Desert Sky Observer

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

Up-Coming Events

September	**9:**	Club Meeting*
September	**10:**	Prime Desert Woodland Moon Walk @ Prime Desert Woodlands
September	**12:**	Board meeting @ Don's house
September	**17-18:**	Pacific Astronomy & Telescope Show @ Pasadena Convention Center
September	**24:**	Dark Sky Star Party @ Mt. Pinos
September	**28:**	Acton Library Astronomy Lecture and Star Party @ 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

What a turnout! If you missed Brite Lake, you missed a great star party. I think it may be the future home of our club picnic. It was no farther than driving to Saddleback Butte and closer than Mt. Pinos. Plus all the children loved the playground and swing set – especially Shane! Just before dusk we fired up the grills and everyone pitched in for a delicious potluck of brats, burgers and dogs with potato salad, beans, chips and all the fixings. A box of half-eaten frozen, bite-sized éclairs became the running joke, showing up on one observer's work table to the next. By the next morning they ended up on Frank's car. He said he tried to get Rose to stash them back in my RV but she just shook her head and finally they were tossed away.

The clouds that threatened earlier never materialized and the night was marked by clear and steady skies. We were treated to views of a comet (C/2001 p1 Garrard – look for it near Brocchi's cluster (the coathanger) as it continues to brighten) as well as a supernova in M101. Matt's view of the Swan Nebula through his OIII filter was stunning and Frank's views of Jupiter were equally impressive.

We were joined by the legendary Keith Lawson who was currently sporting a 12" Orion goto dob. Additionally there were many other folks, some who just heard about the star party locally, others who stumbled upon us and of course the members of the Tehachapi Yahoo Astronomer's newsgroup (now run by our own Frank Moore). It seemed that star hopping and Messier lists were the order of the day. Ellen was thrilled to bits using Sophie's 6" dob and finding all sorts of goodies in Scorpius and Sagittarius. Rose continued her Messier club hunt while Kris joined the fray with a club 8" Discovery dob which she used to bag Messier objects until the wee hours. Toward the end, after Rose had called it a night, I offered Kris the use of the club 13" Coulter truss scope which she took me up on. Frank loaned her a 100º Explore Scientific eyepiece to heighten the experience. She's described herself as being completely spoiled – I don't think the 8" Discovery is going to do it for her anymore…

Still she did a great job with the 8" scope including locating a very dim and diffuse M101 that was hard to detect in my or even Matt's scope. We'll definitely be back to Brite Lake – and yes, Ann, as evidenced by this DSO article, Robert and I survived the trip home on my bad tire! Speaking of Robert, he definitely

wins the Doug Drake Award for worst luck at the star party. He called the day before we left and told me he'd be bringing his nice new and shiny Meade 10" Lightbridge. After some time I wandered by his set up to check it out. We started to collimate it when he noticed the secondary was off a bit. After aligning that we took to aligning the primary but something was very wrong. The return of the laser was not even close and try as we might, it would not center up. Backing up a few steps, I got out my sight tube and slid it in the focuser and… the horror! It appeared that the focuser was way out of square or the secondary was completely mis-aligned! It was barely in view and even after removing the sight tube and looking directly through the focuser you could see that the secondary was way too low!

It made no sense until Robert realized that the spider vanes were almost totally disconnected from the secondary holder. It's as if someone had pushed down on the diagonal from the front of the scope and bent the crap out of it!

Well one good outcome (I hope): Robert is going to return the 10" and upgrade to the 12" Lightbridge! Hopefully it will arrive unscathed…

Vice President

Rose Moore

Many thanks to those members who have come out to support the last few events, our Prime Desert Moon Walks and also the Lockheed Martin event at Highland High, 'A Night to Explore'!

If this DSO arrives to you before the end of the month, we do have an event at the Acton Library on Tuesday, August 30th: the Acton Library Astronomy Lecture and Star Party. Any members who are able to attend with telescopes, it would be appreciated! Come on out to hear Jeremy's lecture on 'Stellar Formations'.

