



Desert Sky Observer

Volume 36

Antelope Valley Astronomy Club Newsletter

November 2016

Up-Coming Events

November 11: Club Meeting*

November 19: [Prime Desert Moonwalk](#)

November 26: [Dark Sky Star Party](#)

* 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

As is often said, “Growing old ain’t for sissies.” I can’t even party like I used to without paying for it the next day (or two...).

To be clear, I’m not talkin’ about boozin’, brawlin’, rowdy parties. I’m talking about calm, quiet, dark sky star parties like the annual Nightfall Star Party from which Rose and I have just returned. Between getting ready for the trip, loading and unloading the motor home, driving around four and half hours each way, and staying up late observing Friday and Saturday night, I feel like I’ve been beaten with a stick. Of course, normal folks might sleep in late after observing late into the night but not me and with our dogs. They have no respect for how late I might have been up and, at home or on the road, get me up early with demands to be taken out on their...ahem...”constitutional” and to be fed.

For those of you unaware, Nightfall is a “different kind of star party” sponsored by the Riverside Astronomical Society. It’s held at the Palm Canyon Hotel and RV Resort in Borrego Springs, mere blocks from the headquarters of the Anza Borrego State Park which is an International Dark Sky Association Dark Sky Preserve. That said, how they achieved that designation is beyond me since there is a rather prominent sky glow to the north coming from Palm Springs. Still, the rest of the sky is great with a distinct milky way twinkling overhead.

Unlike RTMC and other similar events, there’s no registration to attend but, rather, reservations are made through the property and a “nominal fee” (\$12.00 per night) is attached to offset the cost of putting on the star party. The entire property goes “dark sky friendly” with outdoor lighting either turned off or dimmed with the use of red bulbs or filters. Even the restroom/bathhouses in the RV Park were equipped with red florescent tubes. Rose and I stayed in our motor home, in a “37 foot back in site” with full hook ups (electric, water, sewer, cable TV, and WiFi) for \$46.00 a night. Larger pull through sites are available for longer RV’s.

Attendees can either set their telescopes up adjacent to their RVs (or those of friends) or, for those staying in the hotel rooms, on one of two telescope fields one of which is dedicated to imaging. Power also is not a concern since AC electrical power is readily available on the telescope fields and of course in the RV sites. For those who don’t want to bring a telescope, there is still ample opportunity to view through telescopes brought by others and to attend the talks and lectures. The public star party on the main

telescope field went on well into the early morning hours. AVAC member Bob Ayres stayed in another hotel nearby but left his equipment in our camp overnight. Other AVAC members had their RV just a few sits down from us.

The daytime temperature on Friday October 28 reached 94 with a high of only 85 on Saturday. Still, with full hook ups in the RV sites so you could run your AC, air conditioned hotel rooms, lounges, restaurant and a club house, and two swimming pools there were many ways to escape the heat. The upside of those daytime temperatures is that it was comfortable t-shirt weather for nighttime observing with temperatures only dipping into the high 60's on Friday night and low 70's on Saturday.

There were scattered clouds early Friday night, which cleared off leaving sparkling clear observing conditions later on. Saturday night was more of challenge since there was always at least one direction that was obscured and scattered clouds drifting over left us chasing "sucker holes". Still, and even with the less than perfect sky conditions, we had a great time and we'd readily do it again.

We had wanted to attend this event for years and we're glad we finally did it. It's a unique combination of a dark sky site with a hotel and resort replete with amenities. Now that Rose and I have attended, and know the lay of the land, I think we'll encourage a greater turnout from our club in 2017 though we recognize that many of us may "blow our start party budget" on chasing the eclipse in August.

On the public outreach front, several of us participated in the College of the Canyons Fall Star Party, at the Canyon Country Campus, on Friday October 21. This was the first year that Rose and I remember having no moon for the event. Though the sky glow from Santa Clarita and the Greater Los Angeles area is significant, the AVAC members as well as those from the Local Group of the Santa Clarita Valley and the college's own student/astronomy club were able to share solar system and deep sky objects with the public. AVAC members participating included Rod Girard, Kris and Suzy Chase, Ellen Mahler, Darrell Bennett, Jeremy Amarant, and Rose and myself.

