ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 33 *Antelope Valley Astronomy Club Newsletter* **December 2013**

Up-Coming Events

December 6: Public Night at the SAGE Planetarium
December 7: Save Saddleback Star Party
December 11: Acton Library Star Party
December 14: AVAC Annual Christmas Party (Members only)
December 20: Public Night at the SAGE Planetarium
December 21: Prime Desert Woodlands Moon Walk

* 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

Happy Holidays! Thanksgiving is just past, Hanukkah is here and Christmas is right around the corner. In some ways it's a slow month for the club. It's cold and rainy. On the other hand it's dark by 5:30pm! Some of my friends hate to stay up late so this is their ideal observing season. Others hate the cold and look forward to the lazy summer evenings. Still others hate the cold and the late nights (Rose!).

Of course, with Orion, the Pleiades and the other great winter constellations and objects this a great time to observe. What's more, Comet ISON isn't dead yet. Reports of it breaking up during perihelion may be accurate but there still is something to look at. Other comets, such as Lovejoy or Holmes, brightened considerably after breaking up so all is not lost for ISON! It's not going to be another Hale-Bopp but may still be a nice binocular object.

If you want to test my theory then come out to Saddleback Butte State Park on Saturday, December 7th for a public star party hosted by the Save Saddleback Committee and the AVAC. We'll have the group site all night so you can try for the comet at dusk and again at dawn. Otherwise come out and enjoy the winter constellations and share your views through the scope with the public and your fellow members.

If you're more inclined to warm evenings with nice company and good food then don't forget about our annual Christmas Party on Saturday, December 14th. We'll all be at Giannini's Bistro at 858 West Lancaster Blvd. Space is limited so sign up now. Remember that there is no meeting this month! Instead come to the Christmas party and join in on the raffle and silent auction! Contact Rose at 661-972-1953 or RMOrion1@bak.rr.com and add your name to the list.

Vice President

Frank Moore

Hi folks. I'm back from my trip to the Arizona Science and Astronomy Expo (ASAE) in Tucson, AZ. It was a rewarding trip and I saw many old friends, made many new friends, and most importantly made many professional contacts for the AVAC.

I left Tehachapi at approximately 0400 on Friday November 15 and, after driving 562 miles from home, pulled into the hotel at around 2:00 PM Tucson time (MST). After quickly checking into my room I was off to the Tucson Convention Center to set up the AVAC booth. Upon arrival, I was directed through the "underground tunnel" (oooh) to the back loading dock where, upon finding big rigs and moving vans from the "big companies" pulled up to the dock, I parked in a Fire Lane along with all of the other "little" scofflaws…including the Fire Chief.

I proceeded to the registration desk to check in and find the location of our booth. Upon getting there I was pleased to find JMI (Jims Mobile) on one side of us and MonSTAR Prints (AZ Sky Shack) on the other. Across the aisle from us was the Kitt Peak National Observatory, Flagstaff Visitors Bureau/Lowell Observatory, DayStar (solar) Filters, and wonderful folks from "Delight's Earthly Delights' makers of some fantastic science related jewelry. Because our banner is so big, I was wandering in search of the convention center folks to get some extra banner hangers when I happened upon David Ho from "HoTech". David, being an old trade show pro, reached in his box of supplies and loaned me some of his banner hangers on the spot. I had hoped to see him and I thanked him by handing him a picture that I had printed of me using a HoTech SCA Laser Collimator on Rose's Meade Lightbridge at the Brite Lake picnic. He was thrilled and displayed it on his table throughout the show.

That night, as I did each night that I was in Tucson, I had dinner with my daughter who is a student at the University of Arizona.

Since I was the only one manning the booth on Saturday, and with no real way to take a break, I had thought the day would drag by but, instead, the time just seemed to fly by. It seemed that I always had visitors to talk to about our club, our activities, the groups and organizations with whom we work, and our educational outreach. Many officers from the Tucson Amateur Astronomy Association stopped by to welcome me, to compare notes, and to extend invitations to visit their observing site during a star party sometime. They really liked our "Velcro receptive" display board and their officers kept sending folks involved in their educational outreach over to see how it works. On the subject of the board, I found it was very handy to pluck an item of interest off the board (especially if it was mounted down low) and hold it in my hand while we discussed it. I then stuck it back on the board when we were through.

