June 2025

Volume 76, Issue 10

PAStimes

A Publication of the Phoenix Astronomical Society

Stu's Views

- Stu Brackney, President PAS

Hi everyone. I want to thank those who participated in our annual election of officers. We were fortunate to have a full slate of candidates. We are all set for the upcoming year with this leadership team. Check out the list of your volunteer leadership team in this edition of the PAStimes. By the way, if you have ideas on how we can better serve you, please reach out to your Board of Directors and Managers.

Lowell Observatory, Flagstaff, AZ. Is a famous site that attracts thousands of visitors each year. Your Board of Directors is working on a planned one-day trip for members to experience this amazing facility. PAS plans to arrange for discounted ticket prices and possible transportation costs, so keep an eye out for more information. Exact dates to be determined.

During the summer months at PAS we suspend our monthly lecture series and telescope workshops, however we are planning to organize a few dark sky star parties. To see our activities list: go to PAS Event Calendar and Registration Site

Clear skies everyone, take lots of water with you during your warm summer night viewing.

Cheers everyone.
Stu

Lecture: Summer Recess

ASIG: June 2nd MONO vs OSC

ASIG: June 24th ASIAir – Workflow with Tips and Tricks

Book Club : June 7th

Inside This Issue

Upcoming Events

Don't forget to register—spots fill up fast!

June 2025

2nd - ASIG -Zoom -Mono vs OSC
6th - Book Club
24th- ASIAir Workflow

For more information and to register for these events, go to the PAS Event Calendar and Registration Site. It is important to register for all events. In case of an event change or cancellation, you will be notified via email.

Book Club

The Book Club is a community or group dedicated to reading and discussing books about astronomy, space, and related scientific topics.
Book: Quanta and Fields: The Biggest Ideas in the Universe
Meeting June 7th: 1PM @Coffee Plantation
7366 E Shea Blvd #101, Scottsdale, AZ 85260
Please reach out to: saeidmousavi@yahoo.com

First Book: Quanta and Fields introduces quantum field theory in an approachable way, making it ideal for readers eager to grapple with the universe's fundamental ideas. Starter questions like "How does Carroll make quantum concepts relatable?" or "What's surprising about fields in physics?"

Now Forming: Astroimaging Special Interest Group(ASIG)!

Are you passionate about capturing the beauty of the cosmos? Whether you're a beginner or an experienced astrophotographer, now is the perfect time to join The Phoenix Astronomical Society's Astroimaging Special Interest Group as we launch this exciting new group!

Astroimaging, also known as astrophotography, is the practice of capturing images of celestial objects like stars, planets, galaxies, and nebulae. It combines photography and astronomy, allowing you to create stunning visuals of the universe while exploring its mysteries.

Our mission is to:
✨ Advance the art and science of astroimaging.
🌌 Provide educational opportunities, mentorship, and technical Q&A.
📸 Inspire growth through shared experiences, monthly challenges, and interactive discussions.
This is your chance to join a collaborative community of like-minded enthusiasts, explore new techniques, and uncover the wonders of the universe through imaging!
Interested? Drop us an email to sign up for notifications of future events!

EMAIL: editor@pasaz.org subject: "Astroimaging" Join the Astroimaging Adventure—Email Us Today!

Here’s a recap of last month's Meeting

We had a blast at our Pizza party ! 🌌

Guests enjoyed a delicious Pizza Party, celebrated the election results, scored awesome Starzonia giveaways, and battled it out in thrilling Game Night Trivia. Thanks for making it an unforgettable cosmic evening! 🚀

In the NEWS

Massive Barred Spiral Galaxy in Early Universe
A team using ALMA and the James Webb Space Telescope observed a massive, active barred spiral galaxy in the early universe. This discovery, showing similarities to and differences with modern galaxies, enhances understanding of galaxy formation and evolution.

Titan's Wobbling Atmosphere
Researchers revealed that Saturn's moon Titan has a thick, hazy atmosphere that wobbles like a gyroscope, not spinning in sync with its surface. This finding, from observations in May 2025, sheds light on Titan's atmospheric dynamics.

(Source: ScienceDaily.com)

James Webb Space Telescope's Deepest Gaze
The JWST captured its deepest view yet, imaging the Abell S1063 galaxy cluster, which acts as a gravitational lens to reveal warped light from distant early-universe galaxies. This observation, highlighted on May 27, 2025, advances our understanding of cosmic history.

(Source: Space.com)

Scientists spot high-speed galaxy collision 11 billion light-years away: 'We hence call this system the cosmic joust'

Astronomers observed a high-speed collision between two galaxies 11 billion light-years away, dubbed the "cosmic joust." Using the Very Large Telescope and Atacama Large Millimeter/submillimeter Array in Chile, researchers captured the event, where one galaxy, hosting a quasar powered by a supermassive black hole, emits intense radiation that disrupts star formation in its neighbor. The galaxies, moving at 1.2 million miles per hour, are merging, with the quasar's radiation fragmenting gas clouds in the companion galaxy, leaving only small, dense regions incapable of forming new stars. This observation, detailed in a May 2025 Nature study, provides insights into early universe galaxy evolution and quasar influence.

(Source: Space.com)

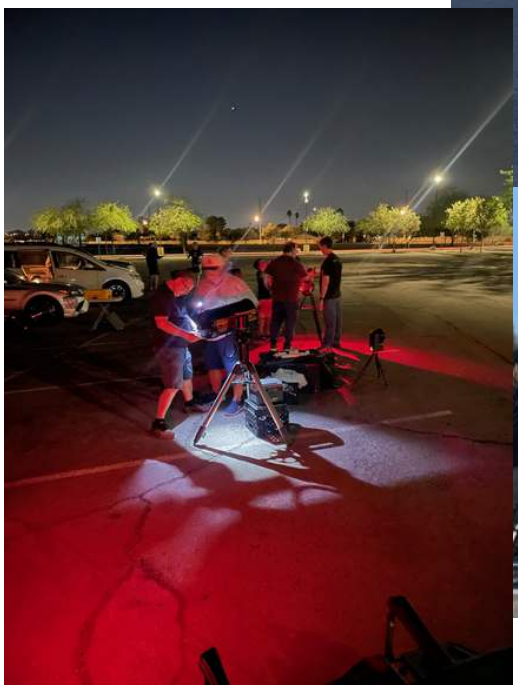
Black Hole Dance Illuminates Hidden Math of the Universe"
Published on May 27, 2025, on Space.com, this article discusses a study of two supermassive black holes orbiting each other in a distant galaxy, observed using the Event Horizon Telescope (EHT). The black holes, located 1 billion light-years away, exhibit a "dance" that creates gravitational waves and reveals insights into the mathematical structure of spacetime. Their orbit, influenced by general relativity, causes a lensing effect, bending light from an accretion disk and producing unique visual patterns. The EHT's high-resolution imaging allowed scientists to test predictions of Einstein's theory and explore "hidden" mathematical symmetries in the universe, potentially advancing our understanding of gravity and cosmic evolution. The study was published in a peer-reviewed journal, emphasizing its significance for theoretical physics.

