



Desert Sky Observer

Volume 33

Antelope Valley Astronomy Club Newsletter

October 2013

Up-Coming Events

- October 4: [Public Night](#) at the SAGE Planetarium
- October 5: Dark Sky Star Party @ [Red Cliffs](#)
- October 11: Antelope Valley [Youth Astronomy Club Meeting](#)
- October 11: Club Annual Business Meeting & Election*
- October 18: [Public Night](#) at the SAGE Planetarium
- October 21: Prime Desert Woodlands [Moon Walk](#)
- October 23: [Acton Library](#) Lecture Series
- October 25: [Edwards Air Force Base](#) Youth Outreach Star Party

* Monthly meetings are held at the S.A.G.E. Planetarium on the Cactus School campus 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

Don Bryden

I can't believe it's autumn already. And with that comes our annual business meeting. Please consider the effort of those few board members. The guest speakers, star parties, trips to JPL, Mt. Wilson, outreach events at state parks and schools and just our monthly fun under the SAGE dome are all possible thanks to hard working executive board members and committee chairs. Consider that this is what we love doing so it's really not hard work anyway. When you consider all this – consider putting your name in the hat. Come out to the October business meeting and help form the new AVAC board!

Well if it's time for the business meeting that means it's also time to say goodbye to summer. We await the return of Orion and the winter constellations, bright Jupiter and Mars and of course a comet or two. Comet C/2012 S1 (ISON) will be rising right along with Mars all month. Look for it just before sunrise in the constellation Leo just a degree or two northeast of Mars – especially on the morning of the fourteenth through the nineteenth when the two solar system objects will be at their closest – the fourteenth will have the added bonus of a near triple alignment with ISON, Mars and Regulus – the heart of Leo the Lion.

Need more assistance in finding these faint fuzzies? Come out to Red Cliffs on Saturday the 5th of October for our monthly dark sky star party or come on down with several of your fellow club members to Nightfall, the Riverside Astronomical Society's annual star party in the Anza-Borrego wilderness. Designated an International Dark Sky Community (IDSC) by the International Dark-Sky Association (IDA), the park has some of the best skies around. We'll be there the first Friday and Saturday in November so check it out at <http://nightfallstarparty.com> and come on down!



Vice President

Frank Moore

Hi folks. Antelope Valley Astronomy Club Tehachapi Division here. I say that because, after our most recent picnic and star party at Brite Lake, the Tehachapi News seems to be following our activities and regularly posting them in their “the Weekender” magazine. I’m just thrilled since I didn’t ask them to do it, haven’t been sending them news releases, but our activities are being published in their calendar anyhow. They recently posted an announcement about our Poppy Reserve Star Party. I’ll have to follow up and give them a little more information from now on.

As I mentioned last month the Pacific Astronomy and Telescope Show (PATs) was canceled for 2013. Our sponsor, Woodland Hills Camera and Telescopes, is filling the void with their own event the “Science, Imaging, and Astronomy Expo” (SIA Expo) at Pierce College on Saturday October 19th. We will be an exhibitor at the event with our display and literature. We’ll need help manning the booth so if you will be coming down let us know if you can take a spell...if only long enough for some of us to grab lunch. There will be many vendors there, and raffles galore, so put it on your calendar. <http://siaexpo.com/>

Also note that the AVAC is also going to have a booth at the Arizona Science and Astronomy Expo (ASAE), in Tucson, AZ, on Saturday and Sunday November 16th and 17th. As I mentioned at the last meeting, in addition to manufacturers, vendors, and other clubs and outreach and educational organizations, there will be tours of the Steward Mirror Lab at the University of Arizona and the Mt. Lemmon Sky Center. The ASAE is the largest gathering of science and astronomy companies and organizations in the western United States and perhaps in the world. Please let Frank, Don, or Rose know if you are contemplating attending and might be able to help out with the booth. We might also be able to plan carpooling and sharing hotel accommodations. <http://www.scienceandastronomy.com/>