It was funny, but I kept finding myself in the role of a "facilitator" introducing various parties with common interests to each other or telling outreach groups about various resources. As an example, a ranger (in uniform) from the Arizona State Parks Kartchner Caverns saw my section on our "Partnership With California State Parks" and stopped to talk about it. I told him about our events at the Poppy Reserve, Saddleback Butte, and Red Cliffs and gave him information on the "Dark Ranger", Kevin Poe from Bryce Canyon NP and how he trains rangers to do star parties. While having this discussion, a couple stopped by and mentioned that they had done astronomy outreach at several Arizona State Parks and were looking to do more. We all exchanged information and I think a new outreach program was about to get started between them. I repeatedly had similar experiences where new relationships, and new partnerships, were forged

right at our booth. Incredibly enough, I actually handed out two applications to California residents who live near the AV.

On Sunday, my daughter Hannah hung out in the booth so I had a chance to get out, explore the booths of other organizations and vendors, and do some solar observing through scopes supplied by the "Charlie Bates Solar Astronomy Project", Meade/Coronado, Lunt Solar Systems, and DayStar Filters. There was some impressive hardware giving impressive views.

Hannah even got to meet an astronomy celebrity. While standing in line at the snack bar I told her, "Hannah, turn around and shake the hand of the man behind you," she did and I said, "Hannah, this is Alex Filippenko, a rather famous astrophysicist. When we get back to my room you can Google his name to see who he is." Alex laughed. "Alex, this is my daughter Hannah, a student at UA." Alex asked if she was an astronomy student and when she said, "No, a biology major," he laughed again and said, "Biology is important too. "

The expo came to an abrupt end at 4:00 on Sunday when, suddenly, sirens started going off, strobes started flashing, and a computerized voice started repeatedly announcing, "An emergency has been reported in this building. Please proceed to the nearest exit." We all thought "false alarm", and ignored it, until security guards and Tucson Police began herding us through the roll up doors onto the loading dock…and kept telling us to get further from the building. At about 4:30 they let us back in (with no explanation) but by then the public had all evacuated as well and we all just started breaking down our booths and loading out.

In any event, it was a wonderful weekend; I made many contacts, made new friends, and had the added bonus of visiting with my daughter. The roster of exhibitors was impressive and, once the date for next year is announced, I can only suggest that you ALL mark it on your calendars and make plans to attend.

Dark Skies…..Frank

Director of Community Development

Rose Moore

We have a few events for this month, to end the year!

We have a 'First Friday' event at the SAGE with Jeremy. This is a public night at the Planetarium on Friday, Dec. 6th. Jeremy will have the Pre-K and Kinder Planetarium Show at 5pm, followed by a Planetarium Show for all ages at 6pm. The cost is $5 per person. A free public Star Party starts at 7:30 pm in front of the SAGE Planetarium. If you would like to help Jeremy with the star party, please bring a telescope!

Our next event is a public star party at Saddleback State Park, on Saturday Dec. 7th. See Don's note above!

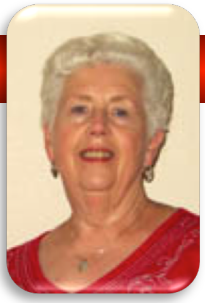
On Wednesday, Dec. 11th we have a public star party at the Acton Library, at 5:30pm, on Crown Valley Road in Acton. This is hosted by Jeremy and he will need members with telescopes to help with this event.

Saturday, Dec. 14th is the club's Annual Christmas Party, at 6pm. This event is for members and their guest(s). This year the party will be held at Giannini's Bistro on Lancaster Blvd. Seating is limited. If you would like to attend, but haven't contacted Frank or I yet, please contact us asap. We will have a special

menu, not a buffet, and many entrees to chose from. There will also be a silent auction and raffle. If you would like to donate an item(s) for the event, you may bring it that evening.

On Saturday, Dec. 21st at 6:30pm, we have a Prime Desert Moon Walk with Jeremy. Come out to celebrate the Winter Solstice! We'll need members with telescopes for this event. For this, as with all public events, dress warm, and weather pending.

See you there!



Secretary

Pam Grove

It is absolutely amazing that another year is coming to an end!

We had a lot of fun filled activities, thanks to Don, Frank and Rose for their expertise, in arranging and organizing to make all these events possible and a success!

I would like to wish everyone a Merry Christmas and a Healthy and Prosperous New Year!

Thanks to those that had confidence in me to fulfill the Secretarial position again for the 2014 year.

