VAAS Website: www.vaas.universeii.com/ 2, October 2018


Messier 17 Nebula (see page 5)

Meeting *News:*

At the September meeting we discussed some general VAAS Business and events we supported during the month of May thru August. Two new members, Joel Krueger and David Valdez welcome to VAAS.

Reminder: **VAAS club meeting Friday October 12th Manzanita school teachers lounge 7:00 PM.**

Lunar Calendar:

New Moon 13th
Full Moon 28th

Andy & Family PCS in Florida

Presidents Message

Hello, All:

Well, we certainly got back to work after our summer break with a very productive first meeting last month! We covered a lot of ground and welcomed new members, Joel Krueger (and Candy) and David Valdez (and daughter Lorena).

Thank you, Jana, for your excellent report on ICEsat2, recently launched from VAFB aboard the last Delta rocket to fly. Your concise information, and that amazing NASA poster, made its mission of environmental study perfectly clear.

It was wonderful to have all of you enthusiastically support our November school outreach at Miguelito Elementary School. Nancy Wear, the organizing teacher, was happy to hear that we committed to be there, Wednesday, November 14th. I will pass along details to you regarding the evening as such is decided by the school. Let's hope for crystal clear skies!

The BIG decision at the meeting was "the when and where" of our annual picnic. The date is Saturday, October 20, gathering at noon. Since River Park is "otherwise occupied" this year, we had to check out other possibilities and settled on Thompson Park in west Lompoc. The City and a group of volunteers have worked very hard to refurbish the park, so we will be honoring their work… while enjoying each other's company and delicious food!

Lastly, we just had great news from Sarah Marcotte of JPL. The Mars InSight landing will be broadcast live at the Lompoc Public Library, Monday, November 26th. Touchdown will be approximately 11:54 AM ; more information about the two-hour broadcast will be forthcoming.

Skyward,
Tom

Events

October 6th ***Star Party at the Observatory.***

Yea!

October 8th Draconids Meteor Shower is a minor meteor shower producing only about 10 meteors per hour. It is produced by dust grains left behind by Comet 21P Giacobini-Zinner. It is an unusual shower in that it is best viewed in the early evening instead of early morning like most showers. The shower peaks on the night of the 8th. Meteors will radiate from the constellation of Draco but can appear anywhere in the sky.

October 13th *Star Party at the Observatory.*

Yea!

October 20th *Star Party at the Observatory.*

Yea!

October 21st Orionids Meteor Shower is an average shower producing up to 20 meteors per hour at its peak. It is produced by dust grains left behind by comet Halley. The shower runs annually from October 2nd thru November 7th. It peaks this year on the night of the 21st and morning of the 22nd. Meteors will radiate from the constellation of Orion but can appear anywhere in the sky.

October 23rd Uranus at Opposition. The blue green planet will be at its closest approach to earth and will be fully illuminated by the Sun. It will be brighter than any other time of the year and be visible all night long. It will appear as a tiny blue-green dot in all but the most powerful telescopes.

Tom @ Rotary Demo

Star party's and Events

September 1st Star Party at the Observatory. Cancelled due to weather! Again!

Nutz!

September 8th Star Party at Figueroa Mt and / or the Observatory. No one at Figueroa. On site (Observatory) Vahan and Jay found the remains of a mouse and also where it chewed up part of the drop light power cord. We cleaned up the area. On site for the evening were Vince, Tom, Jana, Vahan, Jay, Amber and Danny. Sky clear no wind and no bugs and temperature was mild. The Milky Way stood out bright and clear. Venus, Jupiter, Saturn and Mars shown on the ecliptic. Tom set up his 8"SCT, Vince a new scope and Jay his camera. The 14"looked at Jupiter Saturn and Mars and a few other objects. General viewing was M31 and several others. Secured and departed 0030. All in all it was a great night under the stars.

Yea!

