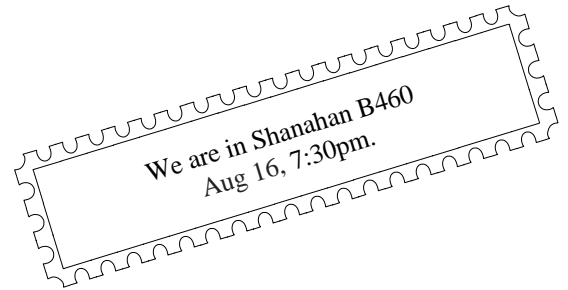




Newsletter of the Pomona Valley Amateur Astronomers

*Across the sea of space, the stars are other suns.  
Carl Sagan*



Volume 39 Number8

*nightwatch*

August 2019

### Important Message

Join fellow Club members for a double-header this month as we hear about the search for cosmic strings to prove a unified theory of everything, using the LIGO observatory to find them, and simulations using cloaking as warps-strings in space time proved by Einstein's General Relativity from Scott Little. Next up will be presentation on the James Webb Space Telescope from his son Nathan Little.

It sounds like a very informative evening –  
hope you can join us!

*Claire Stover*

### Club Events Calendar

**Aug 16 General Meeting – Scott and Nathan Little on Cosmic Strings and Webb Scope**  
**Aug 31 Star Party – TBD**

**Oct 2 Board Meeting**  
**Oct 11 General Meeting**  
**Oct 26 Star Party – TBD**

**Sept 4 Board Meeting**  
**Sept 13 General Meeting**  
**Sept 19-22 RTMC**  
**Sept 28 Star Party – TBD**

**Nov 6 Board Meeting**  
**Nov 15 General Meeting Apollo 12**  
**Nov 23 Star Party – TBD**

### PVAA Officers and Board

#### Officers

President .....	Mathew Wedel .....	909-767-9851
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Secretary .....	Ken Elchert .....	626-541-8679
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#### Board

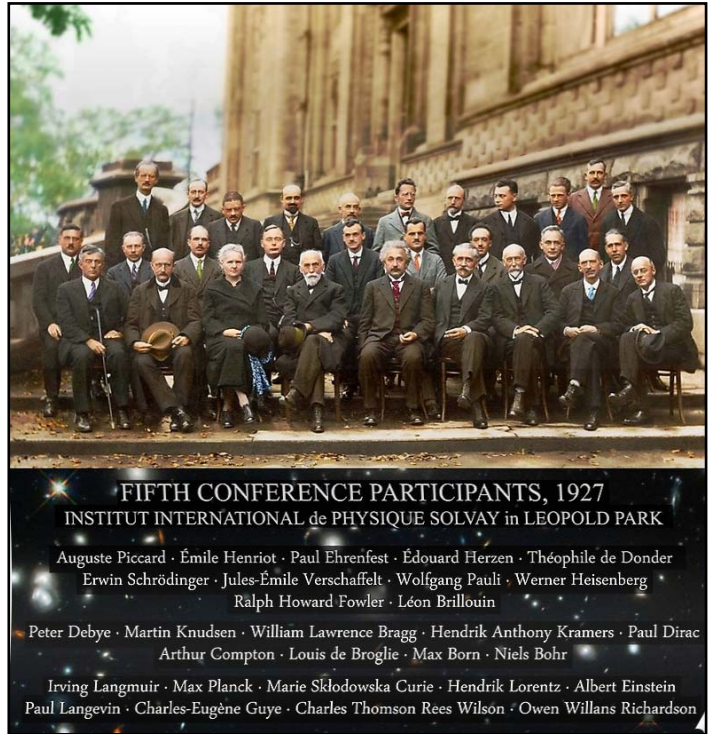
Jim Bridgewater (2018).....	909-599-7123
Richard Wismer(2018) .....	
Ron Hoekwater (2019).....	909-706-7453
Jay Zacks (2019) .....	

#### Directors

Membership / Publicity....	Gary Thompson ..	909-935-5509
Outreach .....	Jeff Schroeder .....	909-758-1840
Programs .....	Ron Hoekwater .....	909-391-1943

