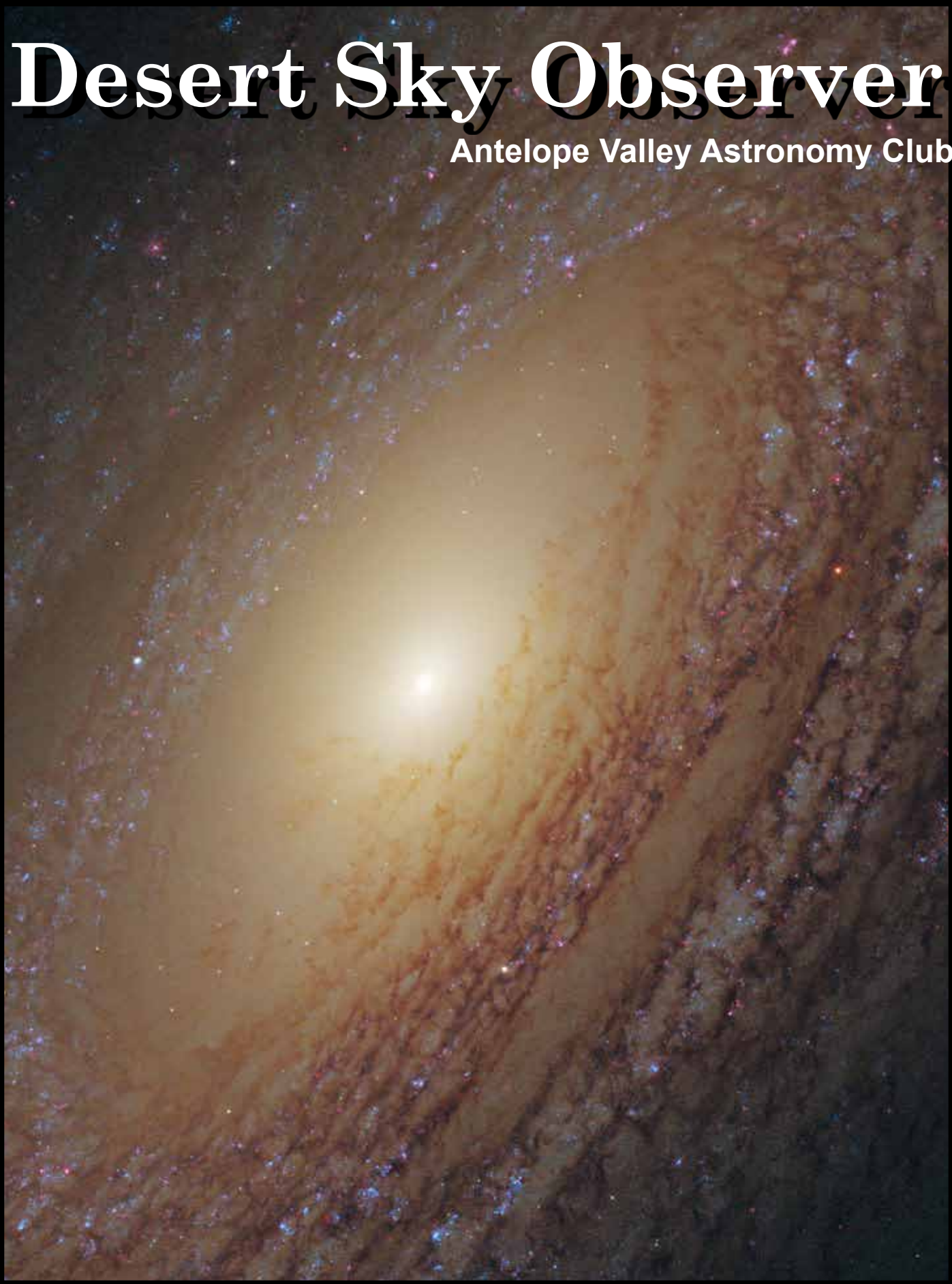
Volume 42.2 February 2022

Desert Sky Observer

Antelope Valley Astronomy Club



Upcoming Events

February 11: Club Meeting
February 19: Moonwalk 6:00 pm @PDW

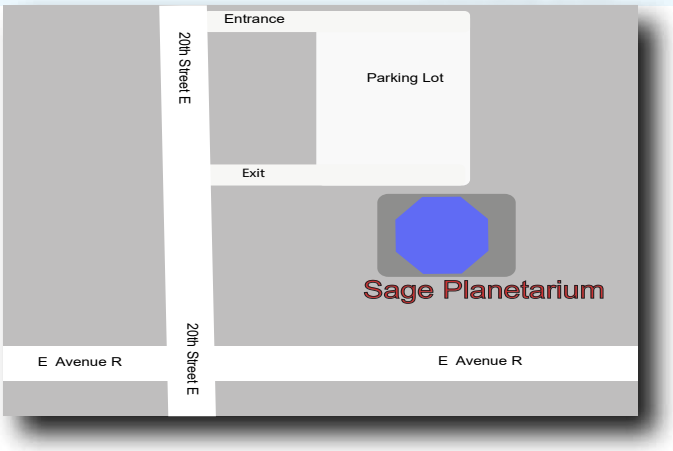
March 11: Club Meeting
March 26: Moon Walk 6:30 pm @ PDW

Every clear night: Personal Star Party

AVAC Calendar

April 2: Messier Marathon @ Saddleback Butte SP
April 8: Club Meeting

May 13: Club Meeting
May 28 - 30: DSSP @ Red Rock Canyon SP



Board Members

President: Phil Wriedt (661) 917-4874
president@avastronomyclub.org

Vice-President: 661-722-5833
vice-president@avastronomyclub.org

Secretary: Rose Moore (661) 972-1953
secretary@avastronomyclub.org

Treasurer: Rod Girard (661) 803-7838
treasurer@avastronomyclub.org

Appointed Positions

Newsletter Editor: Phil Wriedt (661) 917-4874
dso@avastronomyclub.org

Equipment & Library:
John Van Evera 661-754-1819
library@avastronomyclub.org

Club Historian: vacant
history@avastronomyclub.org

Webmaster: Steve Trotta (661) 269-5428
webmaster@avastronomyclub.org

Astronomical League Coordinator:
Frank Moore (661) 972-4775
al@avastronomyclub.org

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

Hey there everyone,

Well, January started off with the Moon Walk at Prime Desert Woodlands on January 8th. Forty to fifty members of the public braved the cold and enjoyed looking though Darrell's or my telescope. The skies were clear and there was no wind. A great night for astronomy. Jeremy was unable to attend, leaving a few unhappy faces, although most said they would return in February.

