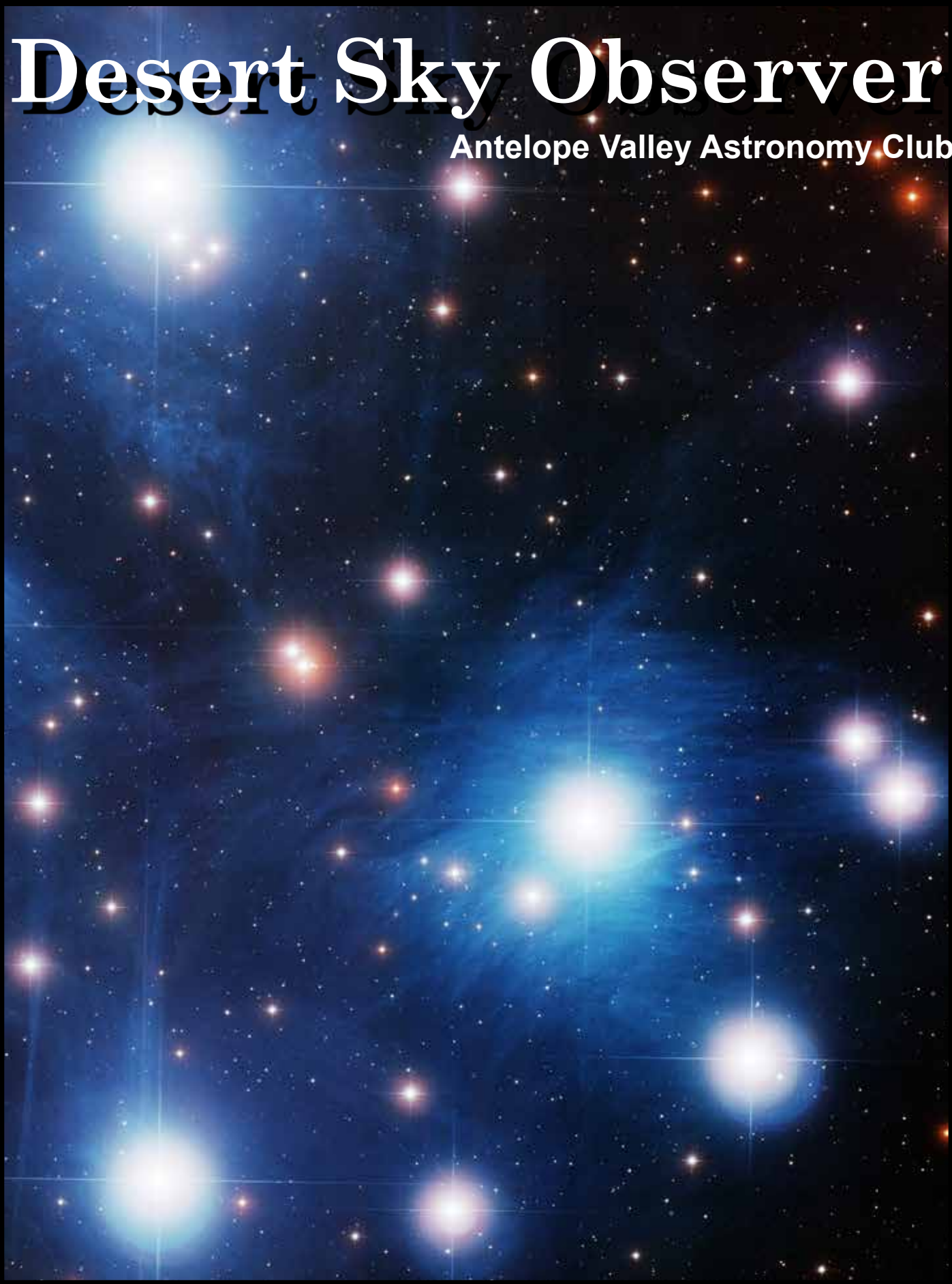
Volume 42.3 March 2022

Desert Sky Observer

Antelope Valley Astronomy Club



Upcoming Events

March 11: Club Meeting
March 26: Moonwalk 6:30 pm @ PDW
Every clear night: Personal Star Party

AVAC Calendar

April 2: Messier Marathon @ Saddleback Butte SP
April 8: Club Meeting
April 9: Moonwalk 7:30 pm @ PDW
April 22-24: Poppy Festival @ AV Fairgrounds

May 13: Club Meeting
May 21: Moonwalk 8:30 pm @ PDW
May 28 - 30: DSSP @ Red Rock Canyon SP

Board Members

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

Vice-President: Gail Lofdahl 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

www.avastronomyclub.org
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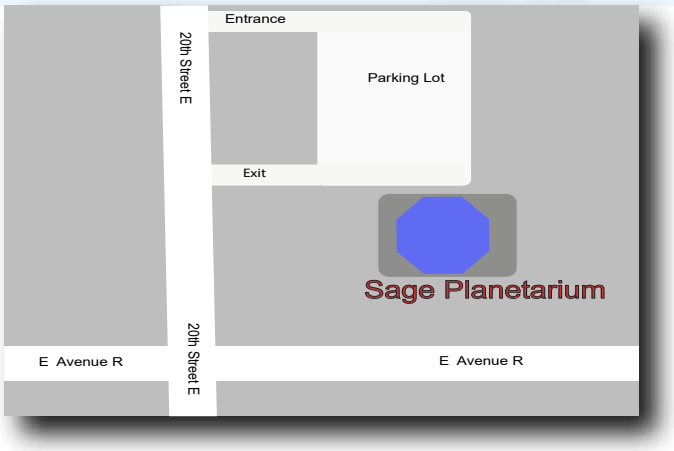
ASTRONOMY CLUB, INC.



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

Wow, it's March already!

That's right, it's time for March Madness. The Messier Marathon is just around the corner. Our first Dark Sky Star Party of the year will be at Saddleback Butte State Park on Saturday, the 2nd of April. We will be occupying the Group Campsite which the Club is paying for. You can arrive in the afternoon, have a meal al fresco, and setup before dark; more details will announced at the meeting and/or in emails.

Our next meeting is at the Sage Planetarium on the 11th at 7:00 pm. Please remember to wear a mask. We had a great speaker all lined up, but he had to postpone to another night. I'm sure that within the next two weeks we will find a replacement.

