



# Desert Sky Observer

Volume 39

Antelope Valley Astronomy Club Newsletter

July 2019

## Up-Coming Events

July 5: [Mt. Wilson Trip/Private Event](#)

July 12: Club Meeting\*

July 27: [Prime Desert Moon Walk](#)

\* Monthly meetings are held at the S.A.G.E. Planetarium in Palmdale, the second Friday of each month. The meeting location is at the northeast corner of Avenue R and 20<sup>th</sup> 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*

## President

### Darrell Bennett

Now that summer is finally here, we can start to see some good weather. It did not start that way, at our June 1st Star Party at Chuchupate in Lockwood Valley. I arrived at 4:30pm it was dry and partly clear skies. About an hour later, Kevin Riley showed up in his old converted news van. That is when I knew it was going to rain. Kevin was optimistic that it was going to clear up. He rolled out his moving blanket and 2 chairs and his scope. We still had some blue skies, so Kevin calibrated his scope and was ready to do some observing. Then the clouds started to come in more and the skies got darker. Then the roar of thunder started. It wasn't until the first drop of rain hit Kevin that he started to put everything back in his van.

We met 2 people from the Ventura Astronomy Club who were up there to do some observing too. They did not take their scopes out of their cars. We talked a little until the rain started to get a little heavier. By the time Kevin and I left it turned into a downpour. I got halfway home and it was clear.

On June 8th we had our monthly Prime Desert Moon Walk. We got lucky that there were no clouds or wind. It was a great turn out with 179 people in attendance. We had a lot of club members there with their scopes. I think we ran out of room to setup more scopes. The sky was so good I could bump up the power on my 12' scope to 391x on the moon.

At our last meeting, we had Tim Thompson from the Los Angeles Astronomical Society give a talk about Black Holes. Tim was a great speaker and he is looking forward to coming back and giving another talk.

The next night, June 9th I went to Mt. Wilson for a lecture by Dr. John Mulchaey on The Search for Life. After the lecture, I ran into Tim Thompson and Scott Roberts from Explore Scientific. When it got dark, I got to look through the 100 inch telescope at M3. I was surprised that about 200 people showed up for this event.

July 5th we will be at Mt. Wilson to use the 60 inch telescope and hoping to have clear skies that night.

I hope to see all of you at our next meeting. Matt or Jeremy will start the meeting because I took a new job at Disney Studios in Burbank and cannot get off work until 6:00pm. By the time, I get to Palmdale it will be close to 7:30pm. Better late than never, I guess.

## Secretary

### Rose Moore

Thank you to all the members who came out to outreach events this month! We also had a good turnout for our speaker this month, Tim Thompson!

Next month brings up our Mt. Wilson trip, for the members and their guests that have signed up. I am waiting to hear from our Session Director for the meet up time for the pre tour. Then I'll send out an email with maps and the time for meeting at the Pearblossom Park and Ride on the 14, exit 30. Please remember to review the information from Mt. Wilson sent out several weeks ago.

Our club meeting on Friday July 12th, will have Jeremy giving us a dome show and talk on the Apollo Moon Landing, 50 years ago! Come on out and enjoy the show!

We have a Prime Desert Moon Walk on Saturday July 27th, at 8:30pm. We'll need members with telescopes to support the event. Weather permitting!

Coming up on Saturday August 3rd, is our summer BBQ at Brite Lake. This is also an outreach event for a public star party after the picnic. Darrell will be starting a sign up sheet at July's meeting for those who will be coming. The club will be supplying the hot dogs and burgers, buns, drinks, and utensils. Another email with more information will be coming in a couple of weeks. Stay tuned!

Our club meeting on August 9th will have a speaker, Dr. Aaron Barth. He is a professor at UC Irvine, who is an observational astronomer who conducts research on supermassive black holes, quasars and active galactic nuclei (AGN).

Also coming up the end of August will be our DSSP at Mt. Pinos starting on Friday August 30th till Monday Sept. 2nd. This is Labor Day Weekend.

Just a note that one of our members, Leon Waller, passed away recently. Some of you may remember him at our star parties, especially those at Mt. Pinos. He used to come with his wife Yvonne. One of our members recently purchased Leon's Lightbridge scope. I'll be sending a sympathy card from the club, to the family.

### 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", 20 mm Plossl eyepiece, a 1.25" diagonal and a 2" diagonal, telrad mount, and a Denkmeier (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](mailto:gurba1826@gmail.com) - or contact Rose by email only: [rmorion1@bak.rr.com](mailto:rmorion1@bak.rr.com).

## Space Place

### Observe the Moon and Beyond: Apollo 11 at 50

By David Prosper

Saturn is at opposition this month, beckoning to future explorers with its beautiful rings and varied, mysterious moons. The Moon prominently passes Saturn mid-month, just in time for the 50th anniversary of Apollo 11!

Saturn is in opposition on July 9, rising in the east as the Sun sets in the west. It is visible all night, hovering right above the teapot of Sagittarius. Saturn is not nearly as bright as Jupiter, nearby and close to Scorpius, but both giant planets are easily the brightest objects in their constellations, making them easy to identify. A full Moon scrapes by the ringed planet late in the evening of the 15th through the early morning of the 16th. Some observers in South America will even see the Moon occult, or pass in front of, Saturn. Observe how fast the Moon moves in relation to Saturn throughout the night by recording their positions every half hour or so via sketches or photos.

While observing the Saturn-Moon celestial dance the early morning of the 16th, you can also contemplate the 50th anniversary of the launch of the Apollo 11 mission! On June 16, 1969, Apollo 11 blasted off from Cape Canaveral in Florida on a journey of almost a quarter million miles to our nearest celestial neighbor, a mission made possible by the tremendous power of the Saturn V rocket – still the most powerful rocket ever launched. Just a few days later, on July 20, 1969 at 10:56 pm EDT, Neil Armstrong and Buzz Aldrin set foot on the lunar surface and became the first people in history to walk on another world. The astronauts set up equipment including a solar wind sampler, laser ranging retroreflector, and seismometer, and gathered up almost 22 kilograms (48 pounds) of precious lunar rocks and soil samples. After spending less than a day on the Moon's surface, the duo blasted off and returned to the orbiting Columbia Command Module, piloted by Michael Collins. Just a few days later, on July 24, all three astronauts splashed down safely in the Pacific Ocean. You can follow the timeline of the Apollo 11 mission in greater detail at [bit.ly/TimelineApollo11](http://bit.ly/TimelineApollo11) and dig deep into mission history and science on NASA's **Apollo History Site**: [bit.ly/ApolloNASA](http://bit.ly/ApolloNASA).