Did I mention that it was really cold for the Moon Walk? Well, that managed to push my lungs right over the edge. I caught a really nasty cold (after 2 tests . . . not Covid). Good news: my doctor was finally able to diagnose my persistent cough. Bad news: I wasn't able to make the January meeting and listen to Rod's presentation.

There will be a meeting on the 11th of February. I don't know who the speaker will be; Since Covid reared it's ugly head we have had a hard time getting anyone to commit to coming and giving us a talk on any subject.

There is a Moon Walk coming up on the 19th. Yes, I know its going to be cold, it's February! We need some members with telescopes to show up help out. For the past 6 months or so it has been the same 3 members and telescopes that show up. I know not everyone has a scope, and everyone is worried about Covid. But the AVAC constitution spells out the purpose of our Club:

> *Article II § I. The purpose of this organization is to promote, through education, a knowledge and appreciation of astronomy. To accomplish this purpose, the members of the Club:*
> *(3) Undertake projects to encourage an awareness of astronomy in the general public, with particular emphasis on developing and sustaining an interest in astronomy among youths.*

I'm off my soapbox. . . We need help. Please come, wear a mask, and help.

We have our first Dark Sky Star Party, a Messier Marathon on April 2nd at Saddleback State Park. Mark your calendars now, make your plans now!

Keep Looking Up! Phil

On The Cover

Star formation is one of the most important processes in shaping the Universe; it plays a pivotal role in the evolution of galaxies and it is also in the earliest stages of star formation that planetary systems first appear.

Yet there is still much that astronomers don't understand, such as how do the properties of stellar nurseries vary according to the composition and density of gas present, and what triggers star formation in the first place? The driving force behind star formation is particularly unclear for a type of galaxy called a flocculent spiral, such as NGC 2841 shown here, which features short spiral arms rather than prominent and well-defined galactic limbs.

Credit:
NASA, ESA and the Hubble Heritage (STScI/AURA)-ESA/Hubble Collaboration Acknowledgment: M. Crockett and S. Kaviraj (Oxford University, UK), R. O'Connell (University of Virginia), B. Whitmore (STScI) and the WFC3 Scientific Oversight Committee.

From the Secretary

By Rose Moore

Members:

We have our club meeting on Friday February 11th at 7pm at the SAGE. Further info coming. I think that it will be difficult to get a speaker until the present Covid situation slows down, but we will let you know specifics about the meeting when they are available. **A reminder that masks must be worn in the Planetarium per the Palmdale School District rules. They must be worn over your nose and mouth at all times in the Planetarium.

On Saturday February 19th at 6:30pm we have a Prime Desert Moon Walk with Jeremy. Weather permitting, free and open to the public. For the newer members, here is the location: 43201 35th St W, Lancaster, CA 93536. We need members with telescopes, or you may come out to take the walk with Jeremy and the public. We will have a waning gibbous moon rising at 8:58pm. Sunset is at 5:40pm. Jupiter, Mars, Saturn, and Venus all rise in the morning, so not visible that evening. Jupiter sets at 6:29pm so will probably not be visible before the walk. Uranus and Neptune will be up in the western sky.

Speaking of Venus, it will be at its brightest on the morning of February 9th, magnitude -4.6! On the morning of February 12 Venus and Mars will be at their closest (conjunction).

Clear skies! Rose

Member Scope For Sale

Member Duane Lewis is selling his 9.25 inch Celestron CGEM OTA with the tripod, CGE mount, counterweights, one 1.25” 20mm Plossl eyepiece, a 1.25”diagonal and a 2” diagonal, telrad mount, and a Denkmeir (unknown model) binocular viewer. The OTA was tuned up by member Don Bryden before he moved. It has not been used since. Price is $1200. Duane is unable to have this set up for viewing because of lack of space. So arrangements will have to be made for viewing the scope and accessories. For more info please contact Duane by email only: gurba1826@gmail.com -- or contact Rose by email: rmorion@bak.rr.com

SOLD!

AVAC Membership Renewal

It is that time year again, time to renew your AVAC Membership and HOORAY!!!, we are back in the Sage Planetarium for our monthly meetings. We have had in person meetings for the last few months now and it has been great. However if you haven't had a chance to make it out to one of these meetings I wholeheartedly encourage you to attend. The Sage Planetarium is one of the club's most rewarding benefits.

It is very gratifying to see the early membership renewals. In these times of financial uncertainty our members are more than ever the lifeblood for the AVAC. That said, please worry not, financially the club is still solvent and we are able to meet all our obligations while providing for future club events and guess speakers etc.

Please remember that our meetings are open to the public and all will be welcome. So, if for any reason you are unable to renew your membership you are still welcome to attend and we look forward to seeing you all again.

For administrative reasons we encourage members to renew their membership in January. For myself the easiest way to renew my membership was through the AVAC website via our PayPal account. However you can renew at our monthly club meetings with good old cash or by check.

