ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

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

Up-Coming Events

February 9: Club Meeting*
February 10: Prime Desert Moon Walk
February 17: Los Angeles County Science Olympiad or Dark Sky Star Party TBD

* 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

"Hold the presses. Extra, Extra! Read all about it. Crazy astronomy club members brave cold weather to view the perigee lunar eclipse. In an amazing coincidence, it was the second full moon of the month."

Meh, now that I read the headline without all of the hype I can see why the media spices it up.

"Rare Super Blue Blood Moon appears in the sky: Frightens Millions".

There, that's better. In true AVAC fashion, a contingent of our brave members, and about 25 members of the public, braved the chilly temperatures and early morning hours to observe the Febuary 31 lunar eclipse at the SAGE Planetarium. The evening started with Matt Leone fortifying our intrepid telescope operators with his famous breakfast burritos. Inside the lobby of the SAGE Planetarium we served donuts (various members brought SIX DOZEN), hot cocoa, exotic blends of coffee and of course Rose brought…MOONPIES. Now don't you wish you'd come on out?

Telescopes and operators on hand included Rod Girard with his 9.25 inch Celestron Edge-HD SCT and Jeremy Amarant with his 8" Meade SCT. For a change from the usual, Rose and I brought our old 6" Celestron refractor since 11" of SCT aperture certainly isn't necessary for lunar observing. However, the real "hot ticket" for the night was Matt and Michael Leone with their Oberwerk Binoculars. Viewed through the dual eyepieces of the binoculars, and with the edges seemingly more lit than the center, the indirectly lit moon just seemed to pop out of the dark background looking …well…like a rocky sphere floating in space. It really was a beautiful sight.

Our next regular meeting at the SAGE Planetarium is on Friday, February 9 at 7:00 pm. We have a speaker, Dr. Rahul I. Patel, Astrophysics post doctoral researcher at IPAC/Caltech, and it would be really nice if we could get crowd in attendance. Rose has more about Dr. Patel and his research in her DSO article.

The next night, Saturday February 10 at 6:00 pm, we support Jeremy Amarant in his monthly Moonwalk at Prime Desert Woodland Preserve. Bring out a telescope to share with the public or just come out for the astronomy "walk and talk" through the preserve. With the waning crescent moon not rising till almost 4:00

in the morning, and provided that the weather cooperates, we should have good viewing conditions for sharing deep sky objects.

I'm still waiting to hear if we're "invited" but, assuming that we are, some of us will be manning an AVAC display, with solar telescopes, at the Los Angeles County Science Olympiad at Antelope Valley College on Saturday February 17. Since it would be difficult for us to "switch gears" from the Science Olympiad to a Dark Sky Star Party, and would make for an extremely long day , we won't attempt both but will do one or the other. More details to follow.

Remember, and as discussed at our last meeting, there will be a celebration marking the 20th Anniversary of the SAGE Planetarium, from 4:30-6:00pm, and preceding our monthly meeting on Friday March 9, 2018. We will have solar telescopes and displays for the public at the event. We plan to continue into the evening hours and to make our monthly meeting a public star party with a coordinated program in the planetarium. Plan on being there.

For those who missed it, our guest speaker Geovanni Somoza gave us a wonderful presentation on the Griffith Observatory at our last meeting. His talk, which in addition to the usual fare was full of obscure history and little known facts, really piqued our interest and we will be looking into a group trip in the near future.

If you haven't already, remember to renew your memberships lest the great computer drop you from the email list and you miss out on important announcements.

Secretary

Rose Moore

For our AVAC meeting on Friday February 9th we have Rahul I. Patel, Ph.D. coming to give us a presentation. Dr. Patel is a postdoctoral researcher in astrophysics at Caltech/IPAC. He works on identifying solar systems that might harbor planets by searching for and characterizing the dust around other stars. As an exoplaneteer, he uses space and ground telescopes to study main sequence stars that might be hosts to these exoplanets, in hopes of finding planets that might be similar to our Earth. His current research takes him into some of the mission planning for the WFIRST telescope, set to launch in 2025.

In his presentation, he will take us on a quick tour through the history of exoplanet discoveries, detection techniques, what we can learn from the current discoveries, and what the astrophysics community has planned for the next decade to search for that elusive Earth 2.0, and help us to understand ourselves by learning about our neighbors.

On Saturday February 10th at 6pm is a Prime Desert Moon Walk. We will need members with telescopes, or you can take the walk with Jeremy and the public! Set up time is approximately 1 hour prior to the walk.

See Frank's note above on the SAGE events prior to, and for our meeting on Friday, March 9th.

March 10th at 6:30pm, Saturday, is another Prime Desert Moon Walk. We will need members with telescopes. Frank and I will not be attending as we have concert event to attend. Set up time is about 1 hour prior to the walk.

There will be a possible trip to the Mt. Wilson 60 inch telescope for a half night of observing coming up. The calendar for this season will not be available until March 1st. I will keep you posted. This will be a sign up event, and there will be a cost to attend.

Thank you to all the members who came out to support the Lunar Eclipse event at the SAGE on Wednesday, Feb. 31st!

Clear skies!

Astro-Tips: Messier Marathon Accessories

By Astro-Tom

Now's the time to begin practicing for the Messier Marathon coming up in March 17-18. (http://www.messier.seds.org/xtra/marathon/mm2018.html) Since the new moon will also be on March 17, the night could be a spectacular chance to see all of the Messier Objects and complete a Marathon!! There are several "accessories" that will help you better enjoy the experience.

A Messier Planner of some kind helps you get and stay organized so you'll know which objects to observe first and last, and when you'll be able to take breaks. I use the free paper print out of the Messier listing organized by time that you can download and/or print out here: http://www.astro-tom.com/messier/marathon_order/marathon_order.htm to ensure the most efficient search pattern. You can note the time of your observation, and there's room for verifiers' initials and equipment used. The question always comes up…Paper vs. all electronic Marathon tracking?? Remember this equation about your phone: A cold night with lots of use = dead phone battery.