September 15th Star Party at the Observatory. Vahan, Dave, Edmund and his associate Tom, Danny and Jay on site. Sky clear minimum wind no bugs but a little on the cold side temp wise. Most time spent looking at Moon, planets and star clusters and the Dumbbell nebula etc. The Milky way stood out nicely against the light from a half Moon. Did a little touch up painting and cleaning. Secured at 9:45. A good night under the stars.

Yea!

October 2018 Moon

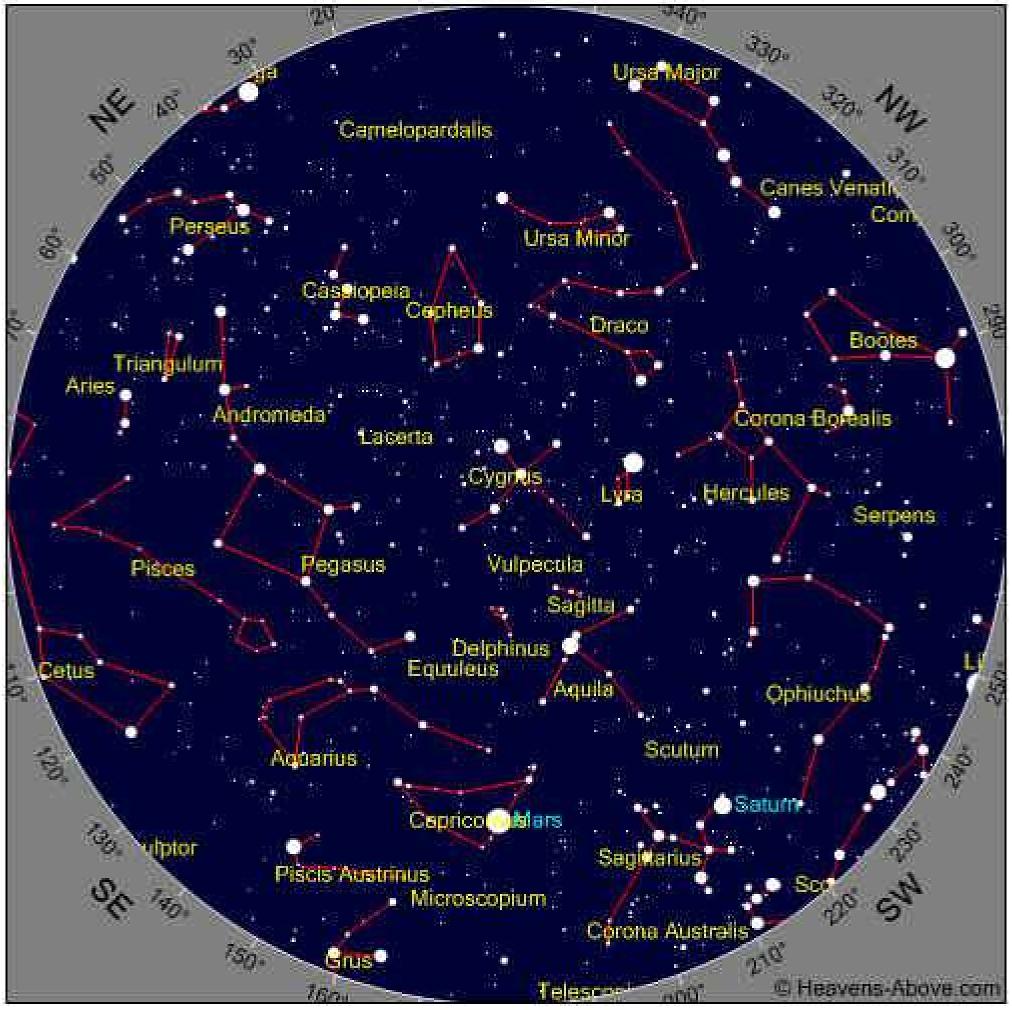
Full 24th, New 9th, Last Quarter 1st, First Quarter 17th.