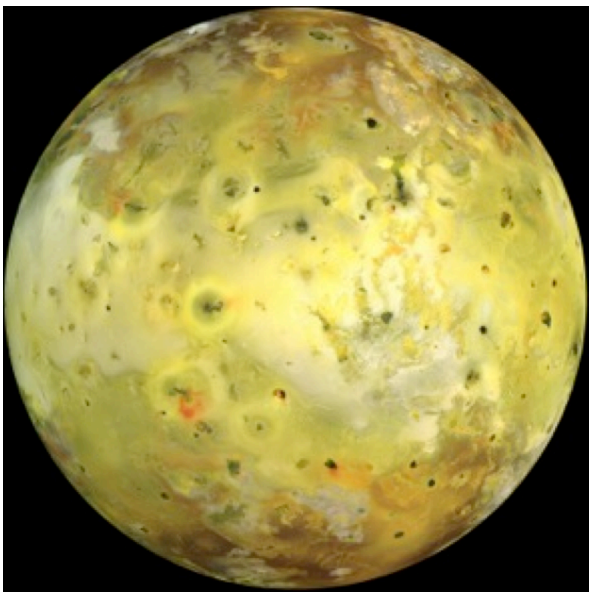
Hope to see everyone at the Christmas Party, our last event of the year!

Space Place

The most volcanically active place is out-of-this-world!

By Dr. Ethan Siegel

Volcanoes are some of the most powerful and destructive natural phenomena, yet they're a vital part of shaping the planetary landscape of worlds small and large. Here on Earth, the largest of the rocky bodies in our Solar System, there's a tremendous source of heat coming from our planet's interior, from a mix of gravitational contraction and heavy, radioactive elements decaying. Our planet consistently outputs a tremendous amount of energy from this process, nearly three times the global power production from all sources of fuel. Because the surface-area-to-mass ratio of our planet (like all large rocky worlds) is small, that energy has a hard time escaping, building-up and releasing sporadically in catastrophic events: volcanoes and earthquakes!



Io. Image credit: NASA / JPL-Caltech, via the Galileo spacecraft.

Yet volcanoes occur on worlds that you might never expect, like the tiny moon Io, orbiting Jupiter. With just 1.5% the mass of Earth despite being more than one quarter of the Earth's diameter, Io seems like an unlikely candidate for volcanoes, as 4.5 billion years is more than enough time for it to have cooled and become stable. Yet Io is anything but stable, as an abundance of volcanic eruptions were predicted before we ever got a chance to view it up close. When the Voyager 1 spacecraft visited, it found no impact craters on Io, but instead hundreds of volcanic calderas, including actual eruptions with plumes 300 kilometers high! Subsequently, Voyager 2, Galileo, and a myriad of telescope observations found that these eruptions change rapidly on Io's surface.

Where does the energy for all this come from? From the combined tidal forces exerted by Jupiter and the outer Jovian moons. On Earth, the gravity from the Sun and Moon causes the ocean tides to raise-and-lower by one-to-two meters, on average, far too small to cause any heating. Io has no oceans, yet the tidal forces acting on it cause the world itself to stretch and bend by an astonishing 100 meters at a time! This causes not only cracking and fissures, but also heats up the interior of the planet, the same way that rapidly bending a piece of metal back-and-forth causes it to heat up internally. When a path to the surface opens up, that internal heat escapes through quiescent lava flows and catastrophic volcanic eruptions! The hottest spots on Io's surface reach 1,200 °C (2,000 °F); compared to the average surface temperature of 110 Kelvin (-163 °C / -261 °F), Io is home to the most extreme temperature differences from location-to-location outside of the Sun.

Just by orbiting where it does, Io gets distorted, heats up, and erupts, making it the most volcanically active world in the entire Solar System! Other moons around gas giants have spectacular eruptions, too (like Enceladus around Saturn), but no world has its surface shaped by volcanic activity quite like Jupiter's innermost moon, Io!

Learn more about Galileo's mission to Jupiter: http://solarsystem.nasa.gov/galileo/. Kids can explore the many volcanoes of our solar system using the Space Place's Space Volcano Explorer: http://spaceplace.nasa.gov/volcanoes.