I have found the laminated Messier card from Astronomics.com to be useful to get general orientation (https://www.astronomics.com/dew-resistant-messier-card_p14380.aspx; $6.95) and also a standard planisphere and good star atlas are recommended to have on hand. These are really accentuated by two more "accessories" that I actually consider to be important location finding tools – A Telrad 1X finder (https://www.amazon.com/Telrad-Finder-Sight/dp/B0000ALKAN; $46), coupled with the excellent two volume laminated card set "***Finder Charts of the Messier Objects***" by Brent Watson. (https://optcorp.com/collections/bookstore/products/finder-charts-of-the-messier-objects-vol-1-m1-thru-m55; $16.95) and (https://optcorp.com/collections/bookstore/products/finder-charts-of-the-messier-objects-vol-2-m56-thru-m110; $16.95).

Other than the Telrad already mentioned – two eyepiece filters are suggested. The first and most dramatic accessory to complete your Messier Marathon is an Oxygen-III filter (commonly pronounced 'Oh three' filter). For the Lumicon O-III filter (https://www.highpointscientific.com/lumicon-1pt25in-oxygen-iii-oiii-filter-lf3040; $99), the boost in contrast when observing emission nebulae like M57 (Ring Nebula) or M17 (Omega / Swan Nebula) has to be seen to be believed. The second filter is the Lumicon Deep-Sky filter (https://www.highpointscientific.com/lumicon-1pt25in-deep-sky-filter-lf3010?utm_source=google&utm_medium=cse&utm_term=LUM-LF3010&gclid=EAIaIQobChMIyPbJpv_G2AIVzrbACh2mOQ9mEAQYASABEgLaVvD_BwE; $99). The filter can offer a noticeable boost in contrast and visibility of the fainter outer detail in emission nebulae over non-filtered views for objects like the the Lagoon Nebula (M8), the Merope Nebula, the Trifid (M20), Orion Nebula (M42), and several others. However, the improvement is not as noticeable on star clusters and galaxies such as more diffuse galaxies like M33 and M81.

These accessories will help your chances of success during the upcoming Messier Marathon. When combined with lots of practice locating the separate messier objects, you should have a good chance at

completing your 1st or 20th Messier Marathon, but remember that it is really, really hard to achieve a perfect score of seeing every Messier object in a single night. Don't be too hard on yourself if you miss a few (or even eight or nine!) of the 110 objects... even experienced marathoners struggle to achieve it, but it's a lot of fun trying!

Space Place

Sixty Years of Observing Our Earth

By Teagan Wall

Satellites are a part of our everyday life. We use global positioning system (GPS) satellites to help us find directions. Satellite television and telephones bring us entertainment, and they connect people all over the world. Weather satellites help us create forecasts, and if there's a disaster—such as a hurricane or a large fire—they can help track what's happening. Then, communication satellites can help us warn people in harm's way.

There are many different types of satellites. Some are smaller than a shoebox, while others are bigger than a school bus. In all, there are more than 1,000 satellites orbiting Earth. With that many always around, it can be easy to take them for granted. However, we haven't always had these helpful eyes in the sky.

The United States launched its first satellite on Jan. 31, 1958. It was called Explorer 1, and it weighed in at only about 30 pounds. This little satellite carried America's first scientific instruments into space: temperature sensors, a microphone, radiation detectors and more.

Explorer 1 sent back data for four months, but remained in orbit for more than 10 years. This small, relatively simple satellite kicked off the American space age. Now, just 60 years later, we depend on satellites every day. Through these satellites, scientists have learned all sorts of things about our planet.

For example, we can now use satellites to measure the height of the land and sea with instruments called altimeters. Altimeters bounce a microwave or laser pulse off Earth and measure how long it takes to come back. Since the speed of light is known very accurately, scientists can use that measurement to calculate the height of a mountain, for example, or the changing levels of Earth's seas.

Satellites also help us to study Earth's atmosphere. The atmosphere is made up of layers of gases that surround Earth. Before satellites, we had very little information about these layers. However, with satellites' view from space, NASA scientists can study how the atmosphere's layers interact with light. This tells us which gases are in the air and how much of each gas can be found in the atmosphere. Satellites also help us learn about the clouds and small particles in the atmosphere, too.

When there's an earthquake, we can use radar in satellites to figure out how much Earth has moved during a quake. In fact, satellites allow NASA scientists to observe all kinds of changes in Earth over months, years or even decades.

Satellites have also allowed us—for the first time in civilization—to have pictures of our home planet from space. Earth is big, so to take a picture of the whole thing, you need to be far away. Apollo 17 astronauts took the first photo of the whole Earth in 1972. Today, we're able to capture new pictures of our planet many times every day.

Today, many satellites are buzzing around Earth, and each one plays an important part in how we understand our planet and live life here. These satellite explorers are possible because of what we learned from our first voyage into space with Explorer 1—and the decades of hard work and scientific advances since then.

To learn more about satellites, including where they go when they die, check out NASA Space Place: https://spaceplace.nasa.gov/spacecraft-graveyard

This photo shows the launch of Explorer 1 from Cape Canaveral, Fla., on Jan. 31, 1958. Explorer 1 is the small section on top of the large Jupiter-C rocket that blasted it into orbit. With the launch of Explorer 1, the United States officially entered the space age.
Image credit: NASA

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

60 years later NASA celebrates the launch of Explorer 1
In the mid-1950s the Cold War was running hot. The U.S. and U.S.S.R. each sought to gain an edge over the other with new technologies and weapons developed during World War II and in the burgeoning Atomic Age. The competition to put a satellite into orbit was particularly intense.
https://explorer1.jpl.nasa.gov/#?

