Newsletter of the Pomona Valley Amateur Astronomers

Only boring people get bored. *Shelby Kostman*

Volume 37 Number 04 ***nightwatch*** **April 2017**

President's Message

So much going on right now!

In old news, we had a great day at the Claremont Public Library's Children's Book Festival last Saturday. Cori Charles and I ran a table inside and saw about 130 kids, while Gary Thompson and Laura Jaoui had telescopes set up out in front of the library to give people safe views of the sun and moon. A lot of people signed up to check out one of the library telescopes, too.

Two days before, on March 30, SpaceX made history by relaunching and relanding a previously flown and landed Falcon 9 first stage. That's the first time an orbital rocket has been flown twice, and landed twice. This is only a first step - it will take time to develop reusable rockets that can be reflown inexpensively and reliably. Nevertheless, we've entered a new era of space travel.

In current news, there are two comets and a supernova to see in the night sky right now. Comet 41P is up right after dark and for most of the night, flying across the constellation Draco between now and April 20. It's big and diffuse, and may not be visible when the moon is up. Comet C/2017 E4 Lovejoy – the sixth comet discovered by Australian amateur astronomer Terry Lovejoy – is up just before dawn, near the 'nose' of Pegasus. And supernova 2017cbv in the spiral galaxy NGC 5643 is visible in Lupus in the middle of the night – it's a few degrees north and about an hour east of Omega Centauri, so it transits the meridian around 3 AM right now. the comets should be visible in binoculars, but the supernova will require at least a 6-inch telescope to spot. Sky & Telescope has finder charts for all three objects - I collected the links here:

https://10minuteastronomy.wordpress.com/2017/03/31/two-binocular-comets-and-a-small-scope-supernova/

And in the near future, club elections are coming up and we need new officers. After several years of dedicated service to the club, Karl Rijkse is moving to another state, and we need at least one new board member to fill his seat. If we had multiple new candidates, so we could have elections with more than one name per seat, that would be even better. The workload is fairly light: represent the club's best interests at monthly board meetings (Thursday evenings) and general meetings. The club only functions because of the time and efforts of its members - please consider serving.

Our speaker this month is former JPL scientist and frequent visitor Tim Thompson, who will speak to us about the jewel of the solar system - the ringed planet Saturn. The general meeting will be Friday night, April 7, at 7:30 PM in Shanahan B460 at Harvey Mudd College. I hope to see you there.

Matt Wedel

PVAA Officers and Board

Officers

President ….....	Mathew Wedel	909-767-9851
Vice President ..	Joe Hillberg	909-949-3650
Secretary	Howard Maculsay	909-624-1667
Treasurer	Gary Thompson	909-935-5509
VP Facilities	Jeff Felton	909-622-6726

Board

Jim Bridgewater (2016).....	909-599-7123
Karl Rijkse (2016)	909-428-1884
Ron Hoekwater (2017).....	909-391-1943
Cori Charles (2017) …….	909-646-0275

Directors

Membership / Publicity	Gary Thompson	909-935-5509
Outreach	Jeff Schroeder	909-758-1840
Programs	Ron Hoekwater	909-391-1943
Nightwatch	John Stover ….....	909-988-9747

PVAA General Meeting 03/10/17

Ron Hoekwater opened the meeting reminding everyone of the upcoming elections. Nominations are due by the next meeting (4/7/17). Club membership dues is also due by the May (5/12/17) meeting. PVAA is selling solar eclipse glasses, – sunglasses to look directly at the sun, - for $2.00 each. Also on the calendar is the PVAA Star Party at the Cow Canyon Saddle site at Mount Baldy on May 22nd. See the club website – PVAA.US – for directions.

The speaker for the night was PVAA member Dave Kary – Professor of Astronomy at Citrus College. His talk for the night was on the Trappist-1 exoplanet system. An exoplanet is a planet that is not orbiting our sun, it is orbiting a different star.