Our next Moonwalk will be on Saturday, March 26th at 7:30 pm. Last month (2/19) we had 172 attendees which included 7 members and 4 telescopes. Yeah! Please come on down, bring your telescope, and enjoy the evening. Sundown is about 7:09 pm so get there before about 6:30 so you have time to setup before it gets dark. The only planet visible will be Uranus which will set about 10:00 pm; so, it will be mostly deep sky objects.

We have dark sky star parties planned at Chuchupate on April 30th, June 25th, and July 30th. On Memorial Day weekend, May 28-30, we will have a multi-day star party at Red Rock Canyon State Park. Our past vice-president Matt Leone will give a multimedia presentation in the amphitheater; more information will be coming over the next few meetings.

This is your Club, come to the meeting, come to a star party, bring a friend, tell a neighbor, call a friend who used to be member and get them to come back to a meeting, see you there>

Keep looking up,

Phil

On The Cover

This image was obtained with the wide-field view of the Mosaic camera on the WIYN 0.9-meter telescope on Kitt Peak, Arizona. The Pleiades are an open cluster easily visible to the naked eye. The cluster is dominated by several hot, luminous and massive stars. The blue nebulosity surrounding the brightest stars are due to blue light from the stars scattering off of dust grains in the interstellar gas between us and the stars. The cluster is also known as the 'Seven Sisters'. And in Japan it is called Subaru. The image was generated with observations in the B (blue), V (green), and I (red) filters. In this image,North is right, East is up.

Credit:
T.A. Rector (University of Alaska Anchorage), Richard Cool (University of Arizona) and WIYN

From the Secretary

By Rose Moore

We have a club meeting on Friday March 11th. The NASA Speaker Bureau has contacted me about a speaker, however he can not make the March 11th meeting, so we will try to get another speaker for that date. More info to follow.

Remember that we are still required to wear a mask in the SAGE Planetarium per the guidelines of the Palmdale School District.

We have a Prime Desert Moon Walk with Jeremy on Saturday March 19th at 7:30pm; weather permitting. We need members with telescopes to help out with this event. Set up time is approximately 30-60 mins prior to the walk. A waning gibbous Moon comes up at 8:53pm, sunset is at 7:05pm.

Saturday April 2nd is our first star party of the year, and it will be our Messier Marathon! We are having the event at Saddleback State Park at the Group Campsite. More info and location to follow. You may arrive in the afternoon to set up and/or enjoy the park. There are bathroom facilities with sinks. Bring your own food, snacks, and drinks. Weather permitting.

Also in April is our club meeting on Friday April 8th, a PDW Moon Walk on Saturday April 9th at 7:30pm, and another club star party on Saturday April 30th. More info to follow.

On March 1st, I will be filling out the application for a night at Mt. Wilson on the 60 inch telescope. We are aiming to get a Saturday night, but a Friday night is also a possibility. I will send out an email when we have a date and more information.

We will be having a public star party on Memorial Day Weekend May 27th, 28th, 29th, at Red Rock Canyon State Park. This is an event we have done several times in the past. Matt Leone will be giving the presentation on Saturday night at the amphitheater area. There will be solar and night observing. The State Park will be reserving a few camp sites for our members. We need members with telescopes to share the sky with the public. More info to follow.

Come out and support your club!

Rose

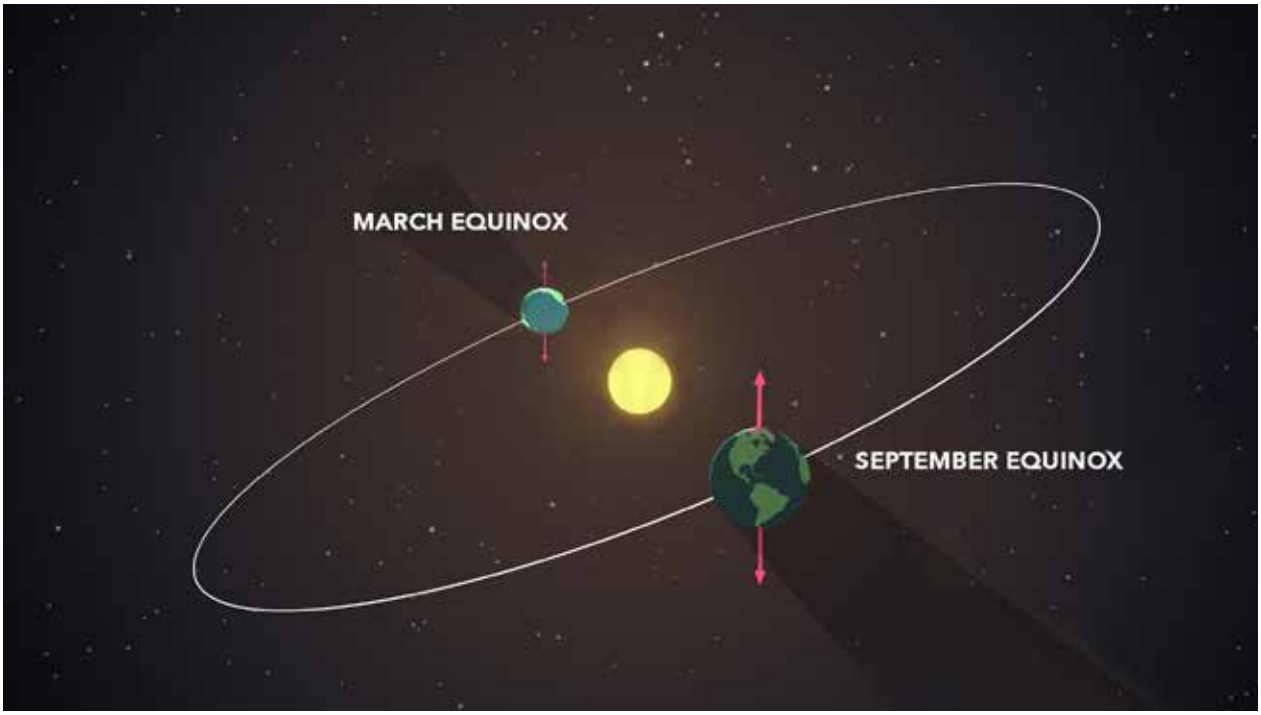
AVAC Membership Renewal

Please remember that we are able to have our monthly meetings again. 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. So PLEASE come to the meeting.

