ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 29 *Antelope Valley Astronomy Club Newsletter* **December 2009**

Up-Coming Events

December 12: Annual Christmas Party @ University of Antelope Valley, 44055 N. Sierra Hwy., Lancaster
December 14: Board meeting
December 19: Dark Sky Star Party @ Red Rock Canyon

* 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

It was a chilly night at Saddleback Butte. If you accidentally exhaled on your eyepiece it frosted right over. The charts and cases on the map table were covered in frost and we had to use Matt's propane heater to defrost Duane's corrector plate on his C9.

Still, the seeing was steady and with no wind the cold was bearable. I managed to stay out until midnight when I finally got my last Messier object for the Messier Club pin. M93, an easy cluster in Puppis, just east and below Canis Major but somehow I forgot to sketch it last winter. I thought I was all done this summer at Mt. Pinos but after going over my log book I had missed M93. In September when Mt Wilson was cancelled and we went back to Pinos I thought I'd be able to pick it up but just as Puppis was rising above the pines so to was the sun coming up in the East. So finally on November 22nd, just about a year after I started my log book, I got my last Messier object!

I did actually observe M93 back in March at the Poppy Reserve during the Messier Marathon but you can't count Messier Marathons toward your Messier pin. You should spend some time at the eyepiece observing the object not just check it off and move on. To accomplish this, I decided to sketch each object. As Frank pointed out, I've accumulated some of the worst eyepiece sketches known to astronomer-kind. Still it was very enjoyable and really gave a purpose to each star party or observing session. I've already begun my Herschel 400 list (no sketches, though).

If you've seen our links to the Astronomical League or the other observing clubs like Lunar, Planetary, Messier, Comet and others you may have wondered what the fuss was about. Well, come out to Red Rocks this month and you may see Karole finishing her Messier club, or Matt working on his second Herschel list or Darrell searching for another comet (or me not sketching some Herschel objects). You don't need much; just a notebook and a star chart so come on out and don't forget your long underwear or propane heater!

-Don

Vice President

Rose Moore

Our Christmas party, for current paid members, is scheduled for Saturday, Dec. 12th at 6pm. We will be having our silent auctions and raffles, and good food, so come on out!! It will be held at one of the banquet rooms of the University of Antelope Valley, previous site of the Antelope Valley Inn, on Sierra Highway. Please check out our website for directions. If you have signed up to attend, but have not paid, please contact Tom or I, or you may pay by the PayPal link on our site.

Please remember there is no club meeting this month.

This is the end of my term as your Vice President. Please welcome Doug Drake as your new Vice President! I'll be moving over to Karole's position as the Director of Community Development. Thanks to all of you who have helped me this year in the position of VP. I am so very proud to be a member of this club!

Our new Board and the club needs your support. Please attend our club meetings, and our community events and club functions. If you have suggestions for our club, please feel free to contact one of us. Don't be hesitant to speak up or help out! We need YOU!

Wishing all of you a very Happy Holidays and Happy New Year!! Be safe!

Clear skies,
Rose

Director of Community Development

Karole Barker

The turnout for Prime Desert Woodlands on 11/14/2009 was 140 people and 5 club members. The moon walks with Jeremy will not start again until March 2010.

Our 1/2 night at Mt. Wilson on Saturday September 19th was canceled due to the Station Fire, and we are decided to reschedule for 2010. We are now scheduled for Saturday, August 7th 2010 for next year at Mt. Wilson. No sign up until 2010 starts.

We had a great turn out for Super Science Saturday @ Joe Walker Middle School this year.

Shane & I would like to thank the Night Sky Network for inviting us up to San Francisco to assist on the new tool kit on Rocks and Ice that will be coming out next fall. We had a lot of fun doing all of the different activities they had planned for that day.

Clear skies,
Karole

Aerospace Committee Report Jeff Riechmann and Roswell (co-chairbeings)

Vandenberg Launch Schedule: As of 2009 November 21

Date	Launch Time/Window (PST/PDT)	Vehicle	Pad/Silo
DEC 9	06:10-06:23	Delta II	SLC-2W
Payload is the WISE infrared astronomy satellite. Launch occurs before sunrise and may provide a Twilight Effect			
JAN-MAR	To be announced	GBI	---
Missile defense Ground-based Interceptor. Delayed from SEP 27. Mission Name: FTG-06			
2010	Evening	Minotaur IV	SLC-8
First-ever Minotaur IV launch. Payload is the Space-Based Space Surveillance (SBSS) satellite. Delayed from OCT due to concerns with the launch vehicle			

Extraterrestrial Tidbits (ET) by Jeff Riechmann

Close Encounter of the Second Kind and the Jupiter Atmospheric Probe

Is there really any such thing as a UFO? The answer is it's all a matter of perspective!

