



Desert Sky Observer

Volume 30

Antelope Valley Astronomy Club Newsletter

October 2010

Up-Coming Events

- October 2: Dark Sky Star Party @ [Red Cliffs Natural Preserve](#)
- October 8: Club Meeting*
- October 11: Board meeting @ [Don's house](#)
- October 23: Super Science Saturday @ [Joe Walker Middle School](#)
- October 23: Moon Walk @ [Prime Desert Woodlands](#)

* 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 just returned from PATS the Pacific Astronomy & Telescope Show. Sure it was fun to look at the gear and hope to win a raffle or two (I didn't). But even better was the opportunity to talk with some of the guys and gals behind the companies that we do business with. I was fortunate enough to pick the brain of Wally Pacholka as he revealed most of his wide field imaging techniques. I chatted with Vic Maris as he told me about how he came to design the TL-6 mount I own (and why they no longer sell it).



Comet Hale-Bopp over Indian Cove

the integral drive system of a \$185000 telescope!

Of course Farah and John from Woodland Hills Camera & Telescope were present, helpful and friendly as ever. This is the great thing about our hobby. It is nearly a cottage industry and, for example, someone like Anthony Davolo (ADM Accessories) gives you some of his knobs and gadgets to try then lets you keep them (just ask Frank!). These guys are out at Mt. Pinos or RTMC or any star party using the same gear and having the same problems and questions that all of us have!

I spoke with the guys at Planewave and got a demo of the CDK-700, a .7 meter Observatory-grade system with dual-Nasmyth focus. The cool thing is that it uses the exact same SiTech servo control system that I put on my Schaefer mount. Of course it also employs Dan Gray's 3-phase direct drive brushless motors with ultra hi res encoders. I remember watching a video of Dan making his prototype out of old dryer parts and lifting counterweights attached to the output shaft with a piece of rope. Now it's



Planewave CDK-700

Well, come on out to Red Cliffs the first Saturday in October and join us for our monthly star party. I'll be trying out Wally's techniques and you never know who might show up!

I would like to take this opportunity to ask for your help. Your club needs you. There are a small group of folks that keep this club going and I implore you to think about lending a hand. The Executive Board brings you monthly star parties and excellent guest speakers. Our public outreach to the schools and communities is essential to the growth of the club. Events like the picnic, Christmas party, private star parties and tours as well as the use of the SAGE planetarium would be non-existent without the efforts of your officers and committee chairmen.

Come out to the annual business meeting this October 8th and throw your name into the hat – you won't regret it.



Vice President

Doug Drake

Jeremy Amarant, our SAGE Planetarium Director, will provide us with some of his new software program presentation. After we have our annual business meeting Jeremy will show off his new program that is sure to delight us. We have no changes submitted to our AVAC Constitution so our business meeting (Friday Oct 8) will mostly be elections for the new 2011 Board members. Our club needs your presence so you can voice topics about what things you would like our club to be doing.

Our Christmas Party (Saturday, Dec 11) will be at the Embassy Suites in Palmdale this year and will start at 6:00 PM. Please contact me (drake4812@roadrunner.com) if you would like to donate items for the free raffle or for the auction we have.

Doug



Director of Community Development

Rose Moore

Many thanks to Matt and Don for attending 'International Observe the Moon Night' hosted by Jeremy at the SAGE on Sept. 18th! Approximately 40 persons attended the event. Also many thanks to those who attended PATS in Pasadena, and helped out at our booth! Special thanks to Darrell for arriving early and setting up and for logging in the most time in the booth! We all had a good time and spent just a little bit of money! There were some great door prizes, including a Celestron 6 inch GoTo, two 8 inch Dobs donated by Orion, and the raffle of a 3 inch refractor from Astronomers Without Borders. There were also some great speakers including Alex Filippenko, Scott Kardel, Dave Jurasevich, and Geoff Marcy!

