Skywatchers
Newsletter of the China Lake Astronomical Society

JULY 01, 2024 CLAS MEETING 7:30

INSIDE THIS ISSUE:

Monday, July 01, 2024 7:00 PM

July Meeting & Program

Refreshments: 7:00 P.M

Program: 7:45

The program this month by Keith Weisz will be an internet presentation of "The solar system is weirder than you think".

Location

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).

China Lake Astronomical Society

Membership or Renewal 2024

Name:_____

Address:_____

City, State, Zip:_____

Phone:_____Email:_____

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.

Mid-July to mid-August 2024 meteors … the Perseids

Predicted peak: The peak is predicted** for August 12, 2024, at 14:00 UTC. So the mornings of August 11, 12 and 13 are probably your best bet.

When to watch: The moon will be at 1st quarter and 50% illuminated during 2024's peak of the Perseid meteor shower. So the best time to watch for Perseids will be starting around midnight until dawn. This shower rises to a peak gradually, then falls off rapidly. And Perseid meteors tend to strengthen in number as late night deepens into the wee hours before dawn. The shower is often best just before dawn.

Radiant: The radiant rises in the middle of the night and is highest at dawn.

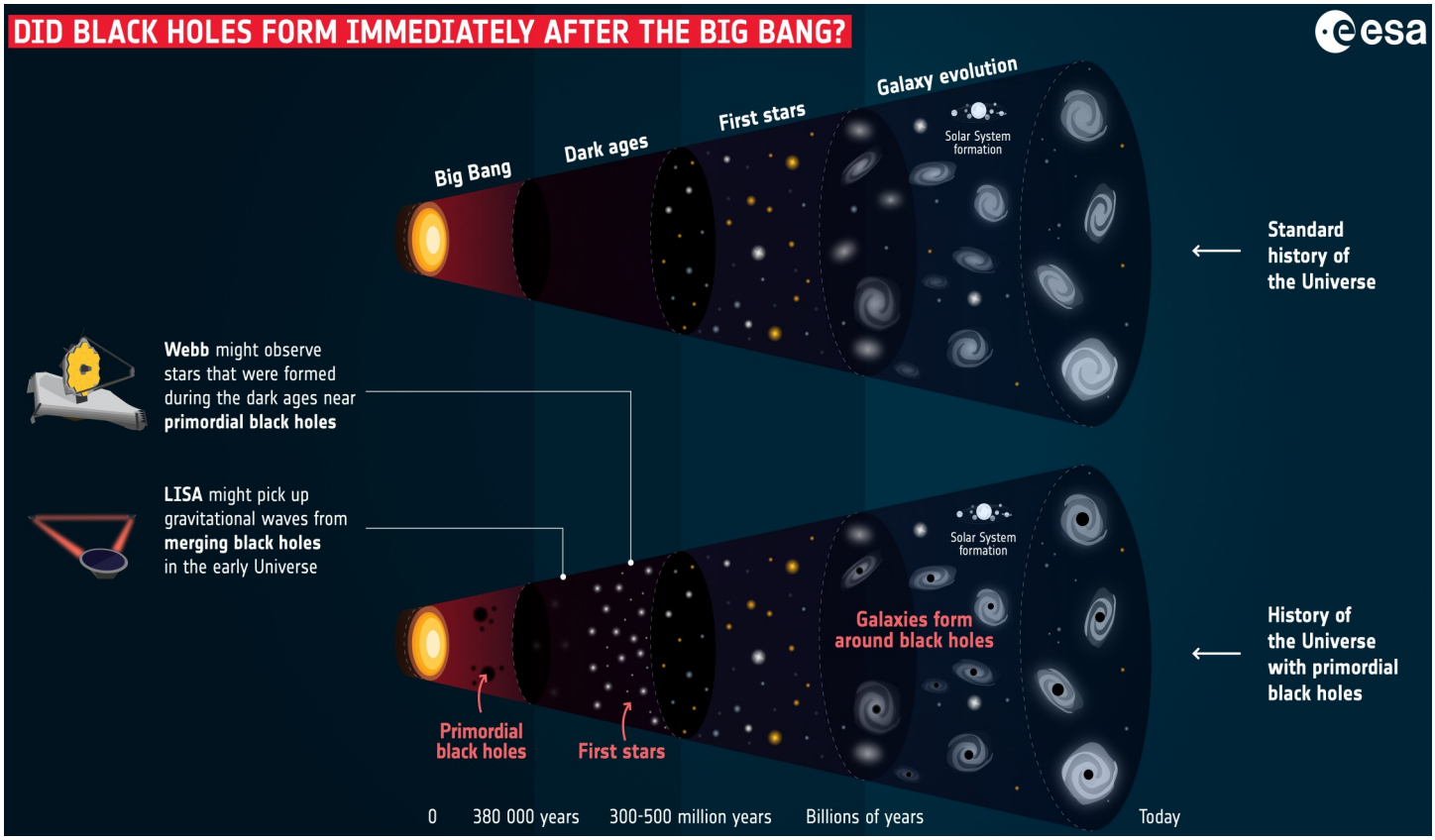
Nearest moon phase: First quarter moon falls at 15:19 UTC on August 12. And a 1st quarter moon sets around midnight, so you'll have dark skies after then until dawn.