On the following night, Saturday October 22, we had our regular "Moonwalk" outreach event at Prime Desert Woodland Preserve. While Jeremy Amarant had the public on his "astronomy walk and talk", the sky went from partly cloudy to mostly cloudy and we had a bit of a challenging night. Members participating included Darrell Bennett, Rod and Donna Girard, Matt Leone and Tom Hames.

Upcoming events include our meeting at the SAGE Planetarium on Friday November 11 and a Prime Desert Woodland Preserve Moonwalk at 6:00 pm on Saturday November 19. Though the calendar shows a Dark Sky Star Party on the weekend of Saturday November 26, and in light of the fact that it is Thanksgiving weekend, I shall poll a few of the regular star party attendees before deciding whether or not to pursue scheduling it.

Finally, for those of you who weren't in attendance at our Annual Business Meeting and Board Election, the following slate of officers was elected for 2017. President – Frank Moore, Treasurer – Rod Girard, Secretary - Rose Moore. Director of Community Development – Robert Lynch Jr. The position of Vice President remains vacant and we are asking any of YOU who would be willing to serve to please step forward. We want to offer our heartfelt thanks to Rod Girard for stepping up to take on the vital position of Treasurer and for the manner in which he has enthusiastically become involved with our outreach activities. Thank you Rod !! You really hit the ground running.

Space Place

Is Proxima Centauri's 'Earth-like' planet actually like Earth at all?

By Ethan Siegel

Just 25 years ago, scientists didn't know if any stars—other than our own sun, of course—had planets orbiting around them. Yet they knew with certainty that gravity from massive planets caused the sun to move around our solar system's center of mass. Therefore, they reasoned that other stars would have periodic changes to their motions if they, too, had planets.



An artist's conception of the exoplanet Kepler-452b (R), a possible candidate for Earth 2.0, as compared with Earth (L). Image credit: NASA/Ames/JPL-Caltech/T. Pyle.

This change in motion first led to the detection of planets around pulsars in 1991, thanks to the change in pulsar timing it caused. Then, finally, in 1995 the first exoplanet around a normal star, 51 Pegasi b, was discovered via the “stellar wobble” of its parent star. Since that time, over 3000 exoplanets have been confirmed, most of which were first discovered by NASA's Kepler mission using the transit method. These transits only work if a solar system is fortuitously aligned to our perspective; nevertheless, we now know that planets—even rocky planets at the right distance for liquid water on their surface—are quite common in the Milky Way.

On August 24, 2016, scientists announced that the stellar wobble of Proxima Centauri, the closest star to our sun, indicated the existence of an exoplanet. At just 4.24 light years away, this planet orbits its red dwarf star in just 11 days, with a lower limit to its mass of just 1.3 Earths. If verified, this would bring the number of Earth-like planets found in their star's habitable zones up to 22, with 'Proxima b' being the closest one. Just based on what we've seen so far, if this planet is real and has 130 percent the mass of Earth, we can already infer the following:

- It receives 70 percent of the sunlight incident on Earth, giving it the right temperature for liquid water on its surface, assuming an Earth-like atmosphere.
- It should have a radius approximately 10 percent larger than our own planet's, assuming it is made of similar elements.
- It is plausible that the planet would be tidally locked to its star, implying a permanent 'light side' and a permanent 'dark side'.
- And if so, then seasons on this world are determined by the orbit's ellipticity, not by axial tilt.

Yet the unknowns are tremendous. Proxima Centauri emits considerably less ultraviolet light than a star like the sun; can life begin without that? Solar flares and winds are much greater around this world; have they stripped away the atmosphere entirely? Is the far side permanently frozen, or do winds allow possible life there? Is the near side baked and barren, leaving only the 'ring' at the edge potentially habitable?

Proxima b is a vastly different world from Earth, and could range anywhere from actually inhabited to completely unsuitable for any form of life. As 30m-class telescopes and the next generation of space observatories come online, we just may find out!

News Headlines

New Horizons Returns Last Bits of 2015 Flyby Data to Earth

NASA's New Horizons mission reached a major milestone this week when the last bits of science data from the Pluto flyby – stored on the spacecraft's digital recorders since July 2015 – arrived safely on Earth. Having traveled from the New Horizons spacecraft over 3.1 billion miles (five hours, eight minutes at light speed)....

