ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 38 *Antelope Valley Astronomy Club Newsletter* **July 2018**

Up-Coming Events

July 13: Club Meeting*
July 14: Dark Sky Star Party and Star-B-Que
July 28: 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 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*

President

Frank Moore

It was a mere five days before the summer solstice, the longest day of the year, but that didn't seem to make much difference in the cold temperatures experienced by the small group of AVAC members who ventured up to Mount Pinos on the night of June 16. Even our intrepid Matt Leone, snow mobile suit and all, was driven indoors by midnight.

Matt Leone had gone up on the night of Friday June 15 and reported that it was beautiful and warm up there. By Saturday night, however, conditions had changed drastically and for Matt and Michael Leone, Rod Girard, and Chuck Ruff and his granddaughter it was a cold and windy night. Though it was cold, AVAC Treasure Rod Girard reported the sky was dark, clear, and steady with good seeing. Before the cold drove him away, Rod spent the night looking for Galaxies which were in the process of colliding and found several like the Antenna Galaxies and the Siamese Galaxies. By about 11:00 PM most of the people from other clubs had left or were packing up. Rose and I were unable to attend as we were at a concert.

On Sunday June 25, twenty-five of our members went up for our half-night of observing on the 60" telescope at the Mount Wilson Observatory. After meeting at the Pearblossom Park and Ride, we broke up into groups and carpooled up Angeles Crest Highway to the observatory. Rose and I, as usual, overestimated our travel time and we arrived at the gate 45 minutes earlier than the scheduled time to meet our guide. He, however, saw us on the camera at the gate and came early to take us in and start our tour.

In recognition of the 150th birthday of solar astronomer, entrepreneur, and Mount Wilson Observatory founder George Ellory Hale, much of the tour and presentation focused on the building process for the observatory from inception, to funding, to completion and the science that followed. It was really a fascinating tour and I learned facts that I had not known before.

Though it was still a little lower than might be optimal, our telescope operator Geovanni Somoza (yes, that Geo Somoza, LAAS, Planetary Society, Griffith Observatory and repeat AVAC guest speaker) started our session with Jupiter so we could see a transit of the Great Red Spot. Even through a little extra atmosphere, it looked stunning with the bands and Red Spot more distinct than I've ever seen from an earth based telescope.

Deep sky objects we observed included the Cat's Eye Nebula (NC6543), the Ring Nebula (M57), Campbell's hydrogen Star, the Whirlpool Galaxy (M51), Arcturus, the Hercules Cluster (M13), and the pièce de résistance, the late rising Saturn which put on a spectacular show appearing to be in high definition with distinct bands and gorgeous rings which were tilted at the perfect angle. Like Jupiter, it was absolutely gorgeous and the best I have seen through an earth based telescope!

Don't miss our Annual Star-B-Cue / Picnic, followed by our public outreach event, at the Brite Lake Recreational Area near Tehachapi on Saturday July 14. We're looking to start a little early, like at about 3:00, to give more time to setup telescopes after the picnic and before the public begin to arrive. I'll be happy if we start to serve at 4:00 but plan on arriving early so we can get started on time. Detailed information and maps will follow in separate emails.

Secretary

Rose Moore

Coming up on Saturday July 14th is our summer picnic, or Star-B-Que. We will be starting at 3pm, a bit earlier, to allow us time to cook, eat, clean up, and have our silent auction and raffle. This is also to allow members time to set up their telescopes for the public star party to follow, starting around 7:30-8:00 pm. Please sign up asap, we need to know a head count by Wednesday July 11th, so that we can get the proper amount of food and items for the picnic. The club will be supplying the hamburgers, hot dogs, buns, utensils, paper plates, napkins, charcoal, and drinks If you would like to bring a side dish or a dessert, please let me know, but it is not necessary. The picnic is open to members and their guest(s) only.

If you have any items you would like to donate to the raffle or silent auction, please bring it to the picnic. If you are not coming to the picnic, but have something to donate, please bring it to the meeting on Friday July 13th. There will be auction sheets to fill out for the silent auction items at the picnic.

On Saturday July 28th we have a Prime Desert Moon Walk. We'll need members with telescopes. Start time is 8:30pm, set up time about 1 hour prior. Weather permitting.

Many thanks to those members who attended the Mt. Wilson trip!! We all had a very enjoyable trip at the observatory. Our group had a pre tour prior to observing. We looked at Arcturus, M51, Campbell's Star, M57, the Cats Eye Nebula, Jupiter, and Saturn. Maybe more?

MEMBER'S TELESCOPE FOR SALE:

One of our members is selling his 12 inch LightBridge telescope. It includes a 10 inch riser, a light hood/dew shield, dust cover, light skirt, lens case, laser collimator, Meade QX 15 mm Wide Angle, W 70 series eyepiece 7.4mm, Meade QX 26 mm wide angle, polarized filters, laser, Telrad, red flashlight, Coleman magnetic red bench light, Meade gadget bag. I believe he wants to sell everything together. If you want to see pictures of the items being sold or further info, please email me.