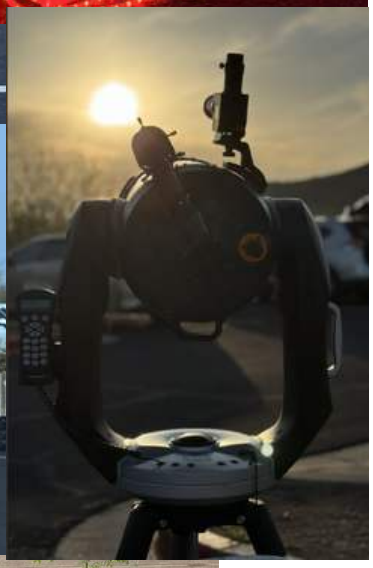
(Source: Space.com)

Summary of May Outreach Events

3rd -Star Party 65 attendees showed up 15 set up telescopes for viewing
22nd- Telescope Workshop
22nd- ASIG Meetup

StarTours-Pinnacle Peak Prep





Astroimaging Special Interest Group (ASIG)

Your astroimages have been stunning—each galaxy spiral and nebula glow pushes our group's passion deeper into the cosmos.

May 22nd - Open Discussion: In our discussion on astrophotography cameras we covered key features of dedicated astro cameras:

- Cooled Sensors: Reduce thermal noise during long exposures, essential for faint objects like NGC 4559.
- Monochrome vs. Color: Monochrome cameras with filters capture fine details (e.g., NGC 4631's halo); color cameras are simpler for M51's spirals.
- High Quantum Efficiency: 80–90% QE maximizes light capture for low-brightness targets like M101.
- Pixel Size: Larger pixels suit deep-sky objects; smaller pixels offer higher resolution for compact targets.

June Target Challenge:

Easy (Small Telescopes):

- M51 (Whirlpool Galaxy): Found in Canes Venatici, this iconic face-on spiral galaxy is a favorite for its distinct spiral arms. Small telescopes under dark skies can reveal its bright core and hints of its companion galaxy, NGC 5195.
- M101 (Pinwheel Galaxy): Located in Ursa Major, this large, face-on spiral galaxy is a bit fainter but accessible with small scopes. Its bright core and subtle spiral structure make it a rewarding target under good conditions.

Challenge (Large Telescopes):

- NGC 4631 (Whale Galaxy): A striking edge-on spiral in Canes Venatici with a distorted shape due to gravitational interactions. Large telescopes under dark skies can reveal its faint halo and companion galaxy, NGC 4627.
- NGC 4559: A faint spiral galaxy in Coma Berenices with low surface brightness. Its patchy arms and subtle details require larger apertures and steady skies to resolve, making it a true test for observers.

Best Nights: June 1-7 and June 21-30, 2025, provide dark skies optimal for galaxy observing, especially in areas with minimal light pollution.

Avoid: June 12-18, 2025, due to the full moon, which will obscure fainter objects like these galaxies.

Helpful YouTube channels

AstroBackyard – Excellent for beginner and intermediate astrophotographers, covering gear, imaging techniques, and post-processing.

Nebula Photos – Focuses on budget astrophotography, including DSLR and smartphone imaging.

Peter Zelinka – Great for nightscape and deep-sky astrophotography techniques.

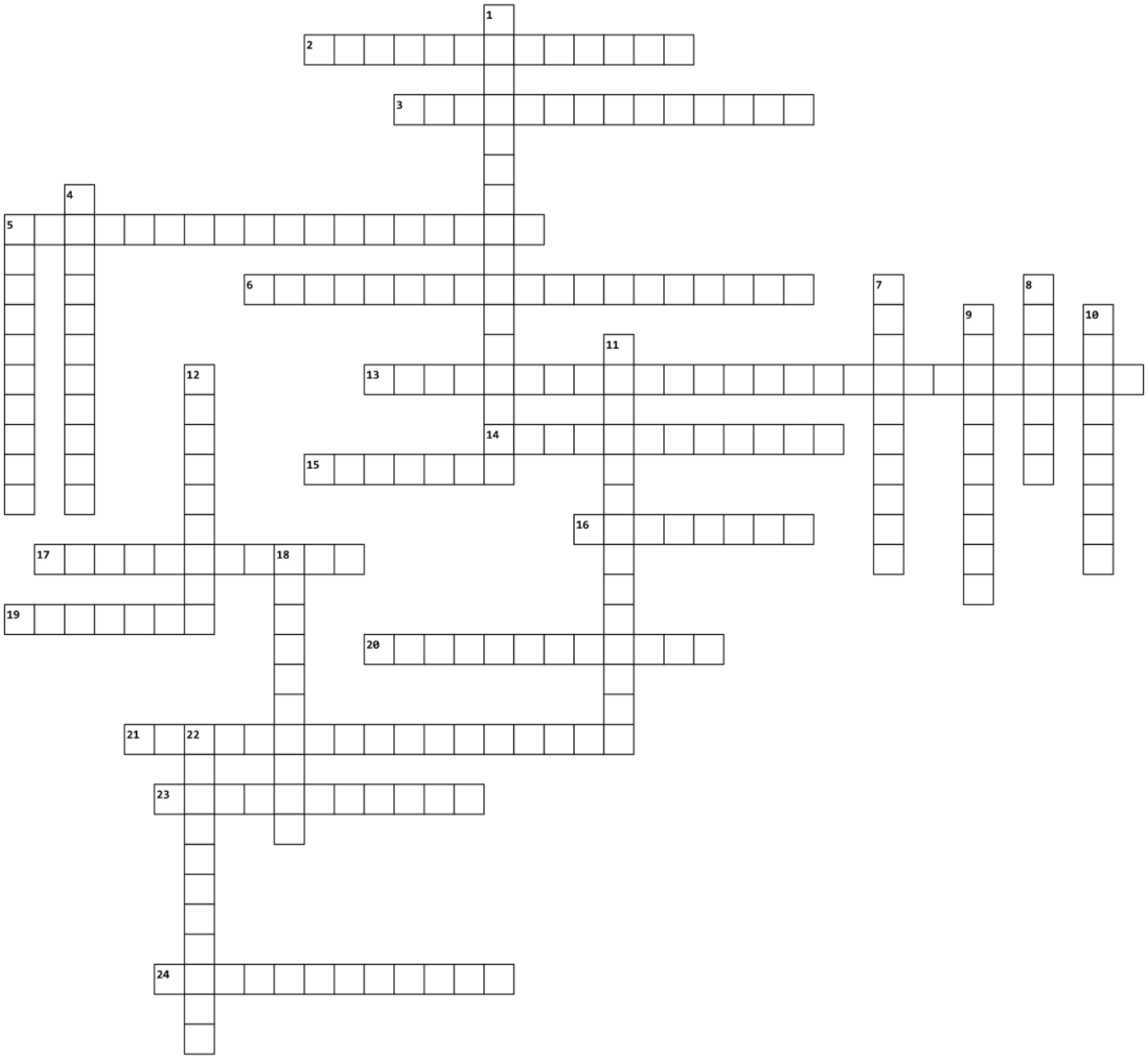
Chuck's Astrophotography – Covers deep-sky imaging, processing tutorials, and equipment reviews.

NSN Webinar Series: JWST: Revealing the Invisible Universe - Principal Science Visuals Developer Joseph DePasquale will provide some background on the observatory and the art and science of image processing that reveals the inherent beauty of the infrared universe.

