



# Desert Sky Observer

Volume 33

Antelope Valley Astronomy Club Newsletter

March 2013

## Up-Coming Events

March 8: Club Meeting\*

March 9: Dark Sky Star Party @ [Vásquez Rocks State Park](#)

March 16: Aerospace Valley Science Olympiad @ [Antelope Valley College](#)

March 27: Acton Library Lecture/Star Party Series @ [Acton Library](#)

\* 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 20<sup>th</sup> 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

We had a small but good turnout at Lee's Flats last month. Bill S. had the Coulter 13" scope, Matt had the 24" LooneyScope and I had the Footscope. Bob had his 8" LX200 freshly repaired thanks to Don Rothman and Ellen was putting her Orion 6" dob through its paces.

There was a nice ISS flyover about 7pm and eventually the wind died which made it rather pleasant out, though I had the RV heater on and Matt had his propane portable going.

We did a little practice Messier Marathoning and then looked at a few other little jewels. I shared the blood red Hind's Crimson Star and also spotted Ceres, glowing at mag. 7 near Elnath in Auriga. Matt gave us some great views in the 24" of the Owl, M81&82, The Crab and a few other usually dim objects that just glowed brightly with all that aperture.

Tom Hames showed up with his grandson and brought a Ronchi eyepiece. That Waite Research mirror in the LooneyScope looked perfect!

The dew and cold increased around 10:30 and by 11:30 we packed it in - Thanks to Lee Bush and his pastor for the use of the property - it was a great night!

This month we'll be out at Devil's Punchbowl on the 9th. There is a nice visitor's center and some raptor cages as well as several trails from easy to difficult. Later, we'll set up down by the amphitheater for a nice evening of star-gazing. Possible targets include Comet Pan-STARRS and Saturn as well as a last look at the Orion Nebula and Jupiter before the summer constellations move in.

The next Saturday, the 16th, we'll be out at AV College for the Science Olympiad. We might be able to see Jupiter and the moon but mostly we'll have the solar scopes going to share with the kids. If you're interested in helping out please email me or Rose or come see us at the next meeting for more information.

Finally, a quick reminder about the upcoming Messier Marathon. We have the group site out at Saddleback State Park for the 6th of April. Come for the day and we'll have a little bar-b-cue before the star hopping starts and then stay all night to see how many of Charles Messier's objects you can find.

One other quick mention, we're looking for people to help out at Space Day in Riverside on the 19th of April. Lockheed Martin will put us up at a nice hotel and treat for dinner Thursday night then we'll do presentations at the middle school Friday morning. Please let me know if you're interested in helping out.



## Vice President

### Frank Moore

“Shrouded in an organic smog, Saturn's giant moon Titan is one of the most fascinating and mysterious bodies in the Solar System. Using data from the Cassini/Huygens spacecraft and probe, we are just beginning to discover the landscape beneath Titan's thick organic haze deck. Similar to Earth, Titan has mountains, lakes, rivers, canyonlands, plains, and dunes. But unlike Earth, Titan's fluids are liquid hydrocarbons at a frigid temperature of 95 Kelvin – only a little above the temperature of liquid nitrogen. These hydrocarbon fluids rain out and wash over a surface made of organic molecules and carve out the terrains we are just beginning to explore”

Sound interesting? That's a bit of the abstract for the presentation by our guest speaker, Dr. Michael Malaska of JPL, at the Friday, March 8, club meeting at the SAGE Planetarium.

Dr. Malaska is a Senior Postdoctoral Fellow at NASA/JPL in Pasadena, CA. His research program combines laboratory simulation, spacecraft remote sensing, and field geology to explore the processes occurring on Saturn's giant moon Titan. An organic chemist by training, Dr. Malaska is examining the dissolution processes that might be making caves, sinkholes and evaporite playas on Titan. He is also an affiliate of the Cassini spacecraft RADAR Science Team.

Dr. Malaska's passion in planetary science was reignited by the images sent down by the Cassini spacecraft. This started his journey from being an interested amateur, to a part-time volunteer researcher, to fully pursuing a career in planetary science. As a self-described enthusiastic science nerd, Mike hopes to share his passion for planetary science, chemistry, geology, and astronomy using recent spacecraft images and data with the AVAC at our March meeting.