Space Place

A Close-Up View of Mars

By Jane Houston Jones and Jessica Stoller-Conrad

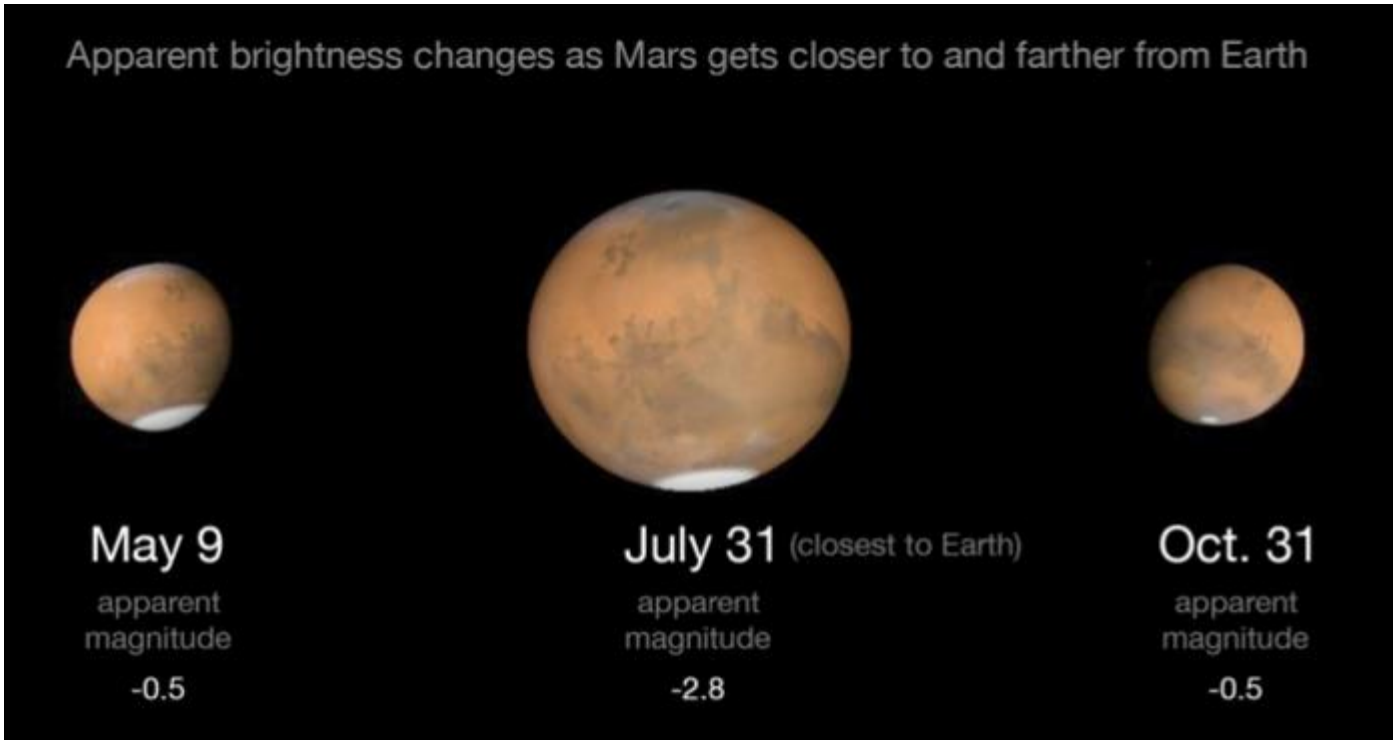
In July 2018, skywatchers can get an up close view of Mars—even without a telescope! In fact, on July 31, Mars will be closer to Earth than it has been in 15 years.

Why is that?

Like all the planets in our solar system, Earth and Mars orbit the Sun. Earth is closer to the Sun, and therefore it races along its orbit more quickly. Earth makes two trips around the Sun in about the same amount of time that Mars takes to make one trip.

Sometimes the two planets are on opposite sides of the Sun and are very far apart. Other times, Earth catches up with its neighbor and passes relatively close to it. This is called Mars's closest approach to Earth, and it's happening this year on July 31. The Moon will be near Mars on that night, too!

Keep in mind that even during its closest approach, Mars is still more than 35 million miles away from Earth. That's really far. So, Mars won't appear as big as the Moon in the sky, but it will appear bigger than it usually does.



In 2018, Mars will appear brightest from July 27 to July 30. Its closest approach to Earth is July 31. That is the point in Mars' orbit when it comes closest to Earth. Mars will be at a distance of 35.8 million miles (57.6 million kilometers). Credit: NASA/JPL-Caltech

July and August will be a great time to check out Mars. Through a telescope, you should normally be able to make out some of the light and dark features of the Red Planet—and sometimes even polar ice. However, a huge Martian dust storm is obscuring these features right now, so less planetary detail is visible.

There is another important Mars date in July: Mars opposition. Mars opposition is when Mars, Earth and the Sun all line up, with Earth directly in the middle. This event is happening on July 27 this year.

Although you may see news focusing on one of these two dates, Mars will be visible for many months. For about three weeks before and three weeks after opposition and closest approach, the planet will appear the same size to a skywatcher.

From July 7 through September 7 Mars will be the third brightest object in the sky (after the Moon and Venus), shining even brighter than Jupiter. The best time to view Mars during this time is several hours after sunset, when Mars will appear higher in the sky.

Mars will still be visible after July and August, but each month it will shrink in size as it travels farther from Earth in its orbit around the Sun.

In other sky news, there will be a partial solar eclipse on July 13, but it will only be visible from Northern Antarctica and southern Australia. On July 27 (beginning at 20:21 UTC), a total lunar eclipse will be visible in Australia, Asia, Africa, Europe and South America. For those viewers, Mars will be right next to the eclipsing Moon!

If you're wanting to look ahead to next month, prepare for August's summer Perseid meteor shower. It's not too early to plan a dark sky getaway for the most popular meteor shower of the year!

You can catch up on NASA's missions to Mars and all of NASA's missions at http://www.nasa.gov/

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

NASA Awards Contract to Continue Operations of JPL
NASA has awarded a contract to Caltech in Pasadena, California, to extend operations of the agency's Jet Propulsion Laboratory, also in Pasadena, for five years, with options for five one-year extensions. The contract extends the agreement between Caltech and NASA for management of JPL beyond its current expiration date of Sept. 30, 2018, and has a value of $15 billion for five years.
https://go.nasa.gov/2IEM7Sl

ECOSTRESS Launches to Space Station on SpaceX Mission
An Earth science instrument built by NASA's Jet Propulsion Laboratory in Pasadena, California, and experiments investigating cellular biology and artificial intelligence, are among the research heading to the International Space Station following Friday's launch of a NASA-contracted SpaceX Dragon spacecraft.
https://go.nasa.gov/2tFrot0

NASA Delays Launch of James Webb Space Telescope to 2021
The liftoff of Webb, the successor to the agency's iconic Hubble Space Telescope, has been pushed back from May 2020 to March 2021, NASA officials announced today (June 27). The project's development cost has risen from $8 billion to $8.8 billion, and its total lifecycle price tag now stands at $9.66 billion, they added.
https://bit.ly/2tGjYWc

