



Desert Sky Observer

Volume 31

Antelope Valley Astronomy Club Newsletter

May 2011

Up-Coming Events

- May 7: Dark Sky Star Party @ [Red Cliff Natural Preserve](#)
- May 13: Club Meeting*
- May 14: [Prime Desert Woodland Moon Walk](#)
- May 16: Board meeting @ [Don's house](#)
- May 18: Acton Library Astronomy Lecture and Star Party @ [Acton Library](#)
- May 25-30: [RTMC](#)

* 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

Ah Spring! For astronomers it's "so long" to the winter nebulae as we welcome in the globulars of summer. That's not to say there are no good nebulae – the Veil is a summertime treat as are the Ha regions of Sagittarius – but for me it's the globular clusters. For anyone who's done a Messier Marathon, you may understand. I always felt that the reward for struggling through the Virgo Cluster of Galaxies is getting to all the fine globulars of Scorpius, Ophiuchus and Sagittarius. A Messier Marathon is like a year's observing all in one (long) evening. You start with a farewell to the winter constellations then move on to the spring. Leo, Virgo and Coma Berenices are up soon and before you know it the summer triangle is rising high.



If you are reading this before the 7th, let me remind you about our star party at Red Cliffs. It should be a nice evening and we'll have the AINA 20" scope out for all to try (if you can get me to stop logging Herschel objects!). I think I'll also have my refractor set up since one of the best features of Red rocks and red Cliffs is the seeing. It's perhaps not as dark as Mt. Pinos but it is the best around for steady skies. I've seen some great planetary views out there and Saturn should be a showpiece (though maybe not quite as nice as the image on the right ->). Come out early and take a hike or just enjoy the magnificent red cliffs. Or help me set up the 20" monster (hopefully with new and improved light shrouds!).

If you're not as ambitious then come join us on the 14th for another Prime Desert Moonwalk. Be sure to bring your moon filter as it'll be just a few days before full. We're hoping for some less cloudy and windy conditions this month. If however you're REALLY feeling unsure of your astronomy skills then we have an answer for that as well. At 3pm at the SAGE, just before the Prime Desert event (5/14), come join Jeremy for his famous





beginner's class. Not only will he lead you in a master class of the basics but this will qualify you to check out most of the club's equipment. Later in the week on Wednesday, the 18th, come out to the Acton Library and join Jeremy for the Library Star Talk. Set up a scope and let the public take a peek or just come out and enjoy the lecture: "Cosmic Distance Ladder-Size of the Universe". The talk begins at 7:30pm.

Lastly, let's not forget that RTMC is fast approaching. The Club is once again a sponsor and we'll be encamped at our usual location near the showers. The days will be filled with trips to the vendor booths, checking out the new hardware from Celestron, Meade, Televue and many others, or browsing the wares of all the smaller vendors like Don Rothmann or David Ho of Hotech. We'll gather "Out Front!" once again to see if we can get lucky in one of the many raffles on Saturday evening. Join us any day from Wednesday the 25th of May through the following Monday. There's still time to get discounted tickets or you can just pay at the entrance.

See <http://www.rtmcastronomyexpo.org/general.html> for more information.



Vice President

Rose Moore

For May there are several events coming up!

We have our YEA, 'Youth Exploring Astronomy', awards on Wednesday, May 11th at 6:30pm at the SAGE Planetarium. Come on out and show your support for the kids who won this year's contest, as well as for Debora and members who helped put this together this year. We will have several speakers, as well as the prizes for our winners!

Our meeting on May 13th will have members Dick, Shane, and Karole presenting a Night Sky Network (NSN) toolkit 'Space Rocks, Asteroids, and Meteorites'. This was the toolkit that Shane and Karole went to NSN facilities to test last year. Come on out and enjoy!

On Saturday, May 14th, we have a Prime Desert Moon Walk with Jeremy at 8:00 pm. Please come out and bring a telescope to show the night sky to the public, or just come out to enjoy the evening with the walk and some observing!

May 18th, Wednesday, is the Acton Library Astronomy Lecture and Star Party with Jeremy. Starting time is 7:30pm. We can use a few members will telescopes, and hopefully will have clear skies. Last month we set up in the parking lot, but had clouds and poor seeing. Jeremy's lecture this month is 'Cosmic Distance Ladder-Size of the Universe'. Come on out for a wonderful lecture and some observing!