Upcoming events for October include our club star party at Red Cliffs on Saturday, Oct. 2nd. On Saturday, October 23rd we have the annual Joe Walker Middle School 'Super Science Saturday', starting at 8am till 12:30pm. We need volunteers with telescopes and other astronomy items of interest to bring to the

event. Please contact me, or sign up at the next club meeting. There is a Beginners Astro Class at the SAGE Planetarium the afternoon of October 23rd, please contact Jeremy for more details if you are interested in attending. Also on evening of the 23rd is a Prime Desert Moon Walk with Jeremy, starting at 6:30pm. Please come on out with your telescopes and show the public what we do!!

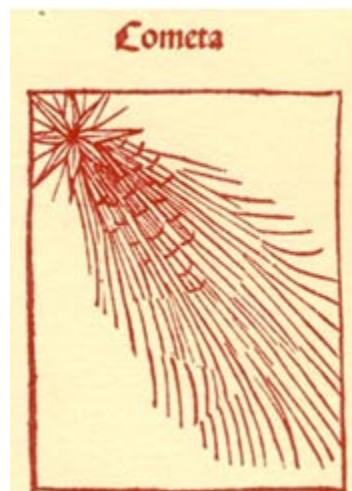
Please remember that our club meeting on Friday, October 8th, is a very important meeting for our members to attend! We are having our annual business meeting, starting at 7pm. Please come and vote for your Executive Board members for next year! Also join in discussions of club business! Your vote, and opinion, counts!

Rose

Comet Code: Understanding How Comets are Named by Tom Koonce

Two hundred years ago, the discoverer of a prominent comet usually had their name incorporated into the official name of the object, but not always. The first named comet was Halley's Comet, named after Sir Edmund Halley who had calculated its orbit and made the discovery that it was a regular visible visitor to the inner solar system. The comet is now officially known as Comet Halley. The name credit for the comet 2P/Encke, discovered in 1786 by Pierre Méchain, was given to the man who calculated its orbit, Johann Franz Encke. If the comet was exceptionally bright and non-periodic, they were known as "The Great Comet of..." followed by the year in which they were observed.

The naming of comets became standardized in the early twentieth century, retaining the names of up to the first three independent discoverers. Comet White-Ortiz-Bolelli (formal designation C/1970 K1) was named for its discoverers amateur astronomer Graeme White, Air France Pilot Emilio Ortiz, and professional astronomer Carlos Bolelli. More recently, comets have been discovered by robotic space-borne instruments, and the instrument's name is included like Comet IRAS-Araki-Alcock (C/1983 H1), discovered by a team of scientists using the Infrared Astronomical Satellite (IRAS), and two amateur astronomers, George Alcock and Genichi Araki.



Wood cut thought to represent Halley's Comet dated 684 A.D.



Photo of C/2009 R1, (Comet McNaught, discovered September 9, 2009 by Robert H McNaught.)

Photo credit: Ria Novosti

The "Old Style" of naming comets gave them a provisional designation of the year of their discovery followed by a lower case letter indicating its order of discovery in that year. Comet Bennett is designated Comet 1969i, the 9th comet discovered in 1969. This worked well until 1987 when more than 26 comets were discovered in a single year. The alphabet was used again with a "1" subscript (Comet Skorichenko-George, 1989e1). In 1989, the count got as high as 1989h1 with 34 comets discovered that year. Once the orbit had been established, the comet was given a permanent designation in order of time of closest approach to the Sun, consisting of the year followed by a Roman numeral. For example, Comet Bennett (1969i) became 1970 II.

More and more comets began to be discovered and the naming procedure became unwieldy, so in 1994 the International Astronomical Union (IAU) approved a new naming system called the "New Style". Using the New Style, comets are designated by the year of their discovery followed by a letter indicating the half-month of the discovery. "A" denotes the first half of January, "B" denotes the second half of January, "C" denotes the first half of February, "D" denotes the second half of February, etc., and a number indicating the order of discovery. As an example, the third comet discovered in the second half of October 2010 would be designated 2010 U3. "I" and "Z" are not used when describing the half of a particular month the comet was discovered because they can be easily confused as the numbers 1 and 2 respectively.

