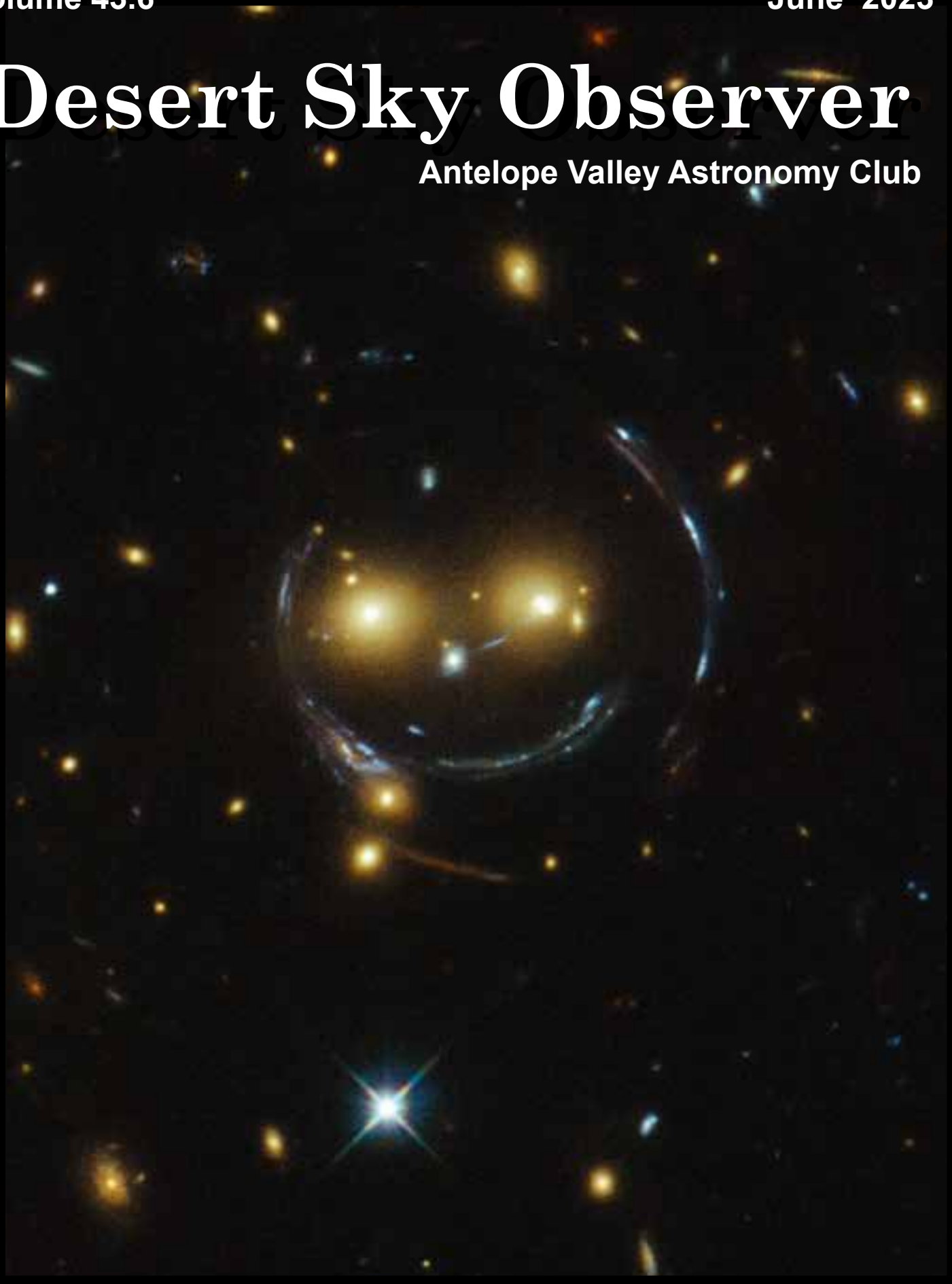
Volume 43.6 June 2023

Desert Sky Observer

Antelope Valley Astronomy Club



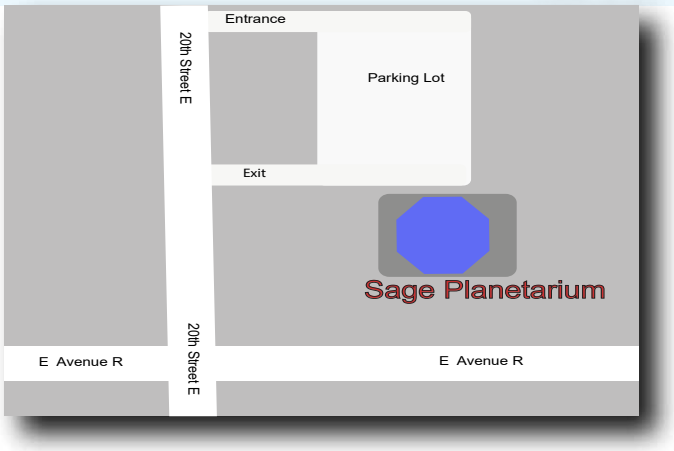
Upcoming Events

June 3: Moonwalk 8:30 pm @ PDW
June 9: Club Meeting
June 17: Dark Sky Star Party @ Chuchupate
June 18: Mt Wilson Trip
June 24: Lunar Club @ Matt's House

Every clear night: Personal Star Party

July 14: Club Meeting
July 15: Dark Sky Star Party 8:30 pm @ PDW
July 22: Lunar Club

AVAC Calendar



Board Members

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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 §503(c)(3) 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 9th of the month. We have a speaker this month! It's Dr Daniel Barth of the University of Arkansas. Okay, so its by Zoom. He's really a great speaker, has a lot of knowledge to pass along, and it's a lot cheaper than flying him out here from Fayetteville. So please, bring your family, friends and neighbors.

We have a Moonwalk on the 3rd at Prime Desert Woodland. Sunset is at 8:01pm, so the Moonwalk will start after 8:30 pm, so plan to get there by about 6:30 pm to setup in daylight. There were 91members of the public and 5 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 May 20th at the Chuchupate was a bust. See the picture below. That was the cloudless part of the sky. Looking east there were lightening flashes. On June 17th, the day before Mt Wilson will be the next DSSP at Chuchupate. Who knows what the weather will bring, but hopefully no clouds or rain. It will probably still be chilly overnight, so be prepared. Come out enjoy a dark sky, let's put the party back in "Star Party"!