<http://pluto.jhuapl.edu/News-Center/News-Article.php?page=20161027>

What is a solar prominence?

A seemingly easy concept, but one I hear told incorrectly at many outreach events.

The Sun's fiery hot sphere produces a variety of special features. Maybe the most intriguing is a so-called solar prominence. Astronomy enthusiasts, eclipse chasers, and Sun watchers talk about solar prominences all the time. So just what is a solar prominence, anyway?

<http://www.astronomy.com/observing/sky-events/2016/10/what-is-a-solar-prominence>

NASA's Juno Mission Exits Safe Mode, Performs Trim Maneuver

NASA's Juno spacecraft at Jupiter has left safe mode and has successfully completed a minor burn of its thruster engines in preparation for its next close flyby of Jupiter.

Mission controllers commanded Juno to exit safe mode Monday, Oct. 24, with confirmation of safe mode exit received on the ground at 10:05 a.m. PDT (1:05 p.m. EDT). The spacecraft entered safe mode on Oct. 18 when a software performance monitor induced a reboot of the spacecraft's onboard computer. The team is still investigating the cause of the reboot and assessing two main engine check valves.

<http://www.nasa.gov/feature/jpl/nasas-juno-mission-exits-safe-mode-performs-trim-maneuver>

Materials From Carl Sagan's College Courses Now Available Online

Are you ready for Astronomy 170 with Professor Sagan?

You can find links to all of the materials, including lecture notes and problem sets, in a blog post. Special Curator Trevor Owens wrote about the newly digitized material. Sagan may have been best known for his popular science books and TV show, *Cosmos*, but he also taught college classes for three decades. "He was a mentor and an educator to a range of scientists and non-scientists alike,"

<https://goo.gl/uDjFWg>

Mars rover stumbles upon strange object on Red Planet

NASA's Mars rover Curiosity stumbled upon a dark grey, golf-ball-sized object last week that looks nothing like the typical red-orange rocks that are normally seen on Mars. To figure out exactly what this weird rock is and where it came from, Curiosity used its on-board rock-zapping laser to analyze the rock's chemical composition. This test revealed that it is an iron-nickel meteorite that fell from the Martian sky. Curiosity's science team dubbed the newfound meteorite "Egg Rock."

<http://www.cbsnews.com/news/strange-meteorite-egg-rock-discovered-on-mars/>

November Sky Data

First Qtr
Nov 7Full
Nov 14Last Qtr
Nov 21New
Nov 29

**Best time for deep sky observing this month:
November 19 through November 30**



Mercury shining at magnitude -0.5 and with a disk some 5 arcs seconds across becomes visible low in the southwest after sunset by the third week of November and slowly climbs higher in the sky until it reaches its furthest angular distance from the Sun in mid December.

Venus sets some 2 hours after the Sun at the start of the month in the west but an hour later by month's end as it begins to dominate the evening sky. Its brightness increases from -4.0 to -4.1 magnitudes during the month while the angular size of its gibbous disk increases from 14 to 17%. As it does so its phase reduces from 78 to 70%, which explains why the brightness changes so little.

Mars, moving quickly eastwards through eastern Sagittarius and Capricornus, dims from magnitude +0.4 to +0.6 during November. The red planet can be seen low above the southern horizon throughout the month but, with a disk only ~7 arc seconds across, no surface features will be seen.

Jupiter is the only planet that can be seen in the pre-dawn sky this month rising some two and a half hours before the Sun at the start of November but by ~ 2:20 by the end of the month. On the first of November it will lie some 20 degrees above the southeastern horizon an hour before sunrise and some 10 degrees higher by month's end. Though at its smallest and dimmest, it still has a magnitude of ~-1.7 and shows a 32 arc second disk.

Saturn is still visible low in the southwest after sunset. However, as the month progresses it will sink lower and become harder to see. Sadly Saturn is moving towards the southern part of the ecliptic so for quite a few years will only be seen at low elevations.

The Leonids **meteor shower** will peak on the night of November 17 and early morning of November 18 in 2016, just 3 days after a Full Moon.

