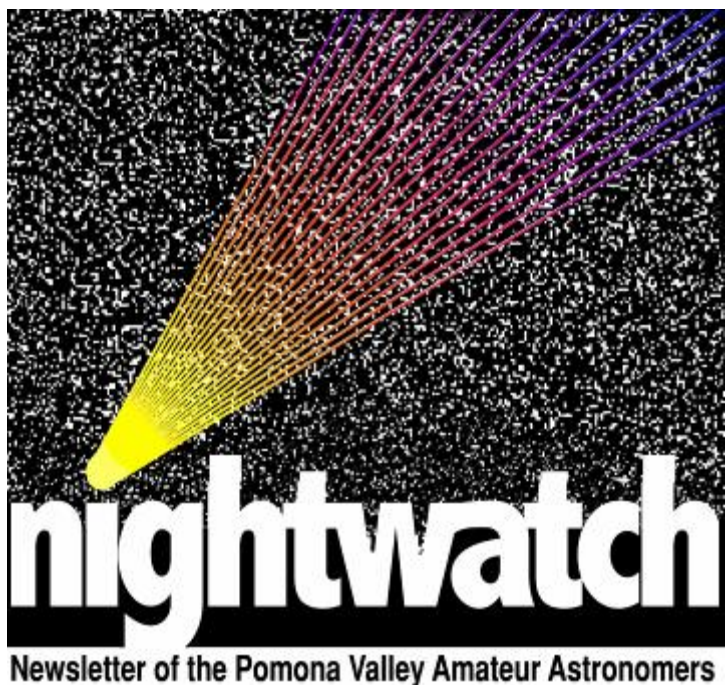




If you want something you have never had,
you must do something you have never done.
Thomas Jefferson



Volume 46 Number 08

nightwatch

August 2026

President's Message

We are officially into the second month of my acting presidency! While last month had a few shaky moments, I am confident this month will be smooth sailing.

Here is what's happening this month:

Updated Door Prize Drawing: To make our door prize drawing run more smoothly, **everyone (including visitors!) will receive one free ticket.** The drawing will take place at the end of the meeting for a prize valued at approximately \$20. *Please note: You must be present at the time of the drawing to win.*

Guest Speaker – Dr. Jeff Rich: We are thrilled to welcome back Dr. Jeff Rich from the Carnegie Observatories. Last year, Dr. Rich gave us an overview of the observatories' vital work. This month, he will dive into his personal research on galaxy formation and evolution—featuring exciting new data from the James Webb Space Telescope!

Publicity Ideas Needed: As mentioned last month, Laretta Davis and Laura Jaoui have stepped up as our new Co-Publicity Directors. They are hard at work designing flyers to help attract new faces to our meetings. If you know of great local spots where we could post these flyers, please reach out and let them know!

Looking forward to seeing you all at the meeting!

Ron Hoekwater

PVAA Officers and Board

Officers

President (acting)	Ron Hoekwater	
Vice President	Ron Hoekwater	
Secretary (acting)	Ken Elchert	626-541-8679
Treasurer	Gary Thompson	909-935-5509

Board

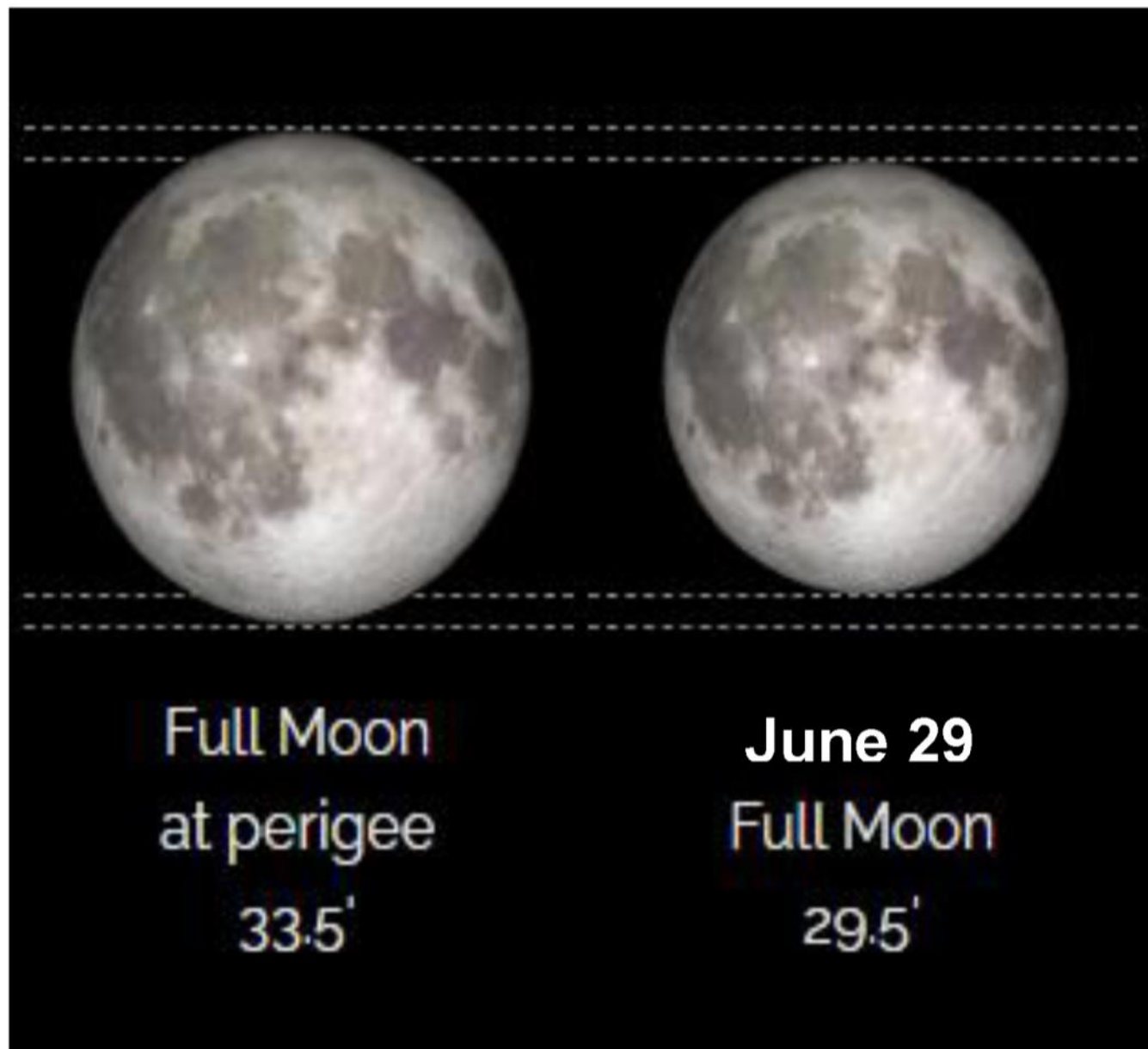
Jim Bridgewater (2028).....	909-599-7123
Claire Stover (2028)	pvaanightwatch@gmail.com
Ken Elchert (2027).....	626-541-8679
Laura Jaoui (2027).....	909-706-7031