Sunday, June 18 is the Mt Wilson trip. All of the 25 slots for the trip are currently taken. But if anyone drops out, we will take the next one on the waiting list. So if you want to be put on the waiting list, please contact Rose.

On June 24th, we have the return of the Lunar Club. We we be meeting at Matt's house just north of Willow Springs Race Track in Rosamond. This is a club to study Earth's c th directions later in the month.

Keep Looking Up, Phil

Looking west from Chuchupate
2.4% Waxing Moon, May 20, 8:11 PM
49mm, 0.5 sec, F/4.0, ISO 20k

On The Cover

Please note: North is 40.6° right of vertical RA: 10h 38' 43.15" DEC: 48° 49' 18.19" (Ursa Major)

In the centre of this image, taken with the NASA/ESA Hubble Space Telescope, are two faint galaxies that seem to be smiling.

You can make out two orange eyes and a white button nose. In the case of this "happy face", the two eyes are the galaxies SDSSCGB 8842.3 and SDSSCGB 8842.4 and the misleading smile lines are actually arcs caused by an effect known as strong gravitational lensing.

Massive structures in the Universe exert such a powerful gravitational pull that they can warp the spacetime around them and act as cosmic lenses which can magnify, distort and bend the light behind them. This phenomenon,

From the Secretary

By Rose Moore

Members:

We have a Prime Desert Moon Walk with Jeremy on Saturday June 3rd starting at 8:30pm. We need members with telescopes to help out! Set up time is 30-60 minutes prior to event. Weather permitting. Sunset is at 8:04pm. There will be a Full Moon; planets up are: Mars and Venus.

Our club meeting on Friday June 9th at 7:00 pm will have Dr. Daniel Barth as our speaker, via Zoom. Dr. Barth is a professor of astronomy and STEM Education at the University of Arkansas. Topic to be announced. Please attend and support this event!

For anyone not attending the Mt. Wilson trip, and wanting to check out the night sky; feel free to head up to Chuchupate on Saturday June 17th. Check out the calendar on the AVAC website for more information and directions. Weather permitting.

The trip to Mt. Wilson is scheduled on Sunday June 18th. Directions, map and other information is to be sent out Memorial Weekend. If you did not receive anything, please email me!! An email will be sent out regarding the time to meet up at the Pearblossom Park and Ride on the 14, after we get an arrival time from the telescope coordinator.

Clear skies, Rose

On The Cover ... continued

crucial to many of Hubble's discoveries, can be explained by Einstein's theory of general relativity.

In this special case of gravitational lensing, a ring — known as an Einstein Ring — is produced from this bending of light, a consequence of the exact and symmetrical alignment of the source, lens and observer and resulting in the ring-like structure we see here.

Hubble has provided astronomers with the tools to probe these massive galaxies and model their lensing effects, allowing us to peer further into the early Universe than ever before. This object was studied by Hubble's Wide Field and Planetary Camera 2 (WFPC2) and Wide Field Camera 3 (WFC3) as part of a survey of strong lenses.

A version of this image was entered into the Hubble's Hidden Treasures image processing competition by contestant Judy Schmidt.

Credit: NASA & ESA Acknowledgement: Judy Schmidt (geckzilla.org)

Look Up in the Sky - It's a Bird

by Theresa Summer, NASA Night Sky Network

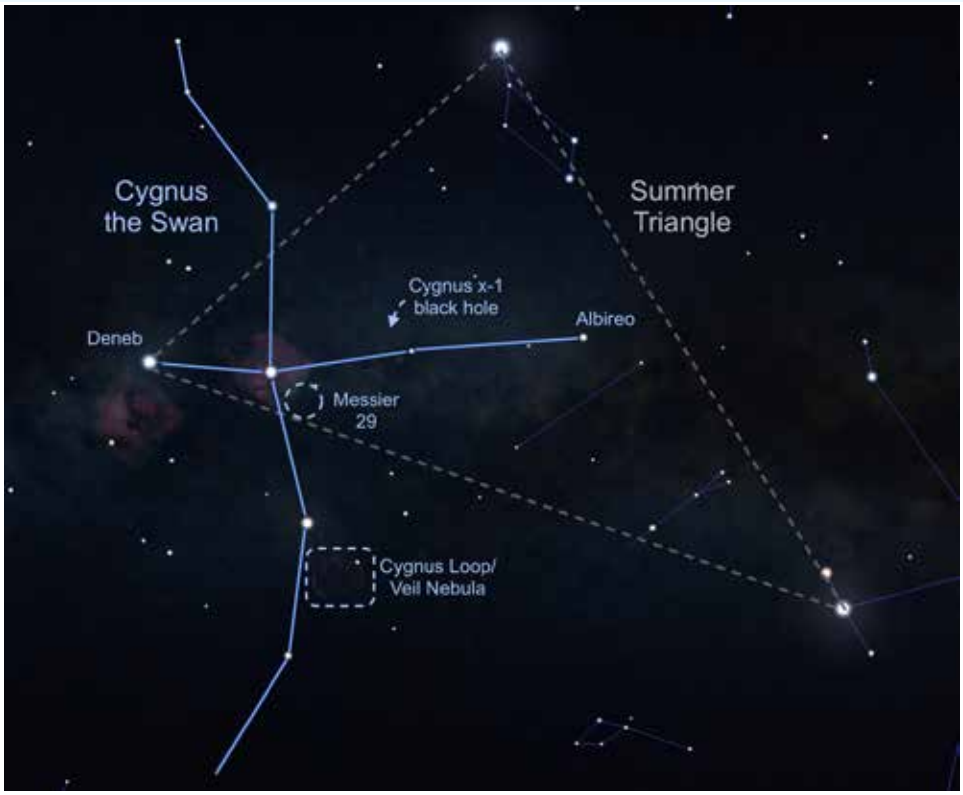
Bird constellations abound in the night sky, including **Cygnus**, the majestic swan. Easy to find with its dazzling stars, it is one of the few constellations that look like its namesake and it is full of treasures. Visible in the Northern Hemisphere all summer long, there's so much to see and even some things that can't be seen. To locate Cygnus, start with the brightest star, **Deneb**, also the northeastern most and dimmest star of the Summer Triangle. The Summer Triangle is made up of three bright stars from three different constellations – read more about it in the September 2022 issue of Night Sky Notes. "Deneb'' is an Arabic word meaning the tail. Then travel into the triangle until you see the star **Albireo**, sometimes called the "beak star" in the center of the summer triangle. Stretching out perpendicular from this line are two stars that mark the crossbar, or the wings, and there are also faint stars that extend the swan's wings.

