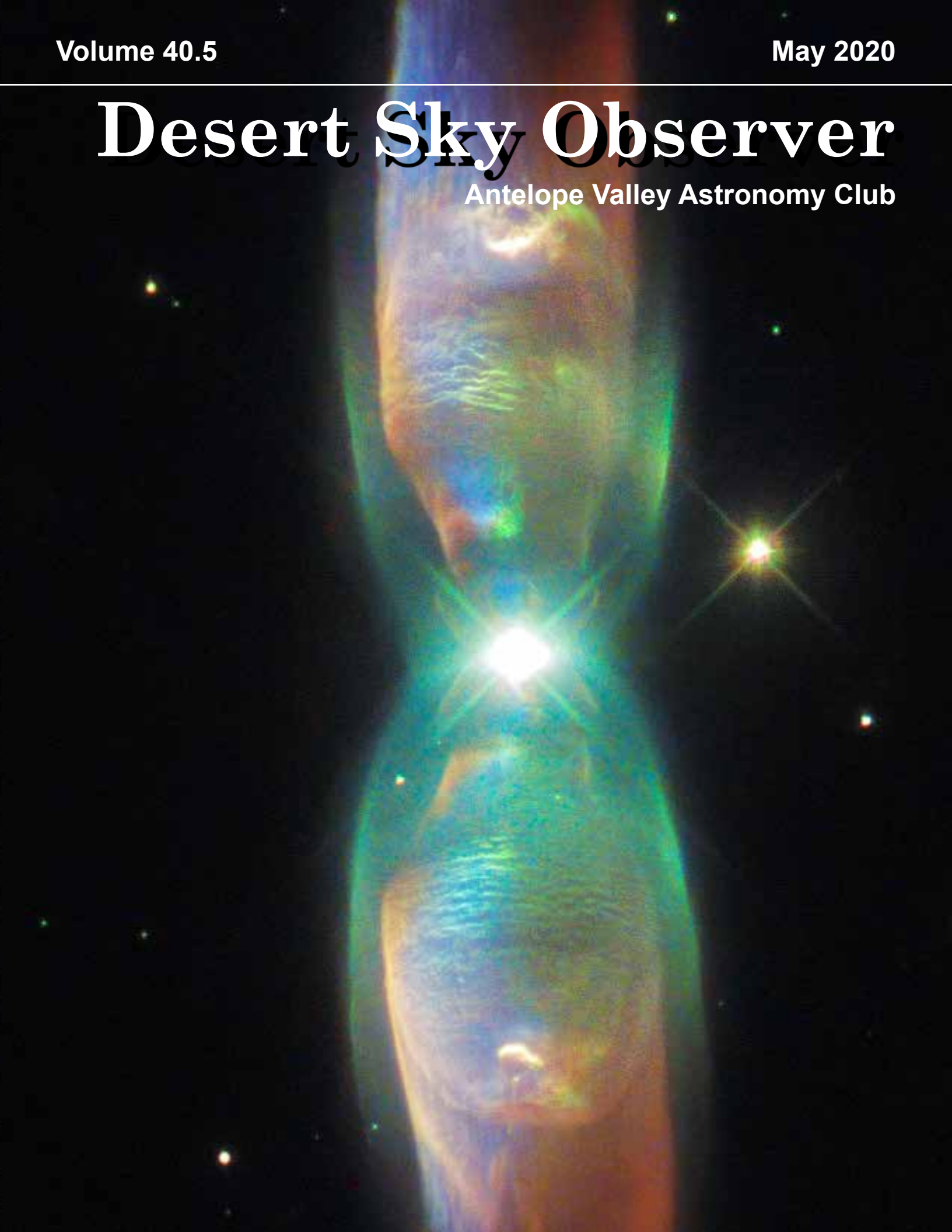
Volume 40.5 May 2020

Desert Sky Observer

Antelope Valley Astronomy Club



Upcoming Events

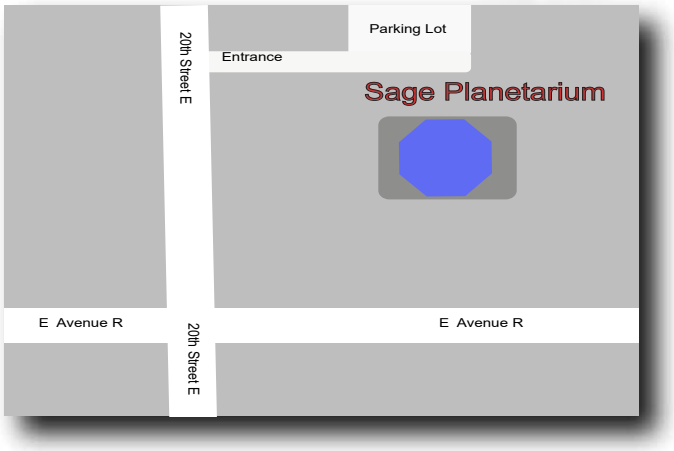
May 8: Club Meeting, . . . Nope
May 9: PDW Moonwalk, . . . Probably not
May 23/24 : DSSP at . . Chuchupate, Maybe

Any night without clouds: Personal Star Party

June 6: PDW Moonwalk ... maybe
June 12: Club Meeting ... maybe
June 20: DSSP at . . . ???

August 22: Mt Wilson trip

AVAC Calendar



Board Members

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president@avastronomyclub.org

Vice-President: Matt Leone (661) 713-1894
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Treasurer: Rod Girard (661) 803-7838
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Webmaster: Steve Trotta (661) 269-5428
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www.avastronomyclub.org
ANTELOPE VALLEY
ASTRONOMY CLUB, INC.

Monthly Meetings

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

Membership

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

The Club has three categories of membership.

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

Membership entitles you to ...

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

AVAC
PO Box 8545
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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 Darrel Bennet

I hope this newsletter finds you and your families doing well. Most of us are getting tired of the stay at home order, but it gives me a lot more time to do things around the house like eat too much.