News Headlines

NASA team uncovers new data on Chelyabinsk meteoroid
On February 15 of this year, the Earth dodged a bullet of cosmic proportions as a meteoroid exploded over Chelyabinsk, Russia with the force of a nuclear weapon. Last Friday, NASA announced a new report published in Science that used videos and eyewitness accounts to provide new insights into the incident and the nature of the object that caused it.
http://www.gizmag.com/chelyabinsk-results/29687/

Latest Updates on Comet ISON
Comet ISON may put on a fine naked-eye display in the December dawn. Excitement is building as the comet dives toward the Sun. Comet ISON (C/2012 S1), discovered last year as a distant speck, has raised a lot of hopes among skywatchers. It's on track to swing very close around the Sun — missing it by less than one solar diameter! — on November 28th and then re-emerge into dawn view, possibly with a long tail, in early December.
http://www.skyandtelescope.com/community/skyblog/observingblog/Comet-ISON-Updates-193909261.html

Chandra Helps Confirm Jet in Milky Way's Black Hole
Astronomers have long sought strong evidence that Sagittarius A* (Sgr A*), the supermassive black hole at the center of the Milky Way, is producing a jet of high-energy particles. Finally they have found it, in new results from NASA's Chandra X-ray Observatory and the National Science Foundation's Very Large Array (VLA) radio telescope.
http://spaceref.com/astronomy/chandra-helps-confirm-jet-in-milky-ways-black-hole.html

Final North American ALMA Antenna Delivered
After an odyssey of design and construction stretching across more than a decade, North America has delivered the last of the 25, 12-meter-diameter dish antennas that comprise its share of antennas for the international ALMA telescope. This is an important milestone in the construction of an observatory that astronomers are already using to open up a "final frontier" of the spectrum of invisible light to high-resolution exploration.
http://www.nrao.edu/pr/2012/alma25/

Rover Team Working to Diagnose Electrical Issue
Science observations by NASA's Mars rover Curiosity have been suspended for a few days while engineers run tests to check possible causes of a voltage change detected on Nov. 17. "The vehicle is safe and stable, fully capable of operating in its present condition, but we are taking the precaution of investigating what may be a soft short," said Mars Science Laboratory Project Manager Jim Erickson at NASA's Jet Propulsion Laboratory, Pasadena, Calif.
http://mars.jpl.nasa.gov/news/whatsnew/index.cfm?FuseAction=ShowNews&NewsID=1559

NASA's LADEE Probe Starts Science Study of Thin Lunar Atmosphere and Dusty Mystery
NASA's Lunar Atmosphere and Dust Environment Explorer (LADEE) has descended to its planned low altitude orbit and begun capturing science data on its ground breaking mission to study the Moon's ultra tenuous atmosphere and dust using a spacecraft based on a revolutionary new design aimed at speeding development and cutting costs.
http://www.universetoday.com/105688/nasas-ladee-probe-starts-science-study-of-thin-lunar-atmosphere-and-dusty-mystery/#more-105688

In Memorial

It's with extreme sadness that I report that Matthew Leone JR., son of AVAC members Sue and Matt Leone, passed away on Sunday November 17, 2013.

Over the years, Matt frequently attended AVAC events and our star parties at Mt. Pinos and other venues. He was always a welcome and entertaining "voice in the dark". We will certainly miss Matt's witticism, unique sense of humor, and most of all his company at AVAC events. The AVAC offers Matt and Sue our sincere condolence and love.

When told of Matt's death, this quote from the motion picture "The Crow" immediately came to mind.

"I believe that imagination is stronger than knowledge, and that myth is more potent than history.
I believe that dreams are more powerful than facts, that hope always triumphs over experience, and that laughter is the only cure for grief.
And I believe that love is stronger than death."

- Frank

Rose Moore and Matt Leone Jr at a star party at Mt. Pinos in July of 2010.

December Sky Data

Best time for deep sky observing this month:
December 1 thru 7 and 22 thru 31

Mercury is visible in the pre-dawn sky shining at magnitude +0.6 down to the lower left of Saturn as December begins. It brightens to -0.8 magnitude during the first couple of weeks but, each morning is a little lower above the horizon as dawn breaks and will be lost from view by mid December and passes behind the Sun (superior conjunction) on December 29th.

Venus shines at magnitude -4.9 in early December However at this time of year the ecliptic is at quite a shallow angle to the horizon and, even worse, Venus, with a declination of -27, is very close to its furthest southern declination. The result is that it will lie close to the horizon in the south south-west.

Mars rises soon after midnight at the start of the month shining at magnitude +1.2. Its magnitude increases to +0.9 during the month with its angular size increasing from 5.6 to 6.8 arc seconds. Mars is moving down across Virgo and, at the very end of the month is very close to Porrima, Gamma Virginis.