Masterofpixinsight-Masters of PixInsight is an educational platform dedicated to teaching astrophotographers how to effectively use PixInsight for deep-sky image processing.

20 Top TIPS for Better Astrophotography Dylan O'Donnell Dylan covers both image acquisition as well as processing and provides some great tips for better images.

Cosmological Wonders:



Across

2. Boundary of no return around a black hole
3. Most powerful explosions in the universe
5. Stretching effect near black holes
6. Gas and dust between stars
13. Faint glow left from the Big Bang
14. Ultra-dense corpse of an exploded star
15. Superbright galactic core powered by a black hole
16. Explosive birth of the universe 13.8 billion years ago
17. Invisible cosmic glue holding galaxies together
19. Spinning neutron star that beams radiation like a lighthouse
20. Infinitely dense point at a black hole's core
21. Quantum particles leaking from black holes
23. Distance light travels in one Earth year
24. Famous star-forming cloud visible to the naked eye

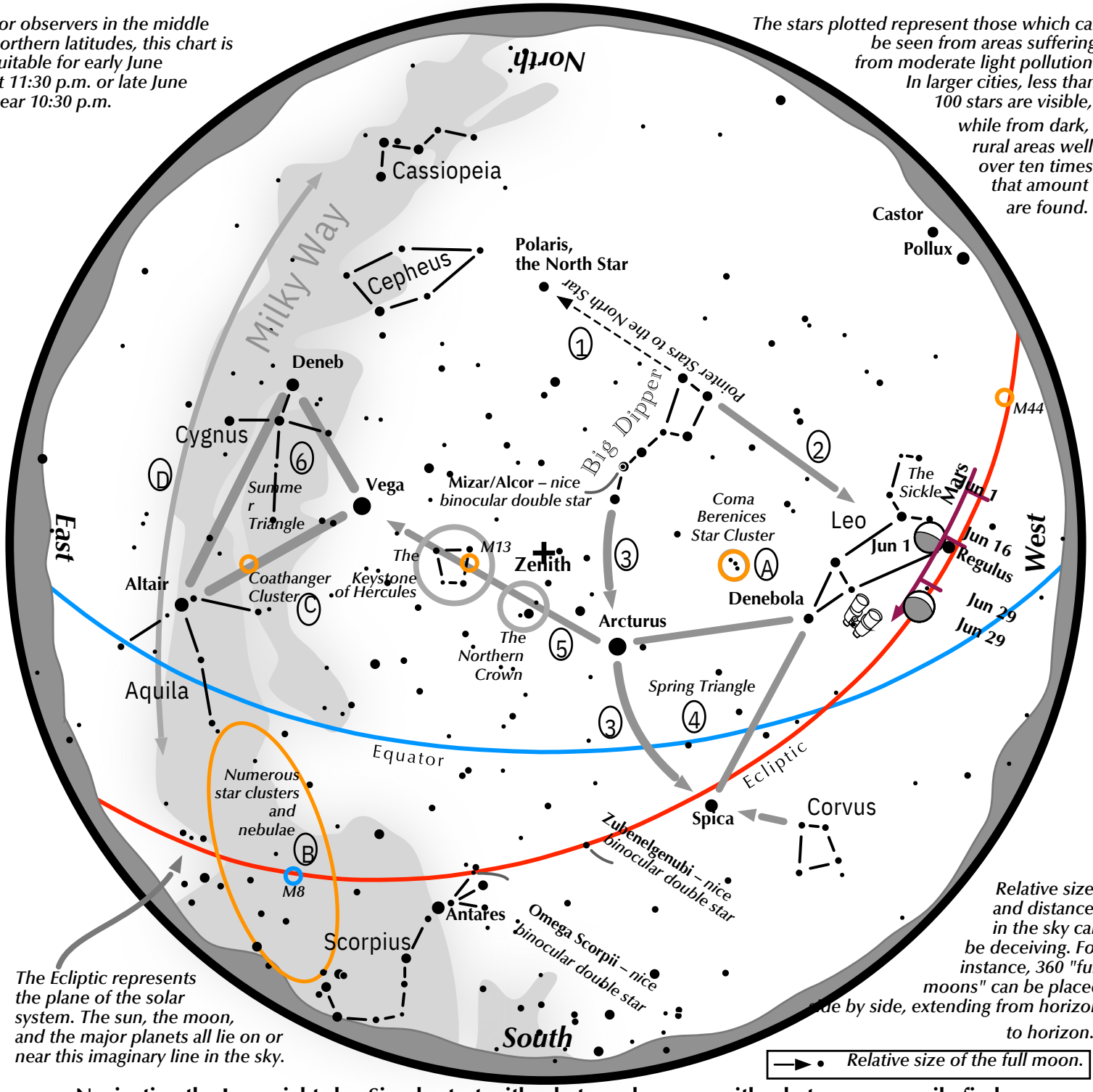
Down

1. Faster-than-light expansion after the Big Bang
4. Mysterious force accelerating universal expansion
5. Violent death explosion of a massive star
7. Region where nothing escapes, not even light
8. Stellar nursery of gas and dust in space
9. Icy shell at our solar system's edge
10. Stretched light revealing cosmic distances
11. Superheated spiral of doomed matter around black holes
12. Neutron star with an ultra-powerful magnetic field
18. World orbiting a distant sun
22. Earth-sized remnant of a sun-like star

Navigating the June Night Sky

For observers in the middle northern latitudes, this chart is suitable for early June at 11:30 p.m. or late June near 10:30 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

Relative size of the full moon.

Navigating the June night sky: Simply start with what you know or with what you can easily find.

1. *Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.*
2. *Draw another line in the opposite direction. It strikes the constellation Leo high in the west.*
3. *Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the June evening sky, then Spica.*
4. *Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.*
5. *To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.*
6. *High in the east are the three bright stars of the Summer Triangle: Vega, Altair, and Deneb.*

Binocular Highlights

A: *Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.*
B: *Between the bright stars of Antares and Altair, hides an area containing many star clusters and nebulae.*
C: *40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.*
D. *Sweep along the Milky Way for an astounding number of faint glows and dark bays.*

RICHARD SAUERBRUN-IC443 JELLYFISH NEBULA

RICHARD SAUERBRUN-NGC7264 - CONE NEBULA

RICHARD SAUERBRUN-M44 - BEEHIVE CLUSTER

7 Telescope Targets for This Month

Each month we feature 7 good targets for small telescopes that should be visible in the evening

1. Izar - Just above bright Arcturus is Izar, a tight yellow/blue binary star in Bootes.
2. Polaris - Our North Star is also a binary star. Small scopes will reveal a faint companion
3. M7 - Also called the Ptolemy cluster, this is a naked-eye visible open cluster in Scorpius
4. M64 - The Black Eye Galaxy is a spiral galaxy with a noticeable dark spot caused by a large region of dust
5. M5 - Beautiful globular cluster found in Serpens
6. M25 - is the largest open cluster without a proper name. Found in Sagittarius
7. M83 - (Southern Pinwheel) Beautiful barred spiral galaxy

Star Party Targets

Planets:

- Venus: Evening, west, brilliant after sunset.
- Jupiter: Evening, high in southwest, very bright.
- Saturn: Pre-dawn, southeast, steady glow.
- Mars: After midnight, east, reddish hue.
- Mercury: Early June, low west after sunset, challenging.