For Memorial Day weekend there is the Riverside Telescope Makers Conference at Camp Oakes, Big Bear City! Persons can start arriving as early as Wednesday, May 25th. There will be observing, vendors, activities, and speakers. Come out for the day, or stay for awhile. Information is available on their website: <http://www.rtmcastronomyexpo.org/general.html>

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Our club summer picnic, Star-B-Que, is Saturday June 4th at 'Mt. Trotta' in Acton. Event starts at 3pm. Please sign up at the next meeting for the Potluck, or please call me to let me know what you would like to bring. If you would like to donate something for the raffle or silent auction, please contact one of the board members to let them know what you will be bringing. There will be observing during the evening. *There is no parking for RV's at their new home!*

Our meeting for June, Friday the 10th, will have Dr. Daniel Barth come and speak on 'Supernovae, Standard Candles, and Dark Energy'. Dr. Barth is currently the Physics/Astronomy Program Chair at Tahquitz High School in Hemet, CA and the Associate Professor of Astronomy at Mt. San Jacinto College in San Jacinto, CA where he runs the astronomy program, and teaches astronomy and physics in the Upward Bound program.

On Saturday, June 11th, there will be a PDW Moon Walk with Jeremy starting at 8:30pm. We need members with telescopes to show the public some of the objects of the night sky!

Tuesday, June 14th will be another Acton Library Astronomy Lecture and Star Party. Starting time is at 7:30pm. We will need members with telescopes. Come on out to hear Jeremy speak on 'The Total Energy of the Universe is Zero', followed by some observing.

Attention!! Payment is due for the Mt. Wilson trip! An email with the Paypal payment link has already gone out to those members who have signed up. If you have not received this please let me know. If you cannot pay via the link, please pay at the May meeting. You may give our Treasurer Virginia a check or cash. Payment is \$36 per person. If you cannot attend the meeting to pay, please mail the payment to the club's address and make sure it arrives to us before June 1st! We have to make out our club's check to Mt. Wilson on June 1st. We will also be opening up any empty spaces to non members the middle of May!



Director of Community Development

Frank Moore

It's the small things....or the "small ones".

You know, sometimes I get tired and wonder "why we do, what we do" in regard to public outreach events.

Such was the case on the night of March 3 when I participated in a little star party as part of the Science Fair at Leona Valley Elementary School.

It was too soon after Rose's knee replacement surgery for her to participate, Don and Tom were out of town on business, and we'd received no response to our requests for volunteers with telescopes. Thinking I'd be the only one there with a telescope for the kids, I somewhat reluctantly loaded up the car and drove the 65 miles from our house in Tehachapi to the Leona Valley school.

I set up in the parking lot and watched everyone else leave as they took a dinner break between science fair judging and the awards. I was quite relieved when, prior to leaving, Kelly Koonce told me that Jeremy Amarant would be there with a telescope later in the evening.

Later, the teachers, parents, students, and their families began to trickle back into the parking lot and proceed into the cafeteria. Jeremy showed up, with his two boys, and set up next to me. "At least", I thought, "There will be someone here who knows what he's talking about."

As it got darker, the sky became transparent and viewing became quite spectacular. Jeremy and I were showing the kids and their parents various objects and I had slewed over to the Andromeda Galaxy. Then, it happened, the cutest little dark haired girl climbed the step stool to look through the telescope. She couldn't have been over six years old. She peered into the eyepiece and proclaimed, "I can't see anything." I looked, and I couldn't see anything either, and then I noticed that she'd accidentally fogged the eyepiece with her breath. I fanned the eyepiece till it cleared, told her to hold her breath, and she looked again. She was ecstatic proclaiming "I see it. I see it.", and telling her mom to look as well.

Her response was the best I'd had all night, and it would have ended there, but then she placed her hands on her hips, looked at the hand controller for our mount, and started to read aloud, "M three one", and then, "O h, 4 3 m, 3 5 dot 4 s RA, 41 star (it was actually an asterisk for degrees) 22 29 D E C"...and I explained to her that the ' and " stood for arc minutes and arc seconds. As best as I could, in kids terms, I told her that what she'd read was basically the sky map location for the Andromeda Galaxy, in Right Ascension and Declination (I tried to explain that as well), at that very minute. Her eyes were wide as saucers and she moved back and forth between the eyepiece and the hand controller.