General Meeting 07/14/19

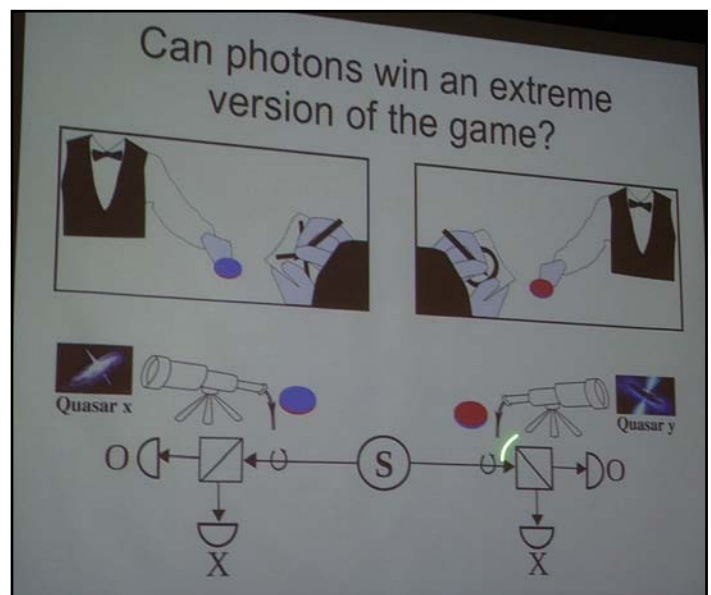
Jeff Schroeder brought in his memorabilia of the 1969 Apollo 11 moon landing. It consisted of newspapers, magazines and promotional material related to the Apollo 11 mission. We also had Mars Viking memorabilia from Mike Carter. Viking 1 landed on Mars on July 20th, 1976. The pair of Viking spacecraft Viking 1 & 2 each consisted of two main parts, the orbiter and the lander. The orbiters took pictures from orbit, while the landers took pictures from the ground. These were the first US missions to land on Mars. The Soviet Union was the first country to successfully land on Mars with their Mars 3 spacecraft on December 2, 1971 but it fell silent 20 seconds after landing. The Viking Orbiters remained functioning until 7/25/1978 (Viking 2) and 8/17/1980 (Viking 1). The landers were operational until 4/11/1980 (Viking 2) and 11/13/1982 (Viking 1). The Viking missions were highly successful and cost a total of about 1 billion dollars.



quantum theory. In this picture of 29 scientists, more than half of those pictured won 1 or more Noble Prizes.

In the experiment that Dr. Gallicchio was involved in, they took light from two different quasars separated by billions of light years to be their ‘random generators’. Based on the light received from the quasars, the filters A or B were used, each filter being 90 degrees from the other. When the photon from the entangled electron hit the filter it was measured as to whether it passed through or not, and which filter was used. Think of two coins being flipped. You could have: Heads Heads, Heads Tails, Tails Heads, Tails Tails. So the odds of having a Head show up are 75%. If everything were random you would get something

The speaker for the evening was Dr. Jason Gallicchio from the Physics Department of Harvey Mudd College. His topic for the evening was ‘Improving Tests of Quantum Entanglement by Using Light from Distant Quasars’. He likened his experiment to taking polarized sunglasses to your laptop or TV, and turning the glasses to let only the polarized light at the same angle as the glasses to get through. If you have two polarized filters at 90 degrees to each other, one would block the photon from getting through, while the other filter would let it pass through, depending on the photon’s polarization. The object was to create entangled particles and send them in different directions then check them randomly to see if they have the same properties. Are they truly ‘entangled’ with the same properties? In 1927 Albert Einstein and Niels Bohr met with 27 other leading scientist at the Solvay Conference in Brussels and went over



very close to 75% Heads after a few thousand tries. What they received was about 85% after a few thousand tries. This they attribute to entanglement - Spooky. Einstein called this 'Spooky actions at a distance.' Looking at one thing at one place will tell you about another in another place, no matter how far apart because they are 'entangled'. Dr. Gallicchio used the Table Mountain 1 meter telescope run by JPL, and then the TNG (Telescopio Nazionale Galileo) – 3.58 meter and the William Herschel Telescope -4.2 meter to do their experiment. The team had researchers from Europe and the US. China used a satellite to test this in 2017.

<https://www.space.com/apollo-11-complete-guide.html>

Apollo 11 Flight Journal-Landing:

[https://www.youtube.com/watch?v=xc1SzgGhMKc&feature=player\\_embedded\\_urn](https://www.youtube.com/watch?v=xc1SzgGhMKc&feature=player_embedded_urn)