For those unable to attend our monthly meeting you can renew your membership through the mail by sending a check to the club's Post Office Box:

Antelope Valley Astronomy Club
PO BOX 8545
Lancaster, CA 93539-8545

For members less familiar with the club's website, it is actually fairly simple:

- Google Antelope Valley Astronomy Club and then open on the link.
- Click on MEMBER and then click on LOGIN.
- The default Member Name will be your Membership Number.
- If you had Signed Up on line you would have created a Password, but if you have forgotten it, use the Forgot Password link.
- Once you have Logged In, under Member click on Profile.
- Under Profile click on Membership.
- Under Your Current Membership click on Renew Now.
- You will have the choice of paying with a PayPal account or with a Credit Card.
- If you choose Credit Card PayPal will allow you to pay as a Guess

Thank you,
Rod Girard AVAC Treasurer

Hang Out with the Twins of Gemini

by David Prosper , NASA Night Sky Network

Castor and Pollux are Gemini's most prominent stars, and often referred to as the "heads" of the eponymous twins from Greek myth. In Chinese astronomy, these stars make up two separate patterns: the Vermillion Bird of the South and the White Tiger of the North. What do you see? The Night Sky Network's "Legends in the Sky" activity includes downloadable "Create Your Own Constellation" handouts so you can draw your own star stories. Image created with assistance from Stellarium.

The night skies of February are filled with beautiful star patterns, and so this month we take a closer look at another famous constellation, now rising high in the east after sunset: Gemini, the Twins!

If you're observing Orion, as discussed in last month's article, then Gemini is easy to find: just look above Orion's "head" to find Gemini's "feet." Or, make a line from brilliant blue-white Rigel in the foot of Orion, through its distinct "Belt," and then on through orange Betelgeuse. Keep going and you will end up in between the bright stars Castor and Pollux, the "heads" of the Gemini Twins. While not actually related – these stars aren't bound to each other, and are almost a magnitude apart in brightness – they do pair up nicely when compared to their surrounding stars. Take note: more than one stargazer has confused Gemini with its next-door neighbor constellation, Auriga. The stars of Auriga rise before Gemini's, and its brightest star, Capella, doesn't pair up as strikingly with its second most brilliant star as Castor and Pollux do. Star-hop to Gemini from Orion using the trick above if you aren't sure which constellation you're looking at.

Montage of Gemini North, located on Mauna Kea in Hawaii, and Gemini South, located on Cerro Pachón in Chile. These "twin" telescopes work together as the Gemini Observatory to observe the entire sky. Image Credit & Source: NOIRLab

Pollux is the brighter of Gemini's two "head" stars - imagine it has the head of the "left twin" - and located about 34 light-years away from our Solar System. Pollux even possesses a planet, Pollux b, over twice the mass of Jupiter. Castor - the head of the "right twin" - by contrast, lies about 51 light-years distant and is slightly dimmer. While no planets have been detected, there is still plenty of company as Castor is actually a six-star system! There are several great deep-sky objects to observe as well. You may be able to spot one with your unaided eyes, if you have dark skies and sharp eyes: M35, a large open cluster near the "right foot" of Gemini, about 3,870 light-years away. It's almost the size of a full Moon in our skies! Optical aid like binoculars or a telescope reveals the cluster's brilliant member stars. Once you spot M35, look around to see if you can spot another open cluster, NGC 2158, much smaller and more distant than M35 at 9,000 light-years away. Another notable object is NGC 2392, a planetary nebula created from the remains of a dying star, located about 6,500 light-years distant. You'll want to use a telescope to find this intriguing faint fuzzy, located near the "left hip" star Wasat.

Gemini's stars are referenced quite often in cultures around the world, and even in the history of space exploration. NASA's famed Gemini program took its name from these stars, as do the appropriately named twin Gemini North and South Observatories in Hawaii and Chile. You can discover more about Gemini's namesakes along with the latest observations of its stars and related celestial objects at nasa.gov.

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 Lunar Gateway: The Plans For A Permanent Space Station That Will Orbit The Moon
If all goes to plan, sometime in 2022 NASA's Space Launch System rocket (SLS) will blast off from Cape Canaveral, Florida, for its maiden flight. The giant SLS rocket, fully 111.25m tall, is set to launch no earlier than February, but probably not until the summer, and will send an uncrewed capsule on a test mission . . . .(continued at https://www.sciencefocus.com/space/nasa-lunar-gateway/)

What Is Antimatter?
Antimatter sounds like science fiction: a material that looks like ordinary matter, but would unleash as much energy as an atomic bomb if even a speck of it came into contact with anything around us. Small wonder that the scientist who first predicted the existence of antimatter felt uneasy about what he had found. . . (continued at https://www.skyatnightmagazine.com/space-science/antimatter/)

JUICE: What Secrets Lie Beneath The Icy Surface Of Jupiter's Moons?
Deep beneath the salty ocean, the seafloor is cracked. Hot gases from the layers below bubble into the water, sustaining colonies of microbial life that are eking out an existence far from the sunkissed surface. This may sound like a scene from the bottom of Earth's vast oceans, but it's actually a possible description of Europa – one of the icy moons orbiting Jupiter. . . . (continued at https://www.sciencefocus.com/space/esa-juice-mission/)

Extraordinary Black Hole Found In Neighboring Galaxy
Astronomers discovered a black hole unlike any other. At one hundred thousand solar masses, it is smaller than the black holes we have found at the centers of galaxies, but bigger than the black holes that are born when stars explode. This makes it one of the only confirmed intermediate-mass black holes, an object that has long been sought by astronomers. . . . (continued at https://www.sciencedaily.com/releases/2022/01/220124151048.htm)

Solar Filters For Observing The Sun
For many, astronomy is a late-night pursuit. We anxiously wait for Sol to set and twilight to fade before we begin to enjoy the sky. But by doing so, we are missing an amazing matinee every day — one performed by the Sun. Our star is the perfect target for observers. No chart is needed to find it. You can't beat it for convenience. And light pollution doesn't even enter into the equation. With the Sun, there's no need to pull an all-nighter. . . . (continued at https://astronomy.com/magazine/news/2022/01/solar-filters-for-observing-the-sun)

Grab-And-Go Astrophotography
With more of us living in cities and urban environments, the problem of light pollution is all too familiar. Even those lucky enough to live outside large metropolises don't escape untouched, because the sky near the horizon is often lost to sky glow. This leaves astroimagers with a choice to make: Invest in a fixed setup with narrowband or light pollution filters, or make the best of a lightweight, portable setup and head to dark-sky sites. . . . . (continued at https://astronomy.com/magazine/news/2022/01/grab-and-go-astrophotography)