Have you ever wanted to see the flag on the Moon left behind by the Apollo astronauts? While no telescope on Earth is powerful enough to see any items left behind the landing sites, you can discover how much you can observe with the Flag on the Moon handout: [bit.ly/MoonFlag](http://bit.ly/MoonFlag)

You can catch up on all of NASA's current and future missions at [nasa.gov](http://nasa.gov)

## Desert Sky Observer

# The Moon

### Copernicus

This crater (left) is easy to spot. It formed about 800 million years ago, and is 57 miles (92 km) wide. Note central peaks and terraced walls, caused by impact.

### Aristarchus

Young crater. So bright that Sir William Herschel thought it was an active volcano.

### Kepler

Small version of Copernicus

### Grimaldi

Lava-filled crater is one of the darkest spots you can see on the Moon. It's 145 miles wide (233 km).

### Mare Humorum

The Sea of Moisture is about 220 miles (350 km) across. You can spot it with the naked eye. With a telescope, you might notice two craters along its edge.

### Tycho

Young crater best seen during a full Moon. Rays of bright material are ejecta blasted out of the crust when a large asteroid struck about 109 million years ago.

### Mare Serenitatis

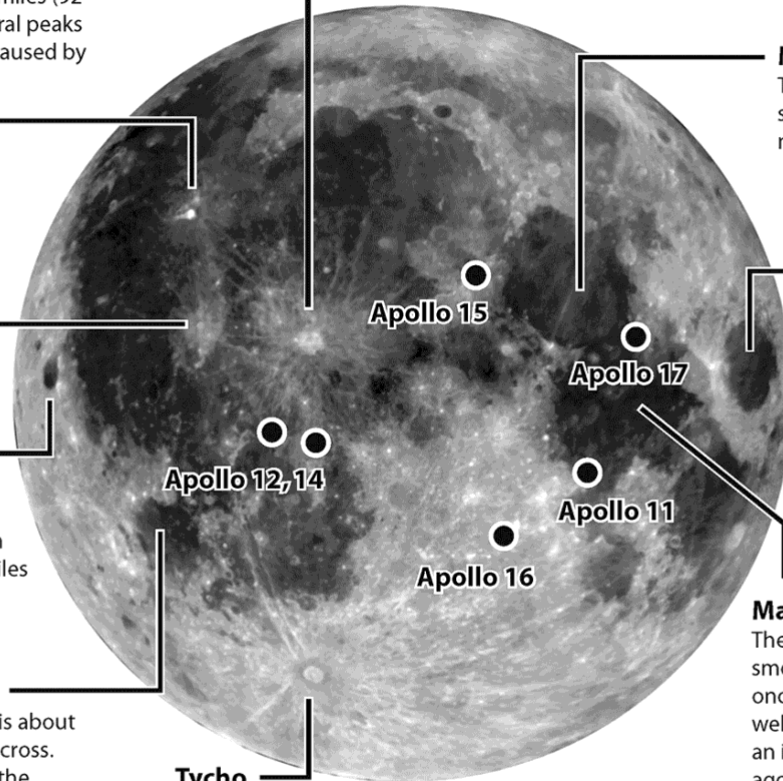
The Sea of Serenity is solid lava, some 380 miles (610 km) across.

### Mare Crisium

The Sea of Crisis is about 340 miles wide (550 km) and visible to the naked eye.

### Mare Tranquillitatis

The Sea of Tranquility is a smooth plain filled with once-molten lava that welled up from below after an impact billions of years ago. The first humans to walk on the Moon, Apollo 11 astronauts, landed near the edge.



SOURCES: NASA; ADVANCED SKYWATCHING; CAMBRIDGE ATLAS OF ASTRONOMY; DK VISUAL ENCYCLOPEDIA

**Photos: James Scala. Layout and text for Moon map used with permission: Robert Roy Britt/SPACE.com.**

## News Headlines

### **Mars 2020 Rover Gets Its Wheels**

On June 13, 2019, engineers at NASA's Jet Propulsion Laboratory in Pasadena, California, install the starboard legs and wheels - otherwise known as the mobility suspension - on the Mars 2020 rover. They installed the port suspension later that day. "Now that's a Mars rover," said David Gruel, the Mars 2020 assembly, test, and launch operations manager at JPL. "With the suspension on, not only does it look like a rover, but we have almost all our big-ticket items for integration in our rearview mirror - if our rover had one."

<https://go.nasa.gov/2KyxsNF>

### **NASA to adjust SOFIA operations to improve productivity**

NASA plans to adjust operations of an airborne astronomical observatory in order to increase its scientific productivity. Paul Hertz, director of NASA's astrophysics division, said those upcoming changes are the outcome of a pair of reviews of the Stratospheric Observatory for Infrared Astronomy (SOFIA), a Boeing 747 equipped with a 2.5-meter telescope for high-altitude infrared observations.

Among the changes will be for SOFIA to fly more frequently and to spend more time at high altitudes above most of the infrared-absorbing water vapor in the atmosphere.

<https://bit.ly/2WVLSrq>

### **Mysterious Moisture in the Mesosphere**

The 2019 season for noctilucent clouds (NLCs) has been remarkable, maybe the best ever, with NLCs appearing as far south as Los Angeles CA and Albuquerque NM. What's going on? Researchers aren't sure, but Lynn Harvey of the University of Colorado's Laboratory for Atmospheric and Space Physics has just found an important clue.

<https://bit.ly/2WZIn9M>

### **X-Ray Telescope for Dark Energy Search Ready to Launch**

A German telescope is ready to search for dark energy and other strange things in the universe. The telescope is hitching a ride with a parent satellite, Spektr-RG, on board a Proton rocket. If all goes well for Russian space agency Spektr-RG will spend four years surveying the entire sky and then 2.5 years zeroing in on particular cosmic objects. Tucked on board Spektr-RG will be the German space agency (DLR)'s Extended Roentgen Survey with an Imaging Telescope Array (eROSITA) X-ray telescope, which is billed as the best X-ray "eyes" ever to launch on a space telescope.