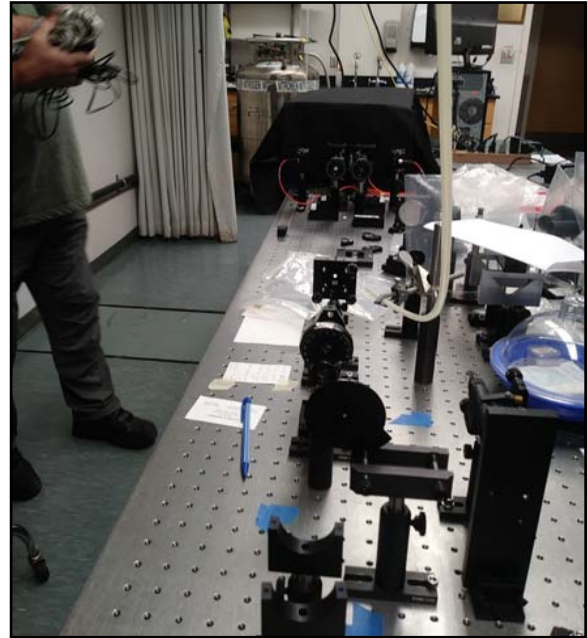
Paper on Quantum Entanglement:

<https://media.physics.hmc.edu/media/pubs/PhysRevA.97.042120.pdf>

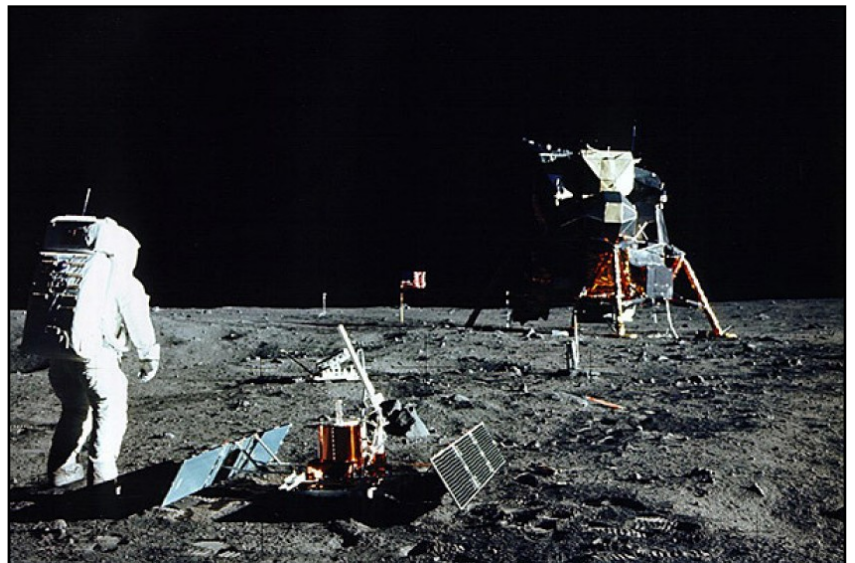
Quantum Riddle | Quantum Entanglement - Documentary HD 2019

<https://www.youtube.com/watch?v=Mn4AwineA5o>

Gary Thompson



Equipment in Jason Gallicchio lab.





We have had several good nights on Joseph Canyon. Ron's 25-inch is dialed in and really excellent. Full aperture we saw the great red spot and two nights shadow transits on Jupiter.

Several dim galaxies and last night the Cat's Eye planetary nebula. Three nights we saw the space station through Cassiopeia at different times. More than usual meteor, many quite bright. One was head on and so bright Ron saw the flash with his back turned. I saw that one flare and leave a brief salmon and yellow cloud with a glowing offset center.

It promises to be good the next few days.

This was sent on Ron's hot spot which gives great Wi-Fi on the property.

*Ludd Trozpek*



## This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.org](http://nightsky.jpl.nasa.org) to find local clubs, events, and more!

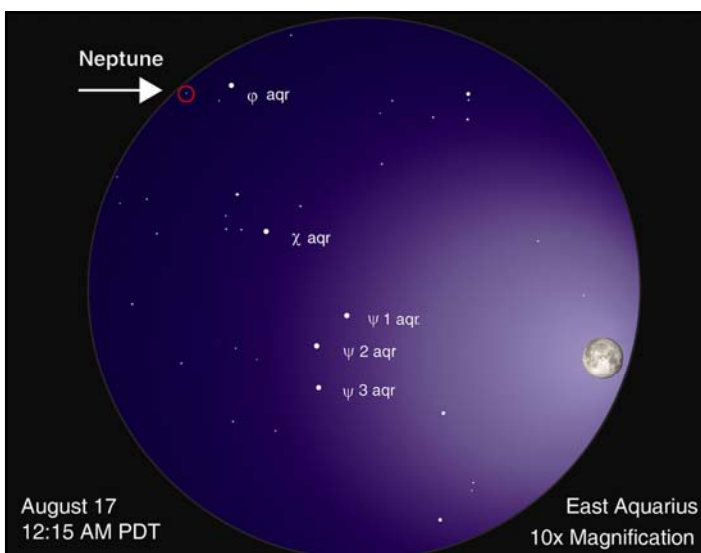
### Chill Out: Spot an Ice Giant in August

Is the summer heat getting to you? Cool off overnight while spotting one of the solar system's ice giants: **Neptune**! It's the perfect way to commemorate the 30th anniversary of Voyager 2's flyby.