The easiest way to renew your membership is through the AVAC website via our PayPal account. But you can still renew using a check via the club's Post Office Box:

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

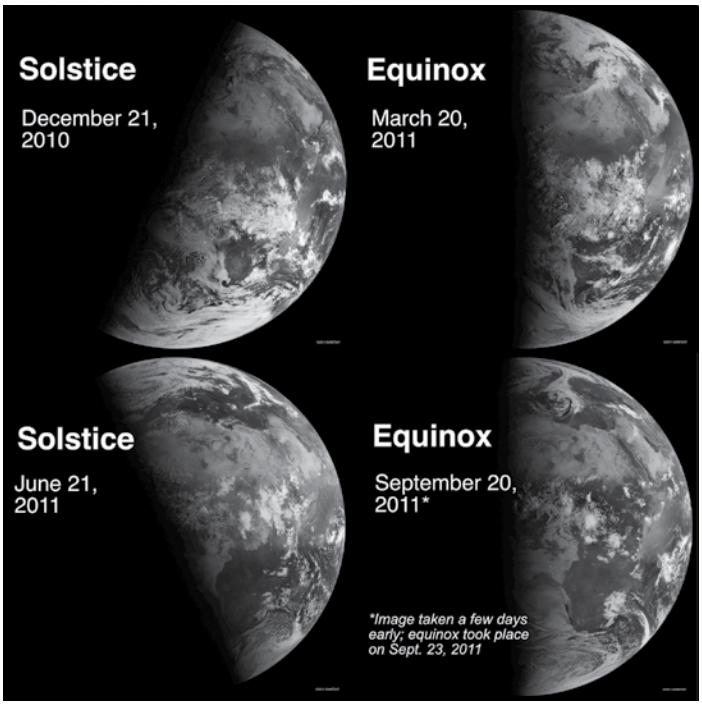
Embracing the Equinox by David Prosper, NASA Night Sky Network



This (not to scale) image shows how our planet receives equal amounts of sunlight during equinoxes. Credit: NASA/GSFC/Genna Duberstein

Depending on your locale, equinoxes can be seen as harbingers of longer nights and gloomy weather, or promising beacons of nicer temperatures and more sunlight. Observing and predicting equinoxes is one of the earliest skills in humanity's astronomical toolkit. Many ancient observatories around the world observed equinoxes along with the more pronounced solstices. These days, you don't need your own observatory to know when an equinox occurs, since you'll see it marked on your calendar twice a year! The word "equinox" originates from Latin, and translates to **equal** (equi-) **night** (-nox). But what exactly is an equinox?

An **equinox** occurs twice every year, in March and September. In 2022, the equinoxes will occur on March 20, at exactly 15:33 UTC (or 11:33 am EDT), and again on September 23, at 01:04 UTC (or September 22 at 9:04 pm EDT). The equinox marks the exact moment when the center of the Sun crosses the plane of our planet's equator. The day of an equinox, observers at the equator will see the Sun directly overhead at noon. After the March equinox, observers anywhere on Earth will see the Sun's path in the sky continue its movement further north every day until the June solstice, after which it begins traveling south. The Sun crosses the equatorial plane again during the September equinox, and continues traveling south until the December solstice, when it heads back north once again. This movement is why some refer to the March equinox as the **northward equinox**, and the September equinox as the **southward equinox**.



Scenes of Earth from orbit from season to season, as viewed by EUMETSAT. Notice how the terminator - the line between day and night - touches both the North and South Poles in the equinox images. See how the shadow is lopsided for each solstice, too: sunlight pours over the Northern Hemisphere for the June solstice, while the sunlight dramatically favors the Southern Hemisphere for the December solstice. Source: bit.ly/earthequinox Images: NASA/Robert Simmon

Our Sun shines equally on both the Northern and Southern Hemispheres during equinoxes, which is why they are the only times of the year when the Earth's North and South Poles are simultaneously lit by sunlight. Notably, the length of day and night on the equinox aren't precisely equal; the date for that split depends on your latitude, and may occur a few days earlier or later than the equinox itself. The complicating factors? Our Sun and atmosphere! The Sun itself is a sphere and not a point light source, so its edge is refracted by our atmosphere as it rises and sets, which adds several minutes of light to every day. The Sun doesn't neatly wink on and off at sunrise and sunset like a light bulb, and so there isn't a perfect split of day and night on the equinox - but it's very close.

Equinoxes are associated with the changing seasons. In March, Northern Hemisphere observers welcome the longer, warmer days heralded by their **vernal**, or spring, equinox, but Southern Hemisphere observers note the shorter days – and longer, cooler nights - signaled by their **autumnal**, or fall, equinox. Come September, the reverse is true. Discover the reasons for the seasons, and much more, with NASA 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

Data From NSF's NOIRLab Show Earth Trojan Asteroid Is The Largest Found

By scanning the sky very close to the horizon at sunrise, the SOAR Telescope in Chile, part of Cerro-Tololo Inter-American Observatory, a Program of NSF's NOIRLab, has helped astronomers confirm the existence of only the second-known Earth Trojan asteroid and reveals that it is over a kilometer wide — about three times larger than the first. . . . (continued at https://noirlab.edu/public/news/noirlab2205/)

How We Learned The Shape Of The Milky Way

For millennia, observers speculated about the Milky Way's true nature. The Greeks said the streak of haze in the sky was milk spurting from the breast of the goddess, Hera, Egyptians thought it was cows' milk, and some Aboriginal Australians thought it was a river flowing through the sky. . . . (continued at https://astronomy.com/magazine/news/2022/02/the-shape-of-the-milky-way)

The 1,000-Light-Year-Wide Cosmic Bubble Around Earth

Think "bubbles," and you may think "soap" or "gum." But not Catherine Zucker, currently a Hubble Fellow at the Space Telescope Science Institute and a former researcher with the Harvard-Smithsonian Center for Astrophysics. Zucker's interest in bubbles is cosmic. And she and her collaborators have found new insights about a bubble in which our solar system sits. . . . (continued at https://astronomy.com/news/2022/01/the-1000-light-year-wide-cosmic-bubble-around-earth)