Duration of shower: July 14 to September 1.

Expected meteors at peak, under ideal conditions: Under a dark sky with no moon, skywatchers frequently report 90 meteors per hour, or more. The August Perseid meteor shower is rich and steady, from early August through the peak. The meteors are colorful. And they frequently leave persistent trains. All of these factors make the Perseid shower perhaps the most beloved meteor shower for the Northern Hemisphere.

Exotic black holes could be a byproduct of dark matter.

In the first quintillionth of a second, the universe may have sprouted microscopic



Date: June 6, 2024

Source: Massachusetts Institute of Technology

Summary: In the first quintillionth of a second, the universe may have sprouted microscopic black holes with enormous amounts of nuclear charge, MIT physicists propose. The gravitational pull from these tiny, invisible objects could potentially explain all the dark matter that we can't see today.

For every kilogram of matter that we can see -- from the computer on your desk to distant stars and galaxies -- there are 5 kilograms of invisible matter that suffuse our surroundings. This "dark matter" is a mysterious entity that evades all forms of direct observation yet makes its presence felt through its invisible pull on visible objects.

Fifty years ago, physicist Stephen Hawking offered one idea for what dark matter might be: a population of black holes, which might have formed very soon after the Big Bang. Such "primordial" black holes would not have been the goliaths that we detect today, but rather microscopic regions of ultradense matter that would have formed in the first quintillionth of a second following the Big Bang and then collapsed and scattered across the cosmos, tugging on surrounding space-time in ways that could explain the dark matter that we know today.

Now, MIT physicists have found that this primordial process also would have produced some unexpected companions: even smaller black holes with unprecedented amounts of a nuclear-physics property known as "color charge."

These smallest, "super-charged" black holes would have been an entirely new state of matter, which likely evaporated a fraction of a second after they spawned. Yet they could still have influenced a key cosmological transition: the time when the first atomic nuclei were forged. The physicists postulate that the color-charged black holes could have affected the balance of fusing nuclei, in a way that astronomers might someday detect with future measurements. Such an observation would point convincingly to primordial black holes as the root of all dark matter today.

"Even though these short-lived, exotic creatures are not around today, they could have affected cosmic history in ways that could show up in subtle signals today," says David Kaiser, the Germeshausen Professor of the History of Science and professor of physics at MIT. "Within the idea that all dark matter could be accounted for by black holes, this gives us new things to look for."

Kaiser and his co-author, MIT graduate student Elba Alonso-Monsalve, have published their study today in the journal *Physical Review Letters*.

A time before stars

The black holes that we know and detect today are the product of stellar collapse, when the center of a massive star caves in on itself to form a region so dense that it can bend space-time such that anything -- even light -- gets trapped within. Such "astrophysical" black holes can be anywhere from a few times as massive as the sun to many billions of times more massive.

"Primordial" black holes, in contrast, can be much smaller and are thought to have formed in a time before stars.

Before the universe had even cooked up the basic elements, let alone stars, scientists believe that pockets of ultradense, primordial matter could have accumulated and collapsed to form microscopic black holes that could have been so dense as to squeeze the mass of an asteroid into a region as small as a single atom. The gravitational pull from these tiny, invisible objects scattered throughout the universe could explain all the dark matter that we can't see today.

If that were the case, then what would these primordial black holes have been made from? That's the question Kaiser and Alonso-Monsalve took on with their new study.

"People have studied what the distribution of black hole masses would be during this early-universe production but never tied it to what kinds of stuff would have fallen into those black holes at the time when they were forming," Kaiser explains.

Super-charged rhinos

The MIT physicists looked first through existing theories for the likely distribution of black hole masses as they were first forming in the early universe.

"Our realization was, there's a direct correlation between when a primordial black hole forms and what mass it forms with," Alonso-Monsalve says. "And that window of time is absurdly early."

She and Kaiser calculated that primordial black holes must have formed within the first quintillionth of a second following the Big Bang. This flash of time would have produced "typical" microscopic black holes that were as massive as an asteroid and as small as an atom. It would have also yielded a small fraction of exponentially smaller black holes, with the mass of a rhino and a size much smaller than a single proton.

What would these primordial black holes have been made from? For that, they looked to studies exploring the composition of the early universe, and specifically, to the theory of quantum chromodynamics (QCD) -- the study of how quarks and gluons interact. Quarks and gluons are the fundamental building blocks of protons and neutrons -- elementary particles that combined to forge the basic elements of the periodic table. Immediately following the Big Bang, physicists estimate, based on QCD, that the universe was an immensely hot plasma of quarks and gluons

that then quickly cooled and combined to produce protons and neutrons.

