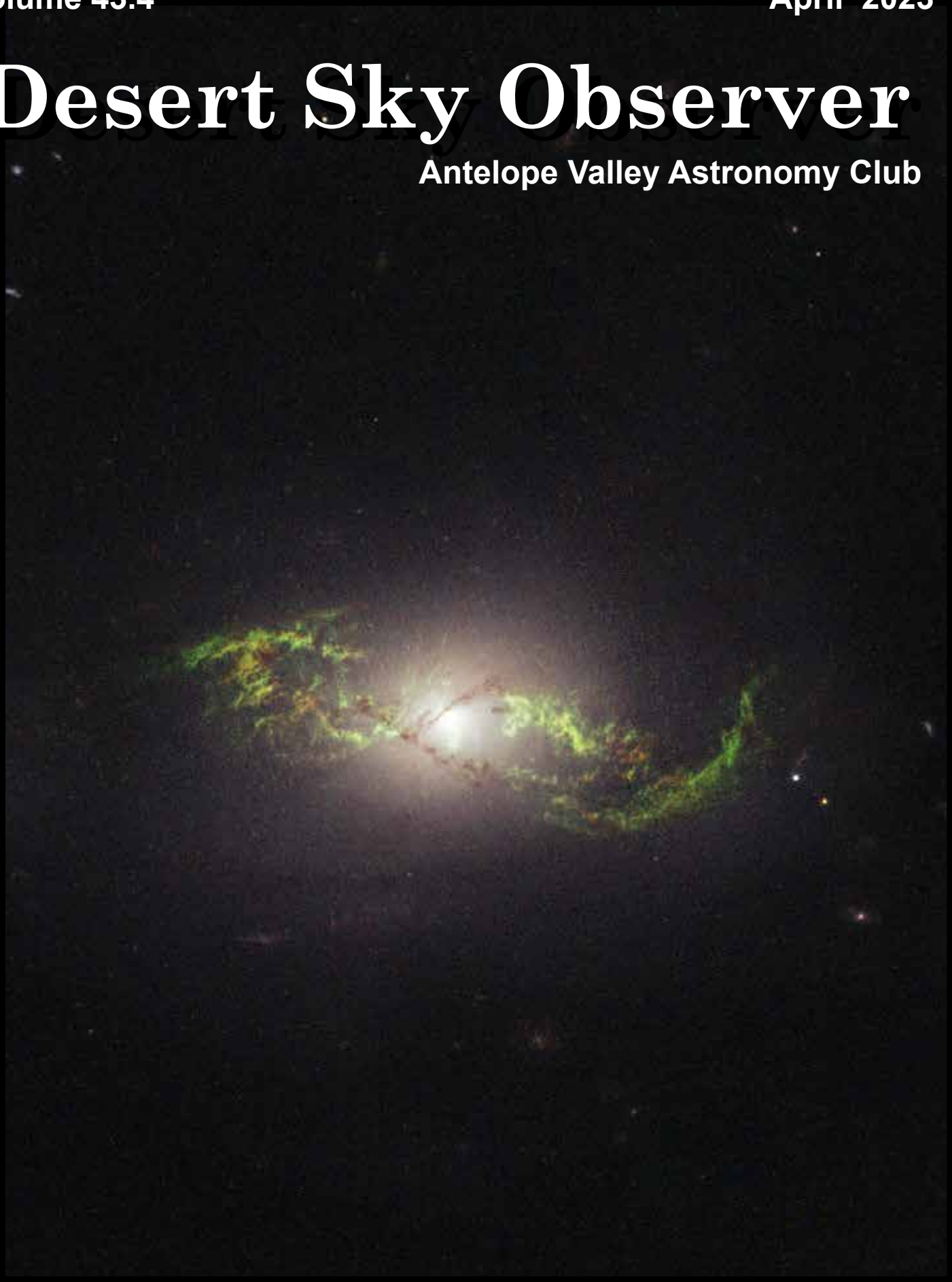
Volume 43.4 April 2023

Desert Sky Observer

Antelope Valley Astronomy Club



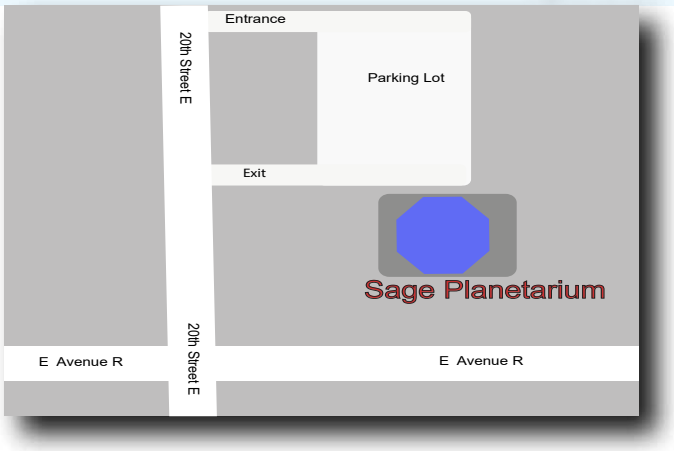
Upcoming Events

April 11: Telescope Class
April 14: Club Meeting
April 15: Moonwalk 8:00 pm @ PDW
April 22: Dark Sky Star Party @ Chuchupate
April 25: Astronomy Class
April 28: College of the Canyons Star Party

Every clear night: Personal Star Party

May 9: Telescope Class
May 12: Club Meeting
May 13: Moonwalk 8:00 pm @ PDW
May 20: Dark Sky Star Party @ Chuchupate
May 23: Astronomy Class

AVAC Calendar



Board Members

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Appointed Positions

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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 second Friday of the month. That will be on the 14th this month. As of right now I don't know who the main speaker will be, but there will be a presentation of some kind. The meeting is where we can talk about up coming plans, discuss where we are going as a club. I know for some, planning events and talking about the future is just as bad as going to the business meeting. But, nobody is being elected, and sometimes you just have to be there to offer your opinion. Please come, lend your voice, and bring the Club to life.

Jeremy has been holding a class on The Telescope (April 11, May 9), and a class on Astronomy (April 25, May 23). These are the last two classes of each. Be there at 6:30pm at the Sage. While many of you have been using your telescope for some time, and have extensive knowledge of astronomy, sitting in on a beginning class may expose you to new ideas or reinforce your current knowledge. Come join us. More information will come by emails and at meetings.

