Volume 43.7 July 2023

Desert Sky Observer

Antelope Valley Astronomy Club

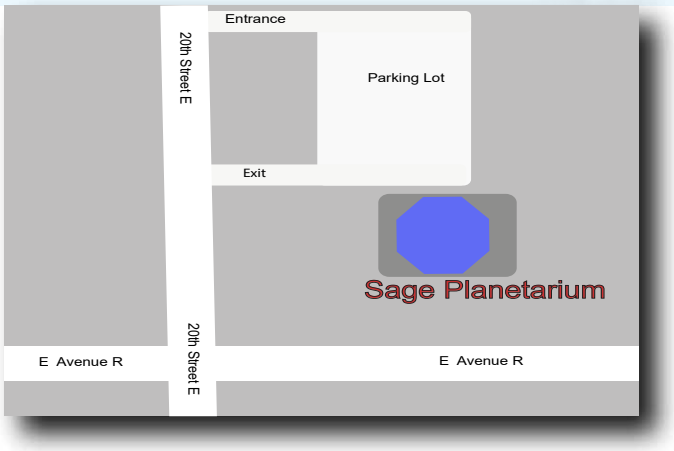
Upcoming Events

July 8: Moonwalk at PDW @ 8:30 PM
July 14: Club Meeting
July 15: Dark Sky Star Party @ Mt Pinos
July 22: Lunar Club@ Matt's House

Every clear night: Personal Star Party

August 11: Club Meeting
August 19: DSSP @ Mt Pinos
August 19: Lunar Club@ Matt's House
August 26: Moonwalk at PDW @ 8:00 PM

AVAC Calendar



Board Members

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president@avastronomyclub.org

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Treasurer: Rod Girard (661) 803-7838
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Webmaster: Steve Trotta (661) 269-5428
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www.avastronomyclub.org
ANTELOPE VALLEY
ASTRONOMY CLUB, INC.

Monthly Meetings

Monthly meetings are held at the **S.A.G.E. Planetarium** in Palmdale, the second Friday of each month except December. The meeting location is at the northeast corner of Avenue R and 20th Street East. Meetings start at 7 p.m. and are open to the public. *Please note that food and drink are not allowed in the planetarium.*

Membership

Membership in the Antelope Valley Astronomy Club is open to any individual or family.

The Club has three categories of membership.

- Family membership at $30.00 per year.
- Individual membership at $25.00 per year.
- Junior membership at $15.00 per year.

Membership entitles you to ...

- The Desert Sky Observer -- monthly newsletter
- The Reflector -- the publication of the Astronomical League.
- The AVAC Membership Manual.
- To borrow club equipment, books, videos, and other items.

AVAC
PO Box 8545
Lancaster, CA 93539-8545

Visit the Antelope Valley Astronomy Club website at www.avastronomyclub.org/.

www.avastronomyclub.org

The Antelope Valley Astronomy Club, Inc. is a 26USC§503(c)(3) California Non-Profit Corporation.

The AVAC is a Sustaining Member of The Astronomical League and the International Dark-Sky Association

President's Message

By Phil Wriedt

Hi There!

We have a Club Meeting on the 14th this month. I'm pretty sure there won't be an outside speaker at our meeting; the major concern being whether the planetarium will be a construction zone or a new palace of astronomic learning. I'm sure if everything (seats, projectors and newly cleaned dome) is put back together, we will be nearly the first to witness the new programs Jeremy has to offer, otherwise we will be meeting in the cafeteria

We have a Moonwalk on the 8th at Prime Desert Woodland. Sunset is at 8:08pm, so the Moonwalk will start after 8:30 pm, plan to get there by about 6:30 pm to setup in daylight. There were about 90 members of the public and 4 members with telescopes that came last month. This is your chance to meet the public and pass along your knowledge. Come, bring your telescope, binoculars, star chart, and of course enthusiasm. See You There!

Our Deep Sky Star Party on June 17th at the Chuchupate was . . .I don't know, did anybody go? Our next DSSP will be on the 15th at Mt Pinos. Mt Pinos Nordic Center parking lot is at 8350 feet and has some really dark skies. After this past winter I wouldn't be surprised to find snow on the ground in shade under trees. Bring warn clothes. Get there Early, as this is a very popular location. The lot holds maybe 250 cars and double parking is normal. Come out enjoy a dark sky. Let's put the party back in "Star Party"!

Sunday, June 18 was the Mt Wilson trip. There were 21 smiling faces in the group shot. In my opinion, seeing was a bit better than last year. There was a thin cloud layer over the LA Basin

On July 22nd, we return to Matt's house for the Lunar Club. Getting to Matt's house is not hard. It's just north of Willow Springs Race Track in Rosamond. This is a club to study Earth's closest neighbor. An Email will be sent out with directions later in the month.

Keep Looking Up, Phil

On The Cover

Please note: North is 50.1° left of vertical RA: 18h 5' 13.39" DEC: -19° 50' 32.56" (Sagittarius)

The Red Spider Nebula NGC 6537

Huge waves are sculpted in this two-lobed nebula some 3000 light-years away in the constellation of Sagittarius. This warm planetary nebula harbours one of the hottest stars known and its powerful stellar winds generate waves 100 billion kilometres high. The waves are caused by supersonic shocks, formed when the local gas is compressed and heated in front of the rapidly expanding lobes. The atoms caught in the shock emit the spectacular radiation seen in this image.

Credit: ESA & Garrelt Mellema (Leiden University, the Netherlands)

From the Secretary

By Rose Moore

Members:

Our events for the month of July include a PDW Moon Walk with Jeremy on Saturday July 8th at 8:30pm; our club meeting at the SAGE Planetarium on Friday July 14th at 7:00 pm; our dark sky star party on Saturday July 15th at Mt. Pinos; and a Lunar Club party at Matt's home on Saturday July 22nd at 7:00pm. An email will be sent out prior to all events with more information. Please come out to an event and support your club!

Other upcoming events include an astronomy paint class with Sue Leone, possibly in November; the fall star party at College of the Canyons in October; and our club Christmas Party on Saturday December 9th.

We had 7 members and a guest at our first Lunar Club party at Matt's home on Saturday June 24th. Matt's son, Michael, helped him set up his 6 inch refractor. We had a couple of dobs and Schmidts at the event. Everyone had great views through their eyepieces. Thanks to Jim for helping me align my Telrad and scope, and thanks to Rod for carrying my heavy equipment from the car!

The Perseid Meteor Shower will occur in August, peaking on August 11, 12, and 13th. The best time for viewing is after 11pm, as the Perseids are usually best seen from 12 midnight to sunrise.