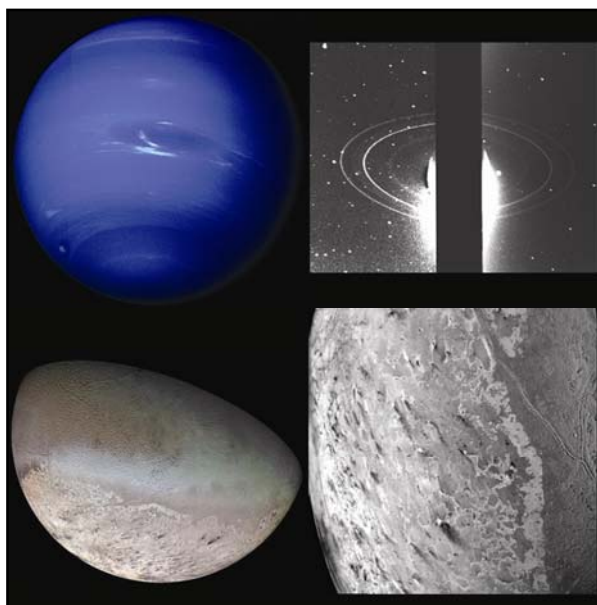
Neptune is too dim to see with your unaided eye so you'll need a telescope to find it. Neptune is at opposition in September, but its brightness and apparent size won't change dramatically as it's so distant; the planet is usually just under 8th magnitude and 4.5 billion kilometers away. You can see Neptune with binoculars but a telescope is recommended if you want to discern its disc; the distant world reveals a very small but discernible disc at high magnification. Neptune currently appears in Aquarius, a constellation lacking in bright stars, which adds difficulty to pinpointing its exact location. Fortunately, the Moon travels past Neptune the night of August 16<sup>th</sup>, passing less than six degrees apart (or about 12 Moon widths) at their closest. If the Moon's glare overwhelms Neptune's dim light, you can still use the its location that evening to mark the general area to search on a darker night. Another Neptune-spotting tip: Draw an imaginary line from bright southern star Fomalhaut up to the Great Square of Pegasus, then mark a point roughly in the middle and search there, in the eastern edge of Aquarius. If you spot a blue-ish star, swap your telescope's eyepiece to zoom in as much as possible. Is the suspect blue "star" now a tiny disc, while the surrounding stars remain points of white light? You've found Neptune!

Neptune and Uranus are ice giant planets. These worlds are larger than terrestrial worlds like Earth but smaller than gas giants like Jupiter. Neptune's atmosphere contains hydrogen and helium like a gas giant, but also methane, which gives it a striking blue color. The "ice" in "ice giant" refers to the mix of ammonia, methane, and water that makes up most of Neptune's mass, located in the planet's large, dense, hot mantle. This mantle surrounds an Earth-size rocky core. Neptune possesses a faint ring system and 13 confirmed moons. NASA's Voyager 2 mission made a very close flyby on August 25, 1989. It revealed a dynamic, stormy world streaked by the fastest winds in the solar system, their ferocity fueled by the planet's surprisingly strong internal heating. Triton, Neptune's largest moon, was discovered to be geologically active, with cryovolcanoes erupting nitrogen gas and dust dotting its surface, and a mottled "cantaloupe" terrain made up of hard water ice. Triton is similar to Pluto in size and composition, and orbits Neptune in the opposite direction of the planet's rotation, unlike every other large moon in the solar system. These clues lead scientists to conclude that this unusual moon is likely a captured Kuiper Belt object.

By David Prosper



Finder chart for Neptune. This is a simulated view through 10x50 binoculars (10x magnification). Please note that the sizes of stars in this chart indicate their brightness, not their actual size. *Moon image courtesy NASA Scientific Visualization Studio; chart created with assistance from Stellarium.*



Clockwise from top left: Neptune and the Great Dark Spot traced by white clouds; Neptune's rings; Triton and its famed icy cantaloupe surface; close up of Triton's surface, with dark streaks indicating possible cryovolcano activity. Find more images and science from Voyager 2's flyby at [bit.ly/NeptuneVoyager2](http://bit.ly/NeptuneVoyager2) Image Credit: NASA/JPL

Discover more about Voyager 2, along with all of NASA's past, present, and future missions, at [nasa.gov](http://nasa.gov)