



Desert Sky Observer

Volume 30

Antelope Valley Astronomy Club Newsletter

December 2010

Up-Coming Events

December 4: Dark Sky Star Party @ [Two Goats Observatory](#)

December 11: AVAC Christmas Party @ [Palmdale Embassy Suites](#)

December 20: Lunar Eclipse Party @ [the S.A.G.E Planetarium](#)

* 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

I hope everyone had a pleasant Blue Moon last week! “What?” you say, “That was only the first full moon in November!” OK so I’m talking about the Farmer’s Almanac definition that refers to the third full moon in a season that has four as the blue moon. We didn’t start referring to the second full moon in a calendar month as a blue moon until Sky

& Telescope started (incorrectly) calling that a blue moon back in the 1940’s. Read why at: <http://www.csmonitor.com/Science/2010/1121/Is-this-a-true-blue-moon>

Who needs full moons anyway? All though it seems that every new moon brings clouds and rain lately. Hopefully the 4th of December will be better weather as we’re having a little dark sky star party at Two Goats observatory (my driveway...). If not, then I hope to see everyone on December 20th at the SAGE Planetarium as we’ll be holding a lunar eclipse party. Come out and set up a scope outside by the SAGE or come inside and enjoy some hot cocoa, coffee and free dome shows. Festivities start at around 9:30pm with totality lasting from about 11:40pm until about 12:50am.

Remember, there’s no monthly meeting for December. Instead we’ll be holding our annual Christmas Party (see Doug’s article below)! I hope everyone has a safe and happy holiday season and I’ll see you at the parties (star and Christmas!).



Vice President

Doug Drake

Well here it is the end of the year, but what a great year we’ve had. The 2010 year will end with our great Christmas Party, 11 December (Saturday) starting at 6:00PM. We always have a great time. The Christmas Party will be at the new “Embassy Suites” in Palmdale located just behind Best Buy. The address is 39375 5th St. West in Palmdale.

The food will be great:

- Fresh garden salad and Waldorf salad.
- Roasted cranberry stuffed chicken breast and honey baked ham.
- Garlic mashed potatoes and green bean casserole with French onion strings.
- NY cheesecake with raspberry drizzle and strawberries.
- Coffee, Ice Tea and water are part of the meal. Sodas shall be available too.

Here are some of the things we are planning, just to name a few:

1. An opportunity drawing for prizes
2. Two free tickets will be given to each person!
3. Silent auction
4. Table center-place giveaway.
5. Awards given out

Remember we will be having the Christmas Party in place of the monthly club meeting. Please welcome and remember that Rose Moore will once again be our Vice President for 2011. She is one of the greatest ever and I know you will think so too. Thank you Rose for contributing your time for our club one more time.

I wish all of you a very happy Christmas Holiday and a New 2011 Year for great things to come.



Director of Community Development

Rose Moore

Merry Christmas and Happy Holidays to All! I'm looking forward to our Christmas Party this year, as we are having it at a new place! And I'm looking forward to seeing you all there for a good time!

Thanks to all who helped out this year at all our public events! I know we reached out to quite a number of people this year, and hopefully stimulated an interest in astronomy. I look forward to this coming year and more public outreach!

This coming year I will be in the VP position, and of course that means finding speakers for our club meetings. Any suggestions would be appreciated! Also any suggestions for increasing our attendance at our meetings would also be welcome. We have been posting the announcements on our website, as well as placing an announcement in the paper, to help reach the public. I feel that we need to come up with a new idea or two to try to increase our turnout. Something for discussions!

So have a very Merry Christmas, Happy Holidays, and a Happy New Year!

And see you all soon!

Rose



Secretary

Frank Moore

After a multi-year battle, during which myself, Duane Lewis, Judith Fuentes, and several other members of our organization attended numerous hearings before the Los Angeles Regional Planning Commission and wrote many letters to planners and County Supervisors, Mr. Tom Malloy, the developer of the proposed Fairmont Butte Motorsports Park adjacent to the Antelope Valley California Poppy Reserve, has canceled the project and withdrawn his application for a conditional use permit.

