



Desert Sky Observer

Volume 37

Antelope Valley Astronomy Club Newsletter

December 2017

Up-Coming Events

December 2: Club Christmas Party

December 9: [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

Well folks, it's December and with the (theoretically) cooler temperatures and unsettled weather a time when we take a little pause and have fewer activities.

Remember, we do not have a club meeting at the SAGE Planetarium in the month of December since we instead have the annual Christmas Party on Saturday December 2.

Due to the proximity of the new moon weekend to the Thanksgiving holiday, we didn't have an official November Dark Sky Star Party but a few members still went out and did some observing. AVAC Treasurer Rod Girard went out to Red Rock Canyon State Park where he said the sky was absolutely beautiful. I had considered going, but with wind gust of 30 mph or more in Tehachapi I figured he was getting blown away at Red Rock Canyon. Nope, he said the wind was almost calm with only the most gentle breeze. Rod said he could see the Orion Nebula with his naked eye at 8:30 pm and I wish I had gone.

The November Prime Desert Woodland Moonwalk was held on Saturday November 4. Because of it was so soon after the October 28 Moonwalk, and due to predicted inclement weather (that did not materialize), I didn't promote it as actively as usual and the turnout was a little light. Still, we had 35 members of the public present to take the walk with Jeremy Amarant and observe through our telescopes. The amazing part was that all 35 of those people were new attendees with none of them repeats from the previous weekend. Members with telescopes at the event included Darrell Bennett, Kevin Reilly, Ellen Mahler, Rod Girard and myself.

The December Moonwalk will be held on Saturday December 9 at 5:30 pm, weather permitting, and the January 2018 Moonwalk will be on Saturday January 6 at 5:30 pm.

There are a few big dates to mark on your calendar. First, we have a Total Lunar Eclipse on the morning of Wednesday January 31, 2018 and we will have an eclipse party and public viewing event in the SAGE Planetarium parking lot. The penumbral eclipse begins at 2:51 am, the partial eclipse at 3:48 am, with totality beginning at 4:51 am. Totality ends at 6:07 am with the moon setting, still partially eclipsed, at 6:54 am. If you haven't seen it before, the sight of a partially eclipsed moon setting toward the horizon as the sky begins to be illuminated by the rising sun is a beautiful site. Setup for the event will start approximately one hour before the penumbral eclipse begins. Information on the eclipse and be found here: <https://www.timeanddate.com/eclipse/in/usa/palmdale>

Rescheduled from a previous date, a celebration of the 20th Anniversary of the SAGE Planetarium will be held, at the planetarium, on Friday March 9, 2018. This is also the night of our March AVAC meeting. We will have solar observing and educational displays in the afternoon, a brief club meeting, and a public star party after dark. We hope to make this a very special event and we will be needing as much member participation as we can muster.

As this is the last newsletter of 2017, I want to thank all of you for your support throughout this past year and I wish you best in your holiday celebrations and in the coming year. I want to recognize, and remind, everyone that we are an interfaith organization with members from all points of the globe and from diverse ethnic backgrounds.

Many of you may know that Rose and I are huge fans of the progressive rock band, The Moody Blues, and that we follow them on multiple tour dates each and every year. While on a fitness walk this past week, I was listening to their album, "In Search of The Lost Chord" on my iPod and the words of drummer Graeme Edge's poem "The Word" struck me as being extremely poignant to how I feel about this organization and the people that comprise it. Mind you, Graeme wrote this in 1968 before most laypersons had a clue about all of the light and radio frequencies that make up the universe and are all around us. With that, I offer you, "The Word".

*This garden universe vibrates complete
Some may get a sound so sweet
Vibrations reach on up to become light
And then through gamma, out of sight*

*Between the eyes and ears there lie
The sounds of color and the light of a sigh
And to hear the sun, what a thing to believe*

*But it's all around if we could but perceive
To know ultra violet, infra-red and X-rays
Beauty to find in so many ways*

*Two notes of the chord, that's our full scope
But to reach the chord is our life's hope
And to name the chord is important to some
So they give a word and the word is Om*

So whether you say, "Om", "Amen", or just "Wow" when you see and ponder on the wonders of the universe, I wish you a joyous holiday season and the best of fortunes in the coming year.



Secretary Rose Moore

A reminder our Christmas Party is on Saturday December 2nd. If you would like to come, but haven't let us know, please email or leave me a voice mail. You may pay at the party.

Coming up on Saturday Dec. 9th at 5:30pm is our last Prime Desert Moon Walk for this year. We'll need members with scopes, or just come out for the walk! The Moon will not come up until after 11:30pm, so it will allow us to view some dark sky objects. Weather permitting.

On Saturday January 6th at 5:30pm will be a Prime Desert Moon Walk. Weather permitting. Moon will be past 1st quarter and will be up for us to view, as well as attempting some dark sky objects.

In the next few weeks, I will be starting to work on speakers for next year. If you have any suggestions for speakers, or have a topic of interest you would like us to cover, please let me know.

I would like to thank all club members, and those who have supported our club outreach this past year! We had more than 18 outreach events, of which 7 were Night Sky Network events! We look forward to sharing our love of the sky with our communities this coming year.

A reminder that dues for next year's membership will be due in January. You may pay via Paypal, or at a club meeting, or mail it to our PO box.

Wishing everyone a very Happy Holiday season and a Merry Christmas! Enjoy a very Happy New Year! Be safe out there!

Space Place

Studying Storms from the Sky

By Teagan Wall

The United States had a rough hurricane season this year. Scientists collect information before and during hurricanes to understand the storms and help people stay safe. However, collecting information during a violent storm is very difficult.

Hurricanes are constantly changing. This means that we need a lot of really precise data about the storm. It's pretty hard to learn about hurricanes while inside the storm, and instruments on the ground can be broken by high winds and flooding. One solution is to study hurricanes from above. NASA and NOAA can use satellites to keep an eye on storms that are difficult to study on the ground.

In Puerto Rico, Hurricane Maria was so strong that it knocked out radar before it even hit land. Radar can be used to predict a storm's path and intensity—and without radar, it is difficult to tell how intense a storm will be. Luckily, scientists were able to use information from a weather satellite called GOES-16, short for Geostationary Operational Environmental Satellite – 16.

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The “G” in GOES-16 stands for geostationary. This means that the satellite is always above the same place on the Earth, so during Hurricane Maria, it never lost sight of the storm. GOES-16’s job as a weather satellite hasn’t officially started yet, but it was collecting information and was able to help.