Complex Organics Bubble up from Enceladus
Data from NASA's Cassini spacecraft reveal complex organic molecules originating from Saturn's icy moon Enceladus, strengthening the idea that this ocean world hosts conditions suitable for life. Research results show much larger, heavier molecules than ever before.
https://www.jpl.nasa.gov/news/news.php?feature=7174

NASA Concerned but Hopeful for Oppy's Future
A dust storm on Mars is threatening NASA's intrepid rover, Opportunity, but its human operators are hopeful that the 15-year-old robot will make it through. For now, Oppy, as it is fondly known, is asleep… waiting for enough power from its solar arrays to wake up and phone home.
https://spacepolicyonline.com/news/nasa-concerned-but-hopeful-for-oppys-future/#.WyGXfj8SQ6o.facebook

Speeding interstellar object 'Oumuamua is a comet, not an asteroid
Ever since Rob Weryk first spotted 'Oumuamua zipping through the solar system in October 2017, the peculiar object has been the target of intense scrutiny for astronomers from around the globe. After confirming the suspected asteroid reached a maximum speed of nearly 200,000 miles per hour during its closest approach to the Sun (and is shaped like a cigar), researchers quickly shifted their focus to determining the composition and origin of this mysterious object.
http://www.astronomy.com/news/2018/06/speeding-interstellar-object-oumuamua-is-a-comet-not-an-asteroid

July Sky Data

Planet Summary

Mercury shining at around 0 magnitude early in the month reaches greatest elongation west of the Sun on July 12th. It will be then be seen about 15 degrees down to the lower right of Venus but will have dimmed to magnitude +1 by the 17th and and then rapidly fade from view into the Sun's glare.

Venus can be seen low in the west after sunset. During July, its illuminated phase thins from ~70% to ~57% but, at the same time, the angular diameter of its disk increases from 16 to 20 arc seconds. On July 9th Venus is close to Regulus in Leo and on the 15th to a waxing crescent Moon.

Mars begins the month rising about 2 hours after sunset shining at magnitude -2 but its brightness peaks at -2.6 during the final week of July. Its angular size reachs 24.3 arc seconds at closest approach but will exceed 24 arc seconds from July 24th until August 8th. With a small telescope it will be possible to spot details, such as Syrtis Major, on its salmon-pink surface.

Jupiter can be seen due south soon after sunset at the start of the month and over towards the southwest as the month progresses. It shines at magnitude -1.9 (falling to -1.7 during the month) and has a disk some 41.5 (falling to 38) arc seconds across.

will be visible during all the hours of darkness. Its disk has an angular size of 18.4 arc seconds falling to 18.0 during the month. Its brightness reduces from +1.1 to +1.3 as the month progresses. The rings were at their widest some months ago and are still, at 26 degrees to the line of sight, well open and spanning ~2.5 times the size of Saturn's globe. Lying in Sagittarius, it is close to the topmost star of the 'teapot' slowly moving to within a few degrees of M8 and M20

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
7/1/2018	22:42	08:48	05:46	20:06
7/5/2018	00:22	12:29	05:48	20:06
7/10/2018	03:29	17:46	05:51	20:05
7/15/2018	08:48	22:29	05:54	20:03
7/20/2018	14:07	00:52	05:57	20:00
7/25/2018	18:37	04:08	06:00	19:57
7/31/2018	22:23	09:27	06:05	19:53

Planet Data

Jul 1

	Rise	Transit	Set	Mag
Mercury	07:41	14:42	21:44	0.2
Venus	09:02	15:51	22:39	-3.6
Mars	22:11	03:08	08:04	-2.0
Jupiter	15:39	21:01	02:23	-1.9
Saturn	19:42	00:40	05:38	1.1

Jul 15

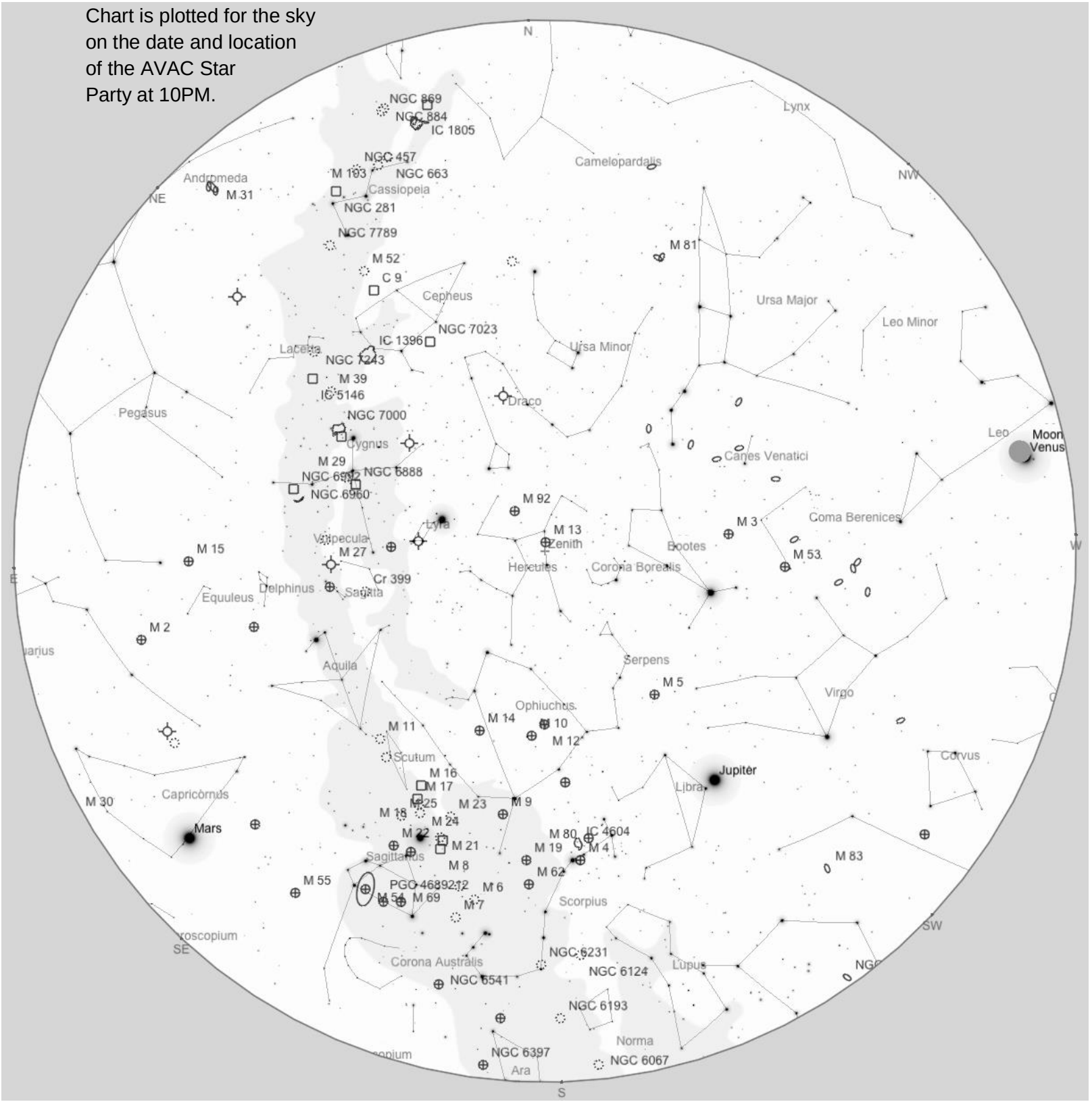
	Rise	Transit	Set	Mag
Mercury	08:05	14:46	21:28	0.9
Venus	09:24	15:55	22:26	-3.7
Mars	21:13	02:05	06:57	-2.4
Jupiter	14:44	20:06	01:28	-1.8
Saturn	18:42	23:40	04:38	1.2