Directors

Membership / Publicity....	Gary Thompson	909-935-5509
Outreach	Open position	
Programs	Ron Hoekwater	909-445-9282
Publicity.....	Laura Jaoui	
	Laretta Davis	

PVAA General Meeting June 26, 2026

Ken Elchert started the meeting with his presentation of upcoming celestial and PVAA events in the June-July time frame. He also displayed a Celestron 80mm reflector telescope the club is selling for \$125. For information on the telescope, you can call Ken at 626-541-8679. John Grippa is also selling his Seestar S50 telescope for \$250, and a full-size tripod for \$50. You can call John at 909-518-1530 for more information.

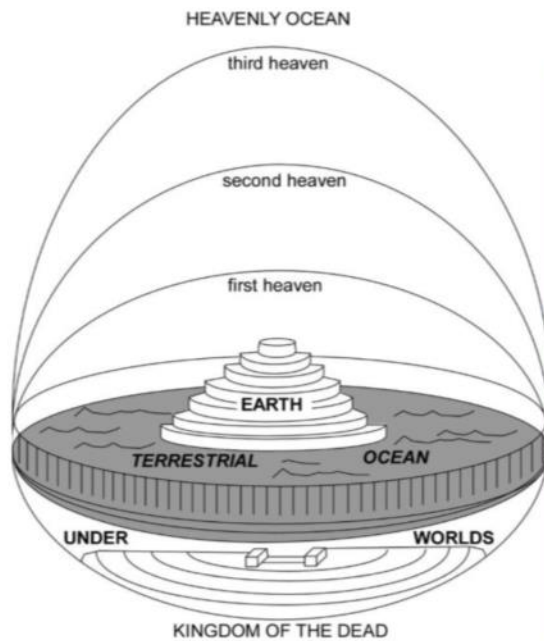


SpaceX has officially launched more satellites into orbit than the rest of the world combined. – and the world had more than a 60-year head start. This is truly a remarkable achievement.

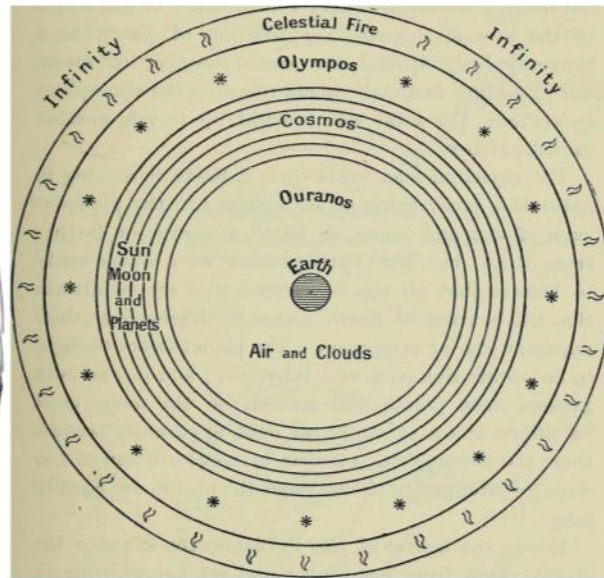
We also started having a door prize raffle for those attending the meeting. Ron Hoekwater will be giving away a small gift worth about \$20. Come to the meeting and join in the fun!