There will be no meeting this month at The SAGE and hoping to get back in there in June. Jeremy will let us know when we can hold our next meeting as soon as he finds out. We will let everyone know.

As I stated, I have a lot of time on my hands so I started to clean up my garage a little. I came across an old moon map. As I was looking for stuff to look at I found 2 craters named after Charles Messier, A & B. One of them looks like a comet.

I have wanted to take my scope out in my backyard but the weather has been so bad. If it was not raining, it was too windy to take out.

I spoke with our Vice President Matt last week about holding a star party at Chuchupate on Memorial Day weekend and he's all for it. I told him that I would check with the ranger's office to get the ok to have our star party there. If it's a go, we will let you know the date and time.

Until then, keep looking up.

On The Cover

The Twin Jet Nebula, or PN M2-9, is a striking example of a bipolar planetary nebula. Bipolar planetary nebulae are formed when the central object is not a single star, but a binary system, Studies have shown that the nebula's size increases with time, and measurements of this rate of increase suggest that the stellar outburst that formed the lobes occurred just 1200 years ago.

Credit:
ESA/Hubble & NASA
Acknowledgement: Judy Schmidt

From the Secretary

By Rose Moore

Well, we have had another month without any astronomy! Frank and I haven't been able to even take our scopes out at home, due to the weather. Have any of you members taken out your telescopes? Here's hoping that the virus restrictions and the weather change for the better soon!

The planet Venus is giving a beautiful view now in the evening sky. Go out and take a look!

As of now, we will not be having any meeting for the month of May. The COVID-19 restrictions are scheduled to last until May 15th in both LA and Kern counties. So we'll see what happens as we get into May. I'm waiting for the official cancellation from Jeremy regarding the PDW scheduled for Saturday May 9th. Tentatively, we have a dark sky star party scheduled for Memorial Day weekend at Chuchupate. Darrell will be checking with the rangers as we get closer to see if this will be possible. Further information to follow.

As we have had to cancel some speakers, I will be checking with Matt as to possibly rescheduling the speakers for future meetings. The speakers we have had to cancel are Tim Thompson and Dr. Eric Becklin, both wonderful speakers! For our meeting in June, we have Tom Hames presenting another painting class. We will have more information and signups during May. Stay tuned!

We have Saturday August 22nd booked for a trip to Mt. Wilson. We will start signups the end of May, beginning of June. We will let you know the cost of the trip. There will be no pre tour, as many of us have taken the tour recently, and it will keep down the cost. Further information coming.

Stay safe, stay healthy! Enjoy the night sky from your home!

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

Become a Citizen Scientist with NASA!

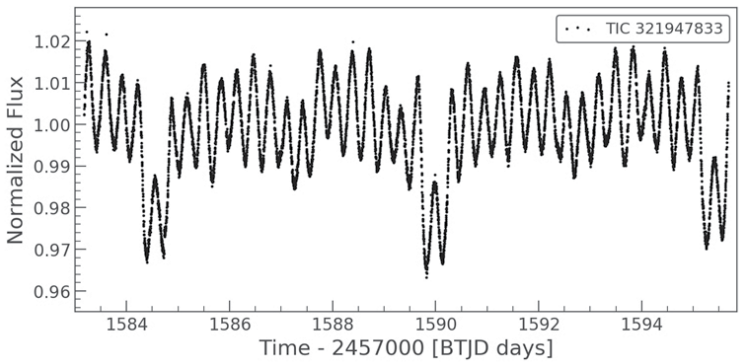
David Prosper, NASA Night Sky Network

Ever want to mix in some science with your stargazing, but not sure where to start? NASA hosts a galaxy of citizen science programs that you can join! You'll find programs perfect for dedicated astronomers and novices alike, from reporting aurora, creating amazing images from real NASA data, searching for asteroids, and scouring data from NASA missions from the comfort of your home. If you can't get to your favorite stargazing spot, then NASA's suite of citizen science programs may be just the thing for you.

Jupiter shines brightly in the morning sky this spring. If you'd rather catch up on sleep, or if your local weather isn't cooperating, all you need is a space telescope - preferably one in orbit around Jupiter! Download raw images straight from the Juno mission, and even process and submit your favorites, on the **JunoCam** website! You may have seen some incredible images from Juno in the news, but did you know that these images were created by enthusiasts like yourself? Go to their website and download some sample images to start your image processing journey. Who knows where it will take you? Get started at bit.ly/nasajunocam

Interested in hunting for asteroids? Want to collaborate with a team to find them?? The **International Astronomical Search Collaboration** program matches potential asteroid hunters together into teams throughout the year to help each other dig into astronomical data in order to spot dim objects moving in between photos. If your team discovers a potential asteroid that is later confirmed, you may even get a chance to name it! Join or build a team and search for asteroids at iasc.cosmosearch.org
Want to help discover planets around other star systems? NASA's TESS mission is orbiting the Earth right now and scanning the sky for planets around other stars. It's accumulating a giant horde of data, and NASA scientists need your help to sift through it all to find other worlds! You can join **Planet Hunters TESS** at: planethunters.org

Intrigued by these opportunities? These are just a few of the many ways to participate in NASA citizen science, including observing your local environment with the **GLOBE** program, reporting aurora with Aurorasaurus, measuring snowpack levels, training software for Mars missions – even counting penguins! Discover more opportunities at science.nasa.gov/citizenscience and join the NASA citizen science Facebook group at facebook.com/groups/Sciencing/ And of course, visit nasa.gov to find the latest discoveries from all the research teams at NASA!