Vista From Mars Rover Looks Back Over Journey So Far
A panoramic image that NASA's Curiosity Mars rover took from a mountainside ridge provides a sweeping vista of key sites visited since the rover's 2012 landing, and the towering surroundings. The view from "Vera Rubin Ridge" on the north flank of Mount Sharp encompasses much of the 11-mile (18-kilometer) route the rover has driven from its 2012 landing site,
https://goo.gl/96qXow

False Positives, False Negatives; The World of Distant Biosignatures Attracts and Confounds
What observations, or groups of observations, would tell exoplanet scientists that life might be present on a particular distant planet? The most often discussed biosignature is oxygen, the product of life on Earth. But while oxygen remains central to the search for biosignatures afar, there are some serious problems with relying on that molecule. It can, for one, be produced without biology, although on Earth biology is the major source. Conditions on other planets, however, might be different, producing lots of oxygen without life.
https://goo.gl/ayPQ2h

Chandra field guide to X-ray sources: Normal Galaxies
Right now Chandra is gazing at a galaxy in Corona Borealis! Nearby are galaxies NGC 6085, a beautiful spiral, and NGC 6086, a bright elliptical! Many more galaxies can also be seen in this view! Today's Observation: 1 hour 56 minutes
More about galaxy shapes:
http://s.si.edu/2E83z3u

Natl Geo, We're Not All Doomed by Earth's Magnetic Field Flip
A geomagnetic apocalypse may not be on the horizon, but there is some fascinating science behind the doomsday hype. Many times over our planet's history, Earth's magnetic poles have reversed, meaning that sometimes a compass pointing north will be aimed at Antarctica rather than the Arctic. This might sound strange, but it's a relatively predictable quirk. Powered by the machinations of the planet's spinning iron core, this process of geomagnetic reversal has been doing its thing without much fanfare for eons.
https://goo.gl/6VakXJ

February Sky Data

Last Qtr	New	First Qtr	Full
Feb 7	Feb 15	Feb 23	N/A

Best time for deep sky observing this month:
February 10 through February 19

Mercury is currently located on the far side of the Sun. The innermost planet passes through superior conjunction on February 16th. Throughout the month it remains too close to the Sun to be safely observed.

Venus returns to the evening sky for the first time since March 2017. The brilliant planet shines at mag. -3.4 and can be seen during twilight from northern locations, very low above the western horizon towards the end of month.

Mars starts the month moving quicky eastwards in Scorpius close to Beta Scorpii (Graffias) but moves into Ophiuchus on the 8th of the month. Now a morning object at, it rises four hours or so earlier than the Sun. During the month, Mars has a magnitude which increases from +1.3 to +1.0 and an angular size of just 5.6, increasing to 6.6, arc seconds so no details will be seen on its salmon-pink surface.

Jupiter rises around 2 am at the beginning of the month and just before midnight by month's end. Initially it has a 36 arc second disk, shining at a magnitude of -1.6 but as the month progresses, its apparent diameter increases to 39 arc seconds and it brightens to magnitude -1.7.

Saturn is an early morning object in Sagittarius. The planet is just north of the constellation's "teapot" asterism among the rich Milky Way star fields. From mid-northern latitudes it's somewhat hindered by low altitude, but by month's end rises some 2.5 hours before the Sun.

There are no significant **meteor-showers** in February, and it is generally a quiet time for sporadic meteors too.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
2/1/2018	8:00pm	8:44am	7:50am	6:22pm
2/5/2018	n/a	11:14am	7:47am	6:26pm
2/10/2018	3:53am	2:23pm	7:43am	6:30pm
2/15/2018	7:36am	6:42pm	7:39am	6:34pm
2/20/2018	10:29am	11:34pm	7:32am	6:40pm
2/25/2018	2:19pm	3:47am	7:27am	6:44pm
2/28/2018	5:38pm	6:32am	7:24am	6:47pm

Planet Data

Feb 1

	Rise	Transit	Set	Mag
Mercury	7:24am	12:26pm	5:27pm	-0.5
Venus	8:16am	1:33pm	6:49pm	-3.4
Mars	3:10am	8:15am	1:20pm	1.3
Jupiter	2:08am	7:24am	12:39pm	-1.6
Saturn	5:30am	10:28am	3:26pm	0.6

Feb 15

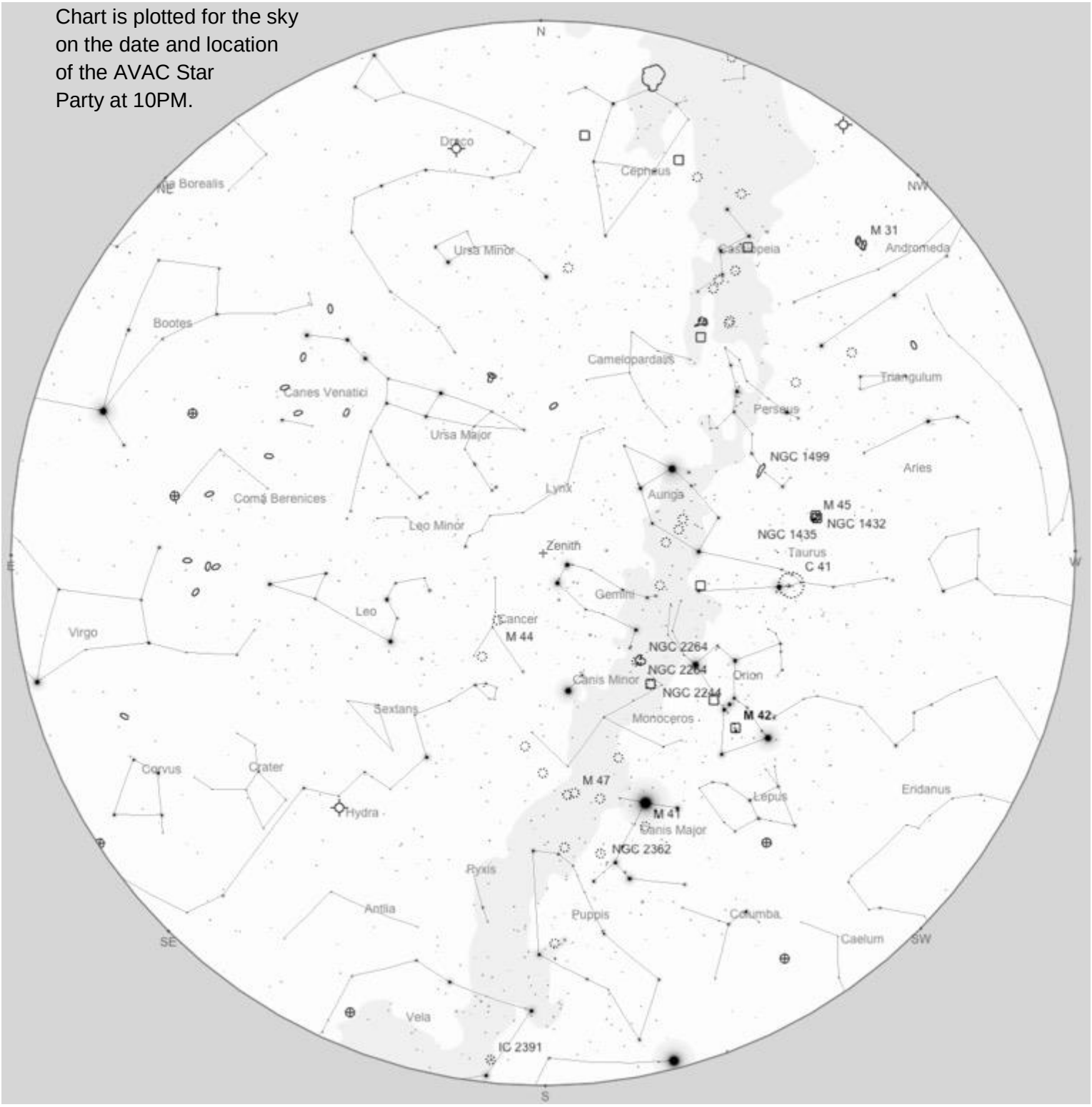
	Rise	Transit	Set	Mag
Mercury	7:45am	1:07pm	6:28pm	-1.1
Venus	8:12am	1:45pm	7:19pm	-3.4
Mars	2:55am	7:55am	12:56pm	1.2
Jupiter	1:19am	6:33am	11:48am	-1.7
Saturn	4:40am	9:39am	2:37pm	0.6

