



Desert Sky Observer

Volume 38

Antelope Valley Astronomy Club Newsletter

May 2018

Up-Coming Events

- May 5: [Prime Desert Moon Walk](#)
- May 11: Club Meeting*
- May 12: [Dark Sky Star Party](#)
- May 19: [Lunar Club](#)
- May 24-26: [RTMC Camp Oakes](#)
- May 25: [AVAC Outreach Program](#)

* 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

“Long stormy spring-time, wet contentious April, winter chilling the lap of very May; but at length the season of summer does come.” - Thomas Carlyle

Well my friends, is it just me or does everyone else think we're kind of having fits and starts getting warmed up for our observing season? Through most of April, and though we were occasionally teased with a partially clear day or night, it seemed like we always had some cloud cover and one form or another of inclement weather. It seems that May is starting off the same way.

The Prime Desert Woodland Moonwalk on Saturday April 7 was no exception as we were teased by drifting clouds and generally poor viewing conditions. Still, the seven club members on hand were able to share a few deep space objects as well as Jupiter and four of its moons with 35 members of the public.

On the following Saturday, April 14, the conditions for our Messier Marathon, at Saddleback Butte State Park, were much better but we were still teased by clouds which moved in and out throughout the night. We had an estimated 30 people in attendance with no fewer than ten telescopes of various shapes and sizes. Unfortunately, as people came and went (or just stayed and went to bed) at various times throughout the night, I never got an official count as to how many Messier Objects each observer bagged. For members who were there and observing, I would appreciate if you could send me a quick email telling me how many Messier Objects you observed on that night, April 14, and also for all members who have been working on your Messier List please send me a note telling me how many Messier Objects you have “bagged” in total. If you have also been working on other catalog lists, like NGC, Herschel, Caldwell or others, please let me know your totals on those as well.

Our final event for the month of April was the College of the Canyons Spring Star Party, on Friday April 27 at the Canyon Country Campus. Rose and I were unable to attend, since we were in Lincoln City, OR for our son Aaron's wedding, and we really appreciate the members who stepped up to represent the AVAC at this event. These included Darrell Bennett with his 12" Meade SCT, Rod Girard with his 9.25" Celestron

SCT and MallinCam and monitor, Kris, Chris and Suzy Chase with their 12" Meade Lightbridge dob, and Ellen Mahler with her 6" Orion dob.

As for Rose and I, our son had the perfect Oregon wedding at the Connie Hanson Gardens in Lincoln City. I say "Perfect Oregon wedding" in that it poured rain for the entire day of the wedding and into that night. After the ceremony, the wedding party ventured out into the botanical gardens where umbrellas were featured prominently as functional props in the official wedding photos. The bride and groom posed with umbrellas in various photos, they were held over the bride and groom in others, and one "umbrella holder" was assigned to keep the official photographer and her equipment dry as well. It was all taken in stride and, all in all, it was a great ceremony and a fun time.

Coming up in the month of May we have a Prime Desert Woodland Moonwalk at 8:00 pm on Saturday May 5, our monthly meeting on Friday May 11, a Lunar Observing session at Judy Fuentes' house in Antelope Acres on Saturday May 19, and our two day and night outreach event at Red Rock Canyon State Park on Memorial Day Weekend. .

As for our Memorial Day Weekend event at Red Rock Canyon State Park, as was the case for the same event last year CA State Parks will be providing us with Campsites 1 and 2 for our Star Party location and the bulk of the members attending without RV's. The club will pay for additional campsites as needed with my hope that I will be able to secure Campsites 3 and 4, as we did last year, and perhaps even Campsite 5. I will be arriving on Thursday night to secure the additional campsites and begin setup at the Star Party site. Public star parties will be held on the nights of Friday May 25 and Saturday May 26 and we will have solar observing throughout both days. I will be conducting an interpretive program with PowerPoint, held in the Outdoor Amphitheater, on the night of Saturday May 26. Additional details will be sent as we get closer to the date.

If you plan on attending the Red Rock Canyon event, just for a day, overnight, or both nights, please let me know ASAP so I can start planning space requirements. Let me know days/nights of attendance, number of persons coming, type of accommodations (vehicle, tent, or RV) and whether or not you will be setting up a telescope.

As many of you may know, the annual Riverside Telescope Makers Conference and Astronomy Expo (RTMC) is being held at YMCA Camp Oakes in Big Bear on the same weekend. While members are certainly welcome to attend RTMC, in lieu of our event, the AVAC will not be having an "official" presence there.



Secretary

Rose Moore

Thank you members for supporting our last meeting and club events. We had a good turnout for the meeting with our guest speaker Alejandro Osorio, from NASA/JPL's UAVSAR program!! Also, we had a good turnout for our Messier Marathon at Saddleback Butte State Park! I only viewed a few more of the Messier objects for my list.....but we don't know who viewed the most. Was it Matt Leone again? Also many thanks to Chris Chase (and others?) who helped Inga Nagel with setting up her pop up trailer at Saddleback!!

Thank you Rod, Darrell, Ellen, Ann, Jeremy, and Chris, Kris, and Suzy Chase for supporting the College of the Canyons event on April 27th!

We have a Prime Desert Woodland Moon Walk on Saturday May 5th at 8pm. Weather permitting. We'll need members with telescopes to help support this event!

On Friday, May 11th we have a club meeting. We have as a **possible** speaker Chris Butler, renowned artist, speaker, educator, and astronomer. His topic will be 'From Nine Planets to Nine Billion Worlds'. Chris contacted me last week and he has been selected as a juror and is on jury duty. He did not know if he would be done with the case in time to do our presentation. If he doesn't make it to this meeting, we will be rescheduling him for another meeting.