For those who missed it AVAC member Brandon Wood, who works for Scaled Composites and is the configuration lead for Paul Allen's Stratolaunch program, gave an outstanding presentation at the September meeting. The subject was “Rockets over Mojave” about the past, present, and future of private space entrepreneurship out of the Mojave Air and Space Port. Brandon has made a YouTube playlist featuring many of the videos he showed with his presentation. You can see them here: <http://www.youtube.com/playlist?list=PL8J7nFTkaqBgo6NvWfW6030ygsQUVexCc>

Finally, we have our Annual Business Meeting and Board Election coming up at the club meeting on October 11th. Please make every effort to come. Though we won’t have a speaker, Jeremy, as always, will have a special treat for us on the dome. We need nominations for board positions. If you know anyone who would be interested in serving on the AVAC Executive Board please nominate them. If YOU would be interested PLEASE nominate yourself. It’s YOUR club. Wouldn’t you like to become involved in running it?

I wish us all dark skies.



Director of Community Development

Rose Moore

A big thank you goes out to all the members who helped out in September at our outreach events! Our day in Lancaster for the 'Celebration on the Blvd' turned out to be hot and windy while the Sun was still up. Thanks to Bill, Pam, and Frank for braving the heat! As the Sun went down, we passed out more club flyers, and met with more of the public. We set up in front of the public library, and did have lots of lights and some trees to deal with, but the public was still able to view the Moon, Saturn, and Venus, and talk to our members.

For October, please come out to support your club at our Annual Business Meeting on Friday, Oct. 11th! This is your time to nominate and elect new officers to our Board, nominate yourself, or re-elect, and to discuss any old or new business that you feel is important! After the Business part of the meeting, Jeremy will do a video and a dome show!

On Saturday, October 19th at 6:30 pm, we have a Prime Desert Moon Walk with Jeremy at the PDW Woodlands Preserve. Please come out and support Jeremy, and bring telescopes!! We can show the public 'what's up' just before and after his Moon Walk. Set up time is approximately 30-60 minutes prior to event.

Saturday, October 19th is the SIA Expo in Woodland Hills! Some of our club members will be attending, including Frank who will be setting up our club booth at the event. (See Frank's note above) Website: siaexpo.com

On Wednesday, Oct. 23rd, we have an Acton Library Lecture series with Jeremy. This starts at 6:30pm, and this evening's lecture will be on 'Cosmic Snowballs'. Come on out for a wonderful presentation and support Jeremy! Please see the map on the club's website, when you click on the event on our calendar, for those who are not familiar where this is being held.

Also note that Jeremy is now doing a public star party event right at the SAGE on the first Friday of each month! We'll be getting the information on this on our club calendar, and Jeremy also places info on the SAGE site on Facebook. Stay tuned!

We may have an outreach event for teens at Edward's AFB towards the end of October. This event is tentative, and further info will follow if this event actually is scheduled.

All events are held subject to the weather, so check the website, Facebook, or call Don, Frank, or Rose if any questions.

See you there!



Secretary

Pam Grove

Celebrate America- A Star Spangled Blvd, on Sat, September 14th, presented a challenge, with the heat, and the wind blowing down Frank's display boards, and the banner. The evening cooled down after the sun set, and Frank, Kevin and Tom had lines of people and kids at their scopes. Everyone seemed to enjoy viewing the Moon, and Saturn. Deep Sky objects were out of the question due to all the lights. Rose was busy with hand outs and talking to the public. Another successful OutReach!

Space Place

How to hunt for your very own supernova!

By Dr. Ethan Siegel

In our day-to-day lives, stars seem like the most fixed and unchanging of all the night sky objects. Shining relentlessly and constantly for billions of years, it's only the long-term motion of these individual nuclear furnaces and our own motion through the cosmos that results in the most minute, barely-perceptible changes.



SN 2013ai, via its discoverer, Emmanuel Conseil, taken with the Slooh.com robotic telescope just a few days after its emergence in NGC 2207 (top); NASA, ESA and the Hubble Heritage Team (STScI) of the same interacting galaxies prior to the supernova (bottom).