We have a Moonwalk on the 15th at Prime Desert Woodland. Sunset is at 7:30pm, so the Moonwalk will start about 8:00 pm, so get there by about 6:30 pm to setup in daylight. Come, bring your telescope, binoculars, star chart, and of course enthusiasm. Meet the public and help answer questions. See You There!

Our next Deep Sky Star Party is on April 22-23 at the Chuchupate parking lot. A few days from now there is a possibility of snow/rain but otherwise its clear skies and generally warming up. So, it looks like the weather might actually cooperate for once. Come out enjoy a dark sky, let's put the party back in "Star Party"!

On April 28th, we will be participating in the Spring Star Party at the College of the Canyons. We do this along with "The Local Group"aka Santa Clarita Astronomy Club. As usual, everything we do outdoors, the weather is a factor. If it's raining, snowing, or high winds blowing, you can guess that the event will be canceled

Keep Looking Up, Phil

On The Cover

Please note: North is 89.9° left of vertical RA: 15h 38' 54.04" DEC: 17° 1' 37.48"

Twisting in the darkness like a disturbed double helix, NGC 5972 exhibits a remarkable structure of ionised gas, which appears to be reeling in space as a result of a huge disturbance of some kind, possibly a merger with another galaxy.

The sweeping trails of gas — both H-alpha and doubly ionised Oxygen, which would both usually be expected in areas of star creation and destruction — reach out into space far beyond the stars that comprise the main body of the galaxy — so far, in fact, that when the Hubble Space Telescope applied the filter necessary to view the gas, it was unable to fit the entire extent of the clouds within its field of view, as seen in this original image.

Aside from its intriguing tendrils, NGC 5972 also plays host to an active galactic nucleus. This means a super-

From the Secretary

By Rose Moore

Members:

We have a club meeting on Friday April 14th at 7pm. We are working on getting a speaker and will let members know when we have something definite. Jeremy and the Board members are working to find speakers for the upcoming months, either by Zoom or in person.

Our Prime Desert Moon Walk is scheduled for Saturday April 15th at 8:00pm. Members are needed with telescopes, please come out and support your club! Weather permitting.

The dark sky star party for April is scheduled for Saturday April 22nd, at Chuchupate. Of course, this will be dependent on the weather. Stay tuned! We had to cancel our DSSP for March due to weather, so this is always a possibility. Chuchupate can still be chilly for April.

College of the Canyons (Canyon Country Campus) will be having their Spring Star Party on Friday April 28th starting at 7:30pm. The guest speaker will be Jennifer Burt, Phd from JPL. She will be speaking on 'The Sky's the Limit: Expanding our Understanding of ExoPlanetary Systems From the Ground Up'. We need members with telescopes to help support this event. Weather permitting. Further info, map, parking, etc., to follow.

We are still taking sign-ups for the Mt. Wilson trip on Sunday, June 18th. The cost is $40 per person, $55 if you also want a pre tour. This is for 1/2 night on the 60 inch telescope. We will be carpooling from the Pearblossom Park and Ride, exit 30 on the 14. People will be allowed to bring snacks and drink up to the event, plus they will supply hot water, hot chocolate, coffee, cups, etc. The telescope is at an altitude of 5700 feet and you have to climb stairs to get up to the telescope level. So those with any limiting medical problems need to consider this before signing up. I'll be sending out a few more emails with basic info about signing up, and then more pertinent information for those who are signed up for the trip. If we do not have enough members and or guests sign up, we will be forced to cancel this event!

Rose

On The Cover ... continued

massive black hole resides at the centre of the galaxy, and the accretion disc around this monster's genocidal jaws is rotated with such ferocity that twin beams of plasma are ejected in opposite directions out into the depths of space at close to the speed of light. Because of the vast sums of energy involved, this process can be imaged most effectively in the radio wavelengths, and doing so produces images of structures that are of indescribable magnitudes. Cygnus A provides perhaps the best illustration of this, as seen in this image taken by the NRAO Very Large Array, where the nucleus of the host galaxy appears as nothing more than an insignificant mote of dust, dwarfed by the jets and lobes of highly charged particles protruding outwards with spectacular flamboyance.

Credit:
NASA, ESA, W. Keel (University of Alabama, USA)

Sunrise - Spring Equinox, Antelope Acres, Ed Hahn
iPhone 11-- 26mm, ISO40, F/1.8, 1/16393s

60 inch computer controls

Our last trip to Mt Wilson 60 inch on June24, 2022.
Our next trip will be on Sunday , June 18, 2023.
Sign up now!

Looking down from the 60" telescope floor, down the stairs to the outside door.

Solar Eclipses Are Coming!

by David Prosper, NASA Night Sky Network

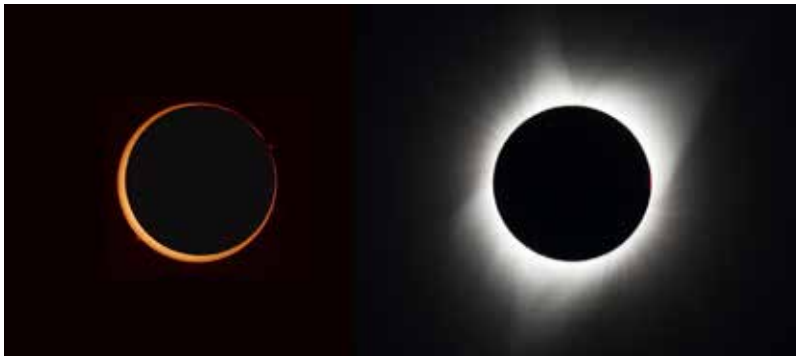
Have you ever witnessed a total solar eclipse? What about an annular solar eclipse? If not, then you are in luck if you live in North America: the next twelve months will see two solar eclipses darken the skies for observers in the continental United States, Mexico, and Canada!