From light-polluted skies, you may only see the brightest stars, sometimes called the Northern Cross. In a darker sky, the line of stars marking the neck of the swan travels along the band of the **Milky Way**. A pair of binoculars will resolve many stars along that path, including a sparkling open cluster of stars designated **Messier 29**, found just south of the swan's torso star. This grouping of young stars may appear to have a reddish hue due to nearby excited gas.

Let's go deeper. While the bright beak star Albireo is easy to pick out, a telescope will let its true beauty shine! Like a jewel box in the sky, magnification shows a beautiful visual double star, with a vivid gold star and a brilliant blue star in the same field of view. There's another marvel to be seen with a telescope or strong binoculars – the Cygnus Loop. Sometimes known as the **Veil Nebula**, you can find this supernova remnant (the gassy leftovers blown off of a large dying star) directly above the final two stars of the swan's eastern wing. It will look like a faint ring of illuminated gas about three degrees across (six times the diameter of the Moon).

Speaking of long-dead stars, astronomers have detected a high-energy X-ray source in Cygnus that we can't see with our eyes or backyard telescopes, but that is detectable by NASA's Chandra X-ray Observatory. Discovered in 1971 during a rocket flight, Cygnus x-1 is the first X-ray source to be widely accepted as a black hole. This black hole is the final stage of a giant star's life, with a mass of about 20 Suns. Cygnus x-1 is spinning at a phenomenal rate – more than 800 times a second – while devouring a nearby star. Astronomically speaking, this black hole is in our neighborhood, 6,070 light years away. But it poses no threat to us, just offers a new way to study the universe.

Check out the beautiful bird in your sky this evening, and you will be delighted to add Cygnus to your go-to summer viewing list. Find out NASA's latest methods for studying black holes at www.nasa.gov/black-holes.



Look up after sunset during summer months to find Cygnus! Along the swan's neck find the band of our Milky Way Galaxy. Use a telescope to resolve the colorful stars of Albireo or search out the open cluster of stars in Messier 29. Image created with assistance from Stellarium: stellarium.org

While the black hole Cygnus x-1 is invisible with even the most powerful Optical telescope, in X-ray, it shines brightly. On the left is the optical view of that region with the location of Cygnus x-1 shown in the red box as taken by the Digitized Sky Survey. On the right is an artist's conception of the black hole pulling material from its massive blue companion star. (Credit: NASA/CXC chandra.harvard.edu/photo/2011/cygx1/)

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!

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

NASA's Hubble Hunts For Intermediate-Sized Black Hole Close To Home

Astronomers using NASA's Hubble Space Telescope have come up with what they say is some of their best evidence yet for the presence of a rare class of "intermediate-sized" black hole that may be lurking in the heart of the closest globular star cluster to Earth, located 6,000 light-years away. Like intense gravitational potholes in the fabric of space, virtually all black holes seem to come in two sizes: small and humongous. It's estimated that our galaxy is littered with 100 million. . . (continued at https://www.sciencedaily.com/releases/2023/05/230523123642.htm)

Bright, Young Supernova Now Visible In M101

When a massive star dies, it goes out with a bang, creating a stunningly bright explosion that can temporarily change the look of the night sky. The brightest and closest may be visible with the naked eye, but even those in distant galaxies can be easily spotted with amateur equipment from your backyard. And now, just such an opportunity has appeared: A supernova just went off in the nearby spiral galaxy M101 (NGC 5457) and you can find it tonight in the sky. According to NASA, the new supernova, called SN 2023ixf, was first spotted by Koichi Itagaki on May 19. . . . (continued at https://www.astronomy.com/observing/bright-supernova-now-in-m101/)

Replay Of Star's Death Sheds Light On Universe's Expansion

Stars explode all the time in the universe. But the supernova that Patrick Kelly found in 2014 marked serendipity at its finest: an explosion not only caught in the act of detonation but also magnified by the gravity of a confluence of foreground galaxies. Now, Kelly (University of Minnesota) is leading a team in using this serendipitous supernova to get an independent measure of the universe's current expansion rate — a quantity astronomers have been debating intensely. . . . (continued at https://skyandtelescope.org/astronomy-news/replay-of-stars-death-sheds-light-on-universes-expansion/)

Could Dark Photon Dark Matter Be Directly Detected Using Radio Telescopes?

Dark matter, matter in the universe that does not emit, absorb or reflect light, cannot be directly detected using conventional telescopes or other imaging technologies. Astrophysicists have thus been trying to identify alternative methods to detect dark matter for decades. Researchers at Tsinghua University, the Purple Mountain Observatory and Peking University recently carried out a study exploring the possibility of directly detecting dark photons, prominent dark matter candidates, using radio telescopes. .(continued at https://phys.org/news/2023-05-dark-photon-radio-telescopes.html)

After Three Years of Upgrades, LIGO is Fully Operational Again

The Laser Interferometer Gravitational-Wave Observatory is made up of two detectors, this one in Livingston, La., and one near Hanford, Wash. The detectors use giant arms in the shape of an "L" to measure tiny ripples in the fabric of the universe. Credit: Caltech/MIT/LIGO Lab. Have you noticed a lack of gravitational wave announcements the past couple of years? Well, now it is time to get ready for an onslaught, as the Laser Interferometric Gravitational-Wave Observatory (LIGO) starts a new 20-month observation run today, May 24th after a 3-year hiatus. . . . (continued at https://www.universetoday.com/)

