Website: https://acl.universeii.com 2, November 2023

Astronomy Club of Lompoc

Presents

The Sidereal Times

Rosette (see page 5)

Meeting *News:* It is time to think about election of club Officers for 2024 operating year.

Reminder: **ACL Friday November 10th club meeting will held at Manzanita School Teachers lounge at 7:00 Pm.**

Lunar Calendar:
New Moon 13th
Full Moon 27th

This issue some photos of Sept Pot Luck @ River park

Presidents Message

Our October Meeting on Friday the 13th turned out to be lucky for us as 13 people attended that night! Our members were still in conversation after the meeting adjourned and stayed later than usual to nearly 9pm! So late that the young janitor for the school came by to ask us to hopefully leave earlier so he can finish up cleaning the teacher's lounge. So, from now on, we will try to finish all business and chatting by 8:30 pm. He was very nice about it so I gave him a couple of solar glasses as an apology and he was pleased to be able to see the eclipse on Sat.

Katherine Black brought her Japanese foreign exchange student **Ayano Kozakai** who has been staying with her for a few months. She exclaimed that at the star Party at the Sunburst in August, that she was so excited to see the Milky Way and amazed at so many stars in the dark sky for the first time since she lives in Tokyo.

October is Nominations month for our club Officers and the present ones have all agreed to continue for the year 2024. In Dec. it will become official when we have the final vote . Consider helping us out! We discussed the **Partial Eclipse** happening the next day in Lompoc Oct 14. Jana handed out solar eclipse glasses for viewing this event. Have your Eclipse story ready to share in Nov. Jana has a good one for you!

Tom showed us photos on his laptop of **The Royal Observatory**, located in Greenwich England. He told us about it and that it is the home of the first Royal Astronomers. He and his wife Molly were in charge of their 9 yr. old granddaughter Sylvie and even she was impressed by the Observatory and the **Prime Meridian Line** that runs through the property. Tom then presented a talk about all the Space Junk circling our Earth that is presenting a growing concern especially to Astronauts and Astronomers. We all signed a Good Bye card for Louise Gray, a 6 year member, that is moving to Sacramento soon. We wish you our best wishes for your move and trip up north Louise! Our November 10th Presentation will be by Vahan on a special subject that will be revealed in the agenda that week. Jana is asking our members to be thinking of what favorite subject in the realm of Astronomy or Space that you could share in a short talk to our club. Hoping for clear Skies! Jana

Events

November 15, 23 & 30 ***Star Party at the Observatory***.

Nov 3 Jupiter at opposition and will be at its closest approach to Earth This is the best time to view or photograph the planet.

Nov 4 & 5 Taurids Meteor shower produces about 10 meteors per hour. It is unusual in that it consists of 2 separate streams. The first is produced by dust grains left behind by Asteroid 2004 TG 10. The second stream is produced by debris left behind by Comet 2P Encke. It peaks this year on the night of the November 4^{th}. Meteors will radiate from the constellation Taurus but can appear anywhere in the sky.

Nov 9 Uranus at opposition. The planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. This is the best time to observe or photograph the planet.

Nov 17 & 18 Leonids Meteor shower is an average shower producing up to 15 meteors per hour at its peak. The Leonids is produced by dust grains left behind by comet Tempel-Tuttle. The shower peaks on the night of the 17^{th} and the morning of the 18^{th} . Meteors will radiate from the constellation of Leo but can appear anywhere in the sky.