I know I'm looking forward to Dr. Malaska's presentation and hope you are too.

I want to give a big “Thank you” to Jeremy Amaran for the presentation on the European Southern Observatory. He put together a wonderful dome show on short notice and it sure piqued my interest in their fantastic astronomical instruments and on the science they are doing in the southern skies.

In the next few months we'll have a presentation on the sub-orbital space tourism programs at XCOR and a visit from Mike Simmons, President of Astronomers Without Borders. For updates and breaking news, stay in touch by visiting the club calendar on the Antelope Valley Astronomy Club website, <http://www.avastronomyclub.org/> and on our Facebook page, <https://www.facebook.com/avastronomyclub>.



## Director of Community Development

### Rose Moore

Thanks to the few members who came out to PDW the beginning of February. Unfortunately, it was totally overcast and there was no observing. There were 35 brave people who showed up for Jeremy's walk and talk! Let's hope the next PDW is warmer and clear!

The next PDW with Jeremy is on Saturday, March 2nd at 6:30pm. Set up is about an hour before. Come on out with your telescope and join us in showing the public some of the night sky, or join Jeremy for the Moon Walk. The Moon will be almost last quarter and won't be up till around 11:15pm. Jupiter will be the only planet up. So maybe we can check out some of the brighter dark sky objects. Dress warm! Weather permitting!

We have 2 events coming up that are sponsored by Lockheed Martin, our club's biggest sponsor:

On Saturday, March 16th will be the Aerospace Valley Science Olympiad being held at Antelope Valley College. This event will be replacing the Super Science Saturday events at Joe Walker and Los Amigos schools, with sponsorship by Lockheed Martin. Further info as to time and exact location for our set up will be announced as they are available. We will need members with telescopes and any other astronomy items of interest to show the students and their families. There will be a sign up sheet at the March meeting, but you may also contact either me or Don via email or phone, so that we know how many members will be there. Come on out to help at this event!

The first big event in April is Space Day at Riverside, being held on Friday, April 19th. This event usually means an overnight stay, provided by Lockheed Martin (the sponsors), the night before. This will allow participating members to be up early to staff our booth at the event. The event usually ends by early to midafternoon. Please contact Don if you can attend to help out, and to get further information.

Also in April is the Poppy Festival, held at Lancaster City Park. This year the event is on Saturday and Sunday April 20th and 21st. The event is from 10am to 6pm. On Saturday, we need to arrive extra early to set up our tent and telescopes, usually around 7-7:30am. We need members for both days. You may sign up for either or both days, and may sign for as many hours as you would like to staff the booth. Sign up sheets will be at the next 2 meetings, or you may contact Rose to confirm. This is an important event for us, and we usually see hundreds of people over the 2 days. There will be a limited amount of free passes to those who sign up first to help out at the booth. We further try to accommodate all members who come out to help by exchanging out passes at the gate if possible. Come out to support this event! Please call or see Rose for further information.

If any questions about any events, please check the calendar, or contact a Board member. Support your club!!!

## Space Place

### Tackling the Really BIG Questions

By Diane K. Fisher

How does NASA get its ideas for new astronomy and astrophysics missions? It starts with a Decadal Survey by the National Research Council, sponsored by NASA, the National Science Foundation, and the Department of Energy. The last one, *New Worlds, New Horizons in Astronomy and Astrophysics* was completed in 2010. It defines the highest-priority research activities in the next decade for astronomy and astrophysics that will “set the nation firmly on the path to answering profound questions about the cosmos.” It defines space- and ground-based research activities in the large, midsize, and small budget categories.



