



# Desert Sky Observer

Volume 38

Antelope Valley Astronomy Club Newsletter

August 2018

## Up-Coming Events

August 10: Club Meeting\*

August 11: [Dark Sky Star Party](#) @ Mt. Pinos

August 18: [Lunar club](#)

August 25: [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 Frank Moore

Greetings AVAC members. Are you enjoying the heat? Are you staying up late on these gorgeous nights and observing the cosmos? You would think that good observing weather would be a sure thing on Southern California summer nights but, unfortunately, it isn't as we often find when dust, high clouds, and even smoke from wildfires spoils the

view.

It was definitely t-shirt weather for our Prime Desert Woodland Moon Walk on Saturday July 28 but, with high clouds, the usual dust, smoke from nearby fires and a 99% of full moon, the only objects which yielded satisfactory viewing were the quartet of planets we had stretched across the sky. Early on, and before sunset, Venus was visible with Jupiter and Saturn also popping out of the hazy sky as the daylight diminished. They were soon followed by Mars and the moon as they Rose over the horizon shortly after the event started.

Since it was low in the west, where the sky was the most obscured by high clouds and smoke, Venus was mostly just a glowing non-descript orb and fine focus was impossible. Higher in the sky and brighter, Jupiter and four of its moons yielded satisfactory views with some banding visible to good eyes and three of the moons clustered on one side with one on the other. Though it was initially down in the murk on the Eastern horizon, as Saturn Rose it too yielded satisfactory views with the rings tilted at just the right angle to wow our visitors. Finally, Mars, at near opposition and seemingly glowing bright red/orange as it rose, was a great target though the surface features were largely non-descript due to the massive dust storms currently blanketing the planet. There were 180 members of the public for the moon walk and star party. Members sharing their telescopes with public were Darrell Bennett, Frank Moore, Rod Girard and Ellen Mahler.

Earlier in the month, on Saturday July 14 we had our annual "Star-B-Cue" picnic and public outreach event at the Brite Lake Recreation Area near Tehachapi. Imagine our surprise when, just as we were setting up for the party, an employee of the Tehachapi Cummings County Water District posted a "Do not drink. Boil Water" sign on the pavilion since they'd discovered e-coli in the campground's water supply. Where else, but in small town America, does the General Manager of the water district show up to deliver extra

bottled water for your event and to make sure everything went OK despite the water issue. Of course, that same water district had already agreed to turn off the outside lights at their nearby plant to ensure that we had dark skies for our event.

My brother-in-law Sam, whose first introduction to telescopes was at the night of observing on the 60" telescope at Mt. Wilson, worked the grill and cooked up the burgers and dogs for us. Thanks Sam! We didn't have enough donations to put on a silent auction so went ahead with our raffles, mostly of books, and had extra time to get the telescopes setup before the public arrived.

With the public coming and going throughout the night it's really difficult to get a count, but we had at least several hundred with Matt Leone reporting that, at one point, he must have had 100 people in line for his 24" dobsonian telescope alone. At times, Rose and I had similar lines for our 11" SCT and 12" Lightbridge. The viewing conditions were just fantastic with clear, dark skies, good viewing and relatively stable images. On a wide range of telescopes, big and small, we were able to share views of five planets and an awesome selection of galaxies, nebulae and star clusters. The public seemed to be extremely engaged and they seemed to stay later this time than in previous years.

Those with telescopes for public viewing included Rose and Frank Moore with their SCT and Lightbridge, Matt and Michael Leone with Matt's beautiful 24" dobsonian and 6" refractor, John VanEvert with the 12" Lightbridge he recently bought from Leone and Yvonne Weller, Jim Pendleton with his 10" dobsonian, Kevin Reilly with "Big Red" his 13" dobsonian, Rod Girard with his 9.25" SCT and video viewing accessories, Ellen Mahler with her 6" dob, Chuck Ruff with his homemade dob, and NASA Solar System Ambassadors Dale Hawkin and Lauren Hollen with their old 8" orange tube Celestron SCT. In addition, there were at least half a dozen Tehachapi locals with telescopes of one kind or another. If I've forgotten anyone, my apologies but it was kind of hard to keep track in the dark.

Our Dark Sky Star Party for August will be held on Saturday August 11, the night after our meeting, at the Mt. Pinos Nordic Base parking lot. Matt Leone intends to setup his RV and equipment on Thursday August 10 and others may do the same. We're planning on having a night of lunar observing at Judy Fuentes' house in Antelope Acres on Saturday August 18 and our next Prime Desert Woodland Moon Walk will be on Saturday August 25 at 8:00 pm. Details for all events will be sent out in separate emails.

Remember folks, our Annual Business Meeting will be held during our October meeting on Friday October 12. The officers will give their "State of Club" reports and we'll have our annual board election. Between now and then, please consider serving in a position on the board and let a current board members know of your willingness to serve. Thanks!!



## Secretary

### Rose Moore

Many thanks to everyone who helped at the picnic, including our brother in law who became the BBQ chef! We didn't have a silent auction as we did not have enough items. But we did give out many awesome items such as new books and DVDs. We had the public star party that evening and had many visitors attend. I was able to find M51, M4, and others in my Lightbridge and they looked beautiful!! We all looked at many different dark sky objects including the planets that were up. Frank will discuss the picnic/star party as well.

Upcoming events include our DSSP at Mt. Pinos for Saturday August 11th, a Lunar club meeting at Judy's on Saturday Aug. 18th, and a Prime Desert Moon Walk on Saturday Aug. 25th at 8pm. Further info to follow. We appreciate members coming out to support these events.

We have a member interested in selling some astronomy gear. Here is his listing and information.

An Orion Sky Glow imaging filter (1.25), Celestron 3x Barlow, Orion expanse eyepieces in 9,6 and 20mm, Baaer Mpcc mark III 2", Orion 20mm illuminating centering eyepiece, Orion 8" Astrograph, and wooden hard case, Celestron CGem mount and Pelican case and Orion guide scope and mounting rings. I was looking for \$2000 all together for the club members as a big package. I have pictures available as well if anyone is interested including images taken with the gear.

Name: Manual Zurich

Email: zuritausmc@gmail.com

Cell phone: 910-599-8642

See you at our events!