Jammed Radar Boom On Jupiter-Bound Juice Probe Finally Freed

After three weeks of intense analysis and troubleshooting, European Space Agency flight controllers have finally succeeded in freeing a jammed 16-metre (52-foot) boom critical to the Jupiter-bound Juice probe's ice-penetrating radar instrument. The Jupiter Icy Moons mission – Juice – was launched on 14 April atop an Ariane 5 rocket. On its way to the first of several gravity assist flybys, the spacecraft successfully deployed its over-size solar arrays and a 10.6-metre (35-foot) magnetometer boom. But a long antenna boom needed by the Radar for Icy Moons . . . (continued at https://astronomynow.com/2023/05/12/jammed-radar-boom-on-jupiter-bound-juice-probe-finally-freed/)

Space News

News from around the Net

The Tragic Tale Of How NASA Space Planes Ended Up In Someone's Backyard

The X-34 program aimed to help break NASA and the Air Force into space far more frequently and inexpensively than ever before. In the end, a pair of rocket plane demonstrators were built, but they never were able to reach their full potential. Still, they were part of a wider family of initiatives that have resulted in the Air Force's hugely successful X-37B mini-space plane that has remained in orbit near continuously for years. But after the shine on the program quickly faded around the turn of the Millennium, the unique craft found themselves in increasingly dire straits, . . . (continued at https://getpocket.com/explore/item/the-tragic-tale-of-how-nasa-s-x-34-space-planes-ended-up-rotting-in-someone-s-backyard?utm_source=pocket-newtab)

New Research Offers Insight Into Fast Radio Bursts

Researchers using a telescope owned and operated by CSIRO, Australia's national science agency, have detected a "fast radio burst" in a nearby galaxy that questions what we know about how the phenomena form. New results published today in The Astrophysical Journal indicate the source of the interstellar blast is in a much calmer galactic environment than other known events. Marcin Glowacki from the Curtin University node of the International Center for Radio Astronomy Research (ICRAR) led the latest research using CSIRO's ASKAP radio telescope on Wajarri Yamaji Country in Western Australia. . . .) continued at https://phys.org/news/2023-05-insight-fast-radio.html)

Scientists Make First Observation Of A Polar Cyclone On Uranus

Scientists used ground-based telescopes to get unprecedented views, thanks to the giant planet's position in its long orbit around the sun. For the first time, NASA scientists have strong evidence of a polar cyclone on Uranus. By examining radio waves emitted from the ice giant, they detected the phenomenon at the planet's north pole. The findings confirm a broad truth about all planets with substantial atmospheres in our solar system: Whether the planets are composed mainly of rock or gas, their atmospheres show signs of a swirling vortex at the poles. . . .(continued at https://phys.org/news/2023-05-scientists-polar-cyclone-uranus.html)

Yerkes Observatory: Restoring The World's Largest Refracting Telescope

When Dr. Amanda Bauer first uncovered the 125-year-old Great Refractor telescope at Yerkes Observatory after it had been inactive for nearly four years, she was unsure what she would find. Built by the University of Chicago in 1897 in Williams Bay, Wisconsin, Yerkes Observatory is home to the world's largest refracting telescope and famous astronomers like George Ellery Hale, Edwin Hubble and Carl Sagan worked and studied there. But as newer technology emerged the Great Refractor became less relevant, and the university closed the observatory in 2018. A non-profit formed by residents. . . .(continued at https://www.grainger.com/know-how/inspiration/kh-yerkes-observatory-restoring-worlds-largest-refracting-telescope?gucid=N:N:AP:Paid:OB:CSM-2925:HAHJXF:20511006:APZ_1&dicbo=v4-JpP6zQC-1080379056)

Could NASA Resurrect The Spitzer Space Telescope?

NASA's Spitzer Space Telescope served the astronomy community well for 16 years. From its launch in 2003 to the end of its operations in January 2020, its infrared observations fueled scientific discoveries too numerous to list. Infrared telescopes need to be kept cool to operate, and eventually, it ran out of coolant. But that wasn't the end of the mission; it kept operating in "warm" mode, where observations were limited. Its mission only ended when it drifted too far away from Earth to communicate effectively. Now NASA thinks they can reboot the telescope. The Spitzer was one of four powerful space-based observatories in NASA's Great Observatories. . . .continued at (https://phys.org/news/2023-05-nasa-resurrect-spitzer-space-telescope.html)

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.

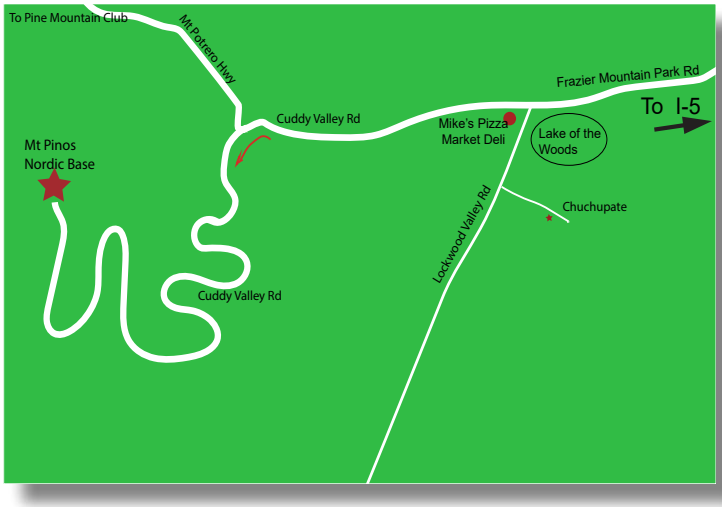
To get there, take the Frazier Mountain Park RD east about 7 miles from I-5, to Lake Of The Woods, Turn left on Lockwood Valley Rd. (If you see Mike's Pizza on your left you missed the turn) In less than a mile there is a road to the left, go past the ranger station, the parking lot is on the right.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

The Planets

Mercury begins the month just past max western elongation at mag 0.3, spending the rest of the month falling back to the Sun, arriving at superior conjunction on the 1st of July.

-

Venus spends the evenings chasing Mars, moving east from Gemini to mid Leo at mag -4.4. On the 27nd Venus almost catches up, falling just 3.5° short . On the 21st the 14% waxing Moon passes less than 3° north.