Light curve of a binary star system containing a pulsating (variable) star, as spotted on Planet Hunters TESS by user mhuten and featured by project scientist Nora Eisner as a "Light Curve of the Week." Credit: Planet Hunters TESS/NASA/mhuten/Nora Eisner

GREAT SOUTHERN JUPITER: Incredible image of Jupiter, submitted to the JunoCam site by Kevin M. Gill. Full Credits : NASA/JPL-Caltech/SwRI/MSSS/Kevin M. Gill

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

Celebrating 30 Years: The Universe Through Hubble's Eye

For 30 years, the Hubble Space Telescope has been a powerhouse of discovery for professional astronomers. But behind the scenes are some amateur astronomers, too. We are among the hundreds of dedicated scientists, engineers, managers, and others who have kept the venerable spacecraft operating and its cosmic revelations flowing over the past three decades. . . . . (continued at https://skyandtelescope.org/astronomy-news/universe-through-hubbles-eye/)

New Comet Alert! Quartet of Comets Grace Our Skies

There's a lot happening in the northern sky these days, namely lots of comets! Comet ATLAS (C/2019 Y4) is still worth watching, but look for the new Comet SWAN (C/2020 F8) and Comet ATLAS (C/2019 Y1). And you can still catch a glimpse of our old friend, Comet Pan-STARRS (C/2017 T2) . . . . (continued at https://skyandtelescope.org/astronomy-news/new-comet-alert-trio-of-comets-grace-our-skies/)

Why are Venus' clouds so weird?

Venus is a planet defined by its clouds. The world's thick, reflective envelope not only whips around the planet at breakneck speeds, but also helps our nearest neighbor shine brighter than any object in the night sky besides the Moon. Unfortunately, these bizarre clouds simultaneously block our view of the venusian surface. But things weren't always that way. . . .(continued at https://astronomy.com/news/2020/04/why-are-venus-clouds-so-weird)

Animals in space: A brief history of 'astrochimps'

Long before Neil Armstrong and Buzz Aldrin famously set foot on the Moon, the hero of America's human spaceflight program was a chimpanzee named Ham. On Jan. 31, 1961 — a few months before Soviet cosmonaut Yuri Gagarin's pioneering flight — Ham became the first hominid in space. Other nonhominid animals had ventured into space before Ham, but he and his fellow "astrochimps" were trained to pull levers and prove it was physically possible to pilot the Project Mercury spacecraft. . . . (continued at https://astronomy.com/news/2020/04/animals-in-space-a-brief-history-of-astro-chimps)

Earth-size, habitable-zone planet found hidden in early NASA Kepler data

A team of transatlantic scientists, using reanalyzed data from NASA's Kepler space telescope, has discovered an Earth-size exoplanet orbiting in its star's habitable zone, the area around a star where a rocky planet could support liquid water. Scientists discovered this planet, called Kepler-1649c, when looking through old observations from Kepler, ... (continued at https://www.sciencedaily.com/releases/2020/04/200416105650.htm)

Space News

News from around the Net. . .continued

Exoplanet apparently disappears in latest Hubble observations
Now you see it, now you don't. What astronomers thought was a planet beyond our solar system has now seemingly vanished from sight. Though this happens in science fiction, such as Superman's home planet Krypton exploding, astronomers are looking for a plausible explanation. . . . .(continued at https://www.sciencedaily.com/releases/2020/04/200420165722.htm)

Very Large Telescope sees star dance around supermassive black hole, proves Einstein right -- Observations made with ESO's Very Large Telescope (VLT) have revealed for the first time that a star orbiting the supermassive black hole at the centre of the Milky Way moves just as predicted by Einstein's general theory of relativity. Its orbit is shaped like a rosette and not like an ellipse as predicted by Newton's theory of gravity. This long-sought-after result was made possible by increasingly precise measurements over nearly 30 years, which have enabled scientists to unlock the mysteries of the behemoth lurking at the heart of our galaxy. . . . . (continued at https://phys.org/news/2020-04-eso-telescope-star-supermassive-black.html)

Star survives close call with a black hole
Astronomers may have discovered a new kind of survival story: a star that had a brush with a giant black hole and lived to tell the tale through exclamations of X-rays. Data from NASA's Chandra X-ray Observatory and ESA's XMM-Newton uncovered the account that began with a red giant star wandering too close to a supermassive black hole in a galaxy about 250 million light years from Earth. The black hole, located in a galaxy called GSN 069, has a mass about 400,000 times that of the Sun, putting it on the small end of the scale for supermassive black holes. . . . .(continued at https://phys.org/news/2020-04-star-survives-black-hole.html)

SpaceX on target for milestone May 27 crew launch, safety panel says
But Boeing has some work to do before its capsule is ready to fly people. SpaceX remains on track to launch astronauts next month despite a few remaining issues, members of a NASA advisory panel said Thursday (April 23). Elon Musk's company and NASA are working toward a May 27 launch date for Demo-2, which will send agency astronauts Doug Hurley and Bob Behnken to and from the International Space Station (ISS) aboard a Crew Dragon capsule. . . . (continued at https://www.space.com/spacex-demo-2-nasa-safety-advisory-panel.html)

Big asteroid shows itself ahead of Earth flyby on April 29 (photo)
We've now got a good visual on the big space rock that's going to fly by Earth next week. On Saturday (April 18), the Arecibo Observatory in Puerto Rico captured a radar image of the asteroid 1998 OR2, which will zoom within 3.9 million miles (6.3 million kilometers) of our planet on April 29. . . . . (continued at https://www.space.com/asteroid-1998-or2-photo-arecibo-observatory-april-2020.html)

Space News

News from around the Net. . .continued

This Planet Is So Scorching That Metals Actually Vaporize Into The Atmosphere
There are hot planets, and then there are unbelievably, unbearably, insufferably hot planets. Imagine an alien world torrid enough to not just melt, but vaporize metal. MASCARA-2 b (whose name has absolutely nothing to do with makeup) is that planet. A team of Yale scientists recently used the EXPRES (Extreme PREcision Spectrometer) spectrograph to investigate this hot Jupiter, . . . (continued at https://www.syfy.com/syfywire/this-planet-is-so-hot-it-makes-metals-vaporize)