Rose's car was parked a few feet away and I said, "Want to see something cool?", and she said "Yes".

I then pointed at the license plate and she literally squealed with delight as she read, "M 31 GLXY". It was if she thought I was magic in making the license plate match what was on the telescope controller. She gathered up friends, and family, and gleefully showed it to them as well.

She thought I was magic, but I felt all the magic was in her and her wide eyed wonder. She literally made my night and left me with the feeling that trip had been worth more to me...than it was to the kids. Come out to an outreach event. You might just get more out of it than you could imagine.

Space Place

Cosmic Recount

by Dr. Tony Phillips

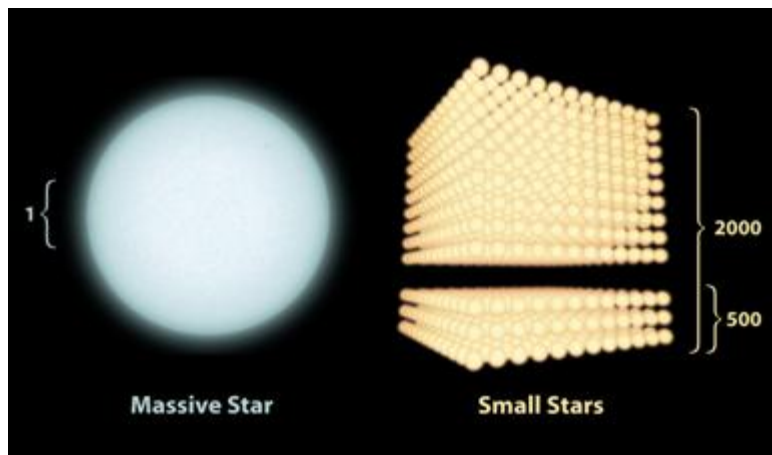
News flash: The Census Bureau has found a way to save time and money. Just count the biggest people. For every NBA star like Shaquille O'Neal or Yao Ming, there are about a million ordinary citizens far below the rim. So count the Shaqs, multiply by a million, and the census is done.

Could the Bureau really get away with a scheme like that? Not likely. Yet this is just what astronomers have been doing for decades.

Astronomers are census-takers, too. They often have to estimate the number and type of stars in a distant galaxy. The problem is, when you look into the distant reaches of the cosmos, the only stars you can see are the biggest and brightest. There's no alternative. To figure out the total population, you count the supermassive Shaqs and multiply by some correction factor to estimate the number of little guys.

The correction factor astronomers use comes from a function called the "IMF"—short for "initial mass function." The initial mass function tells us the relative number of stars of different masses. For example, for every 20-solar-mass giant born in an interstellar cloud, there ought to be about 100 ordinary sun-like stars. This kind of ratio allows astronomers to conduct a census of all stars even when they can see only the behemoths.

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Astronomers have recently found that some galaxies have as many as 2000 small stars for every 1 massive star. They used to think all galaxies had only about 500 small stars for every 1 massive star.

Now for the real news flash: The initial mass function astronomers have been using for years might be wrong.

NASA's Galaxy Evolution Explorer, an ultraviolet space telescope dedicated to the study of galaxies, has found proof that small stars are more numerous than previously believed.

"Some of the standard assumptions that we've had—that the brightest stars tell you about the whole population—don't seem to work, at least not in a constant way," says Gerhard R. Meurer who led the study as a research scientist at Johns Hopkins University, Baltimore, Md. (Meurer is now at the University of Western Australia.)

Meurer says that the discrepancy could be as high as a factor of four. In other words, the total mass of small stars in some galaxies could be four times greater than astronomers thought. Take that, Shaq!

