

Astronomy Club of Lompoc

Presents

The Sidereal Times



Messier 81 (see page 5)

Meeting News At the May Zoom video club meeting we conducted some minor business and had a excellent presentation by Dr. Joe Bassi.

Reminder: ACL club meeting Friday June 11th on Zoom Video 7:00 Pm.



Lunar Calendar:

New Moon 10th
Full Moon 24^h

Some of ACL's Astro Photography following pages



Presidents Message

Hello, Lompoc Astronomy Fans,

All too often I seem to open this letter with an apology, and this is no exception. My missing our May meeting, that I had been so anticipating, was a scheduling conflict almost entirely of my own making. When my fellow desert rat was forced to change his timing for our trip, I misread my own calendar and committed to the wrong week! My gratitude for making the meeting a success goes to Jana, Vahan, Vince, and, yes, one of our guests, Steve Williams. I so hated to miss Dr. Bassi's program on the Nancy Grace Roman Space Telescope, and I have already apologized to him. Vahan took great notes and brought me up to date as soon as I returned. Glad to hear that Joe's program was so well received and that the rest of the meeting went well.

My trip took me to the higher [thus cooler] regions of the Mojave National Preserve and the western side of Death Valley. [We did drive through Death Valley on Wednesday, when the temperature at Furnace Creek was 111 degrees!] I had thought our best night skies would be in the Preserve, and there I did get a nice view of M13 in Hercules, the Beehive Cluster and Mercury, but a dome of light from the casino complex at Primm, NV, to the northeast was a big disappointment. [Yes, Joel and Candy: the sky seemed filled with satellites!] Our best night sky was at Death Valley's Wildrose Campground [4100 feet altitude]; however, by that point in the trip, I was so whipped that I was in the tent and asleep by 9:00 PM! Maybe I am getting a bit old for crawling in and out of a backpacking tent?

ACL returns to in-person gathering at our Annual Picnic, which will happen this year on Saturday, July 24th, from Noon until 3:00 PM at Thompson Park. Vahan has engaged a special sous chef to assist in preparing his delicious tri-tip BBQ, so get your teeth firmly in place for good eating! Please bring your favorite side and/or dessert. We will... uh... "hash out" any details at our July meeting.

By the time you read this, the Club will have hosted the third-grade classes of Manzanita Elementary Charter School in its annual field trip to the Observatory on Thursday, 27th of May. Students will not be permitted inside the Observatory, but will be pass by the open door and for a look at our big telescope. ACL members will brief the students on the uses of the Observatory and explain its "off the grid" power source. Instructor Nichelle Wood is greatly anticipating this event, since Covid concerns forced us to cancel it last spring.

There was a very interesting article the other day about research into the possibilities of Uranus and Neptune harboring microbial life in the vast seas beneath their surface ice. I will report on this at the June meeting. See you there!

Yes, I WILL be there!

Skyward,
Tom

Tom Gerald, President

Events

June 10th Annular Solar Eclipse occurs when the Moon is too far away from the Earth to completely cover the Sun. This results in a ring of light around the darkened Moon. The Sun's Corona is not visible during an annular eclipse. The path of the eclipse will be confined to extreme Eastern Russia, the Arctic Ocean, Western Greenland and Canada. A partial eclipse will be visible in the Northeastern United States, Europe and most of Russia.

June 21st June Solstice occurs at 03:21 UTC. The north pole of the Earth will be tilted toward the Sun which will have reached its North most position in the sky and will be directly over the Tropic of Cancer at 23.44 degrees north latitude. This is the first day of Summer in the Northern hemisphere and the first day of winter in the Southern Hemisphere.

June 5th 12th & 19th *Star Party at the Observatory cancelled due to Covid-19 virus.*



Nuts!



Star party's and Events

May 1st, 8th, 15th Star Party at the Observatory cancelled due to Covid-19 virus.



Nuts!



