Volume 38 Issue 8

August 2024

The Observer

Messier 16 (Eagle Nebula) - Pat Thompson

Upcoming Events:

EVAC Riparian Star Party - August 9th
EVAC Monthy Meeting - August 16th

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

I have always liked the challenge of learning new things. I am just as content watching a good documentary as I am watching the latest blockbuster movie. Maybe that is one reason why I love being involved with astronomy. The thing about astronomy is that you can never learn it all. There is always something new to learn and discover, which means that astronomy can always remain exciting. I experienced a bit of that excitement this week when I found answers to a couple of questions that I have had since last year.

My questions were formed last year when I was preparing to be the main speaker at one of our club meetings. For my presentation I learned ten methods that are used to measure or calculate the distances to objects in space. As part of that presentation, I had to learn more about detecting and quantifying redshift and blueshift. As you might know, a redshift indicates that an object is moving away from us while a blueshift indicates that an object is moving toward us. The amount of redshift or blueshift of an object can be quantified by a number and is labeled as an object's **z** value. Greater speeds moving away from us or toward us are indicated by higher absolute values for **z**. For example, an object with a calculated **z** value of 1.00 is moving away from us at a greater speed than an object with a calculated **z** value of 0.50. Similarly, an object with a **z** value of -0.10 is

From the Desk of the President

by Steve Bradshaw

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moving towards us faster than an object with a **z** value of -0.05.

As I prepared for last year's presentation, I found most of the information to be reasonably easy to understand. But I did have a couple of remaining questions for which I just couldn't seem to get a clear and straightforward answer. You see, there are two formulas for calculating an object's **z** value. The first formula is a simple **z ≈ v/c,** where **v** is the object's measured velocity and **c** is the speed of light. The second formula is more involved. It is:

$$1 + z = \sqrt{\frac{1 + \frac{v}{c}}{1 - \frac{v}{c}}}$$

I knew the difference between the formulas had to do with the recessional speed of the object, but I was unclear about why that made a difference. I also couldn't seem to find the answer to the question: at what point should a person switch from using the first formula to using the second formula? One of the audience members during my presentation asked me these same questions and I had to say I didn't have a solid and clear answer.

To my great delight, I found the answers this past week while not looking for them. I was viewing a YouTube video about the oldest galaxy found—so far—by the James Webb space telescope. (If you are curious, the current candidate is JADES-GS-z14-1 at 13.4 billion years light-travel time.) During the video, the lecturer provided about 90 seconds of background information about calculating **z** values. In those same 90 seconds, I got the answers I was looking for. Huzzah! Of course, it helped that over the last year I have learned more about special relativity, so I was better prepared to "hear" the answers in the YouTube video.

The first and simpler formula is reasonably accurate for calculating the **z** value of objects moving at slower speeds. "Slower speeds" mean speeds that are a smaller fraction of the speed of light, perhaps no more than approximately 45,000 km/s. That's about 15% of the speed of light. That speed maps to a redshift **z** value of around 0.20 and would be associated with galaxies perhaps less than 3 billion light years away.

However, at the higher recessional speeds caused by the expansion of the universe the second formula must be used to achieve more accurate results. Why? Because as an object's speed increases towards the speed of light, the formula used must factor in the effects of Einstein's theory of special relativity. Specifically, the formula must account for the effects of time dilation and length contraction. When astronomers using the JWST report finding galaxies with redshift **z** values of 11, 12, 13, or now even 14, those values must be calculated using the formula that factors in the effects of special relativity.

Ah, it feels so good to have a longer-term question finally answered. It's like an itch in the brain that finally gets scratched. Of course, there are some "itches" that are going to be around for a while. Here's a few. What is dark matter? What is dark energy? What is outside the expanding universe? What is inside a black hole? What is the solution to the Hubble tension? As I wrote at the beginning of this article, there is always something new to learn or discover. That is a big factor in what makes astronomy so exciting.

Until next month, enjoy looking up and learning,

Steve Bradshaw

New Moon on August 4th at 04:13

First Quarter Moon on August 12th at 08:18

Full Moon on August 19th at 11:25

Third Quarter Moon on August 26th at 02:25

EVAC Meeting Minutes for July 19th, 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.
- 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.

Member Presentation - Mt. Graham Observatory Visit: While on a campout/roadtrip to Mount Graham, Steve Bradshaw toured the Submillimeter Radio Telescope, the Vatican Advanced Technology Telescope and the Large Binocular Telescope. Steve shared photos of the Observatories and discussed details of the tour.