<https://bit.ly/2Y78YhU>

## July Sky Data

New Jul 2 & 31    First Qtr Jul 9    Full Jul 16    Last Qtr Jul 24



## Planet Summary

**Mercury** might just be seen low in the west-northwest after sunset in the first few days of the month with a magnitude of 1.2 and an angular size of 9.4 arc seconds. To spot it, one will need a very low horizon and binoculars could well be needed to reduce the Sun's background glare.

**Venus**, with a magnitude of -3.4, rises less than one hour before the Sun at the start of the month with an angular size of 9.7 arc seconds but will be lost from our view around the 18th.

**Mars** remains at magnitude +2.0 all month and is still just visible low in the west-northwest after sunset. Mars crosses Cancer during the month and passes into Leo on the 29th. Mars sets some one hour after the Sun at the start of July (with an elevation at sunset of ~9 degrees) but less than half an hour by month's end - when it will be very difficult to spot. Its angular size falls from 3.7 to 3.5 arc seconds during the month so one will not be able to spot any details on its salmon-pink surface.

**Jupiter**, shining initially at magnitude -2.1 and falling to -2.0, reached opposition on June 10th and is visible towards the south as darkness falls. Its angular size drops slightly from 45.5 to 43 arc seconds as the month progresses. Sadly it is heading towards the southernmost part of the ecliptic so, as it crosses the meridian, it will only have an elevation of ~14 degrees.

**Saturn** comes into oppositions on July 9th shining at magnitude +1.1 during the month. Its disk is ~18 arc seconds across and its rings, which are still nicely tilted from the line of sight, spanning some 42 arc seconds across. Sadly, it is at the lowest point of the ecliptic and will only reach an elevation of ~14 degrees.

There are various minor **meteor-showers** which are active in July, mainly with radiants in the Capricorn-Aquarius area. Towards the end of the month, we may also start to see the first of the Perseids, which peak in August.

## Sun and Moon Rise and Set

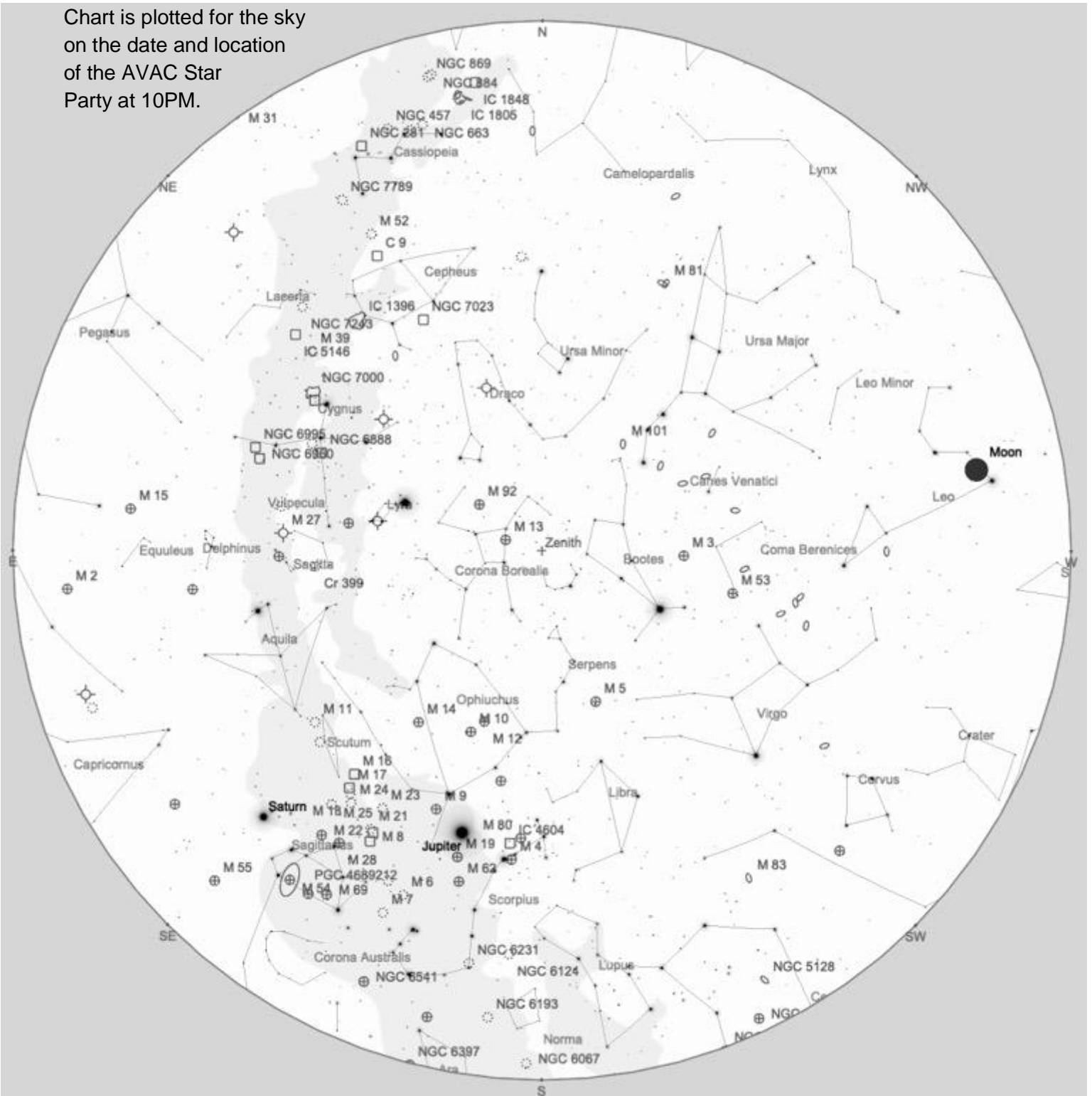
Date	Moonrise	Moonset	Sunrise	Sunset
7/1/2019	04:42	19:18	05:46	20:06
7/5/2019	08:55	22:55	05:48	20:06
7/10/2019	14:29	01:20	05:50	20:05
7/15/2019	19:25	04:44	05:53	20:03
7/20/2019	22:40	09:18	05:56	20:01
7/25/2019	00:37	13:53	06:00	19:58
7/31/2019	05:23	19:57	06:04	19:54