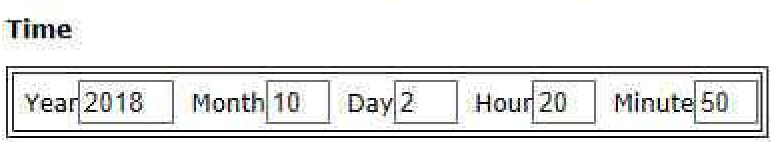
Moon Facts

- **Average distance from Earth**: 238,855 miles (384,400 km)
- **Perigee (closest approach to Earth)**: 225,700 miles (363,300 km)
- **Apogee (farthest distance from Earth)**: 252,000 miles (405,500 km)
- **Orbit circumference:** 1,499,618.58 miles (2,413,402 km)
- **Mean orbit velocity:** 2,287 mph (3,680.5 km/h)

October 2018 Sky

Some Objects of interest, M31, M13, Mars, Saturn





Craig, Edmund & Vahan

Vahan at YMCA Outreach

Photo Courtesy Craig Fair

The Omega Nebula

Messier 17 NGC 6618 also called the Swan, the Horseshoe, and the Lobster nebula is a region of star formation and shines by excited emission caused by the high energy radiation of young stars. Unlike in many other emission nebulae these stars are not obvious in optical images but hidden in the nebula. Star formation is either still active in this nebula or created very recently. A small cluster of about 35 bright but obscured stars seems to be imbedded in the nebulosity. The Omega nebula is about 5000 to 6000 light years from Earth and it spans some 15 light years in diameter. The cloud of interstellar matter of which the nebula is part of is roughly 40 light years in diameter and has a mass of 30,000 solar masses. The total mass is estimated to be 800 solar masses. It is considered to be one of the brightest and most massive star-forming regions in our galaxy. Its local geometry is similar to the Orion nebula except that it is viewed edge-on rather than face-on.
The open cluster NGC 6618 lies imbedded in the nebulosity and causes the gases to shine due to radiation. The actual number of stars in the nebula is up to 800, 100 of spectral type earlier than B9 and 9 of spectral type O plus a thousand stars in formation in its outer regions. It is also one of the youngest clusters know with an age of just 1 million years.
The luminous blue variable HD 168607, located in the South East part of the Omega nebula is generally assumed to be associated with it; its close neighbor, the blue hyper giant HD 168625, may be too. The Swan portion of M17, the Omega nebula, in the Sagittarius nebulosity is said to resemble a barber pole. As for diffuse nebula the overall brightness is difficult to estimate and is given discordantly in the sources. Older estimates are given at 7.0 magnitude and were performed in Northern observatories. Modern compilations list it as brighter, about 5.0 to 6.0 magnitude.

Image Capture, Site 1.5 Figueroa Mt, QHY10 camera, Celestron 9.25 inch SCT, CGEM mount. 300 sec exp 20 lights, darks and bias files. Processed in Lightroom and Topaz DeNoise programs. Stacked in Deep Sky Stacker.

For What its Worth

Stars

Stars are the most widely recognized astronomical objects and represent the most fundamental building blocks of galaxies. The age, distribution and composition of the stars in a galaxy trace the history, dynamics and evolution of that galaxy. Moreover, stars are responsible for the manufacture and distribution of heavy elements such as carbon, nitrogen and oxygen and their characteristics are intimately tied to the characteristics of the planetary systems that may coalesce about them. Consequently the study of the birth, life and death of stars is central to the field of astronomy.

Star Formation

Stars are born within the clouds of dust and gas scattered throughout most galaxies. A familiar example of such a dust cloud is the Orion Nebula. Turbulence deep within these clouds gives rise to knots with sufficient mass that the gas and dust can begin to collapse under its own gravitational attraction. As the cloud collapses the material at the center begins to heat up. Known as a Protostar, it is this hot core at the heart of the collapsing cloud that will one day become a star. Three dimensional computer models of star formation predict that the spinning clouds of collapsing gas and dust may break up into two or three blobs; this would explain why the majority of the stars in the Milky Way are paired or in groups of multiple stars. As the cloud collapses a dense hot core forms and begins gathering dust and gas. Not all this material ends up as part of a star, the remaining dust can become planets, asteroids, or comets or remain as dust. In some cases the cloud may not collapse at a steady pace. In January 2004 an amateur astronomer, James McNeil discovered a small nebula that appeared unexpectedly near the nebula Messier 78 in the constellation of Orion. When observers around the world pointed their instruments at McNeil's nebula they found something interesting. Its brightness appeared to vary. Observations with NASA's Chandra X-ray observatory provided a likely explanation. The interaction between the young stars magnetic field and the surrounding gas causes episodic increases in brightness.