The researchers found that, within the first quintillionth of a second, the universe would still have been a soup of free quarks and gluons that had yet to combine. Any black holes that formed in this time would have swallowed up the untethered particles, along with an exotic property known as "color charge" -- a state of charge that only uncombined quarks and gluons carry.

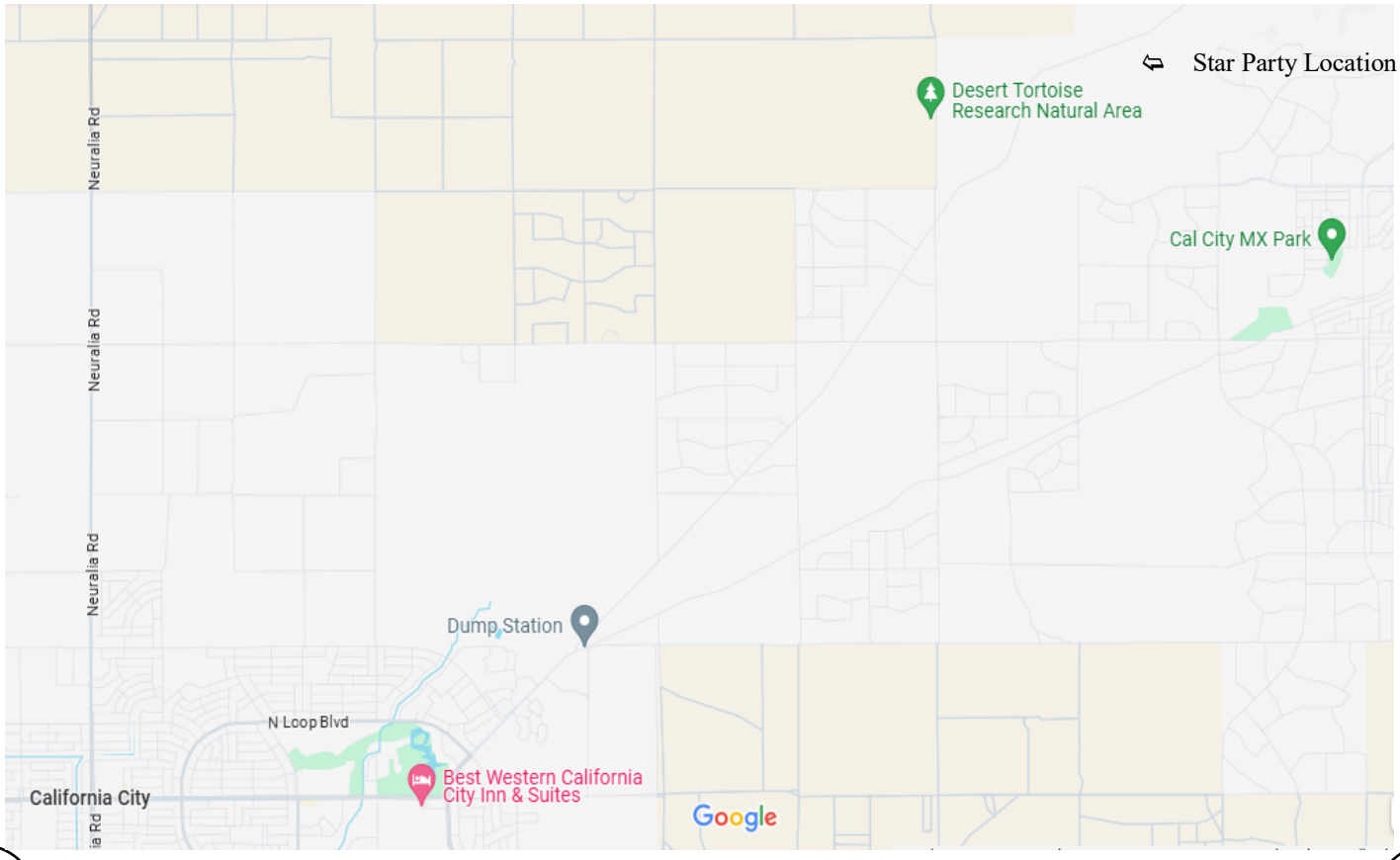
"Once we figured out that these black holes form in a quark-gluon plasma, the most important thing we had to figure out was, how much color charge is contained in the blob of matter that will end up in a primordial black hole?" Alonso-Monsalve says.

Using QCD theory, they worked out the distribution of color charge that should have existed throughout the hot, early plasma. Then they compared that to the size of a region that would collapse to form a black hole in the first quintillionth of a second. It turns out there wouldn't have been much color charge in most typical black holes at the time, as they would have formed by absorbing a huge number of regions that had a mix of charges, which would have ultimately added up to a "neutral" charge.