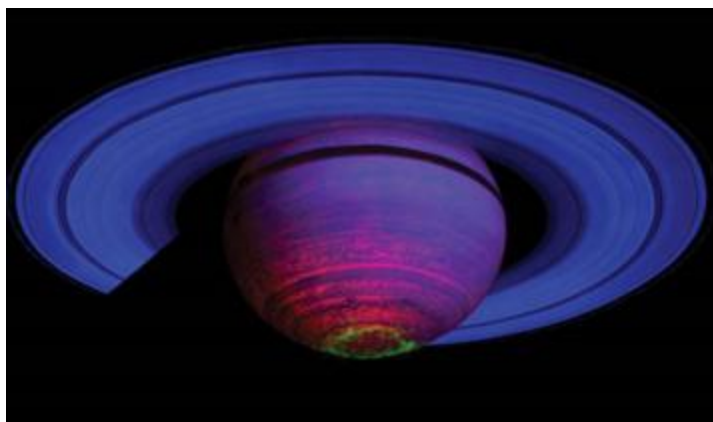
The study relied on data from Galaxy Evolution Explorer to sense UV radiation from the smaller stars in distant galaxies, and data from telescopes at the Cerro Tololo Inter-American Observatory to sense the "H-alpha" (red light) signature of larger stars. Results apply mainly to galaxies where stars are newly forming, cautions Meurer.

"I think this is one of the more important results to come out of the Galaxy Evolution Explorer mission," he says. Indeed, astronomers might never count stars the same way again.

Find out about some of the other important discoveries of the Galaxy Evolution Explorer at <http://www.galex.caltech.edu/>. For an easy-to-understand answer for kids to "How many solar systems are in our galaxy?" go to The Space Place at: <http://tiny.cc/I2KMa>

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



Compilation of data collected by Cassini's visual and infrared mapping spectrometer (VIMS) has revealed images of the infrared aurora that stretches 1000km above the cloud tops. Here a composite false-colour VIMS image uses blue for reflected sunlight (2–3 μ m), green for infrared light from hydrogen ions (3–4 μ m) and red indicates thermal emission at 5 μ m. The dark cloud bands across the face of Saturn are silhouetted in the thermal glow from the interior of the planet, highlighting the importance of cloud circulation, while the high-altitude haze and rings reflect sunlight.

News Headlines

Large galaxies stopped growing 7 billion years ago

Galaxies are thought to develop by the gravitational attraction between and merger of smaller 'sub-galaxies', a process that standard cosmological ideas suggest should be ongoing. But new data from a team of scientists from Liverpool John Moores University directly challenges this idea, suggesting that the growth of some of the most massive objects stopped 7 billion years ago when the Universe was half its present age. On Monday 18 April team member Claire Burke will present their work at the Royal Astronomical Society's National Astronomy Meeting (NAM 2011) in Llandudno, Wales.

<http://www.ras.org.uk/news-and-press/217-news2011/1947-nam-03-large-galaxies-stopped-growing-7-billion-years-ago>

SOFIA Completes First Flight of German Science Instrument

The Stratospheric Observatory for Infrared Astronomy, or SOFIA, completed its first science flight Wednesday, April 6, using the German Receiver for Astronomy at Terahertz Frequencies (GREAT) scientific instrument. GREAT is a high-resolution far-infrared spectrometer that finely divides and sorts light into component colors for detailed analysis.

http://www.nasa.gov/mission_pages/SOFIA/11-104.html

Voyager Set to Enter Interstellar Space

More than 30 years after they left Earth, NASA's twin Voyager probes are now at the edge of the solar system. Not only that, they're still working. And with each passing day they are beaming back a message that, to scientists, is both unsettling and thrilling. The message is, "Expect the unexpected."

<http://www.jpl.nasa.gov/news/news.cfm?release=2011-128>

NASA'S Chandra Finds New Evidence on Origin of Supernovas

Astronomers may now know the cause of an historic supernova explosion that is an important type of object for investigating dark energy in the universe. The discovery, made using NASA's Chandra X-ray Observatory, also provides strong evidence that a star can survive the explosive impact generated when a companion star goes supernova.

<http://www.spaceref.com/news/viewpr.html?pid=33422>

The "Pioneer Anomaly": Case Closed

When NASA launched twin Pioneer spacecraft toward the outer solar system in the early 1970s, there was no dilly-dallying. Rocketing away from Earth at more than 32,000 miles (51,000 km) per hour, Pioneer 10 reached Jupiter in just 21 months. Pioneer 11 followed about a year later, then boomeranged out to Saturn. By 1979, their planet-hopping days were over.