Coming up for our September meeting on September 9th, Dr. David Lynch returns to give us a presentation on 'Color and Light'. He will cover auroras, rainbows, blue skies and others, and give tips on how to photograph them. Please remember if you would like to give a donation for the speaker, that you may give the donation before the meeting or during the first break.

Saturday, September 10th at 7:30pm is a Prime Desert Moon Walk with Jeremy. It will be almost a Full Moon. Please come on out and bring your telescope, binoculars, or other astronomy items of interest to show the public. Our August crowd was almost 200 people!

The weekend of September 17 and 18th is PATS, the Pacific Astronomy and Telescope Show in Pasadena. There will be presentations by Bill Nye, Richard Ellis, David Levy, John Dobson, and others. Also present will be many vendors who will be there to share information with you, as well as having items for sale. We can use your help to man our booth for a few hours, give out handouts and talk to the public. The event runs from 9am - 5pm on Saturday, and 9am - 3pm on Sunday. Tickets are $20 for the day, unless you have purchased the pre sale tickets from Don or Virginia.

Wednesday, September 28th at 6:30pm will be the Acton Library Astronomy Lecture and Star Party. Jeremy will be presenting 'The Solar System, Terrestrial and Jovian Planets'. Please note that the fall schedule lectures are on Wednesday and start at 6:30pm.

October brings the Annual Club Business meeting. Come on out to nominate and vote for members you want to be on the Executive Board for 2012!

Space Place

Solar System Size Surprise

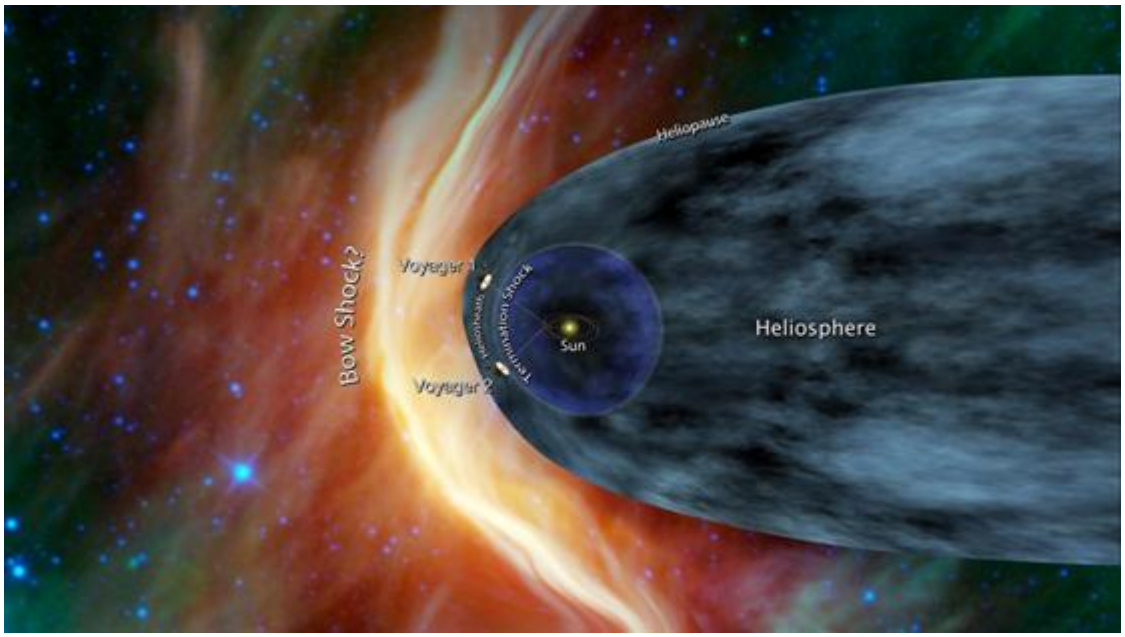
by Dr. Tony Phillips

News flash: You may be closer to interstellar space than you previously thought.