June 2021 Moon

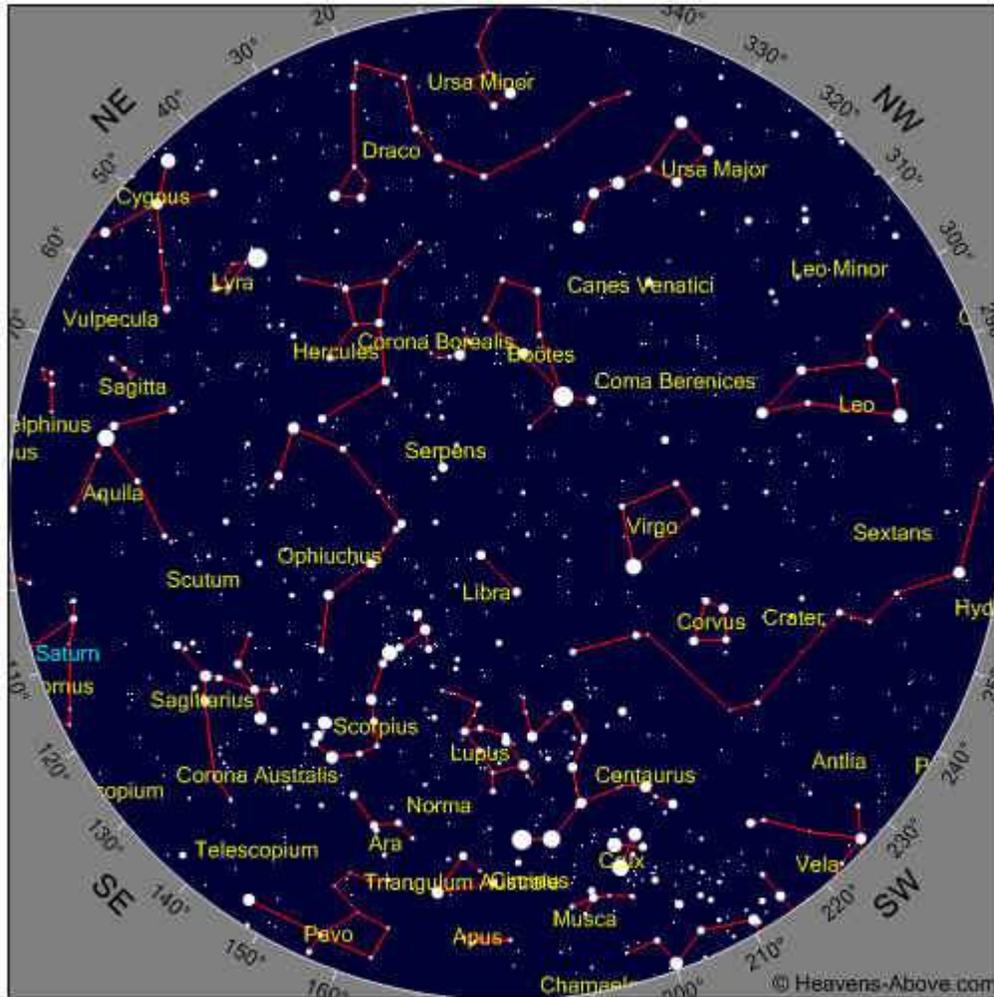


Full 24th , New 10th , Last Quarter 2nd , First Quarter 18th

Moon Facts and Folklore

Earth is about 80 times the volume than the Moon, but both are about the same age
The footprints left by the Apollo astronauts will not erode as they would on earth, no rain or wind on the Moon

June 2021 Sky
Some Objects of interest, M13, M27, M57



Time

Year	2021	Month	6	Day	5	Hour	22	Minute	0
------	------	-------	---	-----	---	------	----	--------	---



Photo Courtesy Hubble Telescope



Messier 81, discovered by German Astronomer Johann Bode in 1774. M81 is one of the brightest galaxies in the night sky. It is located 11.6 million light years from Earth in the constellation of Ursa Major and has an apparent magnitude of 6.9. A small telescope will resolve the galaxies core. The best viewing is in April. The Hubble image was assembled using observations in the infrared and visible light. The galaxies spiral arms wind all the way down into its nucleus and are made up of young bluish stars, hot stars formed in the past few million years. They also host a population of stars formed in an episode of star formation that started about 600 million years ago. Ultraviolet light from hot young stars is fluorescing the surrounding clouds of hydrogen gas. A number of sinuous dust lanes also wind all the way into the nucleus of M81. The galaxy's center bulge contains much older redder stars. It is significantly larger than the Milky Way's bulge. A black hole of 70 million solar masses resides at the center of M81 and is about 15 times the mass of the Milky Way's central black hole. Previous Hubble research showed that the size of a black hole in a galaxy's nucleus is proportional to the mass of the galaxy's bulge. M81 may be undergoing a surge of star formation along the spiral arms due to the close encounter it may have had with its nearby spiral galaxy NGC 3077 and a nearby starburst galaxy M82 about 300 million years ago. Astronomers plan to use the Hubble image to study the star formation history of the galaxy and how this history relates to the neutron stars and black holes seen in X-ray observations of M81 with NASA's Chandra X-ray observatory. A super nova was observed in 1993 and reached a maximum brightness of 10.5. It was the second brightest supernova event seen in the 20th century. It was classified as a type 11b supernova a transitory class between type 11 supernovae caused by explosions of giant stars and type 11 supernovae caused by core collapse of massive stars.

