



If you wish to make an apple pie from scratch,
 you must first invent the universe.
 Carl Sagan

Newsletter of the Pomona Valley Amateur Astronomers

Volume 36 Number 3

nightwatch

March 2016

PVAA Gen Meeting 02/26/16

The Claremont Library is adding a third telescope to its collection. You can check out the telescope for a week at a time. This telescope is a duplicate of the other two currently available. "Available" means you can check them out of the library, just like a book, but there is a waiting list that you would be put on. As the list is several (almost 6) months long, the 3rd telescope will, hopefully, reduce the wait. Many library patrons, after returning the telescope back to the library, immediately put their names back on the waiting list. Without a doubt, the Library Telescopes are a big hit. The PVAA maintains the telescopes, making sure they are kept in working order. Which is to say, "Thanks Mathew Wedel" - for keeping up with the telescopes' maintenance.

We have Mount Wilson scheduled for full nights with the 100" telescope on Friday, June 3rd, and Saturday, June 4th with the 60" telescope. The cost is \$330 for the 100 inch, and \$100 for the 60 inch. We need a minimum amount of people to sign up for us to reserve the nights.

The club secretary Howard Maculsay brought copies of the Andromeda Galaxy taken by the Slooh Network. Anyone in attendance that wanted one picked it up at the break. The picture

was 12 separate areas of the galaxy seamlessly stitched together for a 5800 x 7700 pixel masterpiece. The photographer used the Slooh 17 inch reflector with a 2939mm focal length (f/6.8). 623 exposures were stitched together to create the final image.

Eldred Tubbs brought in a graph showing gravity waves, and had a small presentation of what they had to go through to detect these waves.

On a separate note, the April issue of Sky & Telescope has an article entitled "Big Fish, Small Tackle" (Grab your binoculars and drop a line in the deep pool of the Virgo Galaxy Cluster) by our club president Mathew Wedel. - Pick up the issue and check it out.

We also had 3 speakers for the night: Terry Nakazono, MA UCLA with his presentation entitled "Looking for Astronomy in Denmark." David Nakamoto with his presentation of "Crazy over Planets - The Modern Discovery of Planets." - And Dave Kary of Citrus College on Kuiper Belt Objects.

I will write up these presentations for the next issue of Nightwatch.

Gary Thompson

PVAA Officers and Board

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Directors

Membership / Publicity....	Gary Thompson ..	909-935-5509
Outreach	Jeff Schroeder	909-758-1840
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Club Events Calendar

March 25, 2016 General Meeting–Geo Somoza, Light Sail

April 9, 2016 Star Party--Kelso Dunes

April 14, 2016 Board Meeting

April 22, 2016 General Meeting

May 7, 2016 Star Party--Cow Canyon Saddle, Mt Baldy

May 12, 2016 Board Meeting

May 20, 2016 General Meeting

June 3, 2016 Mt Wilson Observing 100"

June 4, 2016 Mt Wilson Observing 60"

June 16, 2016 Board Meeting

June 24, 2016 General Meeting

July 30, 2016 Star Party - Grandview

July 14, 2016 Board Meeting

July 22, 2016 General Meeting

Aug 27, 2016 Star Party – Cow Canyon Saddle, Mt Baldy

Aug 11, 2016 Board Meeting

Aug 19, 2016 General Meeting

Children's Book Festival

On Saturday, March 5, 2016, PVAA members represented the Astronomy club, at the 5th Annual Claremont Children's Book Festival. There were 487 people in attendance, 207 adults and 280 children. The Library displayed the new telescope, along with a name the telescope contest. This is the third telescope added to the Library's "Check out a Telescope Program". There are already two telescopes on this program, usually with a six month waiting list, including repeats. We collected 72 entries to name the new telescope, which will be available for check out soon. The winner will be the first person to check it out.

Cori Charles



Just a Quick Note

There are some pretty good Hubble photos rolled up in this link:

<http://www.nasa.gov/content/goddard/hubble-eyes-golden-rings-of-star-formation>

Ludd

What's Up? - Hot Goddess Of Love

That would be Venus, the hottest planet in the solar system. A hellish goddess with a mean surface temperature of 900°F due to a 96.5% carbon dioxide atmosphere; the same carbon dioxide that humans are increasingly dumping into the air by burning fossil fuels. It's a runaway greenhouse effect where light passes through the air faster than its resulting heat can escape. With a temperature high enough to cause microbial sterilization there is certainly no life on this planet. Venus' dense atmospheric pressure is a crushing 92 times that of Earth. It's sad because Venus is only slightly smaller than Earth with a similar gravity that could hold life giving liquid water on the surface if it wasn't too hellishly hot. Venus might be an exciting planet to visit, except it would be like being in a self-cleaning oven. It's Earth's tragically failed twin.