Clear skies, Rose

Mt. Wilson -- June 18, 2023

Note: the Telrad mounted on the 60 inch

Find A Ball of Stars – M55

by Linda Shore, Ed.D, Astronomy Society of the Pacific, NASA Night Sky Network

French astronomer Charles Messier catalogued over 100 fuzzy spots in the night sky in the 18th century while searching for comets – smudges that didn't move past the background stars so couldn't be comets. Too faint to be clearly seen using telescopes of the era, these objects were later identified as nebulas, distant galaxies, and star clusters as optics improved. Messier travelled the world to make his observations, assembling the descriptions and locations of all the objects he found in his Catalogue of Nebulae and Star Clusters. Messier's work was critical to astronomers who came after him who relied on his catalogue to study these little mysteries in the night sky, and not mistake them for comets.

Most easily spotted from the Southern Hemisphere, this "faint fuzzy" was first catalogued by another French astronomer, Nicholas Louis de Lacaille in 1752 from Southern Africa. After searching many years in vain through the atmospheric haze and light pollution of Paris, Charles Messier finally added it to his catalog in July of 1778. Identified as **Messier 55 (M55)**, this large, diffuse object can be hard to distinguish unless it's well above the horizon and viewed far from city lights.

But July is great month for getting your own glimpse of M55 – especially if you live in the southern half of the US (or south of 39°N latitude). Also known as the "Summer Rose Star," M55 will reach its highest point in northern hemisphere skies in mid-July. Looking towards the south with a pair of binoculars well after sunset, search for a dim (mag 6.3) cluster of stars below the handle of the "teapot" of the constellation Sagittarius. This loose collection of stars appears about 2/3 as large as the full Moon. A small telescope may resolve the individual stars, but M55 lacks the dense core of stars found in most globular clusters. With binoculars, let your eyes wander the "steam" coming from the teapot-shaped Sagittarius (actually the plane of the Milky Way Galaxy) to find many more nebulas and clusters.

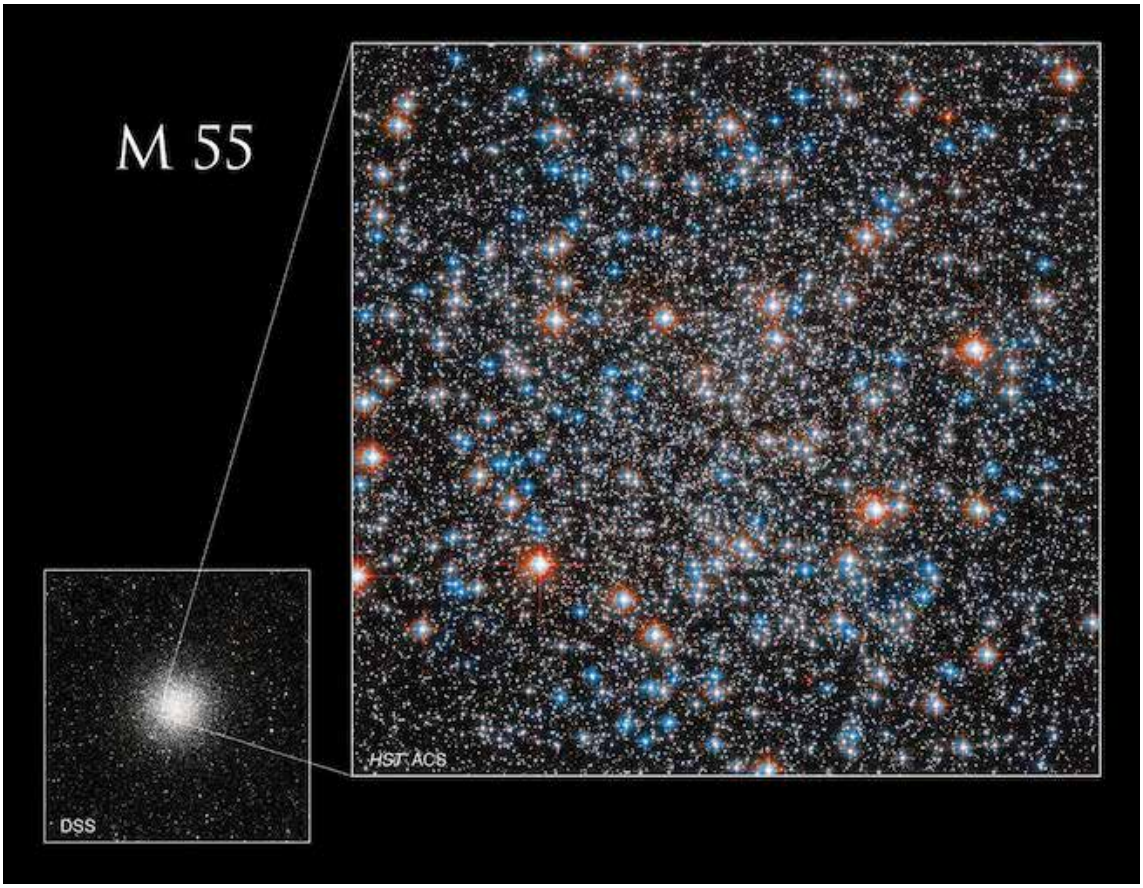
As optics improved, this fuzzy patch was discovered to be a globular cluster of over 100,000 stars that formed more than 12 billion years ago, early in the history of the Universe. Located 20,000 light years from Earth, this ball of ancient stars has a diameter of 100 light years. Recently, NASA released a magnificent image of M55 from the Hubble Space Telescope, revealing just a small portion of the larger cluster. This is an image that Charles Messier could only dream of and would have marvelled at! By observing high above the Earth's atmosphere, Hubble reveals stars inside the cluster impossible to resolve from ground-based telescopes. The spectacular colours in this image correspond to the surface temperatures of the stars; red stars being cooler than the white ones; white stars being cooler than the blue ones. These stars help us learn more about the early Universe.

Discover even more: https://www.nasa.gov/feature/goddard/2023/hubble-messier-55

The Hubble Space Telescope has captured magnificent images of most of Messier's objects. Explore them all: https://www.nasa.gov/content/goddard/hubble-s-messier-catalog/