Jupiter rises about 7:30 pm at the beginning of December and by late evening dominates the eastern sky. It is now moving in retrograde motion westwards across the sky. By month's end Jupiter will rise at 6 pm and transit at 2 am so will be high in the western sky as dawn breaks having a magnitude of -2.7 and a diameter of nearly 47 arc seconds.

Having passed behind the Sun in early November **Saturn** is now visible in the pre-dawn sky, rising at about 5 am as December begins and at about 3:00 am at its end. It is shining with a magnitude of +0.6 and its disk has a diameter of ~15.5 arc seconds. The rings have now opened to around 21 degrees from the line of sight so present a magnificant view.

The next **meteor shower** is the Geminids on the night of December 13-14. The Moon is in its waxing gibbous phase, so moonlight will hamper viewing the shower. Your best bet is to watch on the mornings of December 13 and 14, from moonset until dawn.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
12/1/2013	05:06	15:52	06:40	16:40
12/5/2013	09:11	20:03	06:44	16:40
12/10/2013	12:32	00:24	06:48	16:41
12/15/2013	15:47	05:14	06:51	16:42
12/20/2013	20:03	08:57	06:54	16:44
12/25/2013	------	11:41	06:57	16:47
12/31/2013	05:57	16:30	06:58	16:51

Planet Data

Dec 1

	Rise	Transit	Set	Mag
Mercury	05:25	10:42	15:57	-0.7
Venus	09:47	14:45	19:40	-4.7
Mars	00:42	06:58	13:15	1.2
Jupiter	19:17	02:30	09:43	-2.6
Saturn	04:41	10:06	15:35	0.6

Dec 15

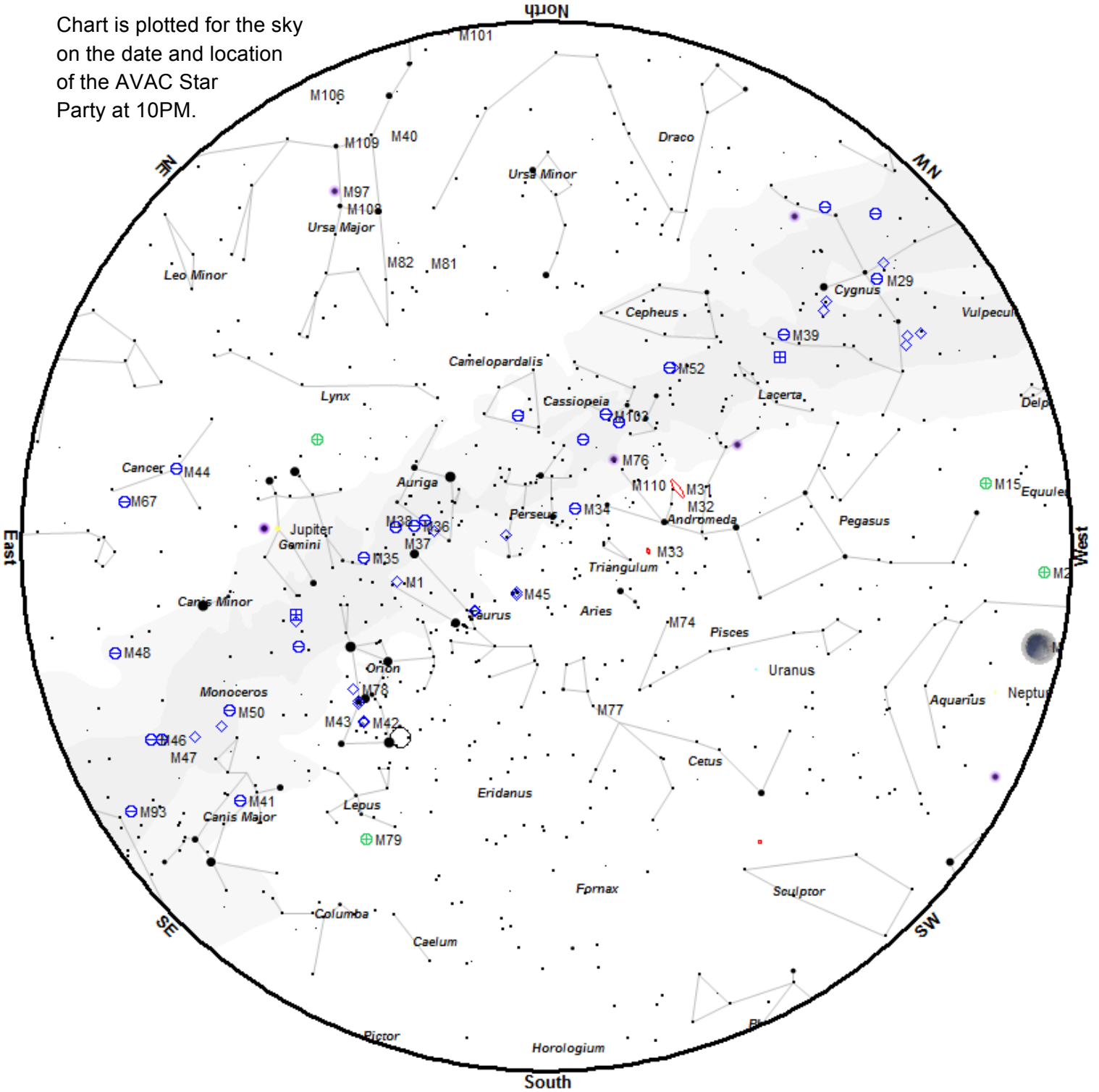
	Rise	Transit	Set	Mag
Mercury	06:17	11:17	16:14	-0.8
Venus	09:06	14:15	19:20	-4.7
Mars	00:21	06:29	12:39	1.1
Jupiter	18:15	01:29	08:43	-2.7
Saturn	03:54	09:17	14:45	0.6