Jul 31

	Rise	Transit	Set	Mag
Mercury	07:20	13:50	20:20	2.0
Venus	09:45	15:55	22:05	-3.8
Mars	19:58	00:45	05:31	-2.6
Jupiter	13:44	19:05	00:26	-1.7
Saturn	17:35	22:33	03:31	1.3

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
NGC5946	Glob	Nor	15h 35m 28s	-50°39'33"	9.6	19:31	21:56	00:22
NGC5962	Gal	Ser	15h 36m 32s	+16°36'28"	11.4	15:08	21:57	04:47
NGC5986	Glob	Lup	15h 46m 04s	-37°47'08"	7.1	18:09	22:07	02:05
NGC6011	Gal	UMi	15h 46m 33s	+72°10'10"	14.0	Circum	22:07	Circum
NGC6015	Gal	Dra	15h 51m 25s	+62°18'35"	11.2	Circum	22:12	Circum
NGC6058	P Neb	Her	16h 04m 27s	+40°40'59"	13.0	13:59	22:25	06:52
NGC6031	Open	Nor	16h 07m 35s	-54°00'54"	8.5	20:51	22:28	00:06
NGC6072	P Neb	Sco	16h 12m 58s	-36°13'47"	14.0	18:29	22:34	02:39
NGC6067	Open	Nor	16h 13m 11s	-54°13'06"	5.6	21:00	22:34	00:08
M80	Glob	Sco	16h 17m 03s	-22°58'32"	8.5	17:41	22:38	03:34
M4	Glob	Sco	16h 23m 35s	-26°31'35"	7.5	18:00	22:44	03:29
NGC6124	Open	Sco	16h 25m 20s	-40°39'12"	5.8	19:04	22:46	02:29
NGC6139	Glob	Sco	16h 27m 40s	-38°50'57"	9.2	18:56	22:49	02:41
NGC6153	P Neb	Sco	16h 31m 31s	-40°15'13"	12.0	19:08	22:52	02:37
NGC6181	Gal	Her	16h 32m 21s	+19°49'32"	11.9	15:54	22:53	05:53
NGC6152	Open	Nor	16h 32m 45s	-52°38'36"	8.0	20:53	22:54	00:54
NGC6167	Open	Nor	16h 34m 34s	-49°46'18"	6.7	20:21	22:55	01:30
NGC6178	Open	Sco	16h 35m 47s	-45°38'36"	7.2	19:46	22:57	02:07
NGC6188	Neb	Ara	16h 40m 05s	-48°39'42"		20:15	23:01	01:47
NGC6192	Open	Sco	16h 40m 23s	-43°22'00"	9.0	19:35	23:01	02:27
NGC6193	Open	Ara	16h 41m 20s	-48°45'48"	5.2	20:18	23:02	01:47
M13	Glob	Her	16h 41m 41s	+36°27'35"	7.0	14:59	23:03	07:06
NGC6207	Gal	Her	16h 43m 04s	+36°49'56"	11.6	14:58	23:04	07:10
NGC6200	Open	Ara	16h 44m 07s	-47°27'48"	7.4	20:09	23:05	02:01
NGC6210	P Neb	Her	16h 44m 30s	+23°47'59"	9.0	15:53	23:05	06:18
M12	Glob	Oph	16h 47m 14s	-01°56'52"	8.0	17:11	23:08	05:06
NGC6216	Open	Sco	16h 49m 24s	-44°43'42"	10.0	19:53	23:10	02:27
NGC6235	Glob	Oph	16h 53m 25s	-22°10'34"	10.2	18:15	23:14	04:13
NGC6231	Open	Sco	16h 54m 10s	-41°49'30"	2.6	19:39	23:15	02:51
NGC6242	Open	Sco	16h 55m 33s	-39°27'42"	6.4	19:27	23:16	03:05
M10	Glob	Oph	16h 57m 09s	-04°05'56"	7.5	17:26	23:18	05:10
NGC6249	Open	Sco	16h 57m 41s	-44°48'42"	8.2	20:02	23:19	02:35
NGC6250	Open	Ara	16h 57m 56s	-45°56'12"	5.9	20:11	23:19	02:27
NGC6253	Open	Ara	16h 59m 05s	-52°42'30"	10.0	21:21	23:20	01:19
NGC6259	Open	Sco	17h 00m 45s	-44°39'18"	8.0	20:04	23:22	02:39
NGC6278	Gal	Her	17h 00m 50s	+23°00'40"	14.0	16:12	23:22	06:32
NGC6268	Open	Sco	17h 02m 10s	-39°43'42"	10.0	19:35	23:23	03:11
NGC6281	Open	Sco	17h 04m 41s	-37°59'06"	5.4	19:29	23:26	03:22
NGC6302	P Neb	Sco	17h 13m 44s	-37°06'12"	13.0	19:34	23:35	03:36