Space News

News from around the Net

Starlink Satellites Don't Impact Science (Yet)

A new study of Starlink satellites' impact on astronomy gives the community cause for both relief and concern. SpaceX's Starlink is a network of satellites designed to provide broadband internet to remote areas. The company has 1,848 working satellites currently in orbit, most of them about 500 kilometers (310 miles) above the ground, but it has applied to fly 40,000 more. . . .(continued at https://skyandtelescope.org/astronomy-news/starlink-satellites-dont-impact-science-yet/)

Solar And Lunar Eclipses In 2022

Up to seven eclipses of the Sun and Moon can take place in one year, though the last time that happened was 1982, and the fewest possible is four. That latter, minimalist mix is what's in store for 2022, and no eclipses at all occur until the April 30th. It's an assortment skewed toward disappearing Moons: There'll be two total lunar eclipses . . . (continued at https://skyandtelescope.org/observing/solar-and-lunar-eclipses-in-2022/)

Meerkat Paints A Mesmerising Portrait Of The Milky Way

Ever wonder what you might see if your eyes were sensitive to radio waves instead of visible light? Then check out the latest images from the 64-antenna MeerKAT radio telescope in South Africa, revealing the heart of the Milky Way as as it appears in radio emissions. The stunning imagery shows previously known and newly-discovered features, . . . (continued at https://astronomynow.com/2022/01/26/meerkat-paints-a-mesmerising-portrait-of-the-milky-way/)

Hubble Spots A Starship-Shaped Galactic Pair

The subject of this image is a group of three galaxies, collectively known as NGC 7764A. They were imaged by the NASA/ESA Hubble Space Telescope, using both its Advanced Camera for Surveys and Wide Field Camera 3. The two galaxies in the upper right of the image appear to be interacting with one another. The long trails of stars and gas extending from them give the impression that they have both just been struck at great speed . . . (continued at https://phys.org/news/2022-01-hubble-starship-shaped-galactic-pair.html)

Astronomers Discover A Mysterious Star That Flashes Every 20 Minutes. But What Is It?

Just 4,000 light-years from Earth is a strange, star-sized object. It's been observed by radio telescopes, but astronomers aren't sure what it is. They call it a long period transient. Transients are objects in the sky that change over some period of time. Fast transients are things such as pulsars, which emit a bright flash over a period of seconds or milliseconds. . . . . (continued at https://www.universetoday.com/154287/astronomers-discover-a-mysterious-star-that-flashes-every-20-minutes-but-what-is-it/)

Twelve For Dinner: The Milky Way's Feeding Habits Shine A Light On Dark Matter

Astronomers are one step closer to revealing the properties of dark matter enveloping our Milky Way galaxy, thanks to a new map of twelve streams of stars orbiting within our galactic halo. Understanding these star streams is very important for astronomers. As well as revealing the dark matter that holds the stars in their orbits, they also tell us about the formation history of the Milky Way, revealing that the Milky Way has steadily grown . . . (continued at https://www.sciencedaily.com/releases/2022/01/220111153711.htm)

Dark Sky Observing Sites

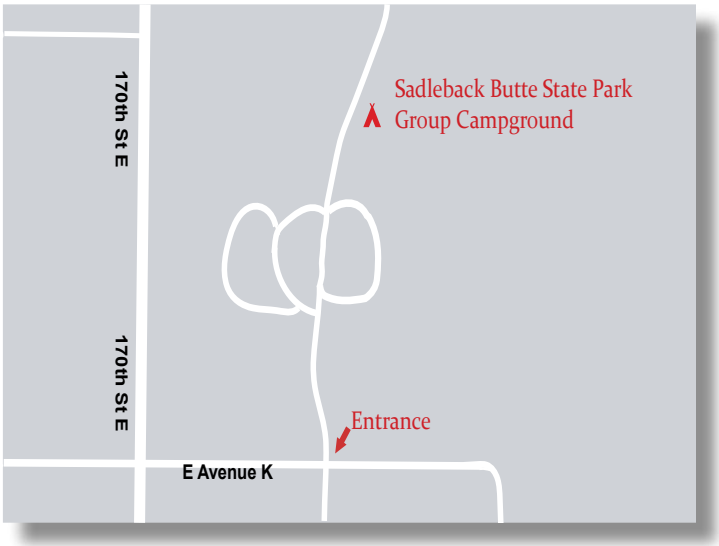
The Chuchupate parking lot is a half a mile beyond the Mt Pinos ranger station (on some maps The Chuchupate Ranger Sta., the parking lot is also called Frazier Mountain trailhead).

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.



Planet Summary

The **Sun** starts February in central Capricorn and crosses into Aquarius by the end the month.

Mercury starts the month in western Sagittarius, reaching maximum western elongation of 26° on the 16th at mag 0.0. It forms a morning triangle with Venus and Mars during the month. The waning crescent Moon passes by on the 28th.

Venus prominent in the morning twilight, reaching its greatest illumination on the 12th when it shines at -4.6 mag. This is at almost 40° elongation from the Sun just 5 weeks after its inferior conjunction. On the 13th, Mars is in a loose conjunction. The 13% waning Moon passes to the south on the 27th.

Mars having separating itself from the Sun, rises more then an hour before the morning twilight in Sagittarius. On the 13th Venus is in a loose conjunction, outshining Mars by some 300x. The 13% waning Moon passes to the south on the 27th.

Jupiter continues its eastward motion in Aquarius. It's low in the southwest sky during the early evening. The 5% Moon passes to the south on the 2nd. After the 4th of March Jupiter passes behind the Sun and begins lighting the morning twilight.

Saturn spends the month moving east toward Jupiter though the stars of eastern Capricorn. On the 4th Saturn ducks behind the Sun. By the end of the month it will it will emerge in the morning twilight.

