ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 31 *Antelope Valley Astronomy Club Newsletter* **July 2011**

Up-Coming Events

July 2: Trip to Mt. Wilson
July 8: Club Meeting*
July 11: Board meeting @ Don's house
July 12: Astronomy Lecture and Star Party @ Acton Library
July 16: Club Repair Day @ Two Goats Observatory
July 16: Prime Desert Woodland Moon Walk
July 22: Messier Club @ Two Goats Observatory
July 29: A Night to Explore @ Highland High School
July 30: Dark Sky Star Party @ Mt. Pinos

* 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

We have a new addition to the club's equipment stable – a 13" Truss-tube dob. We also have a club repair day coming up where we'll be offering the intermediate/advanced class which will qualify you to check out this level of gear!

The Club Repair Day will be Saturday, July 16th, 3pm, at Two Goats Observatory (my garage). We'll get together and clean some club mirrors and eyepieces – feel free to bring your own optics as well. For those interested in the classes, we'll cover setting up and using a GEM and an Alt/Az scope as well as collimating Cassegrain and Newtonian optics. I'll also have the 13" scope on hand in case anyone wants to check it out. You can bring it to the Prime Desert Moonwalk that night if you're eager to try it out. We'll also offer hotdogs, chips and drinks for repair day helpers.

Two weeks later we'll be back at Mt. Pinos for another great dark sky weekend. I love going to Mt. Pinos but I've often thought that we were short-changing some of the members who find the distance and elevation too much to endure for a one or two night star party (though I would recommend you give it a try at least once!). Also as your Astronomical League rep I've felt we don't do enough to support the AL clubs. Matt's Lunar Club is usually the only chance anyone has to work on AL certificates and pins and even then we tend to stray from the official observing list. What I would like to propose is a series of local Friday night star parties geared toward the beginner observer and those in the club interested in learning things like star hopping, telescope/eyepiece selection and just to offer an easy-to-attend fun evening of observing.

I would hope that I and other seasoned club members could host these local outings at their homes or other locally convenient spots and that each outing would have a theme. I propose the first of these be Friday, July 22nd at my house and the topic will be "Star Hopping the Messier List". Come out and learn how to use your star charts to locate those faint fuzzies or just enjoy the night skies of Leona Valley. Look for more events of these types such as lunar outings and globular, bino-messier and Caldwell list observing.

Vice President

Rose Moore

Many thanks to those members who came out to the Star Party at Amargosa Creek Middle School the beginning of the month! We had about 150 kids and then some teachers and adults. We sure could have used some more telescopes!!! The Sun did not go down till after 8:15 or so, then there was twilight, so the kids did not get much of a chance to see dark sky objects. However, the teachers would like to have us back maybe this fall for some dark sky observing. So I'll keep you posted! Many thanks to Don, Dale, Duane, Kevin, and Frank for their participation!

And many thanks to everyone who came out to the club 'Star-B-Que' at the Trotta's home in Acton. A good time was had by all, though we did not have any night time observing due to the weather! For those who donated items to the event for either the raffle or auction, I'll be sending out your donation letters soon. Many thanks to Steve and Kate Trotta and their family, for once again opening up their home to club members!

July 2nd is our trip to Mt. Wilson! Payment has been made. Some members have had to cancel, but we have had others who are going to fill in the empty slots. Have a wonderful trip everyone! Don Bryden will be contacting persons attending to make sure everyone knows where to meet. The information packets, consisting of a few handouts with information/map, have been given out, mailed or emailed, to everyone going. If you haven't received anything, hopefully you've contacted me or Don by now!

For our meeting on July 8th we will have Linda Morabito. Linda is an author, astronomer, and Professor of Astronomy at Victor Valley College in Victorville. She has worked for NASA and JPL, where she made the discovery of volcanic activity on Jupiter's moon, Io. I am waiting to hear back from Linda as to her topic for the evening.

The following events are coming up, so please check the AVAC calendar, or call one of the board members for more info:

July 12th, Tuesday, 7:30pm: Acton Library Astronomy Lecture and Observing with Jeremy, 'Cosmic Beginnings, Spectroscopy'; members with telescopes needed!