## Planet Data

	Jul 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	07:41	14:36	21:32	1.2
<b>Venus</b>	04:55	12:05	19:16	-3.4
<b>Mars</b>	07:21	14:25	21:30	2.0
<b>Jupiter</b>	18:21	23:20	04:19	-2.1
<b>Saturn</b>	20:34	01:34	06:34	1.1
	Jul 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	06:50	13:36	20:22	2.4
<b>Venus</b>	05:15	12:25	19:35	-3.4
<b>Mars</b>	07:09	14:07	21:05	2.0
<b>Jupiter</b>	17:20	22:19	03:19	-2.1
<b>Saturn</b>	19:35	00:34	05:34	1.1
	Jul 31			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:07	11:59	18:52	1.6
<b>Venus</b>	05:45	12:46	19:46	-3.5
<b>Mars</b>	06:56	13:45	20:34	2.0
<b>Jupiter</b>	16:13	21:12	02:12	-2.0
<b>Saturn</b>	18:28	23:26	04:25	1.2

Planet, Sun, and Moon data calculated for local time at Lancaster, CA

Chart is plotted for the sky on the date and location of the AVAC Star Party at 10PM.



To use the chart, go outside within an hour or so of the time listed and hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge.

## Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Star Party, or the Saturday closest to the new moon if there is no star party scheduled. The list is sorted by the transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC5796	Gal	Lib	14h 59m 24s	-16°37'25"	13.0	16:05	21:21	02:38
NGC5806	Gal	Vir	15h 00m 00s	+01°53'28"	11.6	15:14	21:22	03:30
NGC5809	Gal	Lib	15h 00m 52s	-14°09'55"	14.0	15:59	21:23	02:46
NGC5812	Gal	Lib	15h 00m 56s	-07°27'28"	11.2	15:40	21:23	03:05
NGC5813	Gal	Vir	15h 01m 11s	+01°42'07"	10.7	15:16	21:23	03:30
NGC5824	Glob	Lup	15h 03m 59s	-33°04'07"	9.0	17:07	21:26	01:45
NGC5831	Gal	Vir	15h 04m 07s	+01°13'12"	11.5	15:20	21:26	03:32
NGC5822	Open	Lup	15h 04m 21s	-54°23'48"	7.0	19:56	21:26	22:57
NGC5838	Gal	Vir	15h 05m 26s	+02°05'57"	10.8	15:19	21:27	03:36
NGC5823	Open	Cir	15h 05m 30s	-55°36'12"	7.9	20:27	21:27	22:27
NGC5846	Gal	Vir	15h 06m 29s	+01°36'20"	10.2	15:21	21:28	03:35
M102	Gal	Dra	15h 06m 30s	+55°45'47"	10.8	Circum	21:28	Circum
NGC5850	Gal	Vir	15h 07m 08s	+01°32'39"	11.0	15:22	21:29	03:36
NGC5854	Gal	Vir	15h 07m 48s	+02°34'06"	11.8	15:20	21:30	03:39
NGC5876	Gal	Boo	15h 09m 32s	+54°30'22"	14.0	10:29	21:31	08:33
NGC5879	Gal	Dra	15h 09m 47s	+57°00'03"	11.5	Circum	21:32	Circum
NGC5873	P Neb	Lup	15h 12m 51s	-38°07'30"	13.0	17:39	21:35	01:31
NGC5878	Gal	Lib	15h 13m 46s	-14°16'14"	11.5	16:12	21:36	02:59
NGC5885	Gal	Lib	15h 15m 04s	-10°05'08"	11.7	16:02	21:37	03:12
NGC5882	P Neb	Lup	15h 16m 50s	-45°38'56"	11.0	18:28	21:39	00:49
NGC5897	Glob	Lib	15h 17m 24s	-21°00'37"	8.6	16:36	21:39	02:42
M5	Glob	Ser	15h 18m 33s	+02°04'57"	7.0	15:32	21:40	03:49
NGC5903	Gal	Lib	15h 18m 36s	-24°04'06"	11.5	16:48	21:40	02:33
NGC5920	Gal	Ser	15h 21m 52s	+07°42'32"	13.6	15:20	21:44	04:08
NGC5921	Gal	Ser	15h 21m 56s	+05°04'12"	10.8	15:27	21:44	04:00
NGC5928	Gal	Ser	15h 26m 03s	+18°04'25"	14.0	14:54	21:48	04:42
NGC5925	Open	Nor	15h 27m 26s	-54°31'42"	8.0	20:22	21:49	23:17
NGC5927	Glob	Lup	15h 28m 00s	-50°40'23"	8.3	19:25	21:50	00:15
NGC5945	Gal	Boo	15h 29m 45s	+42°55'08"	14.0	13:11	21:52	06:32
NGC5966	Gal	Boo	15h 35m 52s	+39°46'07"	14.0	13:36	21:58	06:19
NGC5959	Gal	Lib	15h 37m 22s	-16°35'46"	14.0	16:43	21:59	03:16
NGC5985	Gal	Dra	15h 39m 37s	+59°19'54"	11.0	Circum	22:01	Circum
NGC5991	Gal	Ser	15h 45m 17s	+24°37'50"	14.0	14:52	22:07	05:23
NGC5986	Glob	Lup	15h 46m 04s	-37°47'08"	7.1	18:10	22:08	02:06
NGC6015	Gal	Dra	15h 51m 25s	+62°18'35"	11.2	Circum	22:13	Circum
NGC6058	P Neb	Her	16h 04m 27s	+40°40'59"	13.0	14:00	22:26	06:53
NGC6031	Open	Nor	16h 07m 35s	-54°00'54"	8.5	20:52	22:29	00:07
NGC6070	Gal	Ser	16h 09m 59s	+00°42'33"	11.7	16:27	22:32	04:36



ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6072	P Neb	Sco	16h 12m 58s	-36°13'47"	14.0	18:30	22:35	02:40
NGC6067	Open	Nor	16h 13m 11s	-54°13'06"	5.6	21:01	22:35	00:09
M4	Glob	Sco	16h 23m 35s	-26°31'35"	7.5	18:01	22:45	03:30
NGC6146	Gal	Her	16h 25m 10s	+40°53'34"	14.0	14:19	22:47	07:15
NGC6124	Open	Sco	16h 25m 20s	-40°39'12"	5.8	19:05	22:47	02:30
NGC6144	Glob	Sco	16h 27m 14s	-26°01'26"	9.1	18:03	22:49	03:35
NGC6153	P Neb	Sco	16h 31m 31s	-40°15'13"	12.0	19:09	22:53	02:38
NGC6178	Open	Sco	16h 35m 47s	-45°38'36"	7.2	19:47	22:58	02:08
NGC6214	Gal	Dra	16h 39m 32s	+66°02'23"	14.0	Circum	23:01	Circum
NGC6188	Neb	Ara	16h 40m 05s	-48°39'42"		20:16	23:02	01:48
NGC6192	Open	Sco	16h 40m 23s	-43°22'00"	9.0	19:36	23:02	02:28
NGC6193	Open	Ara	16h 41m 20s	-48°45'48"	5.2	20:19	23:03	01:48
M13	Glob	Her	16h 41m 41s	+36°27'35"	7.0	15:00	23:04	07:07
NGC6226	Gal	Dra	16h 43m 23s	+61°59'02"	14.0	Circum	23:05	Circum
NGC6200	Open	Ara	16h 44m 07s	-47°27'48"	7.4	20:10	23:06	02:02
NGC6210	P Neb	Her	16h 44m 30s	+23°47'59"	9.0	15:54	23:06	06:19
NGC6229	Glob	Her	16h 46m 59s	+47°31'39"	9.4	13:52	23:09	08:25
M12	Glob	Oph	16h 47m 14s	-01°56'52"	8.0	17:12	23:09	05:07
NGC6208	Open	Ara	16h 49m 28s	-53°43'42"	7.2	21:28	23:11	00:54
NGC6231	Open	Sco	16h 54m 10s	-41°49'30"	2.6	19:40	23:16	02:52
NGC6242	Open	Sco	16h 55m 33s	-39°27'42"	6.4	19:28	23:17	03:06
M10	Glob	Oph	16h 57m 09s	-04°05'56"	7.5	17:27	23:19	05:11
NGC6250	Open	Ara	16h 57m 56s	-45°56'12"	5.9	20:12	23:20	02:28
NGC6268	Open	Sco	17h 02m 10s	-39°43'42"	10.0	19:36	23:24	03:12
NGC6281	Open	Sco	17h 04m 41s	-37°59'06"	5.4	19:30	23:27	03:23
NGC6287	Glob	Oph	17h 05m 09s	-22°42'25"	9.2	18:30	23:27	04:24
NGC6302	P Neb	Sco	17h 13m 44s	-37°06'12"	13.0	19:35	23:36	03:37
NGC6309	P Neb	Oph	17h 14m 04s	-12°54'38"	11.0	18:09	23:36	05:03
NGC6316	Glob	Oph	17h 16m 37s	-28°08'23"	9.0	19:00	23:38	04:17
M92	Glob	Her	17h 17m 07s	+43°08'11"	7.5	14:57	23:39	08:21
NGC6322	Open	Sco	17h 18m 25s	-42°56'00"	6.0	20:11	23:40	03:09
M9	Glob	Oph	17h 19m 12s	-18°30'58"	9.0	18:30	23:41	04:52
NGC6326	P Neb	Ara	17h 20m 46s	-51°45'17"	12.0	21:30	23:43	01:55
NGC6334	Neb	Sco	17h 20m 49s	-36°06'12"		19:37	23:43	03:48
NGC6357	Neb	Sco	17h 24m 43s	-34°12'06"		19:32	23:47	04:01
NGC6366	Glob	Oph	17h 27m 44s	-05°04'36"	10.0	18:01	23:50	05:39
NGC6369	P Neb	Oph	17h 29m 21s	-23°45'34"	13.0	18:57	23:51	04:45
NGC6384	Gal	Oph	17h 32m 24s	+07°03'37"	10.6	17:32	23:54	06:16
NGC6374	Open	Sco	17h 34m 42s	-32°34'54"	9.0	19:35	23:57	04:18
NGC6388	Glob	Sco	17h 36m 17s	-44°44'08"	6.9	20:41	23:58	03:15
M6	Open	Sco	17h 40m 20s	-32°15'12"	4.5	19:40	00:02	04:25
NGC6397	Glob	Ara	17h 40m 42s	-53°40'26"	5.7	22:19	00:03	01:46
NGC6416	Open	Sco	17h 44m 19s	-32°21'42"	5.7	19:44	00:06	04:28
NGC6426	Glob	Oph	17h 44m 55s	+03°10'11"	11.2	17:55	00:07	06:18
NGC6425	Open	Sco	17h 47m 01s	-31°31'48"	7.2	19:43	00:09	04:34