We will have a Lunar Club meeting at Judy Fuentes home on Saturday May 19th at 7pm. Weather permitting. Further details to follow.

Also this month is our solar observing and star party at Red Rock Canyon State Park on Memorial Day weekend. Frank will also be presenting a short talk in the outdoor amphitheater for the public. There will be a full moon, but there will be several planets to observe as well as some of the brighter dark sky objects. More info to follow from Frank.

Clear skies!

Space Place

What's It Like Inside Mars?

By Jessica Stoller-Conrad

Mars is Earth's neighbor in the solar system. NASA's robotic explorers have visited our neighbor quite a few times. By orbiting, landing and roving on the Red Planet, we've learned so much about Martian canyons, volcanoes, rocks and soil. However, we still don't know exactly what Mars is like on the inside. This information could give scientists some really important clues about how Mars and the rest of our solar system formed.

This spring, NASA is launching a new mission to study the inside of Mars. It's called Mars InSight. InSight—short for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport—is a lander. When InSight lands on Mars later this year, it won't drive around on the surface of Mars like a rover does. Instead, InSight will land, place instruments on the ground nearby and begin collecting information.

Just like a doctor uses instruments to understand what's going on inside your body, InSight will use three science instruments to figure out what's going on inside Mars.

One of these instruments is called a seismometer. On Earth, scientists use seismometers to study the vibrations that happen during earthquakes. InSight's seismometer will measure the vibrations of earthquakes on Mars—known as marsquakes. We know that on Earth, different materials vibrate in different ways. By studying the vibrations from marsquakes, scientists hope to figure out what materials are found inside Mars.

InSight will also carry a heat probe that will take the temperature on Mars. The heat probe will dig almost 16 feet below Mars' surface. After it burrows into the ground, the heat probe will measure the heat coming from the interior of Mars. These measurements can also help us understand where Mars' heat comes from in the first place. This information will help scientists figure out how Mars formed and if it's made from the same stuff as Earth and the Moon.

Scientists know that the very center of Mars, called the core, is made of iron. But what else is in there? InSight has an instrument called the Rotation and Interior Structure Experiment, or RISE, that will hopefully help us to find out.

Although the InSight lander stays in one spot on Mars, Mars wobbles around as it orbits the Sun. RISE will keep track of InSight's location so that scientists will have a way to measure these wobbles. This information will help determine what materials are in Mars' core and whether the core is liquid or solid.

InSight will collect tons of information about what Mars is like under the surface. One day, these new details from InSight will help us understand more about how planets like Mars—and our home, Earth—came to be.

For more information about earthquakes and marsquakes, visit: <https://spaceplace.nasa.gov/earthquakes>

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News Headlines

Stellar Dust Survey Paves Way for Exoplanet Missions

Using the Large Binocular Telescope Interferometer, or LBTI, on Mount Graham in Arizona, the HOSTS survey determines the brightness of warm dust floating in the orbital planes of other stars (called exozodiacal dust). In particular, HOSTS has studied dust in nearby stars' habitable zones, where liquid water could exist on the surface of a planet. The LBTI is five to 10 times more sensitive than the previous telescope capable of detecting exozodiacal dust, the Keck Interferometer Nuller.

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

Bound for Mars: Countdown to First Interplanetary Launch from California

In the early morning hours of May 5, millions of Californians will have an opportunity to witness a sight they have never seen before - the historic first interplanetary launch from America's West Coast. On board the 189-foot-tall (57.3-meter) United Launch Alliance Atlas V rocket will be NASA's InSight spacecraft, destined for the Elysium Planitia region located in Mars' northern hemisphere. The May 5 launch window for the InSight mission opens at 4:05 am PDT (7:05 EDT, 11:05 UTC) and remains open for two hours.

<https://www.jpl.nasa.gov/news/news.php?feature=7095>

NASA just greenlit a satellite concept straight out of Star Wars

NASA has just greenlighted a project from Cornell University that is truly mind-blowing: a satellite capable of being launched into space in tiny segments, which can then navigate autonomously to a point and self-assemble. The idea is part of the NASA Innovative Advanced Concepts programme and will be led by the university's Prof Dmitry Savransky and a team of 15 other researchers in the programme's first phase.

<https://www.siliconrepublic.com/machines/nasa-satellite-star-wars>

Key Parker Solar Probe sensor bests sun simulator—last launch hurdle

With old IMAX projector bulbs, Michigan Engineers simulate the sun.

You don't get to swim in the sun's atmosphere unless you can prove you belong there. And the Parker Solar Probe's Faraday cup, a key sensor aboard the \$1.5 billion NASA mission launching this summer, earned its stripes last week by enduring testing in a homemade contraption designed to simulate the sun.

<http://bit.ly/2FBM6wT>

May Sky Data

Last Qtr
May 7

New
May 15

First Qtr
May 21

Full
May 29



Planet Summary

Mercury reached greatest elongation east from the Sun on April 29th and might just be glimpsed low above the western horizon for the first few days of May, but, for the remainder of the month will lie too close to the Sun to be visible.

Venus shines brightly at magnitude -3.4 all month with an angular size of 11.5 increasing to 13 arc seconds. Venus rises a little higher in the sky as May progresses, initially setting around two hours after the Sun but increasing to two and a half hours by month's end as its elevation at sunset stays at around 20 degrees - it will be very prominent in the evening sky.