The Universe may not look the same in all directions after all
One of the core assumptions all professional and amateur astronomers learn when first entering the field is that at large scales, the universe appears the same in all directions, that is, it's isotropic. A paper accepted for publication in Astronomy and Astrophysics suggests that may not be the case. An international team of researchers using NASA's Chandra X-ray Observatory, the European Space Agency's XMM-Newton and other data archives studied the X-ray luminosity of 842 galaxy clusters. . . . (continued at https://astronomynow.com/2020/04/13/the-universe-may-not-look-the-same-in-all-directions-after-all/)

What If We Lived in a Globular Cluster?
Take some cosmic dust and gas, add billions and billions of planets and a whole lot of stars to the mix. Spice it all up with a handful of gravity to hold things together, and you get a galaxy. Shaken, not stirred. Some of those ingredients would get clumped together. The gases and dust would merge into stars. . . . (continued at https://insh.world/science/what-if-we-lived-in-a-globular-cluster/)

SpaceX to send astronauts to the International Space Station May 27
The test will be the first crewed launch from American soil since 2011. SpaceX and NASA will send two astronauts to the International Space Station (ISS) from the Kennedy Space Center in Florida on May 27. The launch will mark the United States' first crewed launch since the end of the Space Shuttle Program in 2011.. . . . (continued at https://astronomy.com/news/2020/04/spacex-to-send-astronauts-to-the-international-space-station-may-27)

That's the way the comet crumbles: Hubble image shows remains of Comet ATLAS
Skywatchers had high hopes that a comet called ATLAS would light up the night sky this spring, with forecasts suggesting it could become bright enough to see with the unaided eye. Instead, the icy object crumbled to pieces — but it's still putting on a spectacular show for scientists. . . . (continued at https://www.space.com/hubble-image-comet-atlas-broken-up.html)

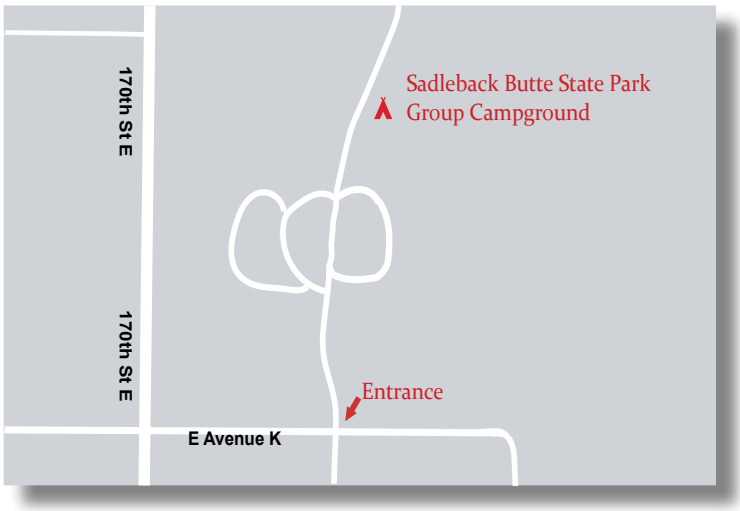
Dark Sky Observing Sites

The Chuchupate parking lot is a half a mile beyond the Mt Pions 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.

Saddleback Butte State Park



Planet Summary

The **Sun** starts May in Aries and crosses into Taurus by the middle of the month

Mercury is at superior conjuction on the 4th. By the 15th Mercury has a seperation of 13° from the Sun. On the evening of the 21st Mercury and Venus pass within 1° of each other. On the evening of the 23rd the 1.9% crescent Moon passes by both Venus and Mercury.

Venus begins the month some 37° east of the Sun. Venus continues moving east until the 13th when it becomes stationary and thereafter begins its retrograde motion west toward the Sun. On the 21-22 it's in conjuction with Mercury. By the end of the month Venus is within 5° of the Sun.

Mars starts the month in Capricorn and ends in Aquarius. The Moon passes 3° to the south on the 14th. Sure it's almost 5 hours before Marsrise, . . .so good luck seeing it.

Jupiter spends the month in Sagittarius 5° west of the Saturn. Jupiter stops its eastward move on the 14th, after which it will spend 4 months in retrograde motion. On the 12th the waning gibbous Moon passes less than 3° to the south of both Jupiter and Saturn.

Saturn spends the month in Capricorn, just over the border from Jupiter in Sagitarius. On the 11th, Saturn becomes stationary and thereafter begins its retrograde motion which will continue until late September. On the morning of the 12th the Moon passes less than 3° to the south.

Uranus will spend 2020 in southern Aries at magnitude 5+. Uranus starts the month 5° west of the Sun and by the end of the month is 61° west.

Neptune will spend 2020 in northeast Aquarius at mag. 7.93. Neptune starts the month 51° west of the Sun, ending the month 81° west.

Pluto spends the month 2° west of Jupiter in Sagittarius at mag 14.

Sun and Moon Rise and Set

First Qtr Apr 30 May 29 | Full May 7 | Third Qtr May 14 | New May 22

Sun and Moon Rise and Set*

Date	Moonrise	Moonset	Sunrise	Sunset
5/1/2020	13:16	02:36	06:02	19:38
5/5/2020	17:56	05:04	05:58	19:41
5/10/2020	23:40	08:41	05:53	19:45
5/15/2020	02:30	13:33	05:49	19:49
5/20/2020	04:49	18:09	05:46	19:53
5/25/2020	08:04	22:59	05:43	19:56
5/30/2020	13:21	01:54	05:41	20:00

Planet Data*

May 1

	Rise	Transit	Set	Mag	Phase%
Mercury	05:54	12:36	19:20	-1.89	99.28
Venus	07:56	15:24	22:52	-4.51	23.78
Mars	02:35	07:53	13:11	0.40	86.20
Jupiter	01:08	06:09	11:10	-2.40	99.11
Saturn	01:25	06:30	11:34	0.57	99.75