First he talked about how we find exoplanets. We can detect a large planet by the wobble of the star caused by the planet's rotation around the star, but that is rare. Another way is to measure the extremely small drop in light as the planet transits the star. A transit is when the planet travels directly between the star and the earth. For that to happen, the exoplanet's orbital plane must line up with the earth, or we wouldn't be able to 'see' or measure it. The moon's orbit around the earth does not match the orbital plane of earth's orbit around the sun. If it did, we would have a solar eclipse every month. Anyway, measuring the light-loss of the planet's transits is currently the most common way to find exoplanets. The Kepler spacecraft was launched specifically to look for the tiny dip in light of a star caused by planet(s) transiting a star. Kepler's field of view is much wider (~100,000 times wider) than the Hubble Space Telescope. It looked at a patch of 100,000 stars about 3,000 light years away. It came up with 4696 possible candidates, 2321 of which have been confirmed. Based on this, and the odds of the planet's orbital plane lining up with earth, we can say that virtually every star has at least one planet, and probably more.

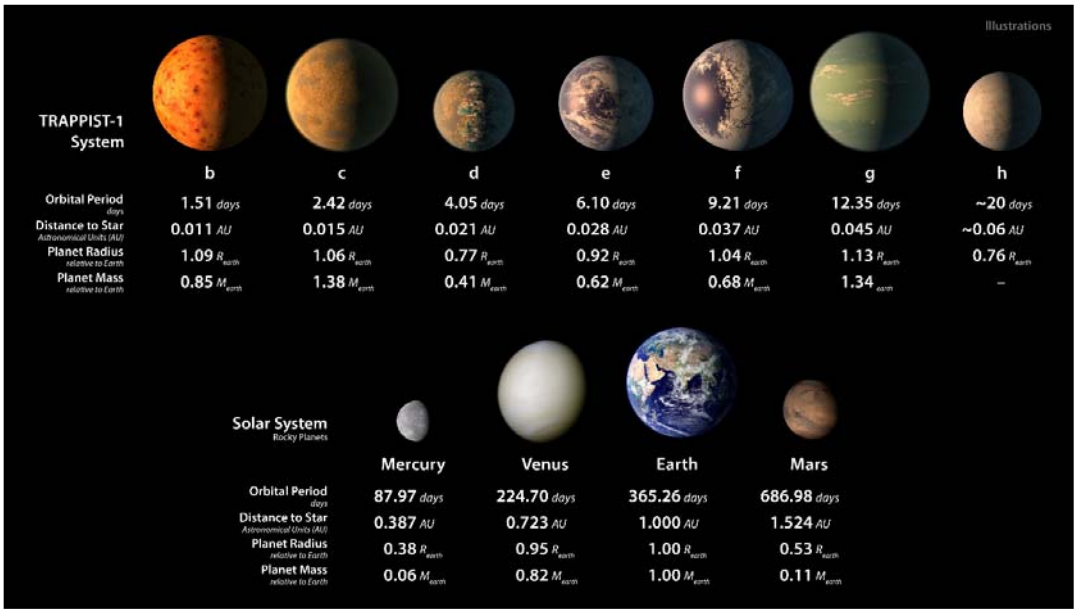
The Trappist-1 system [also known as: 2MASS J23062928-0502285] is named after the **TRA**nsiting **P**lanets and **P**lanetes**I**mals **S**mall **T**elescope, where the initial discovery was made. Additional planets were discovered using the Spitzer space telescope, the Very Large Telescope, UKIRT, the Liverpool Telescope and the William Herschel Telescope.

Trappist-1 is an 18.8 magnitude ultracool dwarf star slightly bigger than Jupiter, but with 30 times Jupiter's mass. Several of the planets are comparable to Earth in mass. Because the star is very low intensity, several planets received an amount of light similar to our planets from Mercury to beyond Mars. Trappist-1 is about 39.5 light-years away and only has a luminosity of .05% that of our sun. (Our sun is 2000 times brighter.) – Most of Trappist-1's energy is broadcast in the infra-red of the spectrum.