Our speaker for the night was Dr. Sujoy Modak - Professor of Physics and Astronomy at Cal Poly Pomona. The title of his presentation was 'Making Sense of the Universe: How Relativity, Quantum Theory, and Observation Reveal the Cosmos.' He started with the question: How big is the universe? The observable universe is 10 to the 24th kilometers. How much ordinary (observable) mass is there in the universe? (1 with 53 zeros kilograms) How can we estimate that? First, let's go back to ancient Babylon.

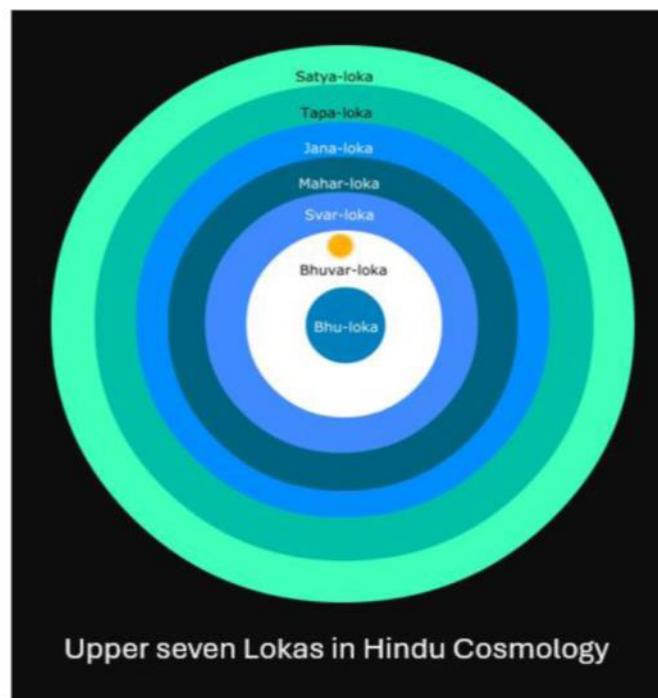
The Earth was viewed as a stationary world at the center of a finite universe, surrounded by the heavens above and the underworld below. Celestial bodies were often associated with divine beings, and astronomical phenomena were intertwined with religious and political meaning.



Ancient Babylon's version of the cosmos.