*Clusters of galaxies collide in this composite image of “Pandora’s Cluster.” Data (in red) from NASA’s Chandra X-ray Observatory show gas with temperatures of millions of degrees. Blue maps the total mass concentration (mostly dark matter) based on data from the Hubble Space Telescope (HST), the European Southern Observatory’s Very Large Telescope (VLT), and the Japanese Subaru telescope. Optical data from HST and VLT also show the constituent galaxies of the clusters. Such images begin to reveal the relationship between concentration of dark matter and the overall structure of the universe.*

The Astrophysics Division is also doing studies of moderate-sized missions, including: gravitational wave mission concepts that would advance some or all of the science objectives of the Laser Interferometer Space Antenna (LISA), but at lower cost; X-ray mission concepts to advance the science objectives of the International X-ray Observatory (IXO), but at lower cost; and mission concept studies of probe-class missions to advance the science of a planet characterization and imaging mission.

The recommended activities are meant to advance three science objectives:

1. Deepening understanding of how the first stars, galaxies, and black holes formed,
2. Locating the closest habitable Earth-like planets beyond the solar system for detailed study, and
3. Using astronomical measurements to unravel the mysteries of gravity and probe fundamental physics.

For the 2012-2021 period, the highest-priority large mission recommended is the Wide-field Infrared Survey Telescope (WFIRST). It would orbit the second Lagrange point and perform wide-field imaging and slitless spectroscopic surveys of the near-infrared sky for the community. It would settle essential questions in both exoplanet and dark energy research and would advance topics ranging from galaxy evolution to the study of objects within the galaxy and within the solar system.

Naturally, NASA’s strategic response to the recommendations in the decadal survey must take budget constraints and uncertainties into account.

The goal is to begin building this mission in 2017, after the launch of the James Webb Space Telescope. But this timeframe is not assured. Alternatively, a different, less ambitious mission that also address the Decadal Survey science objectives for WFIRST would remain a high priority.

## News Headlines

### **Meteorite explodes over Russia, more than 1,000 injured**

A meteorite streaked across the sky and exploded over central Russia on Friday, raining fireballs over a vast area and causing a shock wave that smashed windows, damaged buildings and injured 1,200 people. People heading to work in Chelyabinsk heard what sounded like an explosion, saw a bright light and then felt the shock wave, according to a Reuters correspondent in the industrial city 1,500 km (950 miles) east of Moscow. <http://news.yahoo.com/possible-meteor-shower-reported-eastern-russia-052833588.html>

### **Asteroid Buzzes Earth in Record-Breaking Flyby**

An asteroid half the size of a football field buzzed Earth in a historic flyby today (Feb. 15), barely missing our planet just hours after a much smaller object exploded above Russia, injuring perhaps 1,000 people. The 150-foot-wide (45 meters) near-Earth asteroid 2012 DA14 cruised within 17,200 miles (27,000 kilometers) of Earth at 2:24 p.m. EST (1924 GMT) today, coming closer than many communications satellites circling our planet.

<http://www.space.com/19821-asteroid-2012-da14-flyby-meteor.html>

### **NASA's Kepler Mission Discovers Tiny Planet System**

NASA's Kepler mission scientists have discovered a new planetary system that is home to the smallest planet yet found around a star similar to our sun. The planets are located in a system called Kepler-37, about 210 light-years from Earth in the constellation Lyra. The smallest planet, Kepler-37b, is slightly larger than our moon, measuring about one-third the size of Earth. It is smaller than Mercury, which made its detection a challenge.

<http://www.jpl.nasa.gov/news/news.php?release=2013-066>

### **Clues to the Mysterious Origin of Cosmic Rays**

Very detailed new observations with ESO's Very Large Telescope (VLT) of the remains of a thousand-year-old supernova have revealed clues to the origins of cosmic rays. For the first time the observations suggest the presence of fast-moving particles in the supernova remnant that could be the precursors of such cosmic rays. The results are appearing in the 14 February 2013 issue of the journal Science.

<http://www.eso.org/public/news/eso1308/>

### **Deep Impact spacecraft eyes Comet ISON**

NASA's Deep Impact spacecraft has acquired its first images of Comet ISON (C/2012 S1). The spacecraft's Medium-Resolution Imager took the images over a 36-hour period January 17–18, 2013, from a distance of 493 million miles (793 million kilometers). Many scientists anticipate a bright future for Comet ISON; the spaceborne conglomeration of dust and ice may put on quite a show as it passes through the inner solar system this fall.