Sun and Moon Rise and Set

| Date | Moonrise | Moonset | Sunrise | Sunset |
|------------|----------|---------|---------|--------|
| 11/1/2016 | 08:48 | 19:36 | 07:12 | 17:57 |
| 11/5/2016 | 12:08 | 22:45 | 07:16 | 17:53 |
| 11/10/2016 | 14:31 | 01:45 | 06:21 | 16:49 |
| 11/15/2016 | 18:19 | 07:31 | 06:26 | 16:46 |
| 11/20/2016 | 23:21 | 12:04 | 06:30 | 16:43 |
| 11/25/2016 | 03:03 | 14:51 | 06:35 | 16:41 |
| 11/30/2016 | 07:29 | 18:01 | 06:40 | 16:40 |

Planet Data

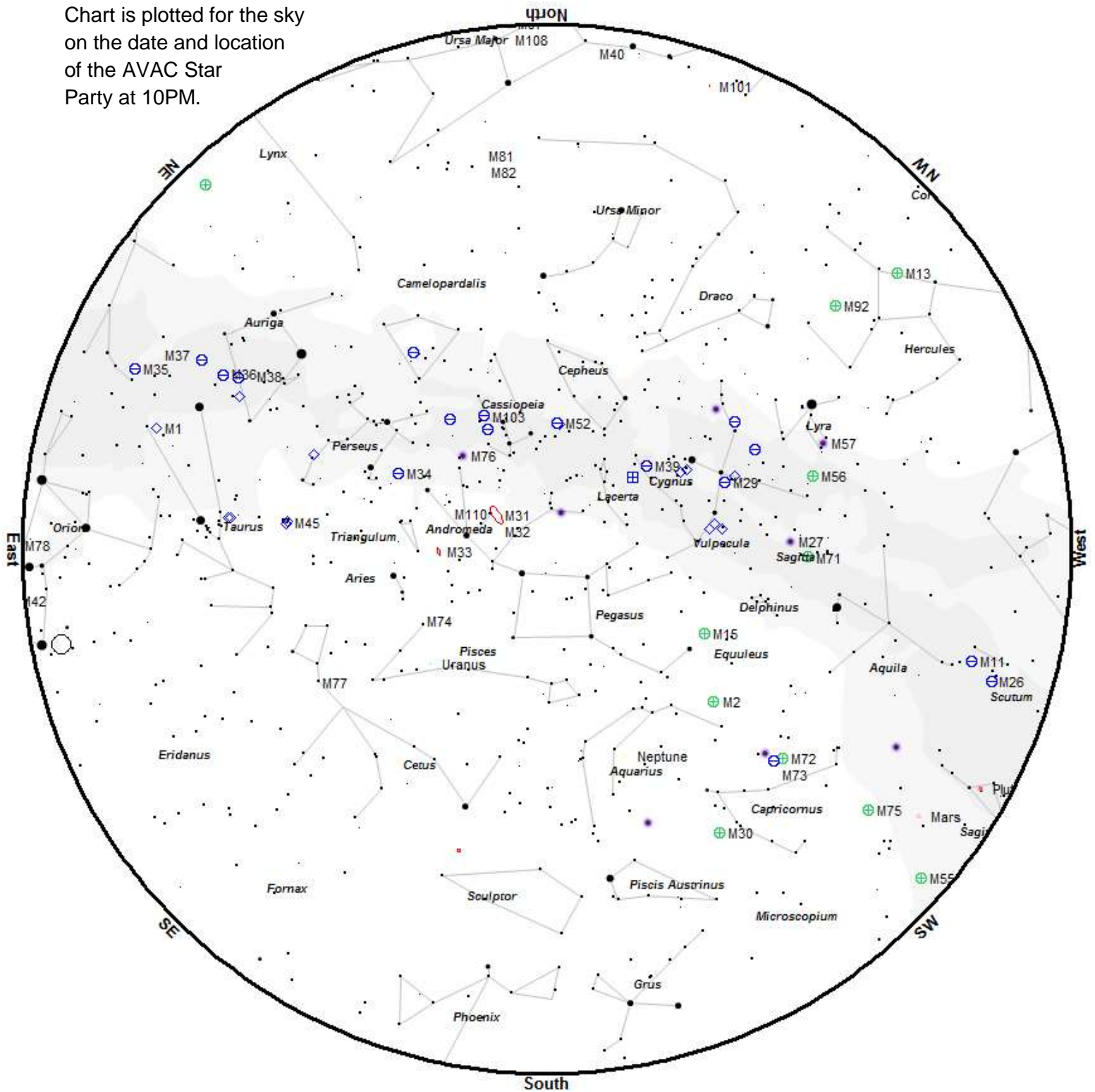
| | Nov 1 | | | |
|----------------|-------|---------|-------|------|
| | Rise | Transit | Set | Mag |
| Mercury | 07:27 | 12:48 | 18:11 | -1.1 |
| Venus | 10:17 | 15:10 | 20:06 | -4.0 |
| Mars | 12:52 | 17:53 | 22:53 | 0.4 |
| Jupiter | 04:48 | 10:46 | 16:47 | -1.7 |
| Saturn | 09:49 | 14:58 | 20:04 | 0.5 |

