Skywatchers

Newsletter of the China Lake Astronomical Society

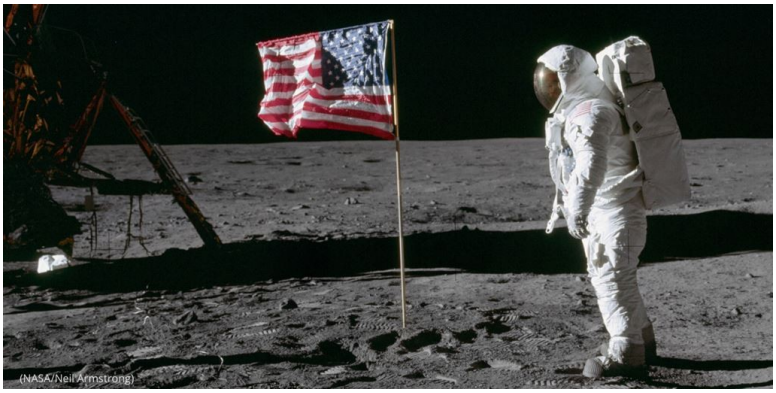
A P R I L 7 T H , 2 0 2 5 C L A S M E E T I N G 7 : 3 0

This Month Issue

Monday, April 07, 2025 7:00 PM

Meeting & Program

Refreshments: 7:00 PM Announcements : 7:30 Program: 7:45



Maturango Museum

Meetings and programs are open to the public, and are held at Maturango Museum on the first Monday of every month (or the following Monday for holidays).

Keith Weisz

Advocacy for the Astronomical Sciences

Keith will present a program from the American Astronomical Society that informs us how to advocate for support and funding for the sciences in these times of government budget reductions.

If you're reading this, you probably value and appreciate science. Yet, in many ways, science is being deemphasized and attacked. What can we do to counter this? In the words of the AAS,

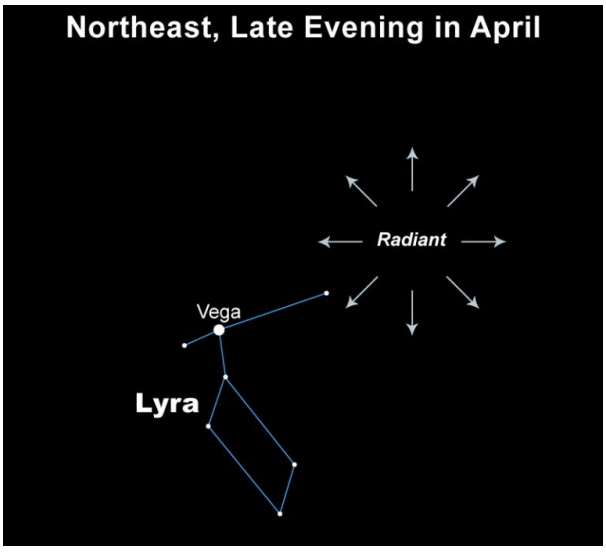
"Public policy is a catchall phrase that includes actions of and interactions with both Congress and the Executive branch. Public policy can involve law-making, setting and funding government spending priorities, regulatory issues, strategy making, and more. It is the means by which democratic societies solve problems and plan for the future."

Learn what you can do to make your feelings known and keep science vital and strong in the United States.

Lyrid Meteor Shower

When to watch in 2025: Late evening April 21 before the thick waning crescent moon rises a few hours after midnight.
The predicted** peak is 16 UTC on April 22. The peak of the Lyrids is narrow (no weeks-long stretches of meteor-watching, as with some showers). In 2025, the last quarter moon falls at 1:35 UTC on April 21. So meteor watching before dawn on April 22 will be impacted by a thick waning crescent moon.
Radiant: Rises before midnight, highest in the sky at dawn.
Nearest moon phase: Last quarter moon falls at 1:35 UTC on April 21. So a fat waning crescent moon will be in the sky during the peak morning for the 2025's Lyrid meteor shower. The best time to watch is late evening on April 21 until the moon rises a few hours before dawn on April 22. Then, after the moon rises, place yourself in the moon's shadow.
Duration of shower: April 15 to April 29. This time period is when we're passing through the meteor stream in space!
Expected meteors at peak, under ideal conditions: In a dark sky with no moon, you might see 10 to 15 Lyrids per hour. In 2025, since the radiant rises before midnight, watch for meteors before the fat crescent moon rises after midnight. The Lyrids are known for uncommon surges that can sometimes bring rates of up to 100 per hour! Read more about Lyrid outbursts.
Note for Southern Hemisphere: This shower's radiant point is far to the north on the sky's dome. So the Southern Hemisphere will see fewer Lyrid meteors. Still, you might see some!
Meteor train possibilities? In a moonless sky, a few Lyrid meteors can leave persistent trains. That is, they leave a trail of ionized gases that glow for a few seconds after the meteor has passed. Lyrids are known to produce fireballs.