July 16th, Saturday, 8:30pm: Prime Desert Moonwalk with Jeremy; members with telescopes, or other astronomy items of interest needed!

July 29th, Friday, 7:30pm: 'A Night To Explore' at Highland High in Palmdale; we need members with telescopes, and other astronomy items (meteorites, astro videos, etc...) of interest to share with the students. Please sign up at next meeting or contact Rose!

We encourage members to check our AVAC calendar frequently, and if you need more info, please call one of the board members!

Also, remember that you may give a speaker donation to Virginia before the meeting, or at the break. Most of our speakers come from quite a distance, and take time from their schedule, to come and give a presentation!

Space Place

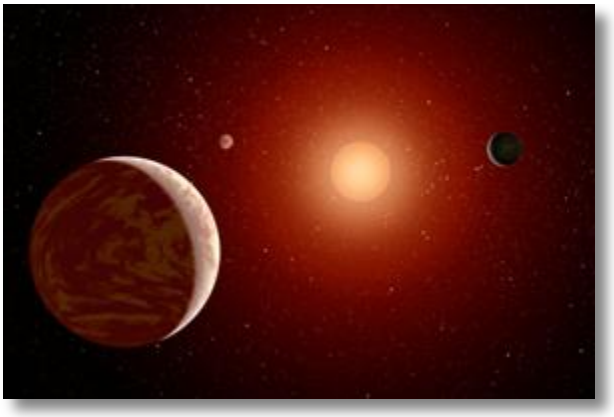
Finding Planets among the Stars by Dr. Tony Phillips

Strange but true: When it comes to finding new extra-solar planets, or exoplanets, stars can be an incredible nuisance.

It's a matter of luminosity. Stars are bright, but their planets are not. Indeed, when an astronomer peers across light years to find a distant Earth-like world, what he often finds instead is an annoying glare. The light of the star itself makes the star's dim planetary system nearly impossible to see.

Talk about frustration! How would you like to be an astronomer who's constantly vexed by stars?

Fortunately, there may be a solution. It comes from NASA's Galaxy Evolution Explorer, an ultraviolet space telescope orbiting Earth since 2003. In a new study, researchers say the Galaxy Evolution Explorer is able to pinpoint dim stars that might not badly outshine their own planets.



Exoplanets are easier to see directly when their star is a dim, red dwarf.

"We've discovered a new technique of using ultraviolet light to search for young, low-mass stars near the Earth," said David Rodriguez, a graduate student of astronomy at UCLA, and the study's lead author. "These M-class stars, also known as red dwarfs, make excellent targets for future direct imaging of exoplanets."

Young red dwarfs produce a telltale glow in the ultraviolet part of the electromagnetic spectrum that Galaxy Evolution Explorer can sense. Because dwarf stars are so numerous—as a class, they account for more than two-thirds of the stars in the galaxy—astronomers could reap a rich bounty of targets.

In many ways, these stars represent a best-case scenario for planet hunting. They are close and in clear lines-of-sight, which generally makes viewing easier. Their low mass means they are dimmer than heavier stars, so their light is less likely to mask the feeble light of a planet. And because they are young, their planets are freshly formed, and thus warmer and brighter than older planetary bodies.

Astronomers know of more than five hundred distant planets, but very few have actually been seen. Many exoplanets are detected indirectly by means of their "wobbles"—the gravitational tugs they exert on their central stars. Some are found when they transit the parent star, momentarily dimming the glare, but not dimming it enough to reveal the planet itself.

The new Galaxy Evolution Explorer technique might eventually lead to planets that can be seen directly. That would be good because, as Rodriguez points out, "seeing is believing."

And it just might make astronomers feel a little better about the stars.

The Galaxy Evolution Explorer Web site at http://www.galex.caltech.edu describes many of the other discoveries and accomplishments of this mission. And for kids, how do astronomers know how far away a star or galaxy is? Play "How Old do I Look" on The Space Place at http://spaceplace.nasa.gov/whats-older and find out!