Prefixes are also added to indicate the nature of the comet, with "P/" indicating a periodic comet, "C/" indicating a non-periodic comet, "X/" indicating a comet for which no reliable orbit could be calculated (typically comets described in historical chronicles), "D/" indicating a comet which has broken up or been lost, and "A/" indicating an object at first thought to be a comet but later reclassified as an asteroid. Periodic comets also have a number indicating the order of their discovery. Thus Halley's Comet, the first comet to be identified as periodic, has the systematic name 1P/1682 Q1. Comet Shoemaker-Levy 9 was the ninth periodic comet jointly discovered by Carolyn and Eugene Shoemaker, and David Levy but its systematic name is D/1993 F2. It was discovered in 1993 and the prefix "D/" is applied, since it was observed to break up and crash into Jupiter. (Ref. http://wapedia.mobi/en/Astronomical_naming_conventions?t=8.)



Photo of C/1995 O1 (Comet Hale-Bopp, discovered July 23, 1995)

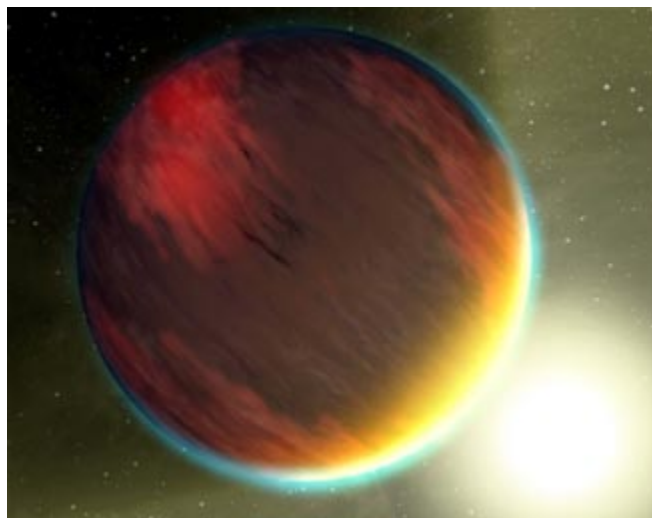
Now you can decode the name designations of comets. Stars are another story altogether... For example, Betelgeuse = Alpha Orionis = HR 2061 = BD +7 1055 = HD 39801 = SAO 113271 = PPM 149643, whose coordinates in the sky are RA 05:55:10.306, Dec +07:24:25.35 (2000.0), the bright red supergiant in Orion. There is a system determined by the IAU for naming all astronomical objects. It just takes some time and study to make sense of it.

Space Place

The Hunt is On! By Carolyn Brinkworth

The world of astronomy was given new direction on August 13, 2010, with the publication of the Astro2010 Decadal Survey. Astro2010 is the latest in a series of surveys produced every 10 years by the National Research Council (NRC) of the National Academy of Sciences. This council is a team of senior astronomers who recommend priorities for the most important topics and missions for the next decade. Up near the top of their list this decade is the search for Earth-like planets around other stars—called “extrasolar planets” or “exoplanets”—which has become one of the hottest topics in astronomy.

The first planet to be found orbiting a star like our Sun was discovered in 1995. The planet, called “51 Peg b,” is a “Hot Jupiter.” It is about 160 times the mass of Earth and orbits so close to its parent star that its gaseous “surface” is seared by its blazing sun. With no solid surface, and temperatures of about 1000 degrees Celsius (1700 Fahrenheit), there was no chance of finding life on this distant world. Since that discovery, astronomers have been on the hunt for smaller and more Earth-like planets, and today we know of around 470 extrasolar planets, ranging from about 4 times to 8000 times the mass of Earth.



