Newsletter of the Pomona Valley Amateur Astronomers

Do not look at stars as bright spots only.
Try to take in the vastness of the universe.
Maria Mitchell

Volume 37 Number 09 ***nightwatch*** **September 2017**

President's Message

I reckon that for most folks, anything else going on in the sky this month is a bit overshadowed by memories of last month's eclipse - mostly happy ones, I hope. Plus, it's mostly been too hot to do any observing. It's zero fun to get up at 4:00 AM for dawn patrol, only to step out the door and find that it's still 80 degrees outside.

Still, things are happening out there. On Friday, September 15, one week after our general meeting, NASA's Cassini mission will come to final, fiery close. After nearly 20 years in space, and more than 13 years orbiting Saturn, the Cassini orbiter will plunge into Saturn's atmosphere and burn up, to ensure that it can't accidentally crash into Enceladus or another moon and accidentally introduce Earth microbes into these potentially life-bearing worlds. Cassini's final operation will be to keep its antenna aimed at Earth, transmitting data on Saturn's atmosphere for as long as possible. Farewell, Cassini. You exceeded all expectations.

Our general meeting this month is this coming Friday, September 8, at 7:30 in Shanahan B460 on the Harvey Mudd campus. We don't have an outside speaker this month. Instead, we're going to swap pictures and stories from the August 21 solar eclipse. You can send them to me ahead of time (mathew.wedel@gmail.com), or bring them as image files or PowerPoint slides on a USB drive. I'll bring something fun for show-and-tell, too. See you then!

Matt Wedel

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PVAA General Meeting 8/4/17

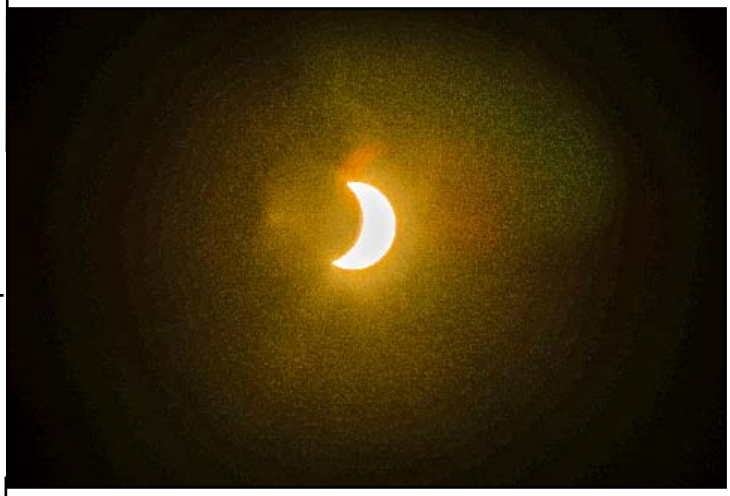
The meeting was to be held in room B460 in the Shanahan building, but we couldn't get the projector to turn on, so it was moved to Beckman Hall at the last minute. We had the usual announcements followed by a small break. September's meeting should be in our usual room: B460 in the Shanahan building. Hopefully the projector will be working.

The speaker for the evening was Physics Professor at Harvey Mudd College Vatche Sahakian. His topic for the night was "Emergence of Spacetime from Quantum Entanglement". He talked about string theory and quantum entanglement across regions of space. He brought up Jacobson's Argument, and then stated that gravity is a thermodynamic illusion. Using string theory, he brought up the concept that Gravity and Space – due to quantum entanglement, are just an illusion. I believe that Sir Isaac Newton might disagree with this train of thought at first. – But it does follow a modified version of his law, allowing for relativistic speeds and change of mass. That brings Newton's 2nd law into sync with Einstein's theory of relativity. Professor Sahakian used Erik Verlinde's 2009 theory to back up his claim. Verlinde's theory describes gravity as an entropic force. It seems to explain the current state of the universe without using dark matter.