A team of researchers led by Tom Krimigis of the Johns Hopkins University Applied Physics Laboratory announced the finding in the June 2011 issue of Nature. The complicated title of their article, "Zero outward flow velocity for plasma in a heliosheath transition layer," belies a simple conclusion: The solar system appears to be a billion or more kilometers smaller than earlier estimates.

The recalculation is prompted by data from NASA's Voyager 1 probe, now 18 billion kilometers from Earth. Voyagers 1 and 2 were designed and built and are managed by NASA's Jet Propulsion Laboratory. Aging but active, the spacecraft have been traveling toward the stars since 1977 on a heroic mission to leave the solar system and find out what lies beyond.

To accomplish their task, the Voyagers must penetrate the outer walls of the heliosphere, a great bubble of plasma and magnetism blown in space by the solar wind. The heliosphere is so big, it contains all the planets, comets, and asteroids that orbit the sun. Indeed many astronomers hold that the heliosphere defines the boundaries of the solar system. Inside it is "home." Outside lies the Milky Way. For 30+ years, the spacecraft have been hurtling toward the transition zone. Voyager 1 is closing in.



This artist's concept shows NASA's two Voyager spacecraft exploring a turbulent region of space known as the heliosheath, the outer shell of the bubble of charged particles around our sun. Image credit: NASA/JPL-Caltech.

Much of Voyager 1's long journey has been uneventful. Last year, however, things began to change. In June 2010, Voyager 1 beamed back a startling number: zero. That's the outward velocity of the solar wind where the probe is now.

"This is the first sign that the frontier is upon us," says Krimigis.

Previously, researchers thought the crossing was still years and billions of kilometers away, but a new analysis gave them second thoughts. Krimigis and colleagues combined Voyager data with previously unpublished measurements from the Cassini spacecraft. Cassini, on a mission to study Saturn, is nowhere near the edge of the solar system, but one of its instruments can detect atoms streaming into our solar system from the outside. Comparing data from the two locations, the team concluded that the edge of the heliosphere lies somewhere between16 to 23 billion kilometers from the sun, with a best estimate of approximately 18 billion kilometers.

Because Voyager 1 is already nearly 18 billion kilometers out, it could cross into interstellar space at any time—maybe even as you are reading this article.

"How close are we?" wonders Ed Stone, Caltech professor and principal investigator of the Voyager project since the beginning. "We don't know, but Voyager 1 speeds outward a billion miles every three years, so we may not have long to wait."

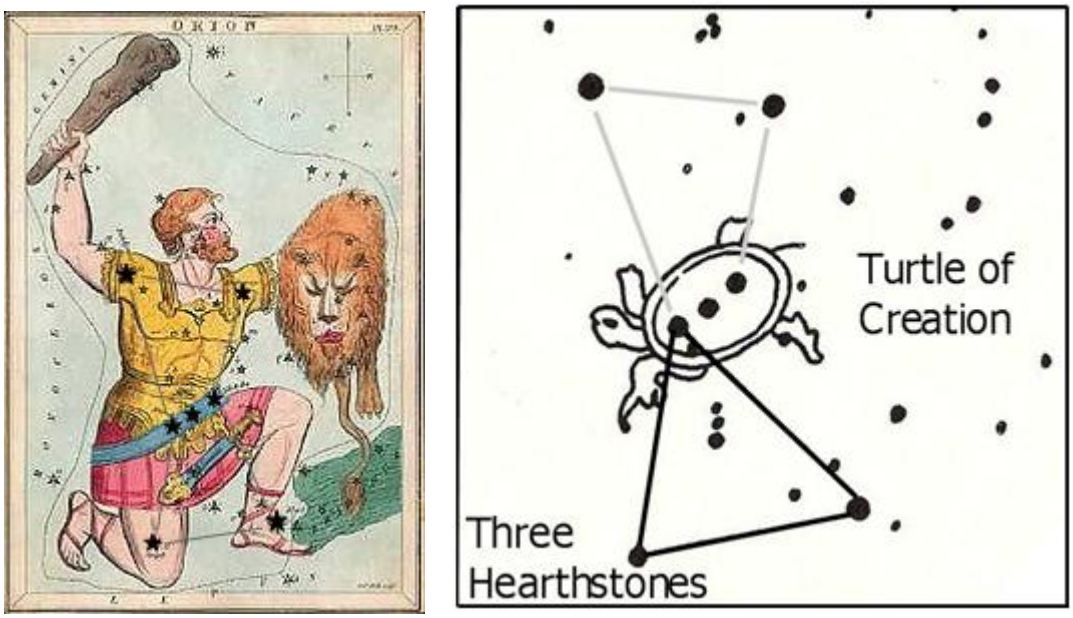
Stay tuned for the crossing.