But the smallest black holes would have been packed with color charge. In fact, they would have contained the maximum amount of any type of charge allowed for a black hole, according to the fundamental laws of physics. Whereas such "extremal" black holes have been hypothesized for decades, until now no one had discovered a realistic process by which such oddities actually could have formed in our universe.

The super-charged black holes would have quickly evaporated, but possibly only after the time when the first atomic nuclei began to form. Scientists estimate that this process started around one second after the Big Bang, which would have given extremal black holes plenty of time to disrupt the equilibrium conditions that would have prevailed when the first nuclei began to form. Such disturbances could potentially affect how those earliest nuclei formed, in ways that might some day be observed. "These objects might have left some exciting observational imprints," Alonso-Monsalve muses. "They could have changed the balance of this versus that, and that's the kind of thing that one can begin to wonder about."

Source: [Exotic black holes could be a byproduct of dark matter |



Special Star Party Invitation

Sultan Randy "R Dub!" Williams, leader of the micronation, The United Territories of The Sovereign Nation of The People's Republic of Slowjamastan, (www.slowjamastan.org) invites you to visit our beloved nation on August 30 and 31, 2024, Labor Day weekend for a Star Party. We are located 11.07 acres of land, parallel to California State Route 78, between the American towns of Ocotillo Wells and Westmorland. Our exact location is **33.125901, -115.958612**. You will not be able to miss our signs.

As we are outside of Borrego Springs, we feature the darkest skies in the west! With an 11.3% moon rising at 3:42 am on the 30th and a 5.6% moon rising at 4:41 on the 31st, there will be galaxies galore! Bring your telescope. Whether you have a 50mm Galileoscope or a fast yard scope, seeing will be limited by your telescope, not the skies! As a telescope maker with an organization headquartered in Vermont, I have a special place in my heart for telescopes that you have made with your own hands. If you have one, please bring it!

Slowjamastan is rural. There are no facilities, such as electricity, or restroom facilities available on site. This is a double-edged sword; no facilities mean no light pollution.

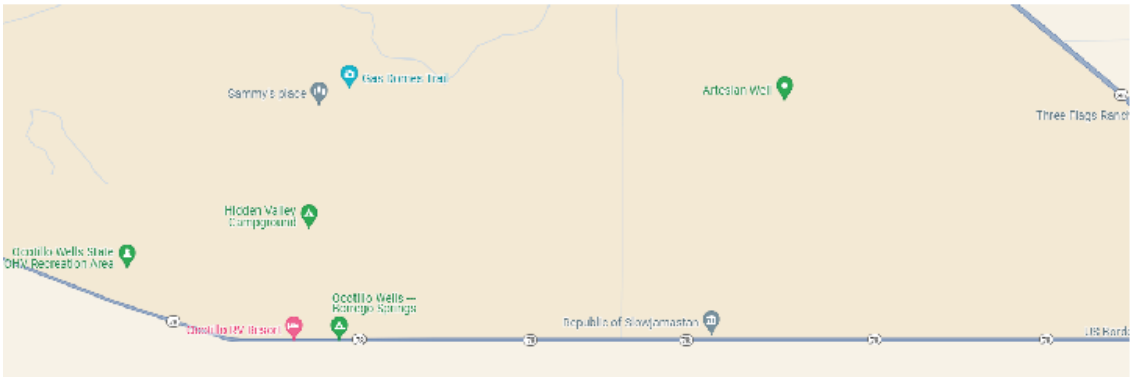
Camping is welcome as are recreational vehicles, however please RSVP with me first to ensure we have room for you. Please help keep Slowjamastan clean. There are also numerous lodging choices nearby, including RV parks just minutes away and numerous hotels and Airbnbs in Borrego Springs.

The weather during the day is expected to be hot. Evenings are usually in the seventies in late August but be prepared for all eventualities. One of the nice things about being in the desert is if you don't like the weather, wait twenty minutes. It will be fine again. Visitors assume all risk of injury or other loss and liability which may be occasioned.

Dark sky protocols will be observed.

Please RSVP to this email address. Include the number in your party.