Lecture #1: Black Holes are Neither Black nor Holes
https://vimeo.com/20269362
Lecture #2: Is, and is impossible not to be.
https://vimeo.com/20424469
Lecture #3: Your sense of certainty, off the quantum edge
http://schrodingersdog.net/home/2011/3/7/physics-at-the-edge-of-philosophy-lecture-3-video-1.html
Lecture #4: What are philosophers and string theorists useful for?
http://schrodingersdog.net/home/2011/3/17/physics-at-the-edge-of-philosophy-lecture-4-video.html
Lecture #5: Finally, the first principles
http://schrodingersdog.net/home/2011/4/13/physics-at-the-edge-of-philosophy-lecture-5-video.html

https://en.wikipedia.org/wiki/Entropic_gravity#Erik_Verlinde.27s_theory

Gary Thompson



Eclipse - Taken in La Verne by Shawn Harris Ahmed

Club Events Calendar

September 8 General Meeting
September 23 Star Party - Palomar Mountain and Observatory tour 10 AM

September 27 Board Meeting
October 6 General Meeting
October 21 Star Party - Nightfall, Anza Borrego

October 25 Board Meeting
November 3 General Meeting
November 18 Star Party - Landers GMARS

November 29 Board Meeting
December 9 Holiday Party

What's Up? - Eclipse Umbra Fun

First eclipse contact starts when our Moon begins its passage across the Sun's face. The shadow (or umbra) is at first only a small bite out of the solar edge. When more of the Sun goes dark there is the effect of tiny spots of light that shine on the ground having crescent images of the vanishing Sun. As a small crescent remains thin waves of light and dark can be seen undulating on light surfaces. These are "shadow bands" caused by the irregularities in the Earth's atmosphere.

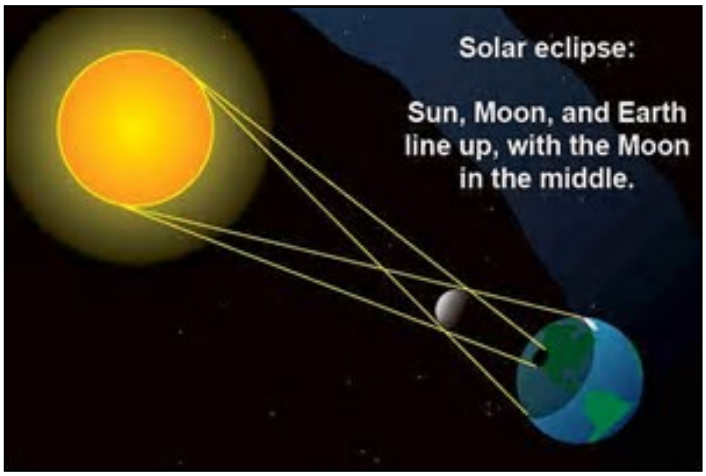
When the Sun's brightness is almost totally dark there will appear "Baily's beads" as final glimmering points. These are caused by the ragged lunar limb allowing beads of light to glimmer through deep valleys in many places. Francis Baily got his name attached to this brief effect by describing and publishing an explanation after the lunar eclipse of 1836. Edmond Halley (of comet fame) had remarked on this earlier in 1715, but Baily was four times President of England's Royal Astronomical Society. Baily was an ambitious writer on astronomy and legal matters. He also got a metal and a lunar crater named after him.

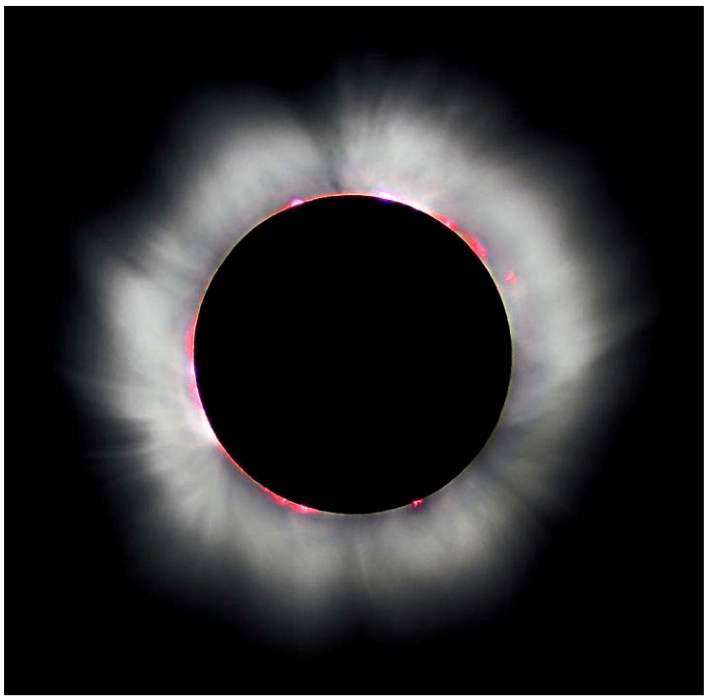
The final and brightest bead effect is known as the "diamond ring" because of its intensity as the edge of the Sun's disk disappears into darkness. It will reoccur when the Sun reappears after eclipse totality is over. It's not safe to look at either of these intense effects without proper eye protection because the dangerous photosphere will still be visible.