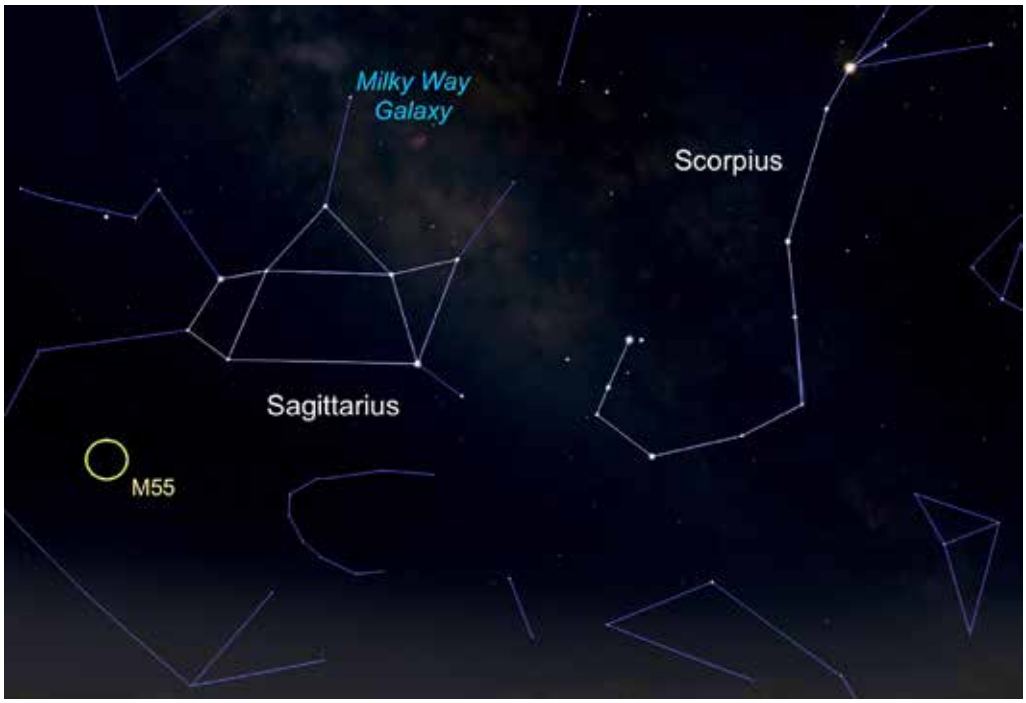
Additional Skywatching Resources

Plan your skywatching with help from our planner page, featuring daily stargazing tips courtesy EarthSky monthly sky maps, and videos from NASA/JPL. You can even find out how to spot the International Space Station! Both Astronomy and Sky and Telescope magazines offer regular stargazing guides to readers, both in print and online. Want to join a group of folks for a star party? Find clubs and astronomy events near you, and may you have clear skies!



The large image shows just the central portion of M55 taken by the Hubble Space Telescope. Above Earth's atmosphere, this magnificent view resolves many individual stars in this cluster. How many can you count through binoculars or a backyard telescope?

Original Image and Credits: NASA, ESA, A. Sarajedini (Florida Atlantic University), and M. Libralato (STScI, ESA, JWST); Smaller image: Digital Sky Survey; Image Processing: Gladys Kober



Look to the south in July and August to see the teapot asterism of Sagittarius. Below the handle you'll see a faint smudge of M55 through binoculars. More "faint fuzzies" can be found in the steam of the Milky Way, appearing to rise up from the kettle.

Image created with assistance from Stellarium: stellarium.org

This article is distributed by NASA Night Sky Network
The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Space News

News from around the Net

Alien Life May Be Possible Even At The Milky Way's Edges

The discovery of phosphorus in a cloud at the edge of the Milky Way has extended the region in our galaxy where life might be found. Phosphorus is one of six essential elements for life on Earth, along with nitrogen, carbon, hydrogen, oxygen and sulfur (SN: 12/16/22). Until now, it had been the only one of those elements missing from the farthest reaches of our galaxy. Finding phosphorus that far out could extend the galaxy's habitable zone out from its center by roughly 22,000 light-years, researchers reported June 8 at a meeting of the American Astronomical Society in Albuquerque. . . . . (continued at https://www.sciencenews.org/article/alien-milky-way-phosphorus-habitable)

In A First, JWST Detected Starlight From Distant Galaxies With Quasars

For the first time, astronomers have detected starlight from distant galaxies that host extremely bright supermassive black holes called quasars. Data from the James Webb Space Telescope reveal that four of these galaxies are massive, compact and possibly disk-shaped, astronomers report June 12 at the JWST First Light meeting. Studying the galaxies could help solve the mystery of how black holes in the early universe grew so big so fast. "Ever since the discovery of [distant] quasars, there have been studies trying to detect their host galaxies," said MIT astrophysicist Minghao Yue. . . . (continued at https://www.sciencenews.org/article/jwst-starlight-galaxy-quasar-black-hole)

The Parker Solar Probe May Have Spotted The Origin Of High-Speed Solar Winds

A spacecraft plunging into the sun's atmosphere has revealed the likely source of powerful blasts of plasma in fast solar winds. Far from the sun, the solar wind is a nebulous, turbulent plasma. But when NASA's Parker Solar Probe dipped within about 8 million kilometers of the sun's surface, it detected narrow plasma streams (SN: 12/15/21). The streams appear to be guided by magnetic fields tracing back to two relatively cool regions of the sun's atmosphere known as coronal holes, researchers report June 7 in Nature. . . . (continued at https://www.sciencenews.org/article/parker-solar-probe-origin-winds-sun)

Astronomers Discover New Multiplanetary Circumbinary System

Circumbinary planets are planets that orbit both stars of a central binary system. They were once confined to science fiction (Tatooine), but the discovery of Kepler-16b paved the way for the detection of 14 transiting planets in 12 binary systems by NASA's Kepler/K2 and TESS missions. "Of the 12 transiting circumbinary planet systems discovered so far, only one hosts multiple circumbinary planets: Kepler-47," said Ohio State University astronomer David Martin and his colleagues. "Kepler-47b, d and c have orbital periods of 49.5, 187.4 and 303.2 days respectively,. . . (continued at https://www.sci.news/astronomy/toi-1338-multiplanetary-circumbinary-system-11999.html)

Europe's Euclid Space Telescope To Launch On July 1

The European Space Agency said on Wednesday its space telescope Euclid is scheduled to launch on July 1, blasting off on a mission to shed light on the mysteries of dark matter and dark energy. The mission will launch on a SpaceX Falcon 9 rocket from Cape Canaveral in Florida, with the broadcast beginning at 1430 GMT, the ESA said in a tweet. Euclid was originally planned to ride into space on a Russian Soyuz rocket, but last year Moscow withdrew its launchers in response to sanctions over the invasion of Ukraine. The two-ton Euclid, which is 4.7 meters (15 feet) tall and 3.5 meters (11 feet) wide, will join fellow space telescope James Webb at a stable hovering spot 1.5 million kilometers from Earth called the second Lagrangian Point. . . . (continued at https://phys.org/news/2023-06-europe-euclid-space-telescope-july.html)

Space News

News from around the Net

Gravitational Waves From Supermassive Black Holes Revealed

Radio observatories across the globe have found compelling evidence for the existence of very-low-frequency gravitational waves. These slow and minute undulations of spacetime are thought to be produced by supermassive black hole binaries in remote galaxies. “After years of work, [we are] opening an entirely new window on the gravitational-wave universe”, says Stephen Taylor (Vanderbilt University), chair of the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) collaboration. . . . (continued at https://skyandtelescope.org/astronomy-news/pulsars-reveal-gravitational-waves-from-supermassive-black-hole-pairs/)