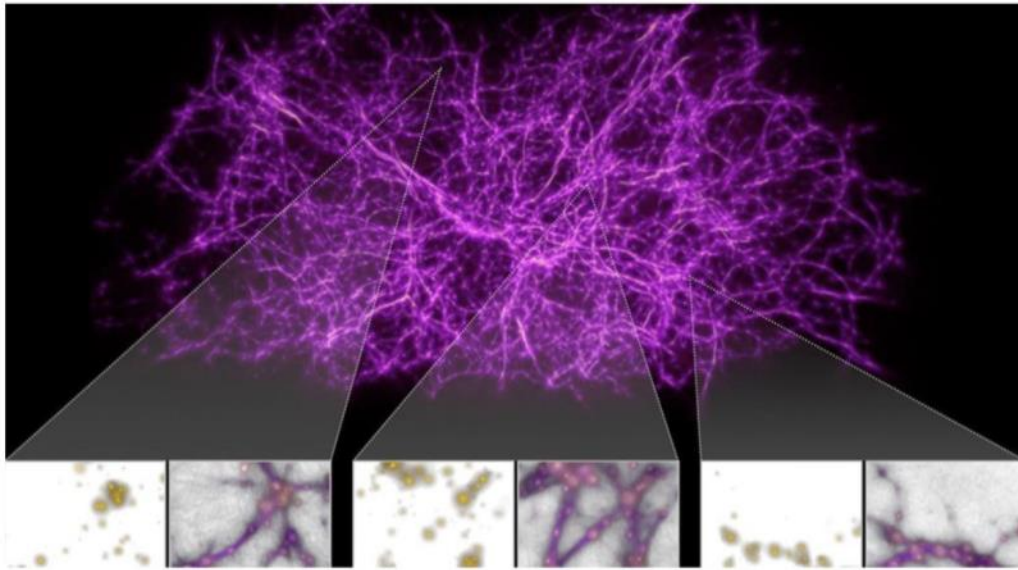


Ancient Greek cosmos



Ancient Hindu cosmos

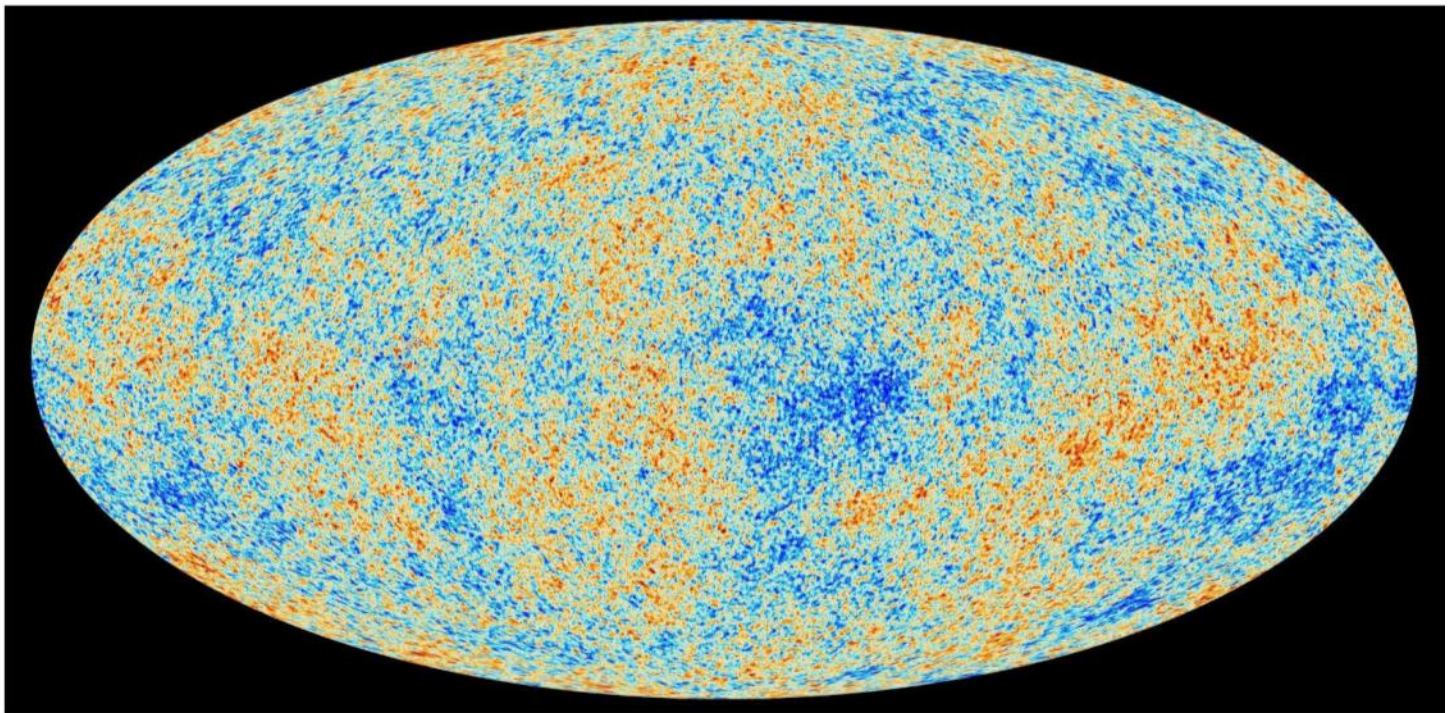
For ancient Greeks, everything moved in perfect circles. Ancient Hindu cosmology, there were seven upper Lokas (Heavens) that were undergoing vast cycles of creation, evolution, and dissolution.



Cosmic Web and Slime Mold

NASA, ESA, and J. Burchett and O. Elek (UC Santa Cruz)

Modern Cosmology really started with the telescope. Galileo Galilei (1564-1642) once stated: “Measure what is measurable and make measurable what is not.” Now with huge telescopes, and spectrographs, we can measure the light-shifts. With photographic plates, and now digital cameras, we can ‘look’ further into the universe than ever before. We now know that the universe is expanding. The ‘Hubble constant’ the measurement of this expansion. The current accepted value for the expansion of the universe is 74 kilometers per second per megaparsec. A megaparsec is about 3.26 light years.



By ESA and the Planck Collaboration - Cosmic Microwave Background

Another thing we discovered is that the entire sky is filled with relic radiation – CMB – Cosmic Microwave Background. We also discovered the universe has structure. Galaxies are not randomly distributed. Then the galaxies, when their mass is estimated by

the mass of their stars and black holes, do not have enough mass to stay together. So, we have come up with the theory that there is 'Dark Matter.' We also know the universe is expanding. For this our current theory includes 'Dark Energy.' Newton gave us the laws of motion, while Einstein gave us 'spacetime' which bends due to gravity.

Because of our measurements of the CMB, the Hubble Constant, and what we can see; we believe the universe started out 1100 times smaller than it is today. Going back to our original question: How big is the universe? We can say the diameter of the observable universe is 93 Gly (Giga light years). Now the biggest questions are: Why is the universe expanding? What is Dark Matter? What is Dark Energy? These are questions that current cosmologists are trying to answer.

Gary Thompson

Calendar of Events

Date	Time	Event	Location
Aug 11	6:00 pm	Teen Astronomy Club Presentation (Perseids)	Glendora Public Library
Aug 12	-----	New Moon	-----
Aug 15	-----	Star Party	GMARS @ Landers
Aug 19	6:00 pm	PVAA Board Meeting	IHOP @ 80 N. Euclid Ave. Upland
Aug 27	-----	Full Moon	-----
Aug 28	7:30 pm	PVAA General Meeting	Harvey Mudd College, Shanahan B-460
Sep 8	6:00 pm	Teen Astronomy Club Present'n (Outer Planets)	Glendora Public Library
Sep 10	-----	New Moon	-----
Sep 12	-----	Star Party	GMARS @ Landers
Sep 16	6:00 pm	PVAA Board Meeting	IHOP @ 80 N. Euclid Ave. Upland
Sep 23	-----	Autumnal Equinox	Earth
Sep 25	7:30 pm	PVAA General Meeting	Harvey Mudd College, Shanahan B-460
Sep 26	-----	Full Moon	-----
Oct 10	-----	New Moon	-----
Oct 10	-----	Star Party	GMARS @ Landers
Oct 13	6:00 pm	Teen Astronomy Club Present'n (Light Pollution)	Glendora Public Library
Oct 14	6:00 pm	PVAA Board Meeting	IHOP @ 80 N. Euclid Ave. Upland
Oct 23	7:30 pm	PVAA General Meeting	Harvey Mudd College, Shanahan B-460
Oct 25	-----	Full Moon	-----