Source:2025 Lyrid meteor shower: All you need to know



China Lake Astronomical Society
Membership or Renewal 2024

Name:_____

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City, State, Zip:_____

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Yearly Membership $ 25 (*due in January*) Family $ 40 Youth 18 & under $ 10.
Checks or Money Orders accepted _____

Contact Roger Brower 760-446-0454 (email brower@iwvisp.com)
Make Checks or Money Orders Payable to China Lake Astronomical Society.(CLAS)

Roger Brower, Treasurer
China Lake Astronomical Society
P.O. Box 1783
Ridgecrest, CA 93556.

On 3/27/2025 9:28 PM, kerniew wrote:
> Last night I tried to image M106. I was amazed by the number of
> satellite trails. Check this link:
> https://youtu.be/xCq2EVyFTr0?si=ijDzqy4hK7HIel8Y

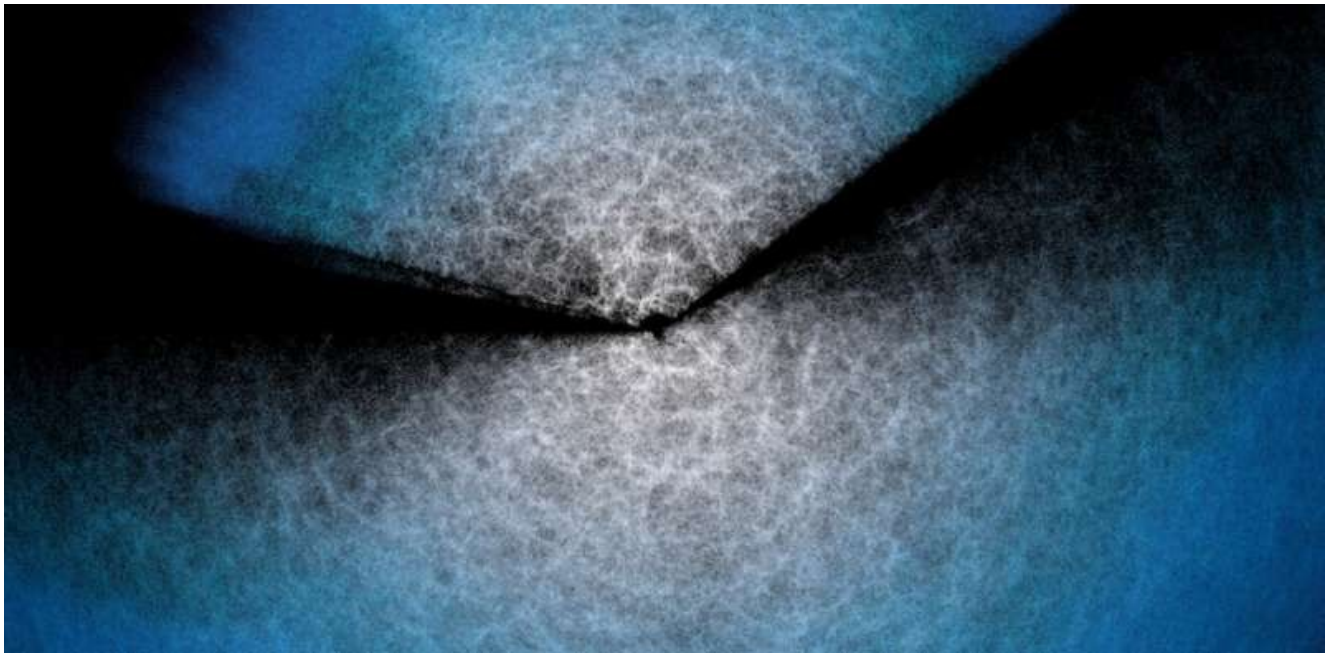
Photo by Keith Weisz

I may have done this image in the past, so sorry if you have seen this before. I like this because it shows an elliptical galaxy (lower left of center which has no clear structure), an edge on galaxy with strong dust lanes (center), a distorted galaxy (upper left of center) and a nice barred spiral galaxy. You will also notice other smudges in the background. Those are galaxies also.
All in all, I like the composition that the group makes.
Paul Hickson published his catalog of 100 compact galaxy groups in 1982. He pulled out the developed a categorization method which made the items be classified as a "Compact Group".