From 22,000 miles above Earth, GOES-16 watched Hurricane Maria, and kept scientists on the ground up to date. Knowing where a storm is—and what it’s doing—can help keep people safe, and get help to the people that need it.

Hurricanes can also have a huge impact on the environment—even after they’re gone. To learn about how Hurricane Irma affected the Florida coast, scientists used images from an environmental satellite called Suomi National Polar-orbiting Partnership, or Suomi-NPP. One of the instruments on this satellite, called VIIRS (Visible Infrared Imaging Radiometer Suite), took pictures of Florida before and after the Hurricane.

Hurricane Irma was so big and powerful, that it moved massive amounts of dirt, water and pollution. The information captured by VIIRS can tell scientists how and where these particles are moving in the water. This can help with recovery efforts, and help us design better ways to prepare for hurricanes in the future.



These images of Florida and the Bahamas were captured by a satellite called Suomi-NPP. The image on the left was taken before Hurricane Irma and the image on the right was taken after the hurricane. The light color along the coast is dirt, sand and garbage brought up by the storm. Image credit: NASA/NOAA

By using satellites like GOES-16 and Suomi-NPP to observe severe storms, researchers and experts stay up to date in a safe and fast way. The more we know about hurricanes, the more effectively we can protect people and the environment from them in the future.

To learn more about hurricanes, check out NASA Space Place: <https://spaceplace.nasa.gov/hurricanes/>

All I Want for (Next) Christmas is...A Bigger Telescope

Astro-Tom

What if you currently have a telescope, comfortable identifying the major constellations, enjoy observing the Moon, and of have seen Jupiter and Saturn? What if you’re hitting up against the limits of your current telescope? What if you are dreaming about taking the next big step and getting a larger telescope, but not exactly sure where to start?

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Your first and best resource to answer your questions is through your membership in the Antelope Valley Astronomy Club. Attending AVAC observing events allows you the opportunity for looking through a variety of other members' telescopes and eyepieces at the objects you like to observe which will give you the ability to judge for yourself what it would be like to own a similar setup. Here is a list of some of the things to think about before moving forward, including:

- Think about the new objects that the larger telescope and new eyepieces might allow you to view (higher magnification, sharper resolution, more light gathering for dim deep sky objects)
- Think about Aperture, Focal Length and Focal Ratio. Will you be doing (mostly) doing visual astronomy or astrophotography with the new telescope? (See references below for more info.)
- Think about what kind of mount will be the best for you (German Equatorial Mount, Fork Mount, Dobsonian, etc.) If considering astrophotography, you will want to get the most solid, best tracking mount you can afford.
- Think about the physical size of the telescope, the mount and observing equipment that you want. Will you be able to set it up yourself? Will it all fit in your vehicle if you want to take it to your favorite dark sky site? Where will you store it when not in use?
- Think about making your own telescope while considering the time and physical effort to do so vs. today's commercial options. Several club members have made their own Dobsonian telescopes, and will proudly show you the views their equipment produce at one of the club's Star Parties. Connect up with these members at a club meeting by raising your hand and simply asking for advice.

Once you know the answer to each of these questions, you're probably ready to get a rough idea of how much money it will take to get the larger telescope. But if you don't know the answers, it's OK. It just means that you're not *quite* ready to buy the most expensive elements of your astronomical dreams, and have more time to save, research, and refine your choices. You may want to sell your existing telescope to help fund the purchase of the larger scope, and this can take time too.

Even if you can't get what you want this year, thinking through what you want, planning and researching how and when to get the best price on the equipment, and saving until you can buy what is right for you will make next year's purchase worth the wait when you look through your eyepiece for the first time and see the views the new equipment offers!

Other sources for your research, where you can ask questions and get knowledgeable opinions:

- Cloudy Nights Astronomy Website (Excellent Info): <https://www.cloudynights.com/index>
- "Uncle Rod" Mollise's Schmidt Cassegrain Website: <https://skywatch.brainiac.com/astroland/>
- Astromart (Great prices on used slightly used equipment!): <https://www.astromart.com/>
- Astromart Forums with Lots of great info: <https://www.astromart.com/forums/>
- Solid Telescope buying advice: <https://lovethenightsky.com/best-telescopes-2017/>
- Aperture, Focal Length, Focal Ratio: http://www.astropix.com/html/i_astrop/scopes.html

All of these sites will help you be better informed in your decision. And consider the value of being able to talk face-to-face with a knowledgeable astronomy club member for their insights and being able to look through telescopes similar to the ones you are considering, at objects you'll want to observe too. This makes buying comparisons much easier. This just one part of the value your continued membership in the Antelope Valley Astronomy Club delivers. There are many, many others.

News Headlines

Cassini Image Mosaic: A Farewell to Saturn

In a fitting farewell to the planet that had been its home for over 13 years, the Cassini spacecraft took one last, lingering look at Saturn and its splendid rings during the final leg of its journey and snapped a series of images that has been assembled into a new mosaic.

<https://goo.gl/tqJCnH>

Space Dust Could Help Life Jump from Planet to Planet

It may not take an asteroid strike to transport life from one planet to another. Fast-moving dust could theoretically knock microbes floating high up in a world's atmosphere out into space, potentially sending the bugs on a [trip to another planet](#) — perhaps even one orbiting a different star, according to a new study.

<https://www.space.com/38846-space-dust-panspermia-alien-life.html>

Our Living Planet Shapes the Search for Life Beyond Earth

Life. It's the one thing that, so far, makes Earth unique among the thousands of other planets we've discovered. Since the fall of 1997, NASA satellites have continuously and globally observed all plant life at the surface of the land and ocean. During the week of Nov. 13-17, NASA is sharing stories and videos about how this view of life from space is furthering knowledge of our home planet and the search for life on other worlds.

<https://goo.gl/Kw6Msf>

Abell 3411 and 3412: Astronomers Discover Powerful Cosmic Double Whamm

Using data from [NASA's Chandra X-ray Observatory](#) and several other telescopes, astronomers have discovered a cosmic one-two punch unlike any ever seen in a pair of colliding [galaxy clusters](#) called Abell 3411 and Abell 3412. This result shows that an eruption from a supermassive [black hole](#) combined with a galaxy cluster merger can create a stupendous cosmic particle accelerator.