First ‘Ghost Particle’ Image Of Milky Way Galaxy Captured By Scientists:

Neutrinos Detected By Icecube Our Milky Way galaxy is an awe-inspiring feature of the night sky, viewable with the naked eye as a horizon-to-horizon hazy band of stars. Now, for the first time, the IceCube Neutrino Observatory has produced an image of the Milky Way using neutrinos—tiny, ghostlike astronomical messengers. In an article to be published in the journal Science, the IceCube Collaboration, an international group of over 350 scientists, presents evidence of high-energy neutrino emission from the Milky Way. The high-energy neutrinos, with energies millions to billions of times higher. . . . .(continued at https://phys.org/news/2023-06-ghost-particle-image-milky-galaxy.html)

SMASH, SAURON & POOPSY, Oh My! Astronomers Get Clever with Acronyms

Astronomers have somewhat of a reputation for twisting the names of their projects and collaborations to get just the right acronym. The results are often clever, funny and awesome. This trend toward tortured astronomy acronyms was on display at the 225th meeting of the American Astronomical Society (AAS), which took place last week in Seattle. Among my favorite acronyms this year were SLoWPoKES (which stands for Sloan Low-mass Wide Pairs of Kinematically Equivalent Stars), ASAS-SN (All-Sky Automated Survey for SuperNovae) and ANGST (ACS Nearby Galaxy Survey Treasury). . . . (continued at https://www.space.com/28244-strange-astronomy-acronyms.html)

Here Come JWST’s First Images Of Saturn

It’s Saturn’s turn. The JWST is aiming its powerful, gold-coated, segmented beryllium mirror at our Solar System’s second-largest, and perhaps most striking, planet. So far, we’ve only got a sneak preview of the raw images without any processing or scientific commentary. But they’re a start. We’re accustomed to gorgeous images of Saturn from the Hubble Space Telescope, especially as part of its OPAL (Outer Planets Atmospheres Legacy) observing program. Those images are not only scientifically rich, they’re also eye candy for the rest of us. But that’s not what these new Saturn images from the JWST are about. . . . (continued at https://www.universetoday.com/162208/here-come-jwsts-first-images-of-saturn/#more-162208)

Second-Ever Elusive White Dwarf Pulsar Spotted

Astronomers have captured their second-ever glimpse into a rare celestial object: a white dwarf pulsar. Pulsars are typically envisioned as spinning neutron stars — a type of stellar remnant left by only massive stars. Despite white dwarfs being the most common stellar fossils, created by Sun-like and smaller stars, pulsar emission has only been observed once before from a white dwarf. The find may illuminate aspects of star formation, their evolution, and how these objects generate their strong magnetic fields. Details on the find were published this month in Nature Astronomy. . . . .(continued at https://www.astronomy.com/science/second-ever-elusive-white-dwarf-pulsar-spotted/)

Dark Sky Observing Sites

The Chuchupate parking lot is a half a mile beyond the Mt Pinos ranger station (on some maps The Chuchupate Ranger Sta.), the parking lot is also called Frazier Mountain trailhead.

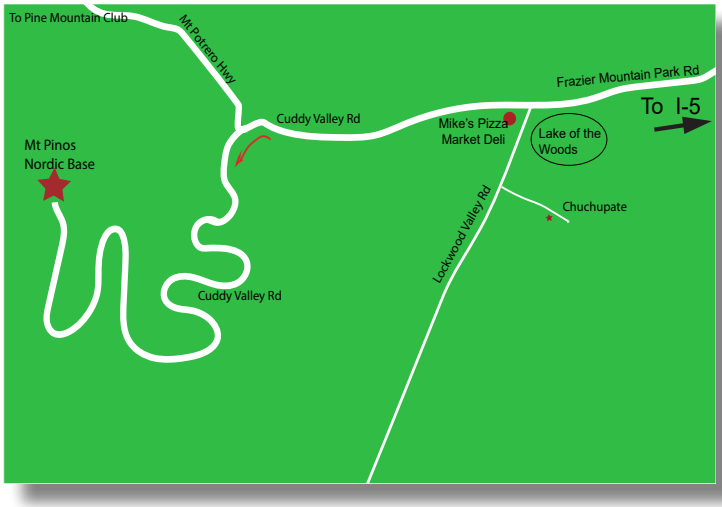
To get there, take the Frazier Mountain Park RD east about 7 miles from I-5, to Lake Of The Woods, Turn left on Lockwood Valley Rd. (If you see Mike's Pizza on your left you missed the turn) In less than a mile there is a road to the left, go past the ranger station, the parking lot is on the right. The Club gathers in the upper end of the lot. The Elevation is 5430 feet. There is a vault toilet.

The Red Cliffs Natural Area is part of **Red Rock Canyon State Park** is a day use area and is not for use by the public after dark. The Club gets a special permit for a star party and pays a fee.

To get there: Take the CA-14 north 25 miles past Mojave. You will see giant red cliffs on the right side and a small sign that says "Red Cliffs Natural Area" and a dirt road. (If you see the large sign for the Ricardo campground, you drove a mile too far). Follow the road to the large parking lot (that hasn't been graded in a long time). Elevation is 2410 feet. There is a vault toilet.

Mt Pinos is a parking lot at 8350 feet for the "Mt Pinos Nordic Base." There is a vault toilet 300 yds to the east in the Chula Vista campground.

To get there: From I-5, get off at Frazier Mountain Park Rd and drive west about 7 miles to Mike's Pizza/ Market Deli at Lockwood Valley Rd. Keep on the main roadway (don't turn left to go to Chuchupate). Continue past Mike's Pizza on Cuddy Valley Rd (the road's new name) about 5 miles. Continue straight (do not turn right on to Mil Potrero Hwy) for another 8 1/2 miles to the parking area.
Note: The entire drive from I-5 is uphill.



Solar System Summary

The **Sun** moves from the middle of Gemini to the middle of Cancer.

The Planets

Mercury begins the month at superior conjunction on the 1st of July, spending the rest of the month slowly rising away from the setting Sun. On the last day of July, Mercury trails Regulus by 4½°

Venus breaks off its chase of Mars, and crosses the ecliptic on the 3rd. On about the 20th Venus reaches it's stationary point, and thereafter begins its retrograde motion, preparing for its inferior conjunction next month.

Mars moves east in Leo, on the 2nd Mars will be within 10 arc-minutes of M44. On the 22nd the 15% waxing Moon passes 3° north, in Leo.

Jupiter spends the month moving east into southern Aries. As Jupiter rises on the morning of the 11th the 31% waning Moon passes north by less than 2°.