One of my favorite books, The UFO Investigator's Handbook by Craig Glenday states that a close encounter of the second kind (CEII) occurs when "a UFO interacts with the environment and causes physical change, such as scorched earth, frightened or injured animals or humans, and increases in radiation.

Let's take a closer look at what could be classified as a close encounter of the second kind.

After traveling through space for almost five months, December 7 marks the fourteenth anniversary of the Galileo spacecraft deploying its Jupiter Atmospheric Probe into the giant planet's clouds to collect data as it fell to the Jovian surface. Constructed by the German Space Agency, the probe measured just over four feet in diameter and carried seven instruments powered by an onboard battery. Upon separation from the mother ship, the probe was protected for the first three minutes of the descent by a 334 pound heat shield as it entered into the atmosphere at a speed of 29 miles per second. As it descended, it slowed to just under the speed of sound (if there is such a thing on Jupiter) in just two minutes. Friction caused by the rapid descent ate away more than half of the mass of the heat shield. It was at this point that the probe deployed its parachute, a minute after its scheduled deployment, to slow its descent rate even further. This is also when the probe began transmitting information, which was relayed to earth by the Galileo spacecraft. The probe continued sending temperature and pressure information for 59 minutes until contact was lost.

Beginning December 1, 2009, you can join the millions around the world as they track the travels of another UFO! Follow Santa Claus's flight path at http://www.noradsanta.org.

Happy Holidays!

Space Place

A Cosmic Crash

by Patrick Barry and Dr. Tony Phillips

Two small planets hurtle toward each other at 22,000 miles per hour. They're on a collision course. With unimaginable force, they smash into each other in a flash of light, blasting streams of molten rock far out into space.

This cataclysmic scene has happened countless times in countless solar systems. In fact, scientists think that such collisions could have created Earth's moon, tilted Uranus on its side, set Venus spinning backward, and sheared the crust off Mercury.

But witnessing such a short-lived collision while pointing your telescope in just the right direction would be a tremendous stroke of luck. Well, astronomers using NASA's Spitzer space telescope recently got lucky.

"It's unusual to catch such a collision in the act, that's for sure," said Geoffrey Bryden, an astronomer specializing in extrasolar planet formation at NASA's Jet Propulsion Laboratory and a member of the science team that made the discovery.

Artist's rendering of cosmic collision involving two objects whose combined mass was at least twice that of our Moon. Discovered using the Spitzer Space Telescope in the planetary system of a star called HD 172555 100 light-years away.

When Bryden and his colleagues pointed Spitzer at a star 100 light-years away called HD 172555, they noticed something strange. Patterns in the spectrum of light coming from nearby the star showed distinctive signs of silicon monoxide gas — huge amounts of it — as well as a kind of volcanic rock called tektite.

It was like discovering the wreckage from a cosmic car crash. The silicon monoxide was produced as the high-speed collision literally vaporized huge volumes of rock, which is made largely of silicon and oxygen. The impact also blasted molten lava far out into space, where it later cooled to form chunks of tektite.

Based on the amount of silicon monoxide and tektites, Bryden's team calculated that the colliding planetary bodies must have had a combined mass more than twice that of Earth's moon. The collision probably happened between 1,000 and 100,000 years ago — a blink of an eye in cosmic terms.

The scientists used the Spitzer space telescope because, unlike normal telescopes, Spitzer detects light at invisible, infrared wavelengths.

"Spitzer wavelengths are the best wavelengths to identify types of rock," Bryden says. "You can pin down which type of rock, dust, or gas you're looking at."

Bryden says the discovery provides further evidence that planet-altering collisions are more common in other star systems than people once thought. The "crash-bang" processes at work in our own solar system may indeed be universal. If so, Spitzer has a front row seat on a truly smashing show

See Spitzer Space Telescope's brand new Web site at http://spitzer.caltech.edu/. Kids can learn about infrared light and see beautiful Spitzer images by playing the new Spitzer Concentration game at http://spaceplace.jpl.nasa.gov/en/kids/spitzer/concentration.