Though details are sketchy, it appears that the land, which had been the proposed site of the racetrack, has been sold to one of the solar energy firms looking to develop in the Fairmont area both north and south of Avenue D. However, it will not be used to build a solar energy project immediately adjacent to the Poppy Reserve but rather as “mitigation land and open space”, to offset the loss of natural environment at the solar project sites. Though I am unable to find any official statements for corroboration, rumor is that the land will be deeded over to either the Antelope Valley Conservancy or the Antelope Valley California Poppy Reserve to be preserved in its natural state.

Norm Hickling, field deputy for Fifth District Los Angeles County Supervisor Michael D. Antonovich, said the racetrack project had already been through several public planning hearings with another one, scheduled for Dec. 15.

"As those meetings progressed it seemed like other issues kept coming up and it didn't seem like some of those concerns were getting resolved," (by the developer) Hickling said. "(We) are generally happy with the outcome because the community raised a large amount of concern and opposition in regards to the racetrack."

On November 18 Mr. Hickling further stated, "I have been informed this afternoon the property where the Fairmont Motor Sports park was proposed to go has been sold to another buyer. The buyer is using the property as mitigation land and open space. The Racetrack is no longer a concern as County Regional Planning has been told to stop all work on the project."

Though I'm sure there will be some disruption to the area as some of these solar projects are built, and that certainly not all will be found to be worthy of approval, I would much rather have a quiet, dark (at night) source of renewable energy in the area than a motorsports park.

With the property now to be used as mitigation land and open space, the quiet, tranquil, and mostly dark environment of the Poppy Reserve will be preserved as will the many documented Significant Ecological Areas (SEA) on the project site.

Though it sometimes seems we're, "Tilting at Windmills", we can make a difference in preserving what is left of our "Dark Skies" by making our friends, neighbors, and public officials aware that the Night Sky is a resource worthy of preservation. With the cancellation of the Fairmont Butte Motorsports Park, the approval of the Greater Tehachapi Area Specific Plan which has many dark sky components, and the implementation of the Kern County Dark Skies Ordinance (19.81) in January of 2011, I certainly have much to be thankful for this season.

I encourage you all to visit the International Dark Sky Association, <http://www.darksky.org>, and become involved. It's only through our combined voices that we can make a difference and preserve the Night Sky for the enjoyment of our hobby and for generations to come.

The Season for Giving - Giving Back to Your Astronomy Club by Tom Koonce

The holiday season is here once again. It's a time to recognize those in need and for giving to others. With the fun that I've had through the years with my astronomy club and fellow amateur astronomers across the country, I started thinking about ways that I might give something back to amateur astronomy. You know that running any organization is a lot of time and work, so you can imagine that our club leaders would be appreciative of any help that is offered. I realized that the best gift I could give to the club would be to step up and help out with an aspect of the club that fits into my schedule. If this sounds like something you're interested in doing too, I have a few ideas for you to consider.

It's surprising how many astronomy-related bits and pieces that we accumulate that we haven't used in a long time such as basic amateur astronomy books, old binoculars, our first eyepieces, and perhaps an old telescope. Consider donating items like these to the club to be gathered up into a potential Spring garage sale for the benefit of the club's treasury. Maybe this could jumpstart the club savings for the summer picnic or piece of equipment that all members could share.

Even if you don't have items to donate, consider donating the benefit of your amateur astronomy knowledge by volunteering to teach a 30 minute to 1 hour class on the area of astronomy that interests you. If enough people wanted to teach small classes, perhaps a Saturday event could be put together that would really interest and excite members!

Even with no preparation, acting as a "Star Guide" mentor for a new member is a way of giving that means a lot. We all remember the first experienced club member who showed us the ropes when we were beginning in astronomy. Why not be that memorable mentor for another person?

I always find it interesting to read the newsletter when someone has written up their observing session. It doesn't have to entail the discovery of a new comet or anything, just the simple observations. (Of course a discovering a new comet would be a pretty nice write-up!) A photo, sketch or even a star map of the area that is being discussed is a plus, but not required. Give back to the organization by summarizing your next observing session and share the evening with your fellow members.

If schedule is tight, giving even a bit of your time is appreciated. For instance, a nice gesture is to assist with greeting people at the monthly meetings. Many clubs do this as a way of welcoming new and long-time members at the door. If you would like to help increase club membership, making others feel welcome each month and taking a personal interest in them is one of the best ways.

