

Astronomy Club of Lompoc Presents The Sidereal Times



Andromeda (see page 5)

Meeting News:

At the March ACL Club meeting we talked about the April Pizza Party at Mi Amore in Lompoc and any extras to add to the menu.

Reminder: ACL club meeting April 8th 6:30 PM
At Mi Amore Pizza in Lompoc. Wear Mask!



Lunar Calendar

New Moon 1st

Full Moon 16th

Show and Tell at Clarence Ruth School



Presidents Message

Hello, Nighthawks,

We are once again in that time of year: the cusp of a new season. March heralded Spring with some amazingly clear nights, but Winter asserted it grasp, making us pay for the clarity with dramatically low temperatures. Still it was fun to check, even if briefly, on Orion and surrounding constellations each night, then catch a view of Scorpio and Sagittarius before dawn. Also, Venus was a lovely jewel of the dawn. Speaking of, dawn on April 18th offers a unique show: four planets strung from east to south-east: Jupiter, Venus, Mars and Saturn in that order. Earlier, pre-dawn on the 5th, Mars and Saturn will pair up only the diameter of the Moon apart. The month closes with Venus and Jupiter even closer together when they meet up on the 30th. Both these conjunctions should be telescope fun.

Our March 11th meeting celebrated the return of in-person gatherings, as a half dozen of us got together around the table at Manzanita and celebrated simply being face-to-face... masked, but still together. Certainly, the best part of the meeting was having Vahan and Ken Jorgensen back with us again! That and Jana's offering of Peanut M&Ms. A shout out to Ken Spraker; hang in there!

At the meeting we planned the Pizza Party and discussed returning to Star Parties. YES!!! The Pizza Party at Mi Amore starts at 6:30 with the ever-popular wings appetizers [limited amount, so don't be late!]; Pizza will follow at 7:00PM.

As for Star Parties, see the list of dates in this Newsletter. All are "weather depending," of course, and email alerts will go out ahead of time.

Jana will manage the Pizza Party and possibly the May meeting, as your Prez will be out of commission for a bit. Surgery will lay me up for several weeks, according to the surgeon. "So it goes," to quote Kurt Vonnegut.

Here's to... well, June, I guess.

Skyward,
Tom

Events

April 9, 23 and 30th -Star Party at the Observatory



April 22,23 Lyrids Meteor Shower is an average shower usually producing 20 meteors per hour at its peak. It is produced by dust grains left behind by comet C/1861 G1 Thatcher. The shower peaks this year on the night of the 22nd and morning of the 23rd. These meteors can sometimes produce bright dust trails that sometimes last for several seconds. Meteors will radiate from the constellation Lyra but can appear anywhere in the sky.

April 29 Mercury at greatest Eastern elongation of 20.6 degrees from the Sun. The best time to view Mercury will be just after Sunset low in the Western sky.

April 30th Partial Solar eclipse will be visible throughout most of the Southeast Pacific ocean and Southern South America. It will be best seen from Argentina with 53% coverage.

Table: Stars Within 10 Light- Years

Name	Distance (light-years)	Apparent Brightness ¹	Luminosity ²
Sun	—	(120 billion)	1.00
Alpha Centauri A	4.3	0.26	1.56
Alpha Centauri B	4.3	0.077	0.45
Alpha Centauri C	4.2	0.00001	0.00006
Barnard's Star	6.0	0.00004	0.0005
Wolf 359	7.7	0.000001	0.00002
BD +36 degrees 2147	8.2	0.0003	0.006
Luyten 726-8 A	8.4	0.000003	0.00006
Luyten 726-8 B	8.4	0.000002	0.00004
Sirius A	8.6	1.00	23.6
Sirius B	8.6	0.001	0.003
Ross 154	9.4	0.00002	0.0005

Manzanita School Show and tell @ the Observatory



Star party's and Events

March 5, 12 & 26th Star Party at the Observatory, poor weather.



How big is one arcsecond at various distances?

An arcsecond is a small angle, 1/3600 of a degree or about 5 millionths of a radian (4.85×10^{-6}). To estimate the size of something that appears 1 arcsecond across you can use the small angle approximation to trigonometry. Multiply the distance to the object by 4.85×10^{-6} .

Examples:

- One arcsecond on the moon is 1.67km
- One arcsecond on the sun is 727km
- One arcsecond on Mars (when it is closest to Earth) is 237km
- One arcsecond at distance of one parsec is one astronomical unit (AU), by definition
- One arcsecond on Alpha Centauri is 200 million km
- One arcsecond on the Andromeda galaxy is 100 trillion km

The atmosphere limits how much detail you can see. Typically the smallest detail you can see is about 3 or 4 arcseconds, though professional telescopes do better by being built on the top of mountains and using various tricks, like adaptive optics.