Hickson 44 (**HCG 44**) is a group of galaxies in the constellation Leo. As Arp 316, a part of this group is also designated as group of galaxies in the Atlas of Peculiar Galaxies.

About 100 million light years away, in the constellation of Leo, sits this magnificent group of galaxies containing three spiral galaxies and an elliptical galaxy, numbered 44 in a catalog of 100 such clusters compiled by astronomer Paul Hickson. The four members of Hickson Compact Group 44 are NGC 3190 (center), 3185 (the upper left), 3187 (the center left), and NGC 3193 (the center right). NGC 3190, the dominant member, is a striking spiral galaxy of some 75000 light-years across with a characteristic dust lane that we see nearly edge-on. NGC 3187 is an S-shaped spiral with a prominent central bar. NGC 3185 is also a barred spiral, but its bar is subtle and much smaller relative to its overall size. NGC 3193 is a good example of an elliptical galaxy.

Dark energy may not be constant—this discovery could undermine our entire model of cosmological history



The great Russian physicist and Nobel laureate Lev Landau once remarked that "cosmologists are often in error, but never in doubt." In studying the history of the universe itself, there is always a chance that we have got it all wrong, but we never let this stand in the way of our inquiries.

A few days ago, a new press release announced groundbreaking findings from the Dark Energy Spectroscopy Instrument (DESI), which is installed on the Mayall Telescope in Arizona. This vast survey, containing the positions of 15 million galaxies, constitutes the largest three-dimensional mapping of the universe to date. For context, the light from the most remote galaxies recorded in the DESI catalog was emitted 11 billion years ago, when the universe was about a fifth of its current age.

DESI researchers studied a feature in the distribution of galaxies that astronomers call "baryon acoustic oscillations." By comparing it to observations of the very early universe and supernovae, they have been able to suggest that dark energy—the mysterious force propelling our universe's expansion—is not constant throughout the history of the universe.

An optimistic take on the situation is that sooner or later the nature of dark matter and dark energy will be discovered. The first glimpses of DESI's results offer at least a small sliver of hope of achieving this.

However, that might not happen. We might search and make no headway in understanding the situation. If that happens, we would need to rethink not just our research, but the study of cosmology itself. We would need to find an entirely new cosmological model, one that works as well as our current one but that also explains this discrepancy. Needless to say, it would be a tall order.

To many who are interested in science, this is an exciting, potentially revolutionary prospect. However, this kind of reinvention of cosmology, and indeed all of science, is not new, as argued in the 2023 book The Reinvention of Science.

The Search for 2 Numbers

Back in 1970, Allan Sandage wrote a much-quoted paper pointing to two numbers that bring us closer to answers about the nature of cosmic expansion. His goal was to measure them and discover how they change with cosmic time. Those numbers are the Hubble constant, H_0, and the deceleration parameter, q_0.

The first of these two numbers tells us how fast the universe is expanding. The second is the signature of gravity: as an attractive force, gravity should be pulling against cosmic expansion. Some data has shown a deviation from the Hubble-Lemaître Law, of which Sandage's second number, q_0, is a measure.

No significant deviation from Hubble's straight line could be found until breakthroughs were made in 1997 by Saul Perlmutter's Supernova Cosmology Project and the High-Z SN Search Team led by Adam Riess and Brian Schmidt. The goal of these projects was to search for and follow supernovae exploding in very distant galaxies.

These projects found a clear deviation from the simple straight line of the Hubble-Lemaître Law, but with one important difference: the universe's expansion is accelerating, not decelerating. Perlmutter, Riess, and Schmidt attributed this deviation to Einstein's cosmological constant, which is represented by the Greek letter Lambda, Λ, and is related to the deceleration parameter.

Their work earned them the 2011 Nobel Prize in Physics.

Dark energy: 70% of the universe

Astonishingly, this Lambda-matter, also known as dark energy, is the dominant component of the universe. It has been speeding up the universe's expansion to the point where the force of gravity is overridden, and it accounts for almost 70% of the total density of the universe. We know little or nothing about the cosmological constant, Λ. In fact, we do not even know that it is a constant. Einstein first said there was a constant energy field when he created his first cosmological model derived from General Relativity in 1917, but his solution was neither expanding nor contracting. It was static and unchanging, and so the field had to be constant.

Constructing more sophisticated models that contained this constant field was an easier task: they were derived by the Belgian physicist Georges Lemaître, a friend of Einstein's. The standard cosmology models today based on Lemaître's work, and are referred to as Λ Cold Dark Matter (ΛCDM) models.

https://youtu.be/VzIOSCm5fNU

The DESI measurements on their own are completely consistent with this model. However, by combining them with observations of cosmic microwave background and supernovae, the best fitting model is one involving a dark energy that evolved over cosmic time, and that will (potentially) no longer be dominant in the future. In short, this would mean the cosmological constant does not explain dark energy.