Unless, that is, you're talking about a star reaching the end of its life. A star like our Sun will burn through all the hydrogen in its core after approximately 10 billion years, after which the core contracts and heats up, and the heavier element helium begins to fuse. About a quarter of all stars are massive enough that they'll reach this giant stage, but the most massive ones -- only about 0.1% of all stars -- will continue to fuse leaner elements past carbon, oxygen, neon, magnesium, silicon, sulphur and all the way up to iron, cobalt, and, nickel in their core. For the rare ultra-massive stars that make it this far, their cores become so massive that they're unstable against gravitational collapse. When they run out of fuel, the core implodes.

The intruding matter approaches the center of the star, then rebounds and bounces outwards, creating a shockwave that eventually causes what we see as a core-collapse supernova, the most common type of supernova in the Universe! These occur only a few times a century in most galaxies, but because it's the most massive, hottest, shortest-lived stars that create these core-collapse supernovae, we can increase our odds of finding one by watching the most actively star-forming galaxies very closely. Want to maximize your chances of finding one for yourself? Here's how.

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Pick a galaxy in the process of a major merger, and get to know it. Learn where the foreground stars are, where the apparent bright spots are, what its distinctive features are. If a supernova occurs, it will appear first as a barely perceptible bright spot that wasn't there before, and it will quickly brighten over a few nights. If you find what appears to be a "new star" in one of these galaxies and it checks out, report it immediately; you just might have discovered a new supernova!

This is one of the few cutting-edge astronomical discoveries well-suited to amateurs; Australian Robert Evans holds the all-time record with 42 (and counting) original supernova discoveries. If you ever find one for yourself, you'll have seen an exploding star whose light traveled millions of light-years across the Universe right to you, and you'll be the very first person who's ever seen it!

Read more about the evolution and ultimate fate of the stars in our universe: <http://science.nasa.gov/astrophysics/focus-areas/how-do-stars-form-and-evolve/>.

While you are out looking for supernovas, kids can have a blast finding constellations using the Space Place star finder: <http://spaceplace.nasa.gov/starfinder/>.

Astrophoto of The Month



M101 by Don Bryden. Taken at Two Goats Observatory through a SV-105 Stellarvue refractor

News Headlines

NASA's SUNRISE Solar Observatory Provides New Insights on the Sun's Atmosphere

Three months after the flight of the solar observatory Sunrise - carried aloft by a NASA scientific balloon in early June 2013 -- scientists from the Max Planck Institute for Solar System Research in Germany have presented unique insights into a layer on the sun called the chromosphere. Sunrise provided the highest-resolution images to date in ultraviolet light of this thin corrugated layer, which lies between the sun's visible surface and the sun's outer atmosphere, the corona.

<http://spaceref.com/sun/nasas-sunrise-solar-observatory-provides-new-insights-on-suns-atmosphere.html>

Hubble Bubble May Explain Different Measurements of Expansion Rate of the Universe

The existence of the "Hubble Bubble" may explain, at least in part, the differing measurements for the expansion and therefore the age of the universe. That is the assumption of a team of physicists headed by Prof. Dr. Luca Amendola from the Institute for Theoretical Physics at Heidelberg University. In collaboration with colleagues from the Netherlands, the Heidelberg physicists developed a theoretical model that places the Milky Way inside of this type of cosmic bubble. The researchers believe the bubble can explain some of the deviations between previous measurements and the latest ones from the Planck satellite of the European Space Agency (ESA).

<http://www.sciencedaily.com/releases/2013/09/130909092520.htm>

NASA Wants Investigations for a Mars 2020 Rover

NASA has released its announcement of an open competition for the planetary community to submit proposals for the science and exploration technology instruments that would be carried aboard the agency's next Mars rover, scheduled for launch in July/August of 2020. The Mars 2020 rover will explore and assess Mars as a potential habitat for life, search for signs of past life, collect carefully selected samples for possible future return to Earth, and demonstrate technology for future human exploration of the Red Planet.

http://www.nasa.gov/mission_pages/mars/news/mars20130927.html

How Engineers Revamped Spitzer to Probe Exoplanets

Now approaching its 10th anniversary, NASA's Spitzer Space Telescope has evolved into a premier observatory for an endeavor not envisioned in its original design: the study of worlds around other stars, called exoplanets. While the engineers and scientists who built Spitzer did not have this goal in mind, their visionary work made this unexpected capability possible.

http://www.spacedaily.com/reports/How_Engineers_Revamped_Spitzer_to_Probe_Exoplanets_999.html

Ready, Set, Observe! How to See Comet ISON In The Early Morning Sky

OK, you've waited patiently for Comet ISON to brighten and reappear in the dawn sky. It has. Now you're chomping at the bit for a look at it in your telescope. Before you set the alarm and venture into the night, let's prepare for what to expect. The better you know your target, the easier it will be to find.