Temperature Scales			
Fahrenheit	Celsius	Kelvin	
212	100	373	Boiling point of water at sea-level
194	90	363	
176	80	353	
158	70	343	
140	60	333	
122	50	323	
104	40	313	Average room temperature
86	30	303	
68	20	293	
50	10	283	Melting (freezing) point of ice (water) at sea-level
32	0	273	
14	-10	263	
-4	-20	253	
-22	-30	243	
-40	-40	233	
-58	-50	223	-89°C (-129°F) Lowest recorded temperature. Vostok, Antarctica July, 1983
-76	-60	213	
-94	-70	203	
-112	-80	193	
-130	-90	183	
-148	-100	173	

April 2022 Moon



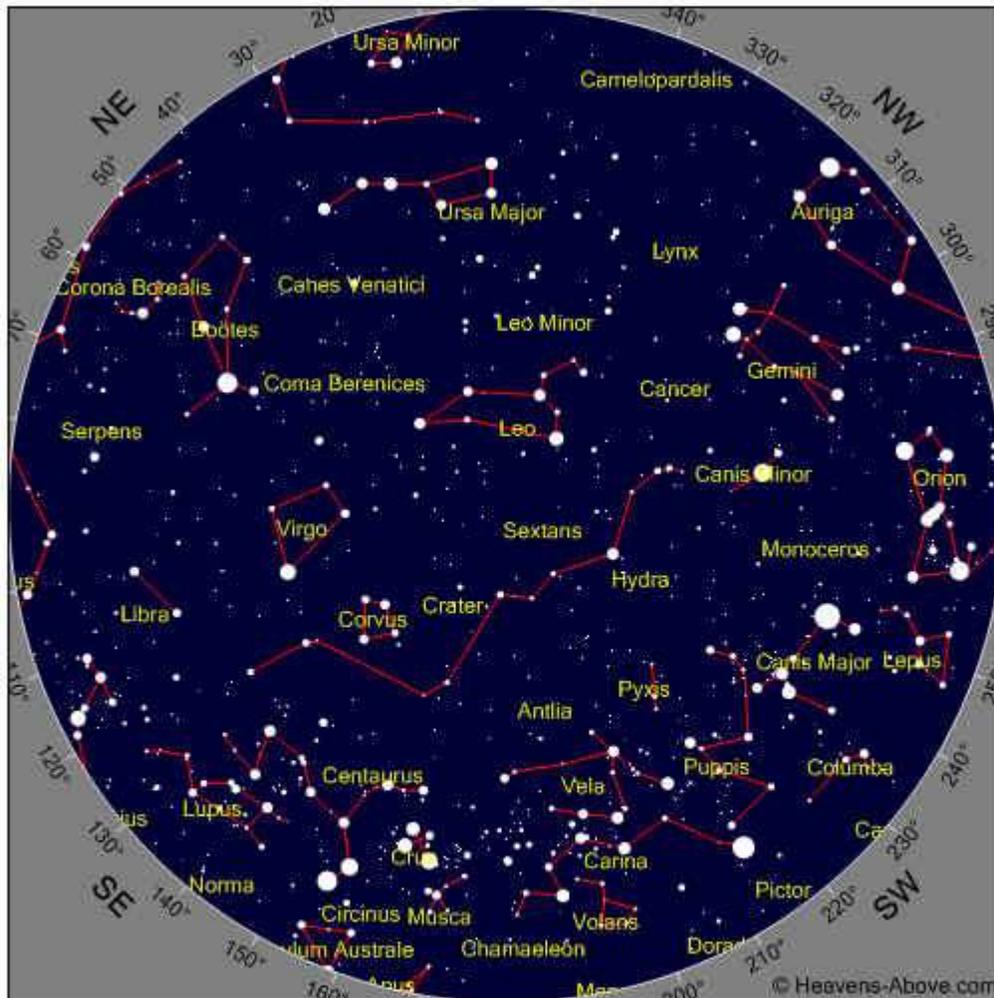
Full 16th, New 1st, Last Quarter 23rd, First Quarter 9th.

Moon Facts and folk lore

The Moon is the fifth largest natural satellite in the Solar System. At 3,475 km in diameter, the Moon is smaller than the major moons of Jupiter and Saturn. Earth is about 80 times the volume than the Moon, but both are about the same age.

Planet	Distance(000 km)	Radius(km)	Mass(kg)	Discoverer	Date
Mercury	57,910	2439	3.30e23		
Venus	108,200	6052	4.87e24		
Earth	149,600	6378	5.98e24		
Mars	227,940	3397	6.42e23		
Jupiter	778,330	71492	1.90e27		
Saturn	1,426,940	60268	5.69e26		
Uranus	2,870,990	25559	8.69e25	Herschel	1781
Neptune	4,497,070	24764	1.02e26	Galle	1846
Pluto	5,913,520	1160	1.31e22	Tombaugh	1930

April 2022 Sky
Some Objects of interest, M104, M44



Time

Year	2022	Month	4	Day	2	Hour	22	Minute	00
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Smallest Resolvable Features

Object	Distance from Earth	Size of 1 arcmin at distance of Object	Size of 1 arcsec at distance of Object	Hubble 0.05 arcsec
Moon	240,000 miles	60 miles	1 mile	1/20 th of a mile or about the length of a football field
Jupiter	Close approach about 425 million miles	125,000 miles (Jupiter's diameter is 88,000 miles!)	2,000 miles	100 miles
Trifid Nebula (M20)	5,200 light years	1.5 lt yrs	0.03 lt yr	9 billion miles (about twice the distance across the Solar System)
Hercules Cluster (M13)	25,000 ly	7 light years	1/10 ly	30 billion miles
Whirlpool Galaxy (M51)	37 million ly	10,000 lt yrs	150 lt yrs	7 lt yrs