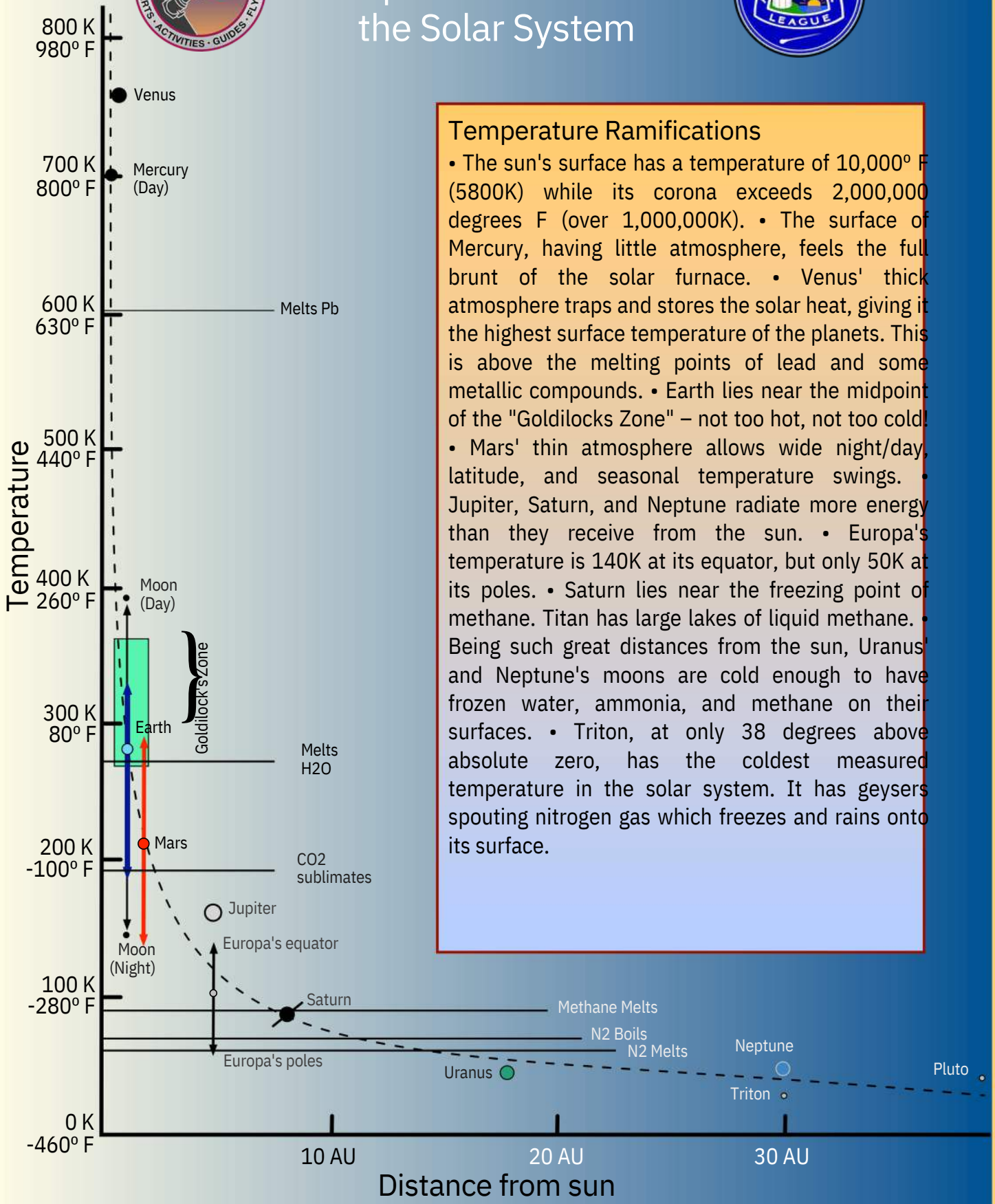
Deep-Sky Objects:

- Virgo Cluster: M87, M84, M86; rich galaxy group.
- Leo Triplet: M65, M66, NGC 3628; trio of galaxies.
- M51 (Whirlpool Galaxy): Spiral galaxy with companion.
- M13 (Hercules Cluster): Bright globular cluster.
- M81/M82 (Bode's/Cigar Galaxies): Contrasting galaxy pair.
- M104 (Sombrero Galaxy): Edge-on with dust lane.
- M3: Dense globular cluster in Canes Venatici.
- NGC 4565 (Needle Galaxy): Edge-on spiral, faint but striking.
- M94: Compact spiral galaxy.
- M97 (Owl Nebula): Planetary nebula, dim but rewarding.
- M44 (Beehive Cluster): Open cluster, great in binoculars.
- Double Cluster (NGC 869/884): Twin star clusters in Perseus.

Perfect for star parties, offering easy and challenging targets. Use binoculars or a telescope for best views under dark skies. 🌌

And you think it is hot/cold here!

Temperature Profile of the Solar System



Temperature Ramifications

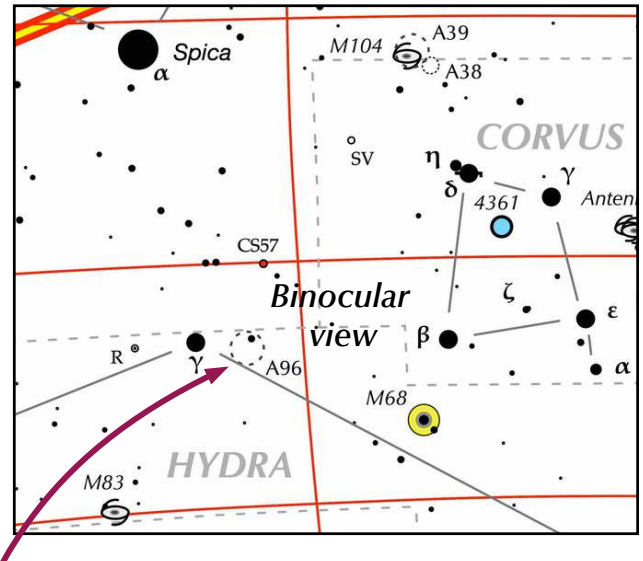
• The sun's surface has a temperature of 10,000° F (5800K) while its corona exceeds 2,000,000 degrees F (over 1,000,000K). • The surface of Mercury, having little atmosphere, feels the full brunt of the solar furnace. • Venus' thick atmosphere traps and stores the solar heat, giving it the highest surface temperature of the planets. This is above the melting points of lead and some metallic compounds. • Earth lies near the midpoint of the "Goldilocks Zone" – not too hot, not too cold! • Mars' thin atmosphere allows wide night/day, latitude, and seasonal temperature swings. • Jupiter, Saturn, and Neptune radiate more energy than they receive from the sun. • Europa's temperature is 140K at its equator, but only 50K at its poles. • Saturn lies near the freezing point of methane. Titan has large lakes of liquid methane. • Being such great distances from the sun, Uranus' and Neptune's moons are cold enough to have frozen water, ammonia, and methane on their surfaces. • Triton, at only 38 degrees above absolute zero, has the coldest measured temperature in the solar system. It has geysers spouting nitrogen gas which freezes and rains onto its surface.