May 15

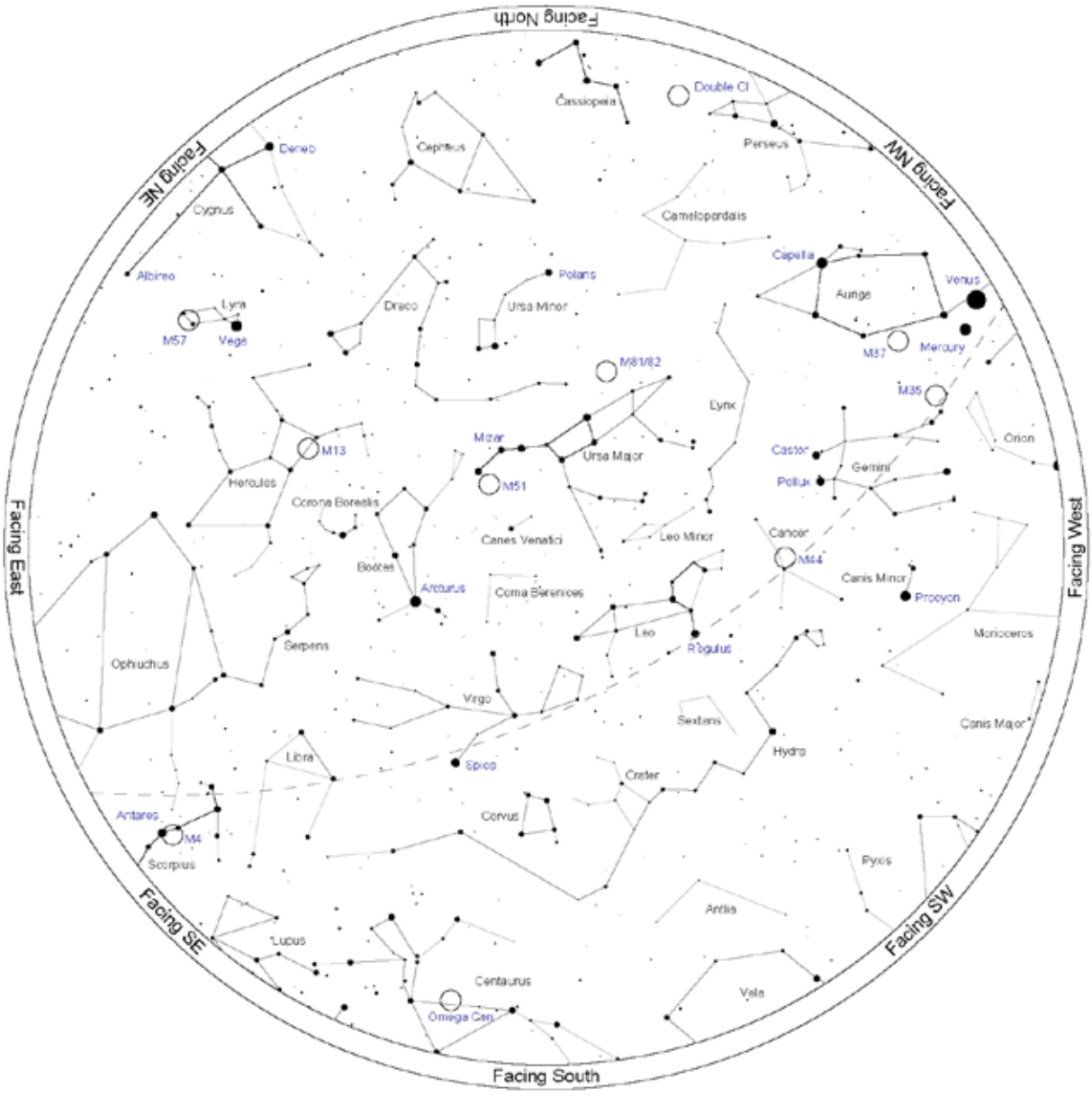
	Rise	Transit	Set	Mag	Phase%
Mercury	06:28	13:41	20:55	-1.12	84.44
Venus	07:14	14:39	22:04	-4.37	10.55
Mars	02:09	07:35	13:02	0.21	85.40
Jupiter	00:10	05:15	10:16	-2.50	99.26
Saturn	00:26	05:35	10:39	0.51	99.79

May 30

	Rise	Transit	Set	Mag	Phase%
Mercury	07:09	14:30	21:50	0.19	46.41
Venus	06:03	13:16	20:29	-3.86	0.47
Mars	01:36	07:13	12:51	-0.01	84.76
Jupiter	23:10	04:11	09:15	-2.60	99.49
Saturn	23:27	04:31	09:39	0.42	99.84