## Space Place

### The Best Meteor Shower of the Year

By Jane Houston Jones and Jessica Stoller-Conrad

If you're a fan of meteor showers, August is going to be an exciting month! The Perseid meteor shower is the best of the year, and in 2018, the peak viewing time for the shower is on a dark, moonless night—perfect for spotting meteors.

The best time to look for meteors during this year's Perseid shower is at the peak, from 4 p.m. EDT on Aug. 12 until 4 a.m. EDT on the Aug. 13. Because the new Moon falls on the peak night, the days before and after the peak will also provide very dark skies for viewing meteors. On the days surrounding the peak, the best time to view the showers is from a few hours after twilight until dawn.

Meteors come from leftover comet particles and bits from broken asteroids. When comets come around the Sun, they leave a dusty trail behind them. Every year Earth passes through these debris trails, which allows the bits to collide with our atmosphere and disintegrate to create fiery and colorful streaks in the sky—called meteors.

The comet that creates the Perseid meteor shower—a comet called Swift-Tuttle—has a very wide trail of cometary dust. It's so wide that it takes Earth more than three weeks to plow all the way through. Because of this wide trail, the Perseids have a longer peak viewing window than many other meteor showers throughout the year.

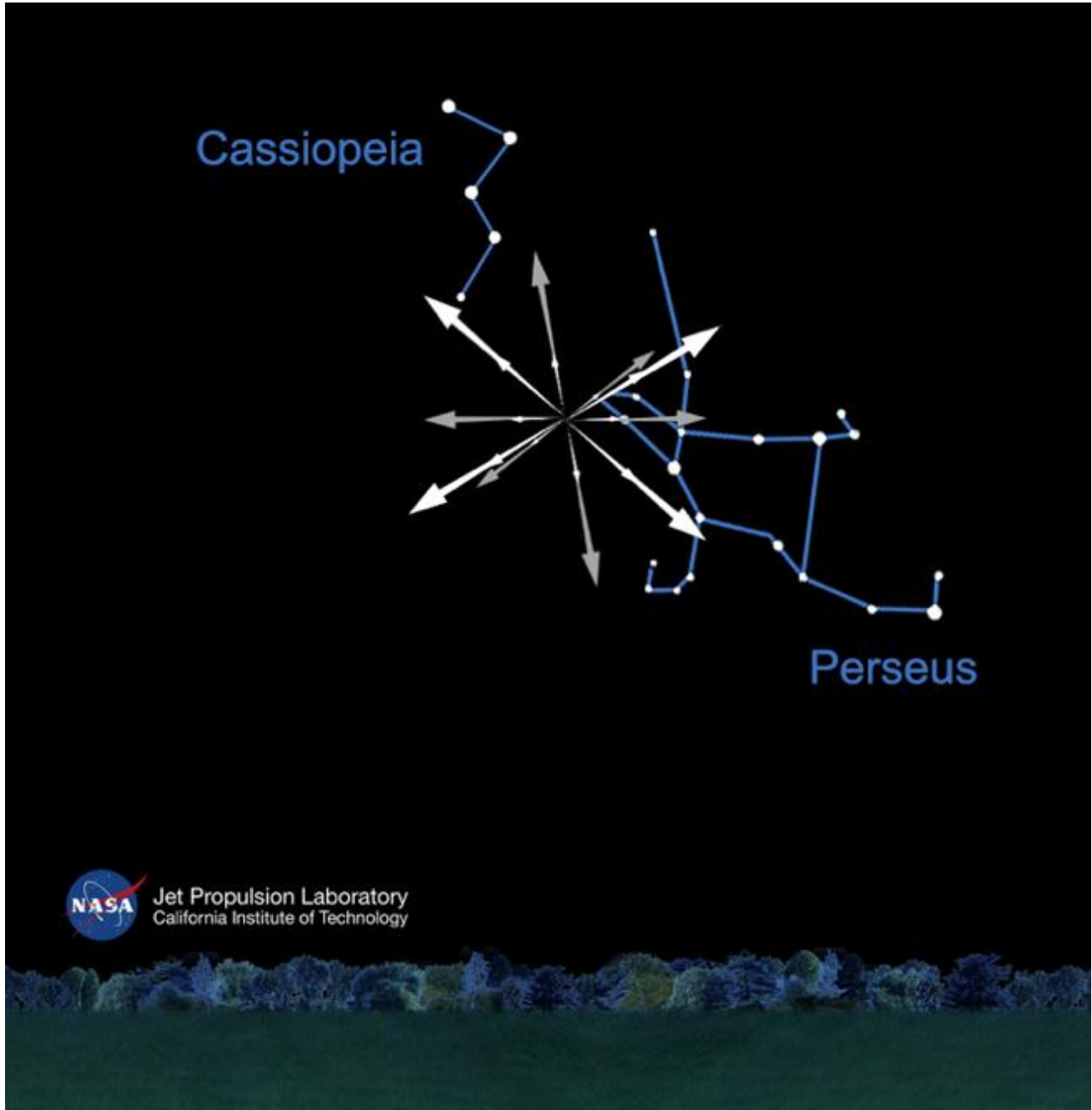
In fact, this year you should be able to see some meteors from July 17 to Aug. 24. The rates of meteors will increase during the weeks before Aug. 12 and decrease after Aug. 13. Observers should be able to see between 60 and 70 meteors per hour at the shower's peak.

The Perseids appear to radiate from the constellation Perseus, which is where we get the name for this shower. Perseus is visible in the northern sky soon after sunset this time of year. Observers in mid-northern latitudes will have the best views.

However, you don't have to look directly at the constellation Perseus to see meteors. You can look anywhere you want to; 90 degrees left or right of Perseus, or even directly overhead, are all good choices.

While you're watching the sky for meteors this month, you'll also see a parade of the planets Venus, Mars, Jupiter and Saturn—and the Milky Way also continues to grace the evening sky. In next month's article, we'll take a late summer stroll through the Milky Way. No telescope or binoculars required!