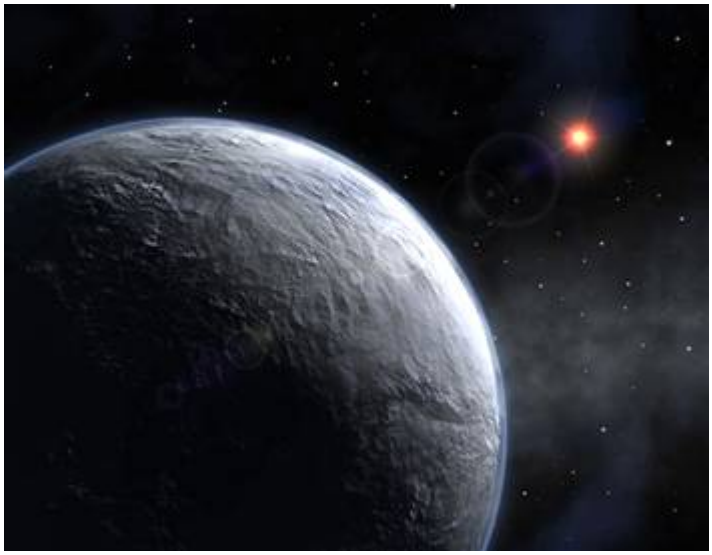
This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Discovering New Worlds by Tom Koonce

My Grandfather was born exactly 100 years ago. I remember him telling me that he and his friends used to watch in amazement as early automobiles passed horse-drawn carriages. He was always interested in technology, sometimes wondering if men would ever make it to the moon, and if they did, what creatures might live there, or even if there might be men that already lived there. You may have heard similar stories from your grandparents or great-grandparents from that era. In just 100 years our world has experienced tremendous change. The pace of the transformation is accelerating; a "Moore's Law" for information, innovation, and discoveries unimagined even a few decades before.

It wasn't that long ago when the universe was imagined to extend beyond our own Galaxy. The rough dimensions of the Milky Way have only been known since the 1920's from the initial work of Kapteyn and Shapely. For that matter, considering how long thinking, rational human beings have existed, the concept that the Earth revolves around the Sun and not the other way around is a relatively recent mental model for our species, only with us since Aristarchus of Samos (310 B.C. to c.a. 230 B.C.) proposed it approximately 17 centuries before Copernicus. In both of these cases, it is interesting that the general public at the time did not immediately react to the revolutionary ideas. These fundamental changes in our models of the universe raised interest in scholarly circles, but were seen as irrelevant information to the everyday lives of the common man and woman.

Mankind is in the midst of yet another fundamental change in its perception of the universe. Scientists and others interested in astronomy are understandably excited about the discovery of numerous worlds around other stars, but few others outside the astronomical community understand the implications of the discovery. The universe is populated with a great multitude of planets! The variety of these bodies appears to be unbounded. Their sizes and orbits have been unexpected and will one day lead to a definitive understanding of the process by which planetary systems are formed.



We have gone from science fantasy regarding the existence of other planets – Flash Gordon and Star Trek – to scientific fact. The existence of extra-solar planets was confirmed in the 1990's, and now we are stunned in 2009 by the sheer number of planets being detected. Within the past 100 years, we've discovered that there are likely planets around nearly every star. We can assume that this is representative of the rest of our galaxy and logically, the rest of the observable universe. The NASA planet-finding mission, the Kepler Mission, is on the verge of discovering how many Earth-like planets exist in a typical part of the sky. Isn't this exciting stuff?! We've progressed from horse-drawn carriages to discovering Earth-like words around distant stars - in only 100 years!

As we wrap up 2009, the International Year of Astronomy, amateur astronomers have gone out of their way to conduct public outreach events to get the general public involved in amateur astronomy and to get them to look through telescopes. Perhaps as we go forward into 2010, we can take it upon ourselves to share our sense of wonder and awe for the heavens, and to *make the time* to truly inspire young minds with the wondrous changing view of a universe filled with planets… and promise for future adventure. Let's inspire the next generation to challenge our understanding of the universe as we discover endless new worlds.