Seahorse Asterism

On the Astronomical League's Asterism list as no. 96

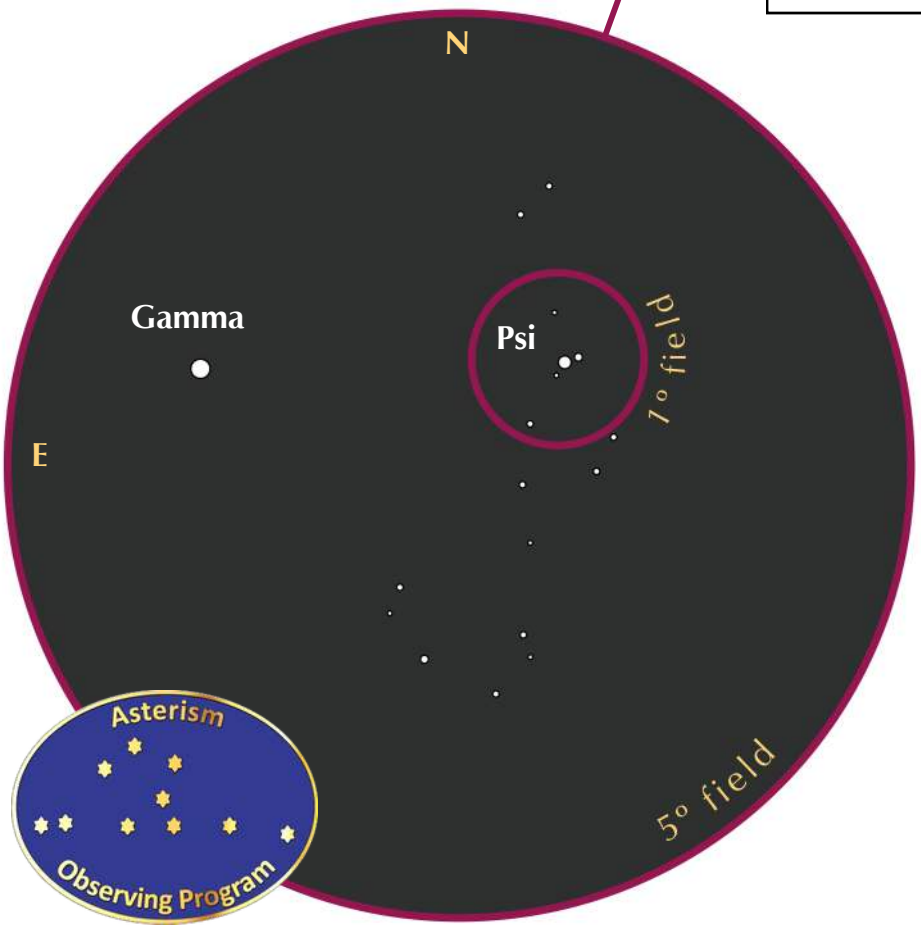
How to find the Seahorse ...

1. 10° south of Spica lies 3rd magnitude Gamma Hydrae. (10° is the angular width of your fist on your outstretched arm.) 2. Place Gamma at the center of the finder (or binocular) field. 3. At the west edge of the finder (or binocular) field lies the 4.9 magnitude Psi Hydrae. 4. Aim the finder (or binoculars) at Psi. 5. Follow the string of 7th, 8th, and 9th magnitude stars as it roughly traces the outline of a seahorse.

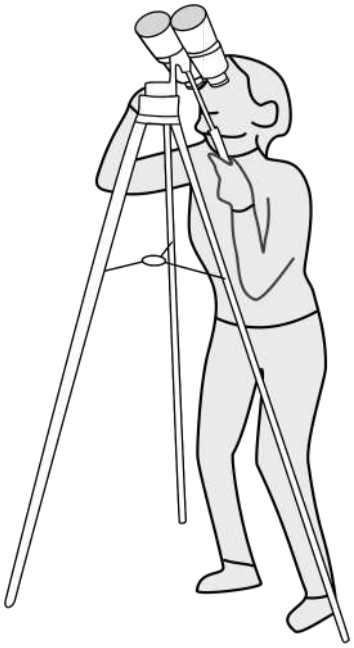


To see it through a finderscope or binoculars, clear, dark skies are a must!

96 Asterism: Seahorse
Magnitudes: 4.9 – 9.6
Diameter: 15 x 90 arc–minutes



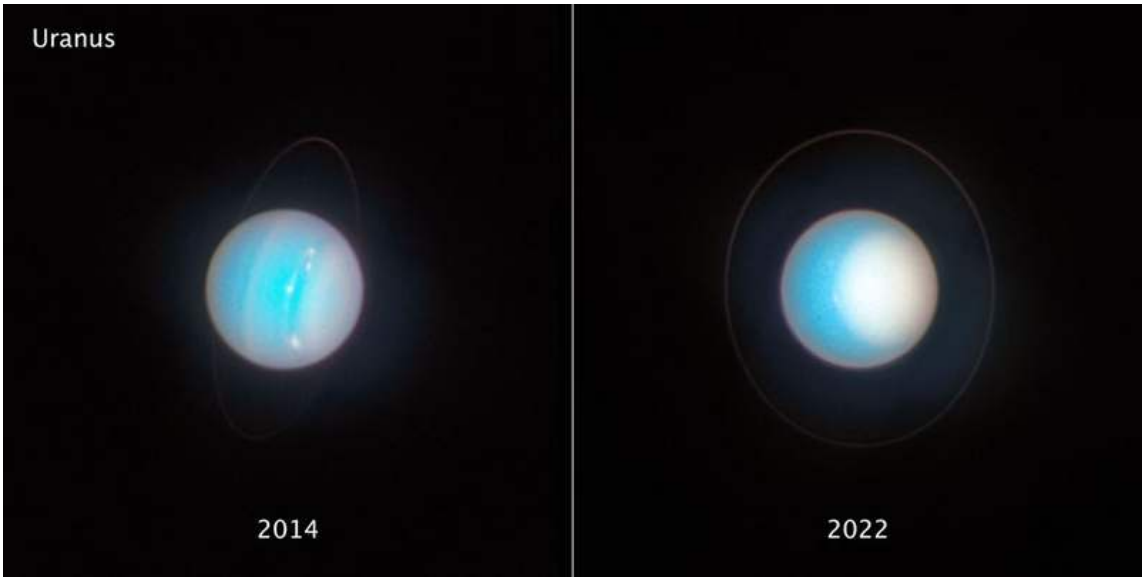
Use a tripod to help bring in the asterism's 7th, 8th, and 9th magnitude stars.



This article is distributed by NASA's Night Sky Network (NSN).
The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit go.nasa.gov/nightskynetwork to find local clubs, events, and more!