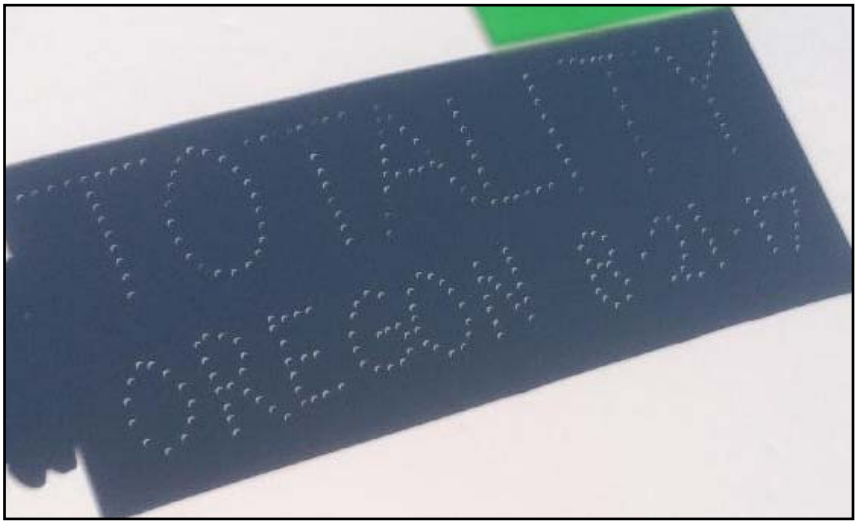
During the few minutes of eclipse totality the corona (Latin for "crown") of our Sun will be visible surrounding the edge of the dark solar disk. This outermost region of the solar atmosphere is above the chromosphere and consists of almost totally ionized plasma held in closed magnetic loops known as coronal loops. These will reach out along magnetic field lines to eventually form the "solar wind" with its flow of energetic charged particles. This coronal plasma can have a temperature in excess of a million kelvins. This is much hotter than the surface of the Sun by a factor of as much as 450. Why this is so is still the subject of many theories involving wave heating and magnetic reconnections.

This area can also contain solar flares as well as filaments and prominences which can be best seen during a solar eclipse when they are free of the usual blinding glare of the Sun. They are all known to be transient coronal mass ejections. Their relationship to the Sun's magnetic field is still being studied. All too quickly the Sun's will throw off our Moon's dark shadow and a period of eclipse umbra fun will be over. It can be interesting to see if birds (thinking night has come) decide to return to their nests or not.

Lee Collins






OREGON


HERE
8 21 17

These pictures were taken with my LG cell phone by putting it up to the eyepiece of my 4.5" (114mm) reflector telescope. I took two solar eclipse glasses, cardboard and duct tape to create the solar filter for the telescope. The camera was hand held.

They were taken from the Claremont Library's parking lot.

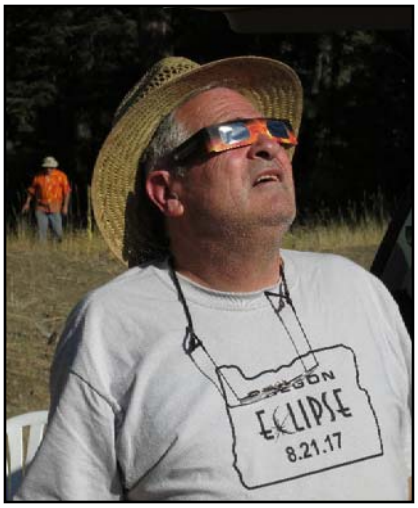
Gary Thompson

Mike Magras photos

The Stover Family

Comedy of Errors - or
How Many Astronomers Does it Take

Robin Ron Laura Annie Bob Ludd Claire John Julie Bob



Robin Trozpek -
Malheur National Forest

This article is provided by NASA Space Place.
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The 2017 Solar Eclipse Across America

On August 21st, the sky will darken, the temperature will drop and all fifty United States will be able to see the Moon pass—at least partially—in front of the Sun. It's a solar eclipse!

A solar eclipse happens when the Moon passes between the Sun and Earth, casting its shadow on Earth. Sometimes the Moon only covers up part of the Sun. That is called a partial solar eclipse. When the Moon covers up the Sun completely, it's called a total solar eclipse. As our planet rotates, the Moon's shadow moves across Earth's surface. The path of the inner part of this shadow, where the Moon totally covers the Sun, is called the path of totality.