Photo Courtesy of my Old Friend Steve



Messier 31

The Andromeda galaxy also known as Messier 31, M31, or NGC224 is a spiral galaxy approximately 780 kiloparsecs (2.5 million light years) distant. It is the nearest major galaxy to the Milky Way and is often referred to as the Great Andromeda Nebula in older texts. It received its name from the area of the sky in which it appears, the constellation of Andromeda that was named after the mythological princess Andromeda. Andromeda is approximately 220,000 light years across. It is the largest galaxy of the local group also containing the Milky Way, the Triangulum galaxy, and other small galaxies. Despite earlier findings that suggested that the Milky Way contains more dark matter and could be the largest in the grouping, the 2006 observations by the Spitzer Space Telescope revealed that Andromeda contains one trillion stars at least twice the number of stars in the Milky Way that is estimated to be 200-400 billion. The mass of the Andromeda galaxy is estimated to be 1.5×10^{12} solar masses while the Milky Way is estimated to be 8.5×10^{11} solar masses. The Milky Way and the Andromeda galaxies are expected to collide in 4.5 billion years eventually merging to form a giant elliptical galaxy or perhaps a large disc galaxy. The apparent magnitude of the Andromeda galaxy at 3.4 is among the brightest of the Messier objects making it visible to the naked eye on moonless nights or when viewed from areas with moderate light pollution. Image capture sigma 170-500 f/5.6 telephoto lens. Canon T3i modified Baader filter, Celestron CGEM mount hypertuned. DSS 3.3.4 processing software. Frames 20 x 120" 0.7 hrs integration time.

For What its Worth

EXOPLANETS An exoplanet is any planet beyond our solar system. Most orbit other stars, but free-floating exoplanets, called rogue planets, orbit the galactic center and are untethered to any star. Most of the exoplanets discovered so far are in a relatively small region of our galaxy, the Milky Way. We know from NASA's Kepler Space Telescope that there are more planets than stars in the galaxy. By measuring exoplanets' sizes (diameters) and masses (weights), we can see compositions ranging from very rocky (like Earth and Venus) to very gas-rich (like Jupiter and Saturn). Exoplanets are made up of elements similar to those of the planets in our solar system, but their mixes of those elements may differ. Some planets may be dominated by water or ice, while others are dominated by iron or carbon. We've identified lava worlds covered in molten seas, puffy planets the density of Styrofoam and dense cores of planet still orbiting their stars.

The first exoplanets were discovered in the 1990s and since then we've identified thousands using a variety of detection methods. It's pretty rare for astronomers to see an exoplanet through their telescopes the way you might see Saturn through a telescope from Earth. That's called direct imaging, and only a handful of exoplanets have been found this way (and these tend to be young gas giant planets orbiting very far from their stars). Now we live in a universe of exoplanets. The count of confirmed planets is in the thousands and rising. That's from only a small sampling of the galaxy as a whole. The count could rise to the tens of thousands within a decade, as we increase the number, and observing power, of robotic telescopes. Most exoplanets are found through indirect methods: measuring the dimming of a star that happens to have a planet pass in front of it, called the transit method, or monitoring the spectrum of a star for the tell-tale signs of a planet pulling on its star and causing its light to subtly Doppler shift. Space telescopes have found thousands of planets by observing "transits," the slight dimming of light from a star when its tiny planet passes between it and our telescopes. Other detection methods include gravitational lensing, the so-called "wobble method."

The TRAPPIST-1 planets have been examined with ground and space telescopes. The space-based studies revealed not only their diameters, but the subtle gravitational influence these seven closely packed planets have upon each other; from this, scientists determined each planet's mass. So now we know their masses and their diameters. We also know how much of the energy radiated by their star strikes these planets' surfaces, allowing scientists to estimate their temperatures. We can even make reasonable estimates of the light level, and guess at the color of the sky, if you were standing on one of them. And while much remains unknown about these seven worlds, including whether they possess atmospheres or oceans, ice sheets or glaciers, it's become the best-known solar system apart from our own.

Exoplanets come in a wide variety of sizes, from gas giants larger than Jupiter to small, rocky planets about as big around as Earth or Mars. They can be hot enough to boil metal or locked in deep freeze. They can orbit their stars so tightly that a "year" lasts only a few days; they can orbit two suns at once. Some exoplanets are sunless rogues, wandering through the galaxy in permanent darkness.

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(New Zealand)



Club Meeting

Reminder Club meeting April 8th 6:30
Pm At Mi Amore Pizza in Lompoc. Masks!

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)

Night Time Bright Objects (no scope required)

The web site link below will take you to some
Great Milky Way interactive images and how
It was developed. (Type it in the search box.)

<http://skysurvey.org/>

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

ACL Club Logo