Upcoming Celestial Events

August 2026

PST = UTC - 8 hrs
 PST = PDT - 1 hr
 PDT = UTC - 7 hrs
 PDT = PST + 1 hr

events visible in southern
 CA highlighted in yellow

Date	Day	LA Time	Event	Direction	Altitude (deg)	Moon Phase/Illumination
Aug 2	Sun	6:54 am view 4:45 am to 6:00 am	Mercury at Greatest Western Elongation elong = 19°	E	17	Waning Gibbous 81%
Aug 3-4	Mon-Tue	11:37 pm - 4:18 am	Comet 10P/Tempel at Peak Brightness	SE to SW	21-30-21	Waning Gibbous 69%
Aug 6	Thu	12:30 am - 5:25 am	Moon-Pleiades Close Approach sep = 1.2°	E	0 to 58	Waning Crescent 31%
Aug 9	Sun	2:30 am - 5:00 am	Moon-Ceres Close Approach sep = 1.4°	E	0 to 29	Waning Crescent 8%
Aug 11	Tue	4:52 am - 5:51 am	Moon-Mercury Close Approach sep = 2.1°	E	0 to 10	Waning Crescent 0%
Aug 12	Wed	10:37 am	New Moon	-----	-----	New Moon 0%
Aug 12-13	Wed-Thur	7:00 pm - 7:00 am	Perseid Meteor Shower Peaks 130/hr	NE	-----	Waxing Crescent 1%
Aug 14	Fri	7:45 pm - 9:40 pm	Venus at Greatest Eastern Elongation elong = 46°	W	21	Waxing Crescent 8%
Aug 15	Sat	7:55 pm - 9:35 pm	Moon-Venus close approach sep = 1.8 deg	W	19	Waxing Crescent 18%
Aug 27	Thu	7:34 pm - 10:52 pm max @ 9:13 pm	Partial Lunar Eclipse 96.2% covered	E to SSE		Full Moon

Lunation No. 1281

Lunation No. 1282

Partial Lunar Eclipse of 2026 Aug 28

Ecliptic Conjunction = 04:19:41.5 TD (= 04:18:26.0 UT)

Greatest Eclipse = 04:14:04.4 TD (= 04:12:49.0 UT) **9:12:49 PDT Aug 27**

Penumbral Magnitude = 1.9645 P. Radius = 1.2117° Gamma = 0.4964

Umbral Magnitude = 0.9299 U. Radius = 0.6840° Axis = 0.4647°

Saros Series = 138 Member = 30 of 83

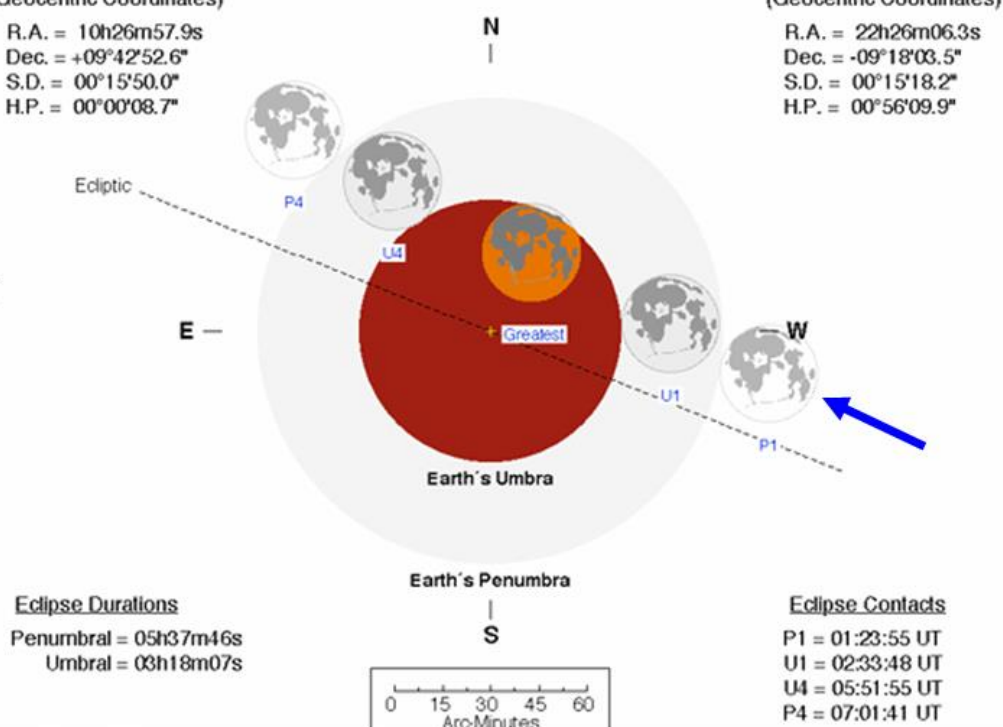
Sun at Greatest Eclipse
 (Geocentric Coordinates)

