



Desert Sky Observer

Volume 32

Antelope Valley Astronomy Club Newsletter

November 2012

Up-Coming Events

November 9: Club Meeting*

November 10: Dark Sky Star Party @ [Two Goats Observatory](#)

November 15: Amargosa Creek Middle School Star Party @ [Amargosa Creek Middle School](#)

November 17: Prime Desert Woodlands Moon Walk @ [Prime Desert Woodlands](#)

November 28: Acton Library Astronomy Lecture 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 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

If you missed last month's meeting then I'd like to introduce you to our new executive board for 2013! There's been a bit of a shake-up on the board – no, I'm afraid you're still stuck with me as president but we have two people in new positions. Rose continues as our Director of Community Development and Virginia will keep the books once again as Treasurer. But Frank has moved from Secretary to Vice-President (I'm looking forward to a Space-X talk, Frank) and in her e-board debut, Pam Grove will be taking over for Frank as our new Secretary.

If you feel like you've missed out, don't fret – we'll be appointing committee positions in November and there have already been a few folks to step up and volunteer. We'll be looking for committee members for the YEA Essay Contest, the Treasurer's Audit and the Community Development committee so think about helping out in the new year.

Now I'd like to turn my attention to some upcoming events. First, on the 10th of November will be a dark sky star party out at Two Goats. In December there will be no star party but don't forget the Christmas Party on the 15th. For 2013 here are a few dates to make a note of. First, the Messier Marathon will be April 6th. And this will be followed by star parties on the 11th of May, the 8th of June, the 6th of July, the 3rd of August and the 7th of September. These are still tentative but I'd count on the picnic being in August or September.

Also, though it falls nearly on a FULL MOON, RTMC will be the 22nd through the 27th of May. Since it won't be much of a star party, Matt Leone is starting to talk up the Bryce Canyon Star Party which will be from June 3rd through the 9th so stay tuned for more details.

Well it should be a year of great speakers, meetings and star parties so come on out and participate and I hope to see you all out among the stars!

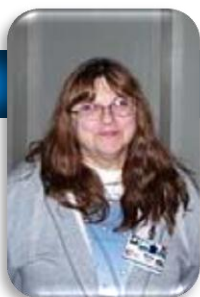


Vice President

Doug Drake

David Lynch will be speaking to us during our club meeting this November 9th. He will be speaking on intelligent life in the Universe. Dr. Lynch has a B.S in Astrophysics and a Ph.D. in Astronomy and has published over 150 scientific papers and 10 books. We look forward to listening to Dr. Lynch about intelligent life in the Universe.

Our Club Christmas Party is on schedule for December 15, third Saturday of the month, at the Embassy Suites in Palmdale. The Embassy Suites is located at 39375 5th Street West, Palmdale, just behind Best Buy. The cost is \$25 per plate and Steve has set-up our web site (<http://www.avastronomyclub.org/christmas.html>) so you can register and make your payment. The web site will also provide directions to the Embassy. If you're unable to use the web site then you can register and pay Virginia, our Treasure, at the November club meeting. If you use the web site please register and make your payment before the end of November. We will have a 3-Entrée buffet with beverages that should delight your appetite. There will be a silent auction and a raffle so you can take some good stuff home from the party. You can help support the auction by bringing some good stuff that can be auctioned off. We always have fun, laugh and play so be there or be square.



Director of Community Development

Rose Moore

Don't forget our meeting on November 9th, with speaker Dr. David Lynch. See Doug's note above. Dr. Lynch has been to our club before, and is an excellent speaker!

On Thursday, Nov. 15th we have a star party for the students of Amargosa Creek Middle School in Lancaster. The event will start at 5:30 pm, until 7:30 pm. Set up time is approximately 1 hour before. We need members with telescopes!!! We have done 2 star parties for them before and had a big crowd! Contact me if you are able to help out!

Our last Prime Desert Moonwalk for the year is on Saturday, Nov. 17th at 5:30pm! We need members to come out to set up telescopes for the public to view before and after the walk.