Catch up on all of NASA's current—and future—missions at [www.nasa.gov](http://www.nasa.gov)



*The Perseid meteor showers appear to radiate from the constellation Perseus. Perseus is visible in the northern sky soon after sunset this time of year. Credit: NASA/JPL-Caltech*

*This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit <https://spaceplace.nasa.gov/> to explore space and Earth science!*

## News Headlines

### **Opportunity Hunkers Down During Dust Storm**

It's the beginning of the end for the planet-encircling dust storm on Mars. But it could still be weeks, or even months, before skies are clear enough for NASA's Opportunity rover to recharge its batteries and phone home. The last signal received from the rover was on June 10.

<https://www.jpl.nasa.gov/news/news.php?feature=7155>

### **Solar minimum deepens**

As of July 31, the sun has been without sunspots for 33 of the past 34 days. To find a similar stretch of blank suns, you have to go back to 2009 when the sun was experiencing the deepest solar minimum in a century. Solar minimum has returned, bringing extra cosmic rays, long-lasting holes in the sun's atmosphere, and strangely pink auroras.

<http://spaceweather.com/>

### **NASA Statement on Possible Subsurface Lake near Martian S Pole**

A new paper published in Science this week suggests that liquid water may be sitting under a layer of ice at Mars' south pole. The finding is based on data from the European Mars Express spacecraft, obtained by a radar instrument called MARSIS (Mars Advanced Radar for Subsurface and Ionosphere Sounding). The Italian Space Agency (ASI) led the development of the MARSIS radar. NASA provided half of the instrument, with management of the U.S. portion led by the agency's Jet Propulsion Laboratory in Pasadena, California.

<https://www.jpl.nasa.gov/news/news.php?feature=7200>

### **The True Colors of Pluto and Charon**

Three years after NASA's New Horizons spacecraft gave humankind our first close-up views of Pluto and its largest moon, Charon, scientists are still revealing the wonders of these incredible worlds in the outer solar system. Marking the anniversary of New Horizons' historic flight through the Pluto system on July 14, 2015, mission scientists have released the most accurate natural color images of Pluto and Charon.

<http://pluto.jhuapl.edu/News-Center/News-Article.php?page=20180720>

### **Safety panel warns commercial crew test flights still uncertain**

As NASA prepares to announce the astronauts who will fly the first commercial crew missions, an independent safety board is cautioning that it is still too soon to set dates for those flights

<https://bit.ly/2KdA539>

## August Sky Data

Last Qtr Aug 4      New Aug 11      First Qtr Aug 18      Full Aug 26



## Planet Summary

**Mercury** passes through inferior conjunction on August 8th. The fast moving planet then moves into the morning sky, reaching greatest elongation west on August 26th. On this day, it will shine at magnitude -0.1 and be positioned 18 degrees from the Sun.

**Venus** remains a brilliant early evening object, visible above the western horizon as soon as it's dark enough. It increases in magnitude -4.3 to -4.6, with its illuminated phase decreasing from 57% to 41%. During this time, the planet's apparent diameter increases from 20 to 29 arc seconds.

**Mars** passed its nearest opposition for 15 years last month, and this month is visible just after sunset and for most of the remainder of the night. Mars begins August at magnitude -2.8, with an apparent diameter exceeding 24 arc seconds. It will fade to magnitude -2.2 with its apparent diameter shrinking to 21 arc seconds by month's end.

**Jupiter** remains a brilliant evening object moving direct in Libra. It's visible towards the southwest as soon as it's dark enough. However, by month's end it sets well before midnight. As the month progresses, the giant planet fades from magnitude -2.1 to -1.9 with its apparent size decreasing from 38 to 35 arc seconds.

**Saturn** remains a well-placed evening object. From mid-latitude northern locations, the ringed planet sets around midnight by month's end. During August, its brightness decreases slightly from magnitude +0.2 to +0.4 with its apparent size decreasing marginally from 18.0 to 17.3 arc seconds.

During the Perseids' **meteor shower** peak this month, spectators should see about 60-70 meteors per hour, but in outburst years (such as in 2016) the rate can be between 150-200 meteors an hour. The meteor shower's peak will be visible both the nights of Aug. 11-12 and Aug. 12-13.

## Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
8/1/2018	22:42	08:48	05:46	20:06
8/5/2018	00:22	12:29	05:48	20:06
8/10/2018	03:29	17:46	05:51	20:05
8/15/2018	08:48	22:29	05:54	20:03
8/20/2018	14:07	00:52	05:57	20:00
8/25/2018	18:37	04:08	06:00	19:57
8/31/2018	22:23	09:27	06:05	19:53