Solar eclipse fans get a chance to witness an **annular eclipse** this fall. On **Saturday, October 14, 2023**, the Moon will move exactly in front of the Sun from the point of view of observers along a narrow strip of land stretching across the United States from Oregon to Texas and continuing on to Central and South America. Since the Moon will be at its furthest point in its orbit from Earth at that time (known as apogee), it won't completely block the Sun; instead, a dramatic "ring" effect will be seen as the bright edge of the Sun will be visible around the black silhouette of the Moon. The distinct appearance of this style of eclipse is why it's called an annular eclipse, as annular means ring-like. If you are standing under a tree or behind a screen you will see thousands of ring-like shadows projected everywhere during maximum eclipse, and the light may take on a wan note, but it won't actually get dark outside; it will be similar to the brightness of a cloudy day. This eclipse must only be observed with properly certified eclipse glasses, or other safe observation methods like pinhole projection or shielded solar telescopes. Even during the peak of the eclipse, the tiny bit of the Sun seen via the "ring" can damage your retinas and even blind you.

Just six months later, a dramatic **total solar eclipse** will darken the skies from Mexico to northeast Canada, casting its shadow across the USA in a strip approximately 124 miles (200 km) wide, on **Monday, April 8, 2024**. While protection must be worn to safely observe most of this eclipse, it's not needed to witness totality itself, the brief amount of time when the Moon blocks the entire surface of the Sun from view. And if you try to view totality through your eclipse viewer, you won't actually be able to see anything! The Moon's shadow will dramatically darken the skies into something resembling early evening, confusing animals and delighting human observers. You will even be able to see bright stars and planets - provided you are able to take your eyes off the majesty of the total eclipse! While the darkness and accompanying chilly breeze will be a thrill, the most spectacular observation of all will be the Sun's magnificent corona! Totality is the only time you can observe the corona, which is actually the beautiful outer fringes of the Sun's atmosphere. For observers in the middle of the path, they will get to experience the deepest portion of the eclipse, which will last over four minutes - twice as long as 2017's total solar eclipse over North America.

While some folks may be lucky enough to witness both eclipses in full – especially the residents of San Antonio, Texas, whose city lies at the crossroads of both paths – everyone off the paths of maximum eclipse can still catch sight of beautiful partial eclipses if the skies are clear. The Eclipse Ambassadors program is recruiting volunteers across the USA to prepare communities off the central paths in advance of this amazing cosmic ballet. Find more information and apply to share the excitement at eclipseambassadors.org. NASA has published a fantastic Solar Eclipse Safety Guide which can help you plan your viewing at bit.ly/nasaeclipsesafety. And you can find a large collection of solar eclipse resources, activities, visualizations, photos, and more from NASA at solarsystem.nasa.gov/eclipses .

This detailed solar eclipse map shows the paths of where and when the Moon's shadow will cross the USA for the upcoming 2023 annular solar eclipse and 2024 total solar eclipse, made using data compiled from multiple NASA missions. Where will you be? This map is very detailed, so if you would like to download a larger copy of the image, you can do so and find out more about its features at: https://svs.gsfc.nasa.gov/5073
Credits: NASA/Scientific Visualization Studio/Michala Garrison; eclipse calculations by Ernie Wright, NASA Goddard Space Flight Center.



Photos of an annular total solar eclipse (left) and a total solar eclipse (right). Note that the annular eclipse is shown with a dark background, as it is only safe to view with protection – you can see how a small portion of the Sun is still visible as the ring around the Moon. On the right, you can see the Sun's wispy corona, visible only during totality itself, when the Moon completely – or totally - hides the Sun from view. A total solar eclipse is only safe to view without protection during totality itself; it is absolutely necessary to protect your eyes throughout the rest of the eclipse!
Credits: Left, Annular Eclipse: Stefan Seip (Oct 3, 2005). Right, Total Eclipse, NASA/Aubrey Gemignani (August 21, 2017)

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

Astro For Kids: Why Does Time Change When Traveling Close To The Speed Of Light?

Imagine you're in a car driving across the country watching the landscape. A tree in the distance gets closer to your car, passes right by you, then moves off again in the distance behind you. Of course, you know that tree isn't actually getting up and walking toward or away from you. It's you in the car who's moving toward the tree. The tree is moving only in comparison, or relative, to you — that's what we physicists call relativity. If you had a friend standing by the tree, they would see you moving toward them at the same speed that you see them moving toward you. ... (continued at https://astronomy.com/news/2023/03/why-does-time-change-when-traveling-close-to-the-speed-of-light)

Here's What The Sky Would Look Like If Humans Could See Gamma Rays

Over 90% of the gamma-ray flashes come from galaxies called blazars, which are powered by feeding supermassive black holes. A new NASA animation shows what the sky over Earth would look like to humans if we had evolved to see high-energy gamma-ray light rather than just the visible light spectrum. The animation represents a cosmic firework display created as Earth's atmosphere is belted by gamma rays from astrophysical sources and powerful cosmic events. . . .(continued at https://www.space.com/gamma-ray-sky-nasa-video-fermi-space-telescope)

Next Generation Event Horizon Telescope Aims To Get Videos Of Black Holes

In 2019, the Event Horizon Telescope (EHT) collaboration produced the first-ever image of a black hole, stunning the world. Now, scientists are taking it further. The next generation Event Horizon Telescope (ngEHT) collaboration aims to create high-quality videos of black holes. But this next-generation collaboration is groundbreaking in other ways, too. It's the first large physics collaboration bringing together perspectives from natural sciences, social sciences, and the humanities.. . . (continued at https://astronomy.com/news/2023/03/next-generation-event-horizon-telescope-aims-to-get-videos-of-black-holes)

Anticipating Comet Tsuchinshan-Atlas (C/2023 A3)

Newly discovered Comet C/2023 A3 might reach naked-eye brightness when it flies past Earth in 2024. Check out our forecast of what to expect to see in the months ahead. Recent Comet ZTF (C/2022 E3) captured the public's interest in part because of social media. While many may have been disappointed at not seeing a bright green apparition in the heavens, the comet met or exceeded expectations in amateur astronomers' eyes. With multiple tails, a peak magnitude of 5 and scenic pairings with Capella and Mars, it inspired us to "jacket up" and brave cold winter nights so we could see it for ourselves. . . . (continued at https://skyandtelescope.org/astronomy-news/anticipating-comet-tsuchinshan-atlas-c-2023-a3/)

Hubble Monitors Changing Weather And Seasons Of Jupiter And Uranus

Ever since its launch in 1990, NASA's Hubble Space Telescope has been an interplanetary weather observer, keeping an eye on the largely gaseous outer planets and their ever-changing atmospheres. NASA spacecraft missions to the outer planets have given us a close-up look at these atmospheres, but Hubble's sharpness and sensitivity keeps an unblinking eye on a kaleidoscope of complex activities over time. . . .(continued at https://phys.org/news/2023-03-hubble-weather-seasons-jupiter-uranus.html)

