



Desert Sky Observer

Volume 38

Antelope Valley Astronomy Club Newsletter

November 2018

Up-Coming Events

November 1: [Nightfall Star Party](#)

November 9: Club Meeting*

November 10: [EFBC Red Light Tours Star Party](#)

November 17: [Prime Desert Moon Walk](#)

* Monthly meetings are held at the S.A.G.E. Planetarium 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 Frank Moore

Greetings members. As the mid-term election approaches I have the answer to the most important election question of the year, “Who are the new board members for the Antelope Valley Astronomy Club?” I’m glad you asked. At the very lightly attended AVAC Business Meeting on Friday October 12, the following officers were elected to lead the Antelope Valley Astronomy Club in 2019.

President: Darrell Bennett

Vice President: Matt Leone

Treasurer: Rod Girard

Community Development: Robert Lynch Jr.

Secretary: Currently Vacant

As you can see, once again we have a board position that is vacant and which really needs to be filled. Please, if you would be willing to serve as Secretary of the Board, please send us a note and contact any of the old or new board members. It would really be nice to have a new Secretary before the transitional board meeting in December, and before the new board takes over in January, so they can hit the ground running.

As we had previously stated, and even though I was again nominated, Rose and I were not running for reelection and we just weren’t up to serving another term at this time. We wish to offer out heartfelt gratitude to the members who stepped up to lead the club and look forward to having new eyes, and new ideas, at the helm of the organization.

On the date of our October 6 Dark Sky Star Party, many members were out of town, with other events or obligations. Our own Rod Girard and two other people from other clubs were the only astronomers present at the Chuchupate observing site and, as temperatures dropped, none of them made it through the night. Because many of us will be attending the Nightfall Star Party in Borrego Springs from Thursday November 1 to Sunday November 4 we won’t be attempting to have our previously scheduled Dark Sky Star Party (Nov 3). Rather, our November 10 “Red Light Tours” event at the Exotic Feline Breeding Compound in Rosamond, will serve as our monthly star party. We will have our telescopes set up on the grounds of the facility for viewing as the docents lead guests, via red light only, to observe the exotic cats after dark. The

event is scheduled to start of 6:00 PM with setup at 5:00 (or earlier if we can get approval). Details will be sent via a separate email.

On Saturday October 20, we supported Jeremy Amaranat at the monthly Prime Desert Woodland Moonwalk. This was preceded by Jeremy's famous, annual "Scary Science" event in the interpretive center. This was also International Observe The Moon Night and we tried to emphasize lunar observing with a lunar map on display and various views of the Moon, Jupiter, Saturn, Mars, Neptune and M57 on a diverse variety of telescopes and at various magnifications. We counted 138 members of the public and six members of the AVAC with four optical instruments available for viewing (3 telescopes, one binocular).

Remember, our Annual Christmas Party is on Saturday December 8 at Gino's Italian Ristorante in the Lancaster Marketplace. They did a wonderful job for our event last year and we're looking forward to their excellent food and service again. Rose has included details on the deadline to RSVP and ticket purchases and payment in her DSO submission and separate email.

Once again, and as was the case last year, we are NOT going to have a silent auction at the Christmas Party this year. This just takes up too much room and too much time, and causes too much work for our board members, especially the Treasurer, when we'd rather be relaxing and enjoying the friendship and fellowship at the event. We WILL be having a door prize and raffle for which everyone in attendance will receive one free ticket with additional chances available for purchase.

The donation of raffle items is welcome but certainly not required and, again as we did last year, we will be placing them, wrapped, under a tree for winners to come up to select. You may wrap your donations, place them in small gift bags, or just bring them unwrapped and we will place them in gift bags at the event. Raffle items need not be astronomy related but no "white elephants" or joke gifts please! Mutually agreeable exchanges of the raffle items will certainly be allowed. You may give your items to a board member at the next AVAC meeting or just bring them to the Christmas Party. Sponsors, or members with businesses who donate raffle items, may put a note or business card in the package in order to let the recipients know who generously donated them.

We hope to make it a special event and hope as many of you as possible will attend.

As we move into the winter months, keep your eyes on the sky and the frost off your optics.



Secretary
Rose Moore

All members who are planning to attend the AVAC Christmas Party: please read your emails that have been sent out!! Here is some of the information on the event: 1) The Christmas Party is on Saturday, Dec. 8th at 6pm. 2) The event is being held at Gino's Restaurante at 44960 Valley Central Way, Lancaster, CA 93536. This is the Marketplace, the same place we had the party last year. 3) This dinner will be a buffet, similar to last year's buffet. 4) The cost of the party is \$20 per person. Children are welcome. It is limited to members of AVAC and their guest(s). 5) Members may pay at the next club meeting on Friday Nov. 9th with cash or check; or mail a check to made out to the 'AVAC' and send it to our PO Box 8545, Lancaster, CA 93539; or you may pay via PayPal via the link on the home page of our website or via this link: <http://www.avastronomyclub.org/christmas.html>

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We will be having a raffle only. Members do not have to bring a gift. If you would like to bring a gift for the raffle, it does not have to be astronomy related. We will take anything, new or gently used as a gift. We ask if you can please wrap it up in wrapping paper, or you may wrap it in tissue paper and place it in a gift bag. We will have extra wrapping paper at the event to wrap up any last minute gifts.