For more about the missions of Voyager 1 and 2, see http://voyager.jpl.nasa.gov/.

Constellations by Paul Derrick

When we peer into the night sky we see stars, planets, the Moon, meteors and other beautiful heavenly bodies. And with a little imagination, we can also "see" a variety of animate and inanimate objects as constellations formed by imaginary lines between some of the brighter stars.

The practice of creating imaginary figures from the stars goes back unknown thousands of years, and has likely been done by many, if not most, peoples of the world. What was seen, of course, reflected the life and experiences of those whose imaginations made them up. Where the Greeks saw a hunter, the Maya saw a Maize God-bearing turtle and the hearthstones of creation. And for all we know, Africans might have seen a zebra, South Americans a snake, Asians a temple, or Australians a kangaroo.



Left image: Orion the Hunter as seen by the Greeks (illustration: Urania's Mirror, London, c. 1825).
Right diagram: In the same star field, the Maya saw the Three Hearthstones and Turtle of Creation (illustration: Maya Cosmos, David Freidel, Linda Schele & Joy Parker, 1993)

Since 1930, the International Astronomical Union has recognized 88 official constellations, 48 of which come from antiquity. Some likely came from the Sumerians who might have handed them down to the Babylonians, who, in turn, bequeathed them to the Greeks., and eventually to us. And who knows what sky lore and knowledge the Sumerians might have inherited from their ancestors. Since these civilizations lived in the Northern Hemisphere, the constellations they invented were only in the parts of the night sky they could see.

The remainder of today's constellations, mostly those seen from deep within the Southern Hemisphere, were created by Europeans when they began exploring previously unknown (to them) parts of the world. When they saw new stars, they invented European-oriented constellations, like a telescope, microscope, compass, and clock.

How I wish they had been less ethnocentric and inquired of the indigenous populations they encountered what they saw in the sky. Our knowledge of this aspect of other ancient cultures, including Native Americans, is quite limited. Imagine how much richer our night sky lore and imagery would be if we also knew how others from around the world had seen the night sky.

Even so, no one with any imagination should find the night sky boring as it is filled with people, animals, mythical creatures, and inanimate objects. Among the people are Andromeda the Princess, Aquarius the Water Carrier, Auriga the Charioteer, Bootes the Herdsman, Cassiopeia the Queen, Cepheus the King, Gemini the Twins (Pollux and Castor), Hercules the Strongman, Indus the American Indian, Ophiuchus the Serpent Bearer, Orion the Hunter, Perseus the Hero, and Virgo the Virgin.

Non-human animals include many kinds of birds, several dogs and fish, three snakes, two lions, two bears, a ram, giraffe, crab, chameleon, dolphin, lizard, rabbit, wolf, lynx, scorpion, bull, colt, fox, and even a fly. Mythical critters include two centaurs, a dragon, seagoat, unicorn, sea monster, and a flying horse.