<http://chandra.harvard.edu/photo/2017/a3411/?linkId=45127854>

SOFIA - Observations of a Comet's First Passage through the Solar System Reveals Unexpected Secrets

Onboard NASA's flying telescope, SOFIA, a team lead by Charles Woodward of the University of Minnesota's Minnesota Institute for Astrophysics observed [Comet C/2012 K1](#) (also called Pan-STARRS after the observatory that discovered it in 2012), searching for new insights into the evolution of the early solar system.

<https://goo.gl/RvBbFy>

Hubble Discovers Wobbling Galaxies

Using the NASA/ESA Hubble Space Telescope, astronomers have discovered that the brightest galaxies within galaxy clusters "wobble" relative to the cluster's centre of mass. This unexpected result is inconsistent with predictions made by the current standard model of dark matter. With further analysis it may provide insights into the nature of dark matter, perhaps even indicating that new physics is at work.

<http://spaceref.com/astrophysics/hubble-discovers-wobbling-galaxies.html>

December Sky Data

Full Dec 3 Last Qtr Dec 9 New Dec 17 First Qtr Dec 26

**Best time for deep sky observing this month:
December 10 through December 22**



Mercury will not be seen for the first three weeks of December as it passes between the Earth and the Sun on December 13th (inferior conjunction). From the 20th or so it brightens rapidly in the pre-dawn sky to reach a magnitude of -0.1 by month's end when some 23 degrees away from the Sun. It will then have a reasonable elevation so making the end of the month an excellent time to observe Mercury.

Moving back towards the Sun, **Venus** rises just 45 minutes before the Sun at the start of December and is lost in the Sun's glare around the 12th of the month on its way towards superior conjunction (on the far side of the Sun) on January 9th. In its final week of visibility, it will have a magnitude of -3.4 and disk 9.9 arc seconds across.

Now a morning object at the start of its new apparition, **Mars** rises four hours or so earlier than the Sun. During the month its magnitude increases from 1.9 to 1.7 and an angular size of just 4.2 to 4.8 arc seconds, so no details will be seen on its salmon-pink surface.

Jupiter is now a pre-dawn object rising some 2 hours before the Sun at the beginning of the month with its 31 arc second disk, shining at a magnitude of -1.3, to be seen under clear skies. As the month progresses, its apparent diameter increases to 33 arc seconds and it brightens to magnitude -1.4.

Saturn will not be visible this month as it leaves the evening sky on its way to superior conjunction (passing behind the Sun) on December 21st before it reappears in the pre-dawn sky next year.

After being washed out by the 2016 December supermoon, the Geminids **meteor shower** will come roaring back in 2017. The famous and bright shower will peak on the night of Dec. 13 and morning of Dec. 14. The Geminids are considered one of the best meteor showers every year because the individual meteors are bright, and the peak can see meteors stream across the sky at rates as high as 120 meteors an hour. The best time to view them is around 2am.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
12/1/2017	4:38pm	5:12am	7:42am	5:41pm
12/5/2017	8:19pm	9:44am	7:45am	5:41pm
12/10/2017	12:38am	1:34pm	7:48am	5:41pm
12/15/2017	5:23am	4:23pm	7:52am	5:42pm
12/20/2017	9:36am	8:08pm	7:55am	5:45pm
12/25/2017	12:42pm	n/a	7:58am	5:48pm
12/31/2017	4:53pm	6:14am	8:00am	5:52pm

Planet Data

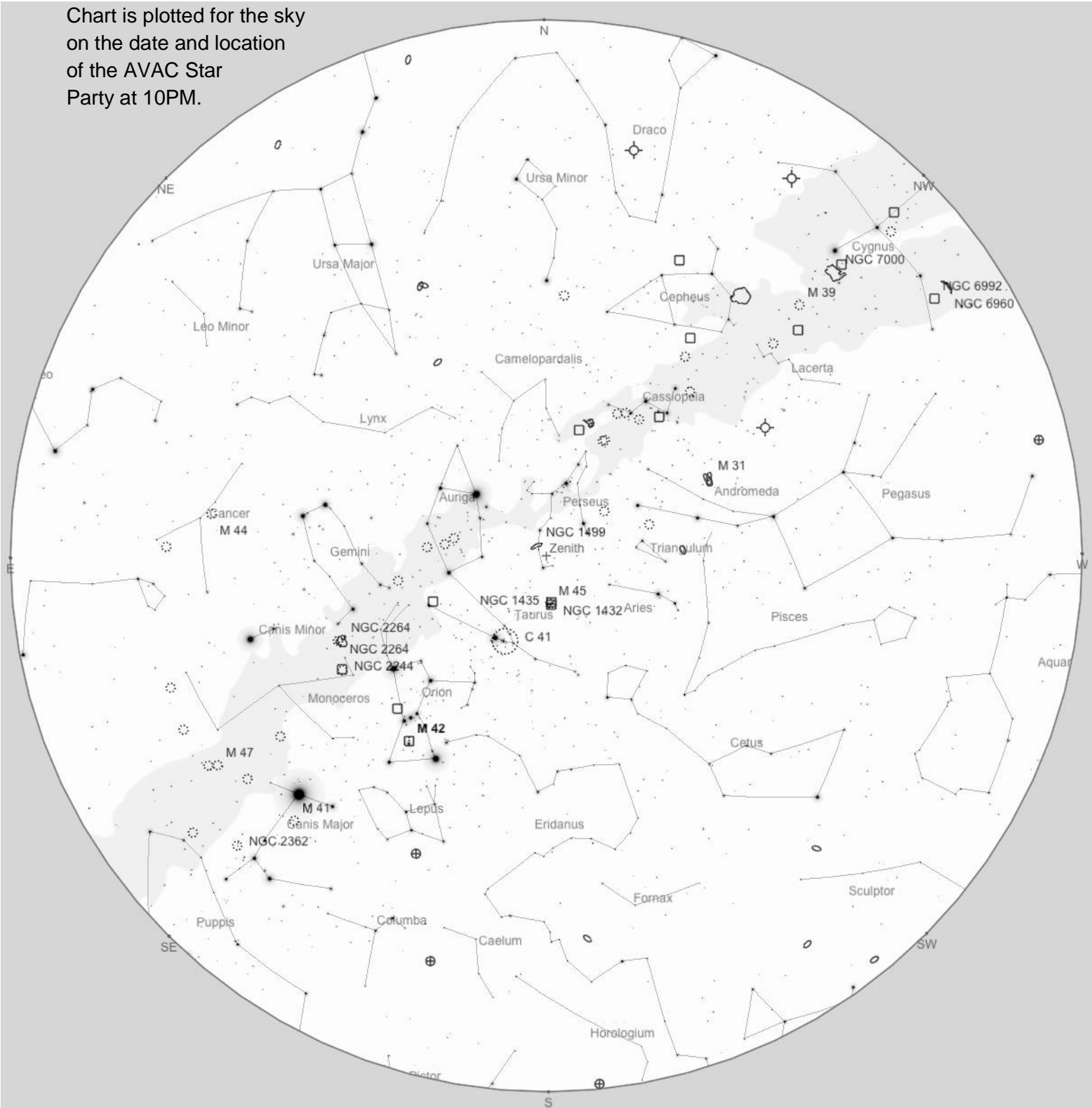
	Dec 1			
	Rise	Transit	Set	Mag
Mercury	9:18am	2:07pm	6:57pm	0.3
Venus	6:58am	12:06pm	5:13pm	-3.4
Mars	4:08am	9:47am	3:26pm	1.9
Jupiter	5:24am	10:48am	4:11pm	-1.3
Saturn	9:04am	2:02pm	7:00pm	1.6