Scientists Reveal 4.4 Million Galaxies In A New Map

Durham University astronomer collaborating with a team of international scientists have mapped more than a quarter of the northern sky using the Low Frequency Array (LOFAR), a pan-European radio telescope. The map reveals an astonishingly detailed radio image of more than 4.4 million objects and a very dynamic picture of our Universe, which now has been made public for the first time. . . . (continued at https://phys.org/news/2022-02-scientists-reveal-million-galaxies.html)

NASA Prepares To Send Its Artemis 1 Orion Spacecraft Around The Moon

NASA is making final preparations before kickstarting its Artemis lunar missions. The U.S. space agency announced in a press conference on Thursday, February 24, it will carry out a "wet dress rehearsal" for its Orion spacecraft that will eventually send humans back to the moon, according to Space.com. The new timeline means that Artemis 1, which was scheduled to liftoff in April, likely won't launch until nearer the summer.. . . (continued at https://interestingengineering.com/nasa-artemis-1-orion-spacecraft)

Space Missions To Look Out For In 2022

Space travel is all about momentum. Rockets turn their fuel into momentum that carries people, satellites and science itself forward into space. 2021 was a year full of records for space programs around the world, and that momentum is carrying forward into 2022. Last year, the commercial space race truly took off. Richard Branson and Amazon founder Jeff Bezos both rode on suborbital launches – and brought friends, including actor William Shatner. SpaceX sent eight astronauts and 1 ton of supplies to the International Space Station for NASA. (continued at https://astronomy.com/news/2022/02/space-missions-to-look-out-for-in-2022)

Space News

News from around the Net

NASA's Roman Mission Could Snap First Image Of A Jupiter-Like World

NASA's Nancy Grace Roman Space Telescope, now under construction, will test new technologies for space-based planet hunting. The mission aims to photograph worlds and dusty disks around nearby stars with detail up to a thousand times better than possible with other observatories. Roman will use its Coronagraph Instrument -- a system of masks, prisms, detectors, and even self-flexing mirrors built to block out the glare from distant stars and reveal the planets in orbit around them -- to demonstrate that direct imaging technologies can perform even better in space than they have with ground-based telescopes. . . .(continues at https://www.sciencedaily.com/releases/2022/02/220224180346.htm)

Black Hole Spins Crookedly

When a big star in a binary star system goes kablooey, the black hole it creates can stay hitched to the surviving star. Over time, gas from the secondary star can spill onto the black hole, skirting the black hole in a hot, fluffy tutu that fuels a pair of plasma jets. Generally, astronomers assume that objects paired this way spin like upright tops around each other. . . .(continued at https://skyandtelescope.org/astronomy-news/black-hole-spins-crookedly/)

Astronomers See An Enormous Shockwave, 60 Times Bigger Than The Milky Way

Astronomers have a thing for big explosions and collisions, and it always seems like they are trying to one-up themselves in finding a bigger, brighter one. There's a new entrant to that category – an event so big it created a burst of particles over 1 billion years ago that is still visible today and is 60 times bigger than the entire Milky Way. That shockwave was created by the merger of two galaxy clusters to create a supercluster known as Abell 3667. . . . (continued at https://www.universetoday.com/154737/astronomers-see-an-enormous-shockwave-60-times-bigger-than-the-milky-way/)

New Images of Artemis in the VAB; Rollout for SLS Launch Rehearsal Test Now Scheduled for March 17 Every journey begins with a single step, and the first step of NASA's return to the Moon begins with a four-mile rollout to the launchpad. NASA announced their target date for rolling out the Space Launch System rocket for the four-mile crawl to the launch pad is March 17. The full rocket stack will spend about a month at the pad undergoing several tests before heading back to the Vehicle Assembly Building. If all goes well with the tests, NASA hopes to launch its uncrewed Artemis test flight, likely by early summer. . . . (continued at https://www.universetoday.com/154707/new-images-of-artemis-in-the-vab-rollout-for-sls-launch-rehearsal-test-now-scheduled-for-march-17/)

A New Spin On The Blue Stellar Sequence

Some humans try to look younger than they really are—stars do, too. This is reported by an international team of astronomers in a paper just published in Nature Astronomy. They propose that stars in stellar clusters gain their mass in two different ways: via "normal" disk accretion, leading to rapid rotation and contributing to the red main sequence, or by mergers of binary stars, leading to slowly rotating stars that appear bluer and therefore younger. It all began with probably the most famous diagram in astronomy, the Hertzsprung-Russell diagram. . . .(continued at https://phys.org/news/2022-02-blue-stellar-sequence.html)

Dark Sky Observing Sites

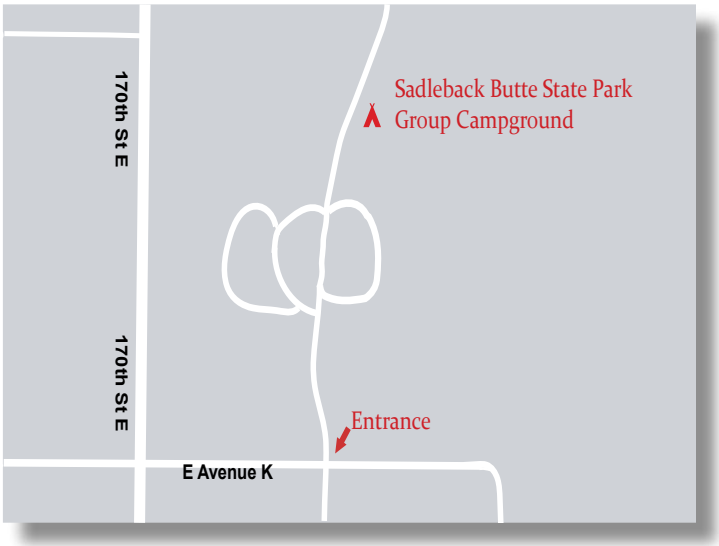
The Chuchupate parking lot is a half a mile beyond the Mt Pinos ranger station (on some maps The Chuchupate Ranger Sta., the parking lot is also called Frazier Mountain trailhead).

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.



Planet Summary

The **Sun** starts March in central Aquarius and crosses into Pisces by the end the month.

Mercury starts the month drawing closer to the Sun slowly getting brighter passing by Saturn on the 2nd, passing Jupiter on the 21th, and Neptune on the 23rd. Although, by then it will be too close to the Sun's glare to be seen. On the 2nd of April solar conjunction occurs.