Member Video - Video Clip of the 04/08/24 Eclipse: Howard Anderson presented a quick video he put together from the last total eclipse he observed in Waco, Texas.

Member Presentation - Making Astronomy Tools with a 3D Printer: James Yoder reviewed of some of the tools and accessories he created with a 3-D printer for his telescope. and a discussion on the equipment and software required to create these items.

Feature Presenter - Kevin Schindler, Lowell Observatory Historian: Kevin discussed some of the projects currently under way at the Lowell Observatory including the new Discovery Center that will be opening in November. Kevin then told the story the life of Robert Burnham and his contribution to astronomy.

The Backyard Astronomer

by Bill Dellinges

Looking at Lyra

August skies find a small, but eye-catching constellation approaching the zenith. This charming little six-star grouping is Lyra, the Lyre (or Harp), one of the original 48 ancient constellations recognized by Greek astronomer Ptolemy in 150 AD. In terms of square degrees of sky (of its 1930 I.A.U. official borders), little Lyra ranks number 52 of the modern I.A.U official 88 constellations. The main stars of Lyra are arranged in two groups. Vega, Epsilon and Zeta form a triangle. Zeta, Delta, Gamma and Beta form a parallelogram.

Mythology: The Lyre was invented by Hermes, son of Zeus. It was handed down to Orpheus, a renowned musician and singer. On board the Argo with Jason and the Argonauts, he saved the ship from crashing on rocks by out singing the Sirens. But was unsuccessful in retrieving his deceased wife Eurydice from the Underworld when he violated his agreement with Hades, God of the Underworld, not to look back to see if she was following him to Earth's surface.

Description: Lyra is surrounded by goliaths like Cygnus, Draco, Hercules, Ophiuchus and Aquila but has bragging rights for having the 5th brightest star in the night sky as its lucida – Vega, magnitude +0.03. Vega is the third brightest star we see at night if you don't count Alpha Centauri and Canopus (the latter is barely visible from the southern U.S.).

Vega comes from the Arabic word for "Swooping Eagle or Vulture," as they saw Lyra's stars as an eagle or vulture. Some classic picture atlases of the 1700's and 1800's show

The Backyard Astronomer
by Bill Dellinges

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both a Harp and Eagle representing Lyra. While Vega is the brightest star in the Summer Triangle, that's only because it's relatively close, "just" 25 light years away. It doesn't hurt that it's also twice the diameter and luminosity of the Sun. Ironically Deneb, dimmest of the three Triangle stars is the brightest intrinsically, a spectra class A2 1a supergiant, boasting a diameter equal to 19 suns and a luminosity of 47 Suns. This blowtorch is estimated to be 2,600 light years away, thus appearing dimmer than Vega and Altair.

Vega Factoids: It's a fast rotator, completing one rotation in 12.4 hours, causing it to be oblate – its equatorial diameter is 19% greater than its polar diameter. It's absolute magnitude (a star's magnitude at a distance of 10 parsecs or 32.6 light years) is +0.58 (the Sun would be +4.8, Deneb -8.38!). Vega will be our North Star in 14,000 years, albeit 4.5 degrees away from Earth's celestial north pole. S&T's Fred Shaff calls Vega the "Summer Sirius."

Deep Sky Wonders: If you mention "Lyra" to any stargazer, bets are their first thought will be "Oh, home to M-57, the Ring Nebula." This planetary nebula icon is 2,000 light years away and nicely placed between Gamma and Beta Lyrae, making it easy pickings for star hoppers. It's always a thrill to see this little smoke ring. Like most planetaries, it's small, only one arc minute across, and thus requires high power; use 100x and up, to fully appreciate it. Its 15th magnitude central star is notoriously difficult to detect. The second most popular object to observe in Lyra is likely the quadruple star Epsilon Lyrae, the famous "Double-Double." One close pair of stars orbit another close pair! Good eyes can split the pairs apart as they have a separation of 3.5'. But it takes a good seeing and a telescope at 100x or more to split each pair (2.3", 2.4"). For more double star action, check out the two western stars of the parallelogram, Zeta (mag. 4.4, and 5.7, sep. 43.7") and Beta (3.4, 7.1, 45.7"). They are easy to split even with 16x70 tripod mounted binoculars (better in an 85mm refractor at 24x). Interestingly, their position angles are very close, 150° and 149°, so at first blush they look like twins! At your next summer night out, give this little constellation a glance. If you hear music, it might put you in a trance.

What's Up - Some Astronomical Events of Note for August 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).