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

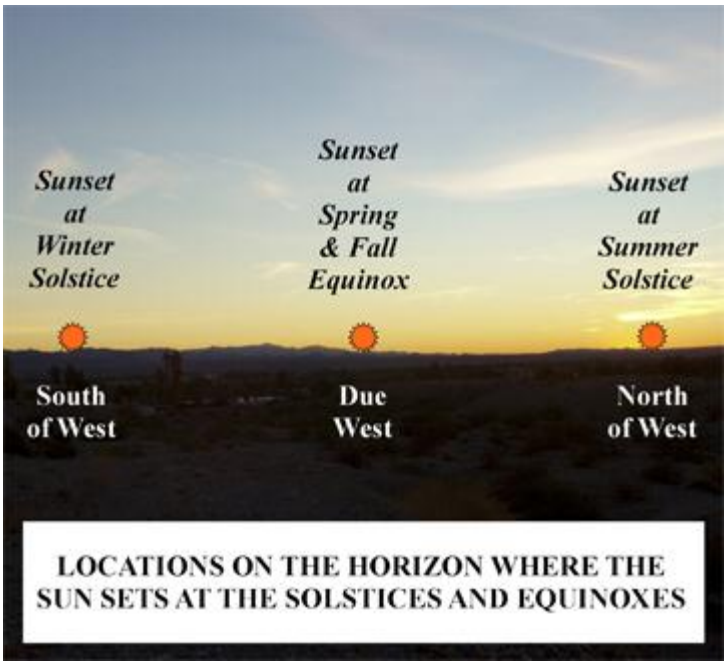
Summer Solstice - the Sun Goes North for the Summer by Paul Derrick

It's almost time for the June 21 summer solstice, (actually passed, but it's still a good article. Ed.) the beginning of the summer season and longest day of the year in the Northern Hemisphere.

Solstice, meaning "Sun stand still," occurs twice each year – at the summer and winter solstices – and was noted and named long ago by the ancients. Of course, the Sun doesn't really stop moving across our sky; the "stand still" refers to the locations on the horizon where the Sun rises and sets.

We are told that each day the Sun rises in the east and sets in the west due to the Earth's daily west-to-east rotation on its axis, and that's generally true. And it true not just for the Sun but for virtually all the natural sky objects, including the Moon, planets, and stars, which move in a broadly easterly-to-westerly direction across our sky, day and night. (About the only exceptions are rapidly moving meteors and circumpolar stars when they are lower than Polaris – a topic for another column.)

Back to the Sun. Actually, only at the fall and spring equinoxes does it rise exactly due east and set exactly due west. After the spring equinox the Sun then sets ever-so-slightly further north of west each evening, and rises ever-so-slightly further north of east each morning – and the days become slightly longer – until the summer solstice when it stops its northward movement.



It then seems to "stand still" for a few days – rise at the same location on the eastern horizon and set at the same location on the western horizon – before reversing direction and retracing its steps to again rise in the east and set in the west at the fall equinox. After the fall equinox it continues its southward movement, rising slightly further south of east and setting slightly further south of west – with the days growing shorter – until it reaches winter solstice. And the annual cycle continues.

How far north and south of due west the Sun sets (and rises in the east) at the solstice varies with latitude (expressed as degrees above the equator, or below the equator in the Southern Hemisphere). At the equator (latitude 0°), the Sun rises and sets 23½ degrees from due east and west at the solstices, owing to the Earth's 23½-degree tilt on its axis. The further from the equator, the greater the differences become. (For example, here in Waco, TX, at latitude 31.5° N, the solstice Sun sets 28 degrees north of due west, and in Fargo, ND, nearly 37 degrees north of west.)

Similarly, the lengths of days and nights throughout the year also vary by latitude. At the equator, days and nights are each 12 hours in length throughout the year, including at the solstices. But this changes as latitude increases.

At summer solstice, the year's longest day in Guatemala (15° N) lasts 13 hours while in Waco we have over 14 hours of summer daylight. In Denver (40° N) the day lasts 15 hours, and in southern Canada (50° N) there is over 16 hours of daylight – not leaving much time for stargazing.