Mars starts the month in Sagittarius and moves into Capricornus in mid-May. Now a morning object, it rises at around 1:00 am at the start of the month and a little before midnight by May 31st. During the month, its magnitude increases rapidly from -0.2 to -1.0 as its angular size increases from 11.1 to 15.1 arc seconds, so it should be possible to spot details, such as Syrtis Major, on its salmon-pink surface with a small telescope.

Jupiter reaches opposition on May 8th, so will be visible all night. It shines at magnitude -2.0 and has a disk some 44 arc seconds across throughout the month. Jupiter's equatorial bands and sometimes the Great Red Spot and up to four of its Galilean moons will be visible in a small telescope.

Saturn rises at around midnight on the first of May and a couple of hours earlier by month's end. It climbs higher before dawn and so becomes easier to spot as the month progresses. The rings were at their widest some months ago and are still, at 25 degrees to the line of sight. Lying in Sagittarius, it is close to the topmost star of the 'teapot'. It will be seen best just before dawn.

The peak of the Eta Aquarid **meteor shower**, when the most meteors are visible, should happen before dawn on May 7. Rates this year can reach 15-20 meteors per hour during that time, but may be washed out by moonlight.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
5/1/2018	21:23	07:25	06:05	19:35
5/5/2018	00:01	10:23	06:01	19:38
5/10/2018	03:16	14:57	05:56	19:42
5/15/2018	06:18	20:14	05:52	19:46
5/20/2018	11:05	00:23	05:49	19:49
5/25/2018	16:20	03:40	05:46	19:53
5/31/2018	21:55	07:29	05:44	19:56

Planet Data

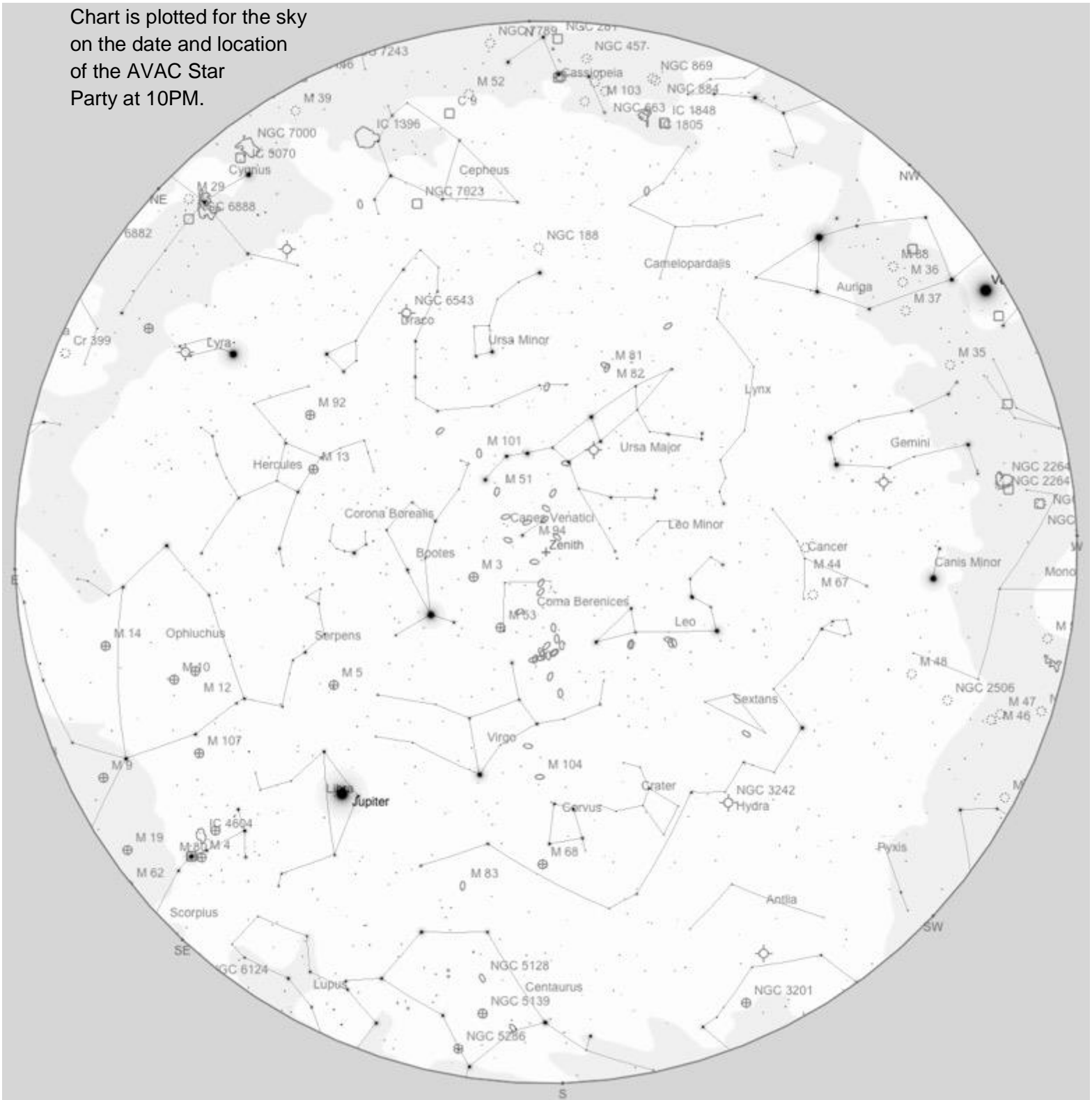
	May 1			
	Rise	Transit	Set	Mag
Mercury	05:04	11:15	17:26	0.6
Venus	07:35	14:44	21:52	-3.4
Mars	01:03	06:00	10:58	-0.2
Jupiter	20:08	01:25	06:43	-2.0
Saturn	23:56	04:55	09:54	1.4