If you have a bit more time, you can help the club out by volunteering to help on a committee or (longer term) running for an officer position to give back to the club in tangible ways that are also rewarding for the volunteers. Frankly, sometimes these are positions that can get a bit stale if the same people are in them again and again. If you are one of the people who have been in a particular job in the organization for a while, thank you for all that you do! Consider mentoring another person to take on this position while you try out something different. The club needs you! But changes can keep the organization fresh and vibrant and it will keep you excited about why we're involved in the first place... because it's fun. It might be a gift that both you and the mentee could give for the long term vitality of the club. Happy Holidays to you and your families. Clear Skies! - Tom

Space Place

Blue Rings around Red Galaxies

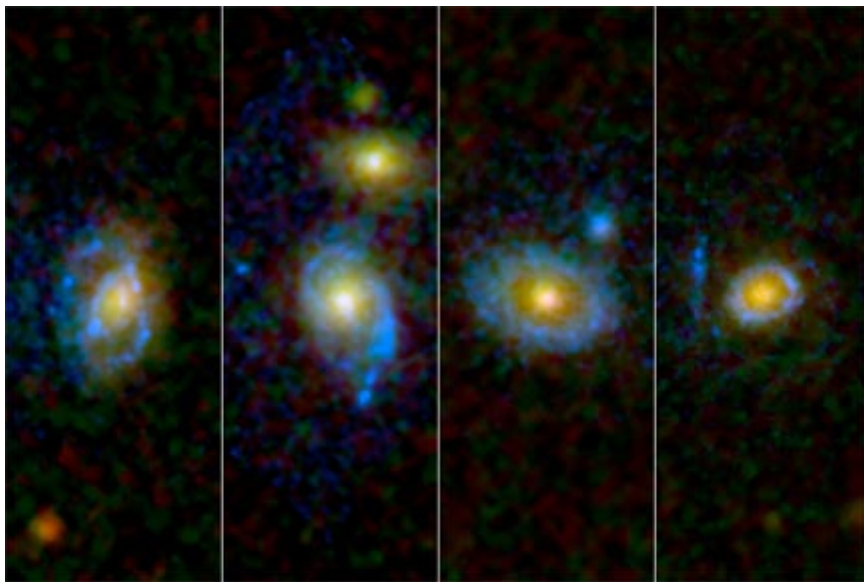
by Trudy E. Bell and Dr. Tony Phillips

Beautiful flat rings around the planet Saturn are one thing—but flat rings around entire galaxies?

That is the astonishing discovery that two astronomers, Samir Salim of Indiana University at Bloomington and R. Michael Rich of UCLA described in the May 10, 2010, issue of *The Astrophysical Journal Letters*.

“For most of the twentieth century, astronomers observing at visible wavelengths saw that galaxies looked either ‘red and dead’ or ‘blue and new,’” explained Salim. Reddish galaxies were featureless, shaped mostly like balls or lentils; bluish ones were magnificent spirals or irregular galaxies.

Elliptical galaxies looked red, astronomers reasoned, because they had mostly old red giant stars near the end of their life cycles, and little gas from which new stars could form. Spiral and irregular galaxies looked blue, however, because they were rich in gas and dust that were active nurseries birthing hot, massive, bluish stars.



The Galaxy Evolution Explorer UV space telescope helped to identify red elliptical galaxies that also emitted the strongest UV. These are detailed, long-exposure Hubble Space Telescope images of four of these galaxies that capture the UV-emitting rings and arcs indicative of new star formation.

At least, that's how galaxies appear in visible light.

As early as the 1970s, though, the first space-borne telescopes sensitive to ultraviolet radiation (UV) revealed something mysterious: a few red elliptical galaxies emitted “a surprising ultraviolet excess,” said Rich. The observations suggested that some old red galaxies might not be as “dead” as previously supposed.

To investigate, Salim and Rich used NASA's Galaxy Evolution Explorer satellite to identify 30 red elliptical galaxies that also emitted the strongest UV. Then they captured a long, detailed picture of each galaxy using the Hubble Space Telescope.

by enormous, flat bluish rings that completely surrounded each reddish galaxy, reminiscent of the rings of Saturn. In some cases, the bluish rings even showed a faint spiral structure!