Venus begins the month in Sagittarius, rising almost 2 hours ahead of the Sun, in the company of Pluto, Mars and Vesta. On the 20th it achieves maximum western elongation when it is 47.° By the 28th Saturn is in conjunction 2°11' to the south.

Mars begins the month the month on the edge of Sagittarius. 5° north is Venus and 1½° south is Pluto and Vesta is 1½° north. By the end of month, Mars is in Capricorn almost 4° east of Saturn and almost 6° east of Venus.

Jupiter is in conjunction with the Sun on the 5th. By the end of the month Jupiter has only 20° separation west of the Sun.

Saturn emerges in the morning sky, separating significantly from the Sun during March. It's elongation stretches from 22° on the 1st to 49° on the 31st. Late in the month it joins Venus and Mars in a single binocular field, with the Moon passing to the south on the 28th. Venus closes to 2° to Saturn's north on the 29th.

Uranus continues moving east in central Aries at mag 5.8. On the 6th the 21% waxing Moon passes 1° to the south.

Neptune will be just too close to the Sun to be seen. In solar conjunction on the 13th.

Pluto spends the month slowing moving east in Sagittarius at mag 14.4. On the 2nd Mars passes by 47' to the north and Venus passes almost 6° to the north.

Moon Phases

First Qtr	Full	Third Qtr	New
Mar 10	Mar 18	Mar 24	Mar 2

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
3/1/2022	06:06	16:54	06:21	17:48
3/5/2022	08:07	21:16	06:16	17:52
3/10/2022	10:54	01:06	06:09	17:56
3/15/2022	16:34	05:57	07:03	19:00
3/20/2022	21:57	08:26	06:53	19:04
3/25/2022	02:34	12:13	06:49	19:08
3/30/2022	06:11	17:51	06:42	19:12

Planet Data*

March 1

	Rise	Transit	Set	Mag	Phase%
Mercury	05:22	10:37	15:52	-0.08	76.3
Venus	03:50	09:04	14:19	-4.55	38.4
Mars	04:11	09:10	14:09	1.25	94.0
Jupiter	06:35	12:17	17:59	-2.03	100
Saturn	05:25	10:41	15:57	0.73	99.9

March 15

	Rise	Transit	Set	Mag	Phase%
Mercury	06:32	12:06	17:42	-0.46	88.6
Venus	04:43	10:01	15:20	-4.43	46.9
Mars	04:52	09:59	15:05	1.17	92.9
Jupiter	06:49	12:34	18:20	-2.04	99.9
Saturn	05:34	10:52	16:10	0.82	99.9

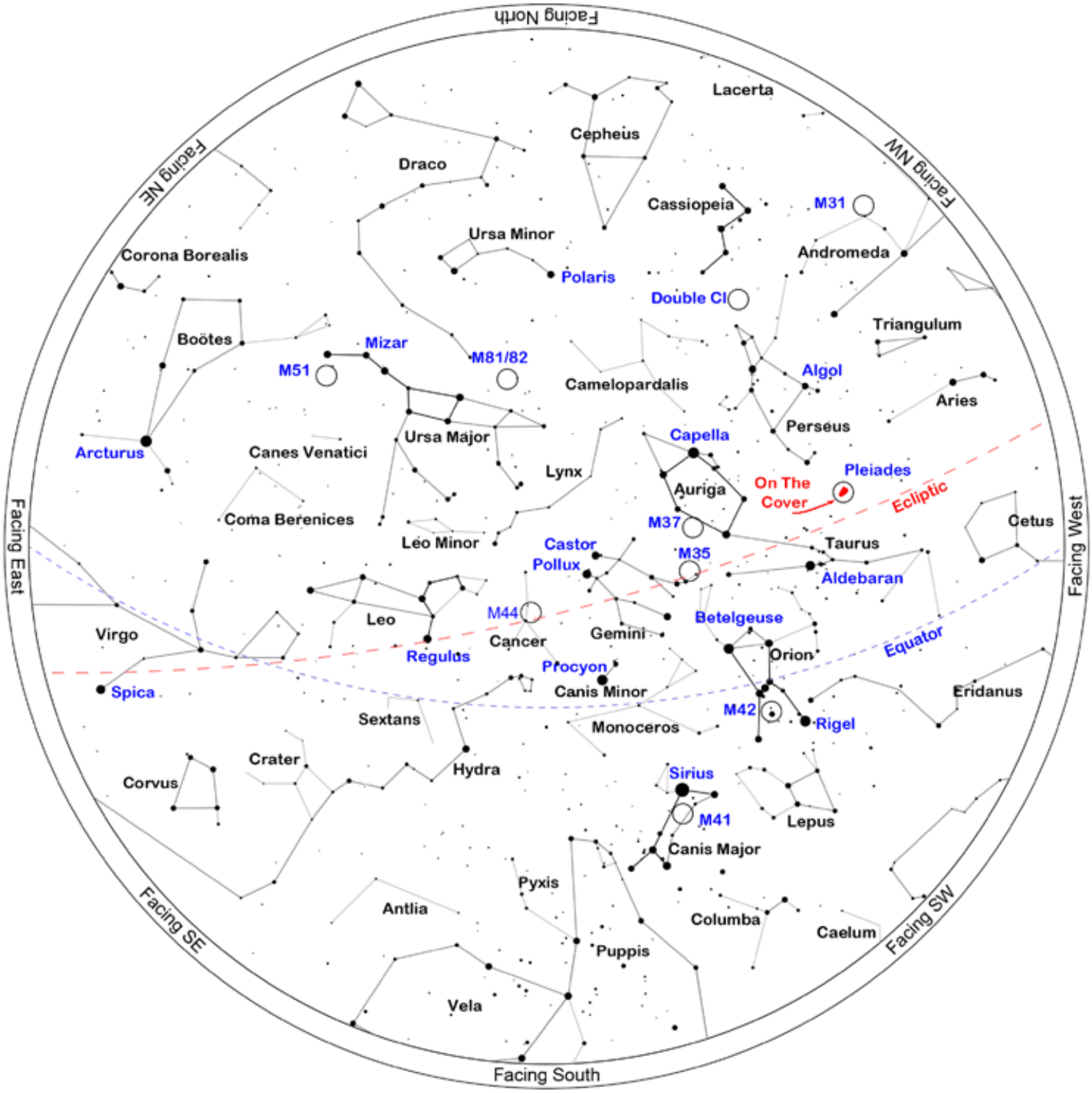
March 30

	Rise	Transit	Set	Mag	Phase%
Mercury	06:41	12:48	18:56	-1.61	99.1
Venus	04:36	10:03	15:31	-4.31	54.6
Mars	04:30	09:45	15:01	1.08	91.8
Jupiter	05:59	11:49	17:38	-2.06	99.8
Saturn	04:40	09:59	15:18	0.85	99.8

