Astronomy Club of Lompoc
Presents
The Sidereal Times

M92 (see page 5)

Meeting *News:*

At the April ACL meeting we had an excellent presentation
by Jana and Steve Ball on the history of the observatory.
Photos were also provided by the presenters.

**Reminder: ACL club meeting May 12th will be
held at Manzanita School Teachers Lounge 7:00 Pm.
Masks!**

Lunar Calendar
New Moon 19th
Full Moon 5th

In this issue, Some club activities in pictures

Presidents Message

We had a great turnout at our April meeting, and I want to thank **Steve Ball** for doing extensive research into our club's history and then presenting an interesting and detailed program about how the Vandenberg Amateur Astronomical Society - VAAS got started. He also explained how the Observatory came about and was used for several years by our members at Ken Adam Park for Saturday night Star Parties for the Public and many school groups. He was among some of the first members that helped choose what kind of Scope (14" Celelstron) and also what kind of dome to use along with helping get the scope ready to move to our new location near Maple H.S .

I continued the history of our club with the Move of the Observatory Dome in 1998 by truck and a huge crane that was provided by Cooks Welding for Free! I then brought up to date our variety of meeting places up to our present location. Our club has done many Star Parties over the years, at schools, wineries, and for both boy and girl scouts. In July of 2021 our club's name officialy changed into Astronomy Club of Lompoc - ACL. This came about with Jana and Tom's discussion with the club for an shorter and easier name to pronounce.

On April 19-20 there was a **Hybrid Solar Eclipse** over the South Pacific and Australia. That is when the solar eclipse starts out as a Total eclipse but changes into an Annular eclipse that is ring shaped. The last eclipse like this was in 2013 and will not occur again until 2031. In fact only 7 will be happening in our 21st Century!

In May **Vahan Yetarian** will give a presentation about **Tides,** with an Astronomy Twist ! Hope to see everyone there!

Hoping for Clear skies!   Jana Hunking

Events

May 13, 20, 27 -*Star Party at the Observatory ??*
May 5 Penumbral Lunar Eclipse occurs when the Moon passes
Though Earth's partial shadow, or penumbra. During this type
of eclipse the moon will darken slightly but not completely. The
eclipse will be visible throughout all of Asia and Australia and
parts of eastern Europe and eastern Africa.
May 6,7 Eta Aquarids Meteor Shower is an above average
Meteor shower capable of producing up to 60 meteors per hour
at its peak. Most of the activity is seen in the southern hemisphere. It is
produced by dust particles left behind by comet Halley. Meteors will radiate
from the constellation of
Aquarius but can appear anywhere n the sky.
May 29 Mercury at its greatest western elongation of 24.9 ° from the Sun.
This is the best time to view mercury since it will
be at its highest point above the horizon in the morning sky.
Look for the planet low in the eastern sky just before sunrise.

THE THERMOSPHERE IS WARMING UP: When solar activity is high, Earth's upper atmosphere puffs up like a marshmallow held over a campfire. That's happening now. Since Solar Cycle 25 began, the Thermosphere Climate Index (TCI) has increased nearly 10-fold:
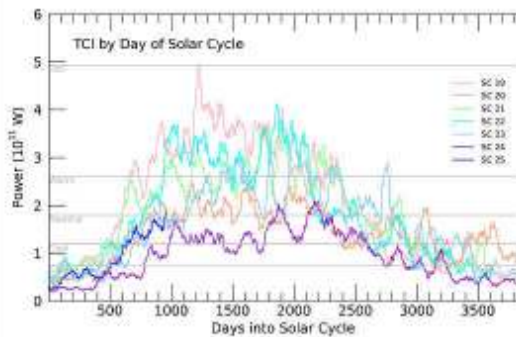
TCI is a number published daily by NASA, which tells us how hot Earth's upper atmosphere is. The thermosphere, the very highest layer of our atmosphere, literally touches space and is a sort of "first responder" to solar activity.

Linda Hunt of Science Systems and Applications, Inc. created the plot, above, which shows how TCI during Solar Cycle 25 compares to other solar cycles of the past. So far, the thermosphere is about twice as warm during Solar Cycle 25 as it was at the same point in the previous solar cycle: data.

"The sun is coming more alive now and looks ready to make a run at exceeding the max TCI of Solar Cycle 24," notes Dr. Marty Mlynczak of NASA.