WARNING!! – Any event associated with viewing the Sun directly will require the use of a solar filter.

Equipment Requirements are noted as follows:

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

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

by James Yoder

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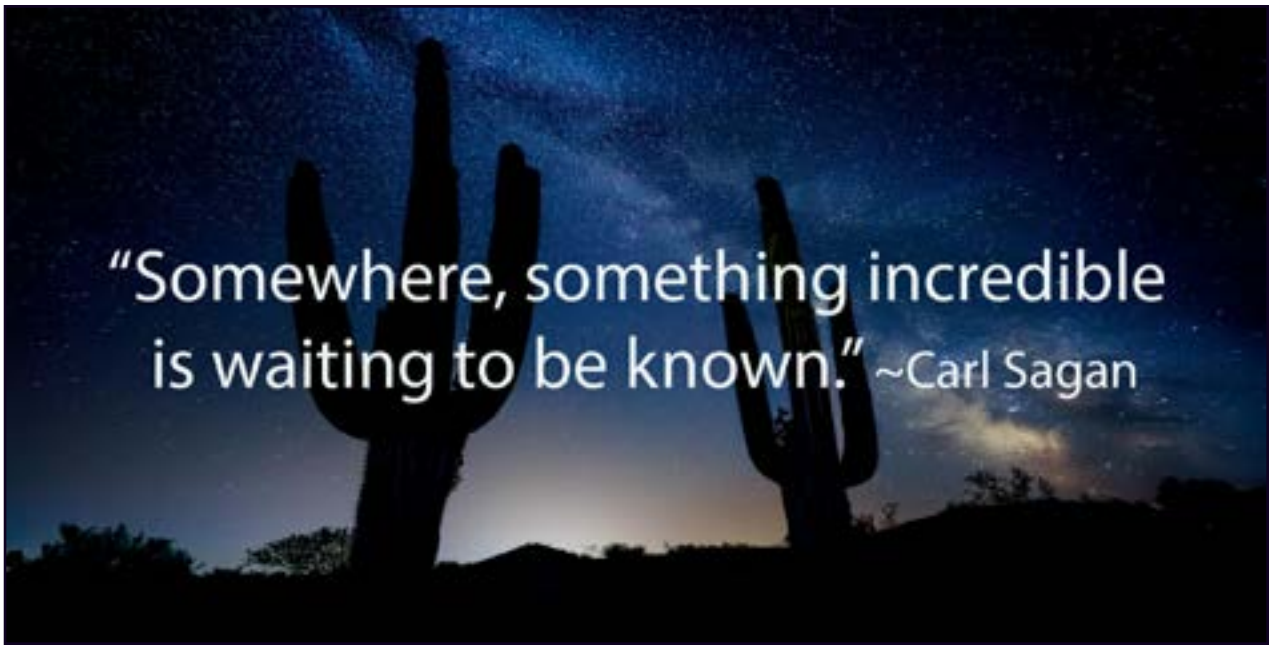
Date	Event	Time	Equipment	Images	Ref	Comments
08/04	New Moon	All Night	N/A			
08/05	Moon-Venus Appulse	6:00 PM	NE, BI	1, 2	1	The Moon and Venus within 1.5° of each other in the western horizon about 29° above the horizon at 6:00 PM.
08/11	Perseid Meteor Shower (150/hr).	All Night	NE			The Perseids meteor shower has an expected peak shower rate of 150 meteors/hour in the late hours of August 11th to the morning of August 12th. While meteors can appear in any part of the the sky, you can trace the trails back to the radiant in the constellation Perseus.
08/14	Mars-Jupiter Appulse	5:00 AM	NE, BI, TS	1, 2	1	At 5:00 AM Mars and Jupiter will be within 19' of each other in the eastern horizon about 50° above the horizon.
08/19	Full Moon	All Night	N/A			
8/20	Moon-Saturn Appulse	10:00 PM	NE, BI	1, 2	1	The Moon and Saturn within 2° of each other in the western horizon about 22° above the horizon at 10:00 PM.

These events and others throughout the year can be viewed on my webpage here, Happy hunting!



Deep Sky Imaging Target Highlights for August 2024

by James Yoder

The average low temperature for August in the Phoenix metro area is 83° F. August 4th is a new moon with Astronomical dusk at 8:56 pm and Astronomical dawn at 4:10 am, giving us 7:14 hours of imaging time.