Feb 31

	Rise	Transit	Set	Mag
Mercury	7:55am	1:45pm	7:34pm	-1.2
Venus	8:04am	1:54pm	7:45pm	-3.4
Mars	2:40am	7:38am	12:35pm	1.0
Jupiter	12:30am	5:45am	10:59am	-1.7
Saturn	3:53am	8:52am	1:50pm	0.6

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
NGC1491	Neb	Per	04h 03m 14s	+51°18'57"		10:01 AM	7:59 PM	5:58 AM
NGC1499	Neb	Per	04h 03m 14s	+36°22'00"		11:56 AM	7:59 PM	4:03 AM
NGC1501	P Neb	Cam	04h 06m 59s	+60°55'14"	13.0	Circum	8:03 PM	Circum
NGC1502	Open	Cam	04h 07m 50s	+62°19'54"	5.7	Circum	8:04 PM	Circum
NGC1514	P Neb	Tau	04h 09m 17s	+30°46'33"	10.0	12:27 PM	8:05 PM	3:44 AM
NGC1513	Open	Per	04h 09m 57s	+49°30'54"	8.4	10:30 AM	8:06 PM	5:42 AM
NGC1535	P Neb	Eri	04h 14m 16s	-12°44'22"	10.0	2:43 PM	8:10 PM	1:38 AM
NGC1528	Open	Per	04h 15m 23s	+51°12'54"	6.4	10:14 AM	8:11 PM	6:09 AM
NGC1579	Neb	Per	04h 30m 14s	+35°16'47"		12:28 PM	8:26 PM	4:24 AM
NGC1605	Open	Per	04h 34m 53s	+45°16'12"	10.7	11:33 AM	8:31 PM	5:28 AM
NGC1664	Open	Aur	04h 51m 06s	+43°40'30"	7.6	12:01 PM	8:47 PM	5:33 AM
NGC1682	Gal	Ori	04h 52m 20s	-03°06'21"	14.0	2:54 PM	8:48 PM	2:43 AM
NGC1724	Open	Aur	05h 03m 32s	+49°29'30"	10.0	11:23 AM	9:00 PM	6:36 AM
NGC1788	Neb	Ori	05h 06m 53s	-03°20'27"		3:09 PM	9:03 PM	2:57 AM
NGC1832	Gal	Lep	05h 12m 03s	-15°41'18"	11.4	3:49 PM	9:08 PM	2:27 AM
NGC1817	Open	Tau	05h 12m 15s	+16°41'24"	7.7	2:19 PM	9:08 PM	3:58 AM
NGC1851	Glob	Col	05h 14m 07s	-40°02'46"	7.3	5:24 PM	9:10 PM	12:56 AM
NGC1857	Open	Aur	05h 20m 05s	+39°19'30"	7.0	12:57 PM	9:16 PM	5:35 AM
NGC1893	Open	Aur	05h 22m 45s	+33°24'42"	7.5	1:29 PM	9:19 PM	5:08 AM
M79	Glob	Lep	05h 24m 11s	-24°31'29"	8.5	4:29 PM	9:20 PM	2:12 AM
NGC1907	Open	Aur	05h 28m 05s	+35°19'30"	8.2	1:26 PM	9:24 PM	5:22 AM
M38	Open	Aur	05h 28m 40s	+35°50'54"	7.0	1:24 PM	9:25 PM	5:25 AM
NGC1952	Neb	Tau	05h 34m 32s	+22°00'52"	8.4	2:24 PM	9:31 PM	4:37 AM
NGC1973	Neb	Ori	05h 35m 05s	-04°43'55"		3:41 PM	9:31 PM	3:21 AM
NGC1981	Open	Ori	05h 35m 09s	-04°25'54"	4.6	3:40 PM	9:31 PM	3:22 AM
NGC1977	Neb	Ori	05h 35m 16s	-04°49'15"		3:42 PM	9:31 PM	3:21 AM
M42	D Neb	Ori	05h 35m 16s	-05°23'25"	4.0	3:43 PM	9:31 PM	3:19 AM
NGC1975	Neb	Ori	05h 35m 18s	-04°41'05"		3:41 PM	9:31 PM	3:21 AM
NGC1980	Neb	Ori	05h 35m 25s	-05°54'54"		3:45 PM	9:31 PM	3:18 AM
M43	D Neb	Ori	05h 35m 31s	-05°16'03"	9.0	3:43 PM	9:32 PM	3:20 AM
NGC1990	Neb	Ori	05h 36m 13s	-01°12'07"		3:33 PM	9:32 PM	3:32 AM
M36	Open	Aur	05h 36m 18s	+34°08'24"	6.5	1:39 PM	9:32 PM	5:25 AM
NGC1999	Neb	Ori	05h 36m 25s	-06°42'57"		3:48 PM	9:32 PM	3:17 AM
NGC2023	Neb	Ori	05h 41m 38s	-02°15'33"		3:41 PM	9:38 PM	3:34 AM
NGC2024	Neb	Ori	05h 41m 42s	-01°51'24"		3:40 PM	9:38 PM	3:35 AM
NGC2022	P Neb	Ori	05h 42m 06s	+09°05'13"	12.0	3:11 PM	9:38 PM	4:06 AM
NGC2064	Neb	Ori	05h 46m 18s	+00°00'21"		3:40 PM	9:42 PM	3:45 AM
NGC2067	Neb	Ori	05h 46m 31s	+00°07'54"		3:39 PM	9:43 PM	3:46 AM
M78	D Neb	Ori	05h 46m 45s	+00°04'48"	8.0	3:40 PM	9:43 PM	3:46 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2071	Neb	Ori	05h 47m 07s	+00°17'39"		3:40 PM	9:43 PM	3:47 AM
M37	Open	Aur	05h 52m 18s	+32°33'12"	6.0	2:02 PM	9:48 PM	5:34 AM