Credits: Early Automobile – Library of Congress; Exoplanet artwork – ESO

International Year of Astronomy

Discovering New Worlds

Watching the night sky as it appears to spin slowly overhead, it is no wonder that humans once thought they were the center of the universe. But when Galileo looked up through a telescope 400 years ago, our view of our place in the universe began to change dramatically. We discovered that the Earth is only one of eight planets orbiting the Sun. And that was only the beginning of the surprises.

The recent discovery of planets orbiting other stars, or exoplanets, has been changing the way we think of our Solar System and of planets in general. Scientists now estimate that there are probably billions of exoplanets in our Milky Way galaxy. They have discovered planetary systems that are very different from our own, including gas giant planets that orbit their star in a matter of days, not years like Jupiter or Saturn.

The discovery of other planetary systems has scientists wondering about the possibility of life on other planets. The field of astrobiology studies the possibility of life on other planets. Scientists look at some of the most extreme environments on Earth to find what conditions life on other planets might be able to tolerate. Use the activity included in this packet to find out where scientists plan to look for other planets that may harbor life.

The more we learn, the less significant and, at the same time, more extraordinary our home planet appears to be. Today we know our planet orbits a star in a vast galaxy full of billions of other stars – many with planets of their own orbiting them. Yet we have still not discovered life on any planet except our own, still do not know how common our type of planet might turn out to be, nor whether the life is rare or common in the universe.

NASA is studying planets around other stars with the PlanetQuest Exoplanet Exploration program. NASA scientists are specifically looking for terrestrial planets with the Kepler mission. Kepler will survey the Milky Way galaxy to look for these Earth-sized planets in or near the habitable zones of their stars, where liquid water and possibly life might exist. To see how researchers in astronomy and biology are working together, take a look at the NASA Astrobiology program. The James Webb Space Telescope will soon be able to peer into clouds of dust where stars are being born and watch as planets form in stellar nurseries.

Astrophoto of The Month

On December 24, 2007 an unknown astrophotograper captured this rare image of Santa crossing the full Moon.

News Headlines

LCROSS Finds Water on the Moon
At a press conference today, researchers revealed preliminary data from NASA's Lunar Crater Observation and Sensing Satellite, or LCROSS, indicating that water exists in a permanently shadowed lunar crater. The discovery opens a new chapter in our understanding of the Moon.
http://science.nasa.gov/headlines/y2009/13nov_lcrossresults.htm

First Black Holes May Have Incubated In Giant Cocoons
The first large black holes in the universe likely formed and grew deep inside gigantic, starlike cocoons that smothered their powerful X-ray radiation and prevented surrounding gases from being blown away, says a new study led by the University of Colorado at Boulder.
http://www.spacedaily.com/reports/First_Black_Holes_May_Have_Incubated_In_Giant_Cocoons_999.html

LHC smashes protons together for first time
The Large Hadron Collider bashed protons together for the first time on Monday, inaugurating a new era in the quest to uncover nature's deepest secrets. Housed in a 27-kilometre circular underground tunnel near Geneva, Switzerland, the LHC is the world's most powerful particle accelerator, designed to collide protons together at unprecedented energies.
http://www.newscientist.com/article/dn18186-lhc-smashes-protons-together-for-first-time.html

Extensive Valley Network on Mars Adds to Evidence for Ancient Martian Ocean
New research adds to the growing body of evidence suggesting the Red Planet once had an ocean. In a new study, scientists from Northern Illinois University and the Lunar and Planetary Institute in Houston used an innovative computer program to produce a new and more detailed global map of the valley networks on Mars.
http://www.sciencedaily.com/releases/2009/11/091123094122.htm

Record-breaking radio astronomy project to measure sky with extreme precision
Astronomers will tie together the largest collection of the world's radio telescopes ever assembled to work as a single observing tool in a project aimed at improving the precision of the reference frame scientists use to measure positions in the sky. The National Science Foundation's Very Long Baseline Array (VLBA) will be a key part of the project.
http://www.astronomy.com/asy/default.aspx?c=a&id=8830

Monster Waves on the Sun are Real
Sometimes you really can believe your eyes. That's what NASA's STEREO (Solar Terrestrial Relations Observatory) spacecraft are telling researchers about a controversial phenomenon on the sun known as the "solar tsunami."
http://science.nasa.gov/headlines/y2009/24nov_solartsunami.htm