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6439	P Neb	Sgr	17h 48m 20s	-16°28'44"	14.0	18:53	00:10	05:27
NGC6445	P Neb	Sgr	17h 49m 15s	-20°00'36"	13.0	19:05	00:11	05:17
NGC6503	Gal	Dra	17h 49m 27s	+70°08'40"	10.2	Circum	00:11	Circum
NGC6441	Glob	Sco	17h 50m 13s	-37°03'03"	7.4	20:11	00:12	04:13
NGC6453	Glob	Sco	17h 50m 52s	-34°35'54"	9.9	20:00	00:13	04:25
M7	Open	Sco	17h 53m 51s	-34°47'36"	3.5	20:04	00:16	04:27
NGC6501	Gal	Her	17h 56m 04s	+18°22'24"	12.3	17:23	00:18	07:13
M23	Open	Sgr	17h 57m 04s	-18°59'06"	6.0	19:10	00:19	05:28
NGC6543	P Neb	Dra	17h 58m 33s	+66°37'59"	9.0	Circum	00:20	Circum
NGC6496	Glob	Sco	17h 59m 04s	-44°16'00"	9.2	21:01	00:21	03:41
NGC6507	Open	Sgr	17h 59m 50s	-17°27'00"	10.0	19:08	00:22	05:36
M20	D Neb	Sgr	18h 02m 42s	-22°58'18"	5.0	19:28	00:25	05:21
NGC6520	Open	Sgr	18h 03m 24s	-27°53'18"	8.0	19:46	00:25	05:05
NGC6522	Glob	Sgr	18h 03m 35s	-30°02'06"	8.6	19:54	00:25	04:57
M8	D Neb	Sgr	18h 03m 41s	-24°22'48"	5.0	19:34	00:26	05:17
NGC6526	Neb	Sgr	18h 04m 06s	-24°26'30"		19:34	00:26	05:18
M21	Open	Sgr	18h 04m 13s	-22°29'24"	7.0	19:28	00:26	05:24
NGC6530	Open	Sgr	18h 04m 31s	-24°21'30"	4.6	19:35	00:26	05:18
NGC6537	P Neb	Sgr	18h 05m 13s	-19°50'35"	13.0	19:21	00:27	05:34
NGC6544	Glob	Sgr	18h 07m 20s	-24°59'53"	8.3	19:39	00:29	05:19
NGC6546	Open	Sgr	18h 07m 22s	-23°17'48"	8.0	19:34	00:29	05:25
NGC6541	Glob	CrA	18h 08m 02s	-43°42'57"	6.6	21:06	00:30	03:54
NGC6598	Gal	Dra	18h 08m 56s	+69°04'05"	14.0	Circum	00:31	Circum
NGC6553	Glob	Sgr	18h 09m 17s	-25°54'30"	8.3	19:45	00:31	05:18
NGC6559	Neb	Sgr	18h 09m 57s	-24°06'23"		19:39	00:32	05:25
NGC6565	P Neb	Sgr	18h 11m 53s	-28°10'41"	13.0	19:55	00:34	05:12
NGC6563	P Neb	Sgr	18h 12m 03s	-33°52'07"	14.0	20:18	00:34	04:50
NGC6572	P Neb	Oph	18h 12m 06s	+06°51'13"	9.0	18:13	00:34	06:55
NGC6567	P Neb	Sgr	18h 13m 45s	-19°04'34"	12.0	19:27	00:36	05:45
NGC6578	P Neb	Sgr	18h 16m 16s	-20°27'03"	13.0	19:34	00:38	05:43
NGC6595	Open	Sgr	18h 17m 05s	-19°51'57"	7.0	19:32	00:39	05:45
NGC6604	Open	Ser	18h 18m 03s	-12°14'35"	6.5	19:11	00:40	06:09
M24	Open	Sgr	18h 18m 26s	-18°24'24"	4.5	19:29	00:40	05:51
M16	D Neb	Ser	18h 18m 48s	-13°48'24"	6.5	19:16	00:41	06:05
M17	D Neb	Sgr	18h 20m 47s	-16°10'18"	7.0	19:25	00:43	06:00
NGC6624	Glob	Sgr	18h 23m 41s	-30°21'40"	8.3	20:15	00:46	05:16
NGC6629	P Neb	Sgr	18h 25m 42s	-23°12'10"	12.0	19:52	00:48	05:43
NGC6633	Open	Oph	18h 27m 15s	+06°30'30"	4.6	18:29	00:49	07:10
NGC6638	Glob	Sgr	18h 30m 56s	-25°29'56"	9.2	20:05	00:53	05:41
NGC6642	Glob	Sgr	18h 31m 54s	-23°28'35"	8.8	19:59	00:54	05:49
NGC6644	P Neb	Sgr	18h 32m 35s	-25°07'44"	12.0	20:05	00:54	05:44
NGC6645	Open	Sgr	18h 32m 37s	-16°53'00"	9.0	19:39	00:54	06:10
NGC6647	Open	Sgr	18h 32m 49s	-17°13'42"	8.0	19:40	00:55	06:09
NGC6649	Open	Sct	18h 33m 27s	-10°24'12"	8.9	19:21	00:55	06:30
NGC6661	Gal	Her	18h 34m 37s	+22°54'36"	11.9	17:47	00:56	08:06

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6652	Glob	Sgr	18h 35m 46s	-32°59'28"	8.9	20:38	00:58	05:17
M22	Glob	Sgr	18h 36m 24s	-23°54'17"	6.5	20:05	00:58	05:52
NGC6664	Open	Sct	18h 36m 33s	-08°13'12"	7.8	19:18	00:58	06:39
M11	Open	Sct	18h 51m 05s	-06°16'12"	7.0	19:27	01:13	06:59
NGC6709	Open	Aql	18h 51m 18s	+10°19'06"	6.7	18:42	01:13	07:44
M57	P Neb	Lyr	18h 53m 35s	+33°01'44"	9.5	17:28	01:15	09:03
NGC6716	Open	Sgr	18h 54m 34s	-19°54'06"	6.9	20:10	01:16	06:23
NGC6723	Glob	Sgr	18h 59m 33s	-36°37'54"	7.3	21:18	01:21	05:25
NGC6738	Open	Aql	19h 01m 21s	+11°36'54"	8.0	18:48	01:23	07:58
NGC6726	Neb	CrA	19h 01m 39s	-36°53'30"		21:21	01:24	05:26
NGC6729	Neb	CrA	19h 01m 55s	-36°57'30"		21:22	01:24	05:25
NGC6741	P Neb	Aql	19h 02m 37s	-00°26'57"	11.0	19:23	01:24	07:26
NGC6749	Glob	Aql	19h 05m 15s	+01°54'02"	11.1	19:19	01:27	07:35
NGC6751	P Neb	Aql	19h 05m 56s	-05°59'31"	13.0	19:41	01:28	07:14
NGC6755	Open	Aql	19h 07m 49s	+04°16'00"	7.5	19:15	01:30	07:44
NGC6772	P Neb	Aql	19h 14m 36s	-02°42'24"	14.0	19:41	01:36	07:32
M56	Glob	Lyr	19h 16m 36s	+30°11'02"	9.5	18:02	01:38	09:15
NGC6778	P Neb	Aql	19h 18m 25s	-01°35'48"	13.0	19:42	01:40	07:39
NGC6781	P Neb	Aql	19h 18m 28s	+06°32'20"	12.0	19:20	01:40	08:01
NGC6791	Open	Lyr	19h 20m 53s	+37°46'18"	9.5	17:32	01:43	09:53
NGC6790	P Neb	Aql	19h 22m 57s	+01°30'48"	10.0	19:38	01:45	07:52
NGC6803	P Neb	Aql	19h 31m 16s	+10°03'23"	11.0	19:23	01:53	08:23
NGC6804	P Neb	Aql	19h 31m 35s	+09°13'31"	12.0	19:25	01:53	08:21
NGC6807	P Neb	Aql	19h 34m 34s	+05°41'03"	14.0	19:38	01:56	08:15
M55	Glob	Sgr	19h 40m 00s	-30°57'44"	7.0	21:34	02:02	06:30
NGC6813	Neb	Vul	19h 40m 22s	+27°18'34"		18:37	02:02	09:27
NGC6819	Open	Cyg	19h 41m 18s	+40°11'12"	7.3	17:40	02:03	10:27
NGC6820	Neb	Vul	19h 42m 28s	+23°05'17"		18:54	02:04	09:14
NGC6814	Gal	Aql	19h 42m 41s	-10°19'27"	11.2	20:30	02:05	07:39
NGC6818	P Neb	Sgr	19h 43m 58s	-14°09'10"	10.0	20:42	02:06	07:29
NGC6826	P Neb	Cyg	19h 44m 48s	+50°31'30"	10.0	16:18	02:07	11:55
NGC6822	Gal	Sgr	19h 44m 57s	-14°48'10"	9.0	20:45	02:07	07:29
NGC6833	P Neb	Cyg	19h 49m 47s	+48°57'40"	14.0	16:41	02:12	11:42
NGC6834	Open	Cyg	19h 52m 12s	+29°24'30"	7.8	18:41	02:14	09:47
M71	Glob	Sge	19h 53m 46s	+18°46'42"	8.5	19:20	02:16	09:12
NGC6842	P Neb	Vul	19h 55m 02s	+29°17'20"	14.0	18:44	02:17	09:49
M27	P Neb	Vul	19h 59m 36s	+22°43'15"	7.5	19:13	02:21	09:30
NGC6866	Open	Cyg	20h 03m 55s	+44°09'30"	7.6	17:37	02:26	11:15
NGC6871	Open	Cyg	20h 05m 59s	+35°46'38"	5.2	18:27	02:28	10:28
NGC6884	P Neb	Cyg	20h 10m 24s	+46°27'39"	13.0	17:25	02:32	11:39
NGC6879	P Neb	Sge	20h 10m 27s	+16°55'22"	13.0	19:42	02:32	09:23
NGC6881	P Neb	Cyg	20h 10m 52s	+37°24'42"	14.0	18:24	02:33	10:41
NGC6883	Open	Cyg	20h 11m 20s	+35°49'55"	8.0	18:32	02:33	10:34
NGC6882	Open	Vul	20h 11m 58s	+26°29'00"	8.1	19:12	02:34	09:56
NGC6888	Neb	Cyg	20h 12m 06s	+38°21'17"		18:21	02:34	10:47