June's Night Sky Notes: Seasons of the Solar System

By: Kat Troche

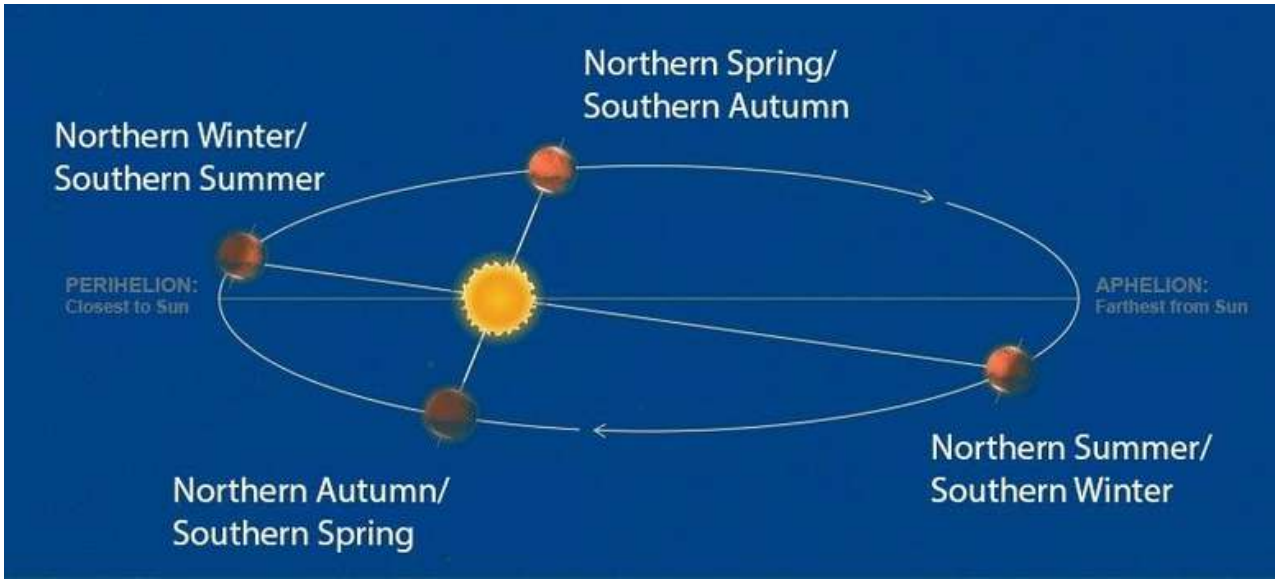


Uranus rolls on its side with an 84-year orbit and a tilt just 8° off its orbital plane. Its odd tilt may be from a lost moon or giant impacts. Each pole gets 42 years of sunlight or darkness. Voyager 2 saw the south pole lit; now Hubble sees the north pole facing the Sun. Credit: NASA, ESA, STScI, Amy Simon (NASA-GSFC), Michael Wong (UC Berkeley); Image Processing: Joseph DePasquale (STScI)

Here on Earth, we undergo a changing of seasons every three months. But what about the rest of the Solar System? What does a sunny day on Mars look like? How long would a winter on Neptune be? Let's take a tour of some other planets and ask ourselves what seasons might look like there.

Martian Autumn

Although Mars and Earth have nearly identical axial tilts, a year on Mars lasts 687 Earth days (nearly 2 Earth years) due to its average distance of 142 million miles from the Sun, making it late autumn on the red planet. This distance and a thin atmosphere make it less than perfect sweater weather. A recent weather report from Gale Crater boasted a high of -18 degrees Fahrenheit for the week of May 20, 2025.

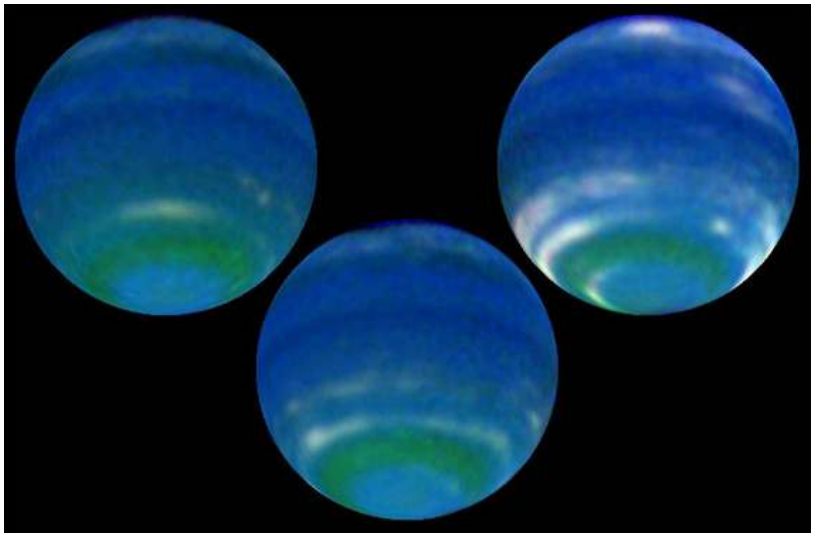


An artist's rendition of Mars' orbit around the Sun, and its seasons. Credit: NASA/JPL-Caltech

Seven Years of Summer

Saturn has a 27-degree tilt, very similar to the 25-degree tilt of Mars and the 23-degree tilt of Earth. But that is where the similarities end. With a 29-year orbit, a single season on the ringed planet lasts seven years. While we can't experience a Saturnian season, we can observe a ring plane crossing here on Earth instead. The most recent plane crossing took place in March 2025, allowing us to see Saturn's rings 'disappear' from view.

A Lifetime of Spring



NASA Hubble Space Telescope observations in August 2002 show that Neptune's brightness has increased significantly

since 1996. The rise is due to an increase in the amount of clouds observed in the planet's southern hemisphere. Credit: NASA, L. Sromovsky, and P. Fry (University of Wisconsin-Madison)

Even further away from the Sun, each season on Neptune lasts over 40 years. Although changes are slower and less dramatic than on Earth, scientists have observed seasonal activity in Neptune's atmosphere. These images were taken between 1996 and 2002 with the Hubble Space Telescope, with brightness in the southern hemisphere indicating seasonal change.

As we welcome summer here on Earth, you can build a Suntrack model that helps demonstrate the path the Sun takes through the sky during the seasons. You can find even more fun activities and resources like this model on NASA's Wavelength and Energy activity.

Helpful Astronomy Websites

by Mark Johnston

The following websites are great free resources to help you plan and enjoy your astronomy adventures

Astromart: astromart.com/
This is one of the top two sites for buying and selling used astronomy gear, product reviews, and forums where you can discuss any aspect of astronomy with other enthusiasts. A small fee is required.

Astrometry.net: https://nova.astrometry.net/
This site will take any astronomy image you send it (galaxy, starfield, nebula, etc) and then tell you what it is and where it is in the sky.

Astronomy Tools: astronomy.tools/calculators/field_of_view/
This site has a lot of capabilities but I use it primarily to figure out how a target (e.g. the Helix nebula) will look in my eyepiece or astronomy camera. You pick your scope, camera, eyepiece and target and the site does the rest.

Astrospheric: www.astrospheric.com/
Probably the best short term astronomy weather forecasting tool, providing predictions of clouds, transparency and seeing.

Clear Sky Charts: www.cleardarksky.com/
Excellent source of astronomy seeing conditions forecast. Also a great tool for finding observing sites with lower light pollution.