Uranus continues moving west in central Aries at mag 5.7. On the 7th the 42% waxing Moon passes almost 2° to the south.

Neptune will spend the month slowly moving east in northeast Aquarius at mag 7.6. On the 3rd the 10% waxing Moon passes 3.5° to the south.

Pluto spends the month slowing moving east in Sagittarius at mag 14.3.

Moon Phases

First Qtr	Full	Third Qtr	New
Feb 8	Feb 16	Feb 23	Jan 31 & Mar 2

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
2/1/2022	07:33	18:05	06:50	17:22
2/5/2022	09:42	22:25	06:47	17:26
2/10/2022	12:18	02:19	06:43	17:31
2/15/2022	16:46	06:24	06:37	17:36
2/20/2022	22:00	08:55	06:32	17:40
2/25/2022	02:35	12:19	06:26	17:45
2/28/2022	05:25	15:43	06:22	17:47

Planet Data*

February 1

	Rise	Transit	Set	Mag	Phase%
Mercury	05:40	10:49	15:59	1.12	21.3
Venus	04:36	09:52	15:07	-4.62	15.6
Mars	04:39	09:31	14:23	1.40	95.9
Jupiter	08:07	13:42	19:17	-2.07	99.8
Saturn	07:04	12:18	17:31	0.68	100

February 15

	Rise	Transit	Set	Mag	Phase%
Mercury	05:15	10:21	15:28	0.06	57.7
Venus	04:04	09:18	14:33	-4.64	28.0
Mars	04:26	09:21	14:15	1.33	95.0
Jupiter	07:21	12:59	18:38	-2.04	99.9
Saturn	06:15	11:29	16:44	0.72	99.9

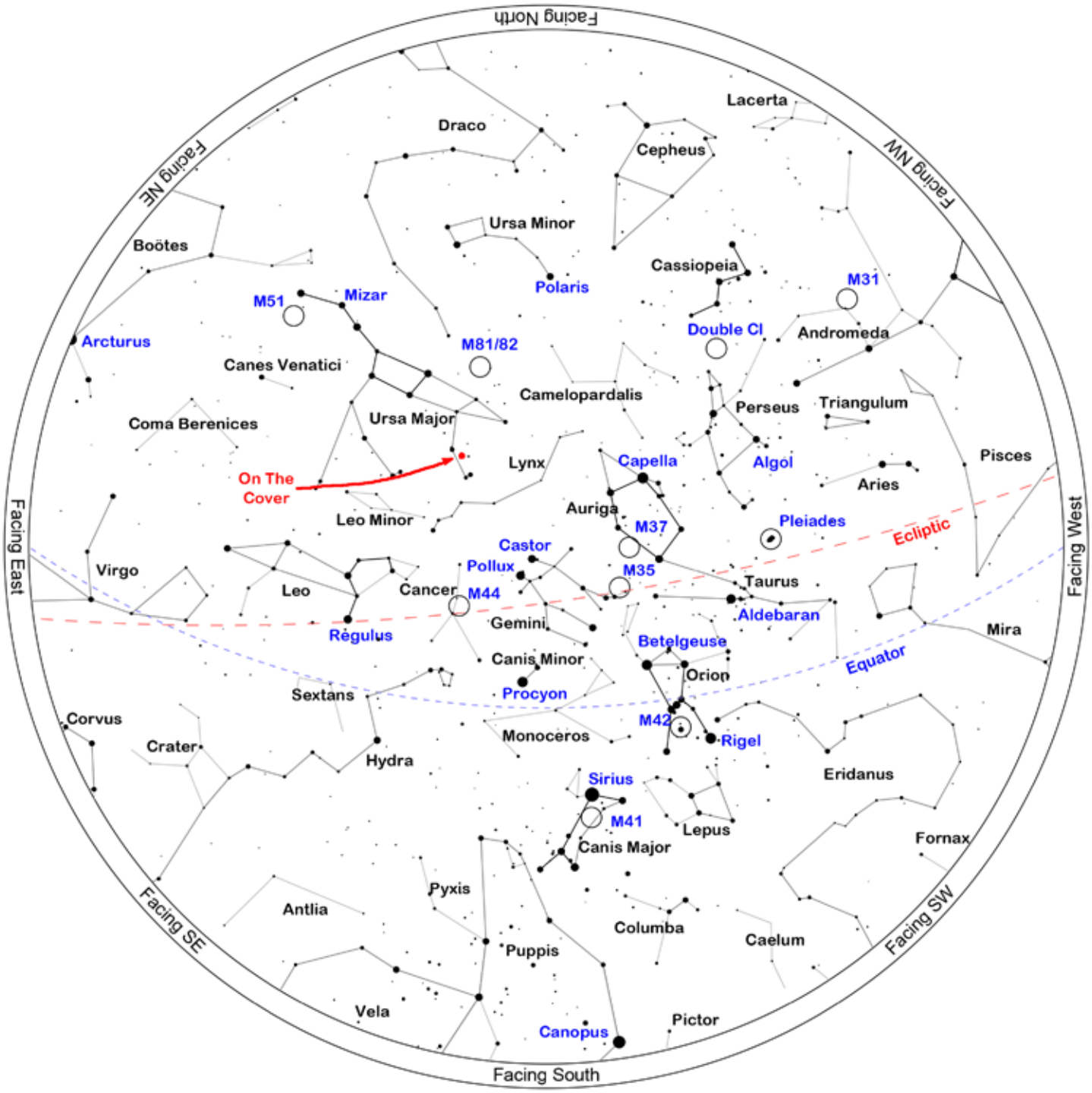
February 28

	Rise	Transit	Set	Mag	Phase%
Mercury	05:22	10:35	15:49	-0.07	75.3
Venus	03:50	09:05	14:19	-4.56	37.6
Mars	04:12	09:11	14:10	1.26	94.0
Jupiter	06:38	12:20	18:01	-2.03	100
Saturn	05:28	10:44	16:01	0.77	99.9

*All time mentioned are local and approximate.