Main Sequence Stars

A star the size of our Sun requires about 50 million years to mature from the beginning of the collapse to adulthood. Our Sun will stay in this mature phase for approximately 10 billion years. Stars are fueled by nuclear fusion of hydrogen to form helium deep in their interiors. The outflow of energy from the central regions of the star provides the pressure necessary to keep the star from collapsing under its own weight and the energy by which it shines. Main sequence stars span a wide range of luminosities and colors and can be classified according to those characteristics. The smallest stars known as red dwarfs may contain as little as 10% the mass of the Sun and emit only 0.01% as much energy glowing feebly at temperatures between 3000-4000K. Despite their diminutive nature red dwarfs are by far the most numerous stars in the universe and have life spans of tens of billions of years. On the other hand the most massive stars known as hypergiants may be 100 or more times more massive than the Sun and have surface temperatures of more than 30,000K. Hypergiants emit hundreds of thousands of times more energy than the Sun but have lifetimes of only a few million years. Although extreme stars like these are believed to have been common in the early universe, today they are extremely rare. The entire Milky Way galaxy contains only a handful of Hypergiants,

Stars and their Fates

In general the larger the star the shorter its life although all but the most massive stars live for billions of years. When a star has fused all its hydrogen in its core nuclear reactions cease. Deprived of the energy production needed to support it the core begins to collapse into itself and becomes much hotter. The hydrogen is still available outside the core so hydrogen fusion continues in a shell surrounding the core. The increasingly hot core also pushes the outer layers of the star outward causing them to expand and cool transforming the star into a red giant. If the star is sufficiently massive the collapsing core may become hot enough to support exotic nuclear reactions that consume helium and produce a variety of heavier elements up to iron. However, such reactions offer only a temporary reprieve. Gradually the stars internal nuclear fires become increasingly unstable, sometimes burning furiously other times dying down. These variations cause the star to pulsate and throw off its outer layers enshrouding itself in a cocoon of gas and dust. What happens next depends on the size of the core.

Average Stars Become White Dwarfs

For average stars like the Sun, the process of ejecting its outer layers continues until the stellar core is exposed. This dead, but still ferociously hot stellar cinder is called a White Dwarf. White Dwarfs, which are roughly the size of our Earth despite containing the mass of a star, once puzzled astronomers - why didn't they collapse further? What force supported the mass of the core? Quantum mechanics provided the explanation. Pressure from fast moving electrons keeps these stars from collapsing. The more massive the core, the denser the white dwarf that is formed. Thus, the smaller a white dwarf is in diameter, the larger it is in mass! These paradoxical stars are very common - our own Sun will be a white dwarf billions of years from now. White dwarfs are intrinsically very faint because they are so small and, lacking a source of energy production, they fade into oblivion as they gradually cool down.

This fate awaits only those stars with a mass up to about 1.4 times the mass of our Sun. Above that mass, electron pressure cannot support the core against further collapse. Such stars suffer a different fate as described below.

White Dwarfs May Become Novae

If a white dwarf forms in a binary or multiple star system, it may experience a more eventful demise as a nova. Nova is Latin for "new" - novae were once thought to be new stars. Today, we understand that they are in fact, very old stars - white dwarfs. If a white dwarf is close enough to a companion star, its gravity may drag matter - mostly hydrogen - from the outer layers of that star onto itself, building up its surface layer. When enough hydrogen has accumulated on the surface, a burst of nuclear fusion occurs, causing the white dwarf to brighten substantially and expel the remaining material. Within a few days, the glow subsides and the cycle starts again. Sometimes, particularly massive white dwarfs (those near the 1.4 solar mass limit mentioned above) may accrete so much mass in the manner that they collapse and explode completely, becoming what is known as a supernova.