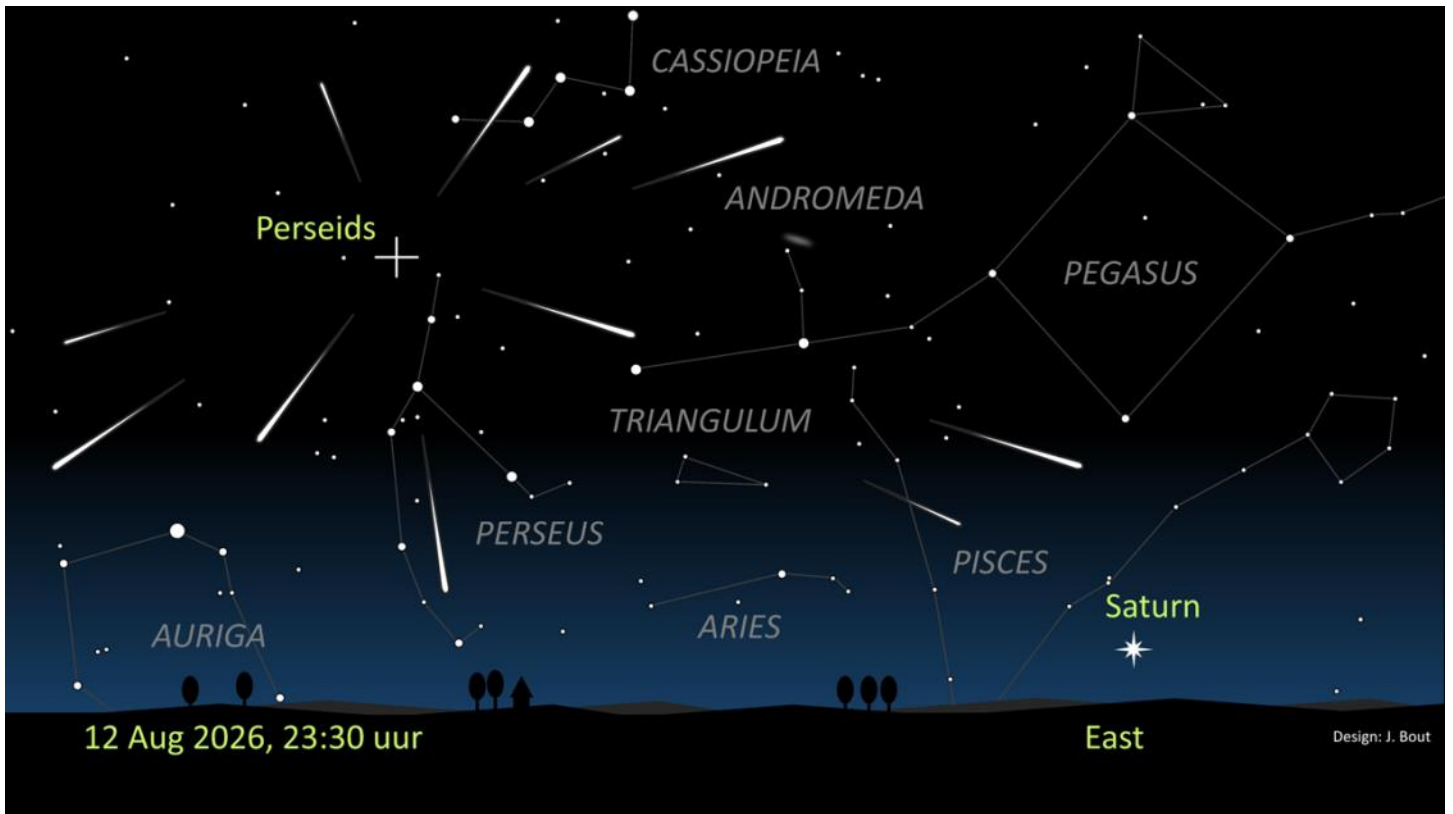
R.A. = 10h26m57.9s
 Dec. = +09°42'52.6"
 S.D. = 00°15'50.0"
 H.P. = 00°00'08.7"

Moon at Greatest Eclipse
 (Geocentric Coordinates)

R.A. = 22h26m06.3s
 Dec. = -09°18'03.5"
 S.D. = 00°15'18.2"
 H.P. = 00°56'09.9"

7:34 pm - 10:52 pm PDT
 max @ 9:13 pm PDT
 Aug. 27, 2026





FREE* EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

Follow us on Bluesky
skymaps.com/bsky/

- More sky events and links at Skymaps.com/skycalendar/

All times in Universal Time (UT). (USA Eastern Daylight Time = UT - 4 hours.)



- Helping curious minds to explore the night sky since January 2000 •
Recommended Products for Sky Watchers: skymaps.com/store/
 All sales support the production of this free resource. Thank you.

Listed on this page are several of the brighter, more interesting celestial objects visible in the evening sky this month (refer to the monthly sky map). The objects are grouped into three categories. Those that can be easily seen with the naked eye (that is, without optical aid), those easily seen with binoculars, and those requiring a telescope to be appreciated. **Note, all of the objects (except single stars) will appear more impressive when viewed through a telescope or very large binoculars.** They are grouped in this way to highlight objects that can be seen using the optical equipment that may be available to the star gazer.

When observing the night sky, and in particular deep-sky objects such as star clusters, nebulae, and galaxies, it's always best to observe from a dark location. Avoid direct light from street lights and other sources. If possible observe from a dark location away from the light pollution that surrounds many of today's large cities.