The plethora of inanimate objects could make for the mother of all garage sales. They include an air pump, alter, engraving tool, drawing compasses, two crowns, cup, cross, furnace, clock, scales, musical lyre, microscope, carpenter's square, octant, painter's easel, mariner's compass, reticle, arrow, sculptor's tool, shield, sextant, telescope, and two triangles. And if that's not enough, there's the long beautiful hair of Queen Berenices, several parts of the great ship Argo on which Jason and the Argonauts had their adventures, and a river and a mountain.

With that much company, how could anyone ever be lonesome or bored under the night sky. But if that's not enough, I encourage you to create your own constellations. Surely you can be just as creative as the Greeks, Babylonians, Sumerians, and others of yesteryear.

News Headlines

Herschel Telescope Detects Oxygen Molecules in Space
The Herschel Space Observatory's large telescope and infrared detectors have provided the first confirmed finding of oxygen molecules in space. The molecules were discovered in the Orion star-forming complex. Individual atoms of oxygen are common in space, particularly around massive stars. But molecular oxygen, which makes up about 20 percent of the air we breathe, has eluded astronomers until now.
http://www.nasa.gov/mission_pages/herschel/news/herschel20110801.html

Progress 44 accident and its consequences for Space Station
The six astronauts on the International Space Station are safe and continuing their normal work after the loss of their space-bound cargo craft on 24 August. While the cause of the accident is being sought by a Russian commission, the Station partners are preparing for several scenarios to ensure the safety of the crew and the orbital outpost.
http://www.esa.int/esaCP/SEM6GJUTTRG_index_0.html

'Big splat' may explain moon's mountainous far side
The mountainous region on the far side of the moon, known as the lunar farside highlands, may be the solid remains of a collision with a smaller companion moon, according to a new study by planetary scientists at the University of California, Santa Cruz.
http://news.ucsc.edu/2011/08/big-splat.html

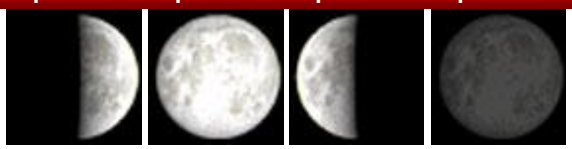
NASA's Chandra Finds Nearest Pair of Supermassive Black Holes
Astronomers using NASA's Chandra X-ray Observatory discovered the first pair of supermassive black holes in a spiral galaxy similar to the Milky Way. Approximately 160 million light years from Earth, the pair is the nearest known such phenomenon.
http://www.nasa.gov/mission_pages/chandra/news/H-11-278.html

Hubble to Target 'Hot Jupiters'
An international team of astronomers led by a former UA graduate student has set out on the largest program to date exploring the alien atmospheres of "Hot Jupiters" - massive planets in solar systems far away from our own. An international team of scientists has secured a large program of nearly 200 hours of observing time with NASA's Hubble Space Telescope to explore the atmospheric conditions of planets outside our solar system, known as exoplanets.
http://www.spaceref.com/news/viewpr.html?pid=34391

NASA Mars Rover Arrives at New Site on Martian Surface
After a journey of almost three years, NASA's Mars Exploration Rover Opportunity has reached the Red Planet's Endeavour crater to study rocks never seen before. On Aug. 9, the golf cart-sized rover relayed its arrival at a location named Spirit Point on the crater's rim.
http://marsrovers.jpl.nasa.gov/newsroom/pressreleases/20110810a.html

Exotic Galaxy Reveals Tantalizing Tale
A galaxy with a combination of characteristics never seen before is giving astronomers a tantalizing peek at processes they believe played key roles in the growth of galaxies and clusters of galaxies early in the history of the Universe.
http://www.nrao.edu/pr/2011/spiralradio/

September Sky Data



Best time for deep sky observing this month:
September 21 through September 30

Mercury is at its greatest elongation westwards of the Sun on September 3rd. So we will have a brief opportunity to see this elusive little planet in the dawn sky. The best period will be from September 5th to 9th, and the best time between 5 and 5:30 am.