	May 15			
	Rise	Transit	Set	Mag
Mercury	04:59	11:30	18:01	-0.1
Venus	07:46	15:02	22:18	-3.4
Mars	00:32	05:31	10:30	-0.6
Jupiter	19:04	00:23	05:42	-2.0
Saturn	22:59	03:58	08:57	1.3

	May 31			
	Rise	Transit	Set	Mag
Mercury	05:24	12:26	19:28	-1.5
Venus	08:07	15:22	22:38	-3.4
Mars	23:51	04:52	09:52	-1.0
Jupiter	17:52	23:12	04:33	-2.0
Saturn	21:53	02:51	07:50	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. The list is sorted by the transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M101	Gal	UMa	14h 03m 13s	+54°20'56"	8.2	13:08	00:05	11:02
NGC5485	Gal	UMa	14h 07m 11s	+55°00'05"	11.5	12:47	00:09	11:31
NGC5460	Open	Cen	14h 07m 27s	-48°20'36"	5.6	21:21	00:09	02:58
NGC5574	Gal	Vir	14h 20m 56s	+03°14'17"	12.4	18:11	00:23	06:34
NGC5643	Gal	Lup	14h 32m 41s	-44°10'26"	11.0	21:14	00:34	03:55
NGC5725	Gal	Vir	14h 40m 58s	+02°11'09"	14.0	18:34	00:43	06:51
NGC5831	Gal	Vir	15h 04m 07s	+01°13'12"	11.5	19:00	01:06	07:12
NGC5823	Open	Cir	15h 05m 30s	-55°36'12"	7.9	00:07	01:07	02:07
NGC5846	Gal	Vir	15h 06m 29s	+01°36'20"	10.2	19:01	01:08	07:15
NGC5879	Gal	Dra	15h 09m 47s	+57°00'03"	11.5	Circum	01:11	Circum
NGC5873	P Neb	Lup	15h 12m 51s	-38°07'30"	13.0	21:19	01:15	05:10
NGC5882	P Neb	Lup	15h 16m 50s	-45°38'56"	11.0	22:08	01:19	04:29
M5	Glob	Ser	15h 18m 33s	+02°04'57"	7.0	19:12	01:20	07:29
NGC5928	Gal	Ser	15h 26m 03s	+18°04'25"	14.0	18:34	01:28	08:22
NGC5946	Glob	Nor	15h 35m 28s	-50°39'33"	9.6	23:12	01:37	04:02
NGC5986	Glob	Lup	15h 46m 04s	-37°47'08"	7.1	21:50	01:48	05:45
NGC5995	Gal	Lib	15h 48m 25s	-13°45'28"	14.0	20:25	01:50	07:15
NGC6015	Gal	Dra	15h 51m 25s	+62°18'35"	11.2	Circum	01:53	Circum
NGC6058	P Neb	Her	16h 04m 27s	+40°40'59"	13.0	17:40	02:06	10:33
NGC6052	Gal	Her	16h 05m 13s	+20°32'35"	13.0	19:05	02:07	09:09
NGC6031	Open	Nor	16h 07m 35s	-54°00'54"	8.5	00:32	02:09	03:47
NGC6072	P Neb	Sco	16h 12m 58s	-36°13'47"	14.0	22:10	02:15	06:20
NGC6067	Open	Nor	16h 13m 11s	-54°13'06"	5.6	00:41	02:15	03:49
M4	Glob	Sco	16h 23m 35s	-26°31'35"	7.5	21:41	02:25	07:10
NGC6124	Open	Sco	16h 25m 20s	-40°39'12"	5.8	22:45	02:27	06:10
NGC6139	Glob	Sco	16h 27m 40s	-38°50'57"	9.2	22:37	02:29	06:22
NGC6134	Open	Nor	16h 27m 46s	-49°09'06"	7.2	23:49	02:29	05:10
NGC6153	P Neb	Sco	16h 31m 31s	-40°15'13"	12.0	22:48	02:33	06:18
M107	Glob	Oph	16h 32m 32s	-13°03'11"	10.0	21:07	02:34	08:01
NGC6167	Open	Nor	16h 34m 34s	-49°46'18"	6.7	00:01	02:36	05:11
NGC6188	Neb	Ara	16h 40m 05s	-48°39'42"		23:56	02:42	05:27
NGC6193	Open	Ara	16h 41m 20s	-48°45'48"	5.2	23:58	02:43	05:28
M13	Glob	Her	16h 41m 41s	+36°27'35"	7.0	18:40	02:43	10:47
NGC6210	P Neb	Her	16h 44m 30s	+23°47'59"	9.0	19:34	02:46	09:59
NGC6204	Open	Ara	16h 46m 09s	-47°01'00"	8.2	23:48	02:48	05:48
NGC6229	Glob	Her	16h 46m 59s	+47°31'39"	9.4	17:32	02:49	12:05
NGC6231	Open	Sco	16h 54m 10s	-41°49'30"	2.6	23:20	02:56	06:32
NGC6242	Open	Sco	16h 55m 33s	-39°27'42"	6.4	23:08	02:57	06:46
M10	Glob	Oph	16h 57m 09s	-04°05'56"	7.5	21:07	02:59	08:50