| | Nov 15 | | | |
|----------------|--------|---------|-------|------|
| | Rise | Transit | Set | Mag |
| Mercury | 07:22 | 12:21 | 17:23 | -0.6 |
| Venus | 09:38 | 14:29 | 19:21 | -4.1 |
| Mars | 11:31 | 16:40 | 21:49 | 0.5 |
| Jupiter | 03:06 | 09:01 | 14:59 | -1.8 |
| Saturn | 08:01 | 13:10 | 18:15 | 0.5 |

| | Nov 31 | | | |
|----------------|--------|---------|-------|------|
| | Rise | Transit | Set | Mag |
| Mercury | 08:09 | 12:58 | 17:50 | -0.5 |
| Venus | 09:51 | 14:48 | 19:46 | -4.1 |
| Mars | 11:06 | 16:26 | 21:45 | 0.6 |
| Jupiter | 02:20 | 08:12 | 14:07 | -1.8 |
| Saturn | 07:10 | 12:18 | 17:23 | 0.5 |

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.



| | | |
|---|---|--|
| <p>Star Magnitudes</p> <p>● 0 ● 1 ● 2 ● 3 ● 4 ● 5</p> | <p>◻ Galaxy</p> <p>⊕ Open Cluster</p> <p>⊕ Globular Cluster</p> <p>⊕ Cluster+Nebosity</p> | <p>◇ Nebula</p> <p>◇ Bright Nebula</p> <p>◇ Planetary Nebula</p> |
|---|---|--|

To use the chart, go outside within an hour or so of the time listed and hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge.

Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Star Party. The list is sorted by the best time to observe the object. The difficulty column describes how difficult it is to observe the object from the current location on a perfect night in a 6 inch Newtonian telescope.