As the thermosphere puffs up, it increases aerodynamic drag on Earth-orbiting satellites. Indeed, this is a key reason for the loss of dozens of Starlink satellites in Feb. 2022. If current trends continue, drag will increase even more as Solar Cycle 25 reaches its peak (Solar Maximum) in 2024 or 2025.

Star party's and Events

May 2023 Moon

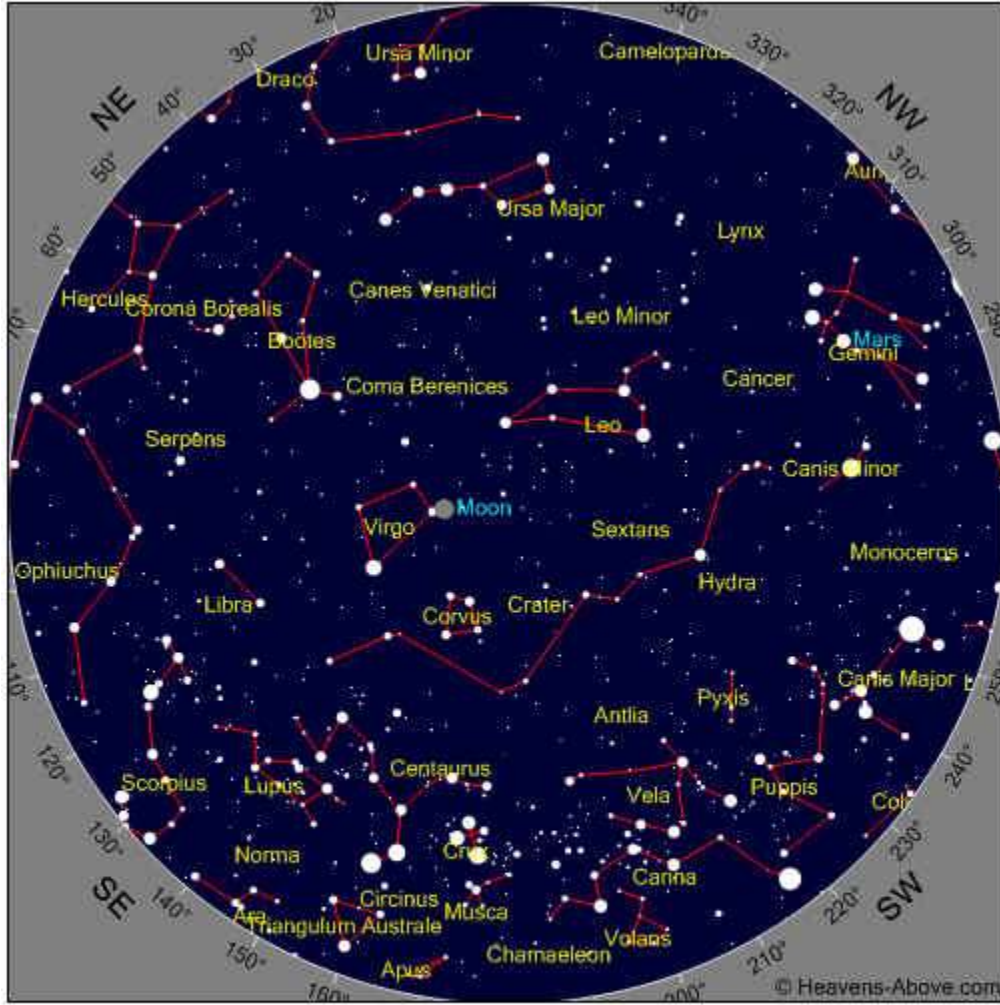Full 5th , New 19th , Last Quarter 12th , First Quarter 27th .

Moon Facts and folk lore

The full Moon on February 11th has been known by some Native American tribes as the Full Hunger Moon since the harsh winter weather made hunting difficult.