Artist's rendering of hot gas planet HD209458b. Both the Hubble and Spitzer Space Telescopes have detected carbon dioxide, methane, and water vapor in the atmosphere of this planet, although since it is a hot ball of gas, it would be unlikely to harbor life.

This explosion in extrasolar planet discoveries is only set to get bigger, with a NASA mission called Kepler that was launched last year. After staring at a single small patch of sky for 43 days, Kepler has detected the definite signatures of seven new exoplanets, plus 706 “planetary candidates” that are unconfirmed and in need of further investigation. Kepler is likely to revolutionize our understanding of Earth's place in the Universe.

We don't yet have the technology to search for life on exoplanets. However, the infrared Spitzer Space Telescope has detected molecules that are the basic building blocks of life in two exoplanet atmospheres. Most extrasolar planets appear unsuitable for supporting life, but at least two lie within the “habitable zone” of their stars, where conditions are theoretically right for life to gain a foothold.

We are still a long way from detecting life on other worlds, but in the last 20 years, the number of known planets in our Universe has gone from the 8 in our own Solar System to almost 500. It's clear to everyone, including the Astro2010 decadal survey team, that the hunt for exoplanets is only just beginning, and the search for life is finally underway in earnest.

Explore Spitzer's latest findings at <http://www.spitzer.caltech.edu>. Kids can dream about finding other Earths as they read “Lucy's Planet Hunt” at <http://spaceplace.nasa.gov/en/kids/storybooks/#lucy>.

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

News Headlines

"Potentially Habitable" Planet Found

As soon as you can read these words when the news embargo lifts, the media worldwide are going to light up with the discovery of the first "potentially habitable" planet beyond Earth. Readers in the know, however, will realize that this milestone is less revolutionary than it sounds.

<http://www.skyandtelescope.com/community/skyblog/newsblog/104031014.html>

Dwarf Galaxy Evolution: Reionization Alone Is Not Able to Stop Star Formation, Research Shows

A team of astronomers has provided evidence suggesting that reionization alone is not able to stop star formation in dwarf galaxies, as had been expected. The Big Bang model predicts that the universe started out as completely ionized plasma, which later cooled and allowed all of the atoms to recombine into neutral atoms. The first generation of stars and galaxies formed from this neutral material and produced high energy radiation which then "reionized" the universe. This period of reionization ended approximately 1 billion years after the Big Bang.

<http://www.sciencedaily.com/releases/2010/09/100910130737.htm>

NASA's EPOXI Mission Sets Up for Comet Flyby

Earlier today, navigators and mission controllers for NASA's EPOXI mission watched their computer screens as 23.6 million kilometers (14.7 million miles) away, their spacecraft successfully performed its 20th trajectory correction maneuver. The maneuver refined the spacecraft's orbit, setting the stage for its flyby of comet Hartley 2 on Nov. 4. Time of closest approach to the comet was expected to be about 10: 02 a.m. EDT (7:02 a.m. PDT).

<http://science.nasa.gov/science-news/>

Encounters with Comet Hartley 2

An icy visitor is positioning itself for good evening viewing. Periodic Comet 103P/Hartley 2 will be high in the evening sky when at its best throughout October 2010, glowing at perhaps 6th or 5th magnitude. It should be dimly visible to the unaided eye from very dark locations, and visible in binoculars and telescopes from less ideal locations throughout the Northern Hemisphere.

<http://www.skyandtelescope.com/observing/home/102632669.html>

Earth to Have Closest Encounter With Jupiter until 2022

Been outside at midnight lately? There's something you really need to see. Jupiter is approaching Earth for the closest encounter between the two planets in more than a decade--and it is dazzling. The night of closest approach is Sept. 20-21st. This is also called "the night of opposition" because Jupiter will be opposite the sun, rising at sunset and soaring overhead at midnight. Among all denizens of the midnight sky, only the moon itself will be brighter.

http://www.nasa.gov/topics/solarsystem/features/jupiter_encounter.html

Chandra Finds Evidence for Stellar Cannibalism

Evidence that a star has recently engulfed a companion star or a giant planet has been found using NASA's Chandra X-ray Observatory. The likely existence of such a "cannibal" star provides new insight into how stars and the planets around them may interact as they age.

http://www.nasa.gov/mission_pages/chandra/news/10-118.html

October Sky Data

Best time for deep sky observing this month:
October 2 through October 13

Mercury is at superior conjunction – almost directly behind the Sun – on October 17th. We're unlikely to see this elusive little planet this month.