If you have any questions, please email me, or call me and leave a voicemail. Money is due by Saturday Nov. 24th. I need to know if you are signing up for the party. If you are paying, please let me know you are going!! I need to keep track of the count for dinner.

At our next club meeting we will have a speaker, Dr. Jeff Rich, give a presentation on 'Merging Galaxies' and a short talk on the Carnegie Observatories. Please come out and support your club at our last regular meeting of the year! If you would like to give a small speaker donation, please see Rod Girard, Treasurer, before or after the speaker's presentation.

We have a special event at the Exotic Feline Breeding Compound in Rosamond on Saturday Nov. 10th at 6-11pm. This is their 'After Hours Red Light Tour'. More info will be coming out in an email. Those attending with the club and using telescopes will not have to pay to get in the compound. However, anyone planning to take just the tour, and the public who will attend, will have to pay a \$15 ticket fee. More info coming on this as well.

On Saturday Nov. 17th at 5:30pm we have a Prime Desert Moon Walk with Jeremy. We need members with telescopes. Free and open to the public, weather permitting.

Also, on Saturday December 1st at 5:30pm is another Prime Desert Moon Walk. This will be our last PDW for this year. A new schedule will be coming out after the holidays for 2019. Please come out and support Jeremy and the club for the Moon Walk!!

Happy Thanksgiving!

News Headlines

The Coincidence Between Two Overachieving NASA Missions

Two vastly different NASA spacecraft are about to run out of fuel: The Kepler spacecraft, which spent nine years in deep space collecting data that detected thousands of planets orbiting stars outside our solar system, and the Dawn spacecraft, which spent 11 years orbiting and studying the main asteroid belt's two largest objects, Vesta and Ceres. However, the two record-setting missions have more in common than their coincidentally low fuel levels. Both missions gathered data that broke new scientific ground, searching for answers inside and outside our solar system.

<https://go.nasa.gov/2DawbJ3>

Newborn Stars Blow Bubbles in the Cat's Paw Nebula

The Cat's Paw Nebula, recently imaged by NASA's Spitzer Space Telescope using the MIPS and IRAC instruments, is a star-forming region that lies inside the Milky Way Galaxy. New stars may heat up the surrounding gas, which can expand to form "bubbles." The nebula is a star-forming region in the Milky Way galaxy, located in the constellation Scorpius. Estimates of its distance from Earth range from about 4,200 to about 5,500 light-years.

<https://go.nasa.gov/2QaMMQ4>

Scientists Want to Launch a Satellite to Make an Artificial Aurora

How the magnetosphere creates auroras is mostly a mystery. When a particle from the Sun hits the magnetosphere, it lights up a corresponding part of the ionosphere with an aurora, but there's no way to tell which part of the magnetosphere is connected to which part of the ionosphere.

The CONNecTion EXplorer—or CONNEX for short—consists mainly of a satellite that will fire electron particles at the planet. Those particles will be captured by the magnetosphere and make it to the ionosphere as artificial aurora. Because we know exactly where those particles are hitting the magnetosphere, CONNEX lets us map different parts of the ionosphere to different parts of the magnetosphere.

<https://bit.ly/2DfxRB8>

Slowest ever pulsar star discovered by PhD student

An approximately 14 million year old pulsar star that is the "slowest-spinning" of its kind ever identified has been discovered by a PhD student from The University of Manchester. Until now, the slowest-spinning pulsar known had a rotation period of 8.5 seconds. This new pulsar, which is located in the constellation Cassiopeia some 5,200 light-years away from Earth, spins at the much slower rate of once every 23.5 seconds. What makes the discovery even more unlikely is that the radio emission lasts just 200 milliseconds of the 23.5 second rotation period.

<https://bit.ly/2Q3fNNi>

November Sky Data

New Nov 7 First Qtr Nov 15 Full Nov 22 Last Qtr Nov 29



Planet Summary

Mercury reaches its greatest elongation east from the Sun on November 6th but, as the angle of the ecliptic to the horizon in the evening is shallow at this time of the year, it will be lost in the Sun's glare as it moves towards inferior conjunction on the 27th of the month.

Venus will be seen in the east before sunrise from around the 6th of the month. A low eastern horizon will be needed though. Venus rapidly increases in elevation as November progresses and will have an elevation of ~20 degrees before sunrise by month's end. Its angular size reduces from 60.6 to 41.4 arc seconds during the month as it moves away from the Earth but, at the same time, its phase increases from just 1% to 25% - which is why the brightness actually increases from -3.4 to a dazzling -4.4 magnitudes.

Mars, though fading from magnitude -0.4 to +0.1, actually becomes more prominent in the southern sky as it climbs higher in elevation from ~17 degrees at the start of the month to ~27 degrees by its end. Its angular size falls from 11.9 arc seconds to 9.3 arc seconds during the month. It should still be possible with a small to medium sized telescope to spot details, such as Syrtis Major.

Jupiter is now moving towards its superior conjunction behind the Sun on November 26th and will not be visible this month.

Saturn will be visible in the southwest after sunset at the beginning of November but disappears into the Sun's glare by the end of the month. Its disk has an angular size of 15.7 arc seconds falling to 15.2 during the month as its brightness reduces from 1.7 to 1.6 magnitudes. The rings are well open and spanning ~2.5 times the size of Saturn's globe.