Watching a Cannibal Galaxy Dine
A new technique using near-infrared images, obtained with ESO's 3.58-metre New Technology Telescope (NTT), allows astronomers to see through the opaque dust lanes of the giant cannibal galaxy Centaurus A, unveiling its "last meal" in unprecedented detail -- a smaller spiral galaxy, currently twisted and warped.
http://www.sciencedaily.com/releases/2009/11/091120084619.htm

December Sky Data

Best time for deep sky observing this month:
December 8 through December 21

Mercury is at its greatest distance east of the Sun on December 18th. At best, it's setting less than two hours after the Sun sets, but it may just be possible to glimpse this elusive little planet. By the end of the month, Mercury will be lost in the Sun's glare again.

At the start of December, **Venus** rises in the south-east just an hour before the Sun; it may be visible very low in the dawn sky. As the month progresses, Venus rises later every day. By the end of December we will certainly have lost sight of it.

Mars is rising in the north-east around 8 pm, and it's high in the southern sky in the early hours of the morning. On the evening of Sunday December 6th, the waning gibbous Moon will appear to the lower right of Mars, about five degrees away. As the night goes by, the Moon will pass directly below Mars.

Jupiter is in the south at dusk, less than 20 degrees above the horizon; it sets in the south-west around 9 pm. Jupiter is moving slowly north-eastwards in Capricornus. On the evening of Monday December 21st, our own crescent Moon will appear just above Jupiter; the two objects will be about 4 degrees apart.

Saturn is rising in the east around 1 am, and it's well up in the southern sky by dawn. It's moving very slowly south-eastwards in Virgo. In a telescope, the disc of Saturn appears 17 arc-seconds across, and the famous rings form a narrow oval, 40 arc-seconds wide and only 3 arc-second high. At dawn on Thursday December 10th, the Moon will appear to be directly above Saturn; the two objects will be 8 degrees apart.

Geminid **meteors** may be seen any time between December 7th and 16th. Their radiant point is close to the bright star Castor in Gemini, so it's in the sky throughout the hours of darkness, though the best meteor numbers are usually seen after midnight. The peak this year is expected in the early morning of Monday 14th – expect to see one meteor every couple of minutes

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
12/1/2009	16:06	06:07	06:40	16:40
12/5/2009	20:38	09:58	06:44	16:40
12/10/2009	01:08	12:42	06:48	16:41
12/15/2009	06:18	16:02	06:51	16:42
12/20/2009	09:43	20:45	06:54	16:44
12/25/2009	11:56	00:31	06:57	16:47
12/31/2009	17:01	06:56	06:58	16:51

Planet Data

Dec 1

	Rise	Transit	Set	Mag
Mercury	07:56	12:43	17:33	-0.5
Venus	05:52	11:01	16:11	-3.9
Mars	21:30	04:30	11:30	-0.1
Jupiter	11:18	16:43	22:05	-2.3
Saturn	01:12	07:20	13:33	1.0