Venus was at superior conjunction on August 16th. This month, the brilliant "Evening Star" will be settting only a few minutes after sunset.

Mars is rising in the north-east just after midnight, and it's well up in the east at dawn. Relative to the stars, it is moving steadily eastwards, leaving the constellation of Gemini on September 15th and crossing into Cancer. Around September 16th the two stars Castor and Pollux and the planet will form a straight line, with Mars at the bottom.

The giant planet **Jupiter** comes up in the east at dusk, and by dawn it's high in the southern sky. Relative to the stars, Jupiter is moving very slowly north-westwards in Aries. In the early morning of Friday September 16th, the Moon will appear close to the right of Jupiter.

Saturn sets less than an hour after sunset; we are unlikely to see the ringed planet this month, as it starts to hide behind the Sun. It will be in superior conjunction on October 13th.

There are no major **meteor-showers** in September, though there are various minor showers producing a few meteors an hour from radiants in Cassiopeia, Auriga, Aquarius and Pisces. But this is generally a good time of the year for seeing sporadic meteors, which may appear at any time, in any part of the sky.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
9/1/2011	10:35	21:28	06:24	19:18
9/5/2011	14:51	------	06:27	19:13
9/10/2011	18:02	04:57	06:30	19:05
9/15/2011	20:29	09:36	06:34	18:58
9/20/2011	------	14:04	06:38	18:51
9/25/2011	04:38	17:26	06:41	18:44
9/30/2011	10:37	20:57	06:45	18:37

Planet Data

Sep 1

	Rise	Transit	Set	Mag
Mercury	04:55	11:47	18:39	0.0
Venus	06:43	13:16	19:49	-3.9
Mars	02:16	09:37	16:59	1.4
Jupiter	21:55	04:45	11:35	-2.7
Saturn	09:10	15:14	21:13	0.9