Alaskans (60° N and beyond) have to do some of their summer sleeping absent darkness as the day lasts some 19 hours and more. And in the Arctic region – in "the land of the midnight Sun" – the Sun doesn't even set in the heart of summer. Having never been there, I can only imagine that would take some getting used to, as would the heart of winter when the Sun never rises.

All of this also applies in the Southern Hemisphere, only the dates differ – summer begins in December, fall in March, winter in June, and spring in September. Now that would really take some getting used – like, we'd have to quit dreaming of white Christmases.

Astrophoto of The Month

Ok, so they are not astro photos but they are photos of astro fun. Here are a few shots from the 'Star-B-Que' at the Trotta's home. These and other photos are available on the club web site.

News Headlines

Is the Sunspot Cycle About to Stop?
Among the 320 solar physicists who have gathered for a conference in Las Cruces, New Mexico, word is buzzing about a claim that the 11-year solar-activity cycle, which some of them have spent their lives studying, may be on the verge of a drastic change.
http://www.skyandtelescope.com/community/skyblog/newsblog/123844859.html

Astronomers Discover Giant Black Holes at Edge of Universe
Astronomers have been peering farther and farther into space, and back in time, using the world's most powerful telescopes to detect galaxies billions of light years away that existed when the universe was just a fraction of its current age. But detecting the giant black holes thought to lurk at the centers of those galaxies has proven much more difficult.
http://opac.yale.edu/news/article.aspx?id=8660

A Galactic Crash Investigation
A team of scientists has studied the galaxy cluster Abell 2744, nicknamed Pandora's Cluster. They have pieced together the cluster's complex and violent history using telescopes in space and on the ground, including ESO's Very Large Telescope and the Hubble Space Telescope. Abell 2744 seems to be the result of a simultaneous pile-up of at least four separate galaxy clusters and this complex collision has produced strange effects that have never been seen together before.
http://www.eso.org/public/news/eso1120/

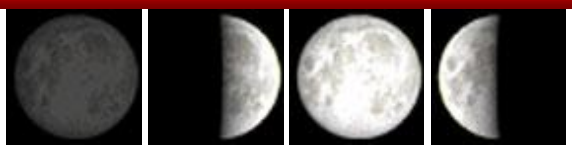
Black hole kills star and blasts 3.8 billion light year beam at Earth
Observations led by astronomers at the University of Warwick have shown that the flash from one of the biggest and brightest bangs yet recorded by astronomers comes from a massive black hole at the centre of a distant galaxy. The black hole appears to have ripped apart a star that wandered too close, creating a powerful beam of energy that crossed the 3.8 billion light years to Earth.
http://www2.warwick.ac.uk/newsandevents/pressreleases/black_hole_kills/

NASA Mission Suggests Sun and Planets Constructed Differently
Researchers analyzing samples returned by NASA's 2004 Genesis mission have discovered that our sun and its inner planets may have formed differently than previously thought. Data revealed differences between the sun and planets in oxygen and nitrogen, which are two of the most abundant elements in our solar system.
http://www.jpl.nasa.gov/news/news.cfm?release=2011-193

The Flames of Betelgeuse
Using the VISIR instrument on ESO's Very Large Telescope (VLT), astronomers have imaged a complex and bright nebula around the supergiant star Betelgeuse in greater detail than ever before. This structure, which resembles flames emanating from the star, is formed as the behemoth sheds its material into space.
http://www.eso.org/public/news/eso1121/

MESSENGER Data from Mercury Orbit Confirm Theories, Offer Surprises
After nearly three months in orbit about Mercury, MESSENGER's payload is providing a wealth of new information about the planet closest to the Sun, as well as a few surprises.
http://messenger.jhuapl.edu/news_room/details.php?id=174

July Sky Data



Best time for deep sky observing this month:
July 1 thru July 3 and July 25 thru July 31

Mercury is at its greatest distance east of the Sun on July 20th, so in theory it should be visible in the evenings, just after sunset. In practice, the planet will be so low above the horizon that we are very unlikely to see this elusive little planet in the glow of twilight.

Venus is rising less than an hour before sunrise, so the "Morning Star", brilliant though it is, will be virtually impossible to see.