The Big Crunch

In 1988, the 2019 physics Nobel laureate P. J. E. Peebles wrote a paper with Bharat Ratra on the possibility that there is a cosmological constant that varies with time. Back when they published this paper, there was no serious body of opinion about Λ.

This is an attractive suggestion. In this case the current phase of accelerated expansion would be transient and would end at some point in the future. Other phases in cosmic history have had a beginning and an end: inflation, the radiation-dominated era, the matter-dominated era, and so on.

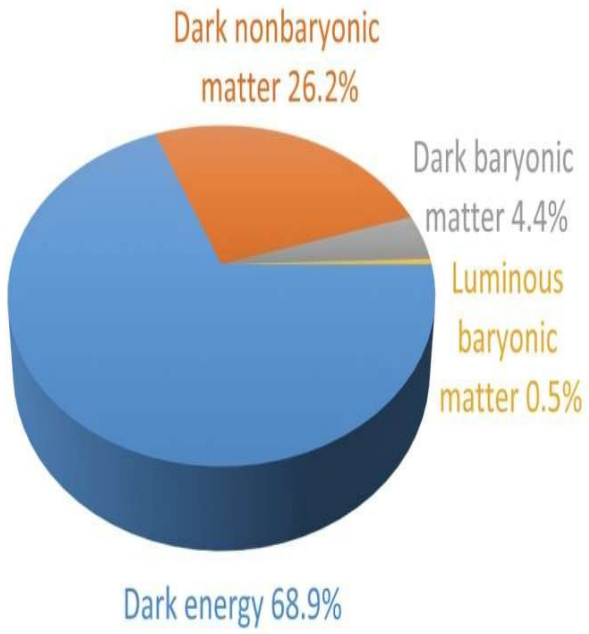
The present dominance of dark energy may therefore decline over cosmic time, meaning it would not be a cosmological constant. The new paradigm would imply that the current expansion of the universe could eventually reverse into a "Big Crunch."

Other cosmologists are more cautious, not least Carl Sagan, who wisely said that "extraordinary claims require extraordinary evidence". It is crucial to have multiple, independent lines of evidence pointing to the same conclusion. We are not there yet.

Answers may come from one of today's ongoing projects—not just DESI but also Euclid and J-PAS—which aim to explore the nature of dark energy through large-scale galaxy mapping.

While the workings of the cosmos itself are up for debate, one thing is for sure—a fascinating time for cosmology is on the horizon.