*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: 2020 May 23, 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 May 23,2020. The list is sorted by the transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M31	Galaxy	And	00h 42m 44s	+41° 16.1'	4.3	00:57	09:31	18:05
NGC246	P Neb	Cet	00h 47m 00s	-11° 53.0'	10.9	04:06	09:36	15:05
NGC253	S Gal	Scl	00h 47m 36s	-25° 17.0'	7.1	04:49	09:36	14:23
NGC288	Globular	Scl	00h 52m 45s	-26° 35.0'	8.1	04:59	09:41	14:24
NGC584	Galaxy	Cet	01h 31m 21s	-06° 52.0'	10.4	04:36	10:20	16:04
M33	Galaxy	Tri	01h 33m 51s	+30° 39.6'	6.2	02:42	10:22	18:03
M76	P Neb	Per	01h 42m 18s	+51° 34.2'	12.0	00:19	10:31	20:43
NGC663	Open	Cas	01h 46m 00s	+61° 15.0'	7.1	Circum	10:35	Circum
NGC752	Open	And	01h 57m 48s	+37° 41.0'	5.7	02:33	10:46	19:00
NGC869	Open	Per	02h 20m 00s	+57° 08.0'	4.3	Circum	11:09	Circum
NGC884	Open	Per	02h 22m 18s	+57° 08.1'	4.0	Circum	11:11	Circum
NGC908	Galaxy	Cet	02h 23m 05s	-21° 14.0'	10.2	06:11	11:12	16:12
NGC896	Neb	Cas	02h 25m 28s	+62° 01.1'		Circum	11:14	Circum
NGC1027	Open	Cas	02h 42m 40s	+61° 35.7'	6.7	Circum	11:31	Circum
NGC1097	S Gal	For	02h 46m 18s	-30° 17.0'	9.2	07:07	11:35	16:03
HR963	Dbl	For	03h 12m 04s	-28° 59.2'	3.9	07:27	12:01	16:34
NGC1261	Globular	Hor	03h 12m 18s	-55° 13.0'	8.4	11:08	12:01	12:53
NGC1291	Galaxy	Eri	03h 17m 18s	-41° 06.4'	8.5	08:30	12:06	15:42
NGC1302	Galaxy	For	03h 19m 51s	-26° 03.6'	11.0	07:24	12:08	16:53
NGC1342	Open	Per	03h 31m 38s	+37° 22.6'	6.7	04:09	12:20	20:32
NGC1432	Neb	Tau	03h 45m 50s	+24° 22.1'		05:18	12:34	19:51
NGC1435	Neb	Tau	03h 46m 10s	+23° 45.8'		05:21	12:35	19:49
M45	Open	Tau	03h 47m 30s	+24° 07.0'	1.6	05:21	12:36	19:51
NGC1499	Neb	Per	04h 03m 14s	+36° 22.0'		04:45	12:52	20:58
NGC1502	Open	Cam	04h 07m 50s	+62° 19.8'	5.7	Circum	12:56	Circum
NGC1514	P Neb	Tau	04h 09m 17s	+30° 46.5'	10.0	05:17	12:58	20:39
NGC1535	P Neb	Eri	04h 14m 16s	-12° 44.3'	10.0	07:36	13:03	18:30
NGC1528	Open	Per	04h 15m 23s	+51° 12.9'	6.4	02:58	13:04	23:10
NGC1579	Neb	Per	04h 30m 14s	+35° 16.7'		05:18	13:19	21:20
NGC1600	Galaxy	Eri	04h 31m 40s	-05° 05.2'	11.1	07:32	13:20	19:09
NGC1662	Open	Ori	04h 48m 27s	+10° 56.1'	6.4	07:04	13:37	20:11
NGC1664	Open	Aur	04h 51m 06s	+43° 40.4'	7.6	04:49	13:40	22:30
NGC1784	Galaxy	Lep	05h 05m 27s	-11° 52.3'	11.8	08:25	13:54	19:23
NGC1778	Open	Aur	05h 08m 04s	+37° 01.4'	7.7	05:47	13:57	22:06
NGC1807	Open	Tau	05h 10m 43s	+16° 31.3'	7.0	07:09	13:59	20:50
NGC1851	Globular	Col	05h 14m 06s	-40° 03.0'	7.3	10:20	14:03	17:45
C31	BrNeb	Aur	05h 16m 12s	+34° 16.0'		06:09	14:05	22:01

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC1893	Open	Aur	05h 22m 45s	+33° 24.7'	7.5	06:19	14:11	22:04
M79	Globular	Lep	05h 24m 11s	-24° 31.4'	8.5	09:23	14:13	19:02
M38	Open	Aur	05h 28m 40s	+35° 50.8'	7.0	06:13	14:17	22:21
NGC1981	Open	Ori	05h 35m 09s	-04° 25.9'	4.6	08:33	14:24	20:14
NGC1977	Neb	Ori	05h 35m 16s	-04° 49.2'		08:34	14:24	20:13
M42	Open+D Neb	Ori	05h 35m 16s	-05° 23.4'	4.0	08:36	14:24	20:12
NGC1975	Neb	Ori	05h 35m 18s	-04° 41.0'		08:34	14:24	20:14
NGC1980	Neb	Ori	05h 35m 25s	-05° 54.9'		08:38	14:24	20:10
M43	D Neb	Ori	05h 35m 31s	-05° 16.0'	9.0	08:36	14:24	20:12
NGC1990	Neb	Ori	05h 36m 13s	-01° 12.1'		08:25	14:25	20:24
M36	Open	Aur	05h 36m 18s	+34° 08.3'	6.5	06:29	14:25	22:20
NGC1999	Neb	Ori	05h 36m 25s	-06° 43.0'		08:41	14:25	20:09
NGC2023	Neb	Ori	05h 41m 38s	-02° 15.5'		08:34	14:30	20:27
NGC2024	Neb	Ori	05h 41m 42s	-01° 51.4'		08:33	14:30	20:28
NGC2022	P Neb	Ori	05h 42m 06s	+09° 05.2'	12.0	08:02	14:31	20:59
NGC2064	Neb	Ori	05h 46m 18s	+00° 00.3'		08:32	14:35	20:38
M37	Open	Aur	05h 52m 18s	+32° 33.1'	6.0	06:53	14:41	22:29
NGC2169	Open	Ori	06h 08m 24s	+13° 57.9'	5.9	08:15	14:57	21:39
M35	Open	Gem	06h 09m 00s	+24° 21.0'	5.5	07:41	14:58	22:14
NGC2174	Neb	Ori	06h 09m 24s	+20° 39.5'		07:55	14:58	22:01
NGC2175	Open	Ori	06h 09m 40s	+20° 29.2'	6.8	07:55	14:58	22:01
NGC2217	Galaxy	CMa	06h 21m 40s	-27° 14.0'	10.4	10:30	15:10	19:50
NGC2232	Open	Mon	06h 28m 01s	-04° 50.8'	3.9	09:27	15:17	21:06
NGC2237	BrNeb	Mon	06h 32m 18s	+05° 03.0'		09:04	15:21	21:38
NGC2244	Open	Mon	06h 32m 24s	+04° 52.0'	4.8	09:05	15:21	21:37
NGC2264	Open	Mon	06h 40m 58s	+09° 53.7'	3.9	08:59	15:30	22:00
M41	Open	CMa	06h 46m 01s	-20° 45.3'	5.0	10:32	15:35	20:37
NGC2281	Open	Aur	06h 48m 17s	+41° 04.7'	5.4	07:04	15:37	00:10
NGC2298	Globular	Pup	06h 48m 59s	-36° 00.2'	9.4	11:34	15:38	19:41
M50	Open	Mon	07h 02m 42s	-08° 23.0'	7.0	10:12	15:51	21:31
NGC2343	Open	Mon	07h 08m 06s	-10° 37.0'	6.7	10:24	15:57	21:30
NGC2362	Open	CMa	07h 18m 48s	-24° 57.0'	4.1	11:19	16:07	20:56
NGC2384	Open	CMa	07h 25m 10s	-21° 01.3'	7.4	11:12	16:14	21:15
NGC2396	Open	Pup	07h 28m 00s	-11° 43.0'	7.0	10:47	16:17	21:46
NGC2392	P Neb	Gem	07h 29m 12s	+20° 55.0'	9.2	09:13	16:18	23:22
NGC2414	Open	Pup	07h 33m 12s	-15° 27.1'	7.9	11:03	16:22	21:41
M47	Open	Pup	07h 36m 35s	-14° 29.0'	4.5	11:03	16:25	21:47
NGC2438	P Neb	Pup	07h 41m 50s	-14° 44.1'	10.0	11:09	16:30	21:51
NGC2440	P Neb	Pup	07h 41m 55s	-18° 12.5'	11.0	11:20	16:31	21:41