You will see more stars after your eyes adapt to the darkness—usually about 10 to 20 minutes after you go outside. Also, if you need to use a torch to view the sky map, cover the light bulb with red cellophane. This will preserve your dark vision.

Finally, even though the Moon is one of the most stunning objects to view through a telescope, its light is so bright that it brightens the sky and makes many of the fainter objects very difficult to see. So try to observe the evening sky on moonless nights around either New Moon or Last Quarter.

Conjunction – An alignment of two celestial bodies such that they present the least angular separation as viewed from Earth.

Constellation – A defined area of the sky containing a star pattern.

Diffuse Nebula – A cloud of gas illuminated by nearby stars.

Double Star – Two stars that appear close to each other in the sky; either linked by gravity so that they orbit each other (binary star) or lying at different distances from Earth (optical double). Apparent separation of stars is given in seconds of arc (").

Ecliptic - The path of the Sun's center on the celestial sphere as seen from Earth

Elongation – The angular separation of two celestial bodies. For Mercury and Venus the greatest elongation occurs when they are at their most angular distance from the Sun as viewed from Earth.

Galaxy – A mass of up to several billion stars held together by gravity.

Globular Star Cluster – A ball-shaped group of several thousand old stars.

Light Year (ly) – The distance a beam of light travels at 300,000 km/sec in one year.

Magnitude – The brightness of a celestial object as it appears in the sky.

Open Star Cluster – A group of tens or hundreds of relatively young stars.

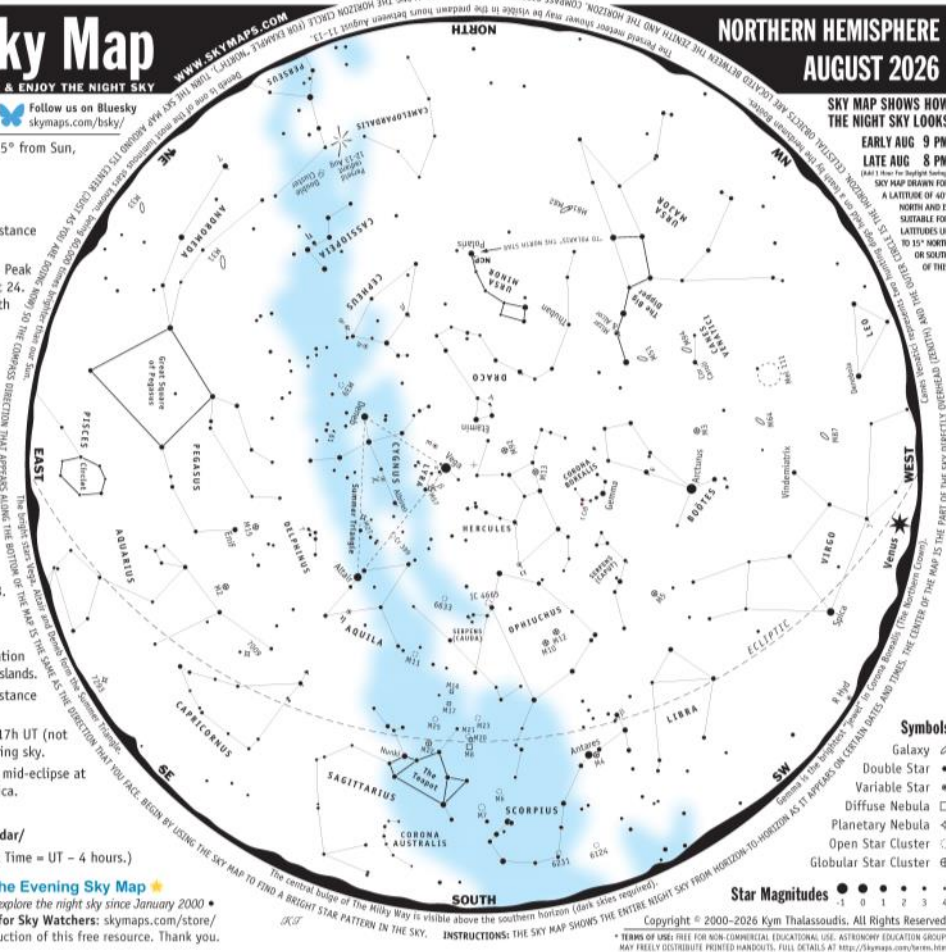
Opposition – When a celestial body is opposite the Sun in the sky.

Planetary Nebula – The remnants of a shell of gas blown off by a star.

Universal Time (UT) – A time system used by astronomers. Also known as Greenwich

Mean Time. USA Eastern Standard Time (for example, New York) is 5 h

Variable Star – A star that changes brightness over a period of time.



Altair	Aql	• Brightest star in Aquila. Name means "the flying eagle". Dist=16.7 ly.
Arcturus	Boo	• Orange, giant K star. Name means "bear watcher". Dist=36.7 ly.
β Cephei	Cep	• Cepheid prototype. Mag varies between 3.5 & 4.6 over 5,366 days. Mag 6 companion.
Deneb	Cyg	• Brightest star in Cygnus. One of the greatest known supernovae. Dist=1,400±200 ly.
α Herculis	Her	• Semi-regular variable. Magnitude varies between 3.1 & 3.9 over 90 days. Mag 5.4 companion
Vega	Lyra	• The 5th brightest star in the sky. A blue-white star. Dist=25.0 ly.
γ Sco	Sco	• Red, supergiant star. Name means "the scorpion". Dist=175 ly.
Polaris	UMi	• The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist=433 ly.
Spiral	Vir	• Latin name means "ear of wheat" and shown held in Virgo's left hand. Dist=250 ly.