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

ID	Common Name	Type		RA	Dec	Mag	Rise	Transit	Set
NGC129		Open	Cas	00h 30m 00s	+60° 13.1'	6.5	Circ	13:12	Circ
NGC133		Open	Cas	00h 31m 19s	+63° 21.0'	9.0	Circ	13:14	Circ
NGC146		Open	Cas	00h 33m 03s	+63° 18.0'	9.1	Circ	13:15	Circ
NGC147	C17	E Gal	Cas	00h 33m 12s	+48° 30.0'	9.3	03:42	13:16	22:50
NGC190		Galaxy	Psc	00h 38m 55s	+07° 03.7'	14.0	06:59	13:21	19:44
M110	Satellite Of Andromeda Galaxy	Galaxy	And	00h 40m 22s	+41° 41.1'	8.9	04:45	13:23	22:00
NGC210		Galaxy	Cet	00h 40m 35s	-13° 52.3'	10.9	08:00	13:23	18:46
NGC206	V-36	Neb	And	00h 40m 36s	+40° 44.0'		04:51	13:23	21:55
Arp168	M32	Galaxy	And	00h 42m 41s	+40° 51.0'	9.0	04:53	13:25	21:57
M32	Andromeda Galaxy Satellite	Galaxy	And	00h 42m 42s	+40° 51.9'	9.1	04:53	13:25	21:58
M31	Andromeda Galaxy	Galaxy	And	00h 42m 44s	+41° 16.1'	4.3	04:50	13:25	22:00
NGC246	C56	P Neb	Cet	00h 47m 00s	-11° 53.0'	10.9	08:00	13:29	18:59
NGC254		Galaxy	Scl	00h 47m 28s	-31° 25.2'	11.8	09:07	13:30	17:53
NGC288		Globular	Scl	00h 52m 45s	-26° 35.0'	8.1	08:53	13:35	18:17
NGC281	PacMan Nebula	Open	Cas	00h 52m 54s	+56° 37.4'	7.0	Circ	13:35	Circ
IC59	Gamma Cassiopeiae Nebula	Neb	Cas	00h 57m 29s	+61° 08.6'		Circ	13:40	Circ
IC63	Gamma Cassiopeiae Nebula	Neb	Cas	00h 59m 29s	+60° 54.7'		Circ	13:42	Circ
C51	IC1613	IrrGal	Cet	01h 04m 48s	+02° 07.0'	9.3	07:38	13:47	19:56
NGC474		Galaxy	Psc	01h 20m 07s	+03° 24.9'	11.1	07:50	14:02	20:15
NGC485		Galaxy	Psc	01h 21m 28s	+07° 01.0'	14.0	07:41	14:04	20:26
M103	NGC581	Open	Cas	01h 33m 23s	+60° 39.0'	7.0	Circ	14:16	Circ
NGC598	Pinwheel Galaxy, Triangulum Galaxy	Galaxy	Tri	01h 33m 51s	+30° 39.6'	5.7	06:35	14:16	21:57
NGC604	III-150	Neb	Tri	01h 34m 33s	+30° 47.0'		06:36	14:17	21:58
M74	The Phantom	Galaxy	Psc	01h 36m 42s	+15° 47.0'	9.8	07:31	14:19	21:07
M76	Little Dumbbell Nebula	P Neb	Per	01h 42m 18s	+51° 34.2'	12.0	04:10	14:25	00:39
NGC651	Apple Core Nebula	P Neb	Per	01h 42m 21s	+51° 34.1'	12.2	04:10	14:25	00:39
NGC637		Open	Cas	01h 43m 04s	+64° 02.4'	8.2	Circ	14:25	Circ
NGC654		Open	Cas	01h 44m 00s	+61° 53.0'	6.5	Circ	14:26	Circ
NGC720		Galaxy	Cet	01h 53m 00s	-13° 44.3'	10.2	09:12	14:35	19:59
NGC780		Galaxy	Tri	02h 00m 35s	+28° 13.5'	14.0	07:12	14:43	22:14
NGC784		Galaxy	Tri	02h 01m 17s	+28° 50.2'	11.8	07:10	14:44	22:17
NGC821		Galaxy	Ari	02h 08m 21s	+10° 59.6'	10.8	08:17	14:51	21:25
Baily191	NGC884	Open	Per	02h 22m 18s	+57° 08.1'	4.0	Circ	15:05	Circ
IC1795		Neb	Cas	02h 26m 32s	+62° 02.4'		Circ	15:09	Circ
NGC936		Galaxy	Cet	02h 27m 37s	-01° 09.3'	10.1	09:10	15:10	21:10