The path of totality on August 21 stretches from Oregon to South Carolina. If you happen to be in that path, you will be able to experience a total solar eclipse! If you're in any of the 50 United States during this time, you can see a partial solar eclipse.

No matter where you'll be for the eclipse, remember that SAFETY is very important. Never look at the Sun when any part of it is exposed, like during a partial eclipse! It can hurt your eyes very badly. If you want to view the eclipse, you can buy special eclipse glasses. Go the NASA 2017 Eclipse Safety website to learn more about what glasses to buy.

If you are in the path of the total eclipse, you may look directly at the eclipse only when the Moon has completely covered the Sun. This is called totality, and it lasts a very short time. You must be sure to put your eclipse glasses back on before the Sun peeks out from behind the Moon.

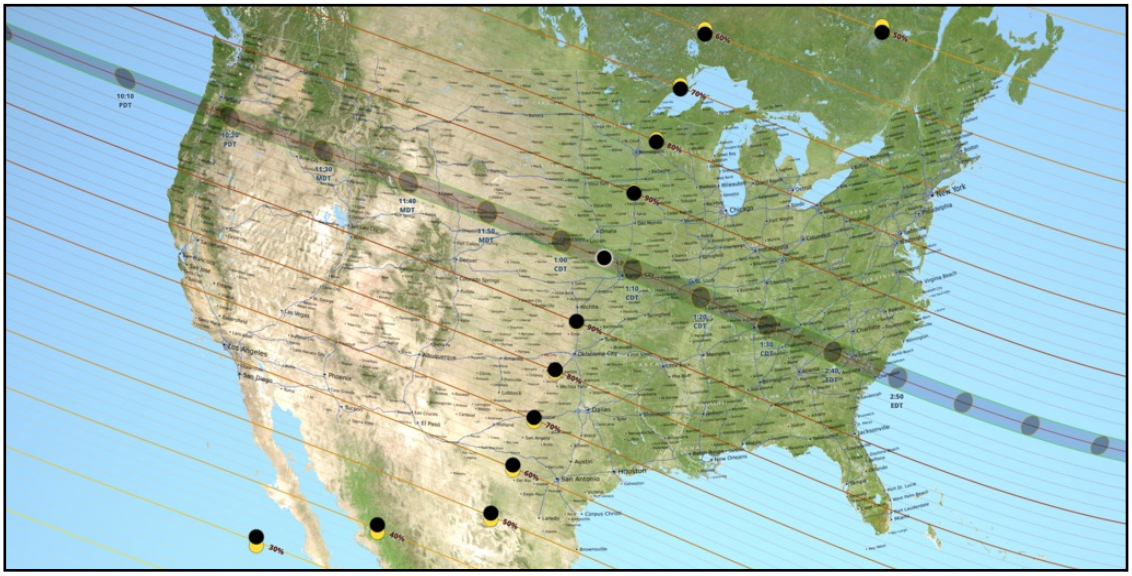
You won't be the only one watching this event! NASA scientists will use this eclipse to study our Sun. During a total solar eclipse, we can see the Sun's atmosphere, called the corona. Usually the Sun is so bright that we can't see the corona. However, when the Moon blocks out most of the Sun's light, we can get a glimpse of the corona.

The surface of the Sun is about 10,000 degrees Fahrenheit, but the corona is much hotter. It's about 2 million degrees Fahrenheit! The eclipse gives NASA researchers the chance to learn more about why the corona is so hot. In fact, while the eclipse will only last about two to three minutes in one place, scientists have found a way to have more time to study it.

NASA will use two research jets to chase the eclipse as it crosses the country. The jets will fly very high, and spend seven minutes in the shadow of the Moon. Researchers are using jets to help look for small explosions on the Sun, called nanoflares. These nanoflares may help to explain the corona's extreme heat.

Whether you're watching with eclipse glasses from the ground, or in a NASA jet from the sky, the 2017 eclipse should be quite a show! It's a fun reminder of our place in the solar system, and how much we still have to learn.

Teagan Wall



Caption: A map of the United States showing the path of totality for the August 21, 2017 total solar eclipse. Image credit: NASA's Scientific Visualization Studio

To learn more about solar eclipses, check out this NASA Space Place video: https://spaceplace.nasa.gov/eclipse-snap