<http://www.universetoday.com/104458/ready-set-observe-how-to-see-comet-ison-in-the-early-morning-sky/>

Astronomers discover densest galaxy ever

Imagine the distance between the sun and the star nearest to it – a star called Alpha Centauri. That's a distance of about 4 light years. Now, imagine as many as 10,000 of our suns crammed into that relatively small space. That is about the density of a galaxy that was recently discovered by an international team of astronomers led by a Michigan State University faculty member

<http://msutoday.msu.edu/news/2013/astronomers-discover-densest-galaxy-ever/>

October Sky Data

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

**Best time for deep sky observing this month:
October 1 through October 8**



Mercury can be seen very low above the horizon about half an hour after sunset down to the lower right of Saturn. Even though, at magnitude -0.1 as October begins, it is twice as bright as Saturn, it will still be hard to see when using binoculars or a telescope. On the 7th it can be glimpsed 5 degrees below Saturn with a slender crescent Moon.

Venus can be seen in the west-southwest after sunset as its brightness increases from -4.2 to -4.5 magnitudes during the month. It is moving quickly across the heavens; initially in Libra, it passes through Scopus (above Antares) and Ophiuchus before reaching Sagittarius on November 1st when it is at its furthest angular separation from the Sun.

Mars, lying in Leo, rises some 4 to 5 hours before the Sun this month shining at magnitude +1.6. It will be easily visible with binoculars in the pre-dawn sky - but please cease using them at sunrise! Its magnitude of +1.6 remains constant during the month with its angular size increasing from 4.4 to 4.9 arc seconds.

Jupiter rises, with the constellation Gemini, about midnight at the beginning of October and about 2 hours earlier by its end, shining at magnitude -2.2 with a disk ~38 arc seconds across. On October 12th, Jupiter is 90 degrees to the right of the Sun as seen from Earth and this is an excellent time for viewing eclipse and shadow transits of the four Galilean moons as they weave their way around it.

Saturn, lying in Libra, may just be visible low above the horizon for the first couple of weeks of October lying well to the right of Venus in the west. The rings have opened out to ~17 degrees from the line of sight and we are now observing the planet's southern hemisphere northern latitudes.

This year is not optimal for watching the Orionid **meteor shower** because a bright waning gibbous moon will be in the sky during the peak hours between midnight and dawn. The best viewing for the Orionids will probably be before dawn on October 21. You'll be watching for those brightest Orionids that can overcome the moon's glare.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
10/1/2013	03:33	16:35	06:46	18:35
10/5/2013	07:31	18:55	06:49	18:29
10/10/2013	12:40	23:14	06:53	18:22
10/15/2013	16:17	03:33	06:57	18:16
10/20/2013	19:27	08:39	07:01	18:10
10/25/2013	23:32	12:45	07:06	18:04
10/31/2013	04:12	16:13	07:11	17:58