Venus is at inferior conjunction – almost directly in front of the Sun – on October 29th. We won't be able to see the "Evening Star" this month.

Mars sets less than an hour after the Sun, so the "Red Planet" is also unavailable for viewing this month.

Jupiter is the one planet to be seen in the night sky this month – the giant planet was in opposition (to the Sun) on September 21st, so it's well placed for viewing.

At dusk, Jupiter is well up in the east, and it's due south in the late evening. Relative to the genuine stars, which are all much fainter, Jupiter is moving slowly south-westwards out of the constellation of Pisces, entering Aquarius on October 15th.

Throughout the evening of Tuesday 19th October and into the early hours of Wednesday 20th, our own gibbous Moon will appear above and to the right of Jupiter.

Saturn, like Mercury, is at superior conjunction this month, on October 1st. But it then moves into the dawn sky; by the end of October, Saturn should be visible low in the eastern sky about 6 am

The Orionid **meteor shower** is active during the second half of October; it will probably peak around Friday 22nd, but activity stays high for a week or more. The radiant is in the northern part of Orion, to the upper left of Betelgeuse, so a few Orionid meteors may be seen even in the late evening; but the best rates will be in the early hours of the morning. Unfortunately, this year there will be a lot of moonlight, which will tend to drown out the fainter meteors.

October is also generally a good time of the year for seeing sporadic meteors, which may appear at any time, in any part of the sky.

New Oct 4 First Qtr Oct 10 Full Oct 17 Last Qtr Oct 25



Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
10/1/2010	-----	14:28	06:46	18:35
10/5/2010	04:23	17:01	06:49	18:29
10/10/2010	10:18	20:23	06:53	18:23
10/15/2010	14:25	00:12	06:57	18:16
10/20/2010	16:44	04:51	07:01	18:10
10/25/2010	19:47	09:44	07:06	18:05
10/31/2010	00:58	14:23	07:11	17:58