Clear and Dark skies!
Francis J. O'Reilly
Minister of Astronomy



July DAILY CELESTIAL CALENDAR

1 The Moon passes 4 deg north of Mars, 11:00 A.M. PST

2 The Moon passes 4.0 deg north of Uranus , 3 A.M. PST

2 Neptune is stationary, 8 P.M. PST

3 The Moon passes 5 deg north of Jupiter, 1:00 A.M. PST

4 Earth is at aphelion (94.5 million miles from the Sun), 10:00 P.M. PST.

5 New Moon occurs at 3:57 P.M. PST

5 Dwarf planet Ceres is at opposition, 5:00 P.M. PST

7 The Moon passes 3.0 deg north of Mercury, 12:00 P.M. PST

12 The Moon is at apogee (251,259 miles from Earth), 1:11 A.M. PST

13 Jupiter passes 5 deg north of Aldebaran 12:00 A.M. PST

13 First Quarter Moon occurs at 3:49 P.M. PST

13 The Moon passes 0.9 deg north of Spica, 8:00 P.M. PST

15 Mars passes 0.6 deg south of Uranus, 2:00 A.M. PST

17 The Moon passes 0.2 deg north of Antares, 1:00 P.M. PST

18 Asteroid Pallas is stationary, 2:00 P.M. PST

21 Asteroid Harmonia is at opposition, 1:00 A.M. PST

21 Full Moon occurs at 3:17 A.M. PST

22 Mercury is at greatest eastern elongation (27 deg), 12:00 A.M. PST

22 Pluto is at opposition, 11:00 P.M. PST

23 The Moon is at Perigee (226,749 miles from Earth), 10:41 P.M. PST

24 The Moon passes 0.4 deg north of Saturn 2:00 P.M. PST

25 The Moon passes 0.6 deg north of Neptune 8:00 A.M. PST

27 Mercury passes 3.0 deg south of Regulus 5:00 A.M. PST

27 Last Quarter Moon occurs at 7:52 P.M. PST

29 The Moon passes 4 deg north of Uranus, 11:00 A.M. PST

30 The Moon passes 5 deg north of Mars 4:00 A.M. PST (Southern Delta Aquariid meteor shower peaks)

30 The Moon passes 5 deg north of Jupiter, 5:00 P.M. PST

ASTRONOMY COLUMN

July EVENTS:

1. The next club meeting on July 1st in the Maturango Museum at 7:30 PM. The program this month will be an internet presentation of "The solar system is weirder than you think".

Star parties:

July 5th : Brown road star party. Signs out 8:30 PM
Viewing at 9 PM.

JULY CELESTIAL CALENDAR

1. Mercury and Venus start the month low in the western evening sky and remain there the whole month.

2. The rest of the planets are all in the morning sky all month. Starting from the eastern horizon they are Jupiter, Mars, Uranus in the east and Neptune and Saturn in the south.

3. The southern Delta Aquariid meteor shower peaks on the 31st.

INFORMATION:

Please visit us at our website ChinaLakeAstro.org.

For more information, contact the China Lake Astronomical Society at 760-446-0454 or 760-384-8666.