And our last Acton Library Astronomy Lecture is scheduled for Wednesday, Nov. 28th at 6:30pm. Come on out and support Jeremy and enjoy an astronomy talk!

Our public outreach program cannot be a success unless you, the members, come out and help support the events!!! Please come out to support your club!!

Clear skies.

Movement in the Night Sky by Paul Derrick

During the course of a night heavenly bodies seem to move across the sky. They rise in the east, move slowly from east to west, and set in the west. Their apparent motion, of course, is actually due to the earth's west-to-east rotation.

One can demonstrate this visual effect. While standing and looking straight ahead cup your hands around your eyes. Now slowly turn around in a counterclockwise direction. The surrounding objects seem to move around you in a clockwise direction. They appear on your left, move across your "sky" from left to right, and then disappear on your right. (If you turn half way around, that's how much "sky" you see in one night.)

But it gets a bit more complicated. While the earth rotates once every 24 hours, the objects in the sky do actually move. Different objects move at different rates. Even the stars move but their movement is extremely gradual as viewed from Earth.

The movement of planets is more noticeable, especially those nearer the sun. The movement of most naked-eye planets against the background stars is easily noticeable from week to week and even night to night.

Disregarding transients like meteors and satellites, the fastest moving night object is the moon. It circles the earth once a month, moving from west to east. Its rapid motion relative to the stars is detectable from hour to hour. It moves one-half degree (one moon width) each hour against the background sky. From one night to the next, the moon moves eastwardly along the ecliptic about 13 degrees -- some call this a moon stride.

To approximate a moon stride, hold your hand out at arm's length. Make a University of Texas "hook 'em horns" sign by spreading your index and little fingers far apart. (This will be difficult for Texas Aggies and Baylor Bears, but it will be dark -- no one will see!) The distance between the tips of the two fingers is about 13 degrees or one moon stride. You can predict where the moon will be tomorrow night. Facing south and using your left hand, align your index finger with the moon. With your little finger aimed to the east, it will be where the moon will be the same time tomorrow night.

Space Place

A Cosmic Tease: Trials of the Herschel Space Telescope Science Teams

By Dr. Marc J. Kuchner

Vast fields of marble-sized chunks of ice and rock spun slowly in the darkness this week, and I sat in the back of a grey conference room with white plastic tables spread with papers and laptops. I was sitting in on a meeting of an international team of astronomers gathered to analyze data from the Herschel Infrared Observatory. This telescope, sometimes just called Herschel, orbits the Sun about a million miles from the Earth.

The meeting began with dinner at Karl's house. Karl charred chorizo on the backyard grill while the airplanes dribbled into Dulles airport. Our colleagues arrived, jetlagged and yawning, from Germany, Sweden, and Spain, and we sat on Karl's couches catching up on the latest gossip. The unemployment level in Spain is about twenty percent, so research funding there is hard to come by these days. That's not nice to hear. But it cheered us up to be with old friends.

The meeting commenced the next morning, as the vast fields of ice and rock continued to spin—shards glinting in the starlight. Or maybe they didn't. Maybe they didn't exist at all.

You see, this team is looking at a series of images of stars taken by a device called a bolometer that is blind to ordinary starlight. Instead, the bolometer inside Herschel senses infrared light, a kind of light that we would probably refer to as heat if we could feel it. But the idea of pointing the bolometer at the stars was not to collect ordinary starlight. It was to measure heat coming from the vicinity of these stars, like an infrared security camera, in case there was something else to be found lurking nearby.

And lo and behold, for a handful of stars, the bolometer measurements were off the charts! Maybe something was orbiting these stars. From the details of the bolometer readings—which channels lit up and so on—you would guess that this stuff took the form of majestic fields or rings of icy and rocky particles. It would be a new kind of disk, a discovery worth writing home to Madrid about.