The peak night of the Leonids **meteor shower** is expected from midnight to dawn on Saturday and Sunday mornings, November 17 and 18. Although a bright waxing gibbous moon will be out for much of the night on the peak dates, try watching this shower during the predawn hours, or after the moon has set.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
11/1/2018	00:42	14:44	07:14	17:58
11/5/2018	04:05	16:12	06:17	16:54
11/10/2018	09:08	19:31	06:22	16:51
11/15/2018	12:52	23:52	06:27	16:47
11/20/2018	15:35	03:40	06:32	16:44
11/25/2018	19:25	09:03	06:36	16:43
11/30/2018	n/a	13:05	06:41	16:41

Planet Data

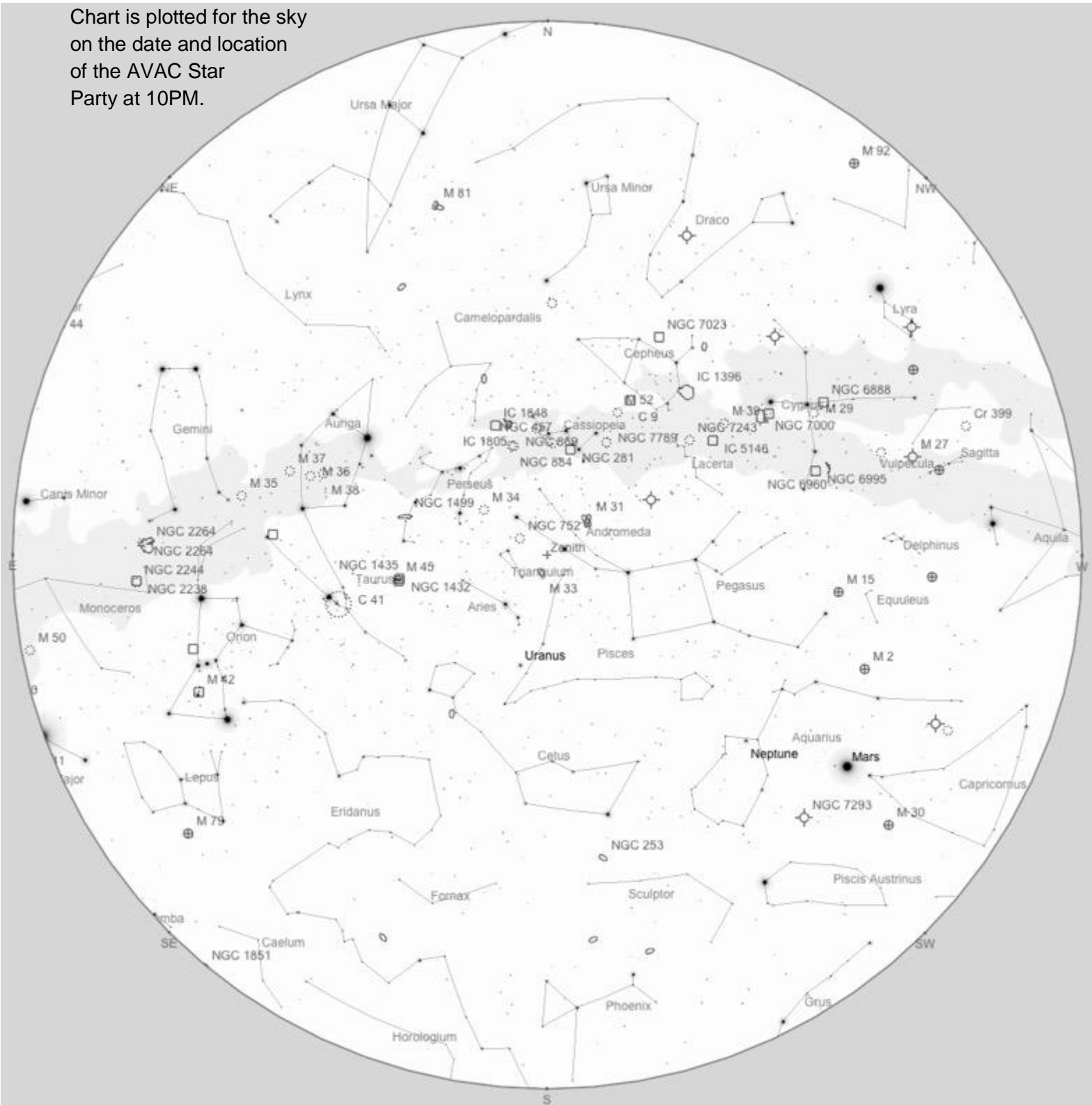
	Nov 1			
	Rise	Transit	Set	Mag
Mercury	09:13	14:09	19:05	-0.1
Venus	06:34	11:53	17:12	-3.4
Mars	14:34	19:50	01:07	-0.4
Jupiter	08:48	13:57	19:06	-1.3
Saturn	11:36	16:33	21:30	1.7

	Nov 15			
	Rise	Transit	Set	Mag
Mercury	08:11	13:02	17:54	0.4
Venus	04:15	09:47	15:20	-4.2
Mars	13:00	18:27	23:53	-0.1
Jupiter	07:08	12:14	17:21	-1.3
Saturn	09:46	14:43	19:40	1.7