It's densest atmosphere of the four terrestrial planets seems to be caused by a history of smoky volcanism which periodically resurfaces the entire planet. A high level of sulfuric acid which can rain out of Venus' atmosphere suggests ongoing volcanic activity. Another heating factor is Venus's slow rotation, its year is equal to 1.92 Venusian days. The other inner planet Mercury has a similarly slow rotation. They're both gripped by gravitational solar forces. Neither planet has a moon, the only planets in our solar system to be moonless. It's theorized that large moons (like our Earth's) pull away excess atmosphere into space so our resultant life on Earth may be because of our large Moon. The impact of something (maybe a doomed moon) might have caused Venus retrograde direction that orbits clockwise around the Sun. It's the only planet in our system that doesn't orbit counterclockwise.

The upper atmosphere of Venus is a shroud of opaque sulfuric dioxide, making it the most reflective of inner planets. This is why it's so beautifully white in the evening and morning sky. Early Babylonian observers figured out that both the Evening Star and the Morning Star were the same moving

object. However the ancient Greeks saw them as separate. The Western Star was Hesperus (a town in the Mojave desert is named Hesperia). The Eastern Star was Phosphorus (also the name of a fiery element). The Romans carried on this tradition with Vesper for Hesperus and Lucifer for Phosphorus. Lucifer later became a fallen angel and so the Devil (which fits hellish Venus). More observant Romans realized it was one object moving back and forth near the Sun. It was named Venus, goddess of love. In most cultures it bears the name of a female goddess or queen. Venus's surface regions now have female names like Aphrodite Terra, Ishtar Terra (Babylonian love goddess), Lakshmi Planum (Hindu love goddess), Cleopatra Patera, Guinevere Planitia (King Arthur's loved queen), Sappho Patera (love poet), different countries picked their favorite females.

Compared to other terrestrial inner planets Venus has fewer impact craters and no small ones. This is due to constant volcanic resurfacing and the burning up of meteors in its thick atmosphere. Its large impact craters are named after famous women like the Mona Lisa, Queen Nefertiti, artist O'Keeffe, pilot Earhart, singers Callas and Flagstad, woman's rights Stanton and Sanger, nurses Nightingale and Barton, authors Hellman and Woolf, scientists Curie and Mead, again chosen favorites. A male name is on a high mountain range, Maxwell Montes (astrophysicist James Clerk Maxwell).

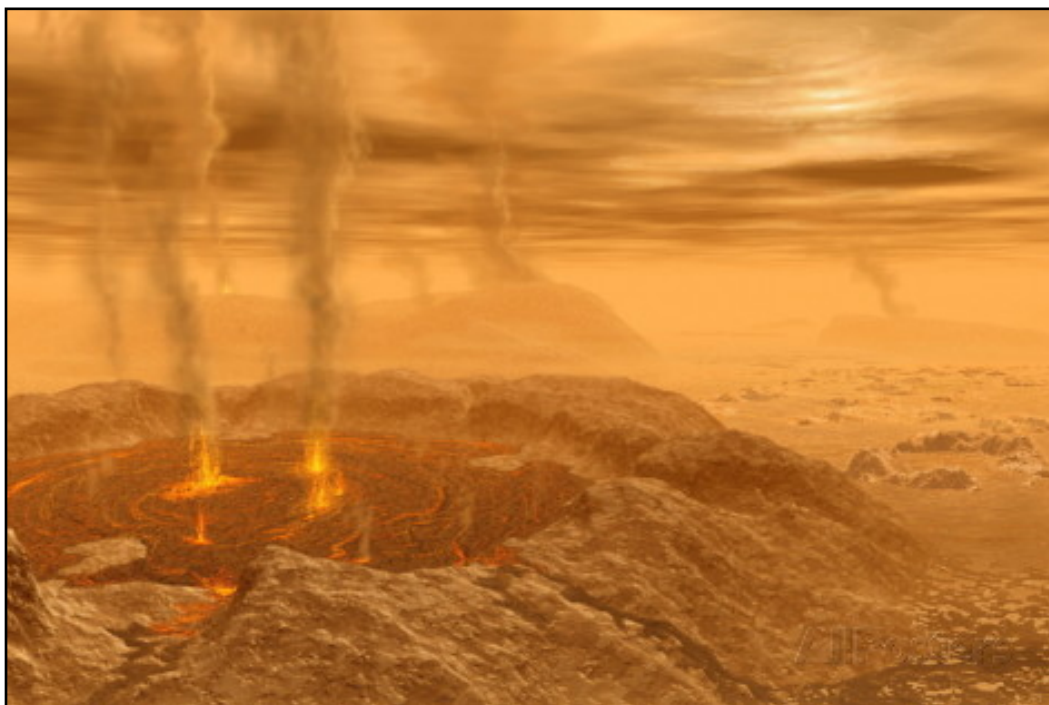
Venus is stunningly white, the brightest object in our night sky (after the Moon). It can reach a magnitude of -4.5, as the closest planet to Earth.