There are several teams of astronomers analyzing data from the Herschel Space Telescope. They call themselves by oddly inappropriate sounding acronyms: GASPS, DUNES, DEBRIS. For the time being, the scientists on these teams are the only ones with access to the Herschel data. But in January, all the data these teams are working on will suddenly be released to the public. So they are all under pressure to finish their work by then. The team whose meeting I was sitting in on would like to publish a paper about the new disks by then.

But it's not so simple. The stars that this team had measured were relatively nearby as stars go, less than a few hundred light years. But the universe is big, and full of galaxies of all kinds—a sea of galaxies starting from maybe a hundred thousand light years away, and stretching on and on. Maybe one of those background galaxies was lined up with each of the stars that had lit up the bolometer—fooling us into thinking they were seeing disks around these stars.

The team argued and paced, and then broke for lunch. We marched to the cafeteria through the rain. Meanwhile, vast fields of marble-sized chunks of ice and rock spun slowly in the darkness. Or maybe they didn't.

What else did Herschel recently uncover? Find out at <http://spaceplace.nasa.gov/comet-ocean>.

Dr. Marc J. Kuchner is an astrophysicist at the Exoplanets and Stellar Astrophysics Laboratory at NASA's Goddard Space Flight Center. NASA's Astrophysics Division works on big questions about the origin and evolution of the universe, galaxies, and planetary systems. Explore more at <http://www.science.nasa.gov/astrophysics/>.

News Headlines

Strange Layer of Venus Surprisingly Cold

Venus may be closer to the sun than Earth, but its typically hellish atmosphere has a surprisingly cold layer that's chillier than any part of our own planet's atmosphere, a new study reveals. This region may be cool enough for carbon dioxide snow or ice to form, according to new observations from Europe's Venus Express satellite. This is surprising for a planet with normally oven-hot temperatures, scientists sa

<http://www.space.com/17850-venus-atmosphere-cold-layer.html>

NASA Mars Curiosity Rover: First Scoopful A Success

On the mission's 61st Martian day, or sol (Oct. 7, 2012), NASA's Mars rover Curiosity used its soil scoop for the first time, collecting a scoopful of sand and powdery material at the "Rocknest" site. Imaging verified collection of the sample.

<http://www.spaceref.com/news/viewsr.html?pid=42274>

Speed of Universe's Expansion Measured Better Than Ever

The universe just got a new speeding ticket. The most precise measurement ever made of the speed of the universe's expansion is in, thanks to NASA's Spitzer Space Telescope, and it's a doozy. Space itself is pulling apart at the seams, expanding at a rate of 74.3 plus or minus 2.1 kilometers (46.2 plus or minus 1.3 miles) per second per megaparsec (a megaparsec is roughly 3 million light-years).

<http://www.space.com/17884-universe-expansion-speed-hubble-constant.html>

Dark Matter Filament Studied in 3D for the First Time

Astronomers using the NASA/ESA Hubble Space Telescope have studied a giant filament of dark matter in 3D for the first time. Extending 60 million light-years from one of the most massive galaxy clusters known, the filament is part of the cosmic web that constitutes the large-scale structure of the Universe, and is a leftover of the very first moments after the Big Bang. If the high mass measured for the filament is representative of the rest of the Universe, then these structures may contain more than half of all the mass in the Universe.

<http://www.spacetelescope.org/news/heic1215/>

New Study Brings a Doubtful Exoplanet 'Back from the Dead'

A second look at data from NASA's Hubble Space Telescope is reanimating the claim that the nearby star Fomalhaut hosts a massive exoplanet. The study suggests that the planet, named Fomalhaut b, is a rare and possibly unique object that is completely shrouded by dust. Fomalhaut is the brightest star in the constellation Piscis Austrinus and lies 25 light-years away.

http://www.nasa.gov/mission_pages/hubble/science/fomalhaut-exo.html

First planet found in star system next door

Meeting the neighbours is normally easier than this. After years of searching, astronomers have finally spotted an Earth-mass planet in Alpha Centauri, the nearest star system to our own. Although the planet orbits too close to its parent star to host life, its discovery ups the chance of the system also hosting hospitable worlds.