Dec 15

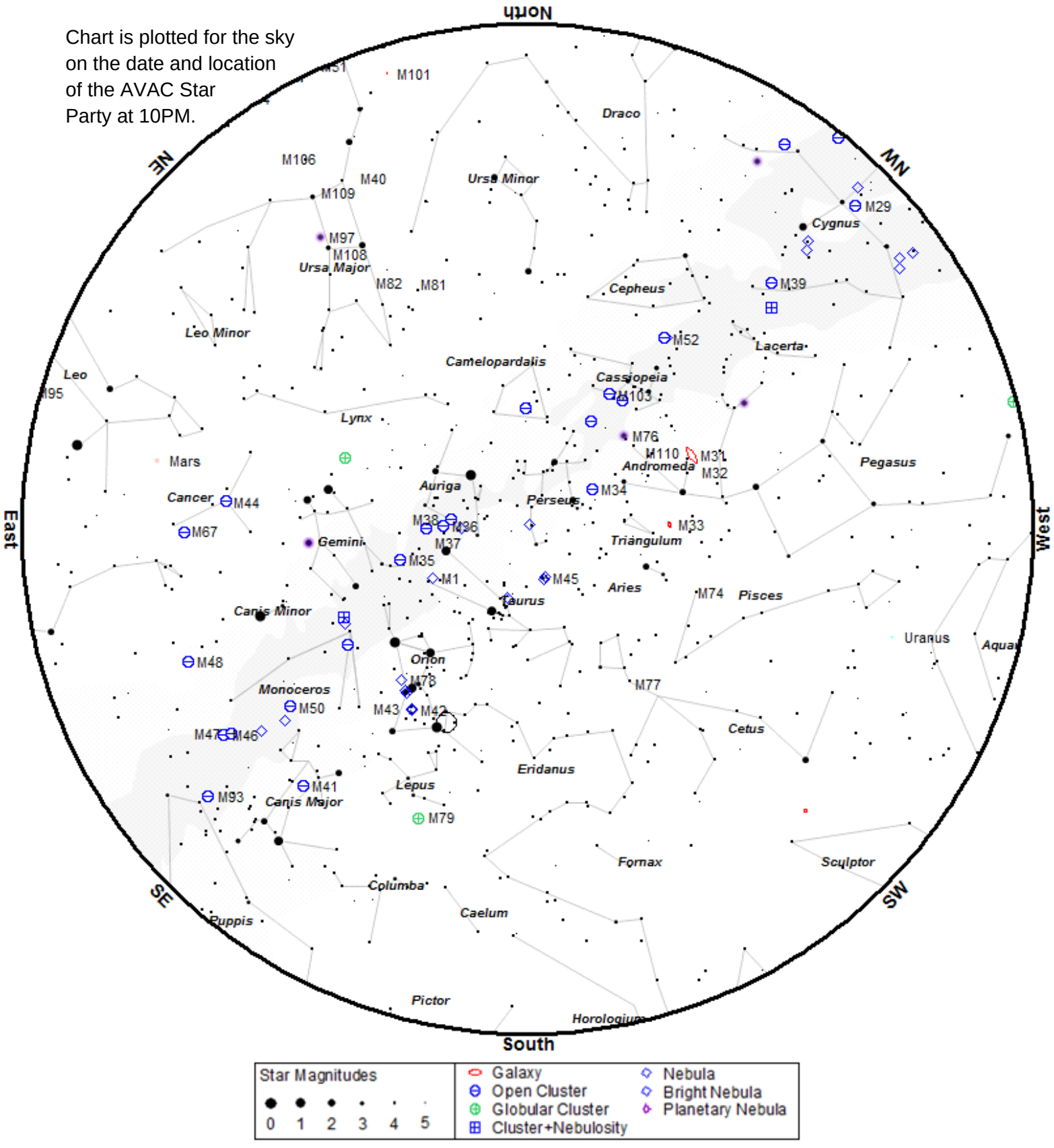
	Rise	Transit	Set	Mag
Mercury	08:23	13:15	18:08	-0.5
Venus	06:21	11:21	16:19	-3.9
Mars	20:43	03:43	10:43	-0.4
Jupiter	10:29	15:57	21:21	-2.2
Saturn	00:21	06:29	12:40	0.9

Dec 31

	Rise	Transit	Set	Mag
Mercury	07:18	12:32	17:37	2.6
Venus	06:49	11:45	16:40	-3.9
Mars	19:35	02:38	09:41	-0.8
Jupiter	09:35	15:06	20:33	-2.1
Saturn	23:20	05:28	11:35	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.



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 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	17:46	18:17	22:00	obvious
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	17:54	18:17	20:50	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	17:55	18:22	21:47	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	17:48	18:24	23:59	obvious
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	17:55	18:24	21:57	detectable
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	17:54	18:37	22:32	detectable
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	17:50	18:38	23:22	easy
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	17:50	18:38	23:18	easy
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	17:54	18:44	20:58	detectable
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	17:54	19:48	23:54	detectable
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	17:54	19:48	23:24	detectable
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	18:05	19:55	22:28	challenging
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	17:55	20:39	01:04	easy
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	17:59	20:40	23:44	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	17:46	20:46	01:52	obvious
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	17:48	20:46	01:37	easy
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	17:56	20:46	01:15	detectable
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	17:50	20:46	01:41	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	17:46	20:46	01:33	obvious
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	17:48	20:46	01:13	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	17:52	20:46	02:00	easy
NGC 1245	Open	7.7	Per	03h14m42.0s	+47°14'12"	18:56	21:12	23:39	challenging
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	17:58	21:29	01:45	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	17:53	21:44	02:21	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	17:48	21:47	03:27	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	17:45	22:01	04:11	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	17:56	22:12	03:23	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	19:25	22:42	02:06	detectable
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	19:35	23:00	02:33	detectable
NGC 1851	Glob	7.1	Col	05h14m06.0s	-40°02'48"	22:02	23:10	00:19	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	19:19	23:25	03:36	detectable
M 1	Neb	8.4	Tau	05h34m30.0s	+22°01'00"	21:26	23:31	01:37	challenging
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	18:43	23:33	04:24	easy
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	20:25	23:32	02:38	easy
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	19:10	23:49	04:31	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	19:23	23:58	04:32	obvious
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	19:49	00:05	04:21	easy
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	19:54	00:05	04:15	obvious