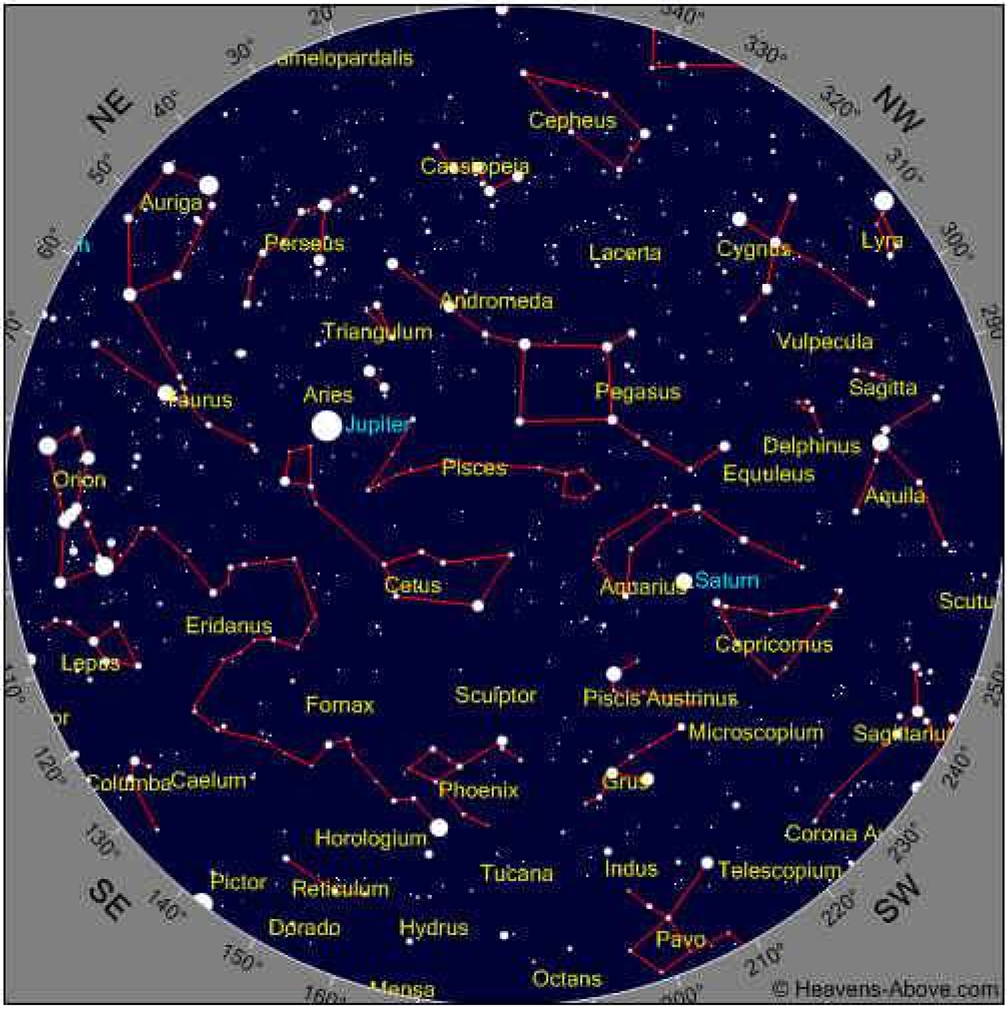
Star party's and Events

November 2023 Moon

Full 27, New 13, Last Quarter 5 , First Quarter 20

<u>November sky 2023</u>

Some Objects of interest, M31, Jupiter, Saturn, M42



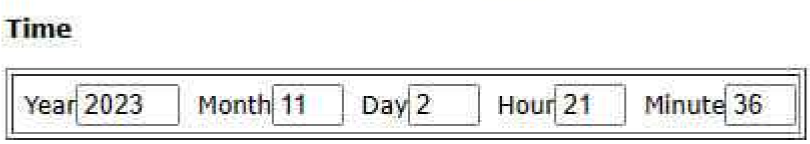


Photo courtesy Vahan Yeterian

The Rosette nebula Caldwell 49 NGC 2237 located near one end of the giant molecular cloud in the Monoceros region of the Milky Way Galaxy. The open cluster NGC 2244 is closely associated with the nebulosity, the stars of the cluster having been formed from the nebula's matter. The cluster and nebula lie at a distance of some 5000 light years from Earth and measure roughly 50 light years in diameter. The radiation from the young stars excites the atoms in the nebula causing them to emit radiation themselves producing the emission nebula we see. The mass of the nebula is estimated to be around 10,000 solar masses. A survey of the nebula with the Chandra X-ray observatory has revealed the presence of numerous new born stars inside the optical Rosette nebula studded with a dense molecular cloud. Altogether, approximately 2500 young stars lie in this star forming complex. This includes the massive O-type stars HD46223 and HD46150 which is responsible for blowing the ionized bubble. Most of the on going star-formation is occurring in the dense molecular cloud to the South East of the bubble. A diffuse X-ray glow is also seen between the stars in the bubble. This has been attributed to super hot plasma with temperatures ranging from 1 to 10,000,000 degrees K. This is significantly hotter than the 10,000 K plasmas seen in the H ii regions and is likely attributed to shock-heated winds from the massive O-type stars. Image capture, Astro-Tech AT80 EDT lens, Canon T3i Baader modified, Celestron AVX GEM mount, frames 20 x 120" and integration time 0.7 hours, image processing software DSS 3.3.4.