| ID | Cls | Con | RA 2000 | Dec 2000 | Mag | Begin | Best | End | Difficulty |
|----------|------|-----|-------------|------------|------|-------|-------|-------|-------------|
| M 55 | Glob | Sgr | 19h40m00.0s | -30°57'42" | 6.3 | 17:57 | 18:05 | 18:17 | detectable |
| M 11 | Open | Sct | 18h51m05.0s | -06°16'12" | 6.1 | 17:58 | 18:10 | 18:35 | detectable |
| NGC 6818 | PNe | Sgr | 19h43m57.8s | -14°09'12" | 10.0 | 17:50 | 18:10 | 19:13 | easy |
| IC 4756 | Open | Ser | 18h39m00.0s | +05°27'00" | 5.4 | 17:57 | 18:11 | 18:49 | easy |
| M 57 | PNe | Lyr | 18h53m35.1s | +33°01'45" | 9.4 | 17:52 | 18:13 | 19:16 | easy |
| NGC 6543 | PNe | Dra | 17h58m33.4s | +66°37'59" | 8.3 | 17:45 | 18:14 | 19:41 | obvious |
| M 56 | Glob | Lyr | 19h16m36.0s | +30°11'06" | 8.4 | 17:57 | 18:15 | 19:18 | detectable |
| NGC 7009 | PNe | Aqr | 21h04m10.9s | -11°21'48" | 8.3 | 17:46 | 18:15 | 19:14 | obvious |
| M 27 | PNe | Vul | 19h59m36.3s | +22°43'16" | 7.3 | 17:54 | 18:16 | 20:00 | easy |
| M 71 | Glob | Sge | 19h53m46.0s | +18°46'42" | 8.4 | 17:54 | 18:16 | 19:45 | easy |
| NGC 6871 | Open | Cyg | 20h05m59.0s | +35°46'36" | 5.8 | 17:53 | 18:17 | 20:31 | easy |
| M 30 | Glob | Cap | 21h40m22.0s | -23°10'42" | 6.9 | 17:55 | 18:16 | 18:17 | detectable |
| NGC 6910 | Open | Cyg | 20h23m12.0s | +40°46'42" | 7.3 | 17:52 | 18:17 | 20:58 | easy |
| M 29 | Open | Cyg | 20h23m57.0s | +38°30'30" | 7.5 | 17:54 | 18:17 | 20:46 | easy |
| M 15 | Glob | Peg | 21h29m58.0s | +12°10'00" | 6.3 | 17:54 | 18:19 | 20:50 | easy |
| M 2 | Glob | Aqr | 21h33m27.0s | -00°49'24" | 6.6 | 17:55 | 18:19 | 20:25 | detectable |
| M 39 | Open | Cyg | 21h31m48.0s | +48°26'00" | 5.3 | 17:52 | 18:21 | 22:20 | easy |
| NGC 7293 | PNe | Aqr | 22h29m38.5s | -20°50'14" | 6.3 | 17:54 | 18:21 | 19:33 | detectable |
| IC 5146 | Neb | Cyg | 21h53m24.0s | +47°16'00" | 10.0 | 17:51 | 18:22 | 22:29 | challenging |
| NGC 7160 | Open | Cep | 21h53m40.0s | +62°36'12" | 6.4 | 17:47 | 18:23 | 23:24 | obvious |
| NGC 7243 | Open | Lac | 22h15m08.0s | +49°53'54" | 6.7 | 17:55 | 18:24 | 22:06 | detectable |
| M 52 | Open | Cas | 23h24m48.0s | +61°35'36" | 8.2 | 17:56 | 18:51 | 23:04 | detectable |
| NGC 7789 | Open | Cas | 23h57m24.0s | +56°42'30" | 7.5 | 17:56 | 19:23 | 23:24 | detectable |
| NGC 7790 | Open | Cas | 23h58m24.0s | +61°12'30" | 7.2 | 17:48 | 19:25 | 01:24 | easy |
| NGC 55 | Gal | Scl | 00h15m08.4s | -39°13'13" | 8.5 | 18:35 | 19:41 | 20:50 | challenging |
| M 110 | Gal | And | 00h40m22.3s | +41°41'09" | 8.9 | 17:56 | 20:07 | 23:58 | detectable |
| M 31 | Gal | And | 00h42m44.3s | +41°16'07" | 4.3 | 17:53 | 20:09 | 00:44 | easy |
| M 32 | Gal | And | 00h42m41.8s | +40°51'58" | 8.9 | 17:53 | 20:09 | 00:49 | easy |
| NGC 253 | Gal | Scl | 00h47m33.1s | -25°17'20" | 7.9 | 19:50 | 20:13 | 20:37 | detectable |
| NGC 288 | Glob | Scl | 00h52m45.0s | -26°35'00" | 8.1 | 18:46 | 20:19 | 21:50 | challenging |
| NGC 457 | Open | Cas | 01h19m35.0s | +58°17'12" | 5.1 | 17:50 | 20:46 | 02:37 | obvious |
| NGC 559 | Open | Cas | 01h29m31.0s | +63°18'24" | 7.4 | 17:51 | 20:56 | 03:02 | easy |
| M 103 | Open | Cas | 01h33m23.0s | +60°39'00" | 6.9 | 17:50 | 21:00 | 02:57 | obvious |
| M 33 | Gal | Tri | 01h33m50.9s | +30°39'36" | 6.4 | 17:59 | 21:00 | 00:50 | detectable |
| NGC 637 | Open | Cas | 01h43m04.0s | +64°02'24" | 7.3 | 17:47 | 21:09 | 03:17 | obvious |
| M 76 | PNe | Per | 01h42m19.9s | +51°34'31" | 10.1 | 17:59 | 21:09 | 01:30 | detectable |
| NGC 663 | Open | Cas | 01h46m09.0s | +61°14'06" | 6.4 | 17:53 | 21:12 | 03:11 | easy |
| NGC 752 | Open | And | 01h57m41.0s | +37°47'06" | 6.6 | 18:59 | 21:24 | 23:49 | challenging |