Astronomers In Hunt For Rocky Exoplanets In Venus Zone

University of California, Riverside Ph.D. student Colby Ostberg and colleagues began with 317 known rocky exoplanets in the Venus zone, a range of stellar distances where a planet with an initial Earth-like atmosphere could experience a runaway greenhouse effect that transforms it into a Venus-like atmosphere. The astronomers whittled the list down to the five most likely to resemble Venus in terms of their radii, masses, densities, the shapes of their orbits, and perhaps most significantly, distances from their stars. . . . .(continued at https://www.sci.news/astronomy/venus-zone-exoplanets-11773.html)

Space News

News from around the Net

'Terminator Zones' On Distant Planets Could Harbor Life, Uc Irvine Astronomers Say

In a new study, University of California, Irvine astronomers describe how extraterrestrial life has the potential to exist on distant exoplanets inside a special area called the "terminator zone," which is a ring on planets that have one side that always faces its star and one side that is always dark. "These planets have a permanent day side and a permanent night side," said Ana Lobo, a postdoctoral researcher in the UCI Department of Physics & Astronomy who led the new work, which just published in The Astrophysical Journal. . . . (continued at https://www.sciencedaily.com/releases/2023/03/230316124434.htm)

Evidence That Venus Is Volcanically Active

Venus appears to have volcanic activity, according to a new research paper that offers strong evidence to answer the lingering question about whether Earth's sister planet currently has eruptions and lava flows. Venus, although similar to Earth in size and mass, differs markedly in that it does not have plate tectonics. The boundaries of Earth's moving surface plates are the primary locations of volcanic activity. New research by University of Alaska Fairbanks Geophysical Institute research professor Robert Herrick revealed a nearly 1-square-mile volcanic vent that changed in shape and grew over eight months in 1991. . . .(continued at https://www.sciencedaily.com/releases/2023/03/230315143900.htm)

14 Things New Stargazers Should Know

If you're new to astronomy, you might be wondering where to start. It can be daunting stepping out under the night sky for the first time with the intention of learning your way around the stars and constellations, looking out for planets and trying to get to know all about the phases of the Moon. This can be especially difficult if you don't have any more experienced amateur astronomers to help, or maybe you're wondering whether you will be able to see anything at all without an expensive telescope (spoiler: you will!). . . . (continued at https://www.skyatnightmagazine.com/advice/skills/things-new-stargazers-should-know/)

Satellite Trails Mar Hubble Images

When SpaceX first began launching its Starlink constellation in 2019, and astronomers began to realize just how bright the satellites would be, CEO Elon Musk glibly tweeted that telescopes would simply have to go to space. Only it turns out that, depending on their orbits, space observatories aren't safe from light pollution either. A new accounting of satellite trails in Hubble Space Telescope images, published March 2nd in Nature, shows that the fraction of images affected has doubled over the past two decades. As of 2021, the chance of seeing the streak of a passing satellite in a Hubble image stood at 6%. The team, led by Sandor Kruk (Max-Planck Institute for Extraterrestrial Physics, Germany), used a novel method to account for satellite trails. The researchers started with comments on an online forum run by the Asteroid Hunters citizen-science project. Volunteers were perusing images for asteroid trails, . . . (continued at https://skyandtelescope.org/astronomy-news/satellite-trails-mar-hubble-images/)

The Aftermath of DART, Humankind's First Planetary Defense Mission

Last year, NASA intentionally crashed the Double Asteroid Redirection Test (DART) into a nearby asteroid to test our ability to defend the Earth from rocky threats. The results are now in – the DART mission was a smashing success. On September 26, 2022, DART hit its target asteroid Dimorphos, moon of the nearby asteroid 65803 Didymos, in a historic celestial experiment. Not only was DART the first planetary defense mission of its kind, but it marked the first time humanity was able to change the motion of a natural object in space.. . . (continued at https://skyandtelescope.org/astronomy-news/the-aftermath-of-dart-humankinds-first-planetary-defense-mission/)

Amateur Astronomers Needed: Help Classify Stars With Gaia's Data

ESA's Gaia mission has been collecting data on millions of space objects like stars and asteroids to build an extensive cosmic record. Now, to take it up a notch, it needs your eyes. Gaia's data is already an invaluable resource for astronomers and scientists. The mission was launched in late 2013 and now lies some 1.5 million km from Earth. With its two powerful telescopes and three science instruments, Gaia is creating the largest and most precise 3D map of the Milky Way.. . . (continued at https://phys.org/news/2023-03-amateur-astronomers-stars-gaia.html)

Dark Sky Observing Sites

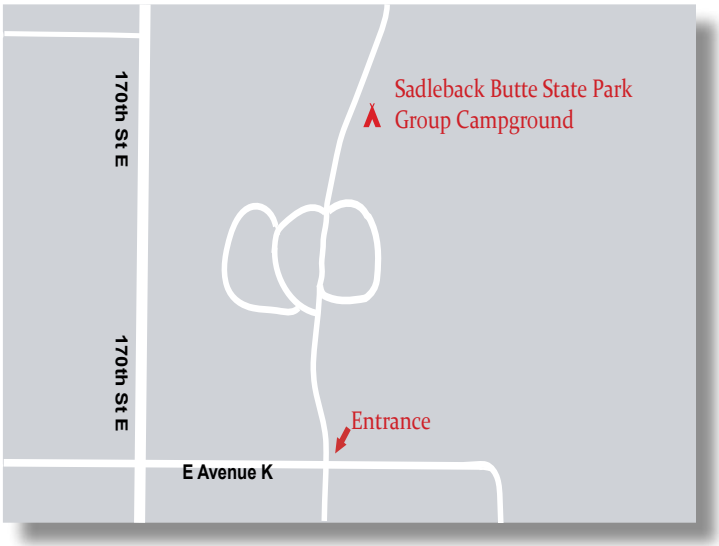
The Chuchupate parking lot is a half a mile beyond the Mt Pinos ranger station (on some maps The Chuchupate Ranger Sta., the parking lot is also called Frazier Mountain trailhead).

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.

Saddleback Butte State Park is east of 170th Street East between Avenue I and Avenue K. Elevation 3651 feet. Temperatures in summer average 95° with a high of 115,° winter average lows are 33° with occasional snow. There are 37 individual campsites and one group campsite. When the club has a star party there the group campsite is used. Individual campsites cost $20 per night. Enter off Avenue K.