Mars moves east in Cancer, 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 southern Aries. As Jupiter rises on the morning of the 14th the 14% waning Moon trails by less than 3°.

Saturn rises well before the Sum slowly moving east in central Aquarius at mag 0.94. The 57% waning Moon passes 7° south on the morning of the 9th.

Uranus by the end of the month it rises 3 hours before the Sun, slowly moving east in southeastern Aries.

Neptune in the morning twilight moving east in southern Pisces at 7.9. On the 11th the 42% 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 southeast of M75. On the 7th the 82% waning Moon passes 3.5° south.

1 Ceres spends the month in Virgo (mag 8.1),heading southeast at 8.5.

2 Pallas at mag 8.9 moves from southern Cancer, west into southern Leo at 9.0.

3 Juno at mag 9.5, moves east through northern Orion, passing behind the Sun about the 16th rising a minutes before the Sun at month's end.

4 Vesta at mag 8.5, starts the month in southern Aries. Heading east winding up in mid-Taurus by months end..

Moon Phases

First Qtr Jun 26 | Full Jun 3 | Third Qtr Jun 10 | New Jun 17

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
6/1/2023	17:45	03:49	05:40	20:00
6/5/2023	22:20	06:48	05:39	20:02
6/10/2023	01:12	12:44	05:39	20:05
6/15/2023	03:37	18:09	05:39	20:07
6/20/2023	07:38	22:37	05:39	20:08
6/25/2023	12:27	00:32	05:41	20:09
6/30/2023	17:42	02:52	05:42	20:09

Planet Data*

June 1

	Rise	Transit	Set	Mag	Phase%
Mercury	04:32	11:14	17:56	0.29	46.1
Venus	08:55	16:08	23:21	-4.29	51.1
Mars	09:51	16:52	23:52	1.59	93.2
Jupiter	03:46	10:20	16:55	-2.13	99.6
Saturn	01:14	06:47	12:24	0.92	99.7

June 15

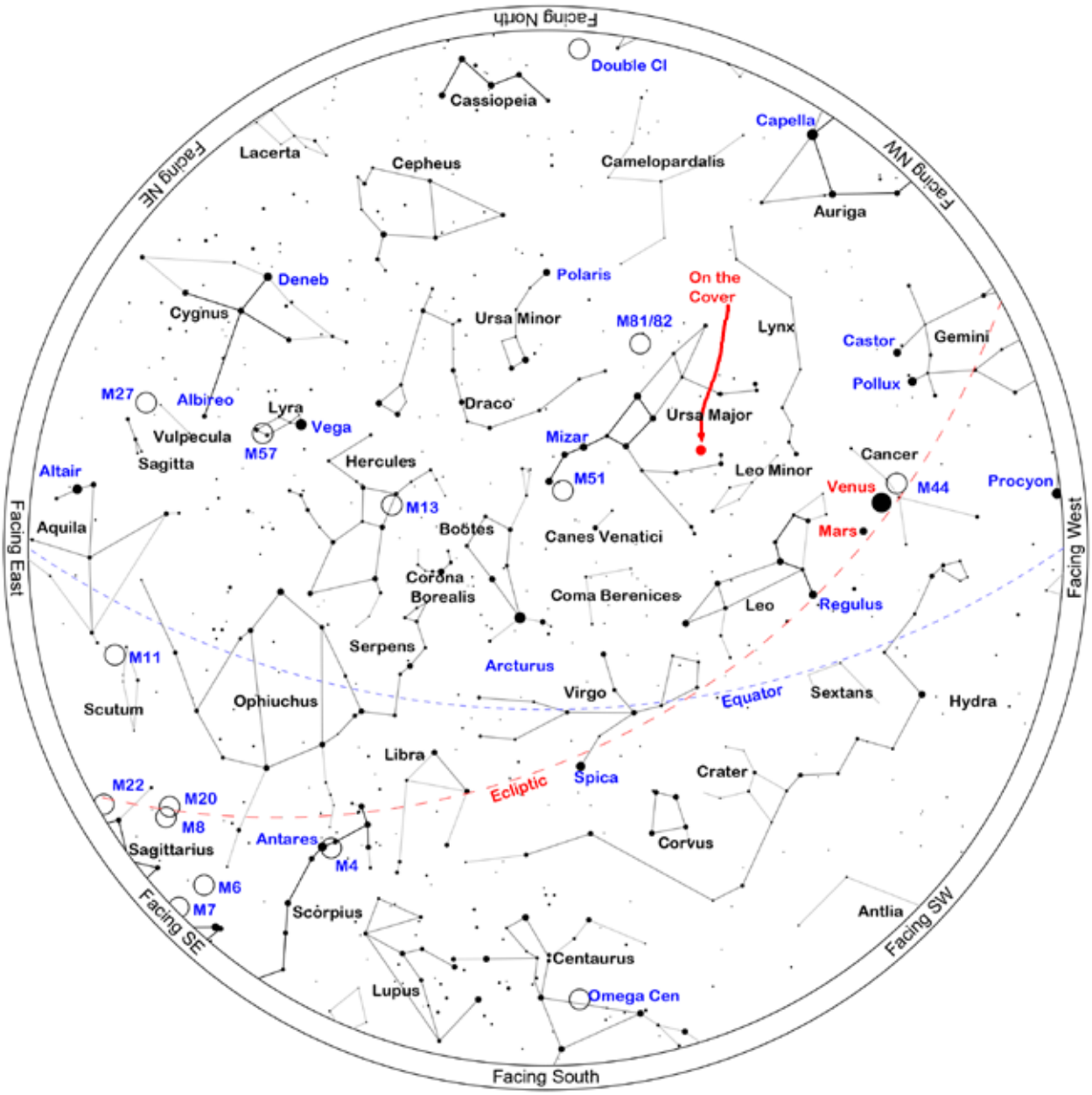
	Rise	Transit	Set	Mag	Phase%
Mercury	04:39	11:41	18:44	-0.75	76.6
Venus	09:06	16:06	23:07	-4.38	42.6
Mars	09:36	16:30	23:22	1.66	94.1
Jupiter	02:59	09:36	16:14	-2.19	99.4
Saturn	00:20	05:53	11:30	0.86	99.7

June 30

	Rise	Transit	Set	Mag	Phase%
Mercury	05:37	12:55	20:13	-2.19	99.9
Venus	09:05	15:51	22:36	-4.46	31.9
Mars	09:22	16:06	22:49	1.72	95.0
Jupiter	02:08	08:48	15:28	-2.26	99.2
Saturn	23:20	04:53	10:30	0.78	99.8

*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 June 17, 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 June 17, 2023. The list is sorted by the transit time of the object.