	Nov 31			
	Rise	Transit	Set	Mag
Mercury	06:01	11:12	16:23	1.8
Venus	03:31	09:07	14:43	-4.4
Mars	12:25	18:03	23:40	0.1
Jupiter	06:25	11:29	16:34	-1.3
Saturn	08:53	13:50	18:48	1.6

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 transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
M72	Glob	Aqr	20h 53m 28s	-12°32'14"	10.0	12:25	17:54	23:22
NGC6992	Neb	Cyg	20h 56m 19s	+31°44'36"		10:14	17:57	01:39
NGC6995	Neb	Cyg	20h 57m 10s	+31°14'06"		10:17	17:57	01:38
M73	Open	Aqr	20h 58m 56s	-12°38'07"	9.0	12:31	17:59	23:27
NGC7000	Neb	Cyg	20h 59m 18s	+44°31'00"		09:08	18:00	02:51
NGC7008	P Neb	Cyg	21h 00m 33s	+54°32'35"	13.0	06:57	18:01	05:04
NGC7006	Glob	Del	21h 01m 29s	+16°11'15"	10.6	11:14	18:02	00:50
NGC7009	P Neb	Aqr	21h 04m 11s	-11°21'50"	8.0	12:33	18:04	23:36
NGC7026	P Neb	Cyg	21h 06m 19s	+47°51'08"	13.0	08:47	18:07	03:26
NGC7027	P Neb	Cyg	21h 07m 02s	+42°14'10"	10.0	09:31	18:07	02:43
NGC7029	Gal	Ind	21h 11m 52s	-49°17'00"	11.8	15:32	18:12	20:52
NGC7048	P Neb	Cyg	21h 14m 15s	+46°17'18"	11.0	09:09	18:14	03:20
NGC7062	Open	Cyg	21h 23m 27s	+46°22'42"	8.3	09:17	18:24	03:30
NGC7067	Open	Cyg	21h 24m 23s	+48°00'36"	9.7	09:04	18:25	03:46
NGC7076	Neb	Cep	21h 26m 24s	+62°53'33"		Circum	18:27	Circum
M15	Glob	Peg	21h 29m 58s	+12°10'02"	7.5	11:54	18:30	01:07
NGC7086	Open	Cyg	21h 30m 27s	+51°36'00"	8.4	08:28	18:31	04:33
M39	Open	Cyg	21h 31m 42s	+48°25'00"	5.5	09:07	18:32	03:57
M2	Glob	Aqr	21h 33m 27s	-00°49'23"	7.5	12:33	18:34	00:34
M30	Glob	Cap	21h 40m 22s	-23°10'45"	8.5	13:45	18:41	23:36
NGC7160	Open	Cep	21h 53m 40s	+62°36'12"	6.1	Circum	18:54	Circum
NGC7177	Gal	Peg	22h 00m 41s	+17°44'16"	11.2	12:08	19:01	01:54
NGC7213	Gal	Gru	22h 09m 16s	-47°10'00"	10.5	16:11	19:09	22:08
NGC7226	Open	Cep	22h 10m 27s	+55°23'54"	9.6	Circum	19:11	Circum
NGC7296	Open	Lac	22h 28m 02s	+52°17'18"	10.0	09:15	19:28	05:42
NGC7301	Gal	Aqr	22h 30m 35s	-17°34'26"	14.0	14:17	19:31	00:44
NGC7308	Gal	Aqr	22h 34m 32s	-12°56'02"	14.0	14:08	19:35	01:02
NGC7331	Gal	Peg	22h 37m 04s	+34°24'57"	9.5	11:43	19:37	03:31
NGC7354	P Neb	Cep	22h 40m 20s	+61°17'07"	13.0	Circum	19:41	Circum
NGC7380	Open	Cep	22h 47m 21s	+58°07'54"	7.2	Circum	19:48	Circum
NGC7448	Gal	Peg	23h 00m 04s	+15°58'49"	11.7	13:13	20:00	02:48
NGC7492	Glob	Aqr	23h 08m 27s	-15°36'41"	11.5	14:49	20:09	01:28
NGC7538	Neb	Cep	23h 13m 38s	+61°30'42"		Circum	20:14	Circum
NGC7582	Gal	Gru	23h 18m 23s	-42°22'14"	10.6	16:46	20:19	23:51
NGC7612	Gal	Peg	23h 19m 44s	+08°34'35"	14.0	13:54	20:20	02:46
NGC7619	Gal	Peg	23h 20m 15s	+08°12'23"	11.1	13:55	20:20	02:46
NGC7635	Neb	Cas	23h 20m 45s	+61°12'42"		Circum	20:21	Circum
NGC7662	P Neb	And	23h 25m 54s	+42°32'06"	9.0	11:48	20:26	05:04
NGC7686	Open	And	23h 30m 07s	+49°08'00"	5.6	10:58	20:30	06:03