Roger Brower

The Evening Sky Map

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

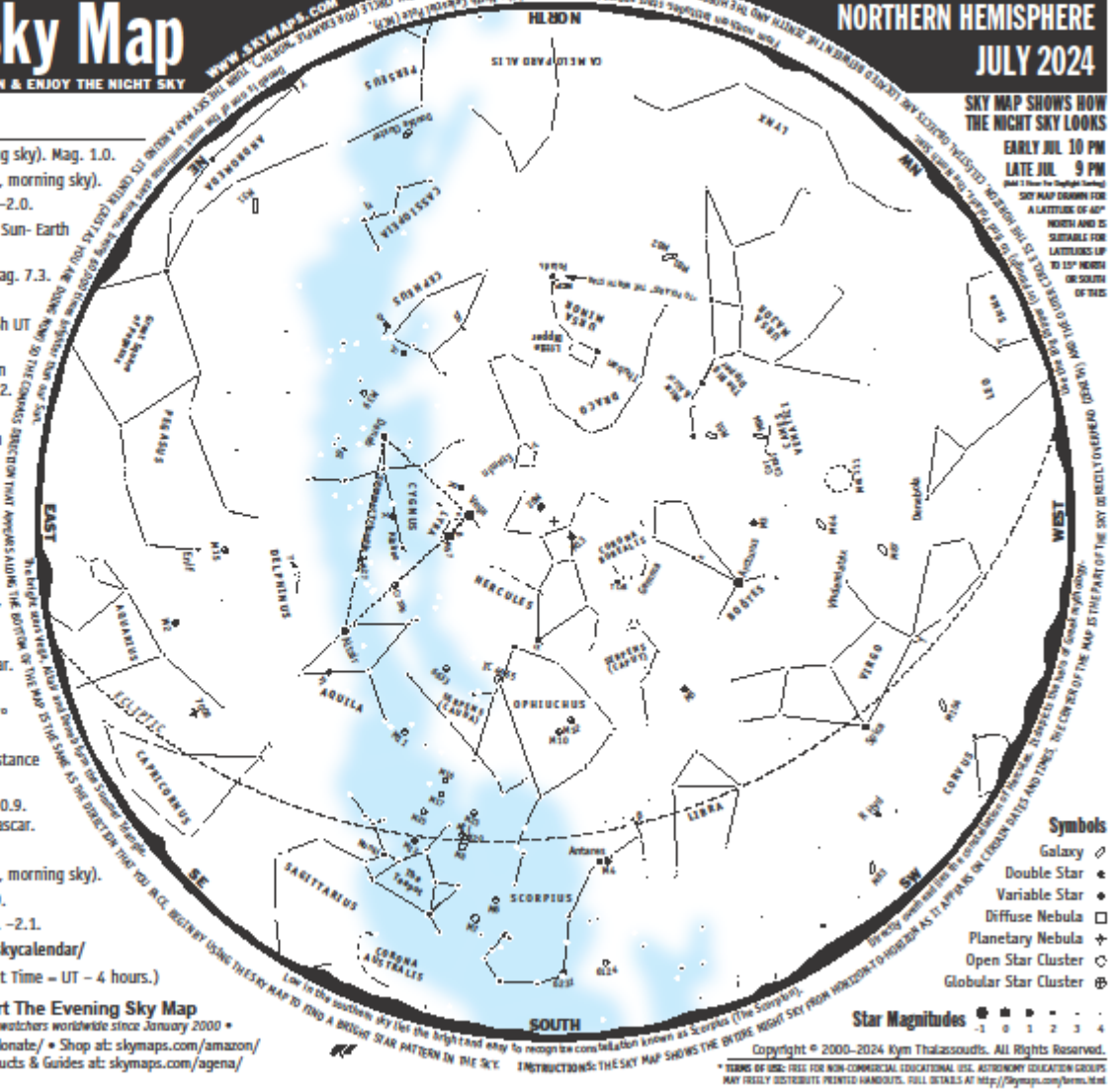
NORTHERN HEMISPHERE
JULY 2024

Sky Calendar – July 2024

1 **Moon near Mars** at 17h UT (54° from Sun, morning sky). Mag. 1.0.
2 **Moon near the Pleiades** at 17h UT (41° from Sun, morning sky).
3 **Moon near Jupiter** at 7h UT (morning sky). Mag. –2.0.
5 **Earth at Aphelion** (farthest from Sun) at 6h UT. The Sun- Earth distance is 1.016725 a.u. or about 152.1 million km.
5 **Dwarf planet 1 Ceres at opposition** at 15h UT. Mag. 7.3.
5 **New Moon** at 22:58 UT. Start of lunation 1256.
7 **Mercury 0.11° NNE of Beehive Cluster (M44)** at 5h UT (22° from Sun, evening sky). Mag. –0.2.
7 **Moon, Mercury and Beehive cluster (M44)** within circle 3.2° diameter at 19h UT (evening sky). Mag. –0.2.
9 **Moon near Regulus** at 15h UT (evening sky).
9 **Jupiter 4.8° N of Aldebaran** at 23h UT (38° from Sun, morning sky). Mags. –2.0 and 0.9.
12 **Moon at apogee** (farthest from Earth) at 8h UT (distance 404,362km; angular size 29.6').
13 **First Quarter Moon** at 22:49 UT.
14 **Moon near Spica** at 4h UT (evening sky). Occultation visible from North and Central America.
15 **Mars 0.53° SE of Uranus** at 15h UT (57° from Sun, morning sky). Mags. 0.9 and 5.8.
17 **Moon near Antares** at 21h UT (evening sky). Occultation visible from Sthn Africa and Madagascar.
21 **Full Moon** at 10:19 UT.
22 **Mercury at greatest elongation** east at 7h UT (27° from Sun, evening sky). Mag. 0.5.
24 **Moon at perigee** (closest to Earth) at 5:44 UT (distance 364,917km; angular size 32.7').
24 **Moon near Saturn** at 21h UT (morning sky). Mag. 0.9. Occultation visible from SE Asia, India and Madagascar.
28 **Last Quarter Moon** at 2:53 UT.
29 **Moon near the Pleiades** at 23h UT (67° from Sun, morning sky).
30 **Moon near Mars** at 9h UT (morning sky). Mag. 0.9.
30 **Moon near Jupiter** at 23h UT (morning sky). Mag. –2.1.