It was the first planet to have its motions correctly plotted across the sky.

The first planet to be visited by a spacecraft (NASA's Mariner 2 in 1962). The first planet to be successfully landed on (USSR's Venera 7 in 1970). The first planet to be mapped by radar probing beneath its thick cloud cover (NASA's Magellan orbiter in 1991). The first telescopic view of Venus by Galileo showed its lunar type phases, which proved that it was between us and the Sun. To Galileo this meant that the Sun was the center of our system and not the Earth as was currently believed.

Several USSR Venera craft landed and took revealing views of Venus's surface before overheating. They showed scattered basalt rock slabs in a smoggy orange haze. Over 47 probes have explored Venus, but there are still many unsolved mysteries.

Venus' astronomical symbol is the same familiar one used in biology for female. A twin planet to Earth but very unearthly.



Gravitational Wave Astronomy Will Be The Next Great Scientific Frontier

Imagine a world very different from our own: permanently shrouded in clouds, where the sky was never seen. Never had anyone see the Sun, the Moon, the stars or planets, until one night, a single bright object shone through. Imagine that you saw not only a bright point of light against a dark backdrop of sky, but that you could see a banded structure, a ringed system around it and perhaps even a bright satellite: a moon. That's the magnitude of what LIGO (the Laser Interferometer Gravitational-wave Observatory) saw, when it directly detected gravitational waves for the first time.

An unavoidable prediction of Einstein's General Relativity, gravitational waves emerge whenever a mass gets accelerated. For most systems -- like Earth orbiting the Sun -- the waves are so weak that it would take many times the age of the Universe to notice. But when very massive objects orbit at very short distances, the orbits decay noticeably and rapidly, producing potentially observable gravitational waves. Systems such as the binary pulsar PSR B1913+16 [the subtlety here is that binary pulsars may contain a single neutron star, so it's best to be specific], where two neutron stars orbit one another at very short distances, had previously shown this phenomenon of orbital decay, but gravitational waves had never been directly detected until now.

When a gravitational wave passes through an object, it simultaneously stretches and compresses space along mutually perpendicular directions: first horizontally, then vertically, in an oscillating fashion. The LIGO detectors work by splitting a laser beam into perpendicular "arms," letting the beams reflect back and forth in each arm hundreds of times (for an effective path lengths of hundreds of km), and then recombining them at a photodetector. The interference pattern seen there will shift, predictably, if gravitational waves pass through and change the effective path lengths of the arms. Over a span of 20 milliseconds on September 14, 2015, both LIGO detectors (in Louisiana and Washington) saw identical stretching-and-

compressing patterns. From that tiny amount of data, scientists were able to conclude that two black holes, of 36 and 29 solar masses apiece, merged together, emitting 5% of their total mass into gravitational wave energy, via Einstein's $E = mc^2$.

During that event, more energy was emitted in gravitational waves than by all the stars in the observable Universe combined. The entire Earth was compressed by less than the width of a proton during this event, yet thanks to LIGO's incredible precision, we were able to detect it. At least a handful of these events are expected every year. In the future, different observatories, such as NANOGrav (which uses radiotelescopes to the delay caused by gravitational waves on pulsar radiation) and the space mission LISA will detect gravitational waves from supermassive black holes and many other sources. We've just seen our first event using a new type of astronomy, and can now test black holes and gravity like never before.