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6886	P Neb	Sge	20h 12m 43s	+19°59'22"	12.0	19:35	02:35	09:35
NGC6891	P Neb	Del	20h 15m 09s	+12°42'16"	12.0	19:59	02:37	09:15
NGC6894	P Neb	Cyg	20h 16m 24s	+30°33'55"	14.0	19:01	02:38	10:16
NGC6900	Gal	Aql	20h 21m 35s	-02°34'12"	14.0	20:48	02:43	08:39
NGC6905	P Neb	Del	20h 22m 23s	+20°06'16"	12.0	19:44	02:44	09:45
NGC6910	Open	Cyg	20h 23m 12s	+40°46'42"	7.4	18:18	02:45	11:12
M29	Open	Cyg	20h 23m 57s	+38°30'30"	9.0	18:32	02:46	11:00
NGC6914	Neb	Cyg	20h 24m 43s	+42°28'57"		18:09	02:47	11:24
NGC6939	Open	Cep	20h 31m 30s	+60°39'42"	7.8	Circum	02:53	Circum
NGC6946	Gal	Cyg	20h 34m 52s	+60°09'14"	8.9	Circum	02:57	Circum
NGC6935	Gal	Ind	20h 38m 20s	-52°06'35"	13.0	00:53	03:00	05:08
NGC6960	Neb	Cyg	20h 45m 58s	+30°35'42"		19:30	03:08	10:46
NGC6959	Gal	Aqr	20h 47m 07s	+00°25'48"	14.0	21:05	03:09	09:13
NGC6992	Neb	Cyg	20h 56m 19s	+31°44'36"		19:36	03:18	11:01
NGC6997	Open	Cyg	20h 56m 39s	+44°37'54"	10.0	18:26	03:19	12:11
NGC6995	Neb	Cyg	20h 57m 10s	+31°14'06"		19:39	03:19	10:59
M73	Asterism	Aqr	20h 58m 56s	-12°38'07"	9.0	21:53	03:21	08:49
NGC7000	Neb	Cyg	20h 59m 18s	+44°31'00"		18:29	03:21	12:13
NGC7008	P Neb	Cyg	21h 00m 33s	+54°32'35"	13.0	16:19	03:22	14:26
NGC7009	P Neb	Aqr	21h 04m 11s	-11°21'50"	8.0	21:54	03:26	08:58
NGC7026	P Neb	Cyg	21h 06m 19s	+47°51'08"	13.0	18:09	03:28	12:48
NGC7027	P Neb	Cyg	21h 07m 02s	+42°14'10"	10.0	18:53	03:29	12:05
NGC7031	Open	Cyg	21h 07m 12s	+50°52'30"	9.1	17:36	03:29	13:22
NGC7029	Gal	Ind	21h 11m 52s	-49°17'00"	11.8	00:54	03:34	06:13
NGC7048	P Neb	Cyg	21h 14m 15s	+46°17'18"	11.0	18:31	03:36	12:42
NGC7046	Gal	Equ	21h 14m 56s	+02°50'05"	14.0	21:26	03:37	09:47
NGC7041	Gal	Ind	21h 16m 32s	-48°21'49"	11.1	00:50	03:38	06:27
NGC7062	Open	Cyg	21h 23m 27s	+46°22'42"	8.3	18:39	03:45	12:52
NGC7076	Neb	Cep	21h 26m 24s	+62°53'33"		Circum	03:48	Circum
M15	Glob	Peg	21h 29m 58s	+12°10'02"	7.5	21:15	03:52	10:28
M39	Open	Cyg	21h 31m 42s	+48°25'00"	5.5	18:29	03:54	13:18
NGC7079	Gal	Gru	21h 32m 35s	-44°04'02"	11.6	00:33	03:54	07:16
M2	Glob	Aqr	21h 33m 27s	-00°49'23"	7.5	21:55	03:55	09:56
NGC7128	Open	Cyg	21h 43m 57s	+53°42'54"	9.7	17:25	04:06	14:47
NGC7144	Gal	Gru	21h 52m 42s	-48°15'15"	10.7	01:25	04:15	07:04
NGC7145	Gal	Gru	21h 53m 20s	-47°52'56"	11.2	01:23	04:15	07:08
NGC7196	Gal	Ind	22h 05m 55s	-50°07'10"	11.5	01:57	04:28	06:59
NGC7217	Gal	Peg	22h 07m 52s	+31°21'33"	10.2	20:49	04:30	12:11
NGC7213	Gal	Gru	22h 09m 16s	-47°10'00"	10.5	01:33	04:31	07:30
NGC7223	Gal	Lac	22h 10m 09s	+41°01'00"	13.0	20:03	04:32	13:01
NGC7226	Open	Cep	22h 10m 27s	+55°23'54"	9.6	Circum	04:32	Circum
NGC7231	Gal	Lac	22h 12m 30s	+45°19'43"	14.0	19:36	04:34	13:32
NGC7245	Open	Lac	22h 15m 11s	+54°20'36"	9.2	17:40	04:37	15:34
NGC7261	Open	Cep	22h 20m 06s	+58°03'00"	8.4	Circum	04:42	Circum
NGC7265	Gal	Lac	22h 22m 27s	+36°12'35"	13.0	20:42	04:44	12:47