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6250	Open	Ara	16h 57m 56s	-45°56'12"	5.9	23:51	03:00	06:08
NGC6259	Open	Sco	17h 00m 45s	-44°39'18"	8.0	23:45	03:02	06:20
M62	Glob	Oph	17h 01m 13s	-30°06'45"	8.0	22:32	03:03	07:34
NGC6292	Gal	Dra	17h 03m 04s	+61°02'39"	14.0	Circum	03:05	Circum
NGC6284	Glob	Oph	17h 04m 29s	-24°45'51"	9.0	22:16	03:06	07:57
NGC6281	Open	Sco	17h 04m 41s	-37°59'06"	5.4	23:10	03:06	07:03
NGC6302	P Neb	Sco	17h 13m 44s	-37°06'12"	13.0	23:14	03:15	07:16
NGC6309	P Neb	Oph	17h 14m 04s	-12°54'38"	11.0	21:49	03:16	08:43
NGC6316	Glob	Oph	17h 16m 37s	-28°08'23"	9.0	22:40	03:18	07:57
M92	Glob	Her	17h 17m 07s	+43°08'11"	7.5	18:37	03:19	12:01
M9	Glob	Oph	17h 19m 12s	-18°30'58"	9.0	22:10	03:21	08:32
NGC6326	P Neb	Ara	17h 20m 46s	-51°45'17"	12.0	01:10	03:22	05:35
NGC6334	Neb	Sco	17h 20m 49s	-36°06'12"		23:17	03:23	07:28
NGC6357	Neb	Sco	17h 24m 43s	-34°12'06"		23:12	03:26	07:41
NGC6369	P Neb	Oph	17h 29m 21s	-23°45'34"	13.0	22:37	03:31	08:25
NGC6374	Open	Sco	17h 34m 42s	-32°34'54"	9.0	23:15	03:36	07:58
NGC6388	Glob	Sco	17h 36m 17s	-44°44'08"	6.9	00:21	03:38	06:55
NGC6396	Open	Sco	17h 37m 36s	-35°01'36"	8.5	23:29	03:39	07:50
M14	Glob	Oph	17h 37m 36s	-03°14'43"	9.5	21:45	03:39	09:33
NGC6400	Open	Sco	17h 40m 12s	-36°56'54"	9.0	23:40	03:42	07:44
M6	Open	Sco	17h 40m 20s	-32°15'12"	4.5	23:19	03:42	08:05
NGC6397	Glob	Ara	17h 40m 42s	-53°40'26"	5.7	01:59	03:42	05:26
NGC6416	Open	Sco	17h 44m 19s	-32°21'42"	5.7	23:24	03:46	08:08
NGC6426	Glob	Oph	17h 44m 55s	+03°10'11"	11.2	21:35	03:47	09:58
NGC6425	Open	Sco	17h 47m 01s	-31°31'48"	7.2	23:23	03:49	08:14
NGC6439	P Neb	Sgr	17h 48m 20s	-16°28'44"	14.0	22:33	03:50	09:07
NGC6440	Glob	Sgr	17h 48m 53s	-20°21'39"	9.7	22:46	03:51	08:55
NGC6445	P Neb	Sgr	17h 49m 15s	-20°00'36"	13.0	22:45	03:51	08:57
NGC6503	Gal	Dra	17h 49m 27s	+70°08'40"	10.2	Circum	03:51	Circum
NGC6441	Glob	Sco	17h 50m 13s	-37°03'03"	7.4	23:51	03:52	07:53
NGC6451	Open	Sco	17h 50m 41s	-30°12'36"	8.0	23:22	03:52	08:23
NGC6453	Glob	Sco	17h 50m 52s	-34°35'54"	9.9	23:40	03:53	08:05
NGC6482	Gal	Her	17h 51m 49s	+23°04'19"	11.3	20:43	03:54	11:04
NGC6469	Open	Sgr	17h 53m 12s	-22°16'30"	8.0	22:56	03:55	08:54
M7	Open	Sco	17h 53m 51s	-34°47'36"	3.5	23:44	03:56	08:07
M23	Open	Sgr	17h 57m 04s	-18°59'06"	6.0	22:50	03:59	09:08
NGC6543	P Neb	Dra	17h 58m 33s	+66°37'59"	9.0	Circum	04:00	Circum
NGC6507	Open	Sgr	17h 59m 50s	-17°27'00"	10.0	22:48	04:02	09:15
NGC6517	Glob	Oph	18h 01m 51s	-08°57'32"	10.3	22:25	04:04	09:42
M20	Open	Sgr	18h 02m 42s	-22°58'18"	5.0	23:08	04:04	09:01
NGC6520	Open	Sgr	18h 03m 24s	-27°53'18"	8.0	23:26	04:05	08:45
NGC6523	Neb	Sgr	18h 03m 41s	-24°22'48"	5.8	23:14	04:05	08:57
M8	Open	Sgr	18h 03m 41s	-24°22'48"	5.0	23:14	04:05	08:57
NGC6535	Glob	Ser	18h 03m 51s	-00°17'51"	10.6	22:04	04:06	10:07
NGC6526	Neb	Sgr	18h 04m 06s	-24°26'30"		23:14	04:06	08:57