NGC2112	Open	Ori	05h 53m 45s	+00°24'36"	9.0	3:46 PM	9:50 PM	3:54 AM
NGC2129	Open	Gem	06h 01m 06s	+23°19'18"	6.7	2:46 PM	9:57 PM	5:08 AM
NGC2126	Open	Aur	06h 02m 32s	+49°52'00"	10.0	12:18 PM	9:59 PM	7:39 AM
NGC2149	Neb	Mon	06h 03m 31s	-09°43'50"		4:23 PM	10:00 PM	3:36 AM
NGC2170	Neb	Mon	06h 07m 32s	-06°23'57"		4:18 PM	10:04 PM	3:49 AM
NGC2169	Open	Ori	06h 08m 24s	+13°57'54"	5.9	3:23 PM	10:04 PM	4:46 AM
M35	Open	Gem	06h 09m 00s	+24°21'00"	5.5	2:51 PM	10:05 PM	5:19 AM
NGC2174	Neb	Ori	06h 09m 24s	+20°39'34"		3:03 PM	10:05 PM	5:08 AM
NGC2182	Neb	Mon	06h 09m 31s	-06°19'35"		4:20 PM	10:06 PM	3:51 AM
NGC2183	Neb	Mon	06h 10m 47s	-06°12'43"		4:21 PM	10:07 PM	3:53 AM
NGC2185	Neb	Mon	06h 11m 00s	-06°13'36"		4:21 PM	10:07 PM	3:53 AM
NGC2232	Open	Mon	06h 28m 01s	-04°50'48"	3.9	4:34 PM	10:24 PM	4:14 AM
NGC2244	Open	Mon	06h 31m 56s	+04°56'35"	4.8	4:12 PM	10:28 PM	4:44 AM
NGC2245	Neb	Mon	06h 32m 41s	+10°09'24"		3:58 PM	10:29 PM	4:59 AM
NGC2247	Neb	Mon	06h 33m 05s	+10°19'17"		3:58 PM	10:29 PM	5:00 AM
NGC2242	P Neb	Aur	06h 34m 07s	+44°46'38"	14.0	1:36 PM	10:30 PM	7:24 AM
NGC2254	Open	Mon	06h 35m 49s	+07°40'24"	9.7	4:08 PM	10:32 PM	4:56 AM
NGC2261	Neb	Mon	06h 39m 10s	+08°44'40"		4:09 PM	10:35 PM	5:02 AM
NGC2264	Open	Mon	06h 40m 58s	+09°53'42"	3.9	4:07 PM	10:37 PM	5:07 AM
NGC2269	Open	Mon	06h 43m 17s	+04°37'30"	10.0	4:24 PM	10:39 PM	4:55 AM
NGC2266	Open	Gem	06h 43m 19s	+26°58'12"	10.0	3:16 PM	10:39 PM	6:03 AM
M41	Open	CMa	06h 46m 01s	-20°45'24"	5.0	5:38 PM	10:42 PM	3:46 AM
NGC2282	Neb	Mon	06h 46m 51s	+01°18'56"		4:37 PM	10:43 PM	4:49 AM
NGC2281	Open	Aur	06h 48m 17s	+41°04'42"	5.4	2:15 PM	10:44 PM	7:13 AM
NGC2298	Glob	Pup	06h 48m 59s	-36°00'15"	9.4	6:39 PM	10:45 PM	2:51 AM
NGC2302	Open	Mon	06h 51m 55s	-07°05'00"	8.9	5:04 PM	10:48 PM	4:31 AM
NGC2304	Open	Gem	06h 55m 11s	+17°59'18"	10.0	3:58 PM	10:51 PM	5:45 AM
NGC2316	Neb	Mon	06h 59m 41s	-07°46'39"		5:14 PM	10:56 PM	4:37 AM
M50	Open	Mon	07h 02m 42s	-08°23'00"	7.0	5:19 PM	10:59 PM	4:39 AM
NGC2335	Open	Mon	07h 06m 49s	-10°01'42"	7.2	5:28 PM	11:03 PM	4:38 AM
NGC2343	Open	Mon	07h 08m 06s	-10°37'00"	6.7	5:30 PM	11:04 PM	4:38 AM
NGC2342	Gal	Gem	07h 09m 18s	+20°38'10"	13.0	4:03 PM	11:05 PM	6:07 AM
NGC2359	Neb	CMa	07h 18m 30s	-13°13'36"		5:48 PM	11:15 PM	4:41 AM
NGC2362	Open	CMa	07h 18m 41s	-24°57'18"	4.1	6:25 PM	11:15 PM	4:05 AM
NGC2367	Open	CMa	07h 20m 06s	-21°52'54"	7.9	6:16 PM	11:16 PM	4:16 AM
NGC2384	Open	CMa	07h 25m 10s	-21°01'18"	7.4	6:18 PM	11:21 PM	4:24 AM
NGC2371	P Neb	Gem	07h 25m 34s	+29°29'17"	13.0	3:48 PM	11:22 PM	6:55 AM
NGC2396	Open	Pup	07h 28m 00s	-11°43'00"	7.0	5:53 PM	11:24 PM	4:55 AM
NGC2392	P Neb	Gem	07h 29m 11s	+20°54'42"	10.0	4:22 PM	11:25 PM	6:28 AM
NGC2300	Gal	Cep	07h 32m 21s	+85°42'31"	11.0	Circum	11:28 PM	Circum
NGC2421	Open	Pup	07h 36m 13s	-20°36'42"	8.3	6:28 PM	11:32 PM	4:36 AM
M47	Open	Pup	07h 36m 35s	-14°29'00"	4.5	6:10 PM	11:33 PM	4:55 AM
NGC2423	Open	Pup	07h 37m 06s	-13°52'18"	6.7	6:09 PM	11:33 PM	4:58 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2419	Glob	Lyn	07h 38m 08s	+38°52'54"	10.4	3:18 PM	11:34 PM	7:50 AM
NGC2420	Open	Gem	07h 38m 23s	+21°34'24"	8.3	4:29 PM	11:34 PM	6:39 AM