Note: This beautiful galaxy is tilted at an oblique angle on our line of sight giving a "birds eye view" of the spiral structure. The Galaxy is similar to our Milky Way galaxy but our favorable view provides a better picture of the typical architecture of spiral galaxy's.

For What its Worth

Knowing that a 6 inch scope gathers 44% more light than a 5 inch scope does not correlate in any obvious way to how different the views are.

“Light gathering’ is a very crude approximation of the capability of a telescope. First using the square of the aperture ignores the various losses in the optical system. In terms of light gathering, if one includes the losses, an 8 inch SCT has an effective aperture of 6.8 inches so if one is comparing it to a 6 inch refractor it’s much closer based on aperture alone. But fundamentally it is flawed because it really doesn’t measure the important aspects of what a telescope does. Light gathering implies that an object will be much brighter and much more intense in a larger scope.

Larger aperture provides greater resolution, it does gather more light but that light is spread over a greater area. So if one thinks in terms of exit pupil magnification relative to the aperture then the differences between the apertures are in the resolution and size of the image but not the surface brightness of an extended object. ie the intensity of the light per unit area. Contrast the ratio of brightness of the object against the night sky, of extended objects, galaxies, nebula and planets does not change with increased aperture. Stars because they represent a tiny resolved disk (diffraction affect) will be brighter with increased aperture and their contrast depends on the magnification. The concept of surface brightness is an important one. The intensity of light, the amount of light an individual rod or cone when viewing a particular part of Andromeda only depends on the exit pupil. If your eye dilates to 7 mm then a 7 mm exit pupil in a 4 inch scope will produce the same surface as a 16 inch scope, the difference will be that the image is 4 times larger in the larger scope. This is what aperture buys you, not a brighter image but a larger image. The larger image allows the observer to see smaller objects. (more detail).

So when compared to a 5 inch scope, what a 6 inch scope really does is give you a larger image scale at the same exit pupil. It is the same basic image. Extended objects will not be more intense, they will be larger but the surface brightness will not change. In terms of objects increased aperture allows you to see smaller objects but not necessarily fainter objects. Of course one can manipulate the exit pupil and view the object at the same magnification that will make the extended object brighter as long as the exit pupil is not larger than the dilated pupil. But at that limit the surface of the object will be no brighter in a large scope.

So just how does the view in a 25 inch differ from the view in a 3 inch? Conceptually the easiest way to quantify the difference is that a 25 inch has $25/3$ times greater aperture or about 8.3 times greater aperture. In simplest terms you are effectively 8 times closer to the object. This means that you can see a galaxy that is $1/8$ the size of what’s visible in a 3 inch scope. Its not that you can see a dimmer lower contrast galaxy, its that you can see a smaller galaxy. In terms of stars they are much brighter as one would expect since you are 8 times closer.

You can bring this back to light gathering by noting that an otherwise identical galaxy that is 8.3 times closer will be 8.3×8.3 times larger in area and thus produce about 69 times more light, 69 is the ratio of the apertures but conceptually what the scope has done is bring you closer.

And another thing....looking through the eyepiece of a 25 inch scope, well, all this talk of analysis doesn’t really prepare you for what you see.

Astronomy Club Officers



President
Tom Gerald

Vice President &
Treasurer
Jana Hunking

ACL Support Personnel

ACL News letter Editor
Serf / Minion Vahan Yeterian



ACL Webmaster
Serf / Minion Aaron Anderson
(New Zealand)



Club Meeting

Reminder ACL Club meeting Friday June 11th
7:00 Pm On Zoom Video.

Star Parties (as always weather permitting)

Other Astronomy Club Meetings

Central Coast Astronomical Society
Link to web site...

<http://www.centralcoastastronomy.org/>

Santa Barbara Astronomical Unit
Link to web site...

[http:// www.sbau.org/#AU_EVENTS_Calendar](http://www.sbau.org/#AU_EVENTS_Calendar)

Link to "Heavens Above" web site

[http:// www.heavens-above.com/](http://www.heavens-above.com/)

*"Astronomy compels the soul to look upward,
and leads us from this world to another".
(Plato)*

ACL Club Logo