<http://www.astronomy.com/~link.aspx?id=bfc6b60-6251-4123-bf53-fdd8de726c98>

## March Sky Data

Last Qtr Mar 4      New Mar 11      First Qtr Mar 19      Full Mar 27



**Best time for deep sky observing this month:**  
**March 2 through March 13**

**Mercury**, reaches greatest western elongation (when it is furthest from the Sun in angle) on the 31st. However this is not a good apparition as the ecliptic at dawn makes a very shallow angle to the horizon at this time of year. As a result, Mercury will be very low above the horizon in the east-southeast as dawn breaks and binoculars will be needed to spot it. But please do not use them when the Sun has risen!

**Venus** reaches superior conjunction on March 28th and so, on the far side of the Sun, will not be visible this month.

**Mars** is still visible low in the west after sunset - as it has been for around 5 months now! It could just be seen at an elevation of about 3 degrees in the southwest 45 minutes after sunset on March 1st but, by month's end, will have been lost in the Sun's glare.

**Jupiter** is now high in the southern sky and will transit at sunset so will be just west of south as darkness falls. Shining at magnitude -2.5, it starts March lying just 5 degrees to the upper right of the star Aldebaran and ends the month above Aldebaran

**Saturn**, rises at 11:18 as March begins and will transit before dawn at 03:49. By month's end, it rises at 21:14 and will transit at about 02:00. Its magnitude brightens slightly during the month, from +0.4 to +0.3 magnitudes, while its angular size increases from 17.8 to 18.6 arc seconds. The rings have now opened out to 19 degrees from the line of sight and will be at their best for 6 years!

There are no major **meteor-showers** in March, but we may see a handful of meteors from the Virginid shower, which is usually active during March and April; they appear to radiate outwards from the constellation of Virgo.

## Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
3/1/2013	22:12	08:22	06:20	17:48
3/5/2013	01:21	11:45	06:15	17:51
3/10/2013	05:10	17:08	06:08	17:55
3/15/2013	09:06	23:06	07:01	18:59
3/20/2013	12:56	02:25	06:54	19:03
3/25/2013	17:46	05:30	06:47	19:07
3/31/2013	-----	09:43	06:39	19:12