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6309	P Neb	Oph	17h 14m 04s	-12°54'38"	11.0	18:08	23:35	05:02
NGC6316	Glob	Oph	17h 16m 37s	-28°08'23"	9.0	18:59	23:38	04:16
M92	Glob	Her	17h 17m 07s	+43°08'11"	7.5	14:56	23:38	08:20
NGC6322	Open	Sco	17h 18m 25s	-42°56'00"	6.0	20:10	23:39	03:08
NGC6326	P Neb	Ara	17h 20m 46s	-51°45'17"	12.0	21:29	23:42	01:54
NGC6334	Neb	Sco	17h 20m 49s	-36°06'12"		19:36	23:42	03:47
NGC6342	Glob	Oph	17h 21m 10s	-19°35'14"	9.9	18:35	23:42	04:49
NGC6363	Gal	Her	17h 22m 40s	+41°06'06"	14.0	15:15	23:44	08:13
NGC6357	Neb	Sco	17h 24m 43s	-34°12'06"		19:31	23:46	04:00
NGC6352	Glob	Ara	17h 25m 29s	-48°25'21"	8.2	20:59	23:46	02:34
NGC6372	Gal	Her	17h 27m 32s	+26°28'28"	14.0	16:27	23:48	07:10
NGC6366	Glob	Oph	17h 27m 44s	-05°04'36"	10.0	18:00	23:49	05:38
NGC6385	Gal	Dra	17h 28m 02s	+57°31'18"	14.0	Circum	23:49	Circum
NGC6369	P Neb	Oph	17h 29m 21s	-23°45'34"	13.0	18:56	23:50	04:44
NGC6384	Gal	Oph	17h 32m 24s	+07°03'37"	10.6	17:31	23:53	06:15
NGC6374	Open	Sco	17h 34m 42s	-32°34'54"	9.0	19:34	23:56	04:17
NGC6388	Glob	Sco	17h 36m 17s	-44°44'08"	6.9	20:40	23:57	03:14
NGC6401	Glob	Oph	17h 38m 37s	-23°54'33"	9.5	19:06	00:00	04:53
NGC6400	Open	Sco	17h 40m 12s	-36°56'54"	9.0	19:59	00:01	04:03
M6	Open	Sco	17h 40m 20s	-32°15'12"	4.5	19:39	00:01	04:24
NGC6397	Glob	Ara	17h 40m 42s	-53°40'26"	5.7	22:18	00:02	01:45
NGC6416	Open	Sco	17h 44m 19s	-32°21'42"	5.7	19:43	00:05	04:27
NGC6426	Glob	Oph	17h 44m 55s	+03°10'11"	11.2	17:55	00:06	06:17
NGC6440	Glob	Sgr	17h 48m 53s	-20°21'39"	9.7	19:05	00:10	05:15
NGC6445	P Neb	Sgr	17h 49m 15s	-20°00'36"	13.0	19:04	00:10	05:16
NGC6503	Gal	Dra	17h 49m 27s	+70°08'40"	10.2	Circum	00:10	Circum
NGC6441	Glob	Sco	17h 50m 13s	-37°03'03"	7.4	20:10	00:11	04:12
NGC6453	Glob	Sco	17h 50m 52s	-34°35'54"	9.9	19:59	00:12	04:24
NGC6482	Gal	Her	17h 51m 49s	+23°04'19"	11.3	17:03	00:13	07:23
M7	Open	Sco	17h 53m 51s	-34°47'36"	3.5	20:03	00:15	04:26
NGC6495	Gal	Her	17h 54m 51s	+18°19'37"	14.0	17:21	00:16	07:10
M23	Open	Sgr	17h 57m 04s	-18°59'06"	6.0	19:09	00:18	05:27
NGC6543	P Neb	Dra	17h 58m 33s	+66°37'59"	9.0	Circum	00:19	Circum
NGC6496	Glob	Sco	17h 59m 04s	-44°16'00"	9.2	21:00	00:20	03:40
M20	Neb	Sgr	18h 02m 42s	-22°58'18"	5.0	19:27	00:24	05:20
NGC6520	Open	Sgr	18h 03m 24s	-27°53'18"	8.0	19:45	00:24	05:04
NGC6522	Glob	Sgr	18h 03m 35s	-30°02'06"	8.6	19:53	00:24	04:56
M8	Neb	Sgr	18h 03m 41s	-24°22'48"	5.0	19:33	00:25	05:16
NGC6526	Neb	Sgr	18h 04m 06s	-24°26'30"		19:33	00:25	05:17
M21	Open	Sgr	18h 04m 13s	-22°29'24"	7.0	19:27	00:25	05:23
NGC6530	Open	Sgr	18h 04m 31s	-24°21'30"	4.6	19:34	00:25	05:17
NGC6528	Glob	Sgr	18h 04m 50s	-30°03'21"	9.5	19:54	00:26	04:57
NGC6537	P Neb	Sgr	18h 05m 13s	-19°50'35"	13.0	19:20	00:26	05:33
NGC6546	Open	Sgr	18h 07m 22s	-23°17'48"	8.0	19:33	00:28	05:24
NGC6541	Glob	CrA	18h 08m 02s	-43°42'57"	6.6	21:05	00:29	03:53