Dec 31

	Rise	Transit	Set	Mag
Mercury	07:09	12:02	16:57	-1.2
Venus	07:43	13:03	18:18	-4.4
Mars	23:54	05:54	11:54	0.8
Jupiter	17:03	00:17	07:32	-2.7
Saturn	02:58	08:21	13:47	0.6

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

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	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
NGC 6572	PNe	Oph	18h12m06.4s	+06°51'12"	8.0	17:44	18:02	18:35	obvious
M 11	Open	Sct	18h51m05.0s	-06°16'12"	6.1	17:59	18:06	18:16	detectable
NGC 6818	PNe	Sgr	19h43m57.8s	-14°09'12"	10.0	17:50	18:06	18:42	easy
NGC 6633	Open	Oph	18h27m15.0s	+06°30'30"	5.6	17:54	18:07	18:28	easy
M 92	Glob	Her	17h17m07.0s	+43°08'12"	6.5	17:54	18:08	18:39	easy
NGC 7009	PNe	Aqr	21h04m10.9s	-11°21'48"	8.3	17:45	18:10	18:32	obvious
M 57	PNe	Lyr	18h53m35.1s	+33°01'45"	9.4	17:51	18:11	18:34	easy
M 30	Glob	Cap	21h40m22.0s	-23°10'42"	6.9	17:55	18:11	19:08	detectable
NGC 6543	PNe	Dra	17h58m33.4s	+66°37'59"	8.3	17:43	18:12	18:58	obvious
M 56	Glob	Lyr	19h16m36.0s	+30°11'06"	8.4	17:58	18:12	18:51	detectable
M 27	PNe	Vul	19h59m36.3s	+22°43'16"	7.3	17:53	18:12	19:17	easy
M 71	Glob	Sge	19h53m46.0s	+18°46'42"	8.4	17:53	18:12	19:02	easy
NGC 6871	Open	Cyg	20h05m59.0s	+35°46'36"	5.8	17:54	18:13	19:52	easy
M 2	Glob	Aqr	21h33m27.0s	-00°49'24"	6.6	17:54	18:13	19:35	detectable
NGC 6910	Open	Cyg	20h23m12.0s	+40°46'42"	7.3	17:51	18:14	20:19	easy
M 29	Open	Cyg	20h23m57.0s	+38°30'30"	7.5	17:53	18:14	20:12	easy
M 15	Glob	Peg	21h29m58.0s	+12°10'00"	6.3	17:53	18:15	20:06	easy
NGC 7293	PNe	Aqr	22h29m38.5s	-20°50'14"	6.3	17:53	18:15	18:51	detectable
M 39	Open	Cyg	21h31m48.0s	+48°26'00"	5.3	17:51	18:17	21:33	easy
IC 5146	Neb	Cyg	21h53m24.0s	+47°16'00"	10.0	17:50	18:18	21:45	challenging
IC 1396	Neb	Cep	21h39m06.0s	+57°30'00"		17:51	18:18	22:01	challenging
NGC 7160	Open	Cep	21h53m40.0s	+62°36'12"	6.4	17:46	18:19	22:40	obvious
NGC 7243	Open	Lac	22h15m08.0s	+49°53'54"	6.7	17:54	18:19	21:10	detectable
M 52	Open	Cas	23h24m48.0s	+61°35'36"	8.2	17:56	18:26	23:13	detectable
NGC 7789	Open	Cas	23h57m24.0s	+56°42'30"	7.5	17:56	18:32	23:29	detectable
NGC 7790	Open	Cas	23h58m24.0s	+61°12'30"	7.2	17:47	18:33	00:42	easy
NGC 55	Gal	Scl	00h15m08.4s	-39°13'13"	8.5	18:04	18:58	20:01	challenging
M 110	Gal	And	00h40m22.3s	+41°41'09"	8.9	17:55	19:09	23:55	detectable
M 32	Gal	And	00h42m41.8s	+40°51'58"	8.9	17:52	19:11	00:33	easy
NGC 253	Gal	Scl	00h47m33.1s	-25°17'20"	7.9	19:08	19:28	19:55	detectable
NGC 288	Glob	Scl	00h52m45.0s	-26°35'00"	8.1	18:13	19:33	20:56	challenging
NGC 637	Open	Cas	01h43m04.0s	+64°02'24"	7.3	17:48	22:22	02:34	obvious
NGC 559	Open	Cas	01h29m31.0s	+63°18'24"	7.4	17:49	22:22	02:19	easy
NGC 1027	Open	Cas	02h42m40.0s	+61°35'42"	7.4	18:04	22:22	02:14	detectable
Heart Neb	Neb	Cas	02h33m52.0s	+61°26'50"	6.5	22:21	22:22	00:25	challenging
NGC 663	Open	Cas	01h46m09.0s	+61°14'06"	6.4	17:51	22:22	02:31	easy
M 103	Open	Cas	01h33m23.0s	+60°39'00"	6.9	17:48	22:22	02:16	obvious
NGC 457	Open	Cas	01h19m35.0s	+58°17'12"	5.1	17:49	22:22	01:55	obvious