## Planet Data

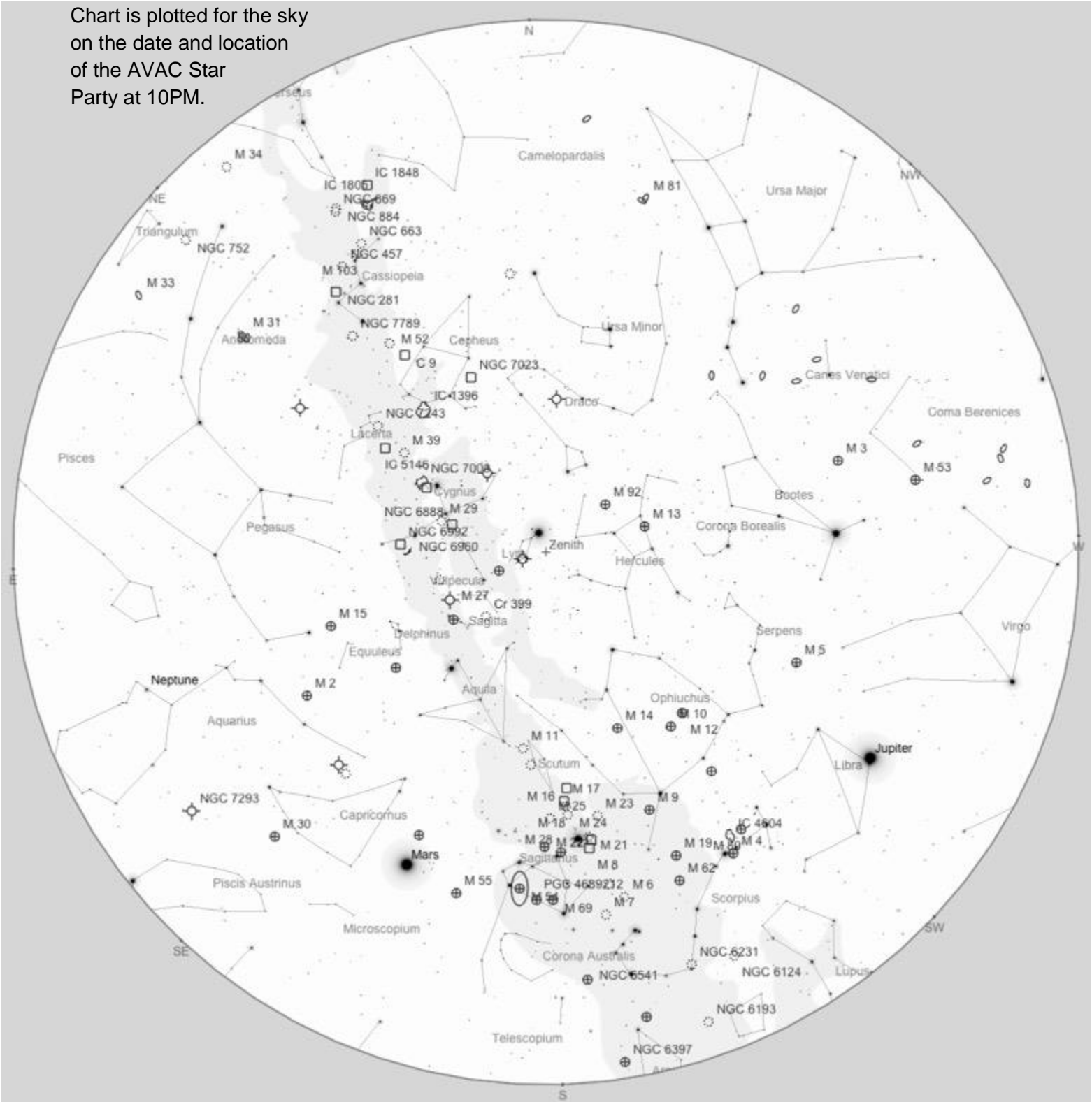
	Aug 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	07:13	13:44	20:14	2.2
<b>Venus</b>	09:46	15:55	22:03	-4.3
<b>Mars</b>	19:54	00:40	05:26	-2.8
<b>Jupiter</b>	13:40	19:01	00:22	-2.1
<b>Saturn</b>	17:31	22:29	03:27	0.2

	Aug 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:32	12:13	18:54	1.9
<b>Venus</b>	09:59	15:49	21:39	-4.4
<b>Mars</b>	18:47	23:31	04:15	-2.5
<b>Jupiter</b>	12:51	18:11	23:31	-1.6
<b>Saturn</b>	16:34	21:31	02:29	0.3

	Aug 31			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:07	11:52	18:37	-0.6
<b>Venus</b>	10:07	15:37	21:07	-4.6
<b>Mars</b>	17:38	22:24	03:10	-2.2
<b>Jupiter</b>	11:57	17:15	22:33	-1.9
<b>Saturn</b>	15:29	20:26	01:24	0.4

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. The list is sorted by the transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6247	Gal	Dra	16h 48m 21s	+62°58'44"	13.0	Circum	20:47	Circum
NGC6208	Open	Ara	16h 49m 28s	-53°43'42"	7.2	19:06	20:48	22:31
NGC6246	Gal	Dra	16h 49m 53s	+55°32'35"	14.1	Circum	20:49	Circum
NGC6235	Glob	Oph	16h 53m 25s	-22°10'34"	10.2	15:53	20:52	01:52
NGC6231	Open	Sco	16h 54m 10s	-41°49'30"	2.6	17:17	20:53	00:29
M10	Glob	Oph	16h 57m 09s	-04°05'56"	7.5	15:04	20:56	02:48
NGC6250	Open	Ara	16h 57m 56s	-45°56'12"	5.9	17:49	20:57	00:05
NGC6253	Open	Ara	16h 59m 05s	-52°42'30"	10.0	18:59	20:58	22:57
M62	Glob	Oph	17h 01m 13s	-30°06'45"	8.0	16:29	21:00	01:31
NGC6268	Open	Sco	17h 02m 10s	-39°43'42"	10.0	17:14	21:01	00:49
M19	Glob	Oph	17h 02m 38s	-26°16'04"	8.5	16:16	21:02	01:47
NGC6281	Open	Sco	17h 04m 41s	-37°59'06"	5.4	17:07	21:04	01:00
NGC6287	Glob	Oph	17h 05m 09s	-22°42'25"	9.2	16:07	21:04	02:02
NGC6302	P Neb	Sco	17h 13m 44s	-37°06'12"	13.0	17:12	21:13	01:14
NGC6309	P Neb	Oph	17h 14m 04s	-12°54'38"	11.0	15:46	21:13	02:40
NGC6304	Glob	Oph	17h 14m 32s	-29°27'43"	8.4	16:40	21:14	01:47
M92	Glob	Her	17h 17m 07s	+43°08'11"	7.5	12:34	21:16	05:58
NGC6325	Glob	Oph	17h 17m 59s	-23°45'57"	10.7	16:23	21:17	02:11
M9	Glob	Oph	17h 19m 12s	-18°30'58"	9.0	16:08	21:18	02:29
NGC6326	P Neb	Ara	17h 20m 46s	-51°45'17"	12.0	19:08	21:20	23:32
NGC6334	Neb	Sco	17h 20m 49s	-36°06'12"		17:14	21:20	01:26
NGC6356	Glob	Oph	17h 23m 35s	-17°48'52"	8.4	16:10	21:23	02:35
NGC6355	Glob	Oph	17h 23m 59s	-26°21'10"	9.6	16:38	21:23	02:08
NGC6357	Neb	Sco	17h 24m 43s	-34°12'06"		17:09	21:24	01:38
NGC6381	Gal	Dra	17h 27m 17s	+60°00'50"	14.0	Circum	21:26	Circum
NGC6369	P Neb	Oph	17h 29m 21s	-23°45'34"	13.0	16:34	21:28	02:22
NGC6374	Open	Sco	17h 34m 42s	-32°34'54"	9.0	17:12	21:34	01:55
NGC6388	Glob	Sco	17h 36m 17s	-44°44'08"	6.9	18:18	21:35	00:52
NGC6396	Open	Sco	17h 37m 36s	-35°01'36"	8.5	17:26	21:37	01:47
M14	Glob	Oph	17h 37m 36s	-03°14'43"	9.5	15:43	21:37	03:31
M6	Open	Sco	17h 40m 20s	-32°15'12"	4.5	17:17	21:39	02:02
NGC6397	Glob	Ara	17h 40m 42s	-53°40'26"	5.7	19:56	21:40	23:24
NGC6416	Open	Sco	17h 44m 19s	-32°21'42"	5.7	17:21	21:43	02:05
NGC6426	Glob	Oph	17h 44m 55s	+03°10'11"	11.2	15:33	21:44	03:55
NGC6425	Open	Sco	17h 47m 01s	-31°31'48"	7.2	17:20	21:46	02:12
NGC6439	P Neb	Sgr	17h 48m 20s	-16°28'44"	14.0	16:31	21:47	03:04
NGC6445	P Neb	Sgr	17h 49m 15s	-20°00'36"	13.0	16:42	21:48	02:54
NGC6441	Glob	Sco	17h 50m 13s	-37°03'03"	7.4	17:48	21:49	01:50
NGC6482	Gal	Her	17h 51m 49s	+23°04'19"	11.3	14:41	21:51	05:01



ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6469	Open	Sgr	17h 53m 12s	-22°16'30"	8.0	16:53	21:52	02:51
M7	Open	Sco	17h 53m 51s	-34°47'36"	3.5	17:41	21:53	02:05
NGC6521	Gal	Dra	17h 55m 48s	+62°36'42"	14.0	Circum	21:55	Circum
NGC6543	P Neb	Dra	17h 58m 33s	+66°37'59"	9.0	Circum	21:58	Circum
NGC6517	Glob	Oph	18h 01m 51s	-08°57'32"	10.3	16:23	22:01	03:39
M20	D Neb	Sgr	18h 02m 42s	-22°58'18"	5.0	17:05	22:02	02:58
NGC6520	Open	Sgr	18h 03m 24s	-27°53'18"	8.0	17:23	22:02	02:42
M8	D Neb	Sgr	18h 03m 41s	-24°22'48"	5.0	17:11	22:03	02:54
NGC6535	Glob	Ser	18h 03m 51s	-00°17'51"	10.6	16:01	22:03	04:05
NGC6526	Neb	Sgr	18h 04m 06s	-24°26'30"		17:11	22:03	02:55
M21	Open	Sgr	18h 04m 13s	-22°29'24"	7.0	17:05	22:03	03:01
NGC6530	Open	Sgr	18h 04m 31s	-24°21'30"	4.6	17:12	22:03	02:55
NGC6539	Glob	Ser	18h 04m 50s	-07°35'11"	9.6	16:22	22:04	03:46
NGC6544	Glob	Sgr	18h 07m 20s	-24°59'53"	8.3	17:17	22:06	02:56
NGC6546	Open	Sgr	18h 07m 22s	-23°17'48"	8.0	17:11	22:06	03:02
NGC6541	Glob	CrA	18h 08m 02s	-43°42'57"	6.6	18:43	22:07	01:31
NGC6559	Neb	Sgr	18h 09m 57s	-24°06'23"		17:16	22:09	03:02
NGC6565	P Neb	Sgr	18h 11m 53s	-28°10'41"	13.0	17:32	22:11	02:49
NGC6563	P Neb	Sgr	18h 12m 03s	-33°52'07"	14.0	17:55	22:11	02:27
NGC6572	P Neb	Oph	18h 12m 06s	+06°51'13"	9.0	15:50	22:11	04:32
NGC6567	P Neb	Sgr	18h 13m 45s	-19°04'34"	12.0	17:04	22:13	03:22
NGC6578	P Neb	Sgr	18h 16m 16s	-20°27'03"	13.0	17:11	22:15	03:20
NGC6605	Open	Ser	18h 16m 24s	-15°00'00"	6.0	16:54	22:15	03:37
NGC6602	Gal	Her	18h 16m 34s	+25°02'38"	14.0	14:59	22:16	05:32
NGC6595	Open	Sgr	18h 17m 05s	-19°51'57"	7.0	17:10	22:16	03:23
M24	Open	Sgr	18h 18m 26s	-18°24'24"	4.5	17:06	22:17	03:28
NGC6584	Glob	Tel	18h 18m 38s	-52°12'57"	9.2	20:11	22:18	00:24
M18	Open	Sgr	18h 19m 58s	-17°06'07"	8.0	17:04	22:19	03:34
M17	D Neb	Sgr	18h 20m 47s	-16°10'18"	7.0	17:02	22:20	03:37
NGC6629	P Neb	Sgr	18h 25m 42s	-23°12'10"	12.0	17:29	22:25	03:20
NGC6633	Open	Oph	18h 27m 15s	+06°30'30"	4.6	16:06	22:26	04:47
NGC6638	Glob	Sgr	18h 30m 56s	-25°29'56"	9.2	17:42	22:30	03:18
M69	Glob	Sgr	18h 31m 23s	-32°20'51"	9.0	18:08	22:30	02:53
M25	Open	Sgr	18h 31m 42s	-19°07'00"	6.5	17:22	22:31	03:39
NGC6642	Glob	Sgr	18h 31m 54s	-23°28'35"	8.8	17:36	22:31	03:26
NGC6644	P Neb	Sgr	18h 32m 35s	-25°07'44"	12.0	17:42	22:32	03:21
NGC6645	Open	Sgr	18h 32m 37s	-16°53'00"	9.0	17:16	22:32	03:47
NGC6652	Glob	Sgr	18h 35m 46s	-32°59'28"	8.9	18:15	22:35	02:54
M22	Glob	Sgr	18h 36m 24s	-23°54'17"	6.5	17:42	22:35	03:29
NGC6664	Open	Sct	18h 36m 33s	-08°13'12"	7.8	16:55	22:36	04:16
M70	Glob	Sgr	18h 43m 12s	-32°17'27"	9.0	18:20	22:42	03:05
NGC6704	Open	Sct	18h 50m 45s	-05°12'18"	9.2	17:01	22:50	04:38
M11	Open	Sct	18h 51m 05s	-06°16'12"	7.0	17:04	22:50	04:36
NGC6709	Open	Aql	18h 51m 18s	+10°19'06"	6.7	16:19	22:50	05:21
NGC6712	Glob	Sct	18h 53m 04s	-08°42'19"	8.2	17:13	22:52	04:31