	Dec 15			
	Rise	Transit	Set	Mag
Mercury	7:18am	12:23pm	5:28pm	2.1
Venus	7:27am	12:25pm	5:22pm	-3.4
Mars	3:55am	9:25am	2:55pm	1.8
Jupiter	4:42am	10:04am	3:25pm	-1.3
Saturn	8:16am	1:14pm	6:12pm	1.6

	Dec 31			
	Rise	Transit	Set	Mag
Mercury	6:17am	11:21am	4:24pm	-0.1
Venus	7:55am	12:49pm	5:44pm	-3.5
Mars	3:40am	9:01am	2:21pm	1.7
Jupiter	3:53am	9:12am	2:31pm	-1.4
Saturn	7:21am	12:19pm	5:17pm	1.6

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, or the Saturday closest to the new moon if there is no star party scheduled. The list is sorted by the transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7492	Glob	Aqr	23h 08m 27s	-15°36'41"	11.5	2:25 PM	7:44 PM	1:04 AM
NGC7538	Neb	Cep	23h 13m 38s	+61°30'42"		Circum	7:50 PM	Circum
NGC7619	Gal	Peg	23h 20m 15s	+08°12'23"	11.1	1:31 PM	7:56 PM	2:21 AM
NGC7635	Neb	Cas	23h 20m 45s	+61°12'42"		Circum	7:57 PM	Circum
NGC7640	Gal	And	23h 22m 07s	+40°50'43"	10.9	11:31 AM	7:58 PM	4:26 AM
NGC7662	P Neb	And	23h 25m 54s	+42°32'06"	9.0	11:24 AM	8:02 PM	4:40 AM
NGC7686	Open	And	23h 30m 07s	+49°08'00"	5.6	10:34 AM	8:06 PM	5:38 AM
NGC7711	Gal	Peg	23h 35m 39s	+15°18'05"	14.0	1:26 PM	8:12 PM	2:57 AM
NGC7721	Gal	Aqr	23h 38m 49s	-06°31'05"	11.8	2:30 PM	8:15 PM	2:00 AM
NGC7724	Gal	Aqr	23h 39m 07s	-12°13'28"	13.0	2:46 PM	8:15 PM	1:44 AM
NGC7785	Gal	Psc	23h 55m 19s	+05°54'56"	11.6	2:12 PM	8:31 PM	2:50 AM
NGC7793	Gal	Scl	23h 57m 50s	-32°35'28"	9.1	4:13 PM	8:34 PM	12:55 AM
NGC7790	Open	Cas	23h 58m 24s	+61°12'30"	8.5	Circum	8:34 PM	Circum
NGC7822	Neb	Cep	00h 03m 36s	+67°09'00"		Circum	8:40 PM	Circum
NGC7832	Gal	Psc	00h 06m 28s	-03°42'59"	13.0	2:50 PM	8:42 PM	2:35 AM
NGC40	P Neb	Cep	00h 13m 01s	+72°31'19"	11.0	Circum	8:49 PM	Circum
NGC55	Gal	Scl	00h 15m 08s	-39°13'12"	8.0	5:01 PM	8:51 PM	12:41 AM
M31	Gal	And	00h 42m 44s	+41°16'08"	4.3	12:49 PM	9:19 PM	5:49 AM
NGC225	Open	Cas	00h 43m 39s	+61°46'30"	7.0	Circum	9:20 PM	Circum
NGC246	P Neb	Cet	00h 47m 03s	-11°52'19"	8.0	3:53 PM	9:23 PM	2:53 AM
NGC288	Glob	Scl	00h 52m 45s	-26°35'01"	8.1	4:45 PM	9:29 PM	2:13 AM
NGC281	Open	Cas	00h 52m 54s	+56°37'29"	7.0	Circum	9:29 PM	Circum
NGC532	Gal	Psc	01h 25m 17s	+09°15'50"	14.0	3:33 PM	10:01 PM	4:29 AM
NGC596	Gal	Cet	01h 32m 52s	-07°01'56"	10.9	4:25 PM	10:09 PM	3:52 AM
M33	Gal	Tri	01h 33m 51s	+30°39'37"	6.2	2:32 PM	10:10 PM	5:48 AM
M76	P Neb	Per	01h 42m 18s	+51°34'15"	12.0	12:16 PM	10:18 PM	8:21 AM
NGC660	Gal	Psc	01h 43m 02s	+13°38'39"	10.8	3:38 PM	10:19 PM	5:00 AM
NGC637	Open	Cas	01h 43m 04s	+64°02'24"	8.2	Circum	10:19 PM	Circum
NGC663	Open	Cas	01h 46m 09s	+61°14'06"	7.1	Circum	10:22 PM	Circum
NGC752	Open	And	01h 57m 41s	+37°47'06"	5.7	2:23 PM	10:34 PM	6:44 AM
NGC744	Open	Per	01h 58m 33s	+55°28'24"	7.9	Circum	10:35 PM	Circum
NGC788	Gal	Cet	02h 01m 06s	-06°48'57"	12.3	4:53 PM	10:37 PM	4:21 AM
NGC838	Gal	Cet	02h 09m 38s	-10°08'47"	12.8	5:11 PM	10:46 PM	4:21 AM
NGC869	Open	Per	02h 19m 00s	+57°07'42"	4.0	Circum	10:55 PM	Circum
NGC884	Open	Per	02h 22m 18s	+57°08'12"	4.0	Circum	10:58 PM	Circum
NGC896	Neb	Cas	02h 25m 28s	+62°01'09"		Circum	11:01 PM	Circum
NGC960	Gal	Cet	02h 31m 41s	-09°18'01"	14.0	5:30 PM	11:08 PM	4:45 AM