*Sun, Moon and Planetary date based on Quartz Hill, CA

Sky Chart



Location: Palmdale, CA 93551
Latitude: 34° 36' N, longitude: 118° 11' W
Time: 2022 February 26, 21:00 (UTC -08:00)

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 February 26, 2022. The list is sorted by the transit time of the object.

ID	Common Name	Type		RA	Dec	Mag	Rise	Transit	Set
C9	Cave Nebula	BrNeb	Cep	22h 56m 48s	+62° 37.0'		Circ	12:30	Circ
IC1470		Neb	Cep	23h 05m 10s	+60° 14.6'		Circ	12:38	Circu
NGC7492		Globular	Aqr	23h 08m 27s	-15° 36.6'	11.5	07:23	12:41	17:59
HR8872	HD219916	Triple	Cep	23h 18m 38s	+68° 06.6'	4.8	Circ	12:51	Circ
IC5308		Galaxy	Gru	23h 19m 21s	-42° 15.4'	12.0	09:24	12:52	16:20
M52	The Scorpion	Open	Cas	23h 24m 48s	+61° 35.6'	8.0	Circ	12:58	Circ
NGC7662	Blue Snowball	P Neb	And	23h 25m 54s	+42° 33.0'	8.3	04:15	12:59	21:42
NGC7686		Open	And	23h 30m 07s	+49° 08.0'	5.6	03:22	13:03	22:44
IC5332		Galaxy	Scl	23h 34m 27s	-36° 06.0'	10.6	09:05	13:07	17:09
NGC7785		Galaxy	Psc	23h 55m 19s	+05° 54.9'	11.6	07:09	13:28	19:47
HR9071	HD224572	Triple	Cas	23h 59m 01s	+55° 45.3'	4.9	Circ	13:32	Circ
NGC7822		Neb	Cep	00h 03m 36s	+67° 09.0'		Circ	13:36	Circ
NGC55	C72	S Gal	Scl	00h 14m 54s	-39° 11.0'	7.9	10:01	13:48	17:34
NGC129		Open	Cas	00h 30m 00s	+60° 13.1'	6.5	Circ	14:03	Circ
NGC133		Open	Cas	00h 31m 19s	+63° 21.0'	9.0	Circ	14:04	Circ
NGC146		Open	Cas	00h 33m 03s	+63° 18.0'	9.1	Circ	14:06	Circ
NGC147	C17	E Gal	Cas	00h 33m 12s	+48° 30.0'	9.3	04:32	14:06	23:40
NGC190		Galaxy	Psc	00h 38m 55s	+07° 03.7'	14.0	07:49	14:12	20:34
M110	Satellite Of Andromeda Galaxy	Galaxy	And	00h 40m 22s	+41° 41.1'	8.9	05:35	14:13	22:51
NGC210		Galaxy	Cet	00h 40m 35s	-13° 52.3'	10.9	08:50	14:13	19:37
NGC206	V-36	Neb	And	00h 40m 36s	+40° 44.0'		05:42	14:13	22:45
Arp168	M32	Galaxy	And	00h 42m 41s	+40° 51.0'	9.0	05:43	14:15	22:48
M32	Satellite Of Andromeda Galaxy	Galaxy	And	00h 42m 42s	+40° 51.9'	9.1	05:43	14:15	22:48
M31	Andromeda Galaxy	Galaxy	And	00h 42m 44s	+41° 16.1'	4.3	05:40	14:15	22:50
NGC246	C56	P Neb	Cet	00h 47m 00s	-11° 53.0'	10.9	08:51	14:20	19:49
NGC254		Galaxy	Scl	00h 47m 28s	-31° 25.2'	11.8	09:57	14:20	18:43
NGC288		Globular	Scl	00h 52m 45s	-26° 35.0'	8.1	09:44	14:25	19:07
NGC281	PacMan Nebula	Open	Cas	00h 52m 54s	+56° 37.4'	7.0	Circ	14:26	Circ
IC59	Gamma Cassiopeiae Nebula	Neb	Cas	00h 57m 29s	+61° 08.6'		Circ	14:30	Circ
IC63	Gamma Cassiopeiae Nebula	Neb	Cas	00h 59m 29s	+60° 54.7'		Circ	14:32	Circ
C51	IC1613	IrrGal	Cet	01h 04m 48s	+02° 07.0'	9.3	08:29	14:38	20:46
NGC474		Galaxy	Psc	01h 20m 07s	+03° 24.9'	11.1	08:41	14:53	21:05
NGC485		Galaxy	Psc	01h 21m 28s	+07° 01.0'	14.0	08:32	14:54	21:17
M103	NGC581	Open	Cas	01h 33m 23s	+60° 39.0'	7.0	Circ	15:06	Circ
NGC598	Pinwheel Galaxy	Galaxy	Tri	01h 33m 51s	+30° 39.6'	5.7	07:26	15:07	22:47