Saturn is slowly moving retrograde in central Aquarius at mag 0.7. The 80% waning Moon passes 3 ¼° south on the morning of the 6th.

Uranus rises in the early morning , slowly moving east in southeastern Aries at mag 5.8. On the 12th the 25% waning Moon passes 2°north.

Neptune rises in the early morning moving in retrograde in southern Pisces at 7.86. On the 8th the 67% waning Moon passes 3° south.

Dwarf Planets

134340 Pluto spends the month on the eastern edge of Capricorn in retrograde at mag 14.4 just south of M75. On the 3rd and the 31st the full Moon passes less than 3° south.

1 Ceres spends the month in Virgo (mag 8.5),heading southeast at 8.8.

2 Pallas at mag 9.0 moves west across southern Leo crossing the ecliptic at months end at 9.12.

3 Juno at mag 9.5, moves east from northern Orion, passing between the feet of Pollux at month's end at 9.75.

4 Vesta at mag 8.6, spends the month in mid-Taurus and at months end is still mag 8.6.

Moon Phases

First Qtr Jul 25 | Full Jul 3 | Third Qtr Jul 9 | New Jul 17

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
7/1/2023	18:53	03:36	05:43	20:09
7/5/2023	22:36	08:05	05:45	20:09
7/10/2023	00:39	13:53	05:47	20:08
7/15/2023	03:41	19:03	05:50	20:06
7/20/2023	08:26	22:10	05:54	20:03
7/25/2023	13:12	23:15	05:57	20:00
7/30/2023	18:45	03:12	06:01	19:56

Planet Data*

July 1

	Rise	Transit	Set	Mag	Phase%
Mercury	05:43	13:00	20:18	-2.10	99.7
Venus	09:05	15:49	22:33	-4.46	31.2
Mars	09:21	16:04	22:47	1.72	95.1
Jupiter	02:08	08:48	15:28	-2.26	99.2
Saturn	23:20	04:53	10:30	0.76	99.8

July 15

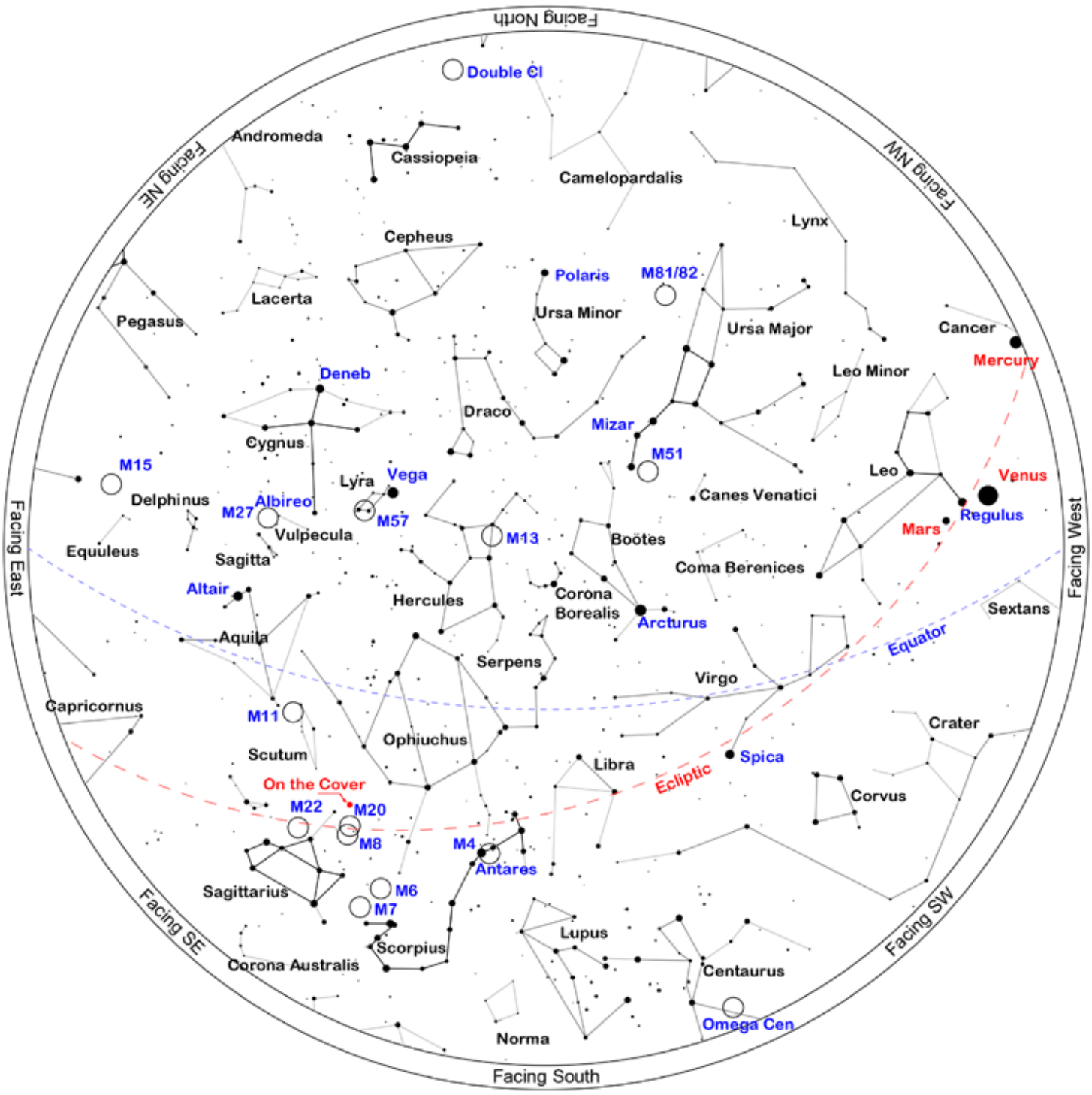
	Rise	Transit	Set	Mag	Phase%
Mercury	07:04	14:06	21:07	-0.64	83.6
Venus	08:44	15:15	21:46	-4.46	19.2
Mars	09:07	15:41	22:15	1.75	95.9
Jupiter	01:20	08:02	14:44	-2.35	99.1
Saturn	22:24	03:56	09:32	0.69	99.9

July 30

	Rise	Transit	Set	Mag	Phase%
Mercury	08:06	14:39	21:11	0.08	63.0
Venus	07:49	14:11	20:33	-4.25	06.15
Mars	08:53	15:17	21:40	1.77	96.8
Jupiter	00:23	07:11	13:54	-2.43	98.9
Saturn	21:23	02:55	08:30	0.59	99.9

*All time mentioned are local and approximate.
*Sun, Moon and Planetary date based on Quartz Hill, CA

Sky Chart



Location: Set from geolocation service
Latitude: 34° 39' N, longitude: 118° 10' W
Time: 2023 July 15, 21:00 (UTC -07:00)

Powered by: Heavens-Above.com

Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Deep Sky Star Party or the Saturday nearest the New Moon, in this case July 15, 2023. The list is sorted by the transit time of the object.