| ID | Cls | Con | RA 2000 | Dec 2000 | Mag | Begin | Best | End | Difficulty |
|-----------|------|-----|-------------|------------|------|-------|-------|-------|-------------|
| NGC 869 | Open | Per | 02h19m00.0s | +57°07'42" | 4.3 | 17:50 | 21:46 | 03:33 | obvious |
| NGC 884 | Open | Per | 02h22m18.0s | +57°08'12" | 4.4 | 17:50 | 21:49 | 03:37 | obvious |
| Heart Neb | Neb | Cas | 02h33m52.0s | +61°26'50" | 6.5 | 18:59 | 22:00 | 01:01 | challenging |
| NGC 957 | Open | Per | 02h33m21.0s | +57°33'36" | 7.2 | 17:55 | 22:00 | 03:35 | easy |
| M 34 | Open | Per | 02h42m05.0s | +42°45'42" | 5.8 | 18:03 | 22:08 | 02:33 | easy |
| M 77 | Gal | Cet | 02h42m40.8s | -00°00'48" | 9.7 | 19:00 | 22:08 | 01:18 | detectable |
| NGC 1027 | Open | Cas | 02h42m40.0s | +61°35'42" | 7.4 | 18:02 | 22:09 | 02:51 | detectable |
| NGC 1245 | Open | Per | 03h14m42.0s | +47°14'12" | 7.7 | 20:19 | 22:41 | 01:02 | challenging |
| NGC 1342 | Open | Per | 03h31m38.0s | +37°22'36" | 7.2 | 18:40 | 22:58 | 03:16 | detectable |
| M 45 | Open | Tau | 03h47m00.0s | +24°07'00" | 1.5 | 18:36 | 23:12 | 03:49 | obvious |
| NGC 1444 | Open | Per | 03h49m25.0s | +52°39'30" | 6.4 | 17:52 | 23:16 | 04:54 | obvious |
| NGC 1502 | Open | Cam | 04h07m50.0s | +62°19'54" | 4.1 | 17:48 | 23:34 | 05:29 | obvious |
| NGC 1528 | Open | Per | 04h15m23.0s | +51°12'54" | 6.4 | 18:27 | 23:41 | 04:54 | easy |
| NGC 1647 | Open | Tau | 04h45m55.0s | +19°06'54" | 6.2 | 20:50 | 00:12 | 03:33 | detectable |
| NGC 1664 | Open | Aur | 04h51m06.0s | +43°40'30" | 7.2 | 19:14 | 00:17 | 05:12 | easy |
| NGC 1746 | Open | Tau | 05h03m50.0s | +23°46'12" | 6.1 | 21:00 | 00:29 | 04:00 | detectable |
| NGC 1851 | Glob | Col | 05h14m06.0s | -40°02'48" | 7.1 | 23:23 | 00:39 | 01:53 | difficult |
| M 38 | Open | Aur | 05h28m40.0s | +35°50'54" | 6.8 | 20:36 | 00:54 | 05:08 | detectable |
| M 36 | Open | Aur | 05h36m18.0s | +34°08'24" | 6.5 | 20:04 | 00:59 | 05:23 | easy |
| M 43 | Neb | Ori | 05h35m30.0s | -05°16'00" | 9.0 | 22:50 | 01:01 | 03:11 | difficult |
| M 1 | Neb | Tau | 05h34m30.0s | +22°01'00" | 8.4 | 22:16 | 01:01 | 03:45 | difficult |
| M 42 | Neb | Ori | 05h35m18.0s | -05°23'00" | 4.0 | 21:50 | 01:01 | 04:11 | easy |
| M 78 | Neb | Ori | 05h46m48.0s | +00°05'00" | 8.0 | 22:59 | 01:12 | 03:24 | difficult |
| M 37 | Open | Aur | 05h52m18.0s | +32°33'12" | 6.2 | 20:32 | 01:18 | 05:23 | easy |