<http://www.skyandtelescope.com/news/119226989.html>

NASA Telescope Ferrets Out Planet-Hunting Targets

Astronomers have come up with a new way of identifying close, faint stars with NASA's Galaxy Evolution Explorer satellite. The technique should help in the hunt for planets that lie beyond our solar system, because nearby, hard-to-see stars could very well be home to the easiest-to-see alien planets.

<http://www.galex.caltech.edu/newsroom/glx2011-01f.html>

May Sky Data

Best time for deep sky observing this month:
May 1 thru May 4 and May 25 thru May 31

Mercury is at its greatest distance west of the Sun on May 7th, but it rises less than an hour before sunrise. We are unlikely to see this elusive little planet this month.

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

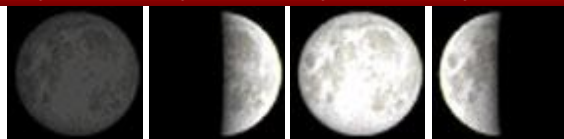
Mars is another planet rising only a few minutes before the Sun. The “Red Planet” is on the far side of its orbit, and quite faint, so we have no chance of seeing it this month.

The giant planet **Jupiter** is the fourth naked-eye planet hiding in the dawn this month. However, this one becomes less difficult to see as the weeks go by. If you have a very clear eastern horizon on the morning of Sunday May 29th, and you can find the narrow waning Moon, you could try looking for Jupiter 6 degrees below it, in a “seven o’clock” direction.

Saturn is the only planet we are likely to see this month; it’s well up in the southern sky at dusk, and sets in the west around sunrise. Relative to the stars, Saturn is moving very slowly north-westwards in the constellation of Virgo, drawing upwards away from the bright star Spica (alpha Virginis) towards the fainter gamma Virginis. Saturn is a little brighter than Spica, and it shines with a steadier light. On the night of Sunday May 14th, our own Moon, waxing gibbous, will be to the lower right of Saturn; the following night, the Moon will appear below and left of the planet.

There are no significant **meteor-showers** for northern-hemisphere observers in May.

New May 2 First Qtr May 10 Full May 17 Last Qtr May 24



Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
5/1/2011	04:51	18:30	06:01	19:36
5/5/2011	07:28	22:16	05:57	19:40
5/10/2011	12:29	01:13	05:53	19:44
5/15/2011	18:14	04:11	05:49	19:47
5/20/2011	23:17	08:43	05:45	19:51
5/25/2011	01:29	13:37	05:43	19:55
5/31/2011	04:37	19:14	05:40	19:59