More sky events and links at http://Skymaps.com/skycalendar/

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



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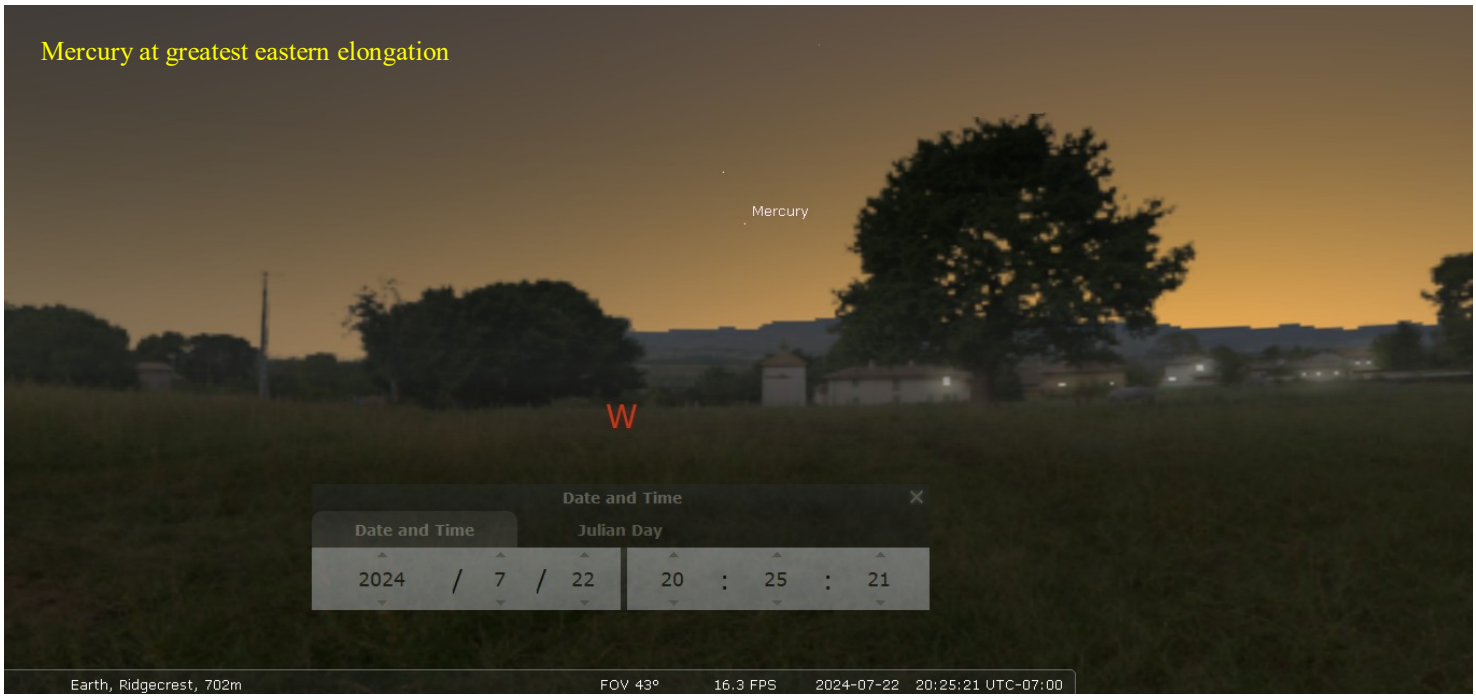


About the Celestial Objects

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.

CELESTIAL OBJECTS

NORTHERN HEMISPHERE JULY 2024

Sky maps

Easily Seen with the Naked Eye

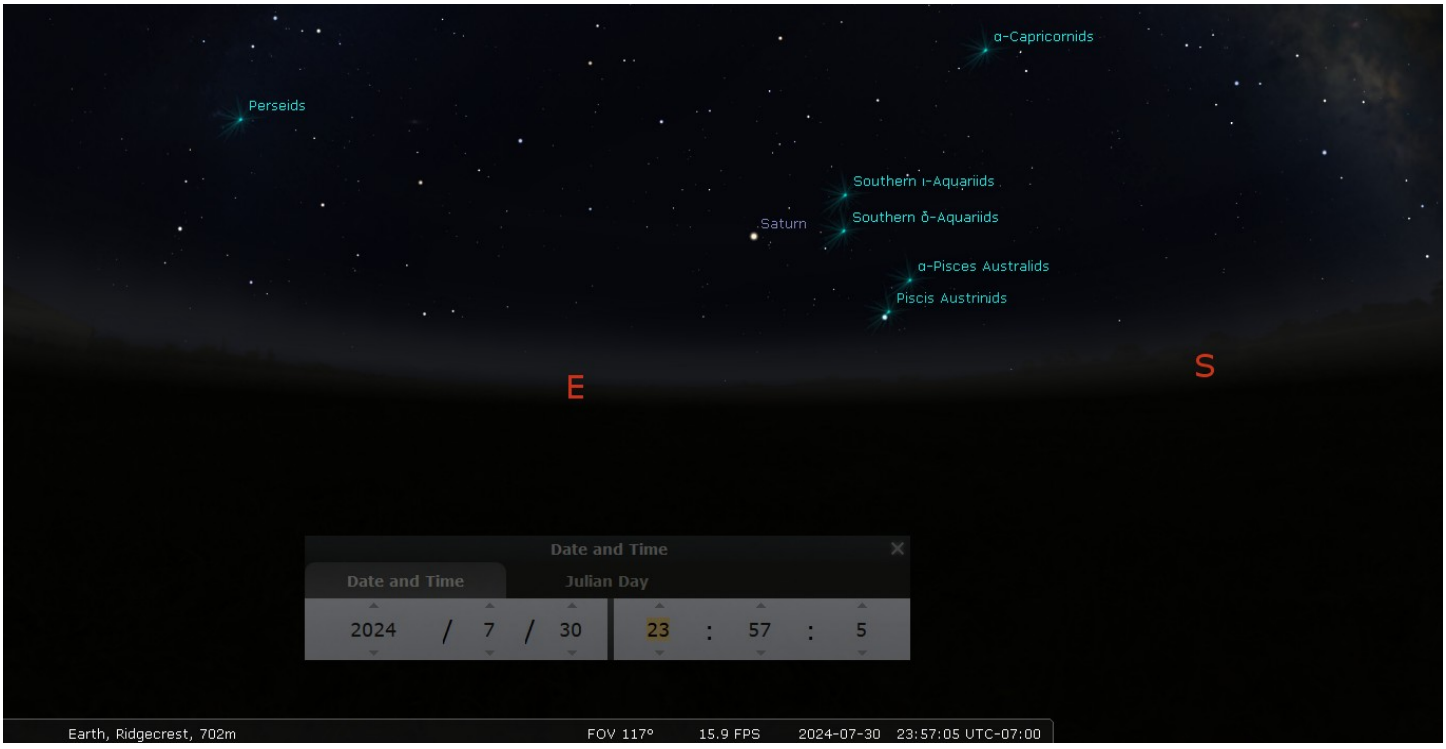
Altair	Aql	✦	Brightest star in Aquila. Name means "the flying eagle". Dist=16.7 ly.
Arcturus	Boo	✦	Orange, giant K star. Name means "bear watcher". Dist=36.7 ly.
δ Cephei	Cep	◆	Cepheid prototype. Mag varies between 3.5 & 4.4 over 5.366 days. Mag 6 companion.
Deneb	Cyg	✦	Brightest star in Cygnus. One of the greatest known supergiants. 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	Lyr	✦	The 5th brightest star in the sky. A blue-white star. Dist=25.0 ly.
Antares	Sco	✦	Red, supergiant star. Name means "rival of Mars". Dist=135.9 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