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7721	Gal	Aqr	23h 38m 49s	-06°31'05"	11.8	14:54	20:39	02:24
NGC7723	Gal	Aqr	23h 38m 57s	-12°57'40"	11.1	15:12	20:39	02:06
NGC7727	Gal	Aqr	23h 39m 54s	-12°17'35"	10.7	15:11	20:40	02:09
NGC7731	Gal	Psc	23h 41m 29s	+03°44'23"	14.0	14:29	20:42	02:55
NGC7743	Gal	Peg	23h 44m 21s	+09°56'01"	11.2	14:15	20:45	03:15
NGC7753	Gal	Peg	23h 47m 05s	+29°29'00"	13.0	13:14	20:47	04:21
NGC7762	Open	Cep	23h 50m 01s	+68°02'18"	10.0	Circum	20:50	Circum
NGC7785	Gal	Psc	23h 55m 19s	+05°54'56"	11.6	14:37	20:56	03:14
NGC7788	Open	Cas	23h 56m 46s	+61°23'59"	9.0	Circum	20:57	Circum
NGC7789	Open	Cas	23h 57m 24s	+56°42'30"	6.7	Circum	20:58	Circum
NGC7793	Gal	Scl	23h 57m 50s	-32°35'28"	9.1	16:37	20:58	01:19
NGC7790	Open	Cas	23h 58m 24s	+61°12'30"	8.5	Circum	20:59	Circum
NGC7822	Neb	Cep	00h 03m 36s	+67°09'00"		Circum	21:04	Circum
NGC24	Gal	Scl	00h 09m 56s	-24°57'52"	11.5	16:20	21:10	02:00
NGC40	P Neb	Cep	00h 13m 01s	+72°31'19"	11.0	Circum	21:13	Circum
NGC52	Gal	Peg	00h 14m 40s	+18°34'52"	14.0	14:19	21:15	04:10
NGC55	Gal	Scl	00h 15m 08s	-39°13'12"	8.0	17:25	21:15	01:06
NGC179	Gal	Cet	00h 37m 46s	-17°50'58"	14.0	16:25	21:38	02:51
NGC185	Gal	Cas	00h 38m 58s	+48°20'14"	9.2	12:15	21:39	07:03
M110	Gal	And	00h 40m 22s	+41°41'07"	8.9	13:08	21:41	06:13
NGC210	Gal	Cet	00h 40m 35s	-13°52'24"	10.9	16:16	21:41	03:05
M32	Gal	And	00h 42m 42s	+40°51'54"	9.1	13:15	21:43	06:11
M31	Gal	And	00h 42m 44s	+41°16'08"	4.3	13:13	21:43	06:13
NGC246	P Neb	Cet	00h 47m 03s	-11°52'19"	8.0	16:17	21:47	03:17
NGC247	Gal	Cet	00h 47m 08s	-20°45'35"	8.9	16:44	21:47	02:51
NGC254	Gal	Scl	00h 47m 28s	-31°25'16"	11.8	17:22	21:48	02:14
NGC288	Glob	Scl	00h 52m 45s	-26°35'01"	8.1	17:09	21:53	02:37
NGC309	Gal	Cet	00h 56m 43s	-09°54'50"	11.8	16:21	21:57	03:33
NGC428	Gal	Cet	01h 12m 56s	+00°58'55"	11.4	16:08	22:13	04:19
NGC452	Gal	Psc	01h 16m 15s	+31°02'01"	14.0	14:37	22:16	05:56
NGC467	Gal	Psc	01h 19m 10s	+03°18'02"	11.9	16:08	22:19	04:31
NGC487	Gal	Cet	01h 21m 55s	-16°22'15"	14.0	17:05	22:22	03:39
NGC494	Gal	Psc	01h 22m 55s	+33°10'25"	14.0	14:35	22:23	06:12
NGC559	Open	Cas	01h 29m 31s	+63°18'24"	9.5	Circum	22:30	Circum
M33	Gal	Tri	01h 33m 51s	+30°39'37"	6.2	14:56	22:34	06:12
NGC636	Gal	Cet	01h 39m 06s	-07°30'45"	11.3	16:57	22:39	04:22
M76	P Neb	Per	01h 42m 18s	+51°34'15"	12.0	12:40	22:43	08:45
NGC637	Open	Cas	01h 43m 04s	+64°02'24"	8.2	Circum	22:43	Circum
NGC672	Gal	Tri	01h 47m 54s	+27°25'59"	10.8	15:23	22:48	06:14
NGC676	Gal	Psc	01h 48m 57s	+05°54'26"	11.0	16:30	22:49	05:08
NGC752	Open	And	01h 57m 41s	+37°47'06"	5.7	14:47	22:58	07:08
NGC786	Gal	Ari	02h 01m 25s	+15°38'47"	14.0	16:15	23:02	05:48
NGC869	Open	Per	02h 19m 00s	+57°07'42"	4.0	Circum	23:19	Circum
NGC884	Open	Per	02h 22m 18s	+57°08'12"	4.0	Circum	23:23	Circum
NGC896	Neb	Cas	02h 25m 28s	+62°01'09"		Circum	23:26	Circum