Planet Data

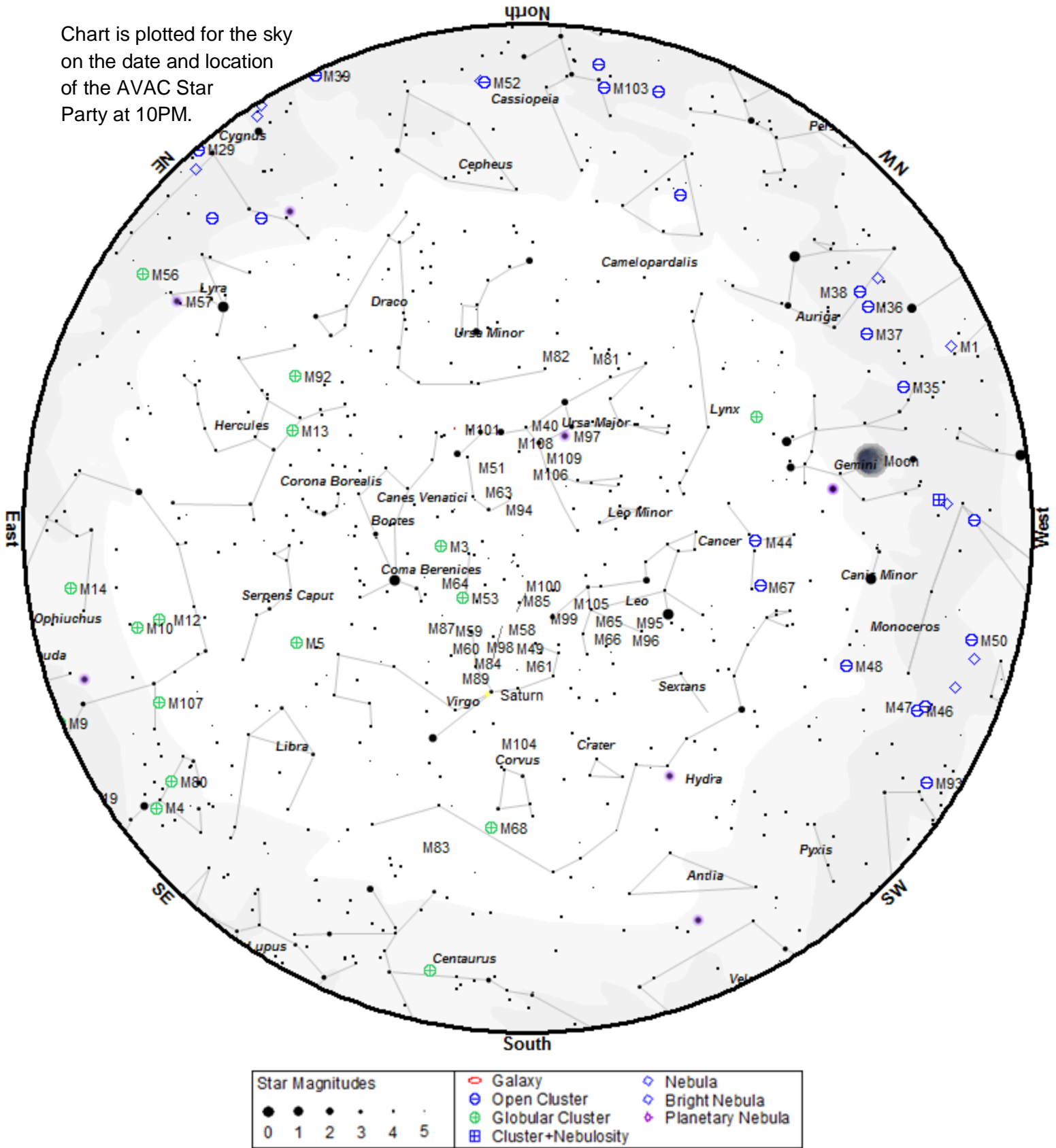
	May 1			
	Rise	Transit	Set	Mag
Mercury	03:57	10:15	16:34	0.8
Venus	03:46	10:05	16:23	-3.9
Mars	04:07	10:39	17:11	1.3
Jupiter	04:07	10:36	17:08	-2.1
Saturn	16:00	22:00	04:01	0.5

	May 15			
	Rise	Transit	Set	Mag
Mercury	03:42	10:15	16:47	0.1
Venus	03:36	10:13	16:49	-3.9
Mars	03:41	10:24	17:07	1.3
Jupiter	03:21	09:53	16:29	-2.1
Saturn	15:02	21:03	03:04	0.6

	May 31			
	Rise	Transit	Set	Mag
Mercury	03:52	10:56	17:55	-1.0
Venus	03:29	10:26	17:22	-3.9
Mars	03:12	10:07	17:03	1.3
Jupiter	02:27	09:04	15:43	-2.2
Saturn	13:56	19:58	01:59	0.7