NGC2432	Open	Pup	07h 40m 53s	-19°04'36"	10.0	6:28 PM	11:37 PM	4:46 AM
NGC2438	P Neb	Pup	07h 41m 50s	-14°44'07"	10.0	6:16 PM	11:38 PM	5:00 AM
NGC2440	P Neb	Pup	07h 41m 55s	-18°12'31"	11.0	6:26 PM	11:38 PM	4:50 AM
M93	Open	Pup	07h 44m 30s	-23°51'24"	6.5	6:47 PM	11:41 PM	4:34 AM
NGC2451	Open	Pup	07h 45m 15s	-37°58'00"	2.8	7:45 PM	11:41 PM	3:38 AM
NGC2452	P Neb	Pup	07h 47m 26s	-27°20'07"	13.0	7:02 PM	11:43 PM	4:25 AM
NGC2477	Open	Pup	07h 52m 10s	-38°31'48"	5.8	7:54 PM	11:48 PM	3:42 AM
NGC2467	Open	Pup	07h 52m 26s	-26°26'12"	7.0	7:04 PM	11:48 PM	4:33 AM
NGC2485	Gal	CMi	07h 56m 49s	+07°28'38"	13.0	5:30 PM	11:53 PM	6:16 AM
NGC2506	Open	Mon	08h 00m 01s	-10°46'12"	7.6	6:23 PM	11:56 PM	5:29 AM
NGC2500	Gal	Lyn	08h 01m 53s	+50°44'15"	11.6	2:07 PM	11:58 PM	9:49 AM
NGC2527	Open	Pup	08h 04m 58s	-28°08'48"	6.5	7:22 PM	12:01 AM	4:40 AM
NGC2533	Open	Pup	08h 07m 04s	-29°53'00"	7.6	7:31 PM	12:03 AM	4:35 AM
NGC2547	Open	Vel	08h 10m 09s	-49°12'54"	4.7	9:26 PM	12:06 AM	2:47 AM
M48	Open	Hya	08h 13m 43s	-05°45'00"	5.5	6:23 PM	12:10 AM	5:57 AM
NGC2558	Gal	Cnc	08h 19m 13s	+20°30'38"	14.0	5:14 PM	12:15 AM	7:17 AM
NGC2580	Open	Pup	08h 21m 28s	-30°18'00"	10.0	7:47 PM	12:17 AM	4:48 AM
NGC2610	P Neb	Hya	08h 33m 23s	-16°08'57"	14.0	7:12 PM	12:29 AM	5:47 AM
NGC2626	Neb	Vel	08h 35m 31s	-40°40'18"		8:49 PM	12:32 AM	4:14 AM
M44	Open	Cnc	08h 40m 24s	+19°40'00"	4.0	5:38 PM	12:36 AM	7:35 AM
NGC2659	Open	Vel	08h 42m 37s	-44°59'00"	8.6	9:23 PM	12:39 AM	3:54 AM
NGC2660	Open	Vel	08h 42m 38s	-47°12'00"	8.8	9:40 PM	12:39 AM	3:37 AM
NGC2670	Open	Vel	08h 45m 30s	-48°48'00"	7.8	9:57 PM	12:42 AM	3:26 AM
M67	Open	Cnc	08h 51m 18s	+11°48'00"	7.5	6:12 PM	12:47 AM	7:23 AM
NGC2713	Gal	Hya	08h 57m 21s	+02°55'15"	11.7	6:43 PM	12:53 AM	7:04 AM
NGC2770	Gal	Lyn	09h 09m 34s	+33°07'25"	12.0	5:17 PM	1:06 AM	8:54 AM
NGC2778	Gal	Lyn	09h 12m 24s	+35°01'39"	13.0	5:12 PM	1:08 AM	9:05 AM
NGC2792	P Neb	Vel	09h 12m 27s	-42°25'41"	14.0	9:36 PM	1:08 AM	4:41 AM
NGC2787	Gal	UMa	09h 19m 19s	+69°12'11"	10.8	Circum	1:15 AM	Circum
NGC2810	Gal	UMa	09h 22m 04s	+71°50'38"	13.0	Circum	1:18 AM	Circum
NGC2903	Gal	Leo	09h 32m 10s	+21°30'04"	8.9	6:23 PM	1:28 AM	8:33 AM
NGC3032	Gal	Leo	09h 52m 08s	+29°14'10"	11.9	6:16 PM	1:48 AM	9:20 AM
NGC3078	Gal	Hya	09h 58m 25s	-26°55'34"	11.1	9:11 PM	1:54 AM	6:37 AM
NGC3108	Gal	Ant	10h 02m 29s	-31°40'35"	13.0	9:34 PM	1:59 AM	6:23 AM
NGC3132	P Neb	Vel	10h 07m 02s	-40°26'11"	8.0	10:19 PM	2:03 AM	5:47 AM
NGC3162	Gal	Leo	10h 13m 32s	+22°44'15"	11.6	7:01 PM	2:10 AM	9:18 AM
NGC3178	Gal	Hya	10h 16m 09s	-15°47'29"	13.0	8:53 PM	2:12 AM	7:31 AM
NGC3147	Gal	Dra	10h 16m 53s	+73°24'02"	10.7	Circum	2:13 AM	Circum
NGC3201	Glob	Vel	10h 17m 37s	-46°24'45"	6.8	11:09 PM	2:14 AM	5:18 AM
NGC3184	Gal	UMa	10h 18m 17s	+41°25'27"	9.8	5:43 PM	2:14 AM	10:45 AM
NGC3228	Open	Vel	10h 21m 22s	-51°43'42"	6.0	12:05 AM	2:17 AM	4:30 AM
NGC3242	P Neb	Hya	10h 24m 46s	-18°38'34"	9.0	9:11 PM	2:21 AM	7:31 AM
NGC3245	Gal	LMi	10h 27m 18s	+28°30'27"	10.8	6:54 PM	2:23 AM	9:53 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC3317	Gal	Hya	10h 37m 43s	-27°31'11"	14.0	9:53 PM	2:34 AM	7:15 AM