Because the bluish UV rings looked like star-forming spiral arms and lay mostly beyond the red stars at the centers of the elliptical galaxies “we concluded that the bluish rings must be made of hot young stars,” Salim continued. “But if new stars are still being formed, that means the red-and-dead galaxies must have acquired some new gas to make them.”

“Hubble revealed the answer,” says Salim. The UV radiation was emitted

How does a galaxy “acquire some gas?” Salim speculates that it was an act of theft. Sometimes galaxies have close encounters. If a gas-rich irregular galaxy passed close to a gas-poor elliptical galaxy, the gravity of the elliptical galaxy could steal some gas.

Further studies by Galaxy Evolution Explorer, Hubble and other telescopes are expected to reveal more about the process. One thing is certain, says Rich: “The evolution of galaxies is even more surprising and beautiful than we imagined.”

The press release is available at <http://www.galex.caltech.edu/newsroom/glx2010-03f.html>. The full published article is “Star Formation Signatures in Optically Quiescent Early-Type Galaxies” by Samir Salim and R. Michael Rich, The Astrophysical Journal Letters 714: L290–L294, 2010 May 10.

Point the kids to the Photon Pile-up Game at <http://spaceplace.nasa.gov/en/kids/galex/photon>, where they can have fun learning about the particle nature of light.

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

Astrophoto of The Month



Star Trails by Shane Barker

Cannon EOS Digital 18mm F/5.6 1251 second exposure

News Headlines

Mr. Hartley's Amazing Comet

Today the Deep Impact spacecraft zipped past Comet 103P/Hartley 2 at a distance of about 435 miles (700 km) at 6:59:47 a.m. PDT (13:59:47 Universal Time). After confirming that the spacecraft had survived its 27,000-mile-per-hour brush with this icy interloper, the scientists and engineers who'd gathered at the Jet Propulsion Laboratory in California held their collective breath for about 20 minutes while waiting for the first images to be radioed to the ground.

<http://www.skyandtelescope.com/community/skyblog/newsblog/106720468.html>

Cassini Finds Ethereal Atmosphere at Rhea

NASA's Cassini spacecraft has detected a very tenuous atmosphere known as an exosphere, infused with oxygen and carbon dioxide around Saturn's icy moon Rhea. This is the first time a spacecraft has directly captured molecules of an oxygen atmosphere albeit a very thin one -- at a world other than Earth.

<http://www.spaceref.com/news/viewstr.html?pid=35390>

Detailed Dark Matter Map Yields Clues to Galaxy Cluster Growth

Astronomers using NASA's Hubble Space Telescope took advantage of a giant cosmic magnifying glass to create one of the sharpest and most detailed maps of dark matter in the universe. Dark matter is an invisible and unknown substance that makes up the bulk of the universe's mass.

<http://hubblesite.org/newscenter/archive/releases/2010/37/full/>

Eris Gets Dwarfed (Is Pluto Bigger?)

Something happened yesterday that could upend the bragging rights among the kingpins of trans-Neptunian space. If the early results hold up, this time it's the dwarf planet Eris's turn to be demoted, and Pluto might have just regained its status as the largest object in the Kuiper Belt.

<http://www.skyandtelescope.com/news/home/106861063.html>

NASA's Chandra Finds Youngest Nearby Black Hole

Astronomers using NASA's Chandra X-ray Observatory have found evidence of the youngest black hole known to exist in our cosmic neighborhood. The 30-year-old black hole provides a unique opportunity to watch this type of object develop from infancy.

<http://www.sciencedaily.com/releases/2010/11/101115151623.htm>

Planet from another galaxy discovered

An exoplanet orbiting a star that entered our Milky Way from another galaxy has been detected by a European team of astronomers using the MPG/ESO 2.2-meter telescope at the European Southern Observatory's (ESO) La Silla Observatory in Chile. The Jupiter-like planet is particularly unusual, as it is orbiting a star nearing the end of its life and could be about to be engulfed by it, giving tantalizing clues about the fate of our own planetary system in the distant future.