Planet Data

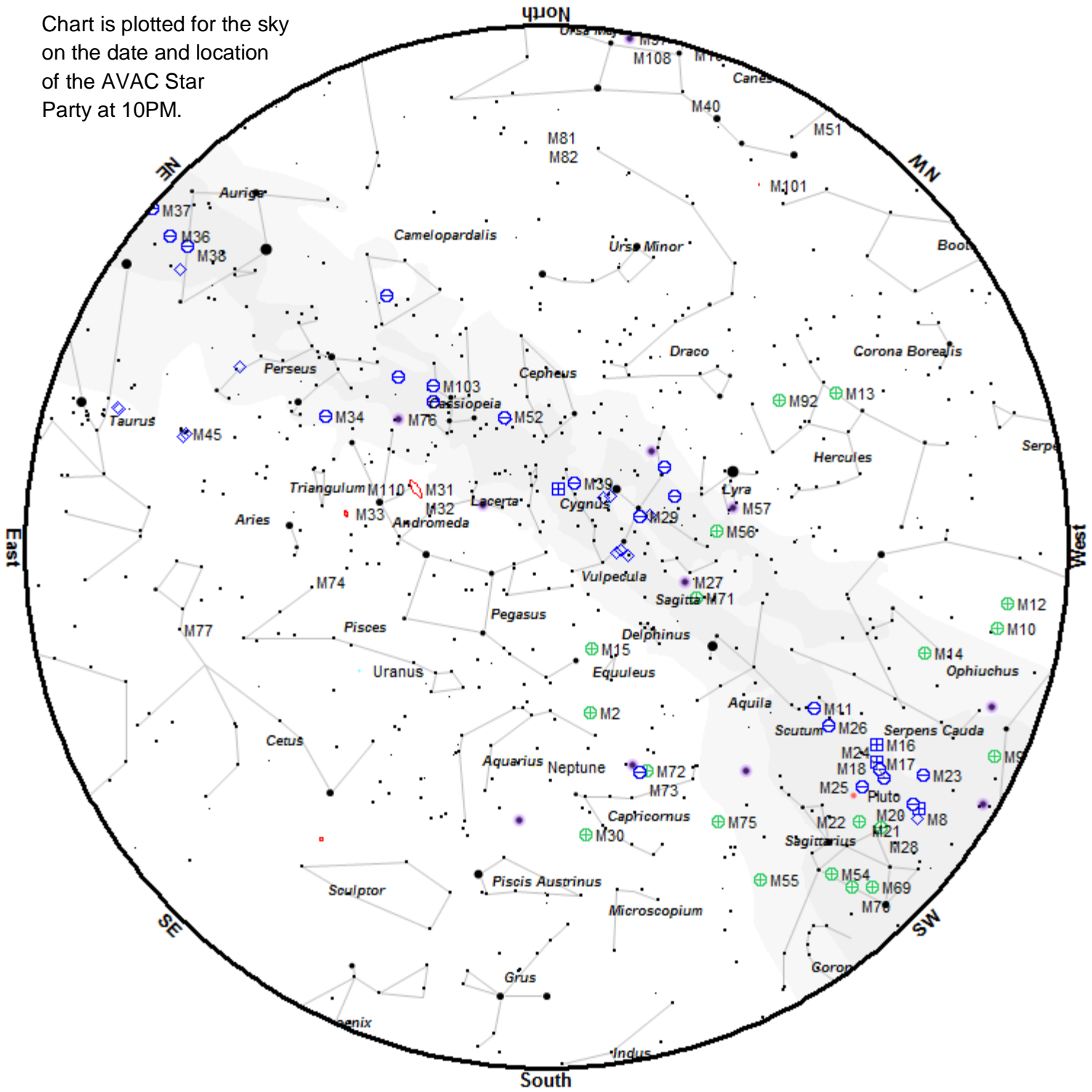
	Oct 1			
	Rise	Transit	Set	Mag
Mercury	08:44	14:08	19:35	0.0
Venus	10:24	15:30	20:38	-4.2
Mars	02:54	09:45	16:39	1.6
Jupiter	00:13	07:26	14:42	-2.2
Saturn	09:07	14:42	20:13	0.7

	Oct 15			
	Rise	Transit	Set	Mag
Mercury	08:55	14:06	19:16	0.2
Venus	10:47	15:40	20:34	-4.3
Mars	02:40	09:23	16:08	1.6
Jupiter	23:24	06:36	13:52	-2.3
Saturn	08:20	13:53	19:22	0.6

	Oct 31			
	Rise	Transit	Set	Mag
Mercury	07:12	12:43	18:04	4.9
Venus	11:04	15:50	20:37	-4.4
Mars	02:23	08:56	15:31	1.5
Jupiter	22:24	05:36	12:52	-2.4
Saturn	07:26	12:57	18:25	0.5

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.



Star Magnitudes						Galaxy	Nebula
●	●	●	●	●	●		
0	1	2	3	4	5	Globular Cluster	Planetary Nebula
						Cluster+Nebosity	

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 best time to observe the object. The difficulty column describes how difficult it is to observe the object from the current location on a perfect night in a 6 inch Newtonian telescope.

