,500
- Takahashi e-130 Astrograph Telescope - \$1,700
- Celestron 8" Schmidt Telescope/Camera - \$400
- Celestron 5.5" Schmidt Telescope/Camera - \$300



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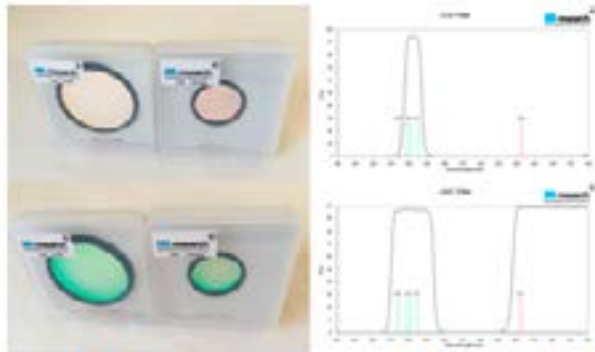
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www.apache-sitgreaves.org

Monthly Meetings will be held in person and also presented live online using Zoom. See the EVAC Website for updates.

The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our normal in-person monthly meetings have resumed. Also, the meetings will continue to be available online via Zoom.

Our meetings are held on the third Friday of each month at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Road; on the southeast corner of Greenfield and Guadalupe Roads. Meetings begin at 7:00 pm.

Visitors are always welcome!



**Southeast Regional Library
775 N. Greenfield Road
Gilbert, Az. 85234**



July 2024

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

July 10th - Larry Murphy Park Star Party

July 19th - EVAC Monthly Meeting

July 12th - 2nd Friday Star Party

August 2024

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

August 9th - 2nd Friday Star Party

August 16st - EVAC Monthly Meeting

East Valley Astronomy Club - 2024 Membership Form

Member Dues (Based on the month you are joining the club)

	Individual	Family	Student (18yr+ with ID)
January - June	\$30.00	\$35.00	\$20.00
July - December (<i>Renew in January</i>)	\$15.00	\$20.00	\$10.00
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Renewal Dues (Current Members Only)

Individual	Family	Student (18yr+ with ID)
\$30.00	\$35.00	\$20.00
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Astronomical League: \$10.00 Annually:

Name Badges: Quantity: _____

\$10.00 Each

Name to imprint: _____

Total amount enclosed:

Please make check or money order payable to EVAC.
Payment will be made using PayPal:

Name:

Phone:

Address:

Email:

City
State
Zip

URL
For website

Would you be interested in our outreach program? Yes No

How did you discover East Valley Astronomy Club?

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC"), the receipt and sufficiency of which is hereby acknowledged, I hereby affirm that I and any related entities, predecessors, successors, affiliates, attorneys, guarantors, insurers, transferees, assigns, parents, spouses, children, subsidiaries, accountants, officers, directors, employees, agents, shareholders, members, and trustees, past and present, hereby forever release, acquit and discharge to hold EVAC and its related entities, predecessors, successors, affiliates, attorneys, guarantors, insurers, transferees, assigns, parents, spouses, subsidiaries, accountants, officers, directors, employees, agents, shareholders, members, and trustees, past and present, from any and all causes of action, claims, losses, damages, liabilities, expenses (including attorneys' fees) and demands of any nature whatsoever, known or unknown, that in any way relate to, arise out of, or concern EVAC and/or my presence on the premises of any EVAC Star Party and related areas, whether or not those causes of action, claims, damages, liabilities, and demands are part of the specific subject matter of EVAC or any EVAC Star Party. This release is intended to and does cover all injuries and damages, and the consequences thereof, whether known or unknown at the time of the execution of this release, which have occurred or may hereafter occur or which may hereafter be discovered, and which may have been caused or may be claimed to have been caused by the said incident, and specifically includes, but is not limited to, bodily injuries, mental and emotional injury, pain and suffering, medical treatments, and loss of earnings or income.

My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance. EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

Signature _____

Date _____

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East Valley Astronomy Club
PO Box 2202
Mesa, Az. 85214-2202

President: Steve Bradshaw

Vice President: Woody Sims

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