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6553	Glob	Sgr	18h 09m 17s	-25°54'30"	8.3	19:44	00:30	05:17
NGC6559	Neb	Sgr	18h 09m 57s	-24°06'23"		19:38	00:31	05:24
NGC6563	P Neb	Sgr	18h 12m 03s	-33°52'07"	14.0	20:17	00:33	04:49
NGC6572	P Neb	Oph	18h 12m 06s	+06°51'13"	9.0	18:12	00:33	06:54
NGC6569	Glob	Sgr	18h 13m 39s	-31°49'35"	8.7	20:10	00:35	04:59
NGC6567	P Neb	Sgr	18h 13m 45s	-19°04'34"	12.0	19:26	00:35	05:44
NGC6578	P Neb	Sgr	18h 16m 16s	-20°27'03"	13.0	19:33	00:37	05:42
NGC6605	Open	Ser	18h 16m 24s	-15°00'00"	6.0	19:16	00:37	05:58
M24	Open	Sgr	18h 18m 26s	-18°24'24"	4.5	19:28	00:39	05:50
M16	Neb	Ser	18h 18m 48s	-13°48'24"	6.5	19:15	00:40	06:04
NGC6619	Gal	Her	18h 18m 55s	+23°39'20"	14.0	17:28	00:40	07:52
M18	Open	Sgr	18h 19m 58s	-17°06'07"	8.0	19:26	00:41	05:56
NGC6625	Open	Sct	18h 23m 01s	-12°01'24"	9.0	19:14	00:44	06:14
NGC6654	Gal	Dra	18h 24m 08s	+73°10'58"	11.6	Circum	00:45	Circum
NGC6629	P Neb	Sgr	18h 25m 42s	-23°12'10"	12.0	19:51	00:47	05:42
NGC6633	Open	Oph	18h 27m 15s	+06°30'30"	4.6	18:28	00:48	07:09
M69	Glob	Sgr	18h 31m 23s	-32°20'51"	9.0	20:30	00:52	05:14
M25	Open	Sgr	18h 31m 42s	-19°07'00"	6.5	19:44	00:53	06:01
NGC6642	Glob	Sgr	18h 31m 54s	-23°28'35"	8.8	19:58	00:53	05:48
NGC6644	P Neb	Sgr	18h 32m 35s	-25°07'44"	12.0	20:04	00:53	05:43
NGC6647	Open	Sgr	18h 32m 49s	-17°13'42"	8.0	19:39	00:54	06:08
NGC6649	Open	Sct	18h 33m 27s	-10°24'12"	8.9	19:20	00:54	06:29
NGC6652	Glob	Sgr	18h 35m 46s	-32°59'28"	8.9	20:37	00:57	05:16
M22	Glob	Sgr	18h 36m 24s	-23°54'17"	6.5	20:04	00:57	05:51
NGC6664	Open	Sct	18h 36m 33s	-08°13'12"	7.8	19:17	00:57	06:38
NGC6683	Open	Sct	18h 42m 13s	-06°12'42"	10.0	19:17	01:03	06:49
M26	Open	Sct	18h 45m 18s	-09°23'00"	9.5	19:29	01:06	06:43
M11	Open	Sct	18h 51m 05s	-06°16'12"	7.0	19:26	01:12	06:58
M57	P Neb	Lyr	18h 53m 35s	+33°01'44"	9.5	17:27	01:14	09:02
NGC6723	Glob	Sgr	18h 59m 33s	-36°37'54"	7.3	21:17	01:20	05:24
NGC6726	Neb	CrA	19h 01m 39s	-36°53'30"		21:21	01:23	05:25
NGC6729	Neb	CrA	19h 01m 55s	-36°57'30"		21:21	01:23	05:25
NGC6741	P Neb	Aql	19h 02m 37s	-00°26'57"	11.0	19:22	01:24	07:25
NGC6749	Glob	Aql	19h 05m 15s	+01°54'02"	11.1	19:18	01:26	07:34
NGC6751	P Neb	Aql	19h 05m 56s	-05°59'31"	13.0	19:40	01:27	07:13
NGC6755	Open	Aql	19h 07m 49s	+04°16'00"	7.5	19:14	01:29	07:43
NGC6760	Glob	Aql	19h 11m 12s	+01°01'50"	9.1	19:27	01:32	07:38
NGC6772	P Neb	Aql	19h 14m 36s	-02°42'24"	14.0	19:40	01:36	07:31
NGC6778	P Neb	Aql	19h 18m 25s	-01°35'48"	13.0	19:41	01:39	07:38
NGC6781	P Neb	Aql	19h 18m 28s	+06°32'20"	12.0	19:19	01:39	08:00
NGC6790	P Neb	Aql	19h 22m 57s	+01°30'48"	10.0	19:37	01:44	07:51
NGC6803	P Neb	Aql	19h 31m 16s	+10°03'23"	11.0	19:22	01:52	08:23
NGC6804	P Neb	Aql	19h 31m 35s	+09°13'31"	12.0	19:25	01:52	08:20
NGC6807	P Neb	Aql	19h 34m 34s	+05°41'03"	14.0	19:37	01:55	08:14
M55	Glob	Sgr	19h 40m 00s	-30°57'44"	7.0	21:33	02:01	06:29