## Planet Data

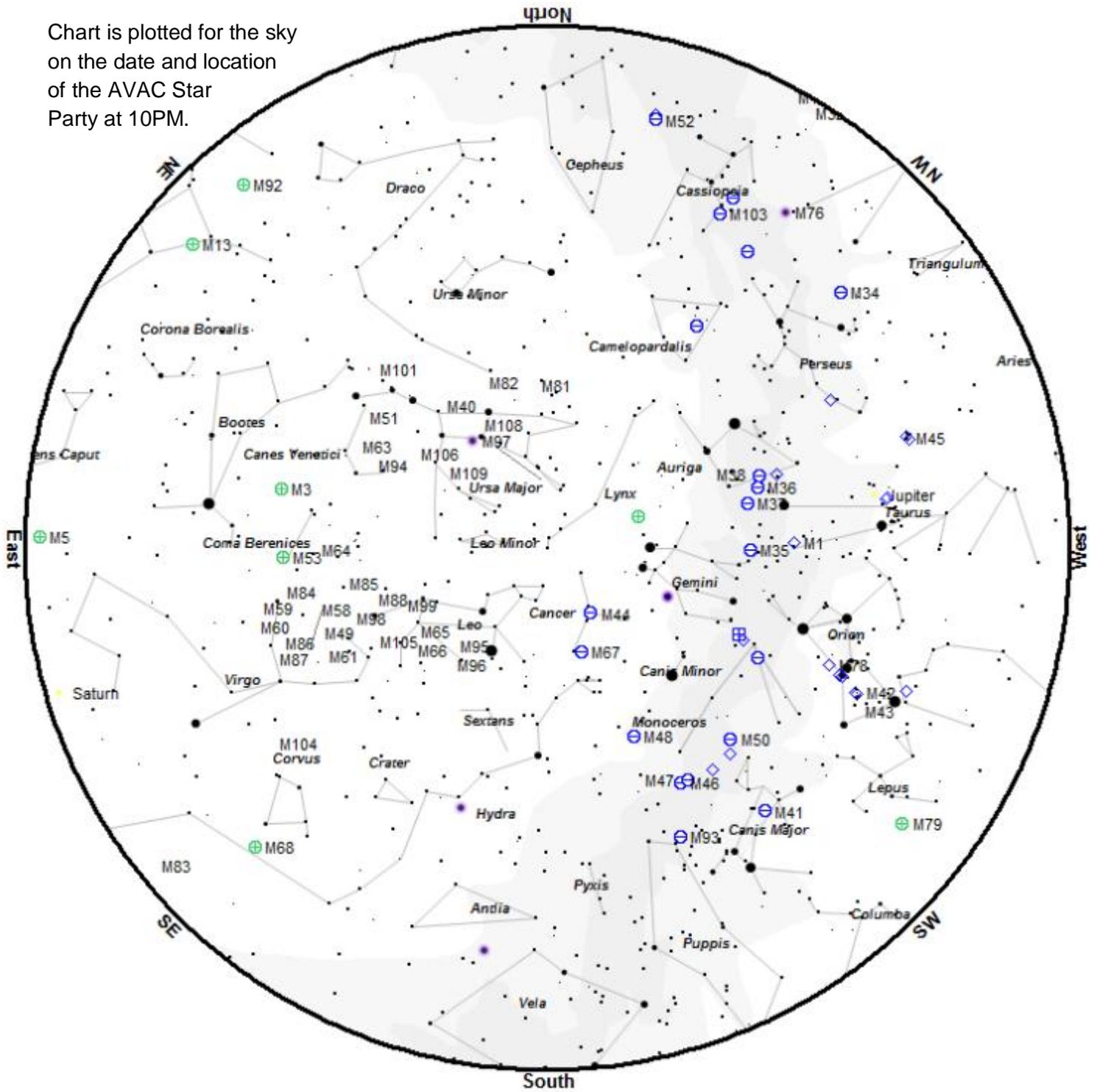
	Mar 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	06:10	12:18	18:18	3.8
<b>Venus</b>	06:03	11:41	17:17	-3.9
<b>Mars</b>	06:46	12:44	18:40	1.2
<b>Jupiter</b>	10:23	17:36	00:45	-2.3
<b>Saturn</b>	22:18	03:49	09:19	0.4

	Mar 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:57	11:41	17:30	1.4
<b>Venus</b>	06:55	12:50	18:46	-3.9
<b>Mars</b>	07:18	13:28	19:37	1.2
<b>Jupiter</b>	10:34	17:48	00:58	-2.3
<b>Saturn</b>	22:21	03:52	09:23	0.3

	Mar 31			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:29	11:15	17:01	0.3
<b>Venus</b>	06:42	13:00	19:18	-3.9
<b>Mars</b>	06:46	13:10	19:33	1.2
<b>Jupiter</b>	09:40	16:55	00:07	-2.2
<b>Saturn</b>	21:14	02:46	08:18	0.3

Planet, Sun, and Moon data calculated for local time at Lancaster, CA

Chart is plotted for the sky on the date and location of the AVAC Star Party at 10PM.