Planet Data

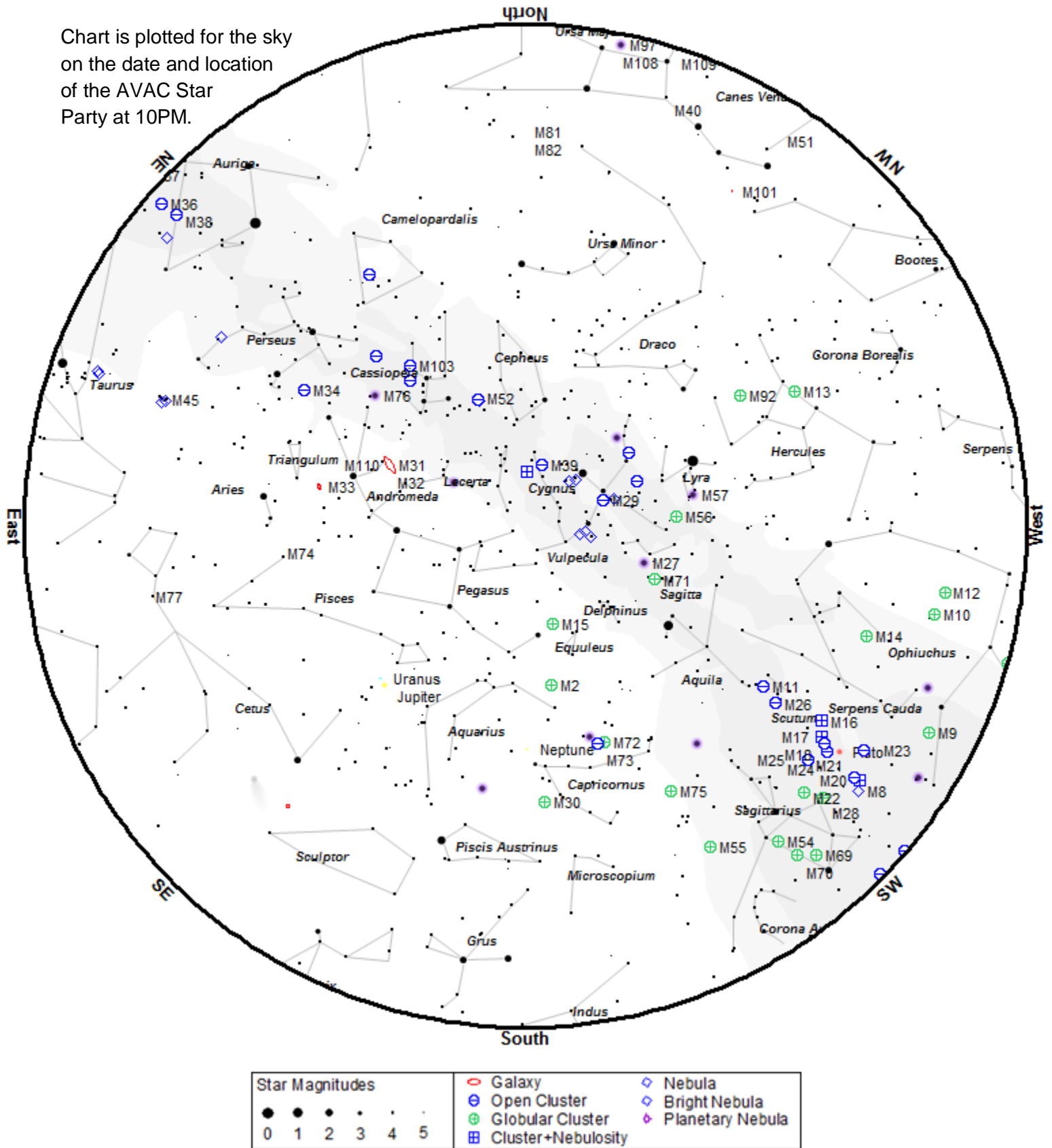
	Oct 1			
	Rise	Transit	Set	Mag
Mercury	04:49	11:04	17:18	-1.2
Venus	08:37	13:41	18:43	-4.6
Mars	08:23	13:46	19:08	1.5
Jupiter	17:01	23:00	04:59	-2.9
Saturn	05:36	11:39	17:46	0.9

	Oct 15			
	Rise	Transit	Set	Mag
Mercury	05:53	11:38	17:22	-1.5
Venus	07:39	12:44	17:43	-4.4
Mars	08:16	13:29	18:42	1.5
Jupiter	16:02	21:59	03:56	-2.9
Saturn	04:49	10:50	16:55	0.9