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M21	Open	Sgr	18h 04m 13s	-22°29'24"	7.0	23:08	04:06	09:04
NGC6530	Open	Sgr	18h 04m 31s	-24°21'30"	4.6	23:14	04:06	08:58
NGC6539	Glob	Ser	18h 04m 50s	-07°35'11"	9.6	22:24	04:07	09:49
NGC6537	P Neb	Sgr	18h 05m 13s	-19°50'35"	13.0	23:00	04:07	09:13
NGC6546	Open	Sgr	18h 07m 22s	-23°17'48"	8.0	23:14	04:09	09:04
NGC6541	Glob	CrA	18h 08m 02s	-43°42'57"	6.6	00:46	04:10	07:34
NGC6559	Neb	Sgr	18h 09m 57s	-24°06'23"		23:19	04:12	09:04
NGC6565	P Neb	Sgr	18h 11m 53s	-28°10'41"	13.0	23:35	04:14	08:52
NGC6563	P Neb	Sgr	18h 12m 03s	-33°52'07"	14.0	23:58	04:14	08:30
NGC6572	P Neb	Oph	18h 12m 06s	+06°51'13"	9.0	21:52	04:14	10:35
NGC6568	Open	Sgr	18h 12m 44s	-21°36'18"	9.0	23:13	04:14	09:15
NGC6569	Glob	Sgr	18h 13m 39s	-31°49'35"	8.7	23:51	04:15	08:40
NGC6567	P Neb	Sgr	18h 13m 45s	-19°04'34"	12.0	23:07	04:15	09:24
NGC6583	Open	Sgr	18h 15m 49s	-22°08'12"	10.0	23:18	04:18	09:17
NGC6578	P Neb	Sgr	18h 16m 16s	-20°27'03"	13.0	23:13	04:18	09:23
NGC6605	Open	Ser	18h 16m 24s	-15°00'00"	6.0	22:57	04:18	09:39
NGC6595	Open	Sgr	18h 17m 05s	-19°51'57"	7.0	23:12	04:19	09:25
NGC6604	Open	Ser	18h 18m 03s	-12°14'35"	6.5	22:51	04:20	09:49
M24	Open	Sgr	18h 18m 26s	-18°24'24"	4.5	23:09	04:20	09:31
NGC6584	Glob	Tel	18h 18m 38s	-52°12'57"	9.2	02:14	04:20	06:26
M16	Open	Ser	18h 18m 48s	-13°48'24"	6.5	22:56	04:20	09:45
NGC6643	Gal	Dra	18h 19m 46s	+74°34'08"	11.1	Circum	04:21	Circum
M18	Open	Sgr	18h 19m 58s	-17°06'07"	8.0	23:07	04:22	09:37
M17	Open	Sgr	18h 20m 47s	-16°10'18"	7.0	23:05	04:22	09:40
NGC6625	Open	Sct	18h 23m 01s	-12°01'24"	9.0	22:55	04:25	09:54
NGC6624	Glob	Sgr	18h 23m 41s	-30°21'40"	8.3	23:55	04:25	08:56
M28	Glob	Sgr	18h 24m 33s	-24°52'07"	8.5	23:36	04:26	09:16
NGC6629	P Neb	Sgr	18h 25m 42s	-23°12'10"	12.0	23:32	04:27	09:23
NGC6633	Open	Oph	18h 27m 15s	+06°30'30"	4.6	22:08	04:29	10:49
M25	Open	Sgr	18h 31m 42s	-19°07'00"	6.5	23:25	04:33	09:42
NGC6642	Glob	Sgr	18h 31m 54s	-23°28'35"	8.8	23:39	04:34	09:28
NGC6644	P Neb	Sgr	18h 32m 35s	-25°07'44"	12.0	23:45	04:34	09:24
NGC6645	Open	Sgr	18h 32m 37s	-16°53'00"	9.0	23:19	04:34	09:50
NGC6647	Open	Sgr	18h 32m 49s	-17°13'42"	8.0	23:20	04:35	09:49
NGC6649	Open	Sct	18h 33m 27s	-10°24'12"	8.9	23:01	04:35	10:09
NGC6661	Gal	Her	18h 34m 37s	+22°54'36"	11.9	21:27	04:36	11:46
M22	Glob	Sgr	18h 36m 24s	-23°54'17"	6.5	23:45	04:38	09:32
NGC6664	Open	Sct	18h 36m 33s	-08°13'12"	7.8	22:58	04:38	10:19
NGC6675	Gal	Lyr	18h 37m 26s	+40°03'27"	13.0	20:16	04:39	13:02
NGC6683	Open	Sct	18h 42m 13s	-06°12'42"	10.0	22:58	04:44	10:30
M70	Glob	Sgr	18h 43m 12s	-32°17'27"	9.0	00:22	04:45	09:07
M26	Open	Sct	18h 45m 18s	-09°23'00"	9.5	23:10	04:47	10:24
NGC6704	Open	Sct	18h 50m 45s	-05°12'18"	9.2	23:04	04:52	10:41
M11	Open	Sct	18h 51m 05s	-06°16'12"	7.0	23:07	04:53	10:39
NGC6709	Open	Aql	18h 51m 18s	+10°19'06"	6.7	22:22	04:53	11:24