M1	And	♂	The Andromeda Galaxy. Most distant object visible to naked eye. Dist=2.5 million ly.
M1	Aquile	♂	Bright Cepheid variable. Mag varies between 3.6 & 4.5 over 7.166 days. Dist=1,200 ly.
M3	Cyln	♂	Easy to find in binoculars. Might be glimpsed with the naked eye.
M5	Cep	♂	Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days.
M5	Cygni	♂	Long period pulsating red giant. Magnitude varies between 3.8 & 14.2 over 407 days.
M39	Cygn	♂	May be visible to the naked eye under good conditions. Dist=900 ly.
M5	Draco	♂	Wide pair of white stars. One of the finest binocular pairs in the sky. Dist=100 ly.
M5	Her	♂	Best planetary in northern skies. Discovered by William Herschel in 1771. Dist=23,000 ly.
M92	Her	♂	Fainter and smaller than M13. Use a telescope to resolve its stars.
M5	Lyrae	♂	Famous Double Double. Binoculars show a double star. High power reveals each a double.
M5	R Lyrae	♂	Semi-regular variable. Magnitude varies between 3.9 & 5.0 over 46.0 days.
M12	Oph	♂	Close to the brighter M10. Dist=18,000 ly.
M10	Oph	♂	3 degrees from the fainter M12. Both may be glimpsed in binoculars. Dist=14,000 ly.
IC 4665	Oph	♂	Large, scattered open cluster. Visible with binoculars.
IC 4633	Oph	♂	Scattered open cluster. Visible with binoculars.
M15	Peg	♂	Only globular known to contain a planetary nebula (Mag 14, d=1"). Dist=30,000 ly.
M8	Sgr	♂	Lagoon Nebula. Bright nebula bisected by a dark lane. Dist=5,200 ly.
M25	Sgr	♂	Bright cluster located about 6 deg N of "teapot's" lid. Dist=1,900 ly.
M22	Sgr	♂	A spectacular globular star cluster. Telescope will show stars. Dist=10,000 ly.
M4	Sco	♂	A close globular. May just be visible without optical aid. Dist=7,000 ly.
M5	Sco	♂	Butterfly Cluster. 30+ stars in 7x binoculars. Dist=1,960 ly.
M6	Sco	♂	Superb open cluster. Visible to the naked eye. Dist=100,000 years. Dist=780 ly.
M7	Ser	♂	One globular star cluster. Telescope will reveal several individual stars. Dist=25,000 ly.
Mizar & Alcor	Uma	♂	Good eyesight or binoculars reveals 2 stars. Not a binary. Mizar has a mag 4 companion.
CR 399	Vul	♂	Goathander asterism or "Brooch's Cluster". Not a true star cluster. Dist=218 to 1,140 ly.

7009	Agr	♂	Saturn Nebula. Requires 8-inch telescope to see Saturn-like appendages.
♂ Bofis	Boo	♂	Red giant star (mag 2.5) with a blue-green mag 4.9 companion. Sep=2.8". Difficult to split.
M54	CvN	♂	Compact nearly face-on spiral galaxy. Dist=15 million ly.
M91	CvN	♂	Whirlpool Galaxy. First recognised to have spiral structure. Dist=25 million ly.
M64	Com	♂	Black Eye Galaxy. Discovered by J.E. Bode in 1775 - "a small, nebulous star."
Albireo	Cyg	♂	Beautiful double star. Contrasting colours of orange and blue-green. Sep=34.4".
61 Cygni	Cyg	♂	Attractive double star. Mags 5.2 & 6.1 orange dwarfs. Dist=11.4 ly. Sep=28.4".
♂ Delphi	Del	♂	Appear yellow & white. Mags 4.3 & 5.2. Dist=100 ly. Swane 2725 double in same field.
♂ Lyrae	Lyr	♂	Eclipsing binary. Mag varies between 3.8 & 4.3 over 12.940 days. Fainter mag 7.2 blue star.
M57	Lyr	♂	Ring Nebula. Magnificent object. Smoke-ring shape. Dist=4,100 ly.
M23	Sgr	♂	Elongated star cluster. Telescope required to show stars. Dist=2,100 ly.
M20	Sgr	♂	Trifid Nebula. A telescope shows 3 dust lanes tracing nebula. Dist=5,200 ly.
M21	Sgr	♂	A wide and impressive cluster. Dist=4,200 ly.
M2	Sgr	♂	Omega Nebula. Contains the star θ 1. Mags 6.618, Dist=4,900 ly.
M11	Sgr	♂	Wild Duck Cluster. Resembles a globular through binoculars. V-shaped. Dist=5,600 ly.
M16	Ser	♂	Eagle Nebula. Requires a telescope of large aperture. Dist=8,150 ly.
M81	UMa	♂	Beautiful spiral galaxy visible with binoculars. Easy to see in a telescope.
M82	UMa	♂	Close to M81 but much fainter and smaller.
M27	Vul	♂	Dumbbell Nebula. Large, twin-lobed shape. Most spectacular planetary. Dist=975 ly.