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 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	19:47	20:05	20:49	easy
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	19:48	20:13	20:48	obvious
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	20:03	20:17	20:53	detectable
NGC 3242	PNe	8.6	Hya	10h24m46.1s	-18°38'32"	19:46	20:17	21:04	obvious
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	19:57	20:19	21:46	easy
NGC 3227	Gal	11.5	Leo	10h23m30.6s	+19°51'54"	20:01	20:23	21:52	difficult
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	19:58	20:27	00:55	easy
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	19:58	20:27	00:40	detectable
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	19:57	20:28	23:24	detectable
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	19:57	20:29	23:27	detectable
M 104	Gal	9.1	Vir	12h39m59.3s	-11°37'22"	19:58	21:21	00:07	detectable
M 68	Glob	7.3	Hya	12h39m28.0s	-26°44'36"	20:01	21:24	23:34	detectable
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	20:05	22:55	01:52	detectable
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	19:59	22:55	02:27	easy
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	20:03	22:55	00:24	difficult
M 84	Gal	10.1	Vir	12h25m03.9s	+12°53'12"	19:59	22:55	00:24	detectable
M 49	Gal	9.3	Vir	12h29m46.8s	+08°00'01"	19:57	22:55	00:27	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	19:58	22:55	01:50	easy
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	19:59	22:55	01:14	detectable
M 86	Gal	9.8	Vir	12h26m12.2s	+12°56'44"	20:01	22:55	00:11	detectable
M 87	Gal	9.6	Vir	12h30m49.2s	+12°23'29"	19:59	22:55	00:31	detectable
M 83	Gal	7.8	Hya	13h37m00.8s	-29°51'56"	20:54	22:55	00:14	detectable
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	20:17	22:56	02:19	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	20:00	22:56	01:00	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	20:00	22:56	02:38	easy
NGC 5897	Glob	8.4	Lib	15h17m24.0s	-21°00'36"	22:55	00:07	01:32	difficult
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	21:09	00:08	03:20	easy
NGC 5986	Glob	7.6	Lup	15h46m03.0s	-37°47'12"	23:31	00:35	01:40	detectable
M 80	Glob	7.3	Sco	16h17m02.0s	-22°58'30"	00:07	01:06	02:06	detectable
NGC 6178	Open	7.2	Sco	16h35m47.0s	-45°38'36"	00:35	01:25	02:15	easy
NGC 6193	Open	5.4	Ara	16h41m20.0s	-48°45'48"	00:32	01:31	02:30	detectable
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	21:30	01:31	03:41	easy
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	22:43	01:36	03:41	easy
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	23:04	01:46	03:38	detectable
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	00:01	01:50	03:31	detectable
M 19	Glob	6.8	Oph	17h02m38.0s	-26°16'06"	00:04	01:51	03:30	detectable
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	22:00	02:06	03:41	easy
NGC 6322	Open	6.5	Sco	17h18m25.0s	-42°56'00"	00:48	02:08	03:27	easy

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
M 9	Glob	7.8	Oph	17h19m12.0s	-18°31'00"	00:17	02:08	03:34	detectable
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	00:32	02:24	03:40	easy
NGC 6388	Glob	6.8	Sco	17h36m17.0s	-44°44'06"	01:46	02:26	03:04	detectable
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	23:43	02:27	03:39	detectable
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	00:22	02:29	03:43	easy
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	00:00	02:35	03:36	detectable
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	01:04	02:43	03:40	easy
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	20:25	02:45	03:51	obvious
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	00:59	02:45	03:39	detectable
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	01:54	02:51	03:42	easy
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	01:45	02:52	03:38	detectable
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	02:31	02:52	03:16	easy
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	23:11	02:57	03:56	obvious
NGC 6541	Glob	6.3	CrA	18h08m02.0s	-43°42'54"	02:13	02:57	03:32	detectable
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	00:44	03:02	03:46	obvious
M 17	Open	7.3	Sgr	18h20m47.0s	-16°10'18"	01:37	03:02	03:33	detectable
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	01:07	03:02	03:44	easy
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	23:43	03:03	03:43	easy
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	01:12	03:06	03:40	detectable
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	00:22	03:06	03:39	easy
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	23:07	03:08	03:46	easy
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	01:35	03:08	03:39	detectable
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	00:39	03:10	03:39	detectable
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	01:07	03:10	03:39	detectable
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	02:46	03:10	03:41	detectable
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	00:43	03:13	03:40	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	00:49	03:13	03:40	easy
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	00:33	03:13	03:44	obvious
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	00:38	03:13	03:40	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	00:41	03:14	03:43	easy
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	02:05	03:14	03:41	detectable
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	00:41	03:14	03:43	easy
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	01:04	03:15	03:40	easy
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	01:57	03:15	03:40	detectable
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	02:11	03:16	03:34	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	02:38	03:17	03:31	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	02:43	03:17	03:41	obvious
M 54	Glob	7.7	Sgr	18h55m03.0s	-30°28'42"	02:16	03:17	03:37	difficult
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	02:55	03:18	03:40	detectable
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	02:11	03:19	03:41	easy
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	02:10	03:20	03:49	easy
NGC 6723	Glob	6.8	Sgr	18h59m33.0s	-36°37'54"	02:25	03:20	03:42	detectable
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	02:57	03:22	03:40	detectable
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	02:33	03:23	03:41	detectable
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	03:13	03:25	03:52	obvious

A.V.A.C. Information

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