ID	Cls	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
NGC 957	Open	Per	02h33m21.0s	+57°33'36"	7.2	17:55	22:22	02:57	easy
NGC 884	Open	Per	02h22m18.0s	+57°08'12"	4.4	17:49	22:22	02:55	obvious
NGC 869	Open	Per	02h19m00.0s	+57°07'42"	4.3	17:49	22:22	02:51	obvious
M 76	PNe	Per	01h42m19.9s	+51°34'31"	10.1	17:57	22:22	01:04	detectable
M 34	Open	Per	02h42m05.0s	+42°45'42"	5.8	18:02	22:22	01:55	easy
M 31	Gal	And	00h42m44.3s	+41°16'07"	4.3	17:51	22:22	00:36	easy
NGC 1342	Open	Per	03h31m38.0s	+37°22'36"	7.2	18:33	22:22	02:34	detectable
M 33	Gal	Tri	01h33m50.9s	+30°39'36"	6.4	17:57	22:22	00:29	detectable
M 77	Gal	Cet	02h42m40.8s	-00°00'48"	9.7	18:44	22:22	00:42	detectable
NGC 1245	Open	Per	03h14m42.0s	+47°14'12"	7.7	22:22	22:23	00:20	challenging
NGC 752	Open	And	01h57m41.0s	+37°47'06"	6.6	22:22	22:23	23:29	challenging
M 45	Open	Tau	03h47m00.0s	+24°07'00"	1.5	18:03	22:30	03:07	obvious
NGC 1444	Open	Per	03h49m25.0s	+52°39'30"	6.4	17:51	22:33	04:12	obvious
NGC 1502	Open	Cam	04h07m50.0s	+62°19'54"	4.1	17:47	22:52	04:55	obvious
NGC 1528	Open	Per	04h15m23.0s	+51°12'54"	6.4	18:19	22:59	04:15	easy
NGC 1647	Open	Tau	04h45m55.0s	+19°06'54"	6.2	21:08	23:29	02:51	detectable
NGC 1664	Open	Aur	04h51m06.0s	+43°40'30"	7.2	19:01	23:34	04:39	easy
NGC 1746	Open	Tau	05h03m50.0s	+23°46'12"	6.1	21:24	23:47	03:18	detectable
NGC 1851	Glob	Col	05h14m06.0s	-40°02'48"	7.1	22:41	23:57	01:13	difficult
M 38	Open	Aur	05h28m40.0s	+35°50'54"	6.8	20:39	00:12	04:31	detectable
M 36	Open	Aur	05h36m18.0s	+34°08'24"	6.5	19:48	00:17	05:16	easy
M 43	Neb	Ori	05h35m30.0s	-05°16'00"	9.0	22:21	00:18	02:29	difficult
M 1	Neb	Tau	05h34m30.0s	+22°01'00"	8.4	22:21	00:18	03:00	difficult
M 42	Neb	Ori	05h35m18.0s	-05°23'00"	4.0	21:38	00:18	03:29	easy
IC 434	Neb	Ori	05h41m00.0s	-02°27'00"	11.0	21:17	00:24	03:45	challenging
M 78	Neb	Ori	05h46m48.0s	+00°05'00"	8.0	22:23	00:29	02:41	difficult
M 37	Open	Aur	05h52m18.0s	+32°33'12"	6.2	20:20	00:36	05:20	easy
NGC 2129	Open	Gem	06h01m07.0s	+23°19'20"	7.0	20:13	00:44	05:19	obvious
NGC 2169	Open	Ori	06h08m24.0s	+13°57'54"	7.0	20:39	00:51	05:03	obvious
M 35	Open	Gem	06h09m00.0s	+24°21'00"	5.6	21:04	00:52	05:16	easy
NGC 2175	Open	Ori	06h09m39.0s	+20°29'12"	6.8	22:03	00:53	04:41	detectable
NGC 2237	Neb	Mon	06h32m02.0s	+04°59'10"	5.5	23:16	01:15	03:14	challenging
NGC 2264	Open	Mon	06h40m58.0s	+09°53'42"	4.1	21:42	01:24	05:25	easy
M 41	Open	CMa	06h46m01.0s	-20°45'24"	5.0	23:52	01:28	03:07	easy
NGC 2301	Open	Mon	06h51m45.0s	+00°27'36"	6.3	22:22	01:34	05:07	easy
M 50	Open	Mon	07h02m42.0s	-08°23'00"	7.2	22:48	01:45	04:42	detectable
NGC 2353	Open	Mon	07h14m30.0s	-10°16'00"	5.2	23:09	01:57	04:45	easy
NGC 2360	Open	CMa	07h17m43.0s	-15°38'30"	9.1	00:31	02:00	03:31	challenging
NGC 2355	Open	Gem	07h16m59.0s	+13°45'00"	9.7	23:14	02:00	04:46	difficult
NGC 2392	PNe	Gem	07h29m10.8s	+20°54'42"	8.6	21:43	02:12	05:37	obvious
NGC 2393	Gal	Gem	07h30m04.6s	+34°01'40"	14.6	21:40	02:13	05:37	not visible
M 44	Open	Cnc	08h40m24.0s	+19°40'00"	3.9	23:13	03:23	05:33	easy
M 67	Open	Cnc	08h51m18.0s	+11°48'00"	7.4	00:33	03:34	05:27	detectable
M 81	Gal	UMa	09h55m33.1s	+69°03'56"	7.8	22:40	04:38	05:33	detectable
M 82	Gal	UMa	09h55m52.4s	+69°40'47"	9.0	22:22	04:38	05:35	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
P.O. BOX 8545,
LANCASTER, CA 93539-8545