Source: http:\\www.physics.org



The Evening Sky Map

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

WWW.SKYMAPS.COM

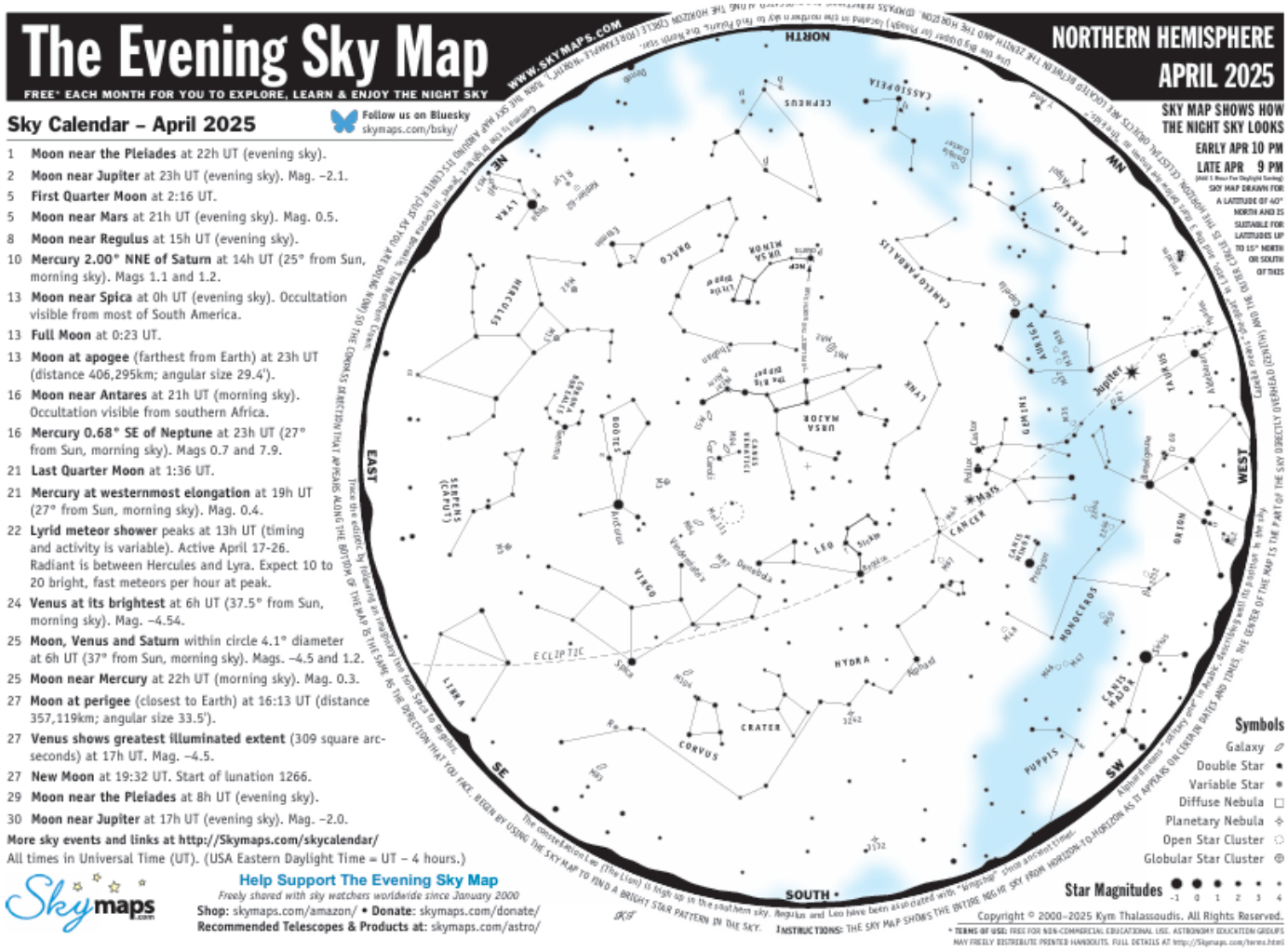
NORTHERN HEMISPHERE
APRIL 2025

Sky Calendar – April 2025

Follow us on Bluesky
skymaps.com/bsky/

1 **Moon near the Pleiades** at 22h UT (evening sky).
2 **Moon near Jupiter** at 23h UT (evening sky). Mag. −2.1.
5 **First Quarter Moon** at 2:16 UT.
5 **Moon near Mars** at 21h UT (evening sky). Mag. 0.5.
8 **Moon near Regulus** at 15h UT (evening sky).
10 **Mercury 2.00° NNE of Saturn** at 14h UT (25° from Sun, morning sky). Mags 1.1 and 1.2.
13 **Moon near Spica** at 0h UT (evening sky). Occultation visible from most of South America.
13 **Full Moon** at 0:23 UT.
13 **Moon at apogee** (farthest from Earth) at 23h UT (distance 406,295km; angular size 29.4').
16 **Moon near Antares** at 21h UT (morning sky). Occultation visible from southern Africa.
16 **Mercury 0.68° SE of Neptune** at 23h UT (27° from Sun, morning sky). Mags 0.7 and 7.9.
21 **Last Quarter Moon** at 1:36 UT.
21 **Mercury at westernmost elongation** at 19h UT (27° from Sun, morning sky). Mag. 0.4.
22 **Lyrid meteor shower** peaks at 13h UT (timing and activity is variable). Active April 17-26. Radiant is between Hercules and Lyra. Expect 10 to 20 bright, fast meteors per hour at peak.
24 **Venus at its brightest** at 6h UT (37.5° from Sun, morning sky). Mag. −4.54.
25 **Moon, Venus and Saturn** within circle 4.1° diameter at 6h UT (37° from Sun, morning sky). Mags. −4.5 and 1.2.
25 **Moon near Mercury** at 22h UT (morning sky). Mag. 0.3.
27 **Moon at perigee** (closest to Earth) at 16:13 UT (distance 357,119km; angular size 33.5').
27 **Venus shows greatest illuminated extent** (309 square arc-seconds) at 17h UT. Mag. −4.5.
27 **New Moon** at 19:32 UT. Start of lunation 1266.
29 **Moon near the Pleiades** at 8h UT (evening sky).
30 **Moon near Jupiter** at 17h UT (evening sky). Mag. −2.0.

More sky events and links at http://Skymaps.com/skycalendar/
All times in Universal Time (UT). (USA Eastern Daylight Time = UT − 4 hours.)