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2451	Open	Pup	07h 45m 15s	-37° 58.0'	2.8	12:40	16:34	20:27
NGC2477	Open	Pup	07h 52m 18s	-38° 33.0'	5.8	12:50	16:41	20:31
NGC2527	Open	Pup	08h 04m 58s	-28° 08.8'	6.5	12:17	16:54	21:30
NGC2547	Open	Vel	08h 10m 09s	-49° 12.9'	4.7	14:25	16:59	19:33
NGC2539	Open	Pup	08h 10m 37s	-12° 49.1'	6.5	11:33	16:59	22:26
NGC2546	Open	Pup	08h 12m 15s	-37° 35.7'	6.3	13:05	17:01	20:56
M48	Open	Hya	08h 13m 43s	-05° 45.0'	5.5	11:15	17:02	22:49
NGC2541	Galaxy	Lyn	08h 14m 40s	+49° 03.7'	11.8	07:25	17:03	02:42
NGC2567	Open	Pup	08h 18m 32s	-30° 38.3'	7.4	12:40	17:07	21:34
C85	Open	Vel	08h 40m 12s	-53° 04.0'	2.5	15:45	17:29	19:12
M44	Open	Cnc	08h 40m 24s	+19° 40.0'	4.0	10:29	17:29	00:29
NGC2781	Galaxy	Hya	09h 11m 28s	-14° 49.0'	11.5	12:39	18:00	23:21
NGC2768	Galaxy	UMa	09h 11m 37s	+60° 02.2'	10.0	Circum	18:00	Circum
NGC2910	Open	Vel	09h 30m 30s	-52° 55.1'	7.2	16:33	18:19	20:05
NGC2968	Galaxy	Leo	09h 43m 12s	+31° 55.7'	11.8	10:46	18:32	02:17
NGC2986	Galaxy	Hya	09h 44m 16s	-21° 16.7'	10.9	13:32	18:33	23:33
NGC3132	P Neb	Vel	10h 07m 42s	-40° 26.0'	9.4	15:16	18:56	22:36
NGC3201	Globular	Vel	10h 17m 36s	-46° 25.0'	6.7	16:07	19:06	22:06
NGC3242	P Neb	Hya	10h 24m 48s	-18° 38.0'	7.8	14:04	19:13	00:22
NGC3277	Galaxy	LMi	10h 32m 55s	+28° 30.6'	11.7	11:50	19:22	02:53
NGC3330	Open	Vel	10h 38m 46s	-54° 07.3'	7.4	18:04	19:27	20:50
NGC3448	Galaxy	UMa	10h 54m 39s	+54° 18.3'	11.7	08:26	19:43	07:00
M97	P Neb	UMa	11h 14m 48s	+55° 01.1'	12.0	Circum	20:03	Circum
NGC3599	Galaxy	Leo	11h 15m 27s	+18° 06.5'	11.9	13:09	20:04	02:59
NGC3607	Galaxy	Leo	11h 16m 55s	+18° 03.0'	10.0	13:10	20:05	03:01
NGC3610	Galaxy	UMa	11h 18m 25s	+58° 47.1'	10.8	Circum	20:07	Circum
NGC3672	Galaxy	Crt	11h 25m 02s	-09° 47.7'	11.0	14:38	20:14	01:49
NGC3705	Galaxy	Leo	11h 30m 07s	+09° 16.5'	11.0	13:50	20:19	02:47
NGC3953	Galaxy	UMa	11h 53m 49s	+52° 19.6'	10.1	10:18	20:42	07:07
NGC4036	Galaxy	UMa	12h 01m 27s	+61° 53.7'	10.6	Circum	20:50	Circum
NGC4147	Globular	Com	12h 10m 06s	+18° 32.5'	10.3	14:02	20:59	03:55
NGC4236	S Gal	Dra	12h 16m 42s	+69° 28.0'	9.7	Circum	21:05	Circum
NGC4233	Galaxy	Vir	12h 17m 08s	+07° 37.4'	11.9	14:42	21:06	03:30
M106	Galaxy	CVn	12h 18m 58s	+47° 18.2'	9.1	11:47	21:08	06:28
NGC4274	Galaxy	Com	12h 19m 51s	+29° 36.8'	10.4	13:32	21:08	04:44
M100	Galaxy	Com	12h 22m 55s	+15° 49.3'	10.1	14:23	21:12	04:00
NGC4340	Galaxy	Com	12h 23m 35s	+16° 43.3'	11.0	14:21	21:12	04:03
NGC4361	P Neb	Crv	12h 24m 31s	-18° 47.0'	10.0	16:04	21:13	02:22
M86	Galaxy	Vir	12h 26m 12s	+12° 56.7'	9.9	14:35	21:15	03:54
M87	Galaxy	Vir	12h 30m 49s	+12° 23.4'	9.6	14:42	21:19	03:57