NGC959	Gal	Tri	02h 32m 24s	+35°29'40"	13.0	3:09 PM	11:08 PM	7:07 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC956	Open	And	02h 32m 30s	+44°35'37"	9.0	2:16 PM	11:08 PM	8:01 AM
NGC988	Gal	Cet	02h 35m 28s	-09°21'25"	11.0	5:34 PM	11:11 PM	4:49 AM
NGC1045	Gal	Cet	02h 40m 29s	-11°16'41"	13.0	5:45 PM	11:16 PM	4:48 AM
NGC1084	Gal	Eri	02h 46m 00s	-07°34'38"	10.6	5:40 PM	11:22 PM	5:04 AM
NGC1261	Glob	Hor	03h 12m 16s	-55°12'57"	8.4	10:37 PM	11:48 PM	12:59 AM
NGC1245	Open	Per	03h 14m 42s	+47°14'12"	8.4	2:37 PM	11:51 PM	9:04 AM
NGC1344	Gal	For	03h 28m 19s	-31°04'05"	10.3	7:37 PM	12:04 AM	4:32 AM
NGC1333	Neb	Per	03h 29m 20s	+31°24'56"		4:24 PM	12:05 AM	7:46 AM
NGC1365	Gal	For	03h 33m 36s	-36°08'25"	9.5	8:04 PM	12:10 AM	4:15 AM
NGC1385	Gal	For	03h 37m 29s	-24°30'07"	11.2	7:22 PM	12:13 AM	5:05 AM
NGC1400	Gal	Eri	03h 39m 31s	-18°41'17"	11.1	7:05 PM	12:15 AM	5:26 AM
NGC1432	Neb	Tau	03h 45m 50s	+24°22'06"		5:07 PM	12:22 AM	7:36 AM
NGC1435	Neb	Tau	03h 46m 10s	+23°45'54"		5:10 PM	12:22 AM	7:35 AM
M45	Open	Tau	03h 47m 30s	+24°07'00"	1.6	5:10 PM	12:23 AM	7:37 AM
NGC1444	Open	Per	03h 49m 25s	+52°39'30"	6.6	2:06 PM	12:25 AM	10:45 AM
NGC1497	Gal	Tau	04h 02m 07s	+23°07'58"	14.0	5:28 PM	12:38 AM	7:48 AM
NGC1491	Neb	Per	04h 03m 14s	+51°18'57"		2:40 PM	12:39 AM	10:38 AM
NGC1499	Neb	Per	04h 03m 14s	+36°22'00"		4:36 PM	12:39 AM	8:43 AM
NGC1501	P Neb	Cam	04h 06m 59s	+60°55'14"	13.0	Circum	12:43 AM	Circum
NGC1502	Open	Cam	04h 07m 50s	+62°19'54"	5.7	Circum	12:44 AM	Circum
NGC1514	P Neb	Tau	04h 09m 17s	+30°46'33"	10.0	5:07 PM	12:45 AM	8:24 AM
NGC1513	Open	Per	04h 09m 57s	+49°30'54"	8.4	3:09 PM	12:46 AM	10:22 AM
NGC1535	P Neb	Eri	04h 14m 16s	-12°44'22"	10.0	7:23 PM	12:50 AM	6:18 AM
NGC1528	Open	Per	04h 15m 23s	+51°12'54"	6.4	2:54 PM	12:51 AM	10:49 AM
NGC1579	Neb	Per	04h 30m 14s	+35°16'47"		5:08 PM	1:06 AM	9:04 AM
NGC1600	Gal	Eri	04h 31m 40s	-05°05'15"	11.1	7:19 PM	1:08 AM	6:57 AM
NGC1560	Gal	Cam	04h 32m 48s	+71°52'48"	11.5	Circum	1:09 AM	Circum
NGC1605	Open	Per	04h 34m 53s	+45°16'12"	10.7	4:13 PM	1:11 AM	10:08 AM
NGC1662	Open	Ori	04h 48m 27s	+10°56'12"	6.4	6:52 PM	1:24 AM	7:57 AM
NGC1664	Open	Aur	04h 51m 06s	+43°40'30"	7.6	4:41 PM	1:27 AM	10:13 AM
NGC1746	Open	Tau	05h 03m 50s	+23°46'12"	6.0	6:27 PM	1:40 AM	8:52 AM
NGC1784	Gal	Lep	05h 05m 27s	-11°52'18"	11.8	8:11 PM	1:41 AM	7:12 AM
NGC1788	Neb	Ori	05h 06m 53s	-03°20'27"		7:49 PM	1:43 AM	7:37 AM
NGC1851	Glob	Col	05h 14m 07s	-40°02'46"	7.3	10:04 PM	1:50 AM	5:36 AM
M79	Glob	Lep	05h 24m 11s	-24°31'29"	8.5	9:09 PM	2:00 AM	6:51 AM
NGC1952	Neb	Tau	05h 34m 32s	+22°00'52"	8.4	7:04 PM	2:10 AM	9:17 AM
NGC1973	Neb	Ori	05h 35m 05s	-04°43'55"		8:21 PM	2:11 AM	8:01 AM
NGC1981	Open	Ori	05h 35m 09s	-04°25'54"	4.6	8:20 PM	2:11 AM	8:02 AM
NGC1977	Neb	Ori	05h 35m 16s	-04°49'15"		8:22 PM	2:11 AM	8:01 AM
M42	D Neb	Ori	05h 35m 16s	-05°23'25"	4.0	8:23 PM	2:11 AM	7:59 AM
NGC1975	Neb	Ori	05h 35m 18s	-04°41'05"		8:21 PM	2:11 AM	8:01 AM
NGC1980	Neb	Ori	05h 35m 25s	-05°54'54"		8:25 PM	2:11 AM	7:58 AM
M43	D Neb	Ori	05h 35m 31s	-05°16'03"	9.0	8:23 PM	2:11 AM	8:00 AM
NGC1990	Neb	Ori	05h 36m 13s	-01°12'07"		8:13 PM	2:12 AM	8:12 AM