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC604		Neb	Tri	01h 34m 33s	+30° 47.0'		07:26	15:07	22:49
M74	The Phantom	Galaxy	Psc	01h 36m 42s	+15° 47.0'	9.8	08:21	15:09	21:58
M76	Little Dumbbell Nebula	P Neb	Per	01h 42m 18s	+51° 34.2'	12.0	05:01	15:15	01:29
NGC651	Apple Core Nebula	P Neb	Per	01h 42m 21s	+51° 34.1'	12.2	05:01	15:15	01:29
NGC637		Open	Cas	01h 43m 04s	+64° 02.4'	8.2	Circ	15:16	Circ
NGC654		Open	Cas	01h 44m 00s	+61° 53.0'	6.5	Circ	15:17	Circ
NGC720		Galaxy	Cet	01h 53m 00s	-13° 44.3'	10.2	10:02	15:26	20:49
NGC780		Galaxy	Tri	02h 00m 35s	+28° 13.5'	14.0	08:02	15:33	23:04
NGC784		Galaxy	Tri	02h 01m 17s	+28° 50.2'	11.8	08:01	15:34	23:07
NGC821		Galaxy	Ari	02h 08m 21s	+10° 59.6'	10.8	09:07	15:41	22:15
Baily191	NGC884,	Open	Per	02h 22m 18s	+57° 08.1'	4.0	Circ	15:55	Circ
IC1795		Neb	Cas	02h 26m 32s	+62° 02.4'		Circ	15:59	Circ
NGC936		Galaxy	Cet	02h 27m 37s	-01° 09.3'	10.1	10:01	16:00	22:00
NGC943	Arp309	Galaxy	Cet	02h 29m 09s	-10° 49.0'	11.4	10:30	16:02	21:34
NGC956		Open	And	02h 32m 30s	+44° 35.6'	9.0	07:07	16:05	01:04
IC1805	Heart Nebula	Open	Cas	02h 32m 47s	+61° 27.6'	6.5	Circ	16:06	Circ
NGC1052		Galaxy	Cet	02h 41m 05s	-08° 15.3'	10.6	10:34	16:14	21:53
M34	Spiral Cluster	Open	Per	02h 42m 05s	+42° 45.6'	6.0	07:30	16:15	01:00
M77	Cetus A	Galaxy	Cet	02h 42m 41s	-00° 00.8'	9.7	10:13	16:15	22:18
NGC1084		Galaxy	Eri	02h 46m 00s	-07° 34.6'	10.6	10:37	16:19	22:00
IC1848	Soul Nebula	Open	Cas	02h 51m 18s	+60° 24.4'	6.5	Circ	16:24	Circ
NGC1156		Galaxy	Ari	02h 59m 42s	+25° 14.2'	11.7	09:13	16:32	23:52
NGC1201		Galaxy	For	03h 04m 08s	-26° 04.1'	10.6	11:53	16:37	21:21
NGC1175		Galaxy	Per	03h 04m 32s	+42° 20.3'	12.8	07:55	16:37	01:19
HR963	HD20010	Dbl	For	03h 12m 04s	-28° 59.2'	3.9	12:12	16:45	21:18
NGC1316	Fornax A	Galaxy	For	03h 22m 42s	-37° 12.4'	8.9	12:59	16:55	20:52
Barnard202	B202	DkNeb	Ari	03h 25m 38s	+30° 16.0'		09:19	16:58	00:38
Barnard204	B204	DkNeb	Ari	03h 28m 29s	+30° 11.0'		09:22	17:01	00:40
NGC1350		Galaxy	For	03h 31m 08s	-33° 37.7'	10.5	12:50	17:04	21:17
Barnard1	B1	DkNeb	Per	03h 32m 57s	+31° 09.0'		09:23	17:06	00:49
Barnard2	B2	DkNeb	Per	03h 33m 31s	+32° 19.0'		09:18	17:06	00:54
Barnard3	B3	DkNeb	Per	03h 40m 01s	+31° 58.0'		09:26	17:13	00:59
NGC1407		Galaxy	Eri	03h 40m 12s	-18° 34.8'	9.8	12:04	17:13	22:22
IC347		Galaxy	Eri	03h 42m 32s	-04° 17.9'	13.0	11:24	17:15	23:06
NGC1448		Galaxy	Hor	03h 44m 32s	-44° 38.6'	11.0	14:05	17:17	20:29
IC348		Open	Per	03h 44m 34s	+32° 09.7'	7.3	09:30	17:17	01:05
M45	Pleiades	Open	Tau	03h 47m 30s	+24° 07.0'	1.6	10:05	17:20	00:36
Barnard5	B5	DkNeb	Per	03h 47m 53s	+32° 53.0'		09:30	17:21	01:11
NGC1461		Galaxy	Eri	03h 48m 27s	-16° 23.5'	11.7	12:05	17:21	22:37
IC353		Neb	Tau	03h 53m 00s	+25° 48.0'		10:04	17:26	00:48