At the start of July, **Mars** is rising in the north-east about 3:30 am. During the first week of July it passes above the bright star Aldebaran, but night by night it draws rapidly away to the left. Both objects should appear the same orange/red colour, but the "Red Planet" is currently on the far side of its orbit, and it appears somewhat dimmer than Aldebaran.

At the start of July, **Jupiter** rises about 1:40 am; by the end of the month it's coming up about midnight, and it's well up in the eastern sky by dawn. Relative to the stars, Jupiter is moving slowly north-eastwards in Aries, but it outshines all the night-time stars, and is easy to recognise. In the early morning of Sunday July 24th, our own waning Moon will appear close to the upper left of Jupiter.

Saturn is in the western sky at dusk. Relative to the stars, it is moving very slowly south-eastwards in the constellation of Virgo, gradually drawing away from the star γ (gamma) Virginis, and heading towards the brighter star Spica. Saturn looks much like Spica, but it shines with a steadier light. In the late evening of Thursday July 7th, our own Moon will appear directly below Saturn, about 8 degrees away.

There are various minor **meteor-showers** which are active in July, mainly with radiants in the Capricorn-Aquarius area. Towards the end of the month, we may also start to see the first of the Perseids, which peak in August.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
7/1/2011	10:32	23:06	05:49	20:14
7/5/2011	10:32	23:06	05:49	20:14
7/10/2011	16:09	01:35	05:52	20:12
7/15/2011	20:30	06:21	05:55	20:11
7/20/2011	22:59	11:13	05:58	20:08
7/25/2011	01:15	15:54	06:01	20:05
7/31/2011	07:10	20:31	06:06	20:00

Planet Data

Jul 1

	Rise	Transit	Set	Mag
Mercury	07:11	14:26	21:45	-0.4
Venus	04:44	12:06	19:29	-3.9
Mars	03:24	10:41	17:58	1.4
Jupiter	01:43	08:29	15:17	-2.3
Saturn	12:56	19:01	01:06	0.9

