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

Vandenberg Amateur Astronomical Society presents The Sidereal Times

Nebulas (see page 5)

Meeting *News:*

At the February meeting we were treated to a Planetarium Show presented by Vince Tobin. Had a brief discussion about some up coming events and a Nova video at the next meeting.

Reminder: VAAS club meeting Friday March 9th at Manzanita school teachers lounge 7:00 PM.

Lunar Calendar:

New Moon 17th
Full Moon 2 & 31

Past display at Elementary school

Presidents Message

Hello, Fellow Sky Watchers!

What a grand evening we had for our February meeting! Over two dozen members and guests showed up for Vince Tobin and His Alan Hancock Traveling Planetarium Show! Vince did a wonderful job of taking us across our night sky, down to the South Pole to see the sun circle the horizon and up to the North Pole to watch the stars circle the horizon in seemingly the opposite direction as at the South Pole. Vince's knowledge of astronomy and his talent in communicating, kept young and older alike in awe. Vince followed his presentation with a fascinating movie projected on the dome which gave us a deeper appreciation of the vastness of the universe. BIG personal thanks to Mark Bumgarner for all he did to make our program a success.

Two wonderful outreach opportunities have recently come our way for the month of April. One, I mentioned at the Planetarium meeting. STEM Night at Jimenez Elementary School in Santa Maria, will be Thursday, April 19th, from 6:00-8:00 PM. The other is Lompoc YMCA's Healthy Kids Day, Saturday, April 21, 10:00 AM-1:00 PM, their theme this year being "Choose Your Own Adventure." Last year they had over 80 young people attend. Any of us who can be at these events will be needed and appreciated.

FINALLY: At our March 9th meeting, we will enjoy watching together the NOVA program "Chasing Pluto" which follows the development, launch, and incredibly successful, nine year, three billion mile mission of the New Horizons' fly-by of Pluto in 2015. Popcorn anyone?

Skyward,
Tom

Earth Rise 1968

Events

March 10th ***Star party at the Observatory.***
Yea!

March 15th The planet Mercury at greatest elongation of 18.4 degrees from the Sun. Best time to observe Mercury is low in the Western evening sky just after sunset.

March 17th ***Star party at the Observatory.***
Yea!

March 20th March equinox occurs at 16:15 UTC. The Sun will be directly over the equator and there will be nearly equal amounts of day and night throughout the world. This is the first day of spring in the northern hemisphere (Vernal equinox) and the first day of Fall (Autuminal equinox) in the Southern hemisphere.

March 24th ***Star party at the Observatory.***
Yea!

March 31st Full Moon Blue Moon. This phase occurs at 12:37 UTC. Since this is the second Blue Moon in the same month it is sometimes referred to as a Blue Moon. This is particularly unique in that January and March both have 2 Moons in the same month while February has no full Moons.

Some Past events

Star party's and Events

Feb 10th Star party at the Observatory. Here we go again….cancelled due to weather.