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7296	Open	Lac	22h 28m 02s	+52°17'18"	10.0	18:37	04:50	15:03
NGC7294	Gal	PsA	22h 32m 08s	-25°23'55"	14.0	00:06	04:54	09:42
NGC7306	Gal	PsA	22h 33m 16s	-27°14'47"	13.0	00:13	04:55	09:37
NGC7320	Gal	Peg	22h 36m 04s	+33°56'54"	12.7	21:06	04:58	12:50
NGC7331	Gal	Peg	22h 37m 04s	+34°24'57"	9.5	21:05	04:59	12:53
NGC7332	Gal	Peg	22h 37m 25s	+23°47'54"	11.0	21:47	04:59	12:12
NGC7354	P Neb	Cep	22h 40m 20s	+61°17'07"	13.0	Circum	05:02	Circum
NGC7380	Open	Cep	22h 47m 21s	+58°07'54"	7.2	Circum	05:09	Circum
NGC7377	Gal	Aqr	22h 47m 47s	-22°18'43"	11.6	00:11	05:10	10:08
NGC7392	Gal	Aqr	22h 51m 49s	-20°36'26"	11.9	00:10	05:14	10:18
NGC7410	Gal	Gru	22h 55m 01s	-39°39'42"	10.4	01:29	05:17	09:05
NGC7412	Gal	Gru	22h 55m 46s	-42°38'30"	11.4	01:47	05:18	08:48
NGC7424	Gal	Gru	22h 57m 18s	-41°04'16"	11.0	01:39	05:19	08:59
NGC7457	Gal	Peg	23h 01m 00s	+30°08'41"	10.8	21:47	05:23	12:59
NGC7465	Gal	Peg	23h 02m 01s	+15°57'54"	13.0	22:36	05:24	12:11
NGC7479	Gal	Peg	23h 04m 57s	+12°19'20"	11.0	22:50	05:27	12:04

## A.V.A.C. Information

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...

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

**AVAC**  
**P.O. BOX 8545,**  
**LANCASTER, CA 93539-8545**

Visit the Antelope Valley Astronomy Club website at [www.avastronomyclub.org/](http://www.avastronomyclub.org/)

The Antelope Valley Astronomy Club, Inc. is a 501(c)(3) Non-Profit Corporation.

The A.V.A.C. is a Sustaining Member of The Astronomical League and the International Dark-Sky Association.

## Board Members

### President:

Darrell Bennett  
[president@avastronomyclub.org](mailto:president@avastronomyclub.org)

### Vice-President:

Matt Leone (661) 713-1894  
[vice-president@avastronomyclub.org](mailto:vice-president@avastronomyclub.org)

### Secretary:

Frank & Rose Moore (661) 972-1953  
[secretary@avastronomyclub.org](mailto:secretary@avastronomyclub.org)

### Treasurer:

Rod Girard (661) 803-7838  
[treasurer@avastronomyclub.org](mailto:treasurer@avastronomyclub.org)

### Director of Community Development:

Robert Lynch, Jr.  
[community@avastronomyclub.org](mailto:community@avastronomyclub.org)

## Appointed Positions

### Newsletter Editor:

Steve Trotta (661) 269-5428  
[dso@avastronomyclub.org](mailto:dso@avastronomyclub.org)

### Equipment & Library:

Vacant  
[library@avastronomyclub.org](mailto:library@avastronomyclub.org)

### Club Historian:

Tom Koonce (661) 943-8200  
[history@avastronomyclub.org](mailto:history@avastronomyclub.org)

### Webmaster:

Steve Trotta (661) 269-5428  
[webmaster@avastronomyclub.org](mailto:webmaster@avastronomyclub.org)

### Astronomical League Coordinator:

Frank Moore (661) 972-4775  
[al@avastronomyclub.org](mailto:al@avastronomyclub.org)

## Our Sponsors

Thank you to our sponsors for your generous support!

### Cosmos Level Sponsors

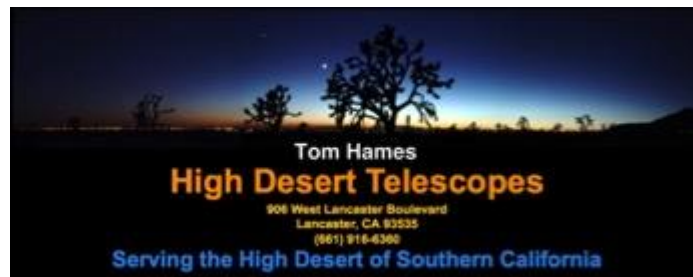


### Woodland Hills Camera

5348 Topanga Canyon Blvd., Woodland Hills  
888-427-8766.

[www.telescopes.net](http://www.telescopes.net)

### Universe Level Sponsors



### Galaxy Level Sponsors



### *Al's Vacuum and Sewing*

904 West Lancaster Blvd., Lancaster  
(661) 948-1521