NGC1999	Neb	Ori	05h 36m 25s	-06°42'57"		8:28 PM	2:12 AM	7:57 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2023	Neb	Ori	05h 41m 38s	-02°15'33"		8:21 PM	2:18 AM	8:14 AM
NGC2024	Neb	Ori	05h 41m 42s	-01°51'24"		8:20 PM	2:18 AM	8:15 AM
NGC2022	P Neb	Ori	05h 42m 06s	+09°05'13"	12.0	7:50 PM	2:18 AM	8:46 AM
NGC2064	Neb	Ori	05h 46m 18s	+00°00'21"		8:20 PM	2:22 AM	8:25 AM
NGC2067	Neb	Ori	05h 46m 31s	+00°07'54"		8:19 PM	2:22 AM	8:26 AM
M78	D Neb	Ori	05h 46m 45s	+00°04'48"	8.0	8:20 PM	2:23 AM	8:26 AM
NGC2071	Neb	Ori	05h 47m 07s	+00°17'39"		8:20 PM	2:23 AM	8:27 AM
NGC2112	Open	Ori	05h 53m 45s	+00°24'36"	9.0	8:26 PM	2:30 AM	8:34 AM
NGC2129	Open	Gem	06h 01m 06s	+23°19'18"	6.7	7:26 PM	2:37 AM	9:48 AM
NGC2126	Open	Aur	06h 02m 32s	+49°52'00"	10.0	4:58 PM	2:38 AM	12:19 PM
NGC2149	Neb	Mon	06h 03m 31s	-09°43'50"		9:03 PM	2:39 AM	8:16 AM
NGC2170	Neb	Mon	06h 07m 32s	-06°23'57"		8:58 PM	2:43 AM	8:29 AM
NGC2169	Open	Ori	06h 08m 24s	+13°57'54"	5.9	8:03 PM	2:44 AM	9:26 AM
M35	Open	Gem	06h 09m 00s	+24°21'00"	5.5	7:31 PM	2:45 AM	9:59 AM
NGC2174	Neb	Ori	06h 09m 24s	+20°39'34"		7:43 PM	2:45 AM	9:47 AM
NGC2182	Neb	Mon	06h 09m 31s	-06°19'35"		9:00 PM	2:45 AM	8:31 AM
NGC2175	Open	Ori	06h 09m 40s	+20°29'15"	6.8	7:44 PM	2:46 AM	9:47 AM
NGC2183	Neb	Mon	06h 10m 47s	-06°12'43"		9:01 PM	2:47 AM	8:33 AM
NGC2185	Neb	Mon	06h 11m 00s	-06°13'36"		9:01 PM	2:47 AM	8:33 AM
NGC2194	Open	Ori	06h 13m 45s	+12°48'24"	8.5	8:12 PM	2:50 AM	9:28 AM
NGC2204	Open	CMa	06h 15m 33s	-18°39'54"	8.6	9:41 PM	2:52 AM	8:02 AM
NGC2217	Gal	CMa	06h 21m 40s	-27°14'02"	10.4	10:16 PM	2:58 AM	7:39 AM
NGC2232	Open	Mon	06h 28m 01s	-04°50'48"	3.9	9:14 PM	3:04 AM	8:54 AM
NGC2244	Open	Mon	06h 31m 56s	+04°56'35"	4.8	8:52 PM	3:08 AM	9:24 AM
NGC2245	Neb	Mon	06h 32m 41s	+10°09'24"		8:38 PM	3:09 AM	9:39 AM
NGC2247	Neb	Mon	06h 33m 05s	+10°19'17"		8:38 PM	3:09 AM	9:40 AM
NGC2250	Open	Mon	06h 33m 49s	-05°05'06"	9.0	9:21 PM	3:10 AM	8:59 AM
NGC2242	P Neb	Aur	06h 34m 07s	+44°46'38"	14.0	6:16 PM	3:10 AM	12:04 PM
NGC2251	Open	Mon	06h 34m 38s	+08°22'00"	7.3	8:45 PM	3:11 AM	9:36 AM
NGC2254	Open	Mon	06h 35m 49s	+07°40'24"	9.7	8:48 PM	3:12 AM	9:35 AM
NGC2261	Neb	Mon	06h 39m 10s	+08°44'40"		8:48 PM	3:15 AM	9:42 AM
NGC2264	Open	Mon	06h 40m 58s	+09°53'42"	3.9	8:47 PM	3:17 AM	9:47 AM
NGC2269	Open	Mon	06h 43m 17s	+04°37'30"	10.0	9:04 PM	3:19 AM	9:35 AM
NGC2266	Open	Gem	06h 43m 19s	+26°58'12"	10.0	7:56 PM	3:19 AM	10:43 AM
M41	Open	CMa	06h 46m 01s	-20°45'24"	5.0	10:18 PM	3:22 AM	8:26 AM
NGC2282	Neb	Mon	06h 46m 51s	+01°18'56"		9:17 PM	3:23 AM	9:29 AM
NGC2281	Open	Aur	06h 48m 17s	+41°04'42"	5.4	6:55 PM	3:24 AM	11:53 AM
NGC2298	Glob	Pup	06h 48m 59s	-36°00'15"	9.4	11:19 PM	3:25 AM	7:31 AM
NGC2301	Open	Mon	06h 51m 45s	+00°27'36"	6.0	9:24 PM	3:28 AM	9:32 AM
NGC2302	Open	Mon	06h 51m 55s	-07°05'00"	8.9	9:44 PM	3:28 AM	9:11 AM
NGC2311	Open	Mon	06h 57m 47s	-04°36'42"	10.0	9:43 PM	3:34 AM	9:24 AM
NGC2316	Neb	Mon	06h 59m 41s	-07°46'39"		9:54 PM	3:36 AM	9:17 AM
NGC2324	Open	Mon	07h 04m 07s	+01°02'42"	8.4	9:35 PM	3:40 AM	9:46 AM
NGC2343	Open	Mon	07h 08m 06s	-10°37'00"	6.7	10:10 PM	3:44 AM	9:18 AM
NGC2345	Open	CMa	07h 08m 18s	-13°11'36"	7.7	10:18 PM	3:44 AM	9:11 AM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2359	Neb	CMA	07h 18m 30s	-13°13'36"		10:28 PM	3:54 AM	9:21 AM