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC945	Gal	Cet	02h 28m 37s	-10°32'19"	12.0	17:55	23:29	05:03
NGC981	Gal	Cet	02h 33m 00s	-10°58'26"	14.0	18:01	23:33	05:06
NGC1022	Gal	Cet	02h 38m 33s	-06°40'39"	11.4	17:54	23:39	05:23
NGC996	Gal	And	02h 38m 40s	+41°38'50"	14.0	15:06	23:39	08:11
NGC1042	Gal	Cet	02h 40m 24s	-08°26'01"	10.9	18:01	23:41	05:20
NGC1052	Gal	Cet	02h 41m 05s	-08°15'20"	10.6	18:01	23:41	05:22
NGC1044	Gal	Cet	02h 41m 06s	+08°44'17"	13.2	17:15	23:41	06:08
NGC1055	Gal	Cet	02h 41m 45s	+00°26'33"	10.6	17:38	23:42	05:46
NGC1098	Gal	Eri	02h 44m 54s	-17°39'35"	14.0	18:32	23:45	04:58
NGC1218	Gal	Cet	03h 08m 26s	+04°06'40"	12.8	17:55	00:09	06:23
NGC1261	Glob	Hor	03h 12m 16s	-55°12'57"	8.4	23:01	00:12	01:24
NGC1291	Gal	Eri	03h 17m 18s	-41°06'29"	8.5	20:38	00:18	03:57
NGC1284	Gal	Eri	03h 17m 45s	-10°17'20"	14.0	18:43	00:18	05:53
NGC1300	Gal	Eri	03h 19m 41s	-19°24'41"	10.4	19:12	00:20	05:28
NGC1326	Gal	For	03h 23m 56s	-36°27'51"	10.5	20:20	00:24	04:28
NGC1337	Gal	Eri	03h 28m 06s	-08°23'22"	11.7	18:48	00:28	06:08
NGC1344	Gal	For	03h 28m 19s	-31°04'05"	10.3	20:01	00:29	04:56
NGC1333	Neb	Per	03h 29m 20s	+31°24'56"		16:48	00:30	08:11
NGC1342	Open	Per	03h 31m 38s	+37°22'36"	6.7	16:23	00:32	08:40
NGC1407	Gal	Eri	03h 40m 12s	-18°34'48"	9.8	19:30	00:40	05:51
NGC1432	Neb	Tau	03h 45m 50s	+24°22'06"		17:32	00:46	08:00
NGC1435	Neb	Tau	03h 46m 10s	+23°45'54"		17:34	00:46	07:59
M45	Open	Tau	03h 47m 30s	+24°07'00"	1.6	17:34	00:48	08:01
NGC1491	Neb	Per	04h 03m 14s	+51°18'57"		15:05	01:03	11:02
NGC1499	Neb	Per	04h 03m 14s	+36°22'00"		17:00	01:03	09:07
NGC1507	Gal	Eri	04h 04m 27s	-02°11'19"	12.2	19:08	01:05	07:01
NGC1496	Open	Per	04h 04m 32s	+52°39'42"	10.0	14:45	01:05	11:24
NGC1501	P Neb	Cam	04h 06m 59s	+60°55'14"	13.0	Circum	01:07	Circum
NGC1502	Open	Cam	04h 07m 50s	+62°19'54"	5.7	Circum	01:08	Circum
NGC1514	P Neb	Tau	04h 09m 17s	+30°46'33"	10.0	17:31	01:09	08:48
NGC1535	P Neb	Eri	04h 14m 16s	-12°44'22"	10.0	19:47	01:14	06:42
NGC1549	Gal	Dor	04h 15m 45s	-55°35'31"	9.9	00:16	01:16	02:16
NGC1579	Neb	Per	04h 30m 14s	+35°16'47"		17:32	01:30	09:29
NGC1624	Open	Per	04h 40m 36s	+50°27'42"	10.4	15:53	01:41	11:28
NGC1640	Gal	Eri	04h 42m 14s	-20°26'06"	11.7	20:38	01:42	06:47
NGC1713	Gal	Ori	04h 58m 55s	-00°29'21"	14.0	19:58	01:59	08:01
NGC1788	Neb	Ori	05h 06m 53s	-03°20'27"		20:13	02:07	08:01
NGC1851	Glob	Col	05h 14m 07s	-40°02'46"	7.3	22:28	02:14	06:00
M79	Glob	Lep	05h 24m 11s	-24°31'29"	8.5	21:33	02:24	07:16
NGC1952	Neb	Tau	05h 34m 32s	+22°00'52"	8.4	19:28	02:35	09:41
NGC1973	Neb	Ori	05h 35m 05s	-04°43'55"		20:45	02:35	08:25
NGC1981	Open	Ori	05h 35m 09s	-04°25'54"	4.6	20:45	02:35	08:26
NGC1977	Neb	Ori	05h 35m 16s	-04°49'15"		20:46	02:35	08:25
M42	D Neb	Ori	05h 35m 16s	-05°23'25"	4.0	20:47	02:35	08:24
NGC1975	Neb	Ori	05h 35m 18s	-04°41'05"		20:45	02:36	08:26