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M37	Salt-and-pepper Clus	Open	Aur	05h 52m 18s	+32° 33.2'	6.0	04:15	12:04	19:52
M35	NGC2168	Open	Gem	06h 09m 00s	+24° 21.0'	5.5	05:04	12:20	19:36
M48	NGC2548	Open	Hya	08h 13m 43s	-05° 45.0'	5.5	08:38	14:25	20:12
M44	Beehive Cluster	Open	Cnc	08h 40m 24s	+19° 40.0'	4.0	07:51	14:52	21:52
M67	King Cobra	Open	Cnc	08h 51m 18s	+11° 48.0'	7.5	08:27	15:03	21:39
M81	Bode's Galaxy	Galaxy	UMa	09h 55m 33s	+69° 03.9'	7.8	Circ	16:07	Circ
M82	Cigar Galaxy	Galaxy	UMa	09h 55m 53s	+69° 40.8'	9.2	Circ	16:07	Circ
M95	NGC3351	Galaxy	Leo	10h 43m 58s	+11° 42.2'	10.6	10:19	16:55	23:31
M96	NGC3368	Galaxy	Leo	10h 46m 46s	+11° 49.2'	10.1	10:22	16:58	23:34
M105	NGC3379	Galaxy	Leo	10h 47m 50s	+12° 34.9'	10.5	10:21	16:59	23:37
M108	NGC3556	Galaxy	UMa	11h 11m 31s	+55° 40.4'	10.6	Circ	17:23	Circ
M97	Owl Nebula	P Neb	UMa	11h 14m 48s	+55° 01.1'	12.0	Circ	17:26	Circ
M65	Leo Triplet	Galaxy	Leo	11h 18m 56s	+13° 05.5'	10.1	10:50	17:30	00:10
M66	Leo Triplet	Galaxy	Leo	11h 20m 15s	+12° 59.4'	9.7	10:52	17:32	00:11
M109		Galaxy	UMa	11h 57m 36s	+53° 22.4'	10.6	07:21	18:09	04:56
M98		Galaxy	Com	12h 13m 48s	+14° 54.0'	10.9	11:40	18:25	01:10
M99	Virgo Pinwheel Galaxy	Galaxy	Com	12h 18m 50s	+14° 25.0'	10.4	11:46	18:30	01:14
M106		Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	09:10	18:30	03:51
M61	Swelling Spiral	Galaxy	Vir	12h 21m 55s	+04° 28.3'	10.1	12:18	18:33	00:48
M40	Winnecke 4	Dbl+Asterism	UMa	12h 22m 12s	+58° 05.0'	8.7	Circ	18:33	Circ
M100	Mirror of M99	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	11:46	18:34	01:22
M84	NGC4374	Galaxy	Vir	12h 25m 04s	+12° 53.2'	10.2	11:57	18:36	01:16
M85	NGC4382	Galaxy	Com	12h 25m 24s	+18° 11.4'	10.0	11:41	18:37	01:32
M86	NGC4406	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	11:58	18:37	01:17
M49	NGC4472	Galaxy	Vir	12h 29m 47s	+08° 00.0'	9.3	12:16	18:41	01:06
M87	Smoking Gun,	Galaxy	Vir	12h 30m 49s	+12° 23.4'	9.6	12:04	18:42	01:20
M88	NGC4501	Galaxy	Com	12h 31m 59s	+14° 25.2'	10.2	11:59	18:43	01:27
M91	Missing Messier Object	Galaxy	Com	12h 35m 27s	+14° 29.7'	10.9	12:03	18:47	01:31
M89	NGC4552	Galaxy	Vir	12h 35m 40s	+12° 33.3'	10.9	12:09	18:47	01:25
M90	NGC4569	Galaxy	Vir	12h 36m 50s	+13° 09.7'	10.2	12:08	18:48	01:28
M58	NGC4579	Galaxy	Vir	12h 37m 44s	+11° 49.1'	10.4	12:13	18:49	01:25
M68	NGC4590	Globular	Hya	12h 39m 28s	-26° 44.5'	9.0	14:09	18:51	23:32
M104	Sombrero Galaxy	Galaxy	Vir	12h 39m 59s	-11° 37.3'	9.2	13:21	18:51	00:21
M59	NGC4621	Galaxy	Vir	12h 42m 02s	+11° 38.7'	10.7	12:18	18:53	01:29
M60	NGC4649	Galaxy	Vir	12h 43m 40s	+11° 33.1'	9.8	12:20	18:55	01:30
M94	Croc's Eye Galaxy	Galaxy	CVn	12h 50m 53s	+41° 07.1'	8.9	10:29	19:02	03:35