SKY MAP SHOWS HOW THE NIGHT SKY LOOKS
EARLY APR 10 PM
LATE APR 9 PM
SKY MAP DRAWN FOR A LATITUDE OF 40° NORTH AND IS SUITABLE FOR LATITUDES UP TO 15° NORTH OR SOUTH OF THIS

Symbols
Galaxy
Double Star
Variable Star
Diffuse Nebula
Planetary Nebula
Open Star Cluster
Globular Star Cluster

Star Magnitudes -1 0 1 2 3 4

Skymaps.com

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About the Celestial Objects

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.

Tips for Observing the Night Sky

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.

Astronomical Glossary

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 hours behind UT.

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

NORTHERN HEMISPHERE CELESTIAL OBJECTS APRIL 2025

Sky-maps.com

Easily Seen with the Naked Eye

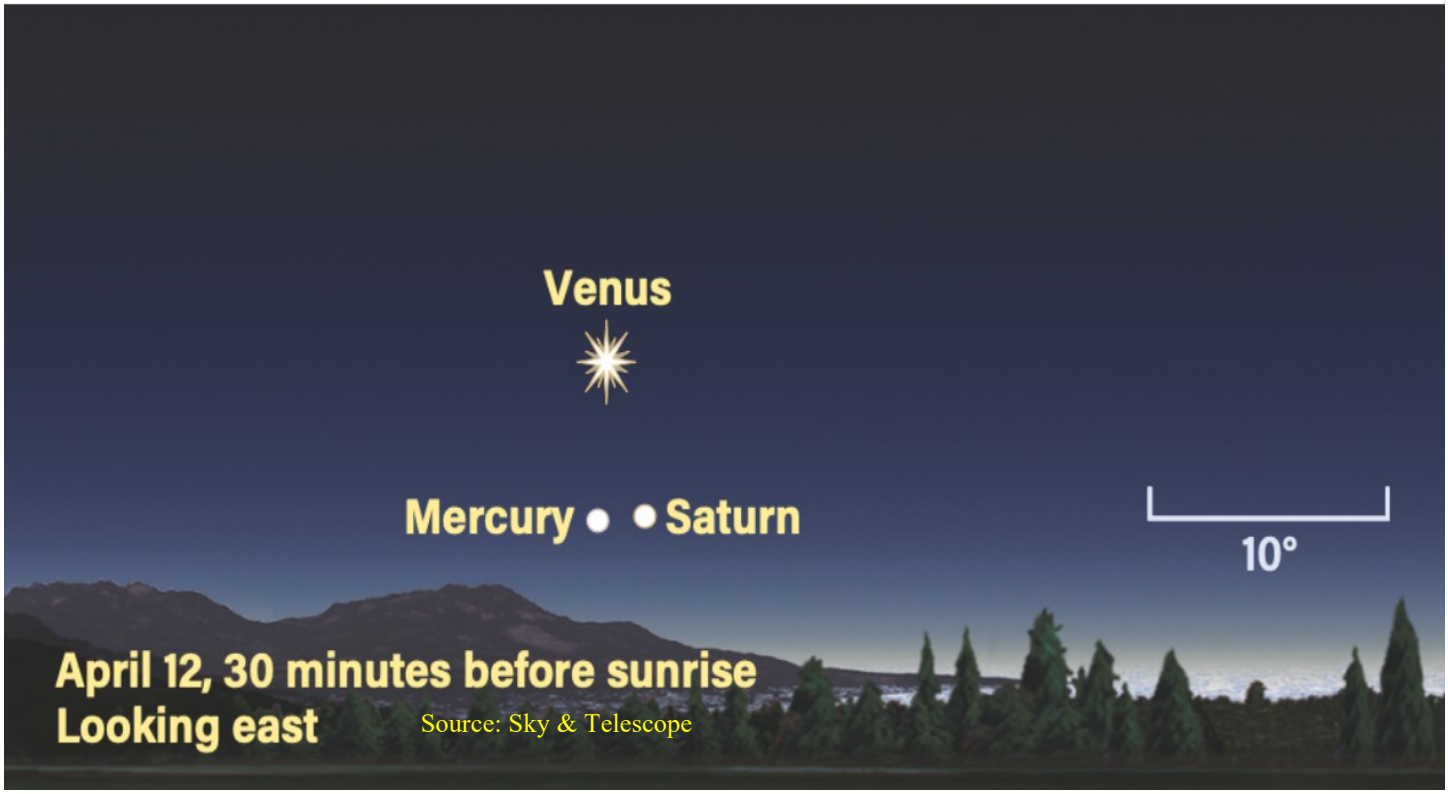
Capella	Aur	✸	The 6th brightest star. Appears yellowish in color. Spectroscopic binary. Dist=42 ly.
Arcturus	Boo	✸	Orange, giant K star. Name means "bear watcher". Dist=36.7 ly.
Sirius	CMa	✸	The brightest star in the sky. Also known as the "Dog Star". Dist=8.6 ly.
Procyon	CMi	✸	Greek name meaning "before the dog" - rises before Sirius (northern latitudes). Dist=11.4 ly.
Castor	Gem	✸	Multiple star system with 6 components. 3 stars visible in telescope. Dist=52 ly.
Pollux	Gem	✸	With Castor, the twin sons of Leda in classical mythology. Dist=34 ly.
Regulus	Leo	✸	Brightest star in Leo. A blue-white star with at least 1 companion. Dist=77 ly.
Vega	Lyr	✸	The 5th brightest star in the sky. A blue-white star. Dist=25.0 ly.
Betelgeuse	Ori	✸	One of the largest red supergiant stars known. Diameter=300 times that of Sun. Dist=430 ly.
Algol	Per	✸	Famous eclipsing binary star. Magnitude varies between 2.1 & 3.4 over 2.867 days.
Aldebaran	Tau	✸	Brightest star in Taurus. It is not associated with the Hyades star cluster. Dist=66.7 ly.
Polaris	UMi	✸	The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist = 433 ly.
Spica	Vir	✸	Latin name means "ear of wheat" and shown held in Virgo's left hand. Dist=250 ly.