<http://www.newscientist.com/article/dn22388-first-planet-found-in-star-system-next-door.html>

November Sky Data

Last Qtr Nov 6 New Nov 13 First Qtr Nov 20 Full Nov 28



**Best time for deep sky observing this month:
November 6 through November 17**

Mercury is at inferior conjunction (almost directly in front of the Sun) on November 17th. But towards the end of the month it will be emerging into the pre-dawn sky, and we may manage to catch a glimpse of this elusive little planet. The best period will be between November 28th and December 10th.

Venus is rising in the early hours of the morning, and by dawn the brilliant “Morning Star” is well up in the south-eastern sky. It outshines every other star-like object in the sky – even the giant planet Jupiter, on the opposite side of the sky. Relative to the stars, Venus is moving rapidly south-eastwards across Virgo.

Mars is still very low in the western sky at dusk; throughout November the “Red Planet” continues to set just as the sky is growing dark. It’s not very bright, and it won’t be easy to see.

The giant planet **Jupiter** is rising in the north-east soon after sunset. It can be seen all through the night, and it’s still high in the south-western sky at dawn. Only the brilliant planet Venus, on the opposite side of the sky at dawn, outshines Jupiter. Relative to the stars, Jupiter is moving very slowly westwards in Taurus, gradually getting closer to Aldebaran.

Saturn was in superior conjunction (almost directly behind the Sun) on October 25th. But it will be emerging into the dawn sky towards the end of November. We can use the much brighter planet Venus to help in locating it. For most of the month, Saturn is to the lower left of Venus

The Leonid **meteor shower** is generally active between November 15th and 20th; this year it will probably peak early on Friday November 18th. We won’t see many Leonid meteors until after midnight. Leonid meteors tend to be fast-moving, and the brighter ones often leave persistent trains. Around the peak we might hope to see one Leonid every five minutes or so. This year there will be no interference from moonlight.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
11/1/2012	20:03	09:44	07:13	17:57
11/5/2012	22:35	11:38	06:16	16:53
11/10/2012	02:39	14:32	06:21	16:49
11/15/2012	08:24	18:46	06:25	16:46
11/20/2012	12:15	-----	06:30	16:43
11/25/2012	14:57	03:57	06:35	16:41
11/30/2012	18:39	08:15	06:40	16:40