Supernovae Leave Behind Neutron Stars or Black Holes

Main sequence stars over eight solar masses are destined to die in a titanic explosion called a supernova. A supernova is not merely a bigger nova. In a nova, only the star's surface explodes. In a supernova, the star's core collapses and then explodes. In massive stars, a complex series of nuclear reactions leads to the production of iron in the core. Having achieved iron, the star has wrung all the energy it can out of nuclear fusion - fusion reactions that form elements heavier than iron actually consume energy rather than produce it. The star no longer has any way to support its own mass, and the iron core collapses. In just a matter of seconds the core shrinks from roughly 5000 miles across to just a dozen, and the temperature spikes 100 billion degrees or more. The outer layers of the star initially begin to collapse along with the core, but rebound with the enormous release of energy and are thrown violently outward. Supernovae release an almost unimaginable amount of energy. For a period of days to weeks, a supernova may outshine an entire galaxy. Likewise, all the naturally occurring elements and a rich array of subatomic particles are produced in these explosions. On average, a supernova explosion occurs about once every hundred years in the typical galaxy. About 25 to 50 supernovae are discovered each year in other galaxies, but most are too far away to be seen without a telescope.

Neutron Stars

If the collapsing stellar core at the center of a supernova contains between about 1.4 and 3 solar masses, the collapse continues until electrons and protons combine to form neutrons, producing a Neutron. Neutron stars are incredibly dense - similar to the density of an atomic nucleus. Because it contains so much mass packed into such a small volume, the gravitation at the surface of a neutron star is immense. Like the White Dwarf stars above, if a neutron star forms in a multiple star system it can accrete gas by stripping it off any nearby companions. The Rossi X-Ray Timing Explorer has captured telltale X-Ray emissions of gas swirling just a few miles from the surface of a Neutron star.
Neutron stars also have powerful magnetic fields which can accelerate atomic particles around its magnetic poles producing powerful beams of radiation. Those beams sweep around like massive searchlight beams as the star rotates. If such a beam is oriented so that it periodically points toward the Earth, we observe it as regular pulses of radiation that occur whenever the magnetic pole sweeps past the line of sight. In this case, the neutron star is known as a pulsar.

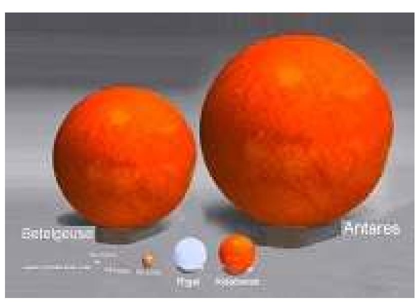
Black Holes

If the collapsed stellar core is larger than three solar masses, it collapses completely to form a black hole: an infinitely dense object whose gravity is so strong that nothing can escape its immediate proximity, not even light. Since photons are what our instruments are designed to see, black holes can only be detected indirectly. Indirect observations are possible because the gravitational field of a black hole is so powerful that any nearby material - often the outer layers of a companion star - is caught up and dragged in. As matter spirals into a black hole, it forms a disk that is heated to enormous temperatures, emitting copious quantities of X-rays and Gamma-rays that indicate the presence of the underlying hidden companion.

From the Remains, New Stars Arise

The dust and debris left behind by novae and supernovae eventually blend with the surrounding interstellar gas and dust, enriching it with the heavy elements and chemical compounds produced during stellar death. Eventually, those materials are recycled, providing the building blocks for a new generation of stars and accompanying planetary systems.

A Few Giants



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

Club Meeting

Reminder Club meeting October 12th 7:00Pm
Manzanita School Teachers lounge.

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

Night Time Bright Objects (no scope required)

Link to "Heavens Above" web site
http:// www.heavens-above.com/

(Iridium Satellite)
(ISS Visible Pass)
Be sure to set the nearest location from their pull-down menu.

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/

Dave McNally is the VAAS Web Site Serf/Minion

Dave