Sep 15

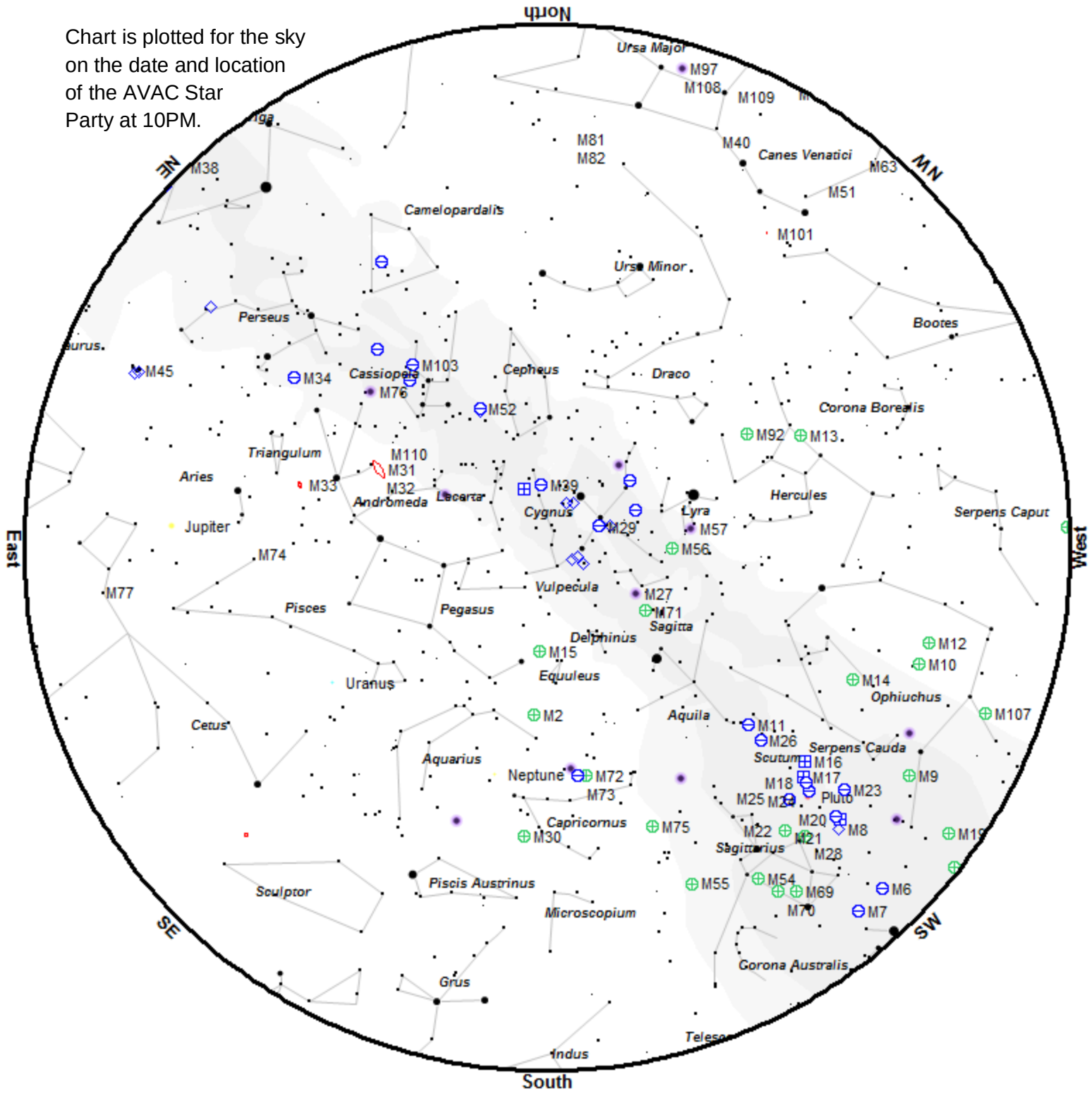
	Rise	Transit	Set	Mag
Mercury	05:39	12:13	18:50	-1.3
Venus	07:12	13:24	19:38	-3.9
Mars	02:03	09:19	16:36	1.4
Jupiter	20:59	03:48	10:37	-2.8
Saturn	08:23	14:24	20:22	0.8

Sep 31

	Rise	Transit	Set	Mag
Mercury	06:53	12:54	18:59	-1.5
Venus	07:42	13:33	19:26	-3.9
Mars	01:48	08:58	16:09	1.3
Jupiter	19:57	02:45	09:33	-2.9
Saturn	07:32	13:32	19:28	0.8

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 6541	Glob	6.3	CrA	18h08m02.0s	-43°42'54"	19:53	20:05	20:34	detectable
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	19:54	20:08	20:42	detectable
M 19	Glob	6.8	Oph	17h02m38.0s	-26°16'06"	19:55	20:09	20:44	detectable
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	19:49	20:09	21:21	easy
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	19:52	20:09	21:07	easy
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	19:52	20:10	21:09	easy
M 9	Glob	7.8	Oph	17h19m12.0s	-18°31'00"	19:57	20:12	20:59	detectable
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	19:59	20:13	20:29	detectable
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	19:54	20:13	20:54	easy
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	19:56	20:13	20:54	detectable
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	19:54	20:14	21:37	detectable
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	19:52	20:14	21:50	easy
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	19:52	20:13	21:56	easy
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	19:54	20:14	20:32	detectable
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	19:55	20:15	21:38	detectable
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	19:55	20:15	21:42	detectable
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	19:55	20:14	21:34	detectable
NGC 6723	Glob	6.8	Sgr	18h59m33.0s	-36°37'54"	19:53	20:15	21:34	detectable
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	19:50	20:15	21:09	easy
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	19:41	20:16	22:47	obvious
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	19:49	20:16	21:30	obvious
M 17	Open	7.3	Sgr	18h20m47.0s	-16°10'18"	19:58	20:16	21:17	detectable
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	19:54	20:16	21:56	detectable
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	19:56	20:16	21:56	detectable
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	19:53	20:17	22:27	easy
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	19:55	20:16	21:06	detectable
M 54	Glob	7.7	Sgr	18h55m03.0s	-30°28'42"	19:57	20:17	21:33	detectable
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	19:52	20:17	23:13	easy
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	19:51	20:18	23:00	easy
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	19:53	20:18	21:21	detectable
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	19:54	20:19	23:02	easy
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	19:43	20:20	00:57	obvious
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	19:54	20:20	22:39	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	19:48	20:21	00:31	easy
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	19:54	20:23	23:43	detectable
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	19:55	20:28	22:29	detectable
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	19:46	20:30	22:52	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	19:50	20:38	00:50	easy