Easily Seen with Binoculars

M38	Aur	○	Stars appear arranged in "pi" or cross shape. Dist=4,300 ly.
M36	Aur	○	About half size of M38. Located in rich Milky Way star field. Dist=4,100 ly.
M37	Aur	○	Very fine star cluster. Discovered by Messier in 1764. Dist=4,400 ly.
M44	Cnc	○	Praesepe or Beehive Cluster. Visible to the naked eye. Dist=590±20 ly.
M3	CVn	◍	Easy to find in binoculars. Might be glimpsed with the naked eye.
Mel 111	Com	○	Coma Berenices. 80 mag 5-6 stars in 5 deg. Dist=283 ly. Age=400 million years.
ν Draconis	Dra	✸	Wide pair of white stars. One of the finest binocular pairs in the sky. Dist=100 ly.
M35	Gem	○	Fine open cluster located near foot of the twin Castor. Dist=2,800 ly.
M13	Her	◍	Best globular in northern skies. Discovered by Halley in 1714. Dist=23,000 ly.
M92	Her	◍	Fainter and smaller than M13. Use a telescope to resolve its stars.
M48	Hya	○	12+ stars in 7x binoculars. Triangular asterism near centre. Dist=1,990 ly.
R Hydrae	Hya	✸	Long period variable. Mag varies between 3.0 & 11.0 over 390 days. Brilliant red.
R Lyrae	Lyr	✸	Semi-regular variable. Magnitude varies between 3.9 & 5.0 over 46.0 days.
2232	Mon	○	A large scattered star cluster of 20 stars. Dist=1,300 ly.
2244	Mon	○	Surrounded by the rather faint Rosette Nebula. Dist=5,540 ly.
N50	Mon	○	Visible with binoculars. Telescope reveals individual stars. Dist=3,000 ly.
Cr 69	Ori	○	Lambda Orionis Cluster. Dist=1,630 ly.
Double Cluster	Per	○	Double Cluster in Perseus. NGC 869 & 884. Excellent in binoculars. Dist=7,300 ly.
M47	Pup	○	Bright star cluster. 15+ stars in 7x binoculars. Dist=1,500 ly.
M46	Pup	○	Dist=5,400 ly. Contains planetary NGC 2438 (Mag 11, d=65") - not associated.
M5	Ser	◍	Fine globular star cluster. Telescope will reveal 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.

Telescopic Objects

ε Boötis	Boo	✸	Red giant star (mag 2.5) with a blue-green mag 4.9 companion. Sep=2.8". Difficult to split.
M67	Cnc	○	Contains 500+ stars mag 10 & fainter. One of the oldest clusters. Dist=2,350 ly.
M94	CVn	◌	Compact nearly face-on spiral galaxy. Dist=15 million ly.
M51	CVn	◌	Whirlpool Galaxy. First recognised to have spiral structure. Dist=25 million ly.
η Cassiopeiae	Cas	✸	Yellow star mag 3.4 & orange star mag 7.5. Dist=19 ly. Orbit=480 years. Sep=12".
M64	Com	◌	Black-Eye Galaxy. Discovered by J.E. Bode in 1775 - "a small, nebulous star".
3242	Hya	✧	Ghost of Jupiter. Bright blue disk. Mag 11 central star. Dist=2,600 ly.
M83	Hya	◌	Classic face-on spiral. Discovered in 1752 by Lacaille. In attractive star field.
γ Leonis	Leo	✸	Superb pair of golden-yellow giant stars. Mags 2.2 & 3.5. Orbit=600 years. Sep=4.4".
β Monocerotis	Mon	✸	Triple star. Mags 4.6, 5.0 & 5.4. Requires telescope to view arc-shape. Sep=7.3".
2264	Mon	○	Christmas Tree Cluster. Associated with the Cone Nebula. Dist=2,450 ly.
M1	Tau	□	Crab Nebula. Remnant from supernova which was visible in 1054. Dist=6,500 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.
3132	Vel	✧	One of the brightest planetaries. Magnitude 10 central star. Dist=2,600 ly.
M87	Vir	◌	Supergiant galaxy with supermassive black hole at its core. Dist=53.5 million ly.
M104	Vir	◌	Sombrero Galaxy. Almost edge-on spiral galaxy. Protruding central core.
γ Virginis	Vir	✸	Superb pair of mag 3.5 yellow-white stars. Orbit=169 years. At their closest in 2005.