<http://www.astronomy.com/en/News-Observing/News/2010/11/Planet%20from%20another%20galaxy%20discovered.aspx>

December Sky Data

Best time for deep sky observing this month:
December 1 through December 10

Mercury is to the east of the Sun at the start of December, but it sets only an hour after sunset. By December 20th it's at inferior conjunction – almost directly in front of the Sun.

Venus is a brilliant “Morning Star” this month, visible low in the south-eastern sky before sunrise. Relative to the stars, Venus begins the month in the constellation of Virgo and moves eastwards, crossing into Libra on December 12th. But Venus is far brighter than any of the stars, and can still be seen as the sky brightens and the stars disappear.

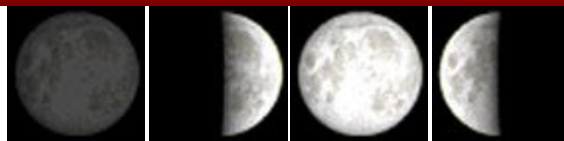
Mars will be at conjunction (almost directly behind the Sun) next February. This month the “Red Planet” sets less than an hour after the Sun, so we won't be able to see it.

Jupiter continues to be well placed for viewing. It's visible as soon as the sky starts to get dark, and it's due south in the early evening; it doesn't set till around midnight. It looks like a very bright star, shining with a strong, steady light. Relative to the genuine stars – which are all much fainter – Jupiter is moving very slowly north-eastwards, leaving Aquarius and crossing into Pisces on December 16th.

Saturn is rising in the east in the early hours of the morning, and it's well up in the southern sky at dawn. Don't confuse it with the planet Venus, which is further left, a bit lower down, and very much brighter. Relative to the stars, Saturn is moving very slowly south-eastwards in the constellation of Virgo.

One of the most reliable **meteor-showers** of the year is the Geminid shower, which occurs every December. 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 can be seen throughout the hours of darkness, though the best meteor numbers are usually seen after midnight. The peak this year is expected in the early hours of Tuesday 14th, when we might expect to see one meteor every couple of minutes, if the sky is clear.

New Dec 4 First Qtr Dec 13 Full Dec 21 Last Qtr Dec 27



Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
12/1/2010	02:21	13:41	06:43	16:42
12/5/2010	06:50	16:46	06:46	16:42
12/10/2010	10:27	21:44	06:50	16:43
12/15/2010	12:44	01:25	06:54	16:44
12/20/2010	16:21	06:22	06:57	16:46
12/25/2010	22:00	10:03	06:59	16:49
12/31/2010	03:35	13:45	07:01	16:53