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M81	Bode's Galaxy	Galaxy	UMa	09h 55m 33s	+69° 03.9'	7.8	Circ	14:16	Circ
M82	Cigar Galaxy	Galaxy	UMa	09h 55m 53s	+69° 40.8'	9.2	Circ	14:17	Circ
M95	NGC3351	Galaxy	Leo	10h 43m 58s	+11° 42.2'	10.6	08:29	15:05	21:41
M96	NGC3368	Galaxy	Leo	10h 46m 46s	+11° 49.2'	10.1	08:32	15:08	21:44
M105	NGC3379	Galaxy	Leo	10h 47m 50s	+12° 34.9'	10.5	08:30	15:09	21:47
M108	NGC3556	Galaxy	UMa	11h 11m 31s	+55° 40.4'	10.6	Circ	15:32	Circ
M97	Owl Nebula	P Neb	UMa	11h 14m 48s	+55° 01.1'	12.0	Circ	15:36	Circ
M65	Leo Triplet	Galaxy	Leo	11h 18m 56s	+13° 05.5'	10.1	09:00	15:40	22:20
M66	Leo Triplet	Galaxy	Leo	11h 20m 15s	+12° 59.4'	9.7	09:02	15:41	22:21
M109	NGC3992	Galaxy	UMa	11h 57m 36s	+53° 22.4'	10.6	05:31	16:18	03:06
M98	NGC4192	Galaxy	Com	12h 13m 48s	+14° 54.0'	10.9	09:49	16:35	23:20
M99	Virgo Cluster Pinwheel	Galaxy	Com	12h 18m 50s	+14° 25.0'	10.4	09:56	16:40	23:24
M106	NGC4258	Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	07:19	16:40	02:00
M61	Swelling Spiral	Galaxy	Vir	12h 21m 55s	+04° 28.3'	10.1	10:28	16:43	22:58
M40	Winnecke 4	Dbl+Asterism	UMa	12h 22m 12s	+58° 05.0'	8.7	Circ	16:43	Circ
M100	Mirror of M99	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	09:56	16:44	23:32
M84	NGC4374	Galaxy	Vir	12h 25m 04s	+12° 53.2'	10.2	10:07	16:46	23:25
M85	NGC4382	Galaxy	Com	12h 25m 24s	+18° 11.4'	10.0	09:51	16:46	23:42
M86	NGC4406	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	10:08	16:47	23:27
M49	NGC4472	Galaxy	Vir	12h 29m 47s	+08° 00.0'	9.3	10:26	16:51	23:16
M87	Smoking Gun	Galaxy	Vir	12h 30m 49s	+12° 23.4'	9.6	10:14	16:52	23:30
M88	NGC4501	Galaxy	Com	12h 31m 59s	+14° 25.2'	10.2	10:09	16:53	23:37
M91	Missing Messier Object	Galaxy	Com	12h 35m 27s	+14° 29.7'	10.9	10:12	16:56	23:40
M89	NGC4552	Galaxy	Vir	12h 35m 40s	+12° 33.3'	10.9	10:18	16:57	23:35
M90	NGC4569	Galaxy	Vir	12h 36m 50s	+13° 09.7'	10.2	10:18	16:58	23:38
M58	NGC4579	Galaxy	Vir	12h 37m 44s	+11° 49.1'	10.4	10:22	16:59	23:35
M68	NGC4590	Globular	Hya	12h 39m 28s	-26° 44.5'	9.0	12:19	17:00	21:42
M104	Sombrero Galaxy	Galaxy	Vir	12h 39m 59s	-11° 37.3'	9.2	11:31	17:01	22:31
M59	NGC4621	Galaxy	Vir	12h 42m 02s	+11° 38.7'	10.7	10:27	17:03	23:39
M60	NGC4649	Galaxy	Vir	12h 43m 40s	+11° 33.1'	9.8	10:29	17:05	23:40
M94	Croc's Eye Galaxy	Galaxy	CVn	12h 50m 53s	+41° 07.1'	8.9	08:39	17:12	01:45
M64	Black Eye Galaxy	Galaxy	Com	12h 56m 44s	+21° 41.0'	9.3	10:11	17:18	00:25
M53	NGC5024	Globular	Com	13h 12m 55s	+18° 10.1'	8.5	10:38	17:34	00:29
M63	Sunflower Galaxy	Galaxy	CVn	13h 15m 49s	+42° 01.7'	9.3	08:58	17:37	02:16
NGC5139	C80	Globular	Cen	13h 26m 48s	-47° 29.0'	3.6	14:57	17:48	20:38
NGC5169		Galaxy	CVn	13h 28m 10s	+46° 40.3'	14.0	08:34	17:49	03:04
NGC5204		Galaxy	UMa	13h 29m 36s	+58° 25.1'	11.3	Circ	17:51	Circ