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC943	Arp309	Galaxy	Cet	02h 29m 09s	-10° 49.0'	11.4	09:39	15:11	20:44
NGC956		Open	And	02h 32m 30s	+44° 35.6'	9.0	06:16	15:15	00:13
IC1805	Heart Nebula	Open	Cas	02h 32m 47s	+61° 27.6'	6.5	Circ	15:15	Circ
NGC1052		Galaxy	Cet	02h 41m 05s	-08° 15.3'	10.6	09:44	15:23	21:03
M34	Spiral Cluster	Open	Per	02h 42m 05s	+42° 45.6'	6.0	06:39	15:24	00:09
M77	Cetus A	Galaxy	Cet	02h 42m 41s	-00° 00.8'	9.7	09:22	15:25	21:28
NGC1084		Galaxy	Eri	02h 46m 00s	-07° 34.6'	10.6	09:47	15:28	21:10
IC1848	Soul Nebula	Open	Cas	02h 51m 18s	+60° 24.4'	6.5	Circ	15:34	Circ
NGC1156		Galaxy	Ari	02h 59m 42s	+25° 14.2'	11.7	08:22	15:42	23:02
NGC1201		Galaxy	For	03h 04m 08s	-26° 04.1'	10.6	11:03	15:46	20:30
NGC1175		Galaxy	Per	03h 04m 32s	+42° 20.3'	12.8	07:05	15:47	00:29
HR963	SAO168373,	Dbl	For	03h 12m 04s	-28° 59.2'	3.9	11:22	15:54	20:27
NGC1316	Fornax A	Galaxy	For	03h 22m 42s	-37° 12.4'	8.9	12:08	16:05	20:02
Barnard202	B202	DkNeb	Ari	03h 25m 38s	+30° 16.0'		08:29	16:08	23:47
Barnard204	B204	DkNeb	Ari	03h 28m 29s	+30° 11.0'		08:32	16:11	23:50
NGC1350		Galaxy	For	03h 31m 08s	-33° 37.7'	10.5	12:00	16:13	20:27
Barnard1	B1	DkNeb	Per	03h 32m 57s	+31° 09.0'		08:32	16:15	23:58
Barnard2	B2	DkNeb	Per	03h 33m 31s	+32° 19.0'		08:28	16:16	00:04
Barnard3	B3	DkNeb	Per	03h 40m 01s	+31° 58.0'		08:36	16:22	00:09
NGC1407		Galaxy	Eri	03h 40m 12s	-18° 34.8'	9.8	11:14	16:23	21:31
IC347		Galaxy	Eri	03h 42m 32s	-04° 17.9'	13.0	10:34	16:25	22:16
NGC1448		Galaxy	Hor	03h 44m 32s	-44° 38.6'	11.0	13:15	16:27	19:39
IC348		Open	Per	03h 44m 34s	+32° 09.7'	7.3	08:40	16:27	00:14
M45	Pleiades, Subaru Seven Sisters,	Open	Tau	03h 47m 30s	+24° 07.0'	1.6	09:14	16:30	23:46
Barnard5	B5	DkNeb	Per	03h 47m 53s	+32° 53.0'		08:40	16:30	00:21
NGC1461		Galaxy	Eri	03h 48m 27s	-16° 23.5'	11.7	11:15	16:31	21:47
IC353		Neb	Tau	03h 53m 00s	+25° 48.0'		09:14	16:35	23:57
IC2003		P Neb	Per	03h 56m 22s	+33° 52.5'	13.0	08:44	16:39	00:34
NGC1499	California Nebula	Neb	Per	04h 03m 14s	+36° 22.0'		08:38	16:46	00:53
NGC1515		Galaxy	Dor	04h 04m 03s	-54° 06.0'	11.0	15:26	16:46	18:06
NGC1496		Open	Per	04h 04m 32s	+52° 39.7'	10.0	06:12	16:47	03:21
NGC1502		Open	Cam	04h 07m 50s	+62° 19.8'	5.7	Circ	16:50	Circ
IC360		Neb	Tau	04h 09m 00s	+26° 06.0'		09:28	16:51	00:14
NGC1514	Crystal Ball Nebula	P Neb	Tau	04h 09m 17s	+30° 46.5'	10.0	09:10	16:52	00:33
NGC1513		Open	Per	04h 09m 57s	+49° 30.8'	8.4	07:07	16:52	02:38
IC359		Neb	Tau	04h 12m 28s	+27° 42.1'		09:26	16:55	00:24
NGC1535		P Neb	Eri	04h 14m 16s	-12° 44.3'	10.0	11:30	16:57	22:23
Barnard10	B10	DkNeb	Tau	04h 18m 41s	+28° 16.0'		09:30	17:01	00:32
NGC1545		Open	Per	04h 20m 57s	+50° 15.2'	6.2	07:08	17:03	02:58

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC1569		Galaxy	Cam	04h 30m 49s	+64° 50.8'	11.2	Circ	17:13	Circ
Barnard18	B18	DkNeb	Tau	04h 31m 13s	+24° 21.0'		09:57	17:14	00:30
NGC1582		Open	Per	04h 31m 53s	+43° 49.0'	7.0	08:22	17:14	02:07
NGC1560		Galaxy	Cam	04h 32m 48s	+71° 52.7'	11.5	Circ	17:15	Circ
Barnard19	B19	DkNeb	Tau	04h 33m 00s	+26° 16.0'		09:52	17:15	00:39
Barnard20	B20	DkNeb	Per	04h 37m 04s	+50° 58.0'		07:15	17:19	03:24
Barnard22	B22	DkNeb	Tau	04h 38m 00s	+26° 03.0'		09:58	17:20	00:43
Barnard14	B14	DkNeb	Tau	04h 39m 59s	+25° 44.0'		10:01	17:22	00:44
IC2087		Neb	Tau	04h 40m 00s	+25° 44.5'		10:01	17:22	00:44
Barnard23	B23	DkNeb	Tau	04h 40m 33s	+29° 52.0'		09:45	17:23	01:00
NGC1624		Open	Per	04h 40m 36s	+50° 27.6'	10.4	07:25	17:23	03:21
NGC1640		Galaxy	Eri	04h 42m 14s	-20° 26.0'	11.7	12:22	17:25	22:28
NGC1647		Open	Tau	04h 45m 55s	+19° 06.8'	6.4	10:29	17:28	00:27
IC2118	Witch Head Nebula	Neb	Eri	05h 04m 54s	-07° 15.0'		12:05	17:47	23:30
NGC1851	C73	Globular	Col	05h 14m 06s	-40° 03.0'	7.3	14:15	17:56	21:38
IC405	Flaming Star Nebula	Neb	Aur	05h 16m 29s	+34° 21.3'		10:02	17:59	01:56
M79	NGC1904	Globular	Lep	05h 24m 11s	-24° 31.4'	8.5	13:17	18:07	22:56
M38	Starfish Cluster	Open	Aur	05h 28m 40s	+35° 50.8'	7.0	10:06	18:11	02:16
M1	Crab Nebula	SNR	Tau	05h 34m 32s	+22° 00.8'	8.4	11:08	18:17	01:25
M42	Great Orion Nebula	Open+D Neb	Ori	05h 35m 16s	-05° 23.4'	4.0	12:30	18:18	00:05
M43	De Mairan's Nebula	D Neb	Ori	05h 35m 31s	-05° 16.0'	9.0	12:30	18:18	00:06
M36	Pinwheel Cluster	Open	Aur	05h 36m 18s	+34° 08.3'	6.5	10:22	18:19	02:15
M78	NGC2068	D Neb	Ori	05h 46m 45s	+00° 04.8'	8.0	12:26	18:29	00:32
M37	Salt-and-pepper Cluster	Open	Aur	05h 52m 18s	+32° 33.2'	6.0	10:46	18:35	02:24
M35	NGC2168	Open	Gem	06h 09m 00s	+24° 21.0'	5.5	11:35	18:51	02:08
M41	Little Beehive	Open	CMa	06h 46m 01s	-20° 45.3'	5.0	14:26	19:28	00:30
M50	Heart-shaped Cluster	Open	Mon	07h 02m 42s	-08° 23.0'	7.0	14:06	19:45	01:24
M47	NGC2422	Open	Pup	07h 36m 35s	-14° 29.0'	4.5	14:57	20:19	01:40
M46	NGC2437	Open	Pup	07h 41m 46s	-14° 48.6'	6.5	15:04	20:24	01:45
M93	NGC2447	Open	Pup	07h 44m 30s	-23° 51.4'	6.5	15:35	20:27	01:18
M48	NGC2548	Open	Hya	08h 13m 43s	-05° 45.0'	5.5	15:09	20:56	02:43
M44	Beehive Cluster	Open	Cnc	08h 40m 24s	+19° 40.0'	4.0	14:22	21:23	04:23
M67	King Cobra	Open	Cnc	08h 51m 18s	+11° 48.0'	7.5	14:57	21:34	04:10
M81	Bode's Galaxy	Galaxy	UMa	09h 55m 33s	+69° 03.9'	7.8	Circ	22:38	Circ
M82	Cigar Galaxy	Galaxy	UMa	09h 55m 53s	+69° 40.8'	9.2	Circ	22:38	Circ
M95	NGC3351	Galaxy	Leo	10h 43m 58s	+11° 42.2'	10.6	16:50	23:26	06:02
M96	NGC3368	Galaxy	Leo	10h 46m 46s	+11° 49.2'	10.1	16:53	23:29	06:05
M105	NGC3379	Galaxy	Leo	10h 47m 50s	+12° 34.9'	10.5	16:52	23:30	06:09
M108	NGC3556	Galaxy	UMa	11h 11m 31s	+55° 40.4'	10.6	Circ	23:54	Circ