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.

Board Members

President:
Don Bryden (661) 270-0627
president@avastronomyclub.org

Vice-President:
Frank Moore (661) 972-4775
vice-president@avastronomyclub.org

Secretary:
Pam Grove
secretary@avastronomyclub.org

Treasurer:
Virgina Reed (661) 824-3932
treasurer@avastronomyclub.org

Director of Community Development:
Rose Moore (661) 972-1953
community@avastronomyclub.org

Appointed Positions

Newsletter Editor:
Steve Trotta (661) 269-5428
newsletter@avastronomyclub.org

Equipment & Library:
Bill Grove
library@avastronomyclub.org

Club Historian:
Tom Koonce (661) 943-8200
history@avastronomyclub.org

Webmaster:
Steve Trotta (661) 269-5428
webmaster@avastronomyclub.org

Astronomical League Coordinator:
Don Bryden (661) 270-0627
al@avastronomyclub.org

Our Sponsors

Thank you to our sponsors for your generous support!

Cosmos Level Sponsors

LOCKHEED MARTIN
We never forget who we're working for™

Woodland Hills Camera

5348 Topanga Canyon Blvd., Woodland Hills
888-427-8766.
www.telescopes.net

Galaxy Level Sponsors

ASTRO-TOM.COM

ActonAstro

Al's Vacuum and Sewing
904 West Lancaster Blvd., Lancaster
(661) 948-1521