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	19:51	20:43	01:01	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	19:50	20:49	01:26	easy
NGC 6388	Glob	6.8	Sco	17h36m17.0s	-44°44'06"	20:45	21:05	22:00	detectable
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	19:50	21:06	02:03	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	19:51	21:07	01:53	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	19:44	21:47	00:29	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	19:55	22:12	02:02	easy
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	19:51	22:14	03:38	easy
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	19:55	22:16	01:38	detectable
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	21:19	22:23	23:28	detectable
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	19:48	22:36	04:40	obvious
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	19:57	22:58	03:25	detectable
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	21:37	23:12	00:47	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	20:06	00:07	04:34	detectable
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	20:33	00:40	04:45	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	19:53	00:41	05:43	obvious
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	21:19	01:22	05:21	detectable
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	20:35	01:25	05:39	easy
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	20:34	01:25	05:39	easy
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	23:02	01:29	03:56	detectable
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	20:11	02:02	05:46	obvious
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	20:05	02:12	05:46	easy
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	22:13	02:16	05:37	detectable
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	20:18	02:16	05:48	obvious
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	21:55	02:24	05:40	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	20:17	02:26	05:49	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	20:29	02:28	05:44	easy
NGC 55	Gal	8.5	Scl	00h15m08.4s	-39°13'13"	01:29	02:47	04:05	difficult
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	21:11	03:01	05:49	obvious
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	21:15	03:04	05:48	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	21:26	03:16	05:45	easy
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	22:44	03:24	05:44	easy
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	00:07	03:24	05:42	detectable
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	22:33	03:25	05:41	detectable
NGC 288	Glob	8.1	Scl	00h52m45.0s	-26°35'00"	01:45	03:25	05:02	difficult
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	23:44	04:14	05:44	easy
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	01:52	04:29	05:13	challenging
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	23:52	04:29	05:50	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	22:53	04:31	05:51	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	22:48	04:45	05:52	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	23:29	04:45	05:46	easy
NGC 1245	Open	7.7	Per	03h14m42.0s	+47°14'12"	03:04	04:50	05:14	challenging
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	00:18	05:12	05:48	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	01:52	05:12	05:43	detectable
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	02:01	05:15	05:44	detectable

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	01:42	05:17	05:46	detectable
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	01:20	05:18	05:48	easy
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	01:38	05:19	05:48	easy
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	03:07	05:19	05:46	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	02:09	05:19	05:50	obvious
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	02:14	05:20	05:47	easy
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	02:47	05:20	05:43	detectable
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	02:38	05:20	05:49	obvious
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	04:09	05:21	05:43	easy
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	04:11	05:21	05:43	detectable
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	03:22	05:21	05:45	obvious
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	03:42	05:22	05:49	obvious
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	04:18	05:22	05:38	difficult
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	04:03	05:22	05:46	easy
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	04:56	05:23	05:41	easy
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	04:47	05:24	05:44	detectable
NGC 1851	Glob	7.1	Col	05h14m06.0s	-40°02'48"	04:23	05:24	05:42	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	05:09	05:25	05:47	easy
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	04:15	05:26	05:43	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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