Cloudynights: www.cloudynights.com/
This is one of the top two sites for buying and selling used astronomy gear, product reviews, and forums where you can discuss any aspect of astronomy with other enthusiasts. Free.

Dark site finder: darksitefinder.com/map/
Great website for finding a dark observing location.

Heavens above: heavens-above.com/
Top site for predicting naked eye observations of satellites. See when the ISS is visible in your neighborhood!

Jupiter transits: shallowsky.com/jupiter/
For anyone with a small telescope, this is a great site. You can find out when the Great Red Spot and Jupiter's satellite transits are visible.

Solar Dynamic Observatory (SDO): https://sdo.gsfc.nasa.gov/data/
Find out how the Sun looks right now, at various wavelengths. If you own a solar telescope, this site coupled with Astrospheric is all you need to plan fabulous solar observing!

Starizona: https://starizona.com/
Astronomy store located in Tucson, Arizona. They specialize in a wide range of astronomy equipment and accessories, catering to both amateur and professional astronomers. Their offerings include telescopes, cameras, filters, and eyepieces, among other products. Knowledgeable staff and passion for astronomy.

Telescopius: telescopius.com/
This site is very helpful in planning an observing evening. It will tell you when any particular target is rising and setting and when is the best time to observe it. This allows you to sequence your observing in a planned manner.

Used equipment for sale

Duration: Ads run for 3 months and may be renewed if submitted by the deadline and space permits.
Cost: Ads are FREE for members only. Equipment Requirements: All items must be in good working order.
Acceptable items include books, star charts, telescopes, eyepieces, finder scopes, binoculars, lasers, and other astronomy-related gear. Submission Details: Email the following information to **editor@pasaz.org**: **Make *Model *Description (Under 100 words-include a link to the manufacturer's site if available) *Price *Contact Information *Preferred Contact Method(Email or phone) *Approximate Location*
PAS is not responsible for the ads and does not guarantee the quality of the items for sale. PAS reminds everyone, you purchase at your own risk, so do your research beforehand.

Description: Obsession 18" f/4 UC with Feather Touch Focuser, Argo Navis (factory installed), Shroud, Telrad
-Purchased the equipment 3 years ago, but have not used the scope in a year having moved from visual to imaging. At 65 years old with the onset of cataracts imaging is a more satisfying pursuit to me now. I also have the Paracorr, 21mm, 13mm Ethos eyepieces which the purchaser may elect to buy as well (priced separately)
Price: $8,000
Contact Information: Toby Patton
Preferred Contact Method: flyfishman2010@gmail.com

PAS offer: This is a first come, first served offer. Review the list. Decide what you want. Email president@pasaz.org what you want. He will set up a day/time for you to come to his location to purchase.
Bring your check payable to Phoenix Astronomical Society or cash … no credit cards please.

Explore Scientific AR102 with Tripod
· 102mm Doublet Refractor
· 2" Eyepiece adapter
· Alt-Az manual mount
Member Price: $400

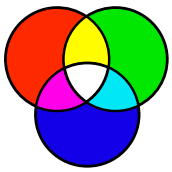
Celestron 6" AstroMaster
· 6" Newtonian Telescope – OTA only
Member Price: $50

Meade ETX-70
· 70mm Refracting Go-To Telescope
· 1.25" Eyepiece adapter
· Battery operated motorized mount
· With carry case
Member Price: $70

Celestron 6" F/4 Newtonian Astrograph Telescope
• Fast 6"-aperture reflector lets you take short exposures with bright, high-resolution results
• Precise 2" dual-speed (10:1) linear-bearing Crayford focuser lies 7" back in the optical tube to block stray light and boost contrast
• Compact 22.5" length and light 12.7 lb. assembled weight doesn't require an enormous mount
• Includes two heavy-duty hinged tube rings, 8x50 finder scope, dovetail mounting bar, and more
Member Price: $250

Celestron Powerseeker 127
· 127mm Newtonian Telescope
· 2" Eyepiece adapter
· German equatorial mount
· With tripod
Member Price: $50

Celestron 8" Schmidt-Cassegrain
· 8" Telescope (classic Orange Tube)
· Alt-Az mount
Member Price: $50



Various Filters – 1.25"
Red, Yellow,Blue,Green,Multiple O3 filters
Member Price: $100

Telescope Loan Program

The PAS Telescope Loan Program provides PAS active members access to various donated telescopes and accessories to enhance their learning of visual astronomy as well as astrophotography.

Check-out Process: The entire PAS inventory of telescopes is available for active members to use. Some telescopes require completion of a training program, others do not. Several of the loaner telescopes represent a significant dollar value. In certain cases, the PAS member will be asked to provide credit card information as insurance against potential damage or loss.

A kit of eyepieces and accessories is available for all loaner telescopes if needed. There is also a special kit of advanced 2" eyepieces available for loan as well as advanced finder scopes. Laser collimation tools are also available for loan if needed.

Loan periods are for a maximum of one month. However, longer periods may be granted in special cases.

All telescope equipment and accessories must be picked up at the PAS storage facility and delivered back to the facility by the end of the loaner period. If you wish to check out one of PAS's telescopes, send an email to telescope@pasaz.org with the following information:

- Full Name
- Email Address
- Desired Telescope and/or accessory kit
- Check out date
- Check in date
- Additional information as needed

ZWO SeeStar S50
Coronado Personal Solar Telescope (PST)
Orion SkyQuest XT-10 - 10" Dobsonian
Orion Skyquest XT-8 – 8" Dobsonian
Meade ETX-70 Go-To Refractor
Sky-Watcher – 10" Collapsible Motorized Dobsonian
Accessory Kit #4 - Advanced Observing
Accessory Kit #5 – 1.25" Eyepieces & filters