Solar System Summary

The **Sun** moves from the middle of Pisces to the middle of Aries during March. A total eclipse will occur on April 20. If you're in Western Australia or eastern Indonesia your in luck.

The Planets

Mercury starts the month in Piscus moving toward greatest eastern elongation in Aries of 19.5° on the 11th. Fading rapidly as it falls toward the Sun in inferior conjunction on May1.

Venus spends the evenings moving east from mid Aries to mid Taurus at mag -4.0. On the 11th passing 2.5° south of the Pleiades.

Mars spends the month moving east through the stars of Gemini, fading from mag 1.0 to 1.3 at months end.

Jupiter is to close to the setting Sun to be seen. After the 11th it becomes a morning "star," still too close to be seen for a while.

Saturn rises well before the Sum slowly moving east in western Aquarius at mag 0.99.

Uranus is in southeastern Aries at mag 5.8 slowly moving east. By the middle of the month it will be hard to see in the glare of the evening Sun.

Neptune quickly separates itself from the Sun in the morning twilight moving east in southern Pisces at 7.9.

Dwarf Planets

134340 Pluto spends the month on the eastern edge of Capricorn slowly moving east at mag 14.4 just southeast of M75.

1 Ceres spends the month in retrograde moving through Coma Berenices (mag 7.0), ending the month just before passing into Leo.

2 Pallas (mag 8.6) heading from central Monoceros northeast ending up southeast of Procyon.

3 Juno (mag 9.6) moves east in northern Cetus crossing into central Aries by the end of April.

4 Vesta (mag 8.1) spends the month, close to the Sun, crossing the southeast corner of Pisces ending in Cetus. About the 24th passes behind the Sun ending up in the morning sky.

Moon Phases

First Qtr Apr 27 | Full Apr 5 | Third Qtr Apr 13 | New Apr 19

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
4/1/2023	15:11	04:42	06:39	19:13
4/5/2023	19:05	06:28	06:34	19:16
4/10/2023	23:29	09:13	06:27	19:20
4/15/2023	04:01	14:43	06:21	19:24
4/20/2023	06:33	20:24	06:15	19:28
4/25/2023	10:04	00:34	06:09	19:32
4/30/2023	14:55	03:40	06:03	19:36

Planet Data*

April 1

	Rise	Transit	Set	Mag	Phase%
Mercury	07:16	13:51	20:27	-1.02	75.5
Venus	08:22	15:18	22:15	-4.04	76.9
Mars	11:09	18:29	01:50	0.99	90.1
Jupiter	07:06	13:26	19:46	-2.06	99.9
Saturn	05:06	10:35	16:04	0.96	99.9

April 15

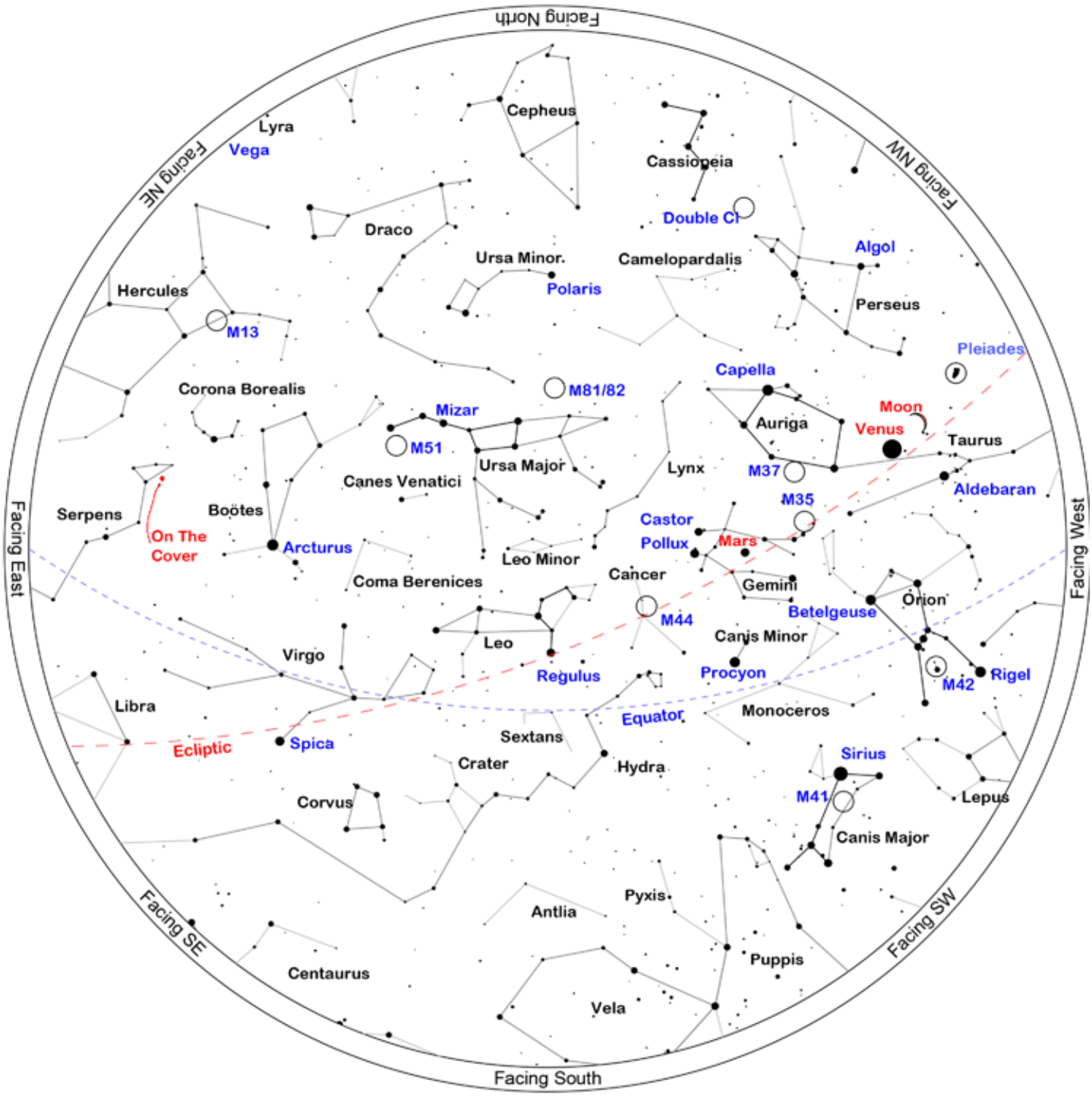
	Rise	Transit	Set	Mag	Phase%
Mercury	07:03	14:00	20:58	0.89	25.4
Venus	08:19	15:30	22:42	-4.08	72.2
Mars	10:48	18:05	01:25	1.17	90.5
Jupiter	06:20	12:44	19:08	-2.05	100.
Saturn	04:14	09:45	15:15	0.99	99.8