For What It's Worth

Quantum a brief account

What is quantum physics? Put simply, it's the physics that explains how everything works: the best description we have of the nature of the particles that make up matter and the forces with which they interact. Quantum physics underlies how atoms work, and so why chemistry and biology work as they do. You, me and the gatepost – at some level at least, we're all dancing to the quantum tune. If you want to explain how electrons move through a computer chip, how photons of light get turned to electrical current in a solar panel or amplify themselves in a laser, or even just how the sun keeps burning, you'll need to use quantum physics. The difficulty – and, for physicists, the fun – starts here. To begin with, there's no single quantum theory.
There's quantum mechanics, the basic mathematical framework that underpins it all, which was first developed in the 1920s by Niels Bohr, Werner Heisenberg, Erwin Schrödinger and others. It characterises simple things such as how the position or momentum of a single particle or group of few particles changes over time. But to understand how things work in the real world, quantum mechanics must be combined with other elements of physics – principally, Albert Einstein's special theory of relativity which explains what happens when things move very fast – to create what are known as quantum field theories.

Three different quantum field theories deal with three of the four fundamental forces by which matter interacts: electromagnetism, which explains how atoms hold together; the strong nuclear force, which explains the stability of the nucleus at the heart of the atom; and the weak nuclear force, which explains why some atoms undergo radioactive decay. Over the past five decades or so these three theories have been brought together in a ramshackle coalition known as the "standard model" of particle physics. For all the impression that this model is slightly held together with sticky tape, it is the most accurately tested picture of matter's basic working that's ever been devised. Its crowning glory came in 2012 with the discovery of the Higgs boson, the particle that gives all other fundamental particles their mass, whose existence was predicted on the basis of quantum field theories as far back as 1964. Conventional quantum field theories work well in describing the results of experiments at high-energy particle smashers such as CERN's Large Hadron Collider, where the Higgs Boson was discovered, which probe matter at its smallest scales. But if you want to understand how things work in many less esoteric situations – how electrons move or don't move through a solid material and so make a material a metal, an insulator or a semiconductor, for example – things get even more complex.

The billions upon billions of interactions in these crowded environments require the development of "effective field theories" that gloss over some of the gory details. The difficulty in constructing such theories is why many important questions in solid-state physics remain unresolved – for instance why at low temperatures some materials are superconductors that allow current without electrical resistance, and why we can't get this trick to work at room temperature.

But beneath all these practical problems lies a huge quantum mystery. At a basic level, quantum physics predicts very strange things about how matter works that are completely at odds with how things seem to work in the real world. Quantum particles can behave like particles, located in a single place; or they can act like waves, distributed all over space or in several places at once. How they appear seems to depend on how we choose to measure them, and before we measure they seem to have no definite properties at all – leading us to a fundamental conundrum about the nature of basic reality. This fuzziness leads to apparent paradoxes such as Schrodinger's Cat, in which thanks to an uncertain quantum process a cat is left dead and alive at the same time. But that's not all. Quantum particles also seem to be able to affect each other instantaneously even when they are far away from each other. This truly bamboozling phenomenon is known as entanglement, or, in a phrase coined by Einstein (a great critic of quantum theory), "spooky action at a distance". Such quantum powers are completely foreign to us, yet are the basis of emerging technologies such as ultra-secure quantum cryptography and ultra-powerful quantum computing.

But as to what it all means, no one knows. Some people think we must just accept that quantum physics explains the material world in terms we find impossible to square with our experience in the larger, "classical" world. Others think there must be some better, more intuitive theory out there that we've yet to discover. In all this, there are several elephants in the room. For a start, there's a fourth fundamental force of nature that so far quantum theory has been unable to explain. Gravity remains the territory of Einstein's general theory of relativity, a firmly non-quantum theory that doesn't even involve particles. Intensive efforts over decades to bring gravity under the quantum umbrella and so explain all of fundamental physics within one "theory of everything" have come to nothing. Meanwhile cosmological measurements indicate that over 95 per cent of the universe consists of dark matter and dark energy, stuffs for which we currently have no explanation within the standard model, and conundrums such as the extent of the role of quantum physics in the messy workings of life remain unexplained. The world is at some level quantum – but whether quantum physics is the last word about the world remains an open question.

(From New Scientist)

Astronomy Club Officers

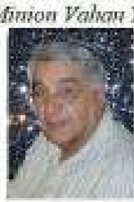
President & Treasurer
Jana Hunking

Vice President
Tom Gerald

Secretary
Katharine Black

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 November 10th 7:00 PM Manzanita School Teachers Lounge.

Star Parties (as always weather permitting)

Other Astronomy club meetings and links to 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 (timeanddat

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

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

https://spaceweather.com

https://www.space.com

https://skymaps.com

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

ACL Club LOGO