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6813	Neb	Vul	19h 40m 22s	+27°18'34"		18:36	02:01	09:26
NGC6819	Open	Cyg	19h 41m 18s	+40°11'12"	7.3	17:39	02:02	10:26
NGC6820	Neb	Vul	19h 42m 28s	+23°05'17"		18:53	02:03	09:13
NGC6814	Gal	Aql	19h 42m 41s	-10°19'27"	11.2	20:29	02:04	07:38
NGC6823	Open	Vul	19h 43m 09s	+23°18'00"	7.1	18:53	02:04	09:15
NGC6824	Gal	Cyg	19h 43m 41s	+56°06'34"	11.9	Circum	02:05	Circum
NGC6818	P Neb	Sgr	19h 43m 58s	-14°09'10"	10.0	20:41	02:05	07:28
NGC6826	P Neb	Cyg	19h 44m 48s	+50°31'30"	10.0	16:17	02:06	11:54
NGC6822	Gal	Sgr	19h 44m 57s	-14°48'10"	9.0	20:44	02:06	07:28
M71	Glob	Sge	19h 53m 46s	+18°46'42"	8.5	19:19	02:15	09:11
NGC6842	P Neb	Vul	19h 55m 02s	+29°17'20"	14.0	18:43	02:16	09:48
M27	P Neb	Vul	19h 59m 36s	+22°43'15"	7.5	19:12	02:21	09:29
NGC6871	Open	Cyg	20h 05m 59s	+35°46'38"	5.2	18:26	02:27	10:27
NGC6861	Gal	Tel	20h 07m 19s	-48°22'12"	11.1	23:40	02:28	05:16
NGC6884	P Neb	Cyg	20h 10m 24s	+46°27'39"	13.0	17:24	02:31	11:38
NGC6879	P Neb	Sge	20h 10m 27s	+16°55'22"	13.0	19:41	02:31	09:22
NGC6881	P Neb	Cyg	20h 10m 52s	+37°24'42"	14.0	18:23	02:32	10:40
NGC6883	Open	Cyg	20h 11m 20s	+35°49'55"	8.0	18:32	02:32	10:33
NGC6882	Open	Vul	20h 11m 58s	+26°29'00"	8.1	19:11	02:33	09:55
NGC6888	Neb	Cyg	20h 12m 06s	+38°21'17"		18:20	02:33	10:46
NGC6886	P Neb	Sge	20h 12m 43s	+19°59'22"	12.0	19:34	02:34	09:34
NGC6891	P Neb	Del	20h 15m 09s	+12°42'16"	12.0	19:58	02:36	09:14
NGC6894	P Neb	Cyg	20h 16m 24s	+30°33'55"	14.0	19:00	02:37	10:15
NGC6905	P Neb	Del	20h 22m 23s	+20°06'16"	12.0	19:43	02:43	09:44
NGC6910	Open	Cyg	20h 23m 12s	+40°46'42"	7.4	18:17	02:44	11:11
M29	Open	Cyg	20h 23m 57s	+38°30'30"	9.0	18:31	02:45	10:59
NGC6914	Neb	Cyg	20h 24m 43s	+42°28'57"		18:08	02:46	11:23
NGC6939	Open	Cep	20h 31m 30s	+60°39'42"	7.8	Circum	02:52	Circum
NGC6934	Glob	Del	20h 34m 11s	+07°24'17"	8.9	20:32	02:55	09:18
NGC6925	Gal	Mic	20h 34m 21s	-31°58'50"	11.3	22:32	02:55	07:19
NGC6940	Open	Vul	20h 34m 26s	+28°17'00"	6.3	19:27	02:55	10:24
NGC6946	Gal	Cyg	20h 34m 52s	+60°09'14"	8.9	Circum	02:56	Circum
NGC6951	Gal	Cep	20h 37m 14s	+66°06'21"	11.1	Circum	02:58	Circum
NGC6944	Gal	Del	20h 38m 24s	+06°59'48"	13.3	20:38	02:59	09:21
NGC6960	Neb	Cyg	20h 45m 58s	+30°35'42"		19:29	03:07	10:45
NGC6963	Gal	Aqr	20h 47m 19s	+00°30'33"	14.1	21:04	03:08	09:12
M72	Glob	Aqr	20h 53m 28s	-12°32'14"	10.0	21:46	03:14	08:43
NGC6992	Neb	Cyg	20h 56m 19s	+31°44'36"		19:35	03:17	11:00
NGC6995	Neb	Cyg	20h 57m 10s	+31°14'06"		19:38	03:18	10:58
NGC7000	Neb	Cyg	20h 59m 18s	+44°31'00"		18:28	03:20	12:12
NGC7008	P Neb	Cyg	21h 00m 33s	+54°32'35"	13.0	16:18	03:21	14:25
NGC7006	Glob	Del	21h 01m 29s	+16°11'15"	10.6	20:34	03:22	10:11
NGC7009	P Neb	Aqr	21h 04m 11s	-11°21'50"	8.0	21:54	03:25	08:57
NGC7027	P Neb	Cyg	21h 07m 02s	+42°14'10"	10.0	18:52	03:28	12:04
NGC7029	Gal	Ind	21h 11m 52s	-49°17'00"	11.8	00:53	03:33	06:12