NGC2362	Open	CMA	07h 18m 41s	-24°57'18"	4.1	11:05 PM	3:55 AM	8:44 AM
NGC2367	Open	CMA	07h 20m 06s	-21°52'54"	7.9	10:56 PM	3:56 AM	8:56 AM
NGC2383	Open	CMA	07h 24m 40s	-20°56'54"	8.4	10:58 PM	4:01 AM	9:04 AM
NGC2384	Open	CMA	07h 25m 10s	-21°01'18"	7.4	10:58 PM	4:01 AM	9:04 AM
NGC2371	P Neb	Gem	07h 25m 34s	+29°29'17"	13.0	8:28 PM	4:02 AM	11:35 AM
NGC2395	Open	Gem	07h 27m 12s	+13°36'30"	8.0	9:23 PM	4:03 AM	10:44 AM
NGC2392	P Neb	Gem	07h 29m 11s	+20°54'42"	10.0	9:02 PM	4:05 AM	11:08 AM
NGC2414	Open	Pup	07h 33m 12s	-15°27'12"	7.9	10:49 PM	4:09 AM	9:29 AM
M47	Open	Pup	07h 36m 35s	-14°29'00"	4.5	10:50 PM	4:13 AM	9:35 AM
NGC2419	Glob	Lyn	07h 38m 08s	+38°52'54"	10.4	7:58 PM	4:14 AM	12:30 PM
NGC2420	Open	Gem	07h 38m 23s	+21°34'24"	8.3	9:09 PM	4:14 AM	11:19 AM
NGC2439	Open	Pup	07h 40m 45s	-31°41'36"	6.9	11:52 PM	4:17 AM	8:42 AM
NGC2432	Open	Pup	07h 40m 53s	-19°04'36"	10.0	11:08 PM	4:17 AM	9:26 AM
NGC2438	P Neb	Pup	07h 41m 50s	-14°44'07"	10.0	10:56 PM	4:18 AM	9:40 AM
NGC2440	P Neb	Pup	07h 41m 55s	-18°12'31"	11.0	11:06 PM	4:18 AM	9:29 AM
NGC2451	Open	Pup	07h 45m 15s	-37°58'00"	2.8	12:24 AM	4:21 AM	8:18 AM
NGC2452	P Neb	Pup	07h 47m 26s	-27°20'07"	13.0	11:42 PM	4:23 AM	9:05 AM
NGC2477	Open	Pup	07h 52m 10s	-38°31'48"	5.8	12:34 AM	4:28 AM	8:22 AM
NGC2460	Gal	Cam	07h 56m 53s	+60°20'58"	11.7	Circum	4:33 AM	Circum
NGC2506	Open	Mon	08h 00m 01s	-10°46'12"	7.6	11:03 PM	4:36 AM	10:09 AM
NGC2533	Open	Pup	08h 07m 04s	-29°53'00"	7.6	12:11 AM	4:43 AM	9:15 AM
NGC2547	Open	Vel	08h 10m 09s	-49°12'54"	4.7	2:06 AM	4:46 AM	7:26 AM
M48	Open	Hya	08h 13m 43s	-05°45'00"	5.5	11:03 PM	4:50 AM	10:37 AM
NGC2580	Open	Pup	08h 21m 28s	-30°18'00"	10.0	12:27 AM	4:57 AM	9:28 AM
NGC2610	P Neb	Hya	08h 33m 23s	-16°08'57"	14.0	11:52 PM	5:09 AM	10:27 AM
NGC2626	Neb	Vel	08h 35m 31s	-40°40'18"		1:29 AM	5:11 AM	8:54 AM
NGC2627	Open	Pyx	08h 37m 15s	-29°57'18"	8.0	12:41 AM	5:13 AM	9:45 AM
M44	Open	Cnc	08h 40m 24s	+19°40'00"	4.0	10:17 PM	5:16 AM	12:15 PM
NGC2670	Open	Vel	08h 45m 30s	-48°48'00"	7.8	2:37 AM	5:21 AM	8:06 AM
NGC2759	Gal	Lyn	09h 08m 37s	+37°37'16"	14.0	9:35 PM	5:45 AM	1:54 PM
NGC2792	P Neb	Vel	09h 12m 27s	-42°25'41"	14.0	2:16 AM	5:48 AM	9:20 AM
NGC2972	Open	Vel	09h 40m 13s	-50°19'24"	9.9	3:47 AM	6:16 AM	8:45 AM
NGC2965	Gal	LMi	09h 43m 19s	+36°14'53"	14.0	10:17 PM	6:19 AM	2:22 PM
NGC3041	Gal	Leo	09h 53m 07s	+16°40'40"	11.5	11:39 PM	6:29 AM	1:19 PM
NGC3092	Gal	Sex	10h 00m 47s	-03°00'47"	14.0	12:42 AM	6:37 AM	12:31 PM
NGC3132	P Neb	Vel	10h 07m 02s	-40°26'11"	8.0	2:59 AM	6:43 AM	10:27 AM
NGC3169	Gal	Sex	10h 14m 15s	+03°28'02"	10.5	12:38 AM	6:50 AM	1:02 PM
NGC3201	Glob	Vel	10h 17m 37s	-46°24'45"	6.8	3:49 AM	6:54 AM	9:58 AM
NGC3203	Gal	Hya	10h 19m 34s	-26°41'55"	13.0	2:12 AM	6:56 AM	11:39 AM
NGC3228	Open	Vel	10h 21m 22s	-51°43'42"	6.0	4:45 AM	6:57 AM	9:10 AM
NGC3227	Gal	Leo	10h 23m 31s	+19°51'54"	10.8	12:00 AM	6:59 AM	1:59 PM
NGC3242	P Neb	Hya	10h 24m 46s	-18°38'34"	9.0	1:50 AM	7:01 AM	12:11 PM
NGC3254	Gal	LMi	10h 29m 20s	+29°29'30"	11.5	11:32 PM	7:05 AM	2:39 PM
NGC3301	Gal	Leo	10h 36m 56s	+21°52'55"	11.4	12:07 AM	7:13 AM	2:19 PM