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	19:22	19:53	21:56	obvious
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	19:33	19:55	21:39	easy
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	19:37	19:55	21:05	detectable
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	19:33	19:57	22:16	easy
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	19:31	19:57	22:11	easy
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	19:35	19:57	22:03	detectable
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	19:35	19:56	21:46	detectable
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	19:23	19:58	00:12	obvious
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	19:30	19:59	23:35	easy
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	19:26	19:59	22:00	easy
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	19:35	20:00	22:42	detectable
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	19:32	20:05	23:47	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	19:32	20:07	23:58	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	19:32	20:09	00:23	easy
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	19:30	20:18	00:58	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	19:31	20:19	00:48	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	19:24	20:57	23:36	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	19:33	21:23	00:59	detectable
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	19:31	21:24	02:33	easy
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	19:35	21:26	00:35	detectable
IC 1396	Neb		Cep	21h39m06.0s	+57°30'00"	19:32	21:31	03:08	challenging
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	19:28	21:46	03:54	obvious
Cocoon	Neb	10.0	Cyg	21h53m24.0s	+47°16'00"	19:32	21:46	02:49	challenging
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	19:37	22:08	02:18	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	19:44	23:17	03:25	detectable
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	20:02	23:50	03:38	difficult
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	19:31	23:51	05:42	easy
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	20:46	00:32	04:20	detectable
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	20:02	00:35	05:09	easy
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	19:59	00:35	05:12	easy
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	19:38	01:12	05:47	easy
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	19:38	01:22	05:48	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	19:36	01:26	05:49	obvious
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	21:39	01:27	05:14	detectable
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	21:24	01:34	05:34	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	19:35	01:36	05:51	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	19:49	01:39	05:45	easy
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	23:34	01:50	04:06	challenging

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	20:20	02:11	05:52	obvious
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	20:23	02:14	05:51	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	20:56	02:26	05:47	easy
Heart Nebula	Neb	6.5	Cas	02h33m52.0s	+61°26'50"	20:33	02:27	05:48	challenging
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	22:08	02:34	05:44	detectable
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	23:32	02:35	05:34	detectable
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	22:04	02:35	05:42	detectable
NGC 1245	Open	7.7	Per	03h14m42.0s	+47°14'12"	00:54	03:07	05:17	challenging
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	23:08	03:24	05:47	detectable
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	23:03	03:39	05:51	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	22:01	03:41	05:54	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	21:53	04:00	05:55	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	22:55	04:07	05:50	easy
Hyades	Open	0.8	Tau	04h26m54.0s	+15°52'00"	00:04	04:18	05:49	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	01:20	04:37	05:46	detectable
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	23:44	04:43	05:49	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	01:28	04:55	05:47	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	01:11	05:10	05:49	detectable
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	00:35	05:14	05:52	easy
M 1	Neb	8.4	Tau	05h34m30.0s	+22°01'00"	03:31	05:13	05:39	challenging
M 43	Neb	9.0	Ori	05h35m30.0s	-05°16'00"	02:20	05:15	05:50	challenging
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	02:20	05:15	05:50	easy
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	00:59	05:17	05:50	easy
M 78	Neb	8.0	Ori	05h46m48.0s	+00°05'00"	02:10	05:17	05:50	challenging
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	01:18	05:19	05:53	obvious
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	01:41	05:19	05:50	easy
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	02:20	05:19	05:46	detectable
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	01:49	05:20	05:53	obvious
NGC 2237	Neb	5.5	Mon	06h32m02.0s	+04°59'10"	02:38	05:22	05:49	challenging
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	02:33	05:23	05:50	easy
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	03:14	05:24	05:49	easy
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	04:05	05:24	05:42	difficult
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	03:13	05:25	05:46	detectable
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	03:16	05:25	05:46	detectable
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	02:52	05:25	05:54	obvious
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	04:00	05:26	05:47	detectable
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	04:05	05:27	05:46	easy

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.

AVAC

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Visit the Antelope Valley Astronomy Club website at www.avastronomyclub.org/

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