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC1980	Neb	Ori	05h 35m 25s	-05°54'54"		20:49	02:36	08:22
M43	D Neb	Ori	05h 35m 31s	-05°16'03"	9.0	20:47	02:36	08:24
NGC1990	Neb	Ori	05h 36m 13s	-01°12'07"		20:37	02:36	08:36
NGC1999	Neb	Ori	05h 36m 25s	-06°42'57"		20:52	02:37	08:21
NGC2023	Neb	Ori	05h 41m 38s	-02°15'33"		20:45	02:42	08:38
NGC2024	Neb	Ori	05h 41m 42s	-01°51'24"		20:44	02:42	08:40
NGC1961	Gal	Cam	05h 42m 05s	+69°22'43"	11.1	Circum	02:42	Circum
NGC2022	P Neb	Ori	05h 42m 06s	+09°05'13"	12.0	20:15	02:42	09:10
NGC2064	Neb	Ori	05h 46m 18s	+00°00'21"		20:44	02:47	08:49
NGC2067	Neb	Ori	05h 46m 31s	+00°07'54"		20:44	02:47	08:50
M78	D Neb	Ori	05h 46m 45s	+00°04'48"	8.0	20:44	02:47	08:50
NGC2071	Neb	Ori	05h 47m 07s	+00°17'39"		20:44	02:47	08:51
NGC2141	Open	Ori	06h 02m 55s	+10°26'48"	9.4	20:32	03:03	09:35
NGC2149	Neb	Mon	06h 03m 31s	-09°43'50"		21:28	03:04	08:40
NGC2170	Neb	Mon	06h 07m 32s	-06°23'57"		21:22	03:08	08:53
NGC2169	Open	Ori	06h 08m 24s	+13°57'54"	5.9	20:27	03:09	09:50
M35	Open	Gem	06h 09m 00s	+24°21'00"	5.5	19:55	03:09	10:24
NGC2174	Neb	Ori	06h 09m 24s	+20°39'34"		20:08	03:10	10:12
NGC2182	Neb	Mon	06h 09m 31s	-06°19'35"		21:24	03:10	08:55
NGC2183	Neb	Mon	06h 10m 47s	-06°12'43"		21:25	03:11	08:57
NGC2185	Neb	Mon	06h 11m 00s	-06°13'36"		21:25	03:11	08:57
NGC2186	Open	Ori	06h 12m 07s	+05°27'30"	8.7	20:55	03:12	09:30
NGC2196	Gal	Lep	06h 12m 10s	-21°48'23"	11.2	22:12	03:12	08:13
NGC2194	Open	Ori	06h 13m 45s	+12°48'24"	8.5	20:36	03:14	09:52
NGC2207	Gal	CMa	06h 16m 22s	-21°22'22"	10.7	22:15	03:17	08:18
NGC2217	Gal	CMa	06h 21m 40s	-27°14'02"	10.4	22:40	03:22	08:04
NGC2223	Gal	CMa	06h 24m 36s	-22°50'19"	11.4	22:28	03:25	08:22
NGC2232	Open	Mon	06h 28m 01s	-04°50'48"	3.9	21:39	03:28	09:18
NGC2244	Open	Mon	06h 31m 56s	+04°56'35"	4.8	21:16	03:32	09:48
NGC2245	Neb	Mon	06h 32m 41s	+10°09'24"		21:02	03:33	10:04
NGC2247	Neb	Mon	06h 33m 05s	+10°19'17"		21:02	03:33	10:04
NGC2242	P Neb	Aur	06h 34m 07s	+44°46'38"	14.0	18:41	03:34	12:28
NGC2254	Open	Mon	06h 35m 49s	+07°40'24"	9.7	21:12	03:36	10:00
NGC2261	Neb	Mon	06h 39m 10s	+08°44'40"		21:13	03:39	10:06
NGC2264	Open	Mon	06h 40m 58s	+09°53'42"	3.9	21:11	03:41	10:11
M41	Open	CMa	06h 46m 01s	-20°45'24"	5.0	22:43	03:46	08:50
NGC2282	Neb	Mon	06h 46m 51s	+01°18'56"		21:41	03:47	09:53
NGC2281	Open	Aur	06h 48m 17s	+41°04'42"	5.4	19:20	03:48	12:17
NGC2298	Glob	Pup	06h 48m 59s	-36°00'15"	9.4	23:43	03:49	07:55
NGC2301	Open	Mon	06h 51m 45s	+00°27'36"	6.0	21:48	03:52	09:56
NGC2304	Open	Gem	06h 55m 11s	+17°59'18"	10.0	21:02	03:55	10:49
NGC2316	Neb	Mon	06h 59m 41s	-07°46'39"		22:18	04:00	09:41
M50	Open	Mon	07h 02m 42s	-08°23'00"	7.0	22:23	04:03	09:43
NGC2343	Open	Mon	07h 08m 06s	-10°37'00"	6.7	22:35	04:08	09:42
NGC2345	Open	CMa	07h 08m 18s	-13°11'36"	7.7	22:42	04:09	09:35