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M57	P Neb	Lyr	18h 53m 35s	+33°01'44"	9.5	15:05	22:53	06:40
NGC6716	Open	Sgr	18h 54m 34s	-19°54'06"	6.9	17:47	22:54	04:00
M54	Glob	Sgr	18h 55m 03s	-30°28'47"	8.5	18:24	22:54	03:24
NGC6723	Glob	Sgr	18h 59m 33s	-36°37'54"	7.3	18:55	22:59	03:02
NGC6726	Neb	CrA	19h 01m 39s	-36°53'30"		18:59	23:01	03:03
NGC6729	Neb	CrA	19h 01m 55s	-36°57'30"		18:59	23:01	03:03
NGC6741	P Neb	Aql	19h 02m 37s	-00°26'57"	11.0	17:00	23:02	05:03
NGC6749	Glob	Aql	19h 05m 15s	+01°54'02"	11.1	16:56	23:04	05:12
NGC6751	P Neb	Aql	19h 05m 56s	-05°59'31"	13.0	17:18	23:05	04:51
M56	Glob	Lyr	19h 16m 36s	+30°11'02"	9.5	15:40	23:16	06:52
NGC6778	P Neb	Aql	19h 18m 25s	-01°35'48"	13.0	17:19	23:17	05:16
NGC6781	P Neb	Aql	19h 18m 28s	+06°32'20"	12.0	16:57	23:17	05:38
NGC6790	P Neb	Aql	19h 22m 57s	+01°30'48"	10.0	17:15	23:22	05:29
NGC6803	P Neb	Aql	19h 31m 16s	+10°03'23"	11.0	17:00	23:30	06:01
NGC6804	P Neb	Aql	19h 31m 35s	+09°13'31"	12.0	17:03	23:31	05:59
NGC6807	P Neb	Aql	19h 34m 34s	+05°41'03"	14.0	17:15	23:34	05:52
M55	Glob	Sgr	19h 40m 00s	-30°57'44"	7.0	19:11	23:39	04:07
NGC6813	Neb	Vul	19h 40m 22s	+27°18'34"		16:14	23:39	07:04
NGC6820	Neb	Vul	19h 42m 28s	+23°05'17"		16:31	23:41	06:52
NGC6814	Gal	Aql	19h 42m 41s	-10°19'27"	11.2	18:07	23:42	05:16
NGC6823	Open	Vul	19h 43m 09s	+23°18'00"	7.1	16:31	23:42	06:53
NGC6818	P Neb	Sgr	19h 43m 58s	-14°09'10"	10.0	18:19	23:43	05:07
NGC6826	P Neb	Cyg	19h 44m 48s	+50°31'30"	10.0	13:55	23:44	09:32
NGC6833	P Neb	Cyg	19h 49m 47s	+48°57'40"	14.0	14:18	23:49	09:19
NGC6842	P Neb	Vul	19h 55m 02s	+29°17'20"	14.0	16:22	23:54	07:27
M27	P Neb	Vul	19h 59m 36s	+22°43'15"	7.5	16:50	23:59	07:07
NGC6866	Open	Cyg	20h 03m 55s	+44°09'30"	7.6	15:14	00:03	08:52
NGC6871	Open	Cyg	20h 05m 59s	+35°46'38"	5.2	16:05	00:05	08:05
M75	Glob	Sgr	20h 06m 05s	-21°55'19"	9.5	19:05	00:05	05:05
NGC6884	P Neb	Cyg	20h 10m 24s	+46°27'39"	13.0	15:02	00:09	09:16
NGC6879	P Neb	Sge	20h 10m 27s	+16°55'22"	13.0	17:19	00:09	07:00
NGC6881	P Neb	Cyg	20h 10m 52s	+37°24'42"	14.0	16:01	00:10	08:18
NGC6888	Neb	Cyg	20h 12m 06s	+38°21'17"		15:58	00:11	08:25
NGC6886	P Neb	Sge	20h 12m 43s	+19°59'22"	12.0	17:12	00:12	07:12
NGC6891	P Neb	Del	20h 15m 09s	+12°42'16"	12.0	17:36	00:14	06:52
NGC6894	P Neb	Cyg	20h 16m 24s	+30°33'55"	14.0	16:38	00:15	07:53
NGC6905	P Neb	Del	20h 22m 23s	+20°06'16"	12.0	17:21	00:21	07:22
M29	Open	Cyg	20h 23m 57s	+38°30'30"	9.0	16:09	00:23	08:37
NGC6914	Neb	Cyg	20h 24m 43s	+42°28'57"		15:46	00:24	09:01
NGC6960	Neb	Cyg	20h 45m 58s	+30°35'42"		17:07	00:45	08:23
NGC6992	Neb	Cyg	20h 56m 19s	+31°44'36"		17:13	00:55	08:38
NGC6997	Open	Cyg	20h 56m 39s	+44°37'54"	10.0	16:03	00:56	09:48
NGC6995	Neb	Cyg	20h 57m 10s	+31°14'06"		17:16	00:56	08:36
NGC7000	Neb	Cyg	20h 59m 18s	+44°31'00"		16:07	00:58	09:50
NGC7008	P Neb	Cyg	21h 00m 33s	+54°32'35"	13.0	13:56	01:00	12:03