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6712	Glob	Sct	18h 53m 04s	-08°42'19"	8.2	23:16	04:55	10:34
M57	P Neb	Lyr	18h 53m 35s	+33°01'44"	9.5	21:07	04:55	12:43
NGC6716	Open	Sgr	18h 54m 34s	-19°54'06"	6.9	23:50	04:56	10:03
M54	Glob	Sgr	18h 55m 03s	-30°28'47"	8.5	00:27	04:57	09:26
NGC6732	Gal	Dra	18h 56m 24s	+52°22'38"	14.0	18:43	04:58	15:13
NGC6723	Glob	Sgr	18h 59m 33s	-36°37'54"	7.3	00:58	05:01	09:05
NGC6738	Open	Aql	19h 01m 21s	+11°36'54"	8.0	22:28	05:03	11:38
NGC6726	Neb	CrA	19h 01m 39s	-36°53'30"		01:01	05:03	09:05
NGC6729	Neb	CrA	19h 01m 55s	-36°57'30"		01:02	05:04	09:05
NGC6741	P Neb	Aql	19h 02m 37s	-00°26'57"	11.0	23:03	05:04	11:06
NGC6749	Glob	Aql	19h 05m 15s	+01°54'02"	11.1	22:59	05:07	11:15
NGC6751	P Neb	Aql	19h 05m 56s	-05°59'31"	13.0	23:21	05:08	10:54
NGC6755	Open	Aql	19h 07m 49s	+04°16'00"	7.5	22:55	05:10	11:24
NGC6760	Glob	Aql	19h 11m 12s	+01°01'50"	9.1	23:07	05:13	11:18
NGC6772	P Neb	Aql	19h 14m 36s	-02°42'24"	14.0	23:21	05:16	11:12
M56	Glob	Lyr	19h 16m 36s	+30°11'02"	9.5	21:42	05:18	12:54
NGC6778	P Neb	Aql	19h 18m 25s	-01°35'48"	13.0	23:22	05:20	11:19
NGC6781	P Neb	Aql	19h 18m 28s	+06°32'20"	12.0	23:00	05:20	11:41
NGC6791	Open	Lyr	19h 20m 53s	+37°46'18"	9.5	21:12	05:23	13:33
NGC6790	P Neb	Aql	19h 22m 57s	+01°30'48"	10.0	23:18	05:25	11:31
NGC6802	Open	Vul	19h 30m 35s	+20°15'42"	8.8	22:31	05:32	12:33
NGC6803	P Neb	Aql	19h 31m 16s	+10°03'23"	11.0	23:03	05:33	12:03
NGC6804	P Neb	Aql	19h 31m 35s	+09°13'31"	12.0	23:05	05:33	12:01
NGC6807	P Neb	Aql	19h 34m 34s	+05°41'03"	14.0	23:18	05:36	11:54
NGC6811	Open	Cyg	19h 37m 17s	+46°23'18"	6.8	20:33	05:39	14:45
M55	Glob	Sgr	19h 40m 00s	-30°57'44"	7.0	01:14	05:42	10:09
NGC6813	Neb	Vul	19h 40m 22s	+27°18'34"		22:17	05:42	13:07
NGC6819	Open	Cyg	19h 41m 18s	+40°11'12"	7.3	21:19	05:43	14:07
NGC6820	Neb	Vul	19h 42m 28s	+23°05'17"		22:34	05:44	12:54
NGC6814	Gal	Aql	19h 42m 41s	-10°19'27"	11.2	00:10	05:44	11:19
NGC6823	Open	Vul	19h 43m 09s	+23°18'00"	7.1	22:34	05:45	12:56
NGC6824	Gal	Cyg	19h 43m 41s	+56°06'34"	11.9	Circum	05:45	Circum
NGC6818	P Neb	Sgr	19h 43m 58s	-14°09'10"	10.0	00:22	05:46	11:09
NGC6826	P Neb	Cyg	19h 44m 48s	+50°31'30"	10.0	19:58	05:46	15:35
NGC6833	P Neb	Cyg	19h 49m 47s	+48°57'40"	14.0	20:21	05:51	15:22
NGC3491	Gal	Leo	11h 00m 35s	+12°09'42"	14.0	14:26	21:02	03:39
M97	P Neb	UMa	11h 14m 48s	+55°01'08"	12.0	09:54	21:16	08:39
NGC3665	Gal	UMa	11h 24m 44s	+38°45'45"	10.8	13:11	21:26	05:42
NGC3680	Open	Cen	11h 25m 38s	-43°14'36"	7.6	18:00	21:27	00:54
NGC3693	Gal	Crt	11h 28m 12s	-13°11'43"	13.0	16:04	21:30	02:56
NGC3705	Gal	Leo	11h 30m 07s	+09°16'35"	11.0	15:04	21:32	04:00
NGC3791	Gal	Crt	11h 39m 42s	-09°22'02"	14.0	16:04	21:41	03:19
NGC3815	Gal	Leo	11h 41m 39s	+24°48'00"	14.0	14:27	21:43	04:59
NGC3836	Gal	Crt	11h 43m 30s	-16°47'40"	13.0	16:29	21:45	03:01
NGC3898	Gal	UMa	11h 49m 15s	+56°05'03"	10.8	Circum	21:51	Circum