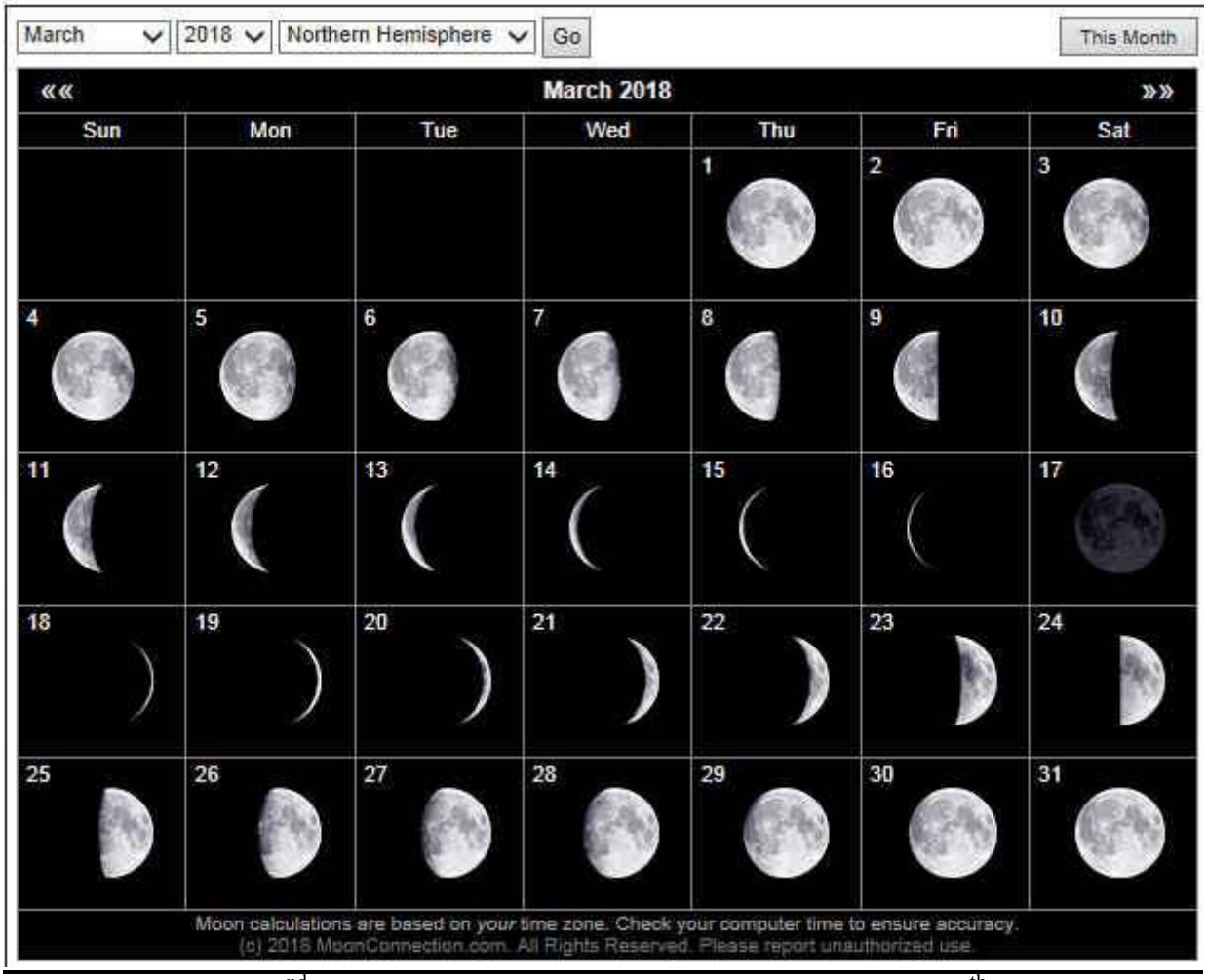
Nuts!

Feb 17th Star party at the Observatory. Dave, Vahan, Vince, Craig, Louise and Elizabeth on site. Vahan and Craig were in the astrophotography mode, Vahan was testing his new scope an Astro-Tech AT80EDT f/6 ED. The girls were observing and getting some info from Vince and Dave about the sky. Dave was the Observatory master for the evening. It was a good sky, no wind but very cold. It was a good night under the stars.
Yea!

Feb 24th Star party at the Observatory. Dave, Craig and Vahan on site. Quite windy a bit cold but clear sky. Working on the observatory 14 inch to retrofit a finder and to determine a means of polar alignment. Looked at M41 and the double cluster and a few other objects. Clouds moved in. Secured and departed 8:00Pm.
Ok!

Past Field trips

March 2018 Moon



Full 2nd & 31st, New 17th, Last Quarter 9th, First Quarter 25th.