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7023	Open	Cep	21h 01m 36s	+68°10'10"	7.0	Circum	01:01	Circum
NGC7009	P Neb	Aqr	21h 04m 11s	-11°21'50"	8.0	19:32	01:03	06:35
NGC7026	P Neb	Cyg	21h 06m 19s	+47°51'08"	13.0	15:46	01:05	10:25
NGC7027	P Neb	Cyg	21h 07m 02s	+42°14'10"	10.0	16:30	01:06	09:42
NGC7031	Open	Cyg	21h 07m 12s	+50°52'30"	9.1	15:13	01:06	10:59
NGC7039	Open	Cyg	21h 10m 48s	+45°37'00"	7.6	16:10	01:10	10:10
NGC7048	P Neb	Cyg	21h 14m 15s	+46°17'18"	11.0	16:08	01:13	10:19
NGC7063	Open	Cyg	21h 24m 21s	+36°29'12"	7.0	17:19	01:23	09:27
NGC7067	Open	Cyg	21h 24m 23s	+48°00'36"	9.7	16:02	01:23	10:44
NGC7076	Neb	Cep	21h 26m 24s	+62°53'33"		Circum	01:25	Circum
M15	Glob	Peg	21h 29m 58s	+12°10'02"	7.5	18:53	01:29	08:05
NGC7086	Open	Cyg	21h 30m 27s	+51°36'00"	8.4	15:27	01:29	11:32
M39	Open	Cyg	21h 31m 42s	+48°25'00"	5.5	16:06	01:31	10:56
M2	Glob	Aqr	21h 33m 27s	-00°49'23"	7.5	19:32	01:32	07:33
NGC7142	Open	Cep	21h 45m 09s	+65°46'30"	9.3	Circum	01:44	Circum
NGC7144	Gal	Gru	21h 52m 42s	-48°15'15"	10.7	23:02	01:52	04:41
NGC7180	Gal	Aqr	22h 02m 19s	-20°32'51"	12.5	20:57	02:01	07:06
NGC7209	Open	Lac	22h 05m 07s	+46°29'00"	6.7	16:57	02:04	11:11
NGC7213	Gal	Gru	22h 09m 16s	-47°10'00"	10.5	23:10	02:08	05:07
NGC7226	Open	Cep	22h 10m 27s	+55°23'54"	9.6	Circum	02:09	Circum
NGC7235	Open	Cep	22h 12m 25s	+57°16'16"	7.7	Circum	02:11	Circum
NGC7243	Open	Lac	22h 15m 08s	+49°53'54"	6.4	16:33	02:14	11:55
NGC7245	Open	Lac	22h 15m 11s	+54°20'36"	9.2	15:17	02:14	13:11
NGC7232	Gal	Gru	22h 15m 38s	-45°51'02"	13.0	23:06	02:15	05:24
NGC7328	Gal	Peg	22h 37m 29s	+10°31'54"	14.0	20:05	02:36	09:08
NGC7354	P Neb	Cep	22h 40m 20s	+61°17'07"	13.0	Circum	02:39	Circum
NGC7410	Gal	Gru	22h 55m 01s	-39°39'42"	10.4	23:06	02:54	06:42
NGC7412	Gal	Gru	22h 55m 46s	-42°38'30"	11.4	23:24	02:55	06:25
NGC7424	Gal	Gru	22h 57m 18s	-41°04'16"	11.0	23:16	02:56	06:36
NGC7457	Gal	Peg	23h 01m 00s	+30°08'41"	10.8	19:24	03:00	10:36
NGC7492	Glob	Aqr	23h 08m 27s	-15°36'41"	11.5	21:48	03:07	08:27
NGC7497	Gal	Peg	23h 09m 04s	+18°10'36"	13.0	20:14	03:08	10:02
NGC7496	Gal	Gru	23h 09m 47s	-43°25'40"	11.1	23:43	03:09	06:35
NGC7538	Neb	Cep	23h 13m 38s	+61°30'42"		Circum	03:13	Circum
NGC7552	Gal	Gru	23h 16m 11s	-42°35'05"	10.7	23:44	03:15	06:46
NGC7576	Gal	Aqr	23h 17m 23s	-04°43'43"	13.0	21:26	03:16	09:06
NGC7590	Gal	Gru	23h 18m 55s	-42°14'22"	11.6	23:45	03:18	06:51
NGC7635	Neb	Cas	23h 20m 45s	+61°12'42"		Circum	03:20	Circum
NGC7634	Gal	Peg	23h 21m 42s	+08°53'14"	14.0	20:54	03:21	09:48
M52	Open	Cas	23h 24m 48s	+61°35'36"	8.0	Circum	03:24	Circum
NGC7662	P Neb	And	23h 25m 54s	+42°32'06"	9.0	18:47	03:25	12:03
NGC7686	Open	And	23h 30m 07s	+49°08'00"	5.6	17:57	03:29	13:01
NGC7727	Gal	Aqr	23h 39m 54s	-12°17'35"	10.7	22:10	03:39	09:08
NGC7741	Gal	Peg	23h 43m 54s	+26°04'32"	11.4	20:22	03:43	11:03
NGC7742	Gal	Peg	23h 44m 16s	+10°46'01"	11.5	21:11	03:43	10:16