NGC3310	Gal	UMa	10h 38m 46s	+53°30'10"	10.9	3:59 PM	2:35 AM	1:11 PM
NGC3335	Gal	Hya	10h 39m 34s	-23°55'21"	14.0	9:42 PM	2:36 AM	7:29 AM
M95	Gal	Leo	10h 43m 58s	+11°42'13"	10.6	8:05 PM	2:40 AM	9:15 AM
M96	Gal	Leo	10h 46m 46s	+11°49'12"	10.1	8:07 PM	2:43 AM	9:18 AM
NGC3389	Gal	Leo	10h 48m 28s	+12°31'59"	11.8	8:07 PM	2:44 AM	9:22 AM
NGC3431	Gal	Crt	10h 51m 15s	-17°00'31"	14.0	9:32 PM	2:47 AM	8:02 AM
NGC3430	Gal	LMi	10h 52m 12s	+32°57'03"	11.5	7:01 PM	2:48 AM	10:36 AM
NGC3522	Gal	Leo	11h 06m 40s	+20°05'07"	14.0	8:02 PM	3:03 AM	10:03 AM
M97	P Neb	UMa	11h 14m 48s	+55°01'08"	12.0	3:48 PM	3:11 AM	2:33 PM
NGC3607	Gal	Leo	11h 16m 55s	+18°03'06"	10.0	8:19 PM	3:13 AM	10:07 AM
M65	Gal	Leo	11h 18m 56s	+13°05'31"	10.1	8:36 PM	3:15 AM	9:54 AM
NGC3646	Gal	Leo	11h 21m 43s	+20°10'11"	11.2	8:17 PM	3:18 AM	10:18 AM
NGC3642	Gal	UMa	11h 22m 18s	+59°04'29"	11.1	Circum	3:18 AM	Circum
NGC3756	Gal	UMa	11h 36m 48s	+54°17'44"	11.5	4:37 PM	3:33 AM	2:28 PM
NGC3831	Gal	Crt	11h 43m 19s	-12°52'41"	14.0	10:12 PM	3:39 AM	9:07 AM
NGC3893	Gal	UMa	11h 48m 38s	+48°42'39"	11.0	6:17 PM	3:45 AM	1:13 PM
NGC3960	Open	Cen	11h 50m 33s	-55°40'24"	8.3	2:49 AM	3:47 AM	4:44 AM
NGC3923	Gal	Hya	11h 51m 02s	-28°48'23"	10.1	11:11 PM	3:47 AM	8:23 AM
NGC3954	Gal	Leo	11h 53m 42s	+20°52'57"	14.0	8:47 PM	3:50 AM	10:53 AM
NGC4147	Glob	Com	12h 10m 06s	+18°32'30"	10.3	9:11 PM	4:06 AM	11:02 AM
NGC4189	Gal	Com	12h 13m 47s	+13°25'30"	11.7	9:30 PM	4:10 AM	10:50 AM
NGC4230	Open	Cen	12h 17m 09s	-55°17'12"	9.0	3:04 AM	4:13 AM	5:23 AM
NGC4235	Gal	Vir	12h 17m 10s	+07°11'28"	11.6	9:51 PM	4:13 AM	10:36 AM
NGC4248	Gal	CVn	12h 17m 50s	+47°24'32"	12.6	6:59 PM	4:14 AM	1:29 PM
NGC4267	Gal	Vir	12h 19m 45s	+12°47'55"	10.9	9:38 PM	4:16 AM	10:54 AM
NGC4274	Gal	Com	12h 19m 51s	+29°36'51"	10.4	8:42 PM	4:16 AM	11:50 AM
NGC4343	Gal	Vir	12h 23m 39s	+06°57'16"	12.1	9:58 PM	4:20 AM	10:41 AM
NGC4361	P Neb	Crv	12h 24m 31s	-18°47'06"	10.0	11:11 PM	4:21 AM	9:30 AM
NGC4371	Gal	Vir	12h 24m 55s	+11°42'14"	10.8	9:46 PM	4:21 AM	10:56 AM
NGC4411	Gal	Vir	12h 26m 30s	+08°52'19"	12.8	9:56 PM	4:23 AM	10:50 AM
NGC4417	Gal	Vir	12h 26m 51s	+09°35'02"	11.2	9:54 PM	4:23 AM	10:52 AM
NGC4474	Gal	Com	12h 29m 54s	+14°04'06"	11.8	9:44 PM	4:26 AM	11:08 AM
M87	Gal	Vir	12h 30m 49s	+12°23'27"	9.6	9:50 PM	4:27 AM	11:04 AM
NGC4503	Gal	Vir	12h 32m 06s	+11°10'35"	11.1	9:55 PM	4:28 AM	11:02 AM
NGC4535	Gal	Vir	12h 34m 20s	+08°11'52"	9.8	10:05 PM	4:30 AM	10:55 AM
M89	Gal	Vir	12h 35m 40s	+12°33'23"	10.9	9:54 PM	4:32 AM	11:09 AM
M58	Gal	Vir	12h 37m 44s	+11°49'06"	10.4	9:58 PM	4:34 AM	11:09 AM
M68	Glob	Hya	12h 39m 28s	-26°44'32"	9.0	11:52 PM	4:35 AM	9:19 AM
NGC4619	Gal	CVn	12h 41m 44s	+35°03'45"	14.0	8:41 PM	4:38 AM	12:35 PM
NGC4638	Gal	Vir	12h 42m 47s	+11°26'31"	11.3	10:05 PM	4:39 AM	11:13 AM
NGC4636	Gal	Vir	12h 42m 50s	+02°41'16"	9.6	10:29 PM	4:39 AM	10:49 AM
NGC4666	Gal	Vir	12h 45m 08s	-00°27'45"	10.8	10:40 PM	4:41 AM	10:43 AM
NGC4697	Gal	Vir	12h 48m 36s	-05°48'02"	9.3	10:58 PM	4:45 AM	10:32 AM