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC3330	Open	Vel	10h 38m 46s	-54°07'24"	7.4	5:39 AM	7:15 AM	8:50 AM
NGC3320	Gal	UMa	10h 39m 37s	+47°23'49"	13.0	10:00 PM	7:16 AM	4:31 PM
NGC3367	Gal	Leo	10h 46m 35s	+13°45'01"	11.5	12:42 AM	7:23 AM	2:03 PM
NGC3359	Gal	UMa	10h 46m 37s	+63°13'25"	10.5	Circum	7:23 AM	Circum
NGC3414	Gal	LMi	10h 51m 16s	+27°58'30"	10.8	12:00 AM	7:27 AM	2:55 PM
NGC3504	Gal	LMi	11h 03m 11s	+27°58'21"	11.1	12:12 AM	7:39 AM	3:07 PM
NGC3510	Gal	LMi	11h 03m 44s	+28°53'06"	12.9	12:09 AM	7:40 AM	3:11 PM
NGC3521	Gal	Leo	11h 05m 49s	-00°02'10"	8.9	1:39 AM	7:42 AM	1:44 PM
NGC3564	Gal	Cen	11h 10m 36s	-37°32'53"	12.2	3:48 AM	7:47 AM	11:45 AM
NGC3567	Gal	Leo	11h 11m 19s	+05°50'11"	14.0	1:29 AM	7:47 AM	2:06 PM
M97	P Neb	UMa	11h 14m 48s	+55°01'08"	12.0	8:28 PM	7:51 AM	7:13 PM
NGC3605	Gal	Leo	11h 16m 47s	+18°01'02"	13.0	12:59 AM	7:53 AM	2:46 PM
NGC3621	Gal	Hya	11h 18m 16s	-32°48'50"	10.0	3:34 AM	7:54 AM	12:14 PM
NGC3626	Gal	Leo	11h 20m 04s	+18°21'25"	10.9	1:01 AM	7:56 AM	2:51 PM
NGC3628	Gal	Leo	11h 20m 17s	+13°35'19"	9.5	1:16 AM	7:56 AM	2:37 PM
NGC3631	Gal	UMa	11h 21m 03s	+53°10'11"	10.4	9:28 PM	7:57 AM	6:26 PM
NGC3651	Gal	Leo	11h 22m 26s	+24°17'55"	14.0	12:44 AM	7:58 AM	3:13 PM
NGC3655	Gal	Leo	11h 22m 55s	+16°35'22"	11.6	1:09 AM	7:59 AM	2:48 PM
NGC3665	Gal	UMa	11h 24m 44s	+38°45'45"	10.8	11:45 PM	8:01 AM	4:16 PM
NGC3670	Gal	Leo	11h 24m 50s	+23°56'42"	14.0	12:48 AM	8:01 AM	3:14 PM
NGC3680	Open	Cen	11h 25m 38s	-43°14'36"	7.6	4:35 AM	8:02 AM	11:29 AM
NGC3681	Gal	Leo	11h 26m 30s	+16°51'48"	11.7	1:12 AM	8:02 AM	2:53 PM
NGC3684	Gal	Leo	11h 27m 11s	+17°01'48"	11.7	1:12 AM	8:03 AM	2:54 PM
NGC3686	Gal	Leo	11h 27m 44s	+17°13'25"	11.4	1:12 AM	8:04 AM	2:55 PM
NGC3690	Gal	UMa	11h 28m 33s	+58°33'49"	12.0	Circum	8:05 AM	Circum
NGC3718	Gal	UMa	11h 32m 35s	+53°04'04"	10.5	9:41 PM	8:09 AM	6:36 PM
NGC3726	Gal	UMa	11h 33m 21s	+47°01'43"	10.4	10:57 PM	8:09 AM	5:21 PM
NGC3729	Gal	UMa	11h 33m 49s	+53°07'32"	11.4	9:42 PM	8:10 AM	6:38 PM
NGC3738	Gal	UMa	11h 35m 49s	+54°31'25"	11.7	9:09 PM	8:12 AM	7:14 PM
NGC3798	Gal	Leo	11h 40m 14s	+24°41'49"	14.0	1:01 AM	8:16 AM	3:32 PM
NGC3808	Gal	Leo	11h 40m 44s	+22°25'45"	11.9	1:09 AM	8:17 AM	3:25 PM
NGC3887	Gal	Crt	11h 47m 05s	-16°51'16"	11.0	3:07 AM	8:23 AM	1:39 PM
NGC3898	Gal	UMa	11h 49m 15s	+56°05'03"	10.8	Circum	8:25 AM	Circum
NGC3960	Open	Cen	11h 50m 33s	-55°40'24"	8.3	7:29 AM	8:27 AM	9:24 AM
M109	Gal	UMa	11h 57m 36s	+53°22'29"	10.6	10:00 PM	8:34 AM	7:07 PM
NGC4038	Gal	Crv	12h 01m 53s	-18°52'07"	10.7	3:28 AM	8:38 AM	1:47 PM
NGC4080	Gal	Com	12h 04m 52s	+26°59'34"	14.0	1:17 AM	8:41 AM	4:05 PM
NGC4111	Gal	CVn	12h 07m 03s	+43°03'57"	10.8	12:01 AM	8:43 AM	5:25 PM
NGC4116	Gal	Vir	12h 07m 37s	+02°41'28"	11.9	2:34 AM	8:44 AM	2:54 PM
NGC4147	Glob	Com	12h 10m 06s	+18°32'30"	10.3	1:51 AM	8:46 AM	3:41 PM
NGC4178	Gal	Vir	12h 12m 46s	+10°51'53"	11.4	2:16 AM	8:49 AM	3:21 PM
NGC4179	Gal	Vir	12h 12m 52s	+01°17'58"	10.9	2:43 AM	8:49 AM	2:55 PM
NGC4183	Gal	CVn	12h 13m 17s	+43°41'53"	13.0	12:03 AM	8:49 AM	5:35 PM

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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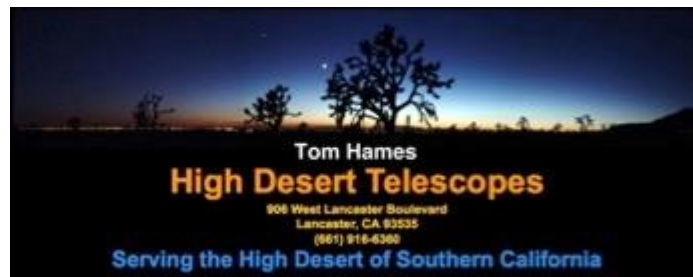


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