Moon Facts

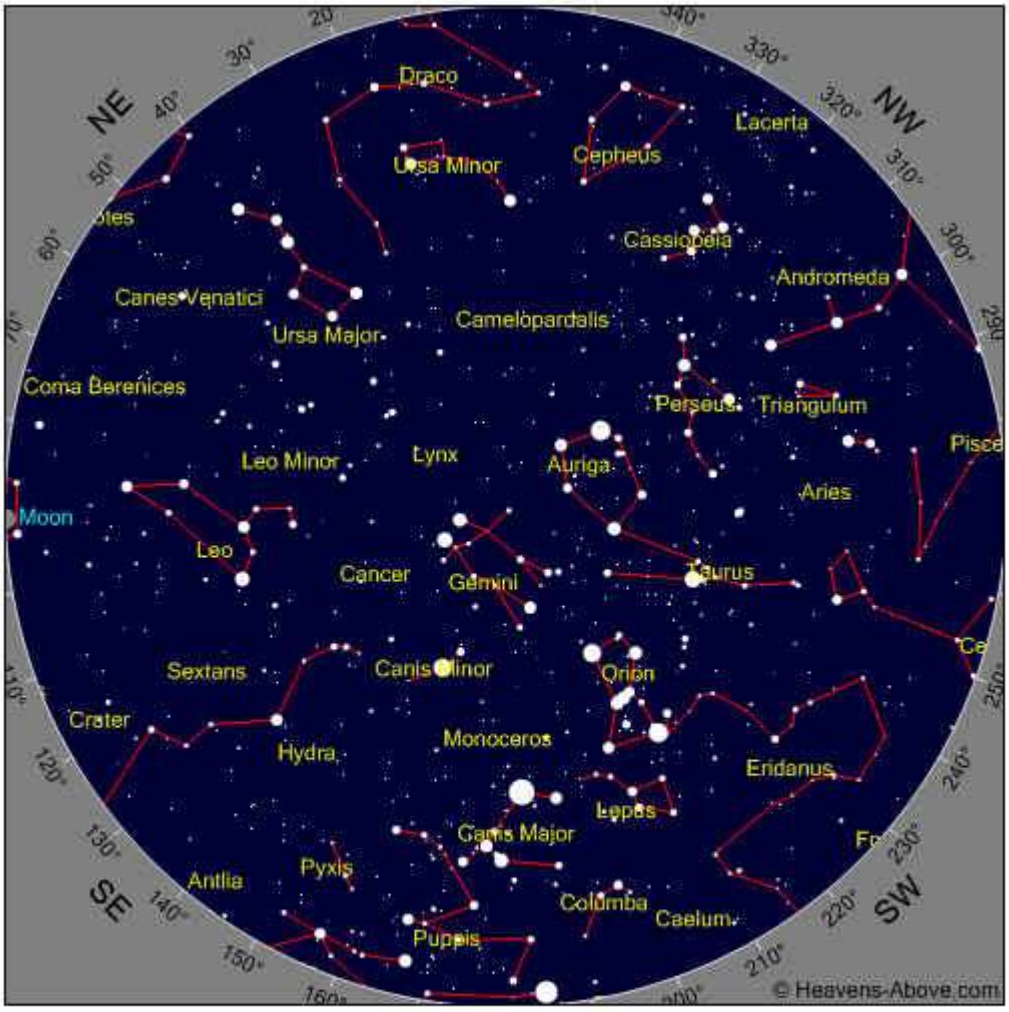
A full day on the Moon, one sunrise to the next, lasts about 29.5 Earth days.

The Moon is moving away from Earth by 3.8cm (1.48 inches) per year.

It there are 2 full Moons in the same month the second one is called a Blue Moon.

March 2018 Sky

Some Objects of interest, M42, M1



Time

Year	2018	Month	3	Day	3	Hour	20	Minute	10

VAAS Picnic 2016

Photo Courtesy David McNally

The Lagoon Messier 8 and Trifid Messier 20 nebulas.

The Lagoon nebula is estimated to be 4000 to 6000 light years distant from Earth. In the sky it spans 90' to 40' which translates to 110 by 50 light years. The nebula contains a number of Bok globules (dark collapsing clouds of protostellar material). It also includes a funnel like structure caused by a Hot O type star that emanates ultraviolet light heating and ionizing gasses on the surface of the nebula. It also contains a central structure in which the first four Herbig-Haro objects were detected including HH 870. This provided the first direct evidence of active star formation by accretion within it.

The Trifid nebula Messier 20 was the subject of an investigation using the Hubble telescope, using filters that isolate emission from hydrogen atoms, ionized sulfur atoms and doubly ionized oxygen atoms. The image shows a dense cloud of dust and gas which is a stellar nursery full of embryonic stars. This cloud is 8 light years away from the nebulas central star. A stellar jet protrudes from the head of the cloud. Jets are the exhaust gasses of star formation and radiation from the nebula's central star makes the jet glow. The finger like stalk to the right of the jet points from the head of the dense cloud directly to the star that powers the Trifid nebula. This stalk is a prominent example of evaporating gaseous globules, or EGGs'. The stalk has survived because the tip is a knot of gas that is dense enough to resist being eaten away by the powerful radiation from the star.

Imaging telescope or lens Sigma 170 500 f/8 telephoto lens, Camera, Canon 60D Baader modified. Mount, Celestron CGEM hypertuned. Software, DSS 3.3.4

Resolution 2600 x 1732, frames 20 x 90', integration time 0.5 hours, pixel scale 5.945 arcsec/pixel, field radius 2.580 degrees.