Planet Data

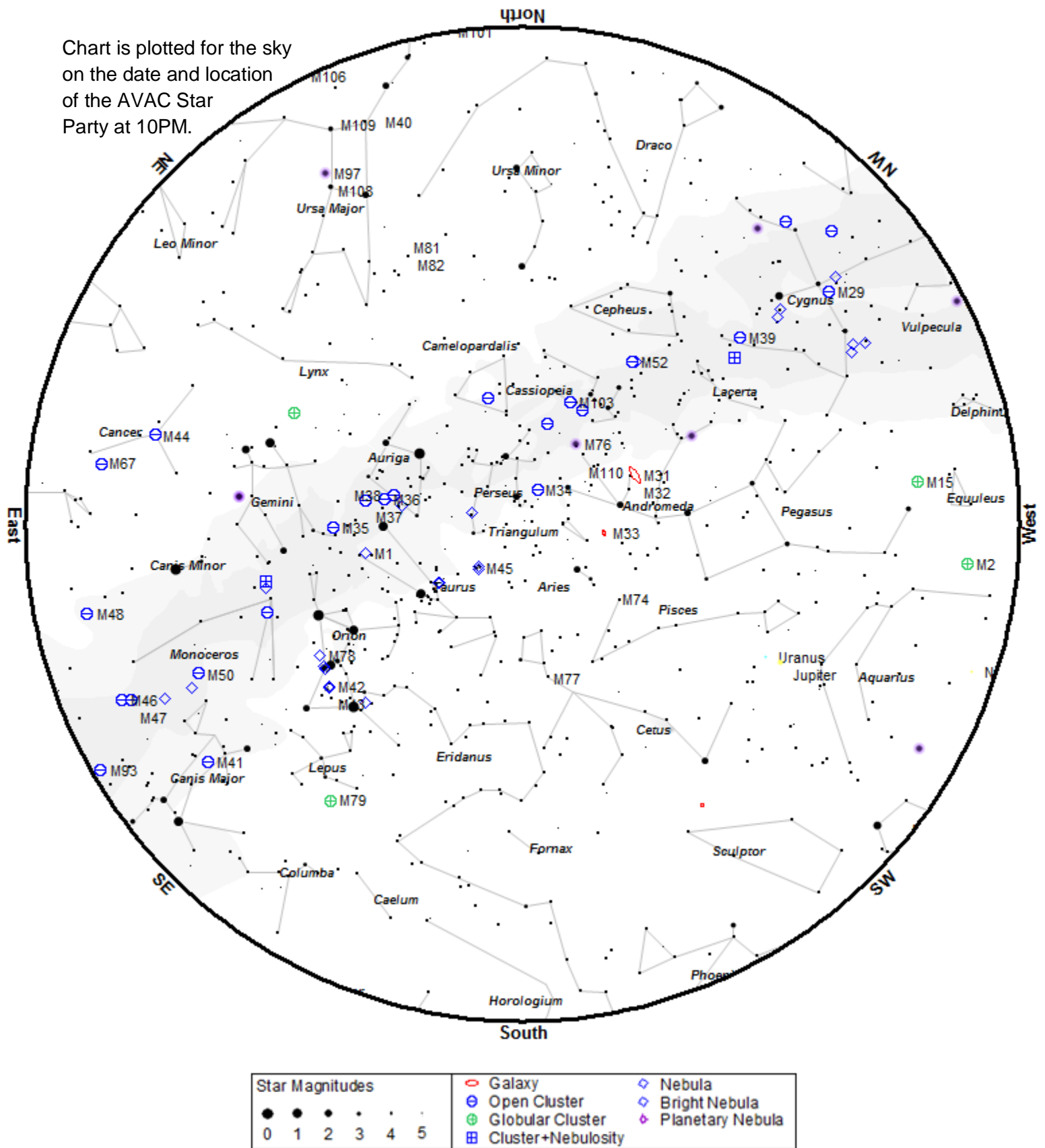
	Dec 1			
	Rise	Transit	Set	Mag
Mercury	08:24	13:15	18:06	-0.4
Venus	03:28	09:06	14:45	-4.7
Mars	07:54	12:51	17:46	1.3
Jupiter	12:53	18:49	00:45	-2.6
Saturn	02:09	08:05	14:05	0.8

	Dec 15			
	Rise	Transit	Set	Mag
Mercury	07:21	12:30	17:29	2.5
Venus	03:14	08:47	14:22	-4.6
Mars	07:45	12:42	17:38	1.3
Jupiter	12:00	17:58	23:55	-2.5
Saturn	01:19	07:14	13:13	0.8

	Dec 31			
	Rise	Transit	Set	Mag
Mercury	05:18	10:27	15:38	0.1
Venus	03:16	08:40	14:04	-4.5
Mars	07:32	12:32	17:31	1.2
Jupiter	10:58	17:01	23:01	-2.4
Saturn	00:20	06:15	12:13	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.



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
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	17:50	18:16	21:31	easy
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	17:45	18:18	22:55	obvious
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	17:54	18:19	21:07	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	17:56	18:31	21:58	detectable
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	17:56	18:56	22:13	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	17:46	18:57	00:56	obvious
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	17:55	19:39	23:08	detectable
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	17:49	19:41	00:04	easy
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	17:49	19:41	00:01	easy
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	19:45	19:46	19:49	detectable
NGC 288	Glob	8.1	Scl	00h52m45.0s	-26°35'00"	18:24	19:51	21:20	difficult
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	17:47	20:18	02:08	obvious
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	17:50	20:28	02:27	easy
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	17:55	20:32	00:10	detectable
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	17:46	20:32	02:29	obvious
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	17:55	20:41	00:55	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	17:46	20:41	02:50	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	17:49	20:45	02:16	easy
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	17:46	21:17	03:05	obvious
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	17:48	21:21	03:08	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	17:52	21:32	02:39	easy
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	18:00	21:40	01:45	easy
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	18:03	21:41	01:42	detectable
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	18:47	21:41	00:34	detectable
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	18:33	22:30	02:25	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	18:08	22:45	03:21	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	17:49	22:48	04:26	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	17:46	23:06	05:08	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	18:22	23:13	04:05	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	20:40	23:44	02:49	detectable
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	19:09	23:49	04:29	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	20:50	00:02	03:14	detectable
NGC 1851	Glob	7.1	Col	05h14m06.0s	-40°02'48"	23:00	00:12	01:24	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	20:35	00:26	04:18	detectable
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	21:25	00:33	03:41	easy
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	19:56	00:34	05:12	easy
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	20:21	00:50	05:17	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	20:25	00:58	05:27	obvious