April 30

	Rise	Transit	Set	Mag	Phase%
Mercury	06:07	12:56	19:44	5.80	0.08
Venus	08:25	15:46	23:07	-4.13	66.4
Mars	10:28	17:41	00:55	1.34	91.3
Jupiter	05:31	11:58	18:26	-2.06	99.9
Saturn	03:19	08:50	14:22	0.99	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 April 22, 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 April 22, 2023. The list is sorted by the transit time of the object.

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M76	Little Dumbbell Nebula	P Neb	Per	01h 42m 18s	+51° 34.2'	12.0	01:50	12:02	22:14
M34	Spiral Cluster	Open	Per	02h 42m 05s	+42° 45.6'	6.0	04:18	13:02	21:46
M77	Cetus A	Galaxy	Cet	02h 42m 41s	-00° 00.8'	9.7	07:00	13:02	19:05
NGC1448		Galaxy	Hor	03h 44m 32s	-44° 38.6'	11.0	10:51	14:04	17:17
IC348		Open	Per	03h 44m 34s	+32° 09.7'	7.3	06:18	14:04	21:51
M45	Pleiades	Open	Tau	03h 47m 30s	+24° 07.0'	1.6	06:52	14:07	21:22
Barnard5	B5	DkNeb	Per	03h 47m 53s	+32° 53.0'		06:18	14:08	21:57
NGC1461		Galaxy	Eri	03h 48m 27s	-16° 23.5'	11.7	08:52	14:08	19:24
IC353		Neb	Tau	03h 53m 00s	+25° 48.0'		06:51	14:13	21:34
IC2003		P Neb	Per	03h 56m 22s	+33° 52.5'	13.0	06:22	14:16	22:10
NGC1499	California Nebula	Neb	Per	04h 03m 14s	+36° 22.0'		06:16	14:23	22:29
NGC1502		Open	Cam	04h 07m 50s	+62° 19.8'	5.7	Circ	14:28	Circ
IC360		Neb	Tau	04h 09m 00s	+26° 06.0'		07:06	14:29	21:51
NGC1514	Crystal Ball Nebula	P Neb	Tau	04h 09m 17s	+30° 46.5'	10.0	06:48	14:29	22:10
NGC1513		Open	Per	04h 09m 57s	+49° 30.8'	8.4	04:46	14:30	00:13
IC359		Neb	Tau	04h 12m 28s	+27° 42.1'		07:04	14:32	22:01
NGC1535		P Neb	Eri	04h 14m 16s	-12° 44.3'	10.0	09:07	14:34	20:01
Barnard10	B10	DkNeb	Tau	04h 18m 41s	+28° 16.0'		07:08	14:38	22:09
NGC1545		Open	Per	04h 20m 57s	+50° 15.2'	6.2	04:48	14:41	00:34
NGC1569		Galaxy	Cam	04h 30m 49s	+64° 50.8'	11.2	Circ	14:50	Circ
Barnard18	B18	DkNeb	Tau	04h 31m 13s	+24° 21.0'		07:35	14:51	22:07
NGC1582		Open	Per	04h 31m 53s	+43° 49.0'	7.0	06:00	14:52	23:43
NGC1560		Galaxy	Cam	04h 32m 48s	+71° 52.7'	11.5	Circ	14:52	Circ
Barnard19	B19	DkNeb	Tau	04h 33m 00s	+26° 16.0'		07:30	14:53	22:16
Barnard20	B20	DkNeb	Per	04h 37m 04s	+50° 58.0'		04:54	14:57	01:00
IC2087		Neb	Tau	04h 40m 00s	+25° 44.5'		07:39	15:00	22:21
Barnard23	B23	DkNeb	Tau	04h 40m 33s	+29° 52.0'		07:23	15:00	22:37
NGC1624		Open	Per	04h 40m 36s	+50° 27.6'	10.4	05:04	15:00	00:56
NGC1640		Galaxy	Eri	04h 42m 14s	-20° 26.0'	11.7	09:59	15:02	20:05
NGC1647		Open	Tau	04h 45m 55s	+19° 06.8'	6.4	08:07	15:06	22:04
IC2118	Witch Head Nebula	Neb	Eri	05h 04m 54s	-07° 15.0'		09:42	15:25	21:07
NGC1851	C73	Globular	Col	05h 14m 06s	-40° 03.0'	7.3	11:52	15:34	19:16
IC405	Flaming Star Nebula	Neb	Aur	05h 16m 29s	+34° 21.3'		07:39	15:36	23:33
M79	NGC1904	Globular	Lep	05h 24m 11s	-24° 31.4'	8.5	10:54	15:44	20:33
M38	Starfish Cluster	Open	Aur	05h 28m 40s	+35° 50.8'	7.0	07:44	15:48	23:52
M1	Crab Nebula	SNR	Tau	05h 34m 32s	+22° 00.8'	8.4	08:46	15:54	23:02