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
IC2003		P Neb	Per	03h 56m 22s	+33° 52.5'	13.0	09:34	17:29	01:24
NGC1499	California Nebula	Neb	Per	04h 03m 14s	+36° 22.0'		09:29	17:36	01:43
NGC1515		Galaxy	Dor	04h 04m 03s	-54° 06.0'	11.0	16:17	17:37	18:57
NGC1496		Open	Per	04h 04m 32s	+52° 39.7'	10.0	07:03	17:37	04:12
NGC1502		Open	Cam	04h 07m 50s	+62° 19.8'	5.7	Circ	17:41	Circ
IC360		Neb	Tau	04h 09m 00s	+26° 06.0'		10:19	17:42	01:05
NGC1514	Crystal Ball Nebula	P Neb	Tau	04h 09m 17s	+30° 46.5'	10.0	10:01	17:42	01:23
NGC1513		Open	Per	04h 09m 57s	+49° 30.8'	8.4	07:57	17:43	03:28
IC359		Neb	Tau	04h 12m 28s	+27° 42.1'		10:16	17:45	01:14
NGC1535		P Neb	Eri	04h 14m 16s	-12° 44.3'	10.0	12:20	17:47	23:14
Barnard10	B10	DkNeb	Tau	04h 18m 41s	+28° 16.0'		10:20	17:51	01:23
NGC1545		Open	Per	04h 20m 57s	+50° 15.2'	6.2	07:59	17:54	03:49
NGC1569		Galaxy	Cam	04h 30m 49s	+64° 50.8'	11.2	Circ	18:04	Circ
Barnard18	B18	DkNeb	Tau	04h 31m 13s	+24° 21.0'		10:47	18:04	01:20
NGC1582		Open	Per	04h 31m 53s	+43° 49.0'	7.0	09:12	18:05	02:57
NGC1560		Galaxy	Cam	04h 32m 48s	+71° 52.7'	11.5	Circ	18:06	Circ
Barnard19	B19	DkNeb	Tau	04h 33m 00s	+26° 16.0'		10:42	18:06	01:29
Barnard20	B20	DkNeb	Per	04h 37m 04s	+50° 58.0'		08:05	18:10	04:15
Barnard22	B22	DkNeb	Tau	04h 38m 00s	+26° 03.0'		10:48	18:11	01:33
Barnard14	B14	DkNeb	Tau	04h 39m 59s	+25° 44.0'		10:51	18:13	01:34
IC2087		Neb	Tau	04h 40m 00s	+25° 44.5'		10:51	18:13	01:34
Barnard23	B23	DkNeb	Tau	04h 40m 33s	+29° 52.0'		10:36	18:13	01:51
NGC1624		Open	Per	04h 40m 36s	+50° 27.6'	10.4	08:16	18:13	04:11
NGC1640		Galaxy	Eri	04h 42m 14s	-20° 26.0'	11.7	13:12	18:15	23:18
NGC1647		Open	Tau	04h 45m 55s	+19° 06.8'	6.4	11:20	18:19	01:17
IC2118	Witch Head Nebula	Neb	Eri	05h 04m 54s	-07° 15.0'		12:55	18:38	00:20
NGC1851	C73	Globular	Col	05h 14m 06s	-40° 03.0'	7.3	15:05	18:47	22:28
IC405	Flaming Star Nebula	Neb	Aur	05h 16m 29s	+34° 21.3'		10:52	18:49	02:47
M79	NGC1904	Globular	Lep	05h 24m 11s	-24° 31.4'	8.5	14:08	18:57	23:46
M38	Starfish Cluster	Open	Aur	05h 28m 40s	+35° 50.8'	7.0	10:57	19:01	03:06
M1	Crab Nebula	SNR	Tau	05h 34m 32s	+22° 00.8'	8.4	11:59	19:07	02:16
M42	Great Orion Nebula	Open+D Neb	Ori	05h 35m 16s	-05° 23.4'	4.0	13:20	19:08	00:56
M43	Orion Nebula Extension	D Neb	Ori	05h 35m 31s	-05° 16.0'	9.0	13:20	19:08	00:56
M36	Pinwheel Cluster	Open	Aur	05h 36m 18s	+34° 08.3'	6.5	11:13	19:09	03:05
M78	NGC2068	D Neb	Ori	05h 46m 45s	+00° 04.8'	8.0	13:16	19:19	01:22
M37	Auriga Salt-and-pepper Cluster	Open	Aur	05h 52m 18s	+32° 33.2'	6.0	11:36	19:25	03:14
M35	NGC2168	Open	Gem	06h 09m 00s	+24° 21.0'	5.5	12:25	19:42	02:58
M41	Little Beehive	Open	CMa	06h 46m 01s	-20° 45.3'	5.0	15:17	20:19	01:21

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M50	Heart-shaped Cluster	Open	Mon	07h 02m 42s	-08° 23.0'	7.0	14:56	20:35	02:15
M47	NGC2422	Open	Pup	07h 36m 35s	-14° 29.0'	4.5	15:48	21:09	02:31
M46	NGC2437	Open	Pup	07h 41m 46s	-14° 48.6'	6.5	15:54	21:14	02:35
M93	NGC2447	Open	Pup	07h 44m 30s	-23° 51.4'	6.5	16:26	21:17	02:09
M48	NGC2548	Open	Hya	08h 13m 43s	-05° 45.0'	5.5	16:00	21:46	03:33
M44	Beehive Cluster	Open	Cnc	08h 40m 24s	+19° 40.0'	4.0	15:13	22:13	05:14
M67	King Cobra	Open	Cnc	08h 51m 18s	+11° 48.0'	7.5	15:48	22:24	05:00
M81	Bode's Galaxy	Galaxy	UMa	09h 55m 33s	+69° 03.9'	7.8	Circ	23:28	Circ
M82	Cigar Galaxy	Galaxy	UMa	09h 55m 53s	+69° 40.8'	9.2	Circ	23:29	Circ
M95	NGC3351	Galaxy	Leo	10h 43m 58s	+11° 42.2'	10.6	17:41	00:17	06:53
M96	NGC3368	Galaxy	Leo	10h 46m 46s	+11° 49.2'	10.1	17:43	00:19	06:56
M105	NGC3379	Galaxy	Leo	10h 47m 50s	+12° 34.9'	10.5	17:42	00:21	06:59
M108	NGC3556	Galaxy	UMa	11h 11m 31s	+55° 40.4'	10.6	Circ	00:44	Circ
M97	Owl Nebula	P Neb	UMa	11h 14m 48s	+55° 01.1'	12.0	Circ	00:48	Circ
M65	Leo Triplet	Galaxy	Leo	11h 18m 56s	+13° 05.5'	10.1	18:12	00:52	07:32
M66	Leo Triplet	Galaxy	Leo	11h 20m 15s	+12° 59.4'	9.7	18:13	00:53	07:33
M109	NGC3992	Galaxy	UMa	11h 57m 36s	+53° 22.4'	10.6	14:39	01:30	12:22
M98	NGC4192	Galaxy	Com	12h 13m 48s	+14° 54.0'	10.9	19:01	01:47	08:32
M99	Coma Pinwheel Galaxy	Galaxy	Com	12h 18m 50s	+14° 25.0'	10.4	19:07	01:52	08:36
M106	NGC4258	Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	16:30	01:52	11:14
M61	Swelling Spiral	Galaxy	Vir	12h 21m 55s	+04° 28.3'	10.1	19:39	01:55	08:10
M40	Winnecke 4	Dbl+Asterism	UMa	12h 22m 12s	+58° 05.0'	8.7	Circ	01:55	Circ
M100	Mirror of M99	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	19:07	01:56	08:44
M84	NGC4374	Galaxy	Vir	12h 25m 04s	+12° 53.2'	10.2	19:18	01:58	08:37
M85	NGC4382	Galaxy	Com	12h 25m 24s	+18° 11.4'	10.0	19:02	01:58	08:54
M86	NGC4406	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	19:19	01:59	08:39
M49	NGC4472	Galaxy	Vir	12h 29m 47s	+08° 00.0'	9.3	19:37	02:03	08:28

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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