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC3952	Gal	Vir	11h 53m 41s	-03°59'46"	13.0	16:03	21:55	03:47
NGC3955	Gal	Crt	11h 53m 57s	-23°09'53"	11.9	17:00	21:56	02:52
NGC3962	Gal	Crt	11h 54m 40s	-13°58'29"	10.6	16:32	21:56	03:20
NGC3969	Gal	Crt	11h 55m 09s	-18°55'38"	14.0	16:47	21:57	03:06
NGC4036	Gal	UMa	12h 01m 27s	+61°53'44"	10.6	Circum	22:03	Circum
NGC4111	Gal	CVn	12h 07m 03s	+43°03'57"	10.8	13:27	22:09	06:50
NGC4123	Gal	Vir	12h 08m 11s	+02°52'41"	11.2	15:59	22:10	04:20
NGC4147	Glob	Com	12h 10m 06s	+18°32'30"	10.3	15:16	22:12	05:07
NGC4168	Gal	Vir	12h 12m 17s	+13°12'17"	11.3	15:35	22:14	04:53
NGC4214	Gal	CVn	12h 15m 39s	+36°19'38"	9.7	14:14	22:17	06:20
NGC4216	Gal	Vir	12h 15m 54s	+13°08'59"	10.0	15:38	22:18	04:57
NGC4233	Gal	Vir	12h 17m 08s	+07°37'26"	11.9	15:55	22:19	04:42
NGC4242	Gal	CVn	12h 17m 30s	+45°37'08"	11.0	13:19	22:19	07:19
NGC4261	Gal	Vir	12h 19m 23s	+05°49'30"	10.3	16:03	22:21	04:40
NGC4274	Gal	Com	12h 19m 51s	+29°36'51"	10.4	14:48	22:22	05:55
NGC4350	Gal	Com	12h 23m 58s	+16°41'36"	11.1	15:36	22:26	05:15
NGC4361	P Neb	Crv	12h 24m 31s	-18°47'06"	10.0	17:16	22:26	03:36
NGC4369	Gal	CVn	12h 24m 36s	+39°22'59"	12.0	14:07	22:26	06:45
M84	Gal	Vir	12h 25m 04s	+12°53'12"	10.2	15:48	22:27	05:05
NGC4421	Gal	Com	12h 27m 03s	+15°27'41"	11.6	15:43	22:29	05:15
NGC4445	Gal	Vir	12h 28m 16s	+09°26'11"	12.8	16:01	22:30	04:59
NGC4461	Gal	Vir	12h 29m 03s	+13°11'02"	11.2	15:51	22:31	05:10
M87	Gal	Vir	12h 30m 49s	+12°23'27"	9.6	15:56	22:33	05:10
NGC4511	Gal	UMa	12h 32m 08s	+56°28'15"	14.0	Circum	22:34	Circum
NGC4535	Gal	Vir	12h 34m 20s	+08°11'52"	9.8	16:11	22:36	05:01
M91	Gal	Com	12h 35m 27s	+14°29'47"	10.9	15:54	22:37	05:20
M89	Gal	Vir	12h 35m 40s	+12°33'23"	10.9	16:00	22:37	05:15
NGC4578	Gal	Vir	12h 37m 31s	+09°33'18"	11.4	16:10	22:39	05:08
NGC4575	Gal	Cen	12h 37m 51s	-40°32'14"	13.0	18:56	22:40	02:23
M104	Gal	Vir	12h 39m 59s	-11°37'23"	9.2	17:11	22:42	04:13
NGC4606	Gal	Vir	12h 40m 58s	+11°54'42"	11.9	16:07	22:43	05:18
NGC4618	Gal	CVn	12h 41m 34s	+41°07'55"	10.8	14:14	22:43	07:12
M60	Gal	Vir	12h 43m 40s	+11°33'08"	9.8	16:11	22:45	05:20
NGC4689	Gal	Com	12h 47m 46s	+13°45'45"	10.9	16:08	22:49	05:30
NGC4712	Gal	Com	12h 49m 34s	+25°28'12"	13.0	15:33	22:51	06:10
NGC4731	Gal	Vir	12h 51m 01s	-06°23'33"	11.0	17:07	22:53	04:38
NGC4839	Gal	Com	12h 57m 24s	+27°29'51"	14.0	15:33	22:59	06:25
NGC4835	Gal	Cen	12h 58m 08s	-46°15'51"	12.0	19:54	23:00	02:06
NGC4855	Gal	Vir	12h 59m 18s	-13°13'51"	14.0	17:35	23:01	04:27
NGC4856	Gal	Vir	12h 59m 21s	-15°02'32"	10.4	17:40	23:01	04:22
NGC4880	Gal	Vir	13h 00m 11s	+12°28'59"	12.0	16:25	23:02	05:39
NGC4900	Gal	Vir	13h 00m 39s	+02°30'01"	11.5	16:53	23:02	05:12
NGC4915	Gal	Vir	13h 01m 28s	-04°32'45"	11.9	17:13	23:03	04:54
NGC4976	Gal	Cen	13h 08m 37s	-49°30'22"	10.2	20:33	23:10	01:48
NGC5033	Gal	CVn	13h 13m 28s	+36°35'38"	10.1	15:11	23:15	07:20

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC5139	Glob	Cen	13h 26m 47s	-47°28'53"	3.7	20:33	23:28	02:24
M3	Glob	CVn	13h 42m 11s	+28°22'35"	7.0	16:15	23:44	07:13
NGC5286	Glob	Cen	13h 46m 27s	-51°22'30"	7.6	21:31	23:48	02:05
NGC5307	P Neb	Cen	13h 51m 03s	-51°12'20"	12.0	21:34	23:53	02:12
NGC5328	Gal	Hya	13h 52m 53s	-28°29'22"	11.8	19:17	23:55	04:32
NGC5363	Gal	Vir	13h 56m 07s	+05°15'16"	10.2	17:41	23:58	06:15
NGC5367	Neb	Cen	13h 57m 43s	-39°58'42"		20:13	23:59	03:46
NGC5382	Gal	Vir	13h 58m 15s	+06°15'29"	14.0	17:40	00:00	06:20

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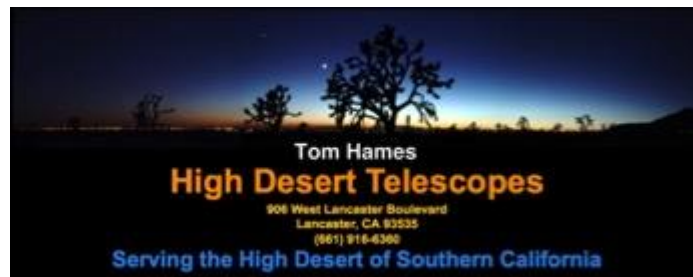


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