Planet Data

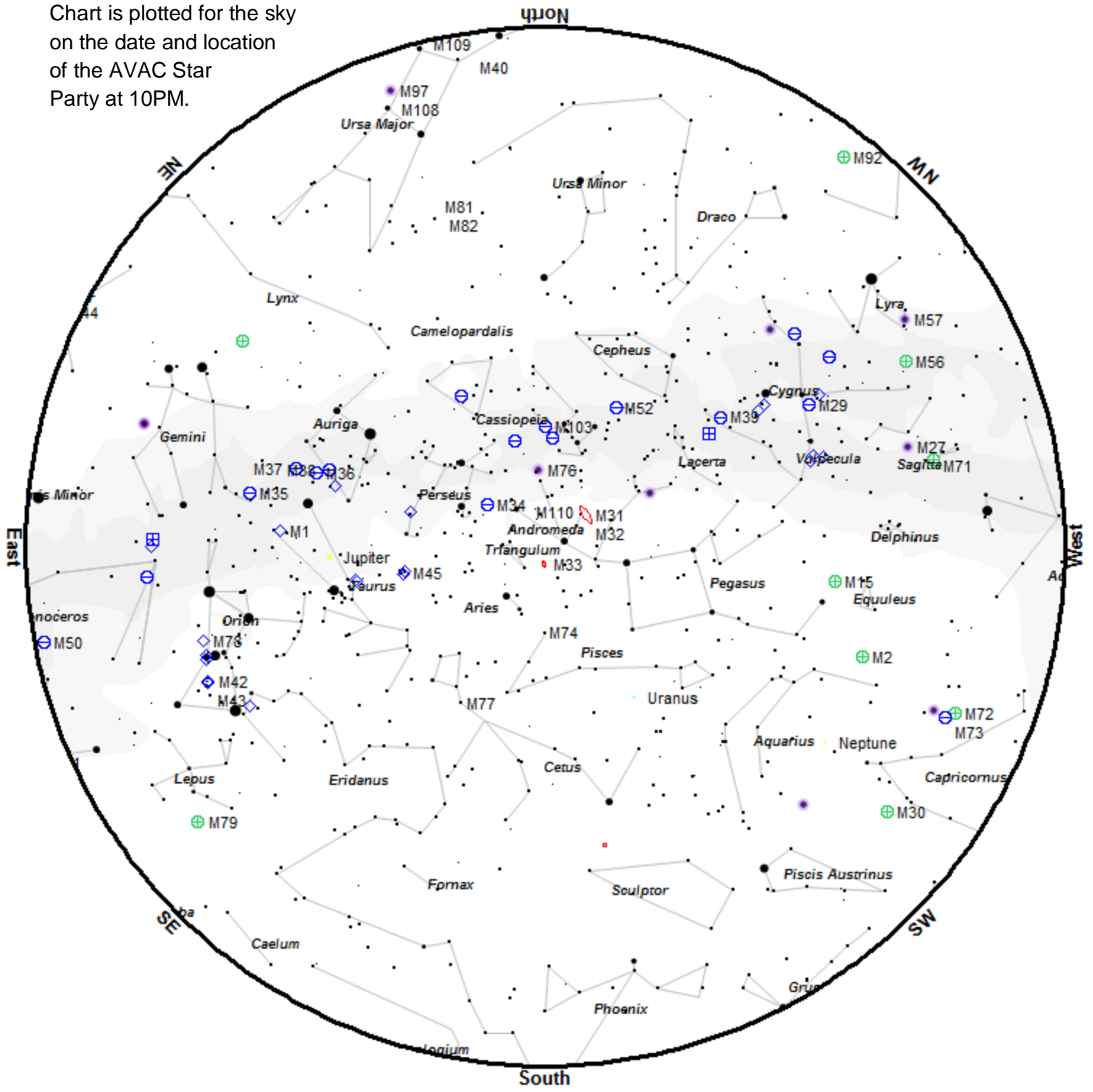
	Nov 1			
	Rise	Transit	Set	Mag
Mercury	09:06	14:05	19:03	0.1
Venus	04:22	10:27	16:33	-4.0
Mars	10:18	15:15	20:12	1.2
Jupiter	19:47	02:58	10:10	-2.8
Saturn	06:32	12:13	17:50	0.6

	Nov 15			
	Rise	Transit	Set	Mag
Mercury	06:35	11:44	17:02	5.1
Venus	03:49	09:36	15:23	-4.0
Mars	09:10	14:06	19:01	1.2
Jupiter	17:46	00:57	08:08	-2.8
Saturn	04:45	10:20	16:00	0.6

	Nov 30			
	Rise	Transit	Set	Mag
Mercury	04:56	10:20	15:46	-0.3
Venus	04:19	09:48	15:16	-4.0
Mars	09:00	13:57	18:53	1.2
Jupiter	16:39	23:49	06:59	-2.8
Saturn	03:54	09:28	15:06	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.