η Aquilae	Aql	◆	Bright Cepheid variable. Mag varies between 3.6 & 4.5 over 7.166 days. Dist=1,200 ly.
M3	CVn	◆	Easy to find in binoculars. Might be glimpsed with the naked eye.
μ Cephei	Cep	◆	Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days.
Mel 111	Com	○	Coma Berenices. 80 mag 5-6 stars in 5 deg. Dist=283 ly. Age=400 million years.
χ Cygni	Cyg	◆	Long period pulsating red giant. Magnitude varies between 3.3 & 14.2 over 407 days.
M39	Cyg	○	May be visible to the naked eye under good conditions. Dist=900 ly.
ν Draconis	Dra	◆	Wide pair of white stars. One of the finest binocular pairs in the sky. Dist=100 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.
ε Lyrae	Lyr	◆	Famous Double Double. Binoculars show a double star. High power reveals each a double.
R Lyrae	Lyr	◆	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.
6633	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.
M6	Sco	○	Butterfly Cluster. 30+ stars in 7x binoculars. Dist=1,960 ly.
M7	Sco	○	Superb open cluster. Visible to the naked eye. Age=260 million years. Dist=780 ly.
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.
Cr 399	Vul	○	Coathanger asterism or "Brocchi's Cluster". Not a true star cluster. Dist=218 to 1,140 ly.

Telescopic Objects

ε Bootis	Boo	◆	Red giant star (mag 2.5) with a blue-green mag 4.9 companion. Sep=2.8". Difficult to split.
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.
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".
γ Delphini	Del	◆	Appear yellow & white. Mags 4.3 & 5.2. Dist=100 ly. Struve 2725 double in same field.
β Lyrae	Lyr	◆	Eclipsing binary. Mag varies between 3.3 & 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 trisecting nebula. Dist=5,200 ly.
M21	Sgr	○	A fine and impressive cluster. Dist=4,200 ly.
M17	Sgr	□	Omega Nebula. Contains the star cluster NGC 6618. Dist=4,900 ly.
M11	Sct	○	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.
M87	Vir	⊘	Supergiant galaxy with supermassive black hole at its core. Dist=53.5 million ly.
M27	Vul	+	Dumbbell Nebula. Large, twin-lobed shape. Most spectacular planetary. Dist=975 ly.



2024 & 2025 New Moons

- July 5, 2024
- August 4, 2024
- September 2, 2024
- October 2, 2024
- November 1, 2024
- Dec 01, 2024
- Dec 30, 2024
- Jan 29, 2025
- Feb 27, 2025
- March 29, 2025
- 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

Red Rock Star Parties

Perseid Meteor Shower 2024 Monday

August 12th AM

Desert Tortoise Reserve Star Parties

July 6th Sunset Sunset

August 3rd Sunset

Public Invited

See location on Page 5

July 5th : Brown road star party. Signs out 8:30 PM Viewing at 9 PM.

Directions: Brown road star parties are held in the desert. Take south China lake Boulevard to 395. Cross 395 and go 2.3 miles on Brown road until you come to signs in cones pointing to the left. Take this dirt road .5 miles to the star party site.

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

PRESIDENT – Ralph Paonessa

VICE-PRESIDENT – Keith Weisz

SECRETARY – Debbie Pio

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/