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	20:28	00:06	03:45	detectable
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	20:37	00:38	04:37	obvious
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	23:14	00:43	02:12	easy
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	21:19	00:48	04:17	easy
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	22:05	00:58	03:52	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	22:26	01:10	03:56	easy
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	22:29	01:13	03:59	difficult
NGC 2360	Open	9.1	CMa	07h17m43.0s	-15°38'30"	23:45	01:14	02:43	challenging
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	20:56	01:25	05:47	obvious
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	23:08	01:33	03:57	easy
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	23:13	01:33	03:52	obvious
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	23:20	01:37	03:55	detectable
NGC 2439	Open	7.1	Pup	07h40m45.0s	-31°41'36"	23:28	01:37	03:43	easy
NGC 2440	PNe	11.5	Pup	07h41m55.4s	-18°12'31"	23:45	01:38	03:32	detectable
M 93	Open	6.5	Pup	07h44m30.0s	-23°51'24"	01:00	01:40	02:21	easy
NGC 2451	Open	3.7	Pup	07h45m23.0s	-37°57'21"	23:53	01:41	03:29	easy
NGC 2477	Open	5.7	Pup	07h52m10.0s	-38°31'48"	00:02	01:48	03:34	easy
NGC 2506	Open	8.9	Mon	08h00m01.0s	-10°46'12"	23:57	01:56	03:55	difficult
NGC 2547	Open	5.0	Vel	08h10m09.0s	-49°12'54"	01:22	02:06	02:52	detectable
NGC 2546	Open	5.2	Pup	08h12m15.0s	-37°35'42"	01:05	02:08	03:11	difficult
NGC 2571	Open	7.4	Pup	08h18m56.0s	-29°45'00"	00:02	02:14	04:28	easy
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	22:30	02:36	05:45	easy
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	23:54	02:47	05:31	detectable
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	21:43	03:48	05:47	easy
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	22:00	03:48	05:47	detectable
NGC 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	02:17	04:02	05:41	easy
NGC 3227	Gal	11.5	Leo	10h23m30.6s	+19°51'54"	01:17	04:19	05:43	difficult
NGC 3242	PNe	8.6	Hya	10h24m46.1s	-18°38'32"	02:31	04:21	05:52	obvious
M 97	PNe	11.0	UMa	11h14m47.7s	+55°01'09"	02:25	05:03	05:40	challenging
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	01:53	05:09	05:45	detectable
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	01:52	05:08	05:47	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	02:04	05:18	05:45	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	02:10	05:21	05:48	easy
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	03:10	05:20	05:44	difficult
M 86	Gal	9.8	Vir	12h26m12.2s	+12°56'44"	03:13	05:20	05:43	detectable
M 84	Gal	10.1	Vir	12h25m03.9s	+12°53'12"	02:58	05:20	05:45	detectable
M 87	Gal	9.6	Vir	12h30m49.2s	+12°23'29"	03:01	05:20	05:46	detectable
M 49	Gal	9.3	Vir	12h29m46.8s	+08°00'01"	03:02	05:20	05:45	detectable
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	03:19	05:22	05:44	detectable
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	03:02	05:21	05:45	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	02:25	05:22	05:47	easy
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	02:58	05:21	05:47	detectable
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	03:12	05:22	05:46	easy
M 104	Gal	9.1	Vir	12h39m59.3s	-11°37'22"	03:59	05:22	05:46	detectable
M 68	Glob	7.3	Hya	12h39m28.0s	-26°44'36"	04:19	05:25	05:45	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.
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