ID	Common Name	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M97	Owl Nebula	P Neb	UMa	11h 14m 48s	+55° 01.1'	12.0	Circ	23:57	Circ
M65	Leo Triplet	Galaxy	Leo	11h 18m 56s	+13° 05.5'	10.1	17:21	00:01	06:41
M66	Leo Triplet	Galaxy	Leo	11h 20m 15s	+12° 59.4'	9.7	17:23	00:03	06:42
M109	NGC3992	Galaxy	UMa	11h 57m 36s	+53° 22.4'	10.6	13:49	00:40	11:31
M98	NGC4192	Galaxy	Com	12h 13m 48s	+14° 54.0'	10.9	18:11	00:56	07:42
M99	Virgo Cluster Pinwheel/ Coma Pinwheel Galaxy	Galaxy	Com	12h 18m 50s	+14° 25.0'	10.4	18:17	01:01	07:45
M106	NGC4258,UGC7353	Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	15:39	01:01	10:23
M61	Swelling Spiral	Galaxy	Vir	12h 21m 55s	+04° 28.3'	10.1	18:49	01:04	07:19
M40	Winnecke 4	Dbl+Asterism	UMa	12h 22m 12s	+58° 05.0'	8.7	Circ	01:05	Circ
M100	Mirror of M99	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	18:17	01:05	07:54
M84	NGC4374	Galaxy	Vir	12h 25m 04s	+12° 53.2'	10.2	18:28	01:07	07:47
M85	NGC4382	Galaxy	Com	12h 25m 24s	+18° 11.4'	10.0	18:12	01:08	08:04
M86	NGC4406	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	18:29	01:09	07:48
M49	NGC4472	Galaxy	Vir	12h 29m 47s	+08° 00.0'	9.3	18:47	01:12	07:37
M87	Smoking Gun	Galaxy	Vir	12h 30m 49s	+12° 23.4'	9.6	18:35	01:13	07:51
M88	NGC4501	Galaxy	Com	12h 31m 59s	+14° 25.2'	10.2	18:30	01:14	07:58
M91	Missing Messier Object	Galaxy	Com	12h 35m 27s	+14° 29.7'	10.9	18:33	01:18	08:02
M89	NGC4552	Galaxy	Vir	12h 35m 40s	+12° 33.3'	10.9	18:40	01:18	07:56
M90	NGC4569	Galaxy	Vir	12h 36m 50s	+13° 09.7'	10.2	18:39	01:19	07:59
M58	NGC4579	Galaxy	Vir	12h 37m 44s	+11° 49.1'	10.4	18:44	01:20	07:56
M68	NGC4590	Globular	Hya	12h 39m 28s	-26° 44.5'	9.0	20:41	01:22	06:03
M104	Sombrero Galaxy	Galaxy	Vir	12h 39m 59s	-11° 37.3'	9.2	19:52	01:22	06:52
M59	NGC46218	Galaxy	Vir	12h 42m 02s	+11° 38.7'	10.7	18:49	01:24	08:00
M60	NGC4649	Galaxy	Vir	12h 43m 40s	+11° 33.1'	9.8	18:50	01:26	08:02
M94	Croc's Eye Galaxy	Galaxy	CVn	12h 50m 53s	+41° 07.1'	8.9	16:59	01:33	10:07
M64	Black Eye Galaxy	Galaxy	Com	12h 56m 44s	+21° 41.0'	9.3	18:32	01:39	08:46
M53	NGC5024	Globular	Com	13h 12m 55s	+18° 10.1'	8.5	19:00	01:55	08:51
M63	Sunflower Galaxy	Galaxy	CVn	13h 15m 49s	+42° 01.7'	9.3	17:18	01:58	10:38
M51	Whirlpool Galaxy	Galaxy	CVn	13h 29m 52s	+47° 11.7'	8.9	16:51	02:12	11:33

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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