Jul 15

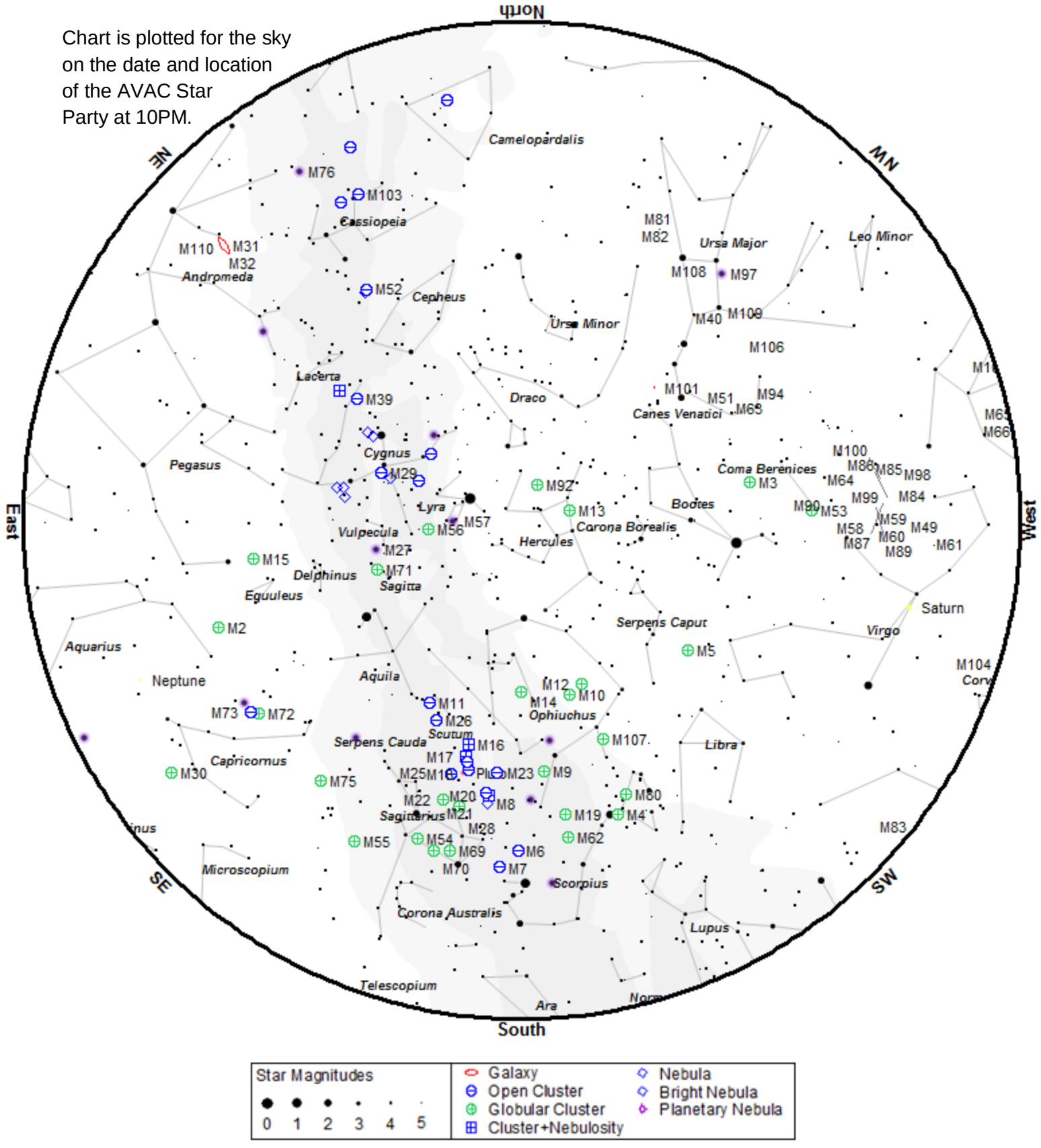
	Rise	Transit	Set	Mag
Mercury	07:57	14:51	21:45	0.3
Venus	05:05	12:26	19:48	-3.9
Mars	03:06	10:28	17:50	1.4
Jupiter	00:54	07:42	14:32	-2.4
Saturn	12:04	18:08	00:12	0.9

Jul 31

	Rise	Transit	Set	Mag
Mercury	07:51	14:27	21:01	1.3
Venus	05:36	12:46	19:58	-3.9
Mars	02:48	10:12	17:37	1.4
Jupiter	23:57	06:46	13:38	-2.5
Saturn	11:02	17:09	23:12	0.9

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		
0 1 2 3 4 5	Galaxy	Nebula
	Open Cluster	Bright Nebula
	Globular Cluster	Planetary Nebula
	Cluster+Nebulosity	

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 6167	Open	6.6	Nor	16h34m34.0s	-49°46'18"	21:05	21:23	22:09	easy
NGC 6193	Open	5.4	Ara	16h41m20.0s	-48°45'48"	21:06	21:26	22:14	easy
NGC 5986	Glob	7.6	Lup	15h46m03.0s	-37°47'12"	21:12	21:28	22:06	detectable
NGC 6178	Open	7.2	Sco	16h35m47.0s	-45°38'36"	21:05	21:28	22:31	easy
NGC 5897	Glob	8.4	Lib	15h17m24.0s	-21°00'36"	21:17	21:32	22:11	difficult
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	21:19	21:33	21:40	difficult
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	21:16	21:33	21:51	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	21:17	21:37	22:09	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	21:15	21:37	22:28	easy
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	21:13	21:37	22:51	easy
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	21:11	21:37	23:19	easy
M 80	Glob	7.3	Sco	16h17m02.0s	-22°58'30"	21:12	21:37	21:48	detectable
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	21:16	21:38	23:09	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	21:13	21:38	23:20	easy
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	21:17	21:40	23:32	detectable
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	21:11	21:42	23:41	detectable
M 19	Glob	6.8	Oph	17h02m38.0s	-26°16'06"	21:13	21:44	23:39	detectable
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	21:10	21:45	00:32	easy
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	21:09	21:46	01:48	easy
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	21:13	21:45	00:26	detectable
NGC 6322	Open	6.5	Sco	17h18m25.0s	-42°56'00"	21:05	21:46	23:37	easy
M 9	Glob	7.8	Oph	17h19m12.0s	-18°31'00"	21:14	21:51	23:38	detectable
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	21:10	21:54	02:32	easy
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	21:08	22:00	00:25	easy
NGC 6388	Glob	6.8	Sco	17h36m17.0s	-44°44'06"	21:14	22:00	23:12	detectable
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	21:13	22:03	01:06	detectable
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	21:07	22:04	00:43	easy
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	21:13	22:10	01:17	detectable
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	21:11	22:18	00:28	easy
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	21:12	22:21	00:12	detectable
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	21:01	22:22	04:38	obvious
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	21:19	22:26	23:34	easy
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	21:47	22:27	23:08	easy
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	21:14	22:28	23:42	detectable
NGC 6541	Glob	6.3	CrA	18h08m02.0s	-43°42'54"	21:21	22:32	23:48	detectable
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	20:55	22:35	02:27	obvious
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	21:06	22:43	01:10	obvious
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	21:07	22:44	00:50	easy