Ethan Siegel

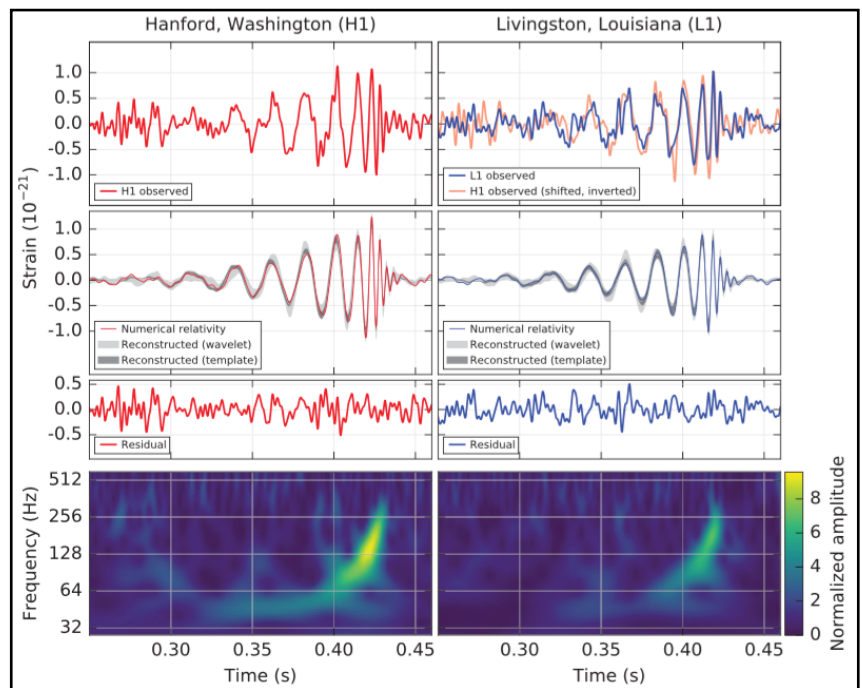


Image credit: Observation of Gravitational Waves from a Binary Black Hole Merger B. P. Abbott et al., (LIGO Scientific Collaboration and Virgo Collaboration), Physical Review Letters 116, 061102 (2016). This figure shows the data (top panels) at the Washington and Louisiana LIGO stations, the predicted signal from Einstein's theory (middle panels), and the inferred signals (bottom panels). The signals matched perfectly in both detectors.

This article is provided by NASA Space Place.

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May 26-30, 2016
Camp Oakes
Big Bear,
California

2016 - FUN WITH OUR SUN!

Welcome to the 48th RTMC Astronomy Expo!

At this year's Expo, we continue our tradition of celebrating amateur astronomy in its many facets, from beginner to advanced researchers and imagers. If you like to camp under the stars, hear great science lectures, see our vendors with the latest in astro-goodies and look through amazing telescopes, then come and join us!

This year our keynote speaker is Tamitha Mulligan Skov, a solar astronomer and "space weather forecaster." She hosts the online TV show, "Spaceweather.tv," telling us what is happening on our star and how it will affect us on earth. Dr. Skov is an engaging speaker and active solar scientist, so her presentation is a must see.

Our theme this year is "Fun With Our Sun," celebrating the observation and science of our nearest star. We will have speakers on solar science and solar telescopes to view the sun in various wavelengths. Our Beginners' Corner activities will involve the family in safe solar observation and, of course, we have our Beginners' Star Party at night.

Our skies this year are putting on a real planetary show, with Mars close to a very favorable opposition. Jupiter will be in the western sky and Saturn will show off its wide-open rings, rising just after 8:00pm. The moon rises later, so we'll also enjoy deep sky viewing.

At night, we've expanded the star party activities to include both the upper and lower telescope fields. If you have a telescope of any size, bring it! If you are having problems with your telescope, bring it anyway; our "Telescope Urgent Care" booth will have knowledgeable amateurs who may be able to help.

RTMC Astronomy Expo offers talks and activities at Beginners' Corner, Merit Awards for telescope-making, an Astro-Imaging Exhibition, an Imaging Workshop and activities for families with kids. Also this year, we are letting all kids, ages 0 to 17, enter the Expo for **free**. Fun things include the swimming pool, the zip line (extra fee), canoeing on the lake, the rock climbing wall, archery, and other activities. Don't forget the Swap Meet on Saturday & Sunday and see what everyone's selling.

I'm Martin Carey, the new RTMC President and I have been attending RTMC since 1978. My professional work is in special education as a school psychologist and I've been promoting our hobby as an amateur astronomer since 1970. Sharing the sky with everyone is a great joy. So on behalf of the RTMC Board, I invite you to come on up to the mountain!

Martin L. Carey
President, RTMC