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7759	Gal	Aqr	23h 48m 55s	-16°32'28"	14.0	22:31	03:48	09:04
NGC7768	Gal	Peg	23h 50m 59s	+27°08'49"	14.0	20:26	03:50	11:14
NGC7788	Open	Cas	23h 56m 46s	+61°23'59"	9.0	Circum	03:56	Circum
NGC7789	Open	Cas	23h 57m 24s	+56°42'30"	6.7	Circum	03:56	Circum
NGC7793	Gal	Scl	23h 57m 50s	-32°35'28"	9.1	23:36	03:57	08:18
NGC7814	Gal	Peg	00h 03m 15s	+16°08'43"	10.5	21:14	04:02	10:50
NGC7822	Neb	Cep	00h 03m 36s	+67°09'00"		Circum	04:03	Circum
NGC7827	Gal	Psc	00h 05m 28s	+05°13'19"	14.0	21:48	04:04	10:21
NGC24	Gal	Scl	00h 09m 56s	-24°57'52"	11.5	23:19	04:09	08:59
NGC40	P Neb	Cep	00h 13m 01s	+72°31'19"	11.0	Circum	04:12	Circum
NGC45	Gal	Cet	00h 14m 04s	-23°10'53"	10.4	23:17	04:13	09:09
NGC55	Gal	Scl	00h 15m 08s	-39°13'12"	8.0	00:24	04:14	08:04
NGC93	Gal	And	00h 22m 03s	+22°24'29"	14.0	21:13	04:21	11:29
NGC103	Open	Cas	00h 25m 16s	+61°19'24"	9.8	Circum	04:24	Circum
NGC134	Gal	Scl	00h 30m 22s	-33°14'44"	10.1	00:11	04:29	08:48
NGC133	Open	Cas	00h 31m 19s	+63°21'00"	9.0	Circum	04:30	Circum
NGC151	Gal	Cet	00h 34m 03s	-09°42'20"	11.5	22:57	04:33	10:09
NGC150	Gal	Scl	00h 34m 16s	-27°48'16"	11.1	23:53	04:33	09:13
NGC157	Gal	Cet	00h 34m 47s	-08°23'46"	10.4	22:54	04:34	10:14
NGC169	Gal	And	00h 36m 52s	+23°59'26"	13.0	21:23	04:36	11:49
NGC200	Gal	Psc	00h 39m 35s	+02°53'15"	14.0	22:28	04:39	10:49
M32	Gal	And	00h 42m 42s	+40°51'54"	9.1	20:14	04:42	13:09
M31	Gal	And	00h 42m 44s	+41°16'08"	4.3	20:12	04:42	13:12
NGC244	Gal	Cet	00h 45m 47s	-15°35'51"	13.3	23:25	04:45	10:04
NGC246	P Neb	Cet	00h 47m 03s	-11°52'19"	8.0	23:16	04:46	10:16
NGC247	Gal	Cet	00h 47m 08s	-20°45'35"	8.9	23:42	04:46	09:50
NGC253	Gal	Scl	00h 47m 33s	-25°17'18"	7.1	23:58	04:47	09:35
NGC278	Gal	Cas	00h 52m 04s	+47°33'02"	10.9	19:34	04:51	14:08
NGC281	Open	Cas	00h 52m 54s	+56°37'29"	7.0	Circum	04:52	Circum
NGC300	Gal	Scl	00h 54m 53s	-37°41'03"	9.0	00:56	04:54	08:52
NGC337	Gal	Cet	00h 59m 50s	-07°34'39"	11.6	23:17	04:59	10:41
NGC345	Gal	Cet	01h 01m 22s	-06°53'05"	13.0	23:16	05:00	10:44
NGC382	Gal	Psc	01h 07m 24s	+32°24'14"	14.0	21:21	05:06	12:52
NGC381	Open	Cas	01h 08m 19s	+61°35'00"	9.0	Circum	05:07	Circum
NGC436	Open	Cas	01h 15m 58s	+58°48'42"	8.8	Circum	05:15	Circum
NGC467	Gal	Psc	01h 19m 10s	+03°18'02"	11.9	23:06	05:18	11:30
NGC470	Gal	Psc	01h 19m 45s	+03°24'35"	11.9	23:07	05:19	11:31
NGC488	Gal	Psc	01h 21m 47s	+05°15'23"	10.3	23:04	05:21	11:38
NGC514	Gal	Psc	01h 24m 04s	+12°55'02"	11.9	22:45	05:23	12:02
NGC523	Gal	And	01h 25m 22s	+34°01'33"	14.0	21:32	05:24	13:17
NGC541	Gal	Cet	01h 25m 44s	-01°22'46"	12.0	23:26	05:25	11:24
NGC559	Open	Cas	01h 29m 31s	+63°18'24"	9.5	Circum	05:28	Circum
NGC578	Gal	Cet	01h 30m 29s	-22°39'59"	10.9	00:32	05:29	10:27
NGC596	Gal	Cet	01h 32m 52s	-07°01'56"	10.9	23:48	05:32	11:15
M103	Open	Cas	01h 33m 23s	+60°39'00"	7.0	Circum	05:32	Circum

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M33	Gal	Tri	01h 33m 51s	+30°39'37"	6.2	21:55	05:33	13:11
NGC613	Gal	Scl	01h 34m 18s	-29°25'08"	10.0	01:00	05:33	10:07
M74	Gal	Psc	01h 36m 42s	+15°47'01"	9.8	22:49	05:36	12:23
NGC648	Gal	Cet	01h 38m 40s	-17°49'55"	14.0	00:25	05:38	10:50
M76	P Neb	Per	01h 42m 18s	+51°34'15"	12.0	19:39	05:41	15:44
NGC659	Open	Cas	01h 44m 24s	+60°40'24"	7.9	Circum	05:43	Circum
NGC663	Open	Cas	01h 46m 09s	+61°14'06"	7.1	Circum	05:45	Circum
NGC672	Gal	Tri	01h 47m 54s	+27°25'59"	10.8	22:21	05:47	13:12
NGC676	Gal	Psc	01h 48m 57s	+05°54'26"	11.0	23:29	05:48	12:07
NGC681	Gal	Cet	01h 49m 11s	-10°25'37"	11.8	00:14	05:48	11:22
NGC718	Gal	Psc	01h 53m 13s	+04°11'43"	11.7	23:38	05:52	12:06
NGC719	Gal	Ari	01h 53m 39s	+19°50'25"	14.0	22:53	05:53	12:52
NGC723	Gal	Cet	01h 53m 46s	-23°45'28"	13.0	00:59	05:53	10:47
NGC741	Gal	Psc	01h 56m 21s	+05°37'43"	11.3	23:37	05:55	12:13
NGC752	Open	And	01h 57m 41s	+37°47'06"	5.7	21:46	05:57	14:07
NGC744	Open	Per	01h 58m 33s	+55°28'24"	7.9	Circum	05:58	Circum
NGC772	Gal	Ari	01h 59m 20s	+19°00'29"	10.3	23:01	05:58	12:55
NGC784	Gal	Tri	02h 01m 17s	+28°50'14"	11.8	22:30	06:00	13:31
NGC821	Gal	Ari	02h 08m 21s	+10°59'41"	10.8	23:34	06:07	12:40

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- Family membership at \$30.00 per year.
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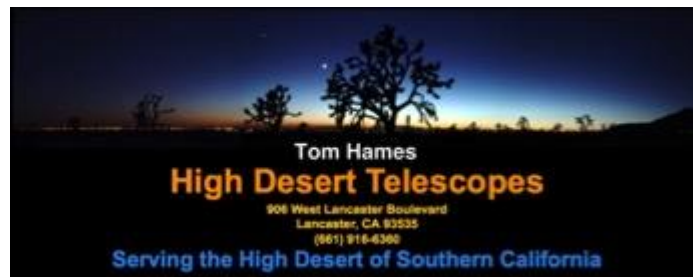


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