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M51	Whirlpool Galaxy,	Galaxy	CVn	13h 29m 52s	+47° 11.7'	8.9	08:31	17:51	03:10
Arp85	M51B	Galaxy	CVn	13h 29m 58s	+47° 16.0'	9.6	08:31	17:51	03:11
NGC5182		Galaxy	Hya	13h 30m 41s	-28° 09.0'	13.0	13:15	17:52	22:28
NGC5214		Galaxy	CVn	13h 32m 49s	+41° 52.3'	14.0	09:16	17:54	02:32
M83	Southern Pinwheel Galaxy	Galaxy	Hya	13h 37m 00s	-29° 51.8'	8.0	13:28	17:58	22:28
HR5144	HD119055	Triple	Boo	13h 40m 40s	+19° 57.3'	5.8	11:00	18:02	01:03
NGC5283		Galaxy	Dra	13h 41m 06s	+67° 40.3'	14.0	Circ	18:02	Circ
M3	NGC5272	Globular	CVn	13h 42m 11s	+28° 22.5'	7.0	10:32	18:03	01:34
NGC5286	C84	Globular	Cen	13h 46m 24s	-51° 22.0'	7.6	15:58	18:07	20:16
NGC5292		Galaxy	Cen	13h 47m 40s	-30° 56.4'	14.0	13:43	18:09	22:34
NGC5356		Galaxy	Vir	13h 54m 59s	+05° 20.0'	14.0	11:58	18:16	00:33
NGC5363		Galaxy	Vir	13h 56m 07s	+05° 15.2'	10.2	12:00	18:17	00:34
NGC5447	III-787	Neb	UMa	14h 02m 29s	+54° 16.3'		07:07	18:23	05:40
M101	Pinwheel Galaxy	Galaxy	UMa	14h 03m 13s	+54° 20.9'	8.2	07:04	18:24	05:44
NGC5461	III-788	Neb	UMa	14h 03m 42s	+54° 19.0'		07:06	18:25	05:43
NGC5485		Galaxy	UMa	14h 07m 11s	+55° 00.0'	11.5	Circ	18:28	Circ
NGC5460		Open	Cen	14h 07m 27s	-48° 20.6'	5.6	15:46	18:28	21:11
NGC5500		Galaxy	Boo	14h 10m 15s	+48° 32.7'	14.0	08:58	18:31	04:04
IC991		Galaxy	Vir	14h 17m 48s	-13° 52.3'	13.0	13:15	18:39	00:02
HR5362	HD125383	Dbl	Lup	14h 20m 10s	-43° 03.5'	5.6	15:17	18:41	22:05
IC4406	Retina Nebula	P Neb	Lup	14h 22m 26s	-44° 09.0'	11.0	15:27	18:43	22:00
HR5409	105 Vir,	Triple	Vir	14h 28m 12s	-02° 13.6'	4.8	12:53	18:49	00:46
NGC5669		Galaxy	Boo	14h 32m 44s	+09° 53.4'	12.0	12:23	18:54	01:24
NGC5689		Galaxy	Boo	14h 35m 30s	+48° 44.5'	11.9	09:21	18:56	04:31
M102	Spindle Galaxy (duplicate of M101?)	Galaxy	Dra	15h 06m 30s	+55° 45.7'	10.8	Circ	19:27	Circ
NGC5875		Galaxy	Boo	15h 09m 13s	+52° 31.6'	13.0	09:01	19:30	05:59
NGC5907	Splinter Galaxy	Galaxy	Dra	15h 15m 54s	+56° 19.7'	11.4	Circ	19:37	Circ
NGC5882		P Neb	Lup	15h 16m 50s	-45° 38.9'	11.0	16:32	19:38	22:43
NGC5897		Globular	Lib	15h 17m 24s	-21° 00.6'	8.6	14:37	19:38	00:40
M5	NGC5904	Globular	Ser	15h 18m 33s	+02° 04.9'	7.0	13:31	19:39	01:48
Barnard228	B228	DkNeb	Lup	15h 44m 00s	-34° 30.0'		15:55	20:05	00:15
IC4593	White Eyed Pea	P Neb	Her	16h 11m 44s	+12° 04.3'	11.0	13:56	20:33	03:10
IC4592	Jabbah	Neb	Sco	16h 11m 59s	-19° 27.4'		15:26	20:33	01:39
M80	NGC6093	Globular	Sco	16h 17m 03s	-22° 58.5'	8.5	15:43	20:38	01:33
IC4601		Neb	Sco	16h 20m 18s	-20° 04.9'		15:37	20:41	01:46
Abell38		P Neb	Sco	16h 23m 17s	-31° 44.9'	11.7	16:22	20:44	01:06
M4	Cat's Eye	Globular	Sco	16h 23m 35s	-26° 31.5'	7.5	16:02	20:44	01:27
IC4603	Rho Ophiuchi Complex [1]	Neb	Oph	16h 25m 24s	-24° 28.0'		15:56	20:46	01:36

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
IC4604	Rho Ophiuchi Complex [2]	Neb	Oph	16h 25m 33s	-23° 26.5'		15:53	20:46	01:40
NGC6124	C75	Open	Sco	16h 25m 36s	-40° 40.0'	5.8	17:08	20:46	00:25
Abell39		P Neb	Her	16h 27m 33s	+27° 54.5'	12.9	13:19	20:48	04:18
IC4605		Neb	Sco	16h 30m 12s	-25° 06.8'		16:04	20:51	01:39
NGC6153		P Neb	Sco	16h 31m 31s	-40° 15.2'	12.0	17:11	20:52	00:33
NGC6181		Galaxy	Her	16h 32m 21s	+19° 49.5'	11.9	13:52	20:53	03:54
NGC6171		Globular	Oph	16h 32m 32s	-13° 03.1'	8.1	15:27	20:53	02:19
NGC6178		Open	Sco	16h 35m 47s	-45° 38.6'	7.2	17:51	20:57	00:02
NGC6193	C82	Open	Ara	16h 41m 18s	-48° 46.0'	5.2	18:24	21:02	23:40
M13	Great Hercules Cluster	Globular	Her	16h 41m 41s	+36° 27.5'	7.0	12:56	21:03	05:10
NGC6210	Turtle Planetary Nebula	P Neb	Her	16h 44m 30s	+23° 48.0'	9.0	13:51	21:05	04:20
Barnard44a	B44a	DkNeb	Sco	16h 44m 45s	-40° 20.0'		17:25	21:06	00:46
NGC6204		Open	Ara	16h 46m 09s	-47° 01.0'	8.2	18:13	21:07	00:01
M12	Gumball Globular	Globular	Oph	16h 47m 14s	-01° 56.8'	8.0	15:11	21:08	03:06
NGC6231	Table of Scorpius	Open	Sco	16h 54m 00s	-41° 48.0'	2.6	17:43	21:15	00:47
IC4628	Prawn Nebula	Neb	Sco	16h 56m 58s	-40° 27.3'		17:38	21:18	00:58
NGC6254		Globular	Oph	16h 57m 09s	-04° 05.9'	6.6	15:27	21:18	03:09
Barnard47		DkNeb	Oph	16h 59m 42s	-22° 38.0'		16:25	21:21	02:17
M62	Flickering Globular	Globular	Oph	17h 01m 13s	-30° 06.7'	8.0	16:53	21:22	01:51
M19	NGC6273	Globular	Oph	17h 02m 38s	-26° 16.0'	8.5	16:40	21:24	02:07
Barnard51		DkNeb	Oph	17h 04m 44s	-22° 15.0'		16:28	21:26	02:23
IC4637		P Neb	Sco	17h 05m 10s	-40° 53.1'	14.0	17:49	21:26	01:03
Barnard56		DkNeb	Sco	17h 08m 48s	-32° 05.0'		17:09	21:30	01:51
Barnard59	Pipe Nebula	DkNeb	Oph	17h 11m 23s	-27° 29.0'		16:53	21:32	02:11
NGC6302	Bug Nebula	P Neb	Sco	17h 13m 42s	-37° 06.0'	9.6	17:37	21:35	01:32
Barnard251		DkNeb	Oph	17h 13m 48s	-20° 09.0'		16:30	21:35	02:39
Barnard63		DkNeb	Oph	17h 16m 00s	-21° 28.0'		16:37	21:37	02:37
M92	NGC6341	Globular	Her	17h 17m 07s	+43° 08.1'	7.5	12:51	21:38	06:25
M9	NGC6333	Globular	Oph	17h 19m 12s	-18° 31.0'	9.0	16:31	21:40	02:50
NGC6326		P Neb	Ara	17h 20m 46s	-51° 45.2'	12.0	19:38	21:42	23:45
Barnard256		DkNeb	Oph	17h 22m 12s	-28° 49.0'		17:09	21:43	02:17
Barnard67a		DkNeb	Oph	17h 22m 30s	-21° 53.0'		16:45	21:43	02:42
Barnard71	B71	DkNeb	Oph	17h 23m 02s	-24° 00.0'		16:52	21:44	02:35
NGC6357	Lobster Nebula	Neb	Sco	17h 24m 43s	-34° 12.1'		17:34	21:46	01:57
IC4651		Open	Ara	17h 24m 52s	-49° 56.5'	6.9	19:20	21:46	00:12
Abell41		P Neb	Ser	17h 29m 04s	-15° 13.3'	13.9	16:30	21:50	03:09
Abell42		P Neb	Oph	17h 31m 31s	-08° 19.1'	14.6	16:13	21:52	03:32
Barnard78	B78	DkNeb	Oph	17h 32m 00s	-25° 35.0'		17:07	21:53	02:39