Star Magnitudes	Galaxy	Nebula
● ● ● ● ●	⊕ Open Cluster	◇ Bright 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 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	17:45	18:16	20:43	obvious
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	17:53	18:17	20:19	easy
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	17:58	18:18	19:50	detectable
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	17:55	18:18	20:40	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	17:54	18:19	20:50	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	17:46	18:19	20:16	obvious
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	17:53	18:20	21:43	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	17:53	18:20	21:34	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	17:55	18:20	21:12	easy
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	17:55	18:26	21:38	detectable
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	17:56	18:26	21:15	detectable
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	17:52	18:27	23:11	easy
IC 1396	Neb		Cep	21h39m06.0s	+57°30'00"	17:52	18:29	23:43	challenging
Cocoon	Neb	10.0	Cyg	21h53m24.0s	+47°16'00"	17:52	18:32	23:26	challenging
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	17:49	18:33	00:25	obvious
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	17:56	18:46	22:56	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	17:59	19:54	00:02	detectable
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	18:01	20:27	00:16	difficult
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	17:51	20:28	02:27	easy
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	18:01	21:09	00:57	detectable
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	17:56	21:12	01:46	easy
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	17:56	21:12	01:50	easy
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	17:54	21:49	03:39	easy
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	17:54	21:59	04:04	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	17:52	22:02	03:59	obvious
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	18:15	22:03	01:52	detectable
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	18:09	22:11	02:24	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	17:51	22:12	04:19	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	17:56	22:16	04:05	easy
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	20:05	22:26	00:50	challenging
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	17:53	22:48	04:36	obvious
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	17:54	22:51	04:39	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	18:01	23:02	04:29	easy
Heart Neb.	Neb	6.5	Cas	02h33m52.0s	+61°26'50"	20:36	23:03	01:29	challenging
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	20:05	23:11	02:18	detectable
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	18:46	23:11	03:37	detectable
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	18:39	23:12	03:43	detectable
NGC 1245	Open	7.7	Per	03h14m42.0s	+47°14'12"	21:27	23:43	02:01	challenging

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	19:45	00:00	04:15	detectable
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	19:39	00:16	04:52	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	18:42	00:18	05:19	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	18:36	00:37	05:23	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	19:32	00:44	05:12	easy
Hyades	Open	0.8	Tau	04h26m54.0s	+15°52'00"	20:41	00:55	05:04	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	21:52	01:14	04:34	detectable
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	20:21	01:20	05:14	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	22:02	01:33	04:56	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	21:47	01:57	05:11	detectable
M 1	Neb	8.4	Tau	05h34m30.0s	+22°01'00"	00:05	02:03	03:54	challenging
M 43	Neb	9.0	Ori	05h35m30.0s	-05°16'00"	22:53	02:04	05:10	challenging
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	22:54	02:04	05:12	easy
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	21:11	02:05	05:19	easy
M 78	Neb	8.0	Ori	05h46m48.0s	+00°05'00"	22:46	02:15	05:14	challenging
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	21:38	02:20	05:17	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	21:56	02:29	05:21	obvious
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	22:25	02:37	05:19	obvious
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	22:59	02:37	05:14	detectable
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	22:19	02:37	05:16	easy
NGC 2237	Neb	5.5	Mon	06h32m02.0s	+04°59'10"	23:16	03:00	05:16	challenging
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	23:08	03:09	05:17	easy
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	23:49	03:20	05:17	easy
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	00:33	03:31	05:15	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	00:55	03:42	05:19	easy
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	01:03	03:45	05:10	difficult
NGC 2360	Open	9.1	CMa	07h17m43.0s	-15°38'30"	02:20	03:45	04:58	challenging
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	01:48	03:47	05:14	detectable
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	01:37	03:47	05:16	easy
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	23:30	03:47	05:24	obvious
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	01:39	03:48	05:19	obvious
NGC 2506	Open	8.9	Mon	08h00m01.0s	-10°46'12"	02:28	04:29	05:09	challenging
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	01:01	04:45	05:18	easy
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	02:22	04:47	05:12	detectable
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	00:05	04:49	05:16	detectable
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	00:22	04:49	05:16	detectable
NGC 3227	Gal	11.5	Leo	10h23m30.6s	+19°51'54"	03:25	04:53	05:12	difficult
M 97	PNe	9.7	UMa	11h14m47.7s	+55°01'09"	02:43	04:53	05:15	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	03:35	04:55	05:13	detectable
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	03:43	04:56	05:13	detectable
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	03:41	04:56	05:13	detectable

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/

The Antelope Valley Astronomy Club, Inc. is a 501(c)(3) Non-Profit Corporation.

The A.V.A.C. is a Sustaining Member of The Astronomical League and the International Dark-Sky Association.

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