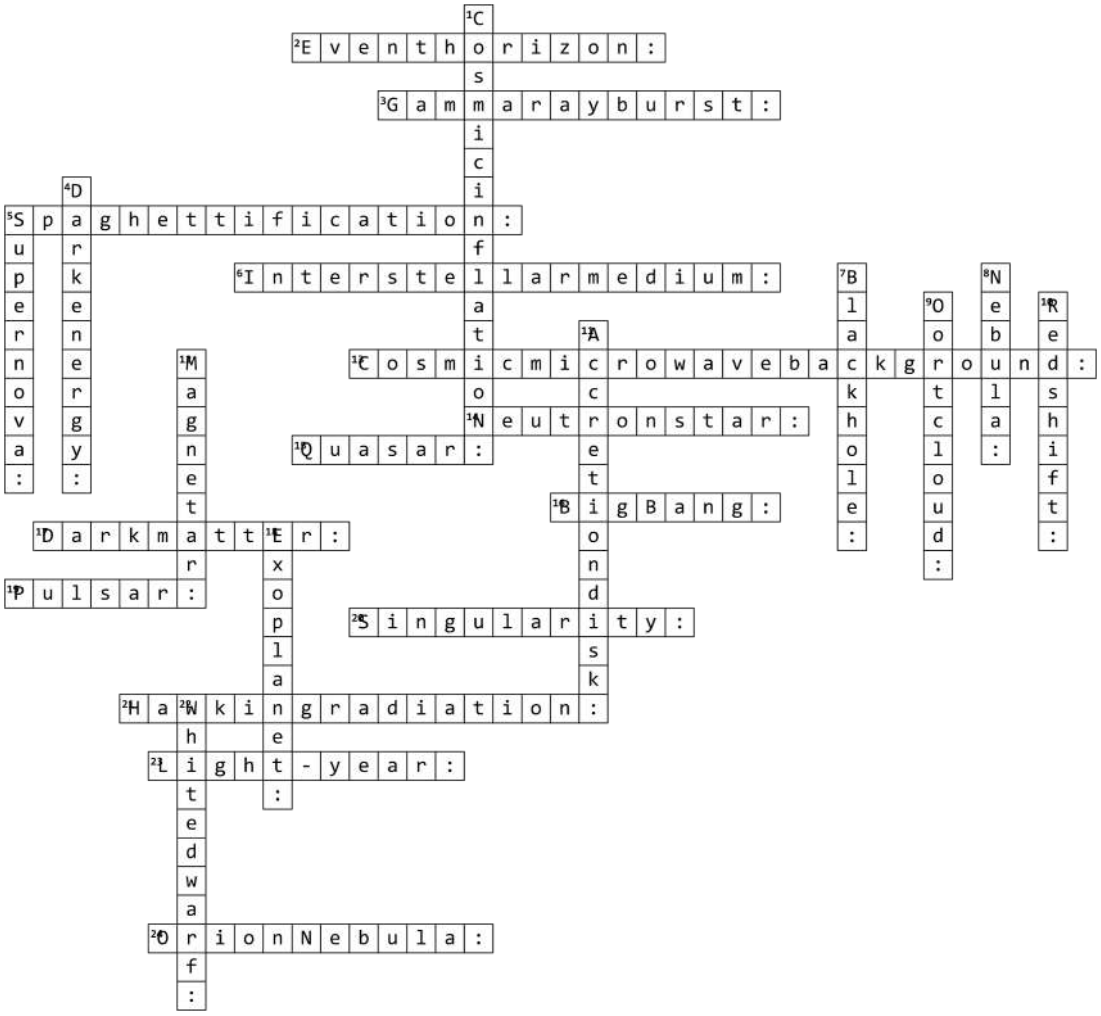


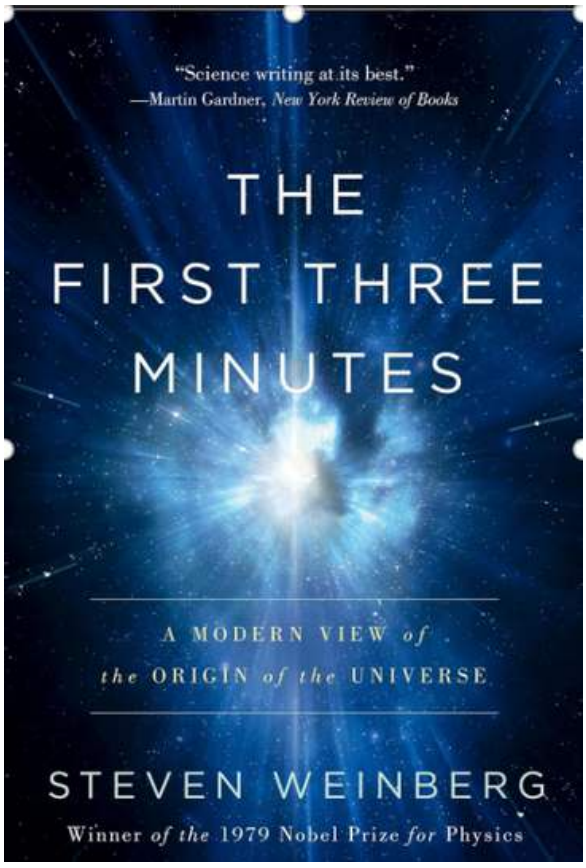






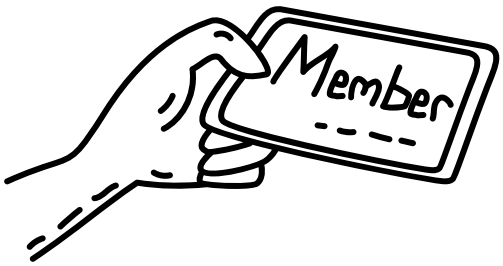






Book: "The First Three Minutes: A Modern View of the Origin of the Universe" by Steven Weinberg

Steven Weinberg's The First Three Minutes is a groundbreaking classic that dives into the complex origins of our universe, from the Big Bang to the formation of stars and galaxies. Written by a Nobel-winning physicist, the book presents cosmology in a deeply accessible way for readers with an interest in the fundamental questions of existence. Weinberg expertly explains the phenomena of black holes, cosmic inflation, and particle physics with clarity, making complex concepts understandable without oversimplifying.



Are you fascinated by the stars and eager to explore the wonders of the universe? Do you want to connect with like-minded individuals who share your passion for astronomy?

Hi everyone. Great news, your Board of Directors decided not to keep up with inflation. They did not raise your annual dues! More good news is, you can easily renew your membership by going to our public website www.pasaz.org, look on the left index column for the link "Join Our Society," click on that and there ya go. Your membership runs from 1 January to 31 December or the date you sign up to the end of the year. Our new Membership Manager, Mr. Richard Pipkin will assist you with any questions you may have: membership@pasaz.org

Benefits of PAS Membership

- Helping the Society accomplish its mission of astronomy outreach and education
- Contributing toward the Society's ability to provide college scholarships to astronomy students
- Participation on the Society's email distribution list
- Email receipt of the Society's monthly newsletter
- Participation in the Society's telescope loaner program
- Ability to serve as a teacher at the Society's telescope workshops
- Ability to serve as a mentor at the Society's star parties
- Ability to participate in the Astro Imaging Special Interest Group (ASIG)
- Ability to serve as a paid presenter in the Society's Star Tours program
- Opportunity to purchase used astronomical equipment at 50% off current value
- Access to club trips to the darkest Arizona sites and top observatories
- Connections with professional astronomers and researchers through guest lectures or workshops.
- Opportunities to hold leadership positions within the club, such as committee chairs or officers.

By becoming a member of the Phoenix Astronomical Society, you not only enhance your own astronomical journey but also contribute to a vibrant community that shares your passion. Together, let's explore the universe and inspire others to do the same.

Sign Up Now and Start Exploring the Cosmos with Us!

Phoenix Astronomical Society Contact Info

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PAS is incorporated in the state of Arizona as a non-profit, scientific and education- al 501(c)(3) organization. Our newsletter PAStimes is published monthly and distributed via the Internet. All issues are available for download on our website **www.pasaz.org** . Ads for astronomy equipment are provided as a courtesy to sellers and buyers, and do not constitute any endorsement by PAS. All photos by Richard Meyers unless otherwise credited.

Star Tours Team 2025

Mark Johnston
Ted Blank
Mark Savan
Andrew Stone-Star Tours Manager
Richard Sauerbrun
Stu Brackney
Roger Anzini
Peter Turner
Chris Ford
Scott Adams
Ryder David
Alessandro Cavallaro
Richard Meyers

These individuals have successfully met the qualifications to participate in Star Tours Events and receive compensation for their services. ☀️