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M42	Great Orion Nebula	Open+D Neb	Ori	05h 35m 16s	-05° 23.4'	4.0	10:07	15:55	21:43
M43	Orion Nebula Extension	D Neb	Ori	05h 35m 31s	-05° 16.0'	9.0	10:07	15:55	21:43
M36	Pinwheel Cluster	Open	Aur	05h 36m 18s	+34° 08.3'	6.5	08:00	15:56	23:52
M78	NGC2068	D Neb	Ori	05h 46m 45s	+00° 04.8'	8.0	10:03	16:06	22:09
M37	Salt-and-pepper Cluster	Open	Aur	05h 52m 18s	+32° 33.2'	6.0	08:24	16:12	00:00
M35	NGC2168	Open	Gem	06h 09m 00s	+24° 21.0'	5.5	09:13	16:29	23:45
M41	Little Beehive	Open	CMa	06h 46m 01s	-20° 45.3'	5.0	12:03	17:06	22:08
M50	Heart-shaped Cluster	Open	Mon	07h 02m 42s	-08° 23.0'	7.0	11:43	17:22	23:02
M47	NGC2422	Open	Pup	07h 36m 35s	-14° 29.0'	4.5	12:35	17:56	23:18
M46	NGC2437	Open	Pup	07h 41m 46s	-14° 48.6'	6.5	12:41	18:01	23:22
M93	NGC2447	Open	Pup	07h 44m 30s	-23° 51.4'	6.5	13:12	18:04	22:56
M48	NGC2548	Open	Hya	08h 13m 43s	-05° 45.0'	5.5	12:47	18:33	00:20
M44	Praesepe Beehive Cluster	Open	Cnc	08h 40m 24s	+19° 40.0'	4.0	12:00	19:00	02:00
M67	King Cobra	Open	Cnc	08h 51m 18s	+11° 48.0'	7.5	12:35	19:11	01:47
M81	Bode's Galaxy	Galaxy	UMa	09h 55m 33s	+69° 03.9'	7.8	Circ	20:15	Circ
M82	Cigar Galaxy	Galaxy	UMa	09h 55m 53s	+69° 40.8'	9.2	Circ	20:16	Circ
M95	NGC3351	Galaxy	Leo	10h 43m 58s	+11° 42.2'	10.6	14:28	21:04	03:39
M96	NGC3368	Galaxy	Leo	10h 46m 46s	+11° 49.2'	10.1	14:30	21:06	03:43
M105	NGC3379	Galaxy	Leo	10h 47m 50s	+12° 34.9'	10.5	14:29	21:07	03:46
M108	NGC3556	Galaxy	UMa	11h 11m 31s	+55° 40.4'	10.6	Circ	21:31	Circ
M97	Owl Nebula	P Neb	UMa	11h 14m 48s	+55° 01.1'	12.0	Circ	21:34	Circ
M65	Leo Triplet	Galaxy	Leo	11h 18m 56s	+13° 05.5'	10.1	14:59	21:39	04:18
M66	Leo Triplet	Galaxy	Leo	11h 20m 15s	+12° 59.4'	9.7	15:00	21:40	04:20
M109	NGC3992	Galaxy	UMa	11h 57m 36s	+53° 22.4'	10.6	11:30	22:17	09:05
M98	NGC4192	Galaxy	Com	12h 13m 48s	+14° 54.0'	10.9	15:48	22:33	05:19
M99	Virgo Cluster	Galaxy	Com	12h 18m 50s	+14° 25.0'	10.4	15:55	22:38	05:22
M106	NGC4258	Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	13:18	22:39	07:59
M61	Swelling Spiral	Galaxy	Vir	12h 21m 55s	+04° 28.3'	10.1	16:26	22:42	04:57
M40	Winnecke 4	Dbl+Asterism	UMa	12h 22m 12s	+58° 05.0'	8.7	Circ	22:42	Circ
M100	Mirror of M99	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	15:54	22:43	05:31
M84	NGC4374	Galaxy	Vir	12h 25m 04s	+12° 53.2'	10.2	16:05	22:45	05:24
M85	NGC4382	Galaxy	Com	12h 25m 24s	+18° 11.4'	10.0	15:50	22:45	05:41
M86	NGC4406	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	16:06	22:46	05:25
M49	NGC4472	Galaxy	Vir	12h 29m 47s	+08° 00.0'	9.3	16:24	22:49	05:15
M87	Smoking Gun	Galaxy	Vir	12h 30m 49s	+12° 23.4'	9.6	16:13	22:50	05:28
M88	NGC4501	Galaxy	Com	12h 31m 59s	+14° 25.2'	10.2	16:08	22:52	05:36
M91	Missing Messier Object	Galaxy	Com	12h 35m 27s	+14° 29.7'	10.9	16:11	22:55	05:39