| NGC 2129 | Open | Gem | 06h01m07.0s | +23°19'20" | 7.0 | 20:52 | 01:27 | 05:26 | obvious |
| NGC 2169 | Open | Ori | 06h08m24.0s | +13°57'54" | 7.0 | 21:21 | 01:34 | 05:25 | obvious |
| M 35 | Open | Gem | 06h09m00.0s | +24°21'00" | 5.6 | 21:11 | 01:34 | 05:20 | easy |
| NGC 2175 | Open | Ori | 06h09m39.0s | +20°29'12" | 6.8 | 21:49 | 01:35 | 05:12 | detectable |
| NGC 2237 | Neb | Mon | 06h32m02.0s | +04°59'10" | 5.5 | 23:56 | 01:57 | 03:58 | challenging |
| NGC 2264 | Open | Mon | 06h40m58.0s | +09°53'42" | 4.1 | 22:05 | 02:06 | 05:24 | easy |
| M 41 | Open | CMa | 06h46m01.0s | -20°45'24" | 5.0 | 00:34 | 02:11 | 03:49 | easy |
| NGC 2301 | Open | Mon | 06h51m45.0s | +00°27'36" | 6.3 | 22:46 | 02:17 | 05:21 | easy |
| M 50 | Open | Mon | 07h02m42.0s | -08°23'00" | 7.2 | 23:30 | 02:27 | 05:15 | detectable |
| NGC 2355 | Open | Gem | 07h16m59.0s | +13°45'00" | 9.7 | 23:56 | 02:42 | 05:13 | difficult |
| NGC 2392 | PNe | Gem | 07h29m10.8s | +20°54'42" | 8.6 | 22:25 | 02:54 | 05:31 | obvious |
| M 47 | Open | Pup | 07h36m35.0s | -14°29'00" | 4.3 | 00:37 | 03:02 | 05:25 | obvious |
| NGC 2439 | Open | Pup | 07h40m45.0s | -31°41'36" | 7.1 | 00:53 | 03:05 | 05:14 | detectable |
| M 46 | Open | Pup | 07h41m46.0s | -14°48'36" | 6.6 | 00:44 | 03:07 | 05:19 | detectable |
| NGC 2440 | PNe | Pup | 07h41m55.4s | -18°12'31" | 11.5 | 01:08 | 03:07 | 05:06 | difficult |
| M 93 | Open | Pup | 07h44m30.0s | -23°51'24" | 6.5 | 02:12 | 03:09 | 04:06 | easy |
| NGC 2506 | Open | Mon | 08h00m01.0s | -10°46'12" | 8.9 | 01:26 | 03:25 | 05:11 | difficult |
| M 44 | Open | Cnc | 08h40m24.0s | +19°40'00" | 3.9 | 23:57 | 04:05 | 05:27 | easy |
| M 67 | Open | Cnc | 08h51m18.0s | +11°48'00" | 7.4 | 01:15 | 04:16 | 05:21 | detectable |
| M 82 | Gal | UMa | 09h55m52.4s | +69°40'47" | 9.0 | 23:05 | 04:45 | 05:26 | detectable |
| M 81 | Gal | UMa | 09h55m33.1s | +69°03'56" | 7.8 | 23:24 | 04:45 | 05:26 | detectable |

A.V.A.C. Information

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

The Club has three categories of membership.

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

Membership entitles you to...

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

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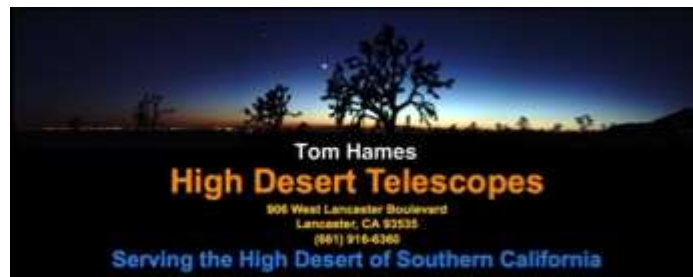


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