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2339	Gal	Gem	07h 08m 21s	+18°46'49"	11.6	21:12	04:09	11:05
NGC2354	Open	CMa	07h 14m 10s	-25°41'24"	6.5	23:27	04:14	09:02
NGC2353	Open	Mon	07h 14m 30s	-10°16'00"	7.1	22:40	04:15	09:49
NGC2355	Open	Gem	07h 16m 59s	+13°45'00"	10.0	21:36	04:17	10:58
NGC2359	Neb	CMa	07h 18m 30s	-13°13'36"		22:52	04:19	09:45
NGC2362	Open	CMa	07h 18m 41s	-24°57'18"	4.1	23:29	04:19	09:09
NGC2367	Open	CMa	07h 20m 06s	-21°52'54"	7.9	23:20	04:20	09:20
NGC2384	Open	CMa	07h 25m 10s	-21°01'18"	7.4	23:23	04:25	09:28
NGC2371	P Neb	Gem	07h 25m 34s	+29°29'17"	13.0	20:52	04:26	11:59
NGC2336	Gal	Cam	07h 27m 04s	+80°10'41"	10.5	Circum	04:27	Circum
NGC2392	P Neb	Gem	07h 29m 11s	+20°54'42"	10.0	21:26	04:29	11:32
NGC2421	Open	Pup	07h 36m 13s	-20°36'42"	8.3	23:32	04:36	09:41
M47	Open	Pup	07h 36m 35s	-14°29'00"	4.5	23:14	04:37	09:59
NGC2423	Open	Pup	07h 37m 06s	-13°52'18"	6.7	23:13	04:37	10:02
NGC2419	Glob	Lyn	07h 38m 08s	+38°52'54"	10.4	20:22	04:38	12:55
NGC2432	Open	Pup	07h 40m 53s	-19°04'36"	10.0	23:32	04:41	09:50
M46	Open	Pup	07h 41m 46s	-14°48'36"	6.5	23:20	04:42	10:04
NGC2438	P Neb	Pup	07h 41m 50s	-14°44'07"	10.0	23:20	04:42	10:04
NGC2440	P Neb	Pup	07h 41m 55s	-18°12'31"	11.0	23:31	04:42	09:54
NGC2429	Gal	Lyn	07h 43m 48s	+52°21'25"	14.0	18:30	04:44	14:58
M93	Open	Pup	07h 44m 30s	-23°51'24"	6.5	23:51	04:45	09:38
NGC2431	Gal	Lyn	07h 45m 14s	+53°04'30"	14.0	18:18	04:45	15:13
NGC2451	Open	Pup	07h 45m 15s	-37°58'00"	2.8	00:49	04:45	08:42
NGC2444	Gal	Lyn	07h 46m 53s	+39°01'56"	12.9	20:30	04:47	13:04
NGC2452	P Neb	Pup	07h 47m 26s	-27°20'07"	13.0	00:06	04:48	09:29
NGC2453	Open	Pup	07h 47m 35s	-27°11'42"	8.3	00:06	04:48	09:30
NGC2477	Open	Pup	07h 52m 10s	-38°31'48"	5.8	00:58	04:52	08:46
NGC2482	Open	Pup	07h 55m 12s	-24°15'30"	7.3	00:03	04:55	09:48
NGC2483	Open	Pup	07h 55m 39s	-27°53'42"	7.6	00:16	04:56	09:35
NGC2489	Open	Pup	07h 56m 15s	-30°03'48"	7.9	00:25	04:56	09:28
NGC2506	Open	Mon	08h 00m 01s	-10°46'12"	7.6	23:27	05:00	10:33
NGC2533	Open	Pup	08h 07m 04s	-29°53'00"	7.6	00:35	05:07	09:39
NGC2547	Open	Vel	08h 10m 09s	-49°12'54"	4.7	02:30	05:10	07:51
NGC2539	Open	Pup	08h 10m 37s	-12°49'06"	6.5	23:43	05:11	10:38
NGC2546	Open	Pup	08h 12m 15s	-37°35'42"	6.3	01:14	05:12	09:11
M48	Open	Hya	08h 13m 43s	-05°45'00"	5.5	23:27	05:14	11:01
NGC2567	Open	Pup	08h 18m 32s	-30°38'24"	7.4	00:50	05:19	09:48
NGC2579	Open	Pup	08h 20m 53s	-36°13'00"	7.5	01:16	05:21	09:26
NGC2610	P Neb	Hya	08h 33m 23s	-16°08'57"	14.0	00:16	05:34	10:51
NGC2626	Neb	Vel	08h 35m 31s	-40°40'18"		01:53	05:36	09:18
M44	Open	Cnc	08h 40m 24s	+19°40'00"	4.0	22:42	05:41	12:40
NGC2672	Gal	Cnc	08h 49m 22s	+19°04'28"	11.6	22:53	05:50	12:47
M67	Open	Cnc	08h 51m 18s	+11°48'00"	7.5	23:16	05:52	12:27
NGC2683	Gal	Lyn	08h 52m 42s	+33°25'14"	9.7	22:03	05:53	13:43
NGC2767	Gal	UMa	09h 10m 12s	+50°24'05"	14.0	20:24	06:10	15:57

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC2768	Gal	UMa	09h 11m 37s	+60°02'13"	10.0	Circum	06:12	Circum
NGC2792	P Neb	Vel	09h 12m 27s	-42°25'41"	14.0	02:41	06:13	09:45
NGC2782	Gal	Lyn	09h 14m 05s	+40°06'50"	11.5	21:51	06:14	14:37
NGC2809	Gal	Cnc	09h 17m 07s	+20°04'11"	14.0	23:17	06:17	13:18
NGC2832	Gal	Lyn	09h 19m 47s	+33°44'59"	11.5	22:29	06:20	14:11

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- Individual membership at \$25.00 per year.
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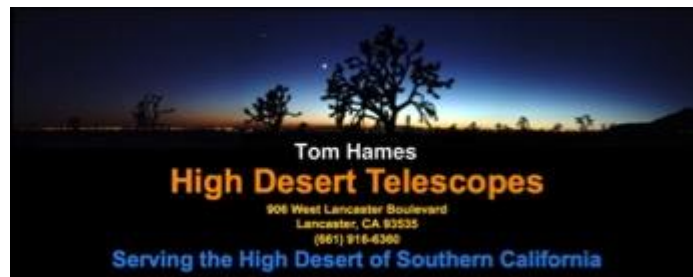


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