May 2023 Sky
Some Objects of interest, M13, Moon, Mars

Time

| Year 2023 | Month 5 | Day 2 | Hour 21 | Minute 5 |

Messier 92, NGC 6341 Globular Cluster is about 26,700 light years distant from Earth and is located in the constellation of Hercules. It was first discovered by Johann Elert Bode on December 27th 1777 and later by Charles Messier. M92 is one of the brightest clusters in the Northern hemisphere (second to M13) in terms of absolute magnitude. M92 occupies an area of 14 arcminutes that corresponds to a linear extention of 109 light years. M92 has a very low abundance of elements other than hydrogen and helium, the iron in the center is only about 0.5 percent of the solar abundance. This puts the estimated age of the cluster at 14.2 billion years, same as the known universe. The cluster is not currently in the state of core collapse. It is an Oosternhoff type cluster meaning it belongs to a group of metal poor clusters with longer period RR Lyrae variable stars. There are 17 known RR Lyrae variables and 10 X-ray sources within the 1.2 arcminutes half radius of the cluster, of which half are candidates for cataclysmic variable stars. The cluster is estimated to contain about 330,000 stars. Image capture was with a Meade 8" SCT at f/6.3 w/PHD2 guide. DSLR Canon T3 (mod) ISO 800, 8 x 100s lights, 4 darks processed with DSS.

For What its Worth

A telescope, even with theoretically perfect optics, cannot produce a point image of a point source, such as a star. This is because of diffraction that is caused by the wave nature of light. As light passes through the telescope aperture, the waves interfere with each other, diffusing the point source. The aperture causes secondary waves to be created, which then interfere with each other. Where crests and troughs of waves coincide, destructive interference cancels out the waves. The effect of this in a telescope is that the light from a star does not drop off smoothly at the edge of the star image, but in a rhythmic pattern of interference. At certain points around the star image, destructive interference causes rings of zero intensity. Just like the walls in an ocean wave, an aperture, such as the edge of a mirror, causes light waves to interfere. The diagram below shows the two wave patterns that are set up by the edge of a mirror. Where the waves cross, there is constructive interference and the light is amplified, producing the bright rings of the diffraction pattern. Halfway between these spots, waves cancel each other out, causing destructive interference and forming the gaps in the diffraction pattern. The resulting effect, assuming no other aberrations, is for about 85% of the light from a point source to be located within the bright central spot of the diffraction pattern. This central spot is called the Airy disk. The outer rings are progressively fainter and are difficult to see under normal conditions. The first bright ring outside the Airy disk contains less than 2% of the light from the source, and the rest are dimmer still. The effective resolution of a telescope can then be considered the size of the central disk in the diffraction pattern. The effect of central obstruction such as that caused by the secondary mirror in a Newtonian or Cassegrain telescope, is to transfer more light from the Airy disk to the outer rings. An extreme example would be a 50% central obstruction. This would cause the first ring to become 4 times brighter while the central disk would drop in brightness by a factor of 2. It also has the interesting effect of reducing the diameter of the Airy disk to about 80% of its unobstructed size. However, instead of the brightness difference between the disk and first ring being a factor of 50, it is reduced to only a factor of 10. Overall the image quality is worse, despite the smaller Airy disk size. The size of the Airy disk can be determined mathematically. Specifically the angular diameter of the disk is $A = 1.22\lambda/D$ radians, where λ is the wavelength of the light. The human eye is most sensitive to a wavelength of 550 nanometers (nm), in the yellow-green part of the visual spectrum. Converting to the more useful angular measure of arcseconds this gives a simple equation: $A = 5.45/D$, for a telescope diameter in inches. It can be seen that the larger the telescope aperture, the smaller will be the Airy disk and the greater the resolution. As an example, the resolution of an 8" telescope is 0.68 arcseconds. A 12" telescope has a resolution of 0.45 arcseconds. For reference, Jupiter is about 45 arcseconds in diameter
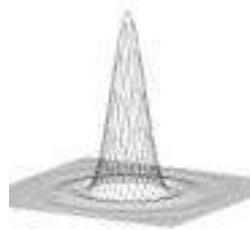
Astronomy Club Officers

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(New Zealand)

Star Parties (as always weather permitting)

Other Astronomy Club Meetings and links to other sites.

http://www.centralcoastastronomy.org/

Astronomy Club of Lompoc (ACL) (universeii.com)

Sunrise and sunset times in Lompoc (timeanddate.com)

Moonrise, Moonset, and Moon Phase in Lompoc (timeanddate.com)

http:// www.sbau.org/#AU_EVENTS_Calendar

http:// www.heavens-above.com/

https://spaceweather.com

https://www.space.com

http://spacemaps.com

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

With at least 25 thousand billion billion star systems out there, it is an incredible conceit to think that Earth is the only planet in the whole Universe nesting life.

ACL Club Logo