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	20:54	01:06	05:16	obvious
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	21:04	01:06	05:09	easy
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	21:46	01:07	04:29	detectable
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	21:45	01:38	05:26	obvious
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	00:07	01:44	03:18	easy
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	22:22	01:49	05:14	easy
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	23:16	02:00	04:44	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	23:24	02:12	04:59	easy
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	23:58	02:14	04:32	difficult
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	21:58	02:27	05:43	obvious
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	00:10	02:34	04:57	obvious
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	00:07	02:34	05:01	easy
NGC 2439	Open	7.1	Pup	07h40m45.0s	-31°41'36"	00:37	02:38	04:39	easy
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	00:18	02:39	05:01	detectable
NGC 2440	PNe	11.5	Pup	07h41m55.4s	-18°12'31"	00:42	02:39	04:36	detectable
NGC 2451	Open	3.7	Pup	07h45m23.0s	-37°57'21"	00:58	02:42	04:26	easy
M 93	Open	6.5	Pup	07h44m30.0s	-23°51'24"	01:49	02:42	03:36	easy
NGC 2506	Open	8.9	Mon	08h00m01.0s	-10°46'12"	01:25	02:58	04:28	difficult
NGC 2547	Open	5.0	Vel	08h10m09.0s	-49°12'54"	02:25	03:07	03:49	detectable
NGC 2546	Open	5.2	Pup	08h12m15.0s	-37°35'42"	02:20	03:09	03:59	difficult
NGC 2571	Open	7.4	Pup	08h18m56.0s	-29°45'00"	01:11	03:16	05:19	easy
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	23:44	03:37	05:37	easy
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	01:19	03:48	05:29	detectable
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	23:10	04:50	05:38	easy
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	23:27	04:50	05:36	detectable
NGC 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	03:14	05:02	05:41	easy
NGC 3227	Gal	11.5	Leo	10h23m30.6s	+19°51'54"	02:35	05:04	05:33	difficult
NGC 3242	PNe	8.6	Hya	10h24m46.1s	-18°38'32"	03:26	05:07	05:43	obvious
M 97	PNe	11.0	UMa	11h14m47.7s	+55°01'09"	03:19	05:09	05:30	challenging
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	02:59	05:11	05:34	detectable
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	02:59	05:11	05:34	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	03:08	05:12	05:34	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	03:07	05:14	05:35	easy
M 86	Gal	9.8	Vir	12h26m12.2s	+12°56'44"	04:06	05:14	05:32	detectable
M 84	Gal	10.1	Vir	12h25m03.9s	+12°53'12"	03:51	05:14	05:34	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	03:17	05:15	05:36	easy
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	04:04	05:14	05:32	difficult
M 87	Gal	9.6	Vir	12h30m49.2s	+12°23'29"	03:53	05:14	05:34	detectable
M 49	Gal	9.3	Vir	12h29m46.8s	+08°00'01"	03:55	05:14	05:34	detectable
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	03:51	05:15	05:33	detectable
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	03:48	05:15	05:34	detectable
NGC 3228	Open	6.4	Vel	10h21m22.0s	-51°43'42"	04:40	05:15	05:34	easy
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	04:05	05:16	05:31	detectable
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	03:54	05:16	05:35	easy
M 104	Gal	9.1	Vir	12h39m59.3s	-11°37'22"	04:57	05:17	05:34	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.
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- The Reflector – the publication of the Astronomical League.
- The A.V.A.C. Membership Manual.
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