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M64	Black Eye Galaxy,	Galaxy	Com	12h 56m 44s	+21° 41.0'	9.3	12:01	19:08	02:15
M53	NGC5024	Globular	Com	13h 12m 55s	+18° 10.1'	8.5	12:29	19:24	02:20
M63	Sunflower Galaxy	Galaxy	CVn	13h 15m 49s	+42° 01.7'	9.3	10:48	19:27	04:06
NGC5139	Centauri	Globular	Cen	13h 26m 48s	-47° 29.0'	3.6	16:48	19:38	22:28
NGC5169		Galaxy	CVn	13h 28m 10s	+46° 40.3'	14.0	10:25	19:39	04:54
NGC5204		Galaxy	UMa	13h 29m 36s	+58° 25.1'	11.3	Circ	19:41	Circ
M51	Whirlpool Galaxy, Question Mark Galaxy	Galaxy	CVn	13h 29m 52s	+47° 11.7'	8.9	10:22	19:41	05:01
Arp85	M51B	Galaxy	CVn	13h 29m 58s	+47° 16.0'	9.6	10:21	19:41	05:01
NGC5182		Galaxy	Hya	13h 30m 41s	-28° 09.0'	13.0	15:05	19:42	00:18
NGC5214		Galaxy	CVn	13h 32m 49s	+41° 52.3'	14.0	11:06	19:44	04:22
M83	Southern Pinwheel Galaxy	Galaxy	Hya	13h 37m 00s	-29° 51.8'	8.0	15:18	19:48	00:18
HR5144	HD119055	Triple	Boo	13h 40m 40s	+19° 57.3'	5.8	12:51	19:52	02:53
NGC5283		Galaxy	Dra	13h 41m 06s	+67° 40.3'	14.0	Circ	19:52	Circ
M3	NGC5272	Globular	CVn	13h 42m 11s	+28° 22.5'	7.0	12:22	19:53	03:25
NGC5286	C84	Globular	Cen	13h 46m 24s	-51° 22.0'	7.6	17:49	19:58	22:07
NGC5292		Galaxy	Cen	13h 47m 40s	-30° 56.4'	14.0	15:33	19:59	00:25
NGC5356		Galaxy	Vir	13h 54m 59s	+05° 20.0'	14.0	13:49	20:06	02:24
NGC5363		Galaxy	Vir	13h 56m 07s	+05° 15.2'	10.2	13:50	20:07	02:25
NGC5447	III-787	Neb	UMa	14h 02m 29s	+54° 16.3'		08:57	20:14	07:30
M101	Pinwheel Galaxy	Galaxy	UMa	14h 03m 13s	+54° 20.9'	8.2	08:55	20:14	07:34
NGC5461	III-788	Neb	UMa	14h 03m 42s	+54° 19.0'		08:56	20:15	07:33
NGC5485		Galaxy	UMa	14h 07m 11s	+55° 00.0'	11.5	Circ	20:18	Circ
NGC5460		Open	Cen	14h 07m 27s	-48° 20.6'	5.6	17:36	20:19	23:01
NGC5500		Galaxy	Boo	14h 10m 15s	+48° 32.7'	14.0	10:49	20:22	05:54
IC991		Galaxy	Vir	14h 17m 48s	-13° 52.3'	13.0	15:06	20:29	01:53
HR5362	HD125383	Dbl	Lup	14h 20m 10s	-43° 03.5'	5.6	17:08	20:31	23:55
IC4406	Retina Nebula	P Neb	Lup	14h 22m 26s	-44° 09.0'	11.0	17:17	20:34	23:50
HR5409	HD126868	Triple	Vir	14h 28m 12s	-02° 13.6'	4.8	14:43	20:39	02:36
NGC5669		Galaxy	Boo	14h 32m 44s	+09° 53.4'	12.0	14:13	20:44	03:15
NGC5689		Galaxy	Boo	14h 35m 30s	+48° 44.5'	11.9	11:12	20:47	06:22
M102	Spindle Galaxy (duplicate of M101?)	Galaxy	Dra	15h 06m 30s	+55° 45.7'	10.8	Circ	21:18	Circ
NGC5875		Galaxy	Boo	15h 09m 13s	+52° 31.6'	13.0	10:52	21:21	07:49
NGC5907	Splinter Galaxy	Galaxy	Dra	15h 15m 54s	+56° 19.7'	11.4	Circ	21:27	Circ
NGC5882		P Neb	Lup	15h 16m 50s	-45° 38.9'	11.0	18:23	21:28	00:34
NGC5897		Globular	Lib	15h 17m 24s	-21° 00.6'	8.6	16:27	21:29	02:30
M5	NGC5904	Globular	Ser	15h 18m 33s	+02° 04.9'	7.0	15:21	21:30	03:38
Barnard228	B228	DkNeb	Lup	15h 44m 00s	-34° 30.0'		17:45	21:55	02:06
IC4593	White Eyed Pea	P Neb	Her	16h 11m 44s	+12° 04.3'	11.0	15:46	22:23	05:00