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
M 17	Open	7.3	Sgr	18h20m47.0s	-16°10'18"	21:19	22:44	00:56	detectable
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	22:23	22:48	23:13	detectable
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	21:08	22:50	02:40	easy
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	21:14	22:55	00:46	detectable
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	22:08	22:59	23:51	detectable
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	21:12	23:02	02:37	easy
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	21:21	23:07	01:06	detectable
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	21:13	23:14	02:19	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	21:08	23:17	04:12	easy
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	21:34	23:18	01:02	detectable
M 54	Glob	7.7	Sgr	18h55m03.0s	-30°28'42"	21:34	23:18	01:06	detectable
NGC 6723	Glob	6.8	Sgr	18h59m33.0s	-36°37'54"	21:39	23:23	01:09	detectable
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	21:16	23:39	03:21	detectable
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	21:59	00:03	02:08	detectable
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	21:42	00:07	02:32	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	21:14	00:17	04:27	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	21:14	00:23	04:35	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	21:14	00:28	04:44	easy
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	21:14	00:46	04:49	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	21:16	00:47	04:48	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	22:45	01:27	04:09	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	22:05	01:53	04:52	easy
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	21:18	01:54	04:55	easy
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	22:35	01:57	04:48	detectable
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	00:57	02:03	03:08	detectable
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	21:11	02:16	05:00	obvious
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	22:13	02:38	04:50	detectable
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	01:18	02:52	04:27	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	23:21	03:47	04:49	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	22:20	04:08	05:00	obvious
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	00:15	04:09	04:49	detectable
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	00:58	04:20	04:53	detectable
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	00:16	04:20	04:57	easy
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	23:46	04:21	04:57	easy
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	23:50	04:21	04:58	obvious
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	00:12	04:21	04:57	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	23:58	04:21	05:00	obvious
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	23:58	04:22	05:00	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	00:08	04:22	04:55	easy
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	01:22	04:23	04:52	detectable
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	00:53	04:24	04:59	obvious
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	01:44	04:24	04:50	detectable
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	00:55	04:24	04:59	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	01:05	04:25	04:56	easy
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	03:15	04:26	04:45	challenging

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	01:45	04:26	04:55	detectable
NGC 55	Gal	8.5	Scl	00h15m08.4s	-39°13'13"	03:20	04:26	04:51	difficult
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	02:28	04:27	05:01	obvious
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	02:00	04:27	04:54	easy
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	02:33	04:28	04:59	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	03:03	04:28	04:54	easy
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	02:48	04:29	04:52	easy
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	02:41	04:28	04:56	detectable
NGC 288	Glob	8.1	Scl	00h52m45.0s	-26°35'00"	03:26	04:29	04:49	difficult
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	03:55	04:30	04:53	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	03:32	04:31	04:56	obvious
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	03:35	04:32	04:54	detectable
Hyades	Open	0.8	Tau	04h26m54.0s	+15°52'00"	04:33	04:34	04:54	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.

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