For What its Worth

The Big Bang theory predicts that the early universe was a very hot place and that as it expands, the gas within it cools. Thus the universe should be filled with radiation that is literally the remnant heat left over from the Big Bang, called the “cosmic microwave background", or CMB. The existence of the CMB radiation was first predicted by Ralph Alpherin 1948 in connection with his research on big bang undertaken together with Robert Herman and George Gamow. It was first observed inadvertently in 1965 by Arno Penzias and Robert Wilson at the Bell Telephone Laboratories in Murray Hill, New Jersey. The radiation was acting as a source of excess noise in a radio receiver they were building. Today, the CMB radiation is very cold, only 2.725° above absolute zero, thus this radiation shines primarily in the microwave portion of the electromagnetic spectrum and is invisible to the naked eye. However, it fills the universe and can be detected everywhere we look. In fact, if we could see microwaves, the entire sky would glow with a brightness that was astonishingly uniform in every direction. The temperature is uniform to better than one part in a thousand! This uniformity is one compelling reason to interpret the radiation as remnant heat from the Big Bang; it would be very difficult to imagine a local source of radiation that was this uniform. Since light travels at a finite speed, astronomers observing distant objects are looking into the past. Most of the stars that are visible to the naked eye in the night sky are 10 to 100 light years away. Thus, we see them as they were 10 to 100 years ago. We observe Andromeda, the nearest big galaxy, as it was about 2.5 million years ago. Astronomers observing distant galaxies with the Hubble Space Telescope can see them as they were only a few billion years after the Big Bang. The CMB radiation was emitted 13.7 billion years ago, only a few hundred thousand years after the Big Bang, long before stars or galaxies ever existed. Thus, by studying the detailed physical properties of the radiation, we can learn about conditions in the universe on very large scales at very early times, since the radiation we see today has traveled over such a large distance. One of the profound observations of the 20th century is that the universe is expanding. This expansion implies the universe was smaller, denser and hotter in the distant past. When the visible universe was half its present size, the density of matter was eight times higher and the cosmic microwave background was twice as hot. When the visible universe was one hundredth of its present size, the cosmic microwave background was a hundred times hotter (273 degrees above absolute zero or 32 degrees Fahrenheit, the temperature at which water freezes to form ice on the Earth's surface). In addition to this cosmic microwave background radiation, the early universe was filled with hot hydrogen gas with a density of about 1000 atoms per cubic centimeter. When the visible universe was only one hundred millionth its present size, its temperature was 273 million degrees above absolute zero and the density of matter was comparable to the density of air at the Earth's surface. At these high temperatures, the hydrogen was completely ionized into free protons and electron. Since the universe was so very hot through most of its early history, there were no atoms in the early universe, only free electrons and nuclei. (Nuclei are made of neutrons and protons). The cosmic microwave background photons easily scatter off of electrons. Thus, photons wandered through the early universe, just as optical light wanders through a dense fog. This process of multiple scattering produces what is called a “thermal” or “blackbody” spectrum of photons. According to the Big Bang theory, the frequency spectrum of the CMB should have this blackbody form. This was indeed measured with tremendous accuracy by the FIRAS experiment on NASA's COBE satellite.

The prediction of the Big Bang theory for the energy spectrum of the cosmic microwave background radiation compared to the observed energy spectrum. Specifically a measurement was made of the surface brightness per unit frequency interval which is a per unit wavelength interval. The FIRAS experiment measured the spectrum at 34 equally spaced points along the blackbody curve. The error bars on the data points are so small that they can not be seen under the predicted curve! There is no alternative theory yet proposed that predicts this energy spectrum. The accurate measurement of its shape was another important test of the Big Bang theory.

The behavior of CMB photons moving through the early universe is analogous to the propagation of optical light through the Earth's atmosphere. Water droplets in a cloud are very effective at scattering light, while optical light moves freely through clear air. Thus, on a cloudy day, we can look through the air out towards the clouds, but can not see through the opaque clouds. Cosmologists studying the cosmic microwave background radiation can look through much of the universe back to when it was opaque: a view back to 380,000 years after the Big Bang. This “wall of light“ is called the surface of last scattering since it was the last time most of the CMB photons directly scattered off of matter. When we make maps of the temperature of the CMB, we are mapping this surface of last scattering. One of the most striking features about the cosmic microwave background is its uniformity. Only with very sensitive instruments, such as COBE and WMAP can cosmologists detect fluctuations in the cosmic microwave background temperature. By studying these fluctuations, cosmologists can learn about the origin of galaxies and large scale structures of galaxies and they can measure the basic parameters of the Big Bang theory.

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

Club Meeting

Reminder Club meeting March 9th 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