<p>Star Magnitudes</p> <p>● ● ● ● ●</p> <p>0 1 2 3 4 5</p>	<p>Galaxy</p> <p>Open Cluster</p> <p>Globular Cluster</p> <p>Cluster+Nebulosity</p>	<p>Nebula</p> <p>Bright Nebula</p> <p>Planetary Nebula</p>
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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 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	18:57	19:19	21:03	easy
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	18:54	19:19	20:52	obvious
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	18:54	19:19	20:48	obvious
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	18:59	19:19	20:39	detectable
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	18:59	19:19	21:03	detectable
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	18:55	19:19	21:03	obvious
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	19:02	19:20	20:57	detectable
Heart Neb.	Neb	6.5	Cas	02h33m52.0s	+61°26'50"	18:57	19:20	21:13	challenging
NGC 1245	Open	7.7	Per	03h14m42.0s	+47°14'12"	18:58	19:20	21:21	challenging
Hyades	Open	0.8	Tau	04h26m54.0s	+15°52'00"	18:57	19:20	21:23	easy
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	18:53	19:21	22:08	obvious
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	19:01	19:21	21:03	detectable
M 43	Neb	9.0	Ori	05h35m30.0s	-05°16'00"	18:56	19:21	21:26	challenging
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	18:56	19:21	22:20	easy
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	18:56	19:21	21:26	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	19:00	19:22	21:23	detectable
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	18:51	19:22	22:51	obvious
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	18:57	19:22	22:36	easy
M 78	Neb	8.0	Ori	05h46m48.0s	+00°05'00"	18:55	19:22	21:57	challenging
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	18:58	19:23	22:22	detectable
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	18:54	19:23	23:09	easy
M 1	Neb	8.4	Tau	05h34m30.0s	+22°01'00"	18:56	19:23	22:32	challenging
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	18:54	19:25	23:14	easy
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	18:55	19:26	23:04	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	18:53	19:26	23:15	obvious
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	18:58	19:26	22:26	detectable
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	18:53	19:26	23:00	obvious
NGC 2237	Neb	5.5	Mon	06h32m02.0s	+04°59'10"	18:56	19:28	22:54	challenging
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	18:55	19:32	23:22	easy
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	18:56	19:36	23:03	easy
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	18:57	19:43	22:37	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	18:54	19:55	22:42	easy
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	19:02	19:57	22:35	difficult
NGC 2360	Open	9.1	CMa	07h17m43.0s	-15°38'30"	19:10	19:58	21:17	challenging
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	18:50	20:10	00:37	obvious
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	18:55	20:16	22:42	obvious
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	18:57	20:17	22:44	easy
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	18:58	20:22	22:43	detectable

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 2506	Open	8.9	Mon	08h00m01.0s	-10°46'12"	19:09	20:40	22:32	challenging
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	18:57	21:20	01:21	easy
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	19:06	21:31	00:19	detectable
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	18:59	22:36	04:31	detectable
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	19:01	22:36	04:16	detectable
NGC 3227	Gal	11.5	Leo	10h23m30.6s	+19°51'54"	20:11	23:03	01:56	difficult
M 97	PNe	9.7	UMa	11h14m47.7s	+55°01'09"	19:38	23:54	04:10	detectable
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	20:44	23:58	03:12	detectable
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	20:40	00:00	03:19	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	21:01	00:58	04:48	detectable
Col 256	Open	2.9	Com	12h25m06.0s	+26°06'00"	20:44	01:04	04:59	easy
M 84	Gal	10.1	Vir	12h25m03.9s	+12°53'12"	21:52	01:05	04:17	detectable
M 86	Gal	9.8	Vir	12h26m12.2s	+12°56'44"	22:10	01:06	04:01	detectable
M 49	Gal	9.3	Vir	12h29m46.8s	+08°00'01"	21:57	01:09	04:19	detectable
M 87	Gal	9.6	Vir	12h30m49.2s	+12°23'29"	21:56	01:10	04:24	detectable
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	22:13	01:16	04:17	difficult
M 104	Gal	9.1	Vir	12h39m59.3s	-11°37'22"	22:39	01:19	03:59	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	21:07	01:30	05:01	detectable
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	21:57	01:36	04:57	detectable
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	22:15	02:08	05:00	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	21:31	02:09	05:04	easy
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	22:20	02:21	05:03	detectable
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	22:49	02:42	05:00	detectable
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	00:36	03:57	05:06	easy
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	00:52	04:36	05:07	easy
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	01:15	04:39	05:06	easy
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	02:05	04:39	05:06	easy
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	00:22	04:40	05:15	obvious
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	02:41	04:40	05:04	detectable
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	03:13	04:42	05:02	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	02:37	04:44	05:07	easy
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	03:11	04:43	05:03	detectable
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	03:37	04:44	05:00	detectable
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	03:15	04:44	05:06	easy
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	03:30	04:44	05:02	detectable
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	03:42	04:45	05:03	easy
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	03:00	04:46	05:16	obvious

## 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/](http://www.avastronomyclub.org/)

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