April DAILY CELESTIAL CALENDAR

1 The Moon passes 5 deg north of Uranus, 7 P.M. PST

2 The Moon passes 6 deg north of Jupiter 5 P.M. PST

2 Mars passes 4 deg south of Pollux 8 P.M. PST

,
4 First Quarter Moon occurs at 7:15 P.M. PST

5 The Moon passes 2 deg north of Mars, 12 P.M. PST

6 Mercury is Stationary 8 A.M. PST

10 Venus is stationary, 8 A.M. PST

12 Full Moon occurs at 5:22 P.M. PST

13 The Moon is at Apogee (252,460 miles from Earth), 3:48 P.M. PST

16 Mercury passes 0.7 deg south of Neptune 12 P.M. PST

16 The Moon passes 0.4 deg south of Antares, 4 P.M. PST

20 Last Quarter Moon occurs at 6:36 P.M. PST

21 Mercury is at its greatest western elongation (27), 12:00 P.M.. PST

22 Lyrid Meteor Shower Peaks

24 The Moon passes 2 deg south of Venus, 6 P.M. PST

24 The Moon passes 2 deg north of Saturn 12 A.M. EDT

25 The Moon passes 1.9 deg north of Neptune, 3 A.M. PST

25 The Moon passes 4 deg north of Mercury, 6 P.M. PST

27 Venus is at greatest brilliancy (mag –4.8), 3 A.M. PST

27 The Moon is at perigee (221,903 miles from Earth), 9:18 PST

27 New Moon occurs at 12:31 P.M. PST

28 The Moon passes 5 deg north of Uranus, 7 P.M. PST

29 Venus passes 4 deg north of Saturn, 7 P.M. PST

30 The Moon passes 5 deg north of Jupiter, 11 A.M. PST

2025 & 2026 New Moons

- April 27, 2025
- May 26, 2025
- June 25, 2025
- July 24, 2025
- August 22nd 2025
- September 21st 2025
- Oct 21st, 2025
- November 19th, 2025
- December 19th, 2025
- January 18th, 2026
- February 17th, 2026
- March 18th, 2026
- April 17th, 2026
- May 16th, 2026
- June 14th, 2026
- July 14th, 2026
- August 12th, 2026
- September 10th, 2026 Nov 08th, 2026
- October 10th, 2026 Dec 08th, 2026

10 ***Star Parties for Red Rock Ricardo Station***

- *April 26th*
- *May 24th*
- *Sept 20th (Tentative Fall Schedule)*
- *Oct 18th (Tentative Fall Schedule)*
- *Nov 15th (Tentative Fall Schedule)*

Brown Road Star Parties

April 25th Brown Road Star Party

Maturango Museum

April 5th 8:00 P.M. Quarter Moon Star Party

Cerro Coso College Astronomical Star Party and Barbecue

Telescopes under dark skies at the college

September 19 - Friday 6:00 PM

Club Information

Monthly Skywatchers Newsletter.

Our newsletter is sent by email once a month to those who have subscribed. You do not have to be a member. Subscribe at a meeting or online at ChinaLakeAstro.org/subscribe

Annual Membership Dues

- Individual $25.00 per year.
- Family $ 40
- Youth 18 & under $10

Officers

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VICE-PRESIDENT – Keith Weisz

SECRETARY – Vacant

TREASURER – Roger Brower

NEWSLETTER EDITOR – Ted Hodgkinson ghodkinson@sbcglobal.net

Club Information

Meetings of the China Lake Astronomical Society are held at the Maturango Museum 7:00 P.M. on the first Monday evening of each month, except when the first Monday is a holiday.

WESTERN AMATEUR ASTRONOMERS WEB SITE http://www.waastro.org/