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
IC4592	Jabbah	Neb	Sco	16h 11m 59s	-19° 27.4'		17:17	22:23	03:30
M80	NGC6093	Globular	Sco	16h 17m 03s	-22° 58.5'	8.5	17:33	22:28	03:23
IC4601		Neb	Sco	16h 20m 18s	-20° 04.9'		17:27	22:32	03:36
Abell38		P Neb	Sco	16h 23m 17s	-31° 44.9'	11.7	18:12	22:35	02:57
M4	Cat's Eye	Globular	Sco	16h 23m 35s	-26° 31.5'	7.5	17:52	22:35	03:17
IC4603	Rho Ophiuchi	Neb	Oph	16h 25m 24s	-24° 28.0'		17:47	22:37	03:27
IC4604	Rho Ophiuchi [2]	Neb	Oph	16h 25m 33s	-23° 26.5'		17:44	22:37	03:30
NGC6124	C75	Open	Sco	16h 25m 36s	-40° 40.0'	5.8	18:58	22:37	02:16
Abell39		P Neb	Her	16h 27m 33s	+27° 54.5'	12.9	15:10	22:39	06:08
IC4605		Neb	Sco	16h 30m 12s	-25° 06.8'		17:54	22:41	03:29
NGC6153		P Neb	Sco	16h 31m 31s	-40° 15.2'	12.0	19:02	22:43	02:24
NGC6181		Galaxy	Her	16h 32m 21s	+19° 49.5'	11.9	15:43	22:44	05:44
NGC6171		Globular	Oph	16h 32m 32s	-13° 03.1'	8.1	17:18	22:44	04:10
NGC6178		Open	Sco	16h 35m 47s	-45° 38.6'	7.2	19:42	22:47	01:53
NGC6193	C82	Open	Ara	16h 41m 18s	-48° 46.0'	5.2	20:14	22:53	01:31
M13	Great Hercules Cluster	Globular	Her	16h 41m 41s	+36° 27.5'	7.0	14:46	22:53	07:00
NGC6210	Turtle Planetary Nebula	P Neb	Her	16h 44m 30s	+23° 48.0'	9.0	15:42	22:56	06:10
Barnard44a	B44a	DkNeb	Sco	16h 44m 45s	-40° 20.0'		19:15	22:56	02:37
NGC6204		Open	Ara	16h 46m 09s	-47° 01.0'	8.2	20:03	22:57	01:52
M12	Gumball Globular	Globular	Oph	16h 47m 14s	-01° 56.8'	8.0	17:01	22:59	04:56
NGC6231	Table of Scorpius	Open	Sco	16h 54m 00s	-41° 48.0'	2.6	19:33	23:05	02:37
IC4628	Prawn Nebula	Neb	Sco	16h 56m 58s	-40° 27.3'		19:28	23:08	02:48
NGC6254		Globular	Oph	16h 57m 09s	-04° 05.9'	6.6	17:17	23:08	05:00
Barnard47	B47	DkNeb	Oph	16h 59m 42s	-22° 38.0'		18:15	23:11	04:07
M62	Flickering Globular	Globular	Oph	17h 01m 13s	-30° 06.7'	8.0	18:44	23:13	03:41
M19	NGC6273	Globular	Oph	17h 02m 38s	-26° 16.0'	8.5	18:30	23:14	03:57
Barnard51	B51	DkNeb	Oph	17h 04m 44s	-22° 15.0'		18:19	23:16	04:13
IC4637		P Neb	Sco	17h 05m 10s	-40° 53.1'	14.0	19:39	23:16	02:54
Barnard56	B56	DkNeb	Sco	17h 08m 48s	-32° 05.0'		18:59	23:20	03:41
Barnard59	Pipe Nebula	DkNeb	Oph	17h 11m 23s	-27° 29.0'		18:44	23:23	04:02
NGC6302	Bug Nebula	P Neb	Sco	17h 13m 42s	-37° 06.0'	9.6	19:27	23:25	03:23
Barnard251	B251	DkNeb	Oph	17h 13m 48s	-20° 09.0'		18:21	23:25	04:29
Barnard63	B63	DkNeb	Oph	17h 16m 00s	-21° 28.0'		18:27	23:27	04:27
M92	NGC6341	Globular	Her	17h 17m 07s	+43° 08.1'	7.5	14:42	23:28	08:15
M9	NGC6333	Globular	Oph	17h 19m 12s	-18° 31.0'	9.0	18:21	23:30	04:40
NGC6326		P Neb	Ara	17h 20m 46s	-51° 45.2'	12.0	21:28	23:32	01:36
IC4651		Open	Ara	17h 24m 52s	-49° 56.5'	6.9	21:10	23:36	02:02
Abell41		P Neb	Ser	17h 29m 04s	-15° 13.3'	13.9	18:21	23:40	05:00

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
Abell42		P Neb	Oph	17h 31m 31s	-08° 19.1'	14.6	18:03	23:43	05:22
NGC6388		Globular	Sco	17h 36m 17s	-44° 44.1'	6.9	20:35	23:48	03:00
M14	NGC6402	Globular	Oph	17h 37m 36s	-03° 14.7'	9.5	17:55	23:49	05:43
M6	Butterfly Cluster	Open	Sco	17h 40m 20s	-32° 15.2'	4.5	19:32	23:52	04:12
NGC6397	C86	Globular	Ara	17h 40m 42s	-53° 40.0'	5.6	22:20	23:52	01:24
NGC6426		Globular	Oph	17h 44m 55s	+03° 10.1'	11.2	17:45	23:56	06:08
IC4665		Open	Oph	17h 46m 30s	+05° 39.0'	4.2	17:39	23:58	06:16
NGC6445	Crescent Nebula	P Neb	Sgr	17h 49m 15s	-20° 00.6'	13.0	18:56	00:01	05:05
NGC6503		Galaxy	Dra	17h 49m 27s	+70° 08.6'	10.2	Circ	00:01	Circ
NGC6441		Globular	Sco	17h 50m 13s	-37° 03.0'	7.4	20:03	00:02	04:00
M7	Scorpion's Tail	Open	Sco	17h 53m 51s	-34° 47.6'	3.5	19:56	00:05	04:14
IC4670		Neb	Sgr	17h 55m 07s	-21° 44.6'		19:07	00:06	05:05
NGC6501		Galaxy	Her	17h 56m 04s	+18° 22.3'	12.3	17:11	00:07	07:03
M23	NGC6494	Open	Sgr	17h 57m 04s	-18° 59.1'	6.0	19:00	00:08	05:16
NGC6543	Cat Eye Nebula	P Neb	Dra	17h 58m 36s	+66° 38.0'	8.1	Circ	00:10	Circ
NGC6496		Globular	Sco	17h 59m 04s	-44° 16.0'	9.2	20:55	00:10	03:26
M20	Trifid Nebula	Open+D Neb	Sgr	18h 02m 42s	-22° 58.2'	5.0	19:19	00:14	05:09
M8	Lagoon Nebula	Open+D Neb	Sgr	18h 03m 41s	-24° 22.7'	5.0	19:25	00:15	05:05
M21	NGC6531	Open	Sgr	18h 04m 13s	-22° 29.3'	7.0	19:19	00:16	05:12
NGC6530		Open	Sgr	18h 04m 31s	-24° 21.5'	4.6	19:26	00:16	05:06
NGC6528		Globular	Sgr	18h 04m 50s	-30° 03.3'	9.5	19:47	00:16	04:45
IC4684		Neb	Sgr	18h 09m 08s	-23° 26.1'		19:27	00:20	05:14
IC4685		Neb	Sgr	18h 09m 18s	-23° 59.2'		19:29	00:21	05:12
IC1274		Neb	Sgr	18h 09m 51s	-23° 38.8'		19:29	00:21	05:14
IC1275		Neb	Sgr	18h 10m 07s	-23° 45.7'		19:29	00:21	05:14
NGC6572		P Neb	Oph	18h 12m 06s	+06° 51.2'	9.0	18:02	00:23	06:45
NGC6567		P Neb	Sgr	18h 13m 45s	-19° 04.5'	12.0	19:17	00:25	05:33
IC4701		Neb	Sgr	18h 16m 36s	-16° 38.0'		19:13	00:28	05:43

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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