	Oct 31			
	Rise	Transit	Set	Mag
Mercury	06:59	12:11	17:27	-0.7
Venus	05:50	11:05	16:25	-4.1
Mars	08:09	13:13	18:17	1.4
Jupiter	14:55	20:51	02:47	-2.8
Saturn	03:55	09:54	15:57	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 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	18:26	18:59	21:09	obvious
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	18:38	19:01	21:27	easy
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	18:37	19:02	21:22	easy
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	18:41	19:02	21:05	easy
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	18:29	19:03	23:25	obvious
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	18:40	19:03	20:34	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	18:35	19:04	22:46	easy
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	18:31	19:06	21:13	easy
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	18:39	19:07	21:54	detectable
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	18:36	19:12	22:58	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	18:37	19:14	23:09	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	18:37	19:18	23:17	easy
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	18:37	19:29	23:52	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	18:38	19:30	23:40	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	18:29	20:10	22:48	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	18:38	20:35	00:10	easy
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	18:38	20:37	01:02	easy
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	18:40	20:39	23:47	detectable
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	19:50	20:45	21:43	detectable
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	18:34	20:59	03:07	obvious
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	18:43	21:20	01:02	detectable
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	20:06	21:35	23:04	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	19:01	22:30	01:03	detectable
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	19:48	23:02	01:03	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	18:38	23:03	04:34	obvious
NGC 55	Gal	8.5	Scl	00h15m08.4s	-39°13'13"	21:31	23:20	01:03	difficult
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	20:18	23:45	02:33	detectable
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	19:30	23:47	03:45	easy
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	19:25	23:48	03:47	easy
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	21:54	23:53	01:25	detectable
NGC 288	Glob	8.1	Scl	00h52m45.0s	-26°35'00"	22:35	23:58	01:03	difficult
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	18:50	00:25	04:43	obvious
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	18:50	00:34	04:41	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	18:45	00:39	04:45	obvious
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	21:02	00:39	03:49	detectable
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	20:35	00:47	04:26	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	18:41	00:48	04:47	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	19:22	00:51	04:41	easy

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	20:40	01:02	04:36	challenging
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	21:05	01:02	04:52	obvious
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	21:44	01:02	04:33	detectable
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	20:31	01:02	04:42	easy
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	19:35	01:02	04:46	obvious
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	19:31	01:02	04:46	obvious
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	21:40	01:02	04:39	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	22:16	01:02	04:48	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	21:13	01:02	04:50	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	22:11	01:02	04:45	easy
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	22:31	01:02	04:43	easy
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	22:54	01:02	04:22	detectable
Hyades	Open	0.8	Tau	04h26m54.0s	+15°52'00"	23:18	03:40	04:46	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	00:26	03:57	04:41	detectable
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	22:59	04:02	04:46	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	01:10	04:08	04:42	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	00:21	04:14	04:43	detectable
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	23:48	04:15	04:48	easy
NGC 1851	Glob	7.1	Col	05h14m06.0s	-40°02'48"	03:14	04:15	04:41	detectable
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	00:11	04:17	04:46	easy
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	01:33	04:17	04:48	easy
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	01:12	04:19	04:46	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	00:31	04:19	04:50	obvious
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	01:54	04:19	04:42	detectable
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	01:02	04:19	04:48	obvious
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	01:51	04:22	04:45	obvious
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	02:25	04:22	04:44	easy
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	02:29	04:22	04:42	detectable
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	03:39	04:23	04:37	difficult
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	02:26	04:23	04:44	easy
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	02:04	04:24	04:51	obvious
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	03:14	04:24	04:42	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	03:34	04:25	04:47	easy
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	04:20	04:25	04:43	easy
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	03:22	04:27	04:43	easy
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	04:16	04:27	04:44	easy
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	04:20	04:27	04:46	obvious
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	04:26	04:27	04:41	detectable
NGC 2440	PNe	11.5	Pup	07h41m55.4s	-18°12'31"	03:54	04:29	04:41	detectable
M 93	Open	6.5	Pup	07h44m30.0s	-23°51'24"	03:44	04:30	04:46	easy
NGC 2439	Open	7.1	Pup	07h40m45.0s	-31°41'36"	04:06	04:33	04:45	easy

A.V.A.C. Information

Membership in the Antelope Valley Astronomy Club is open to any individual or family.

The Club has three categories of membership.

- Family membership at \$30.00 per year.
- Individual membership at \$25.00 per year.
- Junior membership at \$15.00 per year.

Membership entitles you to...

- Desert Sky Observer—monthly newsletter.
- The Reflector – the publication of the Astronomical League.
- The A.V.A.C. Membership Manual.
- To borrow club equipment, books, videos and other items.

AVAC

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