In this month's list there are over 111 object/configuration combinations provided of just about every class of deep sky object including 14 Globulars, 31 Planetary Nebulas, 31 Nebulas, 14 Dark Nebulas, 14 Open Clusters and 7 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 narrowband 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 crosses the meridian (aka Transit) sometime between Astronomical Dusk to Dawn. We will be highlighting objects that transit roughly between 10pm and 2am when possible. 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	18	Loch Ness Monster (LDN-772)	Dark Nebula	204 min
Hyperstar	27	Gamma Cyg Nebula (IC-1318 A& B)	Nebula	392 min
Focal Reducer	20	The Finger (NGC-6820)	Nebula	1,008 min
Primary Focus (Moon)	13	M-22	Globular	Unknown
Primary Focus (Moon)	15	Ring Nebula (M-57)	Planetary Nebula	Unknown
Primary Focus (Moon)	15	M-54	Globular	110 min
Primary Focus	29	IC-1318 B	Nebula	130 min

Resources:

- ArtCentrics.com – August 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 LeAlcala

August Outreach Events:

- August 9th – 7:00 PM – 2nd Friday Star Party – Gilbert Rotary Centenial Observatory.
- August 17th – 6:30 PM – "Flashlight Night" Star Party w/ Partners from Lowell Observatory – Phoenix Desert Botanical Garden.

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 LeAlcala , (EVAC's Events Coordinator), if you can volunteer at an event. It is 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 consder 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 used astronomy equipment for sale. Please note that equipment sales are **"as is"** and are **"pick-up only"**.

For more details and to answer any questions, contact the EVAC Property Director, James Yoder (properties@evaconline.org) or visit the EVAC Sales webpage HERE. This page includes a brief description of the items, photos and reference materials (e.g. users manuals, etc.)**.**

EVAC Equipment being offered for sale this month:

- **Celestron 8SE Schmidt-Cassegrain GoTo Telescope** in fair condition (Sale Price = $500)
- **TeleVue/Coronado 79mm Refactor Telescope** in good condition (Sale Price = $1,400)
- **Eyepieces** – A large collection of eyepieces of just about every type and price point
- **Bino Viewers** – 3 different types with price points from $50 to $350

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 begin 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 friendy.
- **Celestron 10" Dobsonian Telescope** - Everything you need to begin exploring the sky.
- **Visual Filters for Deep Sky Objects** - 15 different filters to try before you buy.
- **Imaging Kit for Planetary & Moon Photography** - Everything you need to capture and process images except the telescope.

Telescopes come with all equipment necessary for observation (e.g. 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 Equpiment for Sale:
- Celestron C90 Spotting Scope - $160.

James Yoder Equpiment for Sale:
- Celestron NexStar 130SLT Goto Telescope - $300.
- Celestron StarSense Explorer DX130AZ - $250.
- 4.5" Newtonian on Alt/Az Mount - $50.

Brian Rucker Equpiment for Sale:
- Orion X12i 12" Dobsonian - $1,200.

Bill Frazer Equpiment for Sale:
- Lunt Solar Binoculars - $45.
- Meade 8" LX90 ACF SCT Telescope, GoTo Mount - Sale Price $550.
- Miyauchi 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 more.
- Misc. equipment including: Observing Chair, Laser Finder, Star Diagonals, Equipment Case, Filters.

Fred Milenovich Equpiment for Sale:
- Sky-Watch Skymax 127 Maksutov-Cassegrain OTA - $200
- 14.5" Cassegrain & Secondary Mirror kit - $1,000
- 12.5" Telescope Kit with mounting hardware - $1,200
- 2" Filter Set (4 Filters) - $175
- 72mm Filter Set (3 Filters)- $210
- Various Observatory Reference Books and Astronomy Cases - See website

SkyPi Remote Observatory

The darkest, most Pristine, sky in the continental U.S. !

At the site: Bathroom facilities, running water, 5 pads w110v, wifi, acres of grassy camp sites.

From the site: Very Large Array 42mi E, The Astronomical Lyceum 55mi E, MRO Observatory 80mi East.

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 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.

Meetings are also available online via Zoom.

Visitors are always welcome!

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

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

September 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					

September 13th - 2nd Friday Star Party

September 14th - Boyce Thompson Arboretum Star Party

September 20th - 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 (*Renew in January)*	**$15.00** ☐	**$20.00** ☐	**$10.00** ☐

Renewal Dues (Current Members Only**)** Astronomical League: $10.00 Annually: ☐

Individual	Family	Student (18yr+ with ID)
$30.00 ☐	$35.00 ☐	$20.00 ☐

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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The East Valley Astronomy Club is a 501(c)(3) nonprofit charitable organization.

www.evaconline.org

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