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6388		Globular	Sco	17h 36m 17s	-44° 44.1'	6.9	18:45	21:57	01:09
M14	NGC6402	Globular	Oph	17h 37m 36s	-03° 14.7'	9.5	16:05	21:58	03:52
Barnard276		DkNeb	Oph	17h 39m 39s	-19° 49.0'		16:55	22:01	03:06
M6	Butterfly Cluster	Open	Sco	17h 40m 20s	-32° 15.2'	4.5	17:41	22:01	02:21
NGC6397	C86	Globular	Ara	17h 40m 42s	-53° 40.0'	5.6	20:29	22:02	23:34
NGC6426		Globular	Oph	17h 44m 55s	+03° 10.1'	11.2	15:54	22:06	04:17
Barnard83a		DkNeb	Sgr	17h 45m 18s	-20° 00.0'		17:01	22:06	03:11
IC4665		Open	Oph	17h 46m 30s	+05° 39.0'	4.2	15:49	22:07	04:26
NGC6445	Crescent Nebula	P Neb	Sgr	17h 49m 15s	-20° 00.6'	13.0	17:05	22:10	03:15
NGC6503		Galaxy	Dra	17h 49m 27s	+70° 08.6'	10.2	Circ	22:10	Circ
NGC6441		Globular	Sco	17h 50m 13s	-37° 03.0'	7.4	18:13	22:11	02:09
Barnard283	B283	DkNeb	Sco	17h 51m 00s	-33° 52.0'		17:59	22:12	02:25
Barnard285	B285	DkNeb	Ser	17h 51m 32s	-12° 52.0'		16:46	22:12	03:39
M7	Ptolemy's Cluster	Open	Sco	17h 53m 51s	-34° 47.6'	3.5	18:06	22:15	02:24
IC4670		Neb	Sgr	17h 55m 07s	-21° 44.6'		17:17	22:16	03:15
NGC6501		Galaxy	Her	17h 56m 04s	+18° 22.3'	12.3	15:21	22:17	05:13
M23	NGC6494	Open	Sgr	17h 57m 04s	-18° 59.1'	6.0	17:10	22:18	03:26
NGC6543	Cat Eye Nebula	P Neb	Dra	17h 58m 36s	+66° 38.0'	8.1	Circ	22:19	Circ
NGC6496		Globular	Sco	17h 59m 04s	-44° 16.0'	9.2	19:04	22:20	01:36
Barnard291	B291	DkNeb	Sgr	17h 59m 43s	-33° 53.0'		18:08	22:21	02:34
Barnard292	B292	DkNeb	Sgr	18h 00m 34s	-33° 20.0'		18:06	22:21	02:37
Barnard293	B293	DkNeb	Sgr	18h 01m 12s	-35° 20.0'		18:16	22:22	02:29
M20	Trifid Nebula	Open+D Neb	Sgr	18h 02m 42s	-22° 58.2'	5.0	17:29	22:24	03:19
M8	Lagoon Nebula	Open+D Neb	Sgr	18h 03m 41s	-24° 22.7'	5.0	17:34	22:25	03:15
Barnard295	B295	DkNeb	Sgr	18h 04m 05s	-31° 09.0'		18:00	22:25	02:50
M21	NGC6531	Open	Sgr	18h 04m 13s	-22° 29.3'	7.0	17:29	22:25	03:22
NGC6530		Open	Sgr	18h 04m 31s	-24° 21.5'	4.6	17:35	22:25	03:16
NGC6528		Globular	Sgr	18h 04m 50s	-30° 03.3'	9.5	17:57	22:26	02:55

And - Andromeda
Ant - Antlia
Aps - Apus
Aql - Aquila
Aqr - Aquarius
Ara - Ara
Ari - Aries
Aur - Auriga
Boo - Bootes
Cae - Caelum
Cam - Camelopardis
Cap - Capricornus
Car - Carina
Cas - Cassiopeia
Cen - Centaurus
Cep - Cepheus
Cet - Cetus
Cha - Chamaeleon
Cir - Circinus
CMa - Canis Major
CMi - Canis Minor
Cnc - Cancer
Col - Columba
Com - Coma Berenices
CrA - Corona Australis
CrB - Corona Borealis
Crt - Crater
Cru - Crux
Crv - Corvus
CVn - Canes Venatici
Cyg - Cygnus
Del - Delphinus
Dor - Dorado
Dra - Draco
Equ - Equuleus
Eri - Eridanus
For - Fornax
Gem - Gemini
Gru - Grus
Her - Hercules
Hor - Horologium
Hya - Hydra
Hyi - Hydrus
Ind - Indus
Lac - Lacerta
Leo - Leo
Lep - Lepus
Lib - Libra
LMi - Leo Minor
Lup - Lupus
Lyn - Lynx
Lyr - Lyra
Men - Mensa
Mic - Microscopium
Mon - Monoceros
Mus - Musca
Nor - Norma
Oct - Octans
Oph - Ophiuchus
Ori - Orion
Pav - Pavo
Peg - Pegasus
Per - Perseus
Phe - Phoenix
Pic - Pictor
PsA - Pisces Austrinus
Psc - Pisces
Pup - Puppis
Pyx - Pyxis
Ret - Reticulum
Scl - Sculptor
Sco - Scorpius
Sct - Scutum
Ser - Serpens
Sex - Sextans
Sge - Sagitta
Sgr - Sagittarius
Tau - Taurus
Tel - Telescopium
TrA - Triangulum Australe
Tri - Triangulum
Tuc - Tucana
UMa - Ursa Major
UMi - Ursa Minor
Vel - Vela
Vir - Virgo
Vol - Volans
Vul - Vulpecula

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