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7048	P Neb	Cyg	21h 14m 15s	+46°17'18"	11.0	18:30	03:35	12:41
NGC7049	Gal	Ind	21h 19m 00s	-48°33'46"	10.7	00:53	03:40	06:26
NGC7076	Neb	Cep	21h 26m 24s	+62°53'33"		Circum	03:47	Circum
NGC7082	Open	Cyg	21h 29m 17s	+47°07'36"	7.2	18:37	03:50	13:03
M15	Glob	Peg	21h 29m 58s	+12°10'02"	7.5	21:15	03:51	10:27
M39	Open	Cyg	21h 31m 42s	+48°25'00"	5.5	18:28	03:53	13:18
NGC7079	Gal	Gru	21h 32m 35s	-44°04'02"	11.6	00:32	03:53	07:15
M2	Glob	Aqr	21h 33m 27s	-00°49'23"	7.5	21:54	03:54	09:55
NGC7121	Gal	Aqr	21h 44m 53s	-03°37'12"	14.0	22:13	04:06	09:59
NGC7131	Gal	Cap	21h 47m 36s	-13°10'57"	14.0	22:42	04:09	09:35
NGC7135	Gal	PsA	21h 49m 46s	-34°52'35"	11.7	23:59	04:11	08:22
NGC7144	Gal	Gru	21h 52m 42s	-48°15'15"	10.7	01:24	04:14	07:03
NGC7145	Gal	Gru	21h 53m 20s	-47°52'56"	11.2	01:22	04:14	07:07
NGC7160	Open	Cep	21h 53m 40s	+62°36'12"	6.1	Circum	04:15	Circum
NGC7165	Gal	Aqr	21h 59m 26s	-16°30'45"	14.0	23:04	04:20	09:37
NGC7194	Gal	Peg	22h 03m 31s	+12°38'12"	14.0	21:47	04:24	11:02
NGC7217	Gal	Peg	22h 07m 52s	+31°21'33"	10.2	20:48	04:29	12:10
NGC7213	Gal	Gru	22h 09m 16s	-47°10'00"	10.5	01:32	04:30	07:29
NGC7221	Gal	PsA	22h 11m 15s	-30°33'48"	12.0	00:03	04:32	09:02
NGC7307	Gal	Gru	22h 33m 52s	-40°56'02"	13.0	01:14	04:55	08:36
NGC7314	Gal	PsA	22h 35m 46s	-26°03'01"	10.9	00:11	04:57	09:43
NGC7321	Gal	Peg	22h 36m 28s	+21°37'16"	14.0	21:52	04:57	12:03
NGC7323	Gal	Peg	22h 36m 54s	+19°08'37"	14.0	22:01	04:58	11:55
NGC7330	Gal	Lac	22h 36m 56s	+38°32'52"	13.0	20:43	04:58	13:12
NGC7331	Gal	Peg	22h 37m 04s	+34°24'57"	9.5	21:04	04:58	12:52
NGC7354	P Neb	Cep	22h 40m 20s	+61°17'07"	13.0	Circum	05:01	Circum
NGC7377	Gal	Aqr	22h 47m 47s	-22°18'43"	11.6	00:10	05:09	10:07
NGC7410	Gal	Gru	22h 55m 01s	-39°39'42"	10.4	01:28	05:16	09:04
NGC7457	Gal	Peg	23h 01m 00s	+30°08'41"	10.8	21:46	05:22	12:58
NGC7469	Gal	Peg	23h 03m 16s	+08°52'26"	11.9	22:57	05:24	11:51
NGC7479	Gal	Peg	23h 04m 57s	+12°19'20"	11.0	22:49	05:26	12:03
NGC7492	Glob	Aqr	23h 08m 27s	-15°36'41"	11.5	00:10	05:29	10:49
NGC7510	Open	Cep	23h 11m 04s	+60°34'15"	7.9	Circum	05:32	Circum
NGC7507	Gal	Scl	23h 12m 08s	-28°32'24"	10.4	00:56	05:33	10:10
NGC7518	Gal	Psc	23h 13m 13s	+06°19'17"	14.0	23:14	05:34	11:54
NGC7538	Neb	Cep	23h 13m 38s	+61°30'42"		Circum	05:35	Circum
NGC7541	Gal	Psc	23h 14m 44s	+04°32'02"	11.7	23:21	05:36	11:51
NGC7548	Gal	Peg	23h 15m 11s	+25°16'56"	14.0	22:18	05:36	12:54
NGC7552	Gal	Gru	23h 16m 11s	-42°35'05"	10.7	02:06	05:37	09:08
NGC7582	Gal	Gru	23h 18m 23s	-42°22'14"	10.6	02:07	05:39	09:12
NGC7590	Gal	Gru	23h 18m 55s	-42°14'22"	11.6	02:07	05:40	09:13
NGC7606	Gal	Aqr	23h 19m 05s	-08°29'09"	10.8	00:00	05:40	11:20
NGC7599	Gal	Gru	23h 19m 21s	-42°15'25"	11.4	02:07	05:40	09:13
NGC7626	Gal	Peg	23h 20m 43s	+08°13'01"	11.2	23:16	05:42	12:07
NGC7635	Neb	Cas	23h 20m 45s	+61°12'42"		Circum	05:42	Circum

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7640	Gal	And	23h 22m 07s	+40°50'43"	10.9	21:16	05:43	14:11
NGC7649	Gal	Peg	23h 24m 20s	+14°38'48"	13.7	23:02	05:45	12:29
M52	Open	Cas	23h 24m 48s	+61°35'36"	8.0	Circum	05:46	Circum
NGC7662	P Neb	And	23h 25m 54s	+42°32'06"	9.0	21:09	05:47	14:25
NGC7686	Open	And	23h 30m 07s	+49°08'00"	5.6	20:19	05:51	15:23
NGC7689	Gal	Phe	23h 33m 16s	-54°05'38"	12.0	04:18	05:54	07:30
NGC7723	Gal	Aqr	23h 38m 57s	-12°57'40"	11.1	00:33	06:00	11:27
NGC7727	Gal	Aqr	23h 39m 54s	-12°17'35"	10.7	00:32	06:01	11:30
NGC7728	Gal	Peg	23h 40m 01s	+27°08'01"	14.0	22:37	06:01	13:25
NGC7741	Gal	Peg	23h 43m 54s	+26°04'32"	11.4	22:44	06:05	13:25
NGC7742	Gal	Peg	23h 44m 16s	+10°46'01"	11.5	23:33	06:05	12:38
NGC7747	Gal	Peg	23h 45m 32s	+27°21'36"	14.0	22:41	06:06	13:32
NGC7749	Gal	Scl	23h 45m 47s	-29°31'03"	14.0	01:33	06:07	10:40
NGC7762	Open	Cep	23h 50m 01s	+68°02'18"	10.0	Circum	06:11	Circum

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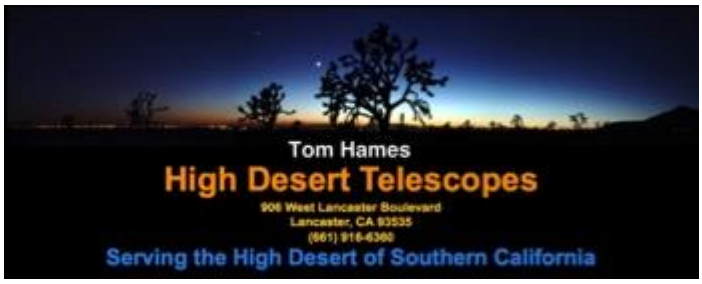

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