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M89	NGC4552	Galaxy	Vir	12h 35m 40s	+12° 33.3'	10.9	16:17	22:55	05:34
M90	NGC4569	Galaxy	Vir	12h 36m 50s	+13° 09.7'	10.2	16:16	22:57	05:37
M58	NGC4579	Galaxy	Vir	12h 37m 44s	+11° 49.1'	10.4	16:21	22:57	05:34
M68	NGC4590	Globular	Hya	12h 39m 28s	-26° 44.5'	9.0	18:17	22:59	03:41
M104	Sombrero Galaxy	Galaxy	Vir	12h 39m 59s	-11° 37.3'	9.2	17:30	23:00	04:30
M59	NGC4621	Galaxy	Vir	12h 42m 02s	+11° 38.7'	10.7	16:26	23:02	05:37
M60	NGC4649	Galaxy	Vir	12h 43m 40s	+11° 33.1'	9.8	16:28	23:03	05:39
M94	Croc's Eye Galaxy	Galaxy	CVn	12h 50m 53s	+41° 07.1'	8.9	14:37	23:11	07:44
M64	Black Eye Galaxy,	Galaxy	Com	12h 56m 44s	+21° 41.0'	9.3	16:09	23:16	06:23
M53	NGC5024	Globular	Com	13h 12m 55s	+18° 10.1'	8.5	16:37	23:33	06:28
M63	Sunflower Galaxy	Galaxy	CVn	13h 15m 49s	+42° 01.7'	9.3	14:56	23:35	08:15
NGC5139	Omega Centauri	Globular	Cen	13h 26m 48s	-47° 29.0'	3.6	20:56	23:46	02:37
NGC5169		Galaxy	CVn	13h 28m 10s	+46° 40.3'	14.0	14:33	23:48	09:02
NGC5204		Galaxy	UMa	13h 29m 36s	+58° 25.1'	11.3	Circ	23:49	Circ
M51		Galaxy	CVn	13h 29m 52s	+47° 11.7'	8.9	14:30	23:50	09:09
Arp85	M51B	Galaxy	CVn	13h 29m 58s	+47° 16.0'	9.6	14:30	23:50	09:10
NGC5182		Galaxy	Hya	13h 30m 41s	-28° 09.0'	13.0	19:14	23:50	04:27
NGC5214		Galaxy	CVn	13h 32m 49s	+41° 52.3'	14.0	15:14	23:52	08:30
M83	Southern Pinwheel Galaxy	Galaxy	Hya	13h 37m 00s	-29° 51.8'	8.0	19:27	23:57	04:27
HR5144	1 Boo	Triple	Boo	13h 40m 40s	+19° 57.3'	5.8	16:59	00:00	07:02
NGC5283		Galaxy	Dra	13h 41m 06s	+67° 40.3'	14.0	Circ	00:01	Circ
M3	NGC5272	Globular	CVn	13h 42m 11s	+28° 22.5'	7.0	16:31	00:02	07:33
NGC5286	C84	Globular	Cen	13h 46m 24s	-51° 22.0'	7.6	21:57	00:06	02:15
NGC5292		Galaxy	Cen	13h 47m 40s	-30° 56.4'	14.0	19:42	00:07	04:33
NGC5356		Galaxy	Vir	13h 54m 59s	+05° 20.0'	14.0	17:57	00:15	06:32
NGC5363		Galaxy	Vir	13h 56m 07s	+05° 15.2'	10.2	17:58	00:16	06:33
NGC5447	III-787	Neb	UMa	14h 02m 29s	+54° 16.3'		13:06	00:22	11:39
M101	Pinwheel Galaxy	Galaxy	UMa	14h 03m 13s	+54° 20.9'	8.2	13:03	00:23	11:43
NGC5461	III-788	Neb	UMa	14h 03m 42s	+54° 19.0'		13:05	00:23	11:42
NGC5485		Galaxy	UMa	14h 07m 11s	+55° 00.0'	11.5	Circ	00:27	Circ
NGC5460		Open	Cen	14h 07m 27s	-48° 20.6'	5.6	21:45	00:27	03:10
NGC5500		Galaxy	Boo	14h 10m 15s	+48° 32.7'	14.0	14:57	00:30	10:03
IC991		Galaxy	Vir	14h 17m 48s	-13° 52.3'	13.0	19:14	00:37	06:01
HR5362	HD125383	Dbl	Lup	14h 20m 10s	-43° 03.5'	5.6	21:16	00:40	04:04
IC4406	Retina Nebula	P Neb	Lup	14h 22m 26s	-44° 09.0'	11.0	21:26	00:42	03:59
HR5409	HD126868	Triple	Vir	14h 28m 12s	-02° 13.6'	4.8	18:51	00:48	06:44
NGC5669		Galaxy	Boo	14h 32m 44s	+09° 53.4'	12.0	18:22	00:52	07:23
NGC5689		Galaxy	Boo	14h 35m 30s	+48° 44.5'	11.9	15:20	00:55	10:30
M102	Spindle Galaxy (duplicate of M101?)	Galaxy	Dra	15h 06m 30s	+55° 45.7'	10.8	Circ	01:26	Circ

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC5875		Galaxy	Boo	15h 09m 13s	+52° 31.6'	13.0	15:00	01:29	11:58
NGC5907	Splinter Galaxy	Galaxy	Dra	15h 15m 54s	+56° 19.7'	11.4	Circ	01:36	Circ
NGC5882		P Neb	Lup	15h 16m 50s	-45° 38.9'	11.0	22:31	01:37	04:42
NGC5897		Globular	Lib	15h 17m 24s	-21° 00.6'	8.6	20:36	01:37	06:39
M5	NGC5904	Globular	Ser	15h 18m 33s	+02° 04.9'	7.0	19:30	01:38	07:47
Barnard228	B228	DkNeb	Lup	15h 44m 00s	-34° 30.0'		21:53	02:04	06:14
IC4593	White Eyed Pea	P Neb	Her	16h 11m 44s	+12° 04.3'	11.0	19:55	02:31	09:08
IC4592	Jabbah	Neb	Sco	16h 11m 59s	-19° 27.4'		21:25	02:32	07:38
M80	NGC6093	Globular	Sco	16h 17m 03s	-22° 58.5'	8.5	21:42	02:37	07:32
M4	Cat's Eye	Globular	Sco	16h 23m 35s	-26° 31.5'	7.5	22:01	02:43	07:26
IC4603	Rho Ophiuchi Complex [1]	Neb	Oph	16h 25m 24s	-24° 28.0'		21:55	02:45	07:35
IC4604	Rho Ophiuchi Complex [2]	Neb	Oph	16h 25m 33s	-23° 26.5'		21:52	02:45	07:39
M13	Great Hercules Cluster	Globular	Her	16h 41m 41s	+36° 27.5'	7.0	18:54	03:01	11:08
M12	Gumball Globular	Globular	Oph	16h 47m 14s	-01° 56.8'	8.0	21:10	03:07	09:04
M19	NGC6273	Globular	Oph	17h 02m 38s	-26° 16.0'	8.5	22:39	03:22	08:06
M92	NGC6341	Globular	Her	17h 17m 07s	+43° 08.1'	7.5	18:50	03:37	12:23
M9	NGC6333	Globular	Oph	17h 19m 12s	-18° 31.0'	9.0	22:29	03:39	08:48
NGC6326		P Neb	Ara	17h 20m 46s	-51° 45.2'	12.0	01:37	03:40	05:44
NGC6357	Lobster Nebula	Neb	Sco	17h 24m 43s	-34° 12.1'		23:33	03:44	07:56
IC4651		Open	Ara	17h 24m 52s	-49° 56.5'	6.9	01:19	03:45	06:11
Abell41		P Neb	Ser	17h 29m 04s	-15° 13.3'	13.9	22:29	03:49	09:08
Abell42		P Neb	Oph	17h 31m 31s	-08° 19.1'	14.6	22:12	03:51	09:31
Barnard78	B78	DkNeb	Oph	17h 32m 00s	-25° 35.0'		23:06	03:52	08:38
NGC6388		Globular	Sco	17h 36m 17s	-44° 44.1'	6.9	00:44	03:56	07:08
M14	NGC6402	Globular	Oph	17h 37m 36s	-03° 14.7'	9.5	22:04	03:57	09:51
Barnard276	B276	DkNeb	Oph	17h 39m 39s	-19° 49.0'		22:54	03:59	09:05
M6	Butterfly Cluster	Open	Sco	17h 40m 20s	-32° 15.2'	4.5	23:40	04:00	08:20
M7	Ptolemy's Cluster	Open	Sco	17h 53m 51s	-34° 47.6'	3.5	00:05	04:14	08:22

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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