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC4528	Galaxy	Vir	12h 34m 06s	+11° 19.2'	11.7	14:48	21:23	03:57
M91	Galaxy	Com	12h 35m 27s	+14° 29.7'	10.9	14:40	21:24	04:08
NGC4546	Galaxy	Vir	12h 35m 29s	-03° 47.5'	10.3	15:32	21:24	03:16
M68	Globular	Hya	12h 39m 28s	-26° 44.5'	9.0	16:46	21:28	02:10
NGC4691	Galaxy	Vir	12h 48m 14s	-03° 20.0'	11.2	15:43	21:37	03:30
NGC4753	Galaxy	Vir	12h 52m 22s	-01° 12.0'	9.9	15:42	21:41	03:40
NGC4762	Galaxy	Vir	12h 52m 56s	+11° 13.8'	10.2	15:07	21:42	04:16
NGC4936	Galaxy	Cen	13h 04m 17s	-30° 31.5'	11.3	17:26	21:53	02:20
M53	Globular	Com	13h 12m 55s	+18° 10.1'	8.5	15:06	22:02	04:57
NGC5018	Galaxy	Vir	13h 13m 01s	-19° 31.1'	10.8	16:55	22:02	03:08
NGC5053	Globular	Com	13h 16m 27s	+17° 41.8'	9.8	15:11	22:05	04:59
NGC5139	Globular	Cen	13h 26m 48s	-47° 29.0'	3.6	19:25	22:15	01:06
HR5144	Triple	Boo	13h 40m 40s	+19° 57.3'	5.8	15:28	22:29	05:30
M3	Globular	CVn	13h 42m 11s	+28° 22.5'	7.0	15:00	22:31	06:02
NGC5286	Globular	Cen	13h 46m 24s	-51° 22.0'	7.6	20:26	22:35	00:44
NGC5307	P Neb	Cen	13h 51m 03s	-51° 12.3'	12.0	20:28	22:40	00:51
NGC5354	Galaxy	CVn	13h 53m 27s	+40° 18.1'	11.5	14:14	22:42	07:10
NGC5427	Galaxy	Vir	14h 03m 26s	-06° 01.8'	11.4	17:06	22:52	04:38
NGC5474	Galaxy	UMa	14h 05m 02s	+53° 39.7'	10.9	11:59	22:54	09:48
NGC5466	Globular	Boo	14h 05m 28s	+28° 31.9'	9.1	15:22	22:54	06:26
NGC5460	Open	Cen	14h 07m 27s	-48° 20.6'	5.6	20:13	22:56	01:39
HR5362	Dbl	Lup	14h 20m 10s	-43° 03.5'	5.6	19:45	23:09	02:33
HR5409	Triple	Vir	14h 28m 12s	-02° 13.6'	4.8	17:20	23:17	05:13
NGC5634	Globular	Vir	14h 29m 37s	-05° 58.6'	9.6	17:32	23:18	05:04
NGC5660	Galaxy	Boo	14h 29m 50s	+49° 37.3'	11.8	13:33	23:18	09:03
NGC5668	Galaxy	Vir	14h 33m 24s	+04° 27.0'	11.5	17:07	23:22	05:37
NGC5694	Globular	Hya	14h 39m 36s	-26° 32.0'	10.2	18:46	23:28	04:11
NGC5713	Galaxy	Vir	14h 40m 11s	-00° 17.4'	11.4	17:27	23:29	05:31
NGC5806	Galaxy	Vir	15h 00m 00s	+01° 53.4'	11.6	17:41	23:49	05:57
NGC5812	Galaxy	Lib	15h 00m 56s	-07° 27.4'	11.2	18:07	23:50	05:32
NGC5824	Globular	Lup	15h 03m 59s	-33° 04.1'	9.0	19:36	23:53	04:09
NGC5885	Galaxy	Lib	15h 15m 04s	-10° 05.1'	11.7	18:29	00:04	05:38
NGC5882	P Neb	Lup	15h 16m 50s	-45° 38.9'	11.0	21:00	00:05	03:11
NGC5897	Globular	Lib	15h 17m 24s	-21° 00.6'	8.6	19:05	00:06	05:07
M5	Globular	Ser	15h 18m 33s	+02° 04.9'	7.0	17:59	00:07	06:16
NGC5927	Globular	Lup	15h 28m 00s	-50° 40.3'	8.3	21:59	00:17	02:34
NGC5946	Globular	Nor	15h 35m 28s	-50° 39.5'	9.6	22:06	00:24	02:42
NGC5986	Globular	Lup	15h 46m 04s	-37° 47.1'	7.1	20:40	00:35	04:29
NGC6067	Open	Nor	16h 13m 11s	-54° 13.1'	5.6	23:41	01:02	02:23
M80	Globular	Sco	16h 17m 03s	-22° 58.5'	8.5	20:11	01:06	06:01
NGC6093	Globular	Sco	16h 17m 03s	-22° 58.5'	7.2	20:11	01:06	06:01
M4	Globular	Sco	16h 23m 35s	-26° 31.5'	7.5	20:30	01:12	05:55
NGC6121	Globular	Sco	16h 23m 35s	-26° 31.5'	5.9	20:30	01:12	05:55
NGC6124	Open	Sco	16h 25m 36s	-40° 40.0'	5.8	21:35	01:14	04:53

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