NGC4989	Gal	Vir	13h 09m 16s	-05°23'48"	14.0	11:17 PM	5:05 AM	10:53 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M53	Glob	Com	13h 12m 55s	+18°10'07"	8.5	10:15 PM	5:09 AM	12:03 PM
NGC5053	Glob	Com	13h 16m 27s	+17°41'52"	9.8	10:20 PM	5:12 AM	12:05 PM
NGC5054	Gal	Vir	13h 16m 58s	-16°38'05"	11.0	11:57 PM	5:13 AM	10:29 AM
NGC5078	Gal	Hya	13h 19m 50s	-27°24'34"	12.0	12:35 AM	5:16 AM	9:57 AM
NGC5140	Gal	Cen	13h 26m 21s	-33°52'06"	13.0	1:07 AM	5:22 AM	9:38 AM
NGC5139	Glob	Cen	13h 26m 47s	-47°28'53"	3.7	2:27 AM	5:23 AM	8:19 AM
M3	Glob	CVn	13h 42m 11s	+28°22'35"	7.0	10:09 PM	5:38 AM	1:07 PM
NGC5286	Glob	Cen	13h 46m 27s	-51°22'30"	7.6	3:26 AM	5:42 AM	7:59 AM
NGC5307	P Neb	Cen	13h 51m 03s	-51°12'20"	12.0	3:28 AM	5:47 AM	8:06 AM
NGC5350	Gal	CVn	13h 53m 22s	+40°21'49"	11.4	9:25 PM	5:49 AM	2:14 PM
NGC5363	Gal	Vir	13h 56m 07s	+05°15'16"	10.2	11:35 PM	5:52 AM	12:09 PM
NGC5383	Gal	CVn	13h 57m 05s	+41°50'46"	11.4	9:19 PM	5:53 AM	2:27 PM
NGC5367	Neb	Cen	13h 57m 43s	-39°58'42"		2:08 AM	5:54 AM	9:40 AM
M101	Gal	UMa	14h 03m 13s	+54°20'56"	8.2	7:02 PM	5:59 AM	4:56 PM
NGC5466	Glob	Boo	14h 05m 28s	+28°31'57"	9.1	10:32 PM	6:01 AM	1:31 PM
NGC5460	Open	Cen	14h 07m 27s	-48°20'36"	5.6	3:15 AM	6:03 AM	8:52 AM
NGC5576	Gal	Vir	14h 21m 04s	+03°16'15"	10.9	12:05 AM	6:17 AM	12:29 PM
NGC5589	Gal	Boo	14h 21m 25s	+35°16'14"	14.0	10:19 PM	6:17 AM	2:15 PM
NGC5634	Glob	Vir	14h 29m 37s	-05°58'37"	9.6	12:39 AM	6:26 AM	12:12 PM
NGC5694	Glob	Hya	14h 39m 37s	-26°32'18"	10.2	1:51 AM	6:36 AM	11:20 AM
NGC5751	Gal	Boo	14h 43m 49s	+53°24'01"	14.0	8:06 PM	6:40 AM	5:14 PM
NGC5750	Gal	Vir	14h 46m 11s	-00°13'23"	11.6	12:40 AM	6:42 AM	12:44 PM
NGC5824	Glob	Lup	15h 03m 59s	-33°04'07"	9.0	2:41 AM	7:00 AM	11:19 AM
NGC5823	Open	Cir	15h 05m 30s	-55°36'12"	7.9	6:02 AM	7:02 AM	8:01 AM
NGC5873	P Neb	Lup	15h 12m 51s	-38°07'30"	13.0	3:13 AM	7:09 AM	11:05 AM
NGC5878	Gal	Lib	15h 13m 46s	-14°16'14"	11.5	1:47 AM	7:10 AM	12:33 PM
NGC5882	P Neb	Lup	15h 16m 50s	-45°38'56"	11.0	4:02 AM	7:13 AM	10:23 AM
NGC5897	Glob	Lib	15h 17m 24s	-21°00'37"	8.6	2:11 AM	7:13 AM	12:16 PM
M5	Glob	Ser	15h 18m 33s	+02°04'57"	7.0	1:06 AM	7:15 AM	1:23 PM
NGC5921	Gal	Ser	15h 21m 56s	+05°04'12"	10.8	1:01 AM	7:18 AM	1:34 PM
NGC5925	Open	Nor	15h 27m 26s	-54°31'42"	8.0	5:56 AM	7:23 AM	8:51 AM
NGC5927	Glob	Lup	15h 28m 00s	-50°40'23"	8.3	4:59 AM	7:24 AM	9:49 AM
NGC5946	Glob	Nor	15h 35m 28s	-50°39'33"	9.6	5:06 AM	7:32 AM	9:57 AM
NGC5986	Glob	Lup	15h 46m 04s	-37°47'08"	7.1	3:44 AM	7:42 AM	11:40 AM
NGC6058	P Neb	Her	16h 04m 27s	+40°40'59"	13.0	11:34 PM	8:00 AM	4:27 PM
NGC6031	Open	Nor	16h 07m 35s	-54°00'54"	8.5	6:26 AM	8:04 AM	9:41 AM
NGC6070	Gal	Ser	16h 09m 59s	+00°42'33"	11.7	2:01 AM	8:06 AM	2:11 PM
NGC6095	Gal	Dra	16h 11m 11s	+61°16'04"	14.0	Circum	8:07 AM	Circum

A.V.A.C. Information

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

The Club has three categories of membership.

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

Membership entitles you to…

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

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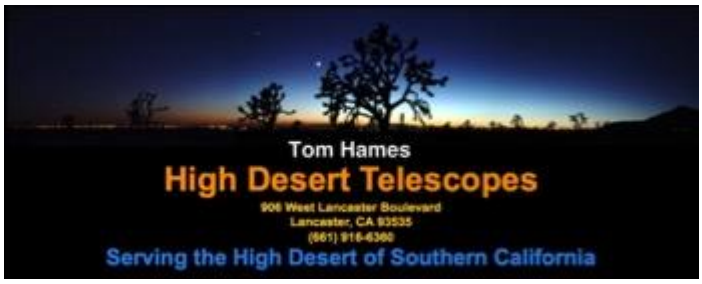

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