The 1st 3 planets of the system were discovered in spring of 2016. Then they got 21 days on the Spitzer Space Telescope. Spitzer specializes in the infra-red. Spitzer confirmed the first two planets – b &c, and determined that the 3rd planet was actually 2 separate planets d &e. It also found two more (f & g) and caught one more transit (planet h). The Trappist-1 system looks remarkably like Jupiter and its Galilean moons. What has made the news is that these planets are rocky (Earth-like), and 3 of them are in the 'habitual zone' – where water can be a liquid.

What's next? The TESS (Transiting Exoplanet Survey Satellite) will take Kepler's place. Unfortunately, it will only image stars down to the 12th magnitude, and Trappist-1 is a very dim 18.8 magnitude. The James Webb Space Telescope should launch in October of 2018. It will be looking at the Trappist-1 system. Also, the sales of the Belgium Trappist Beer seem to be doing a lot better lately.

Gary Thompson



http://www.trappist.one/
https://exoplanets.nasa.gov/trappist1/

Club Events Calendar

Apr 7, 2017 General Meeting
Apr 22, 2017 Star Party – Cow Canyon Saddle

May 3, 2017 Board Meeting
May 12, 2017 General Meeting
May 25 - 29, Joint RTMC

May 31, 2017 Board Meeting
June 9, 2017 General Meeting
June 24, 2017 Star Party – Grandview

June 29 Board Meeting
July 7 General Meeting
July 22 Star Party -Culp Valley Campground, Anza Borrego

July 27 Board Meeting
August 4 General Meeting
August 12 Star Party - Cow Canyon Saddle, Mount Baldy

August 31 Board Meeting
September 8 General Meeting
September 16 Star Party - Palomar Mountain and Observatory tour

September 28 Board Meeting
October 6 General Meeting
October 21 Star Party - Nightfall, Anza Borrego

October 26 Board Meeting
November 3 General Meeting
November 18 Star Party - Landers GMARS

Claremont Library Book Festival

The Book Festival was a nice event, that brought about 200 kids to the PVAA table. Lots of interest in the Library Telescope Lending Program, which currently has a 33 week waiting list, to check it out. The kids drew an Exoplanet, to submit to the NASA (Transiting Exoplanet Survey Satellite (TESS) program. Submissions will fly aboard the TESS spacecraft while it searches the sky for new worlds, outside our solar system. By submitting the drawings, permission is given to NASA to download it, share it in an online gallery and include it aboard the drive being sent into space. Laura and Gary set up their solar telescopes, for viewing the Sun, and also the Moon.

Cori Charles

This article is provided by NASA Space Place.
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What It's Like on a TRAPPIST-1 Planet

With seven Earth-sized planets that could harbor liquid water on their rocky, solid surfaces, the TRAPPIST-1 planetary system might feel familiar. Yet the system, recently studied by NASA's Spitzer Space Telescope, is unmistakably alien: compact enough to fit inside Mercury's orbit, and surrounds an ultra-cool dwarf star—not much bigger than Jupiter and much cooler than the sun.

If you stood on one of these worlds, the sky overhead would look quite different from our own. Depending on which planet you're on, the star would appear several times bigger than the sun. You would feel its warmth, but because it shines stronger in the infrared, it would appear disproportionately dim.

"It would be a sort of an orangish-salmon color—basically close to the color of a low-wattage light bulb," says Robert Hurt, a visualization scientist for Caltech/IPAC, a NASA partner. Due to the lack of blue light from the star, the sky would be bathed in a pastel, orange hue.

But that's only if you're on the light side of the planet. Because the worlds are so close to their star, they're tidally locked so that the same side faces the star at all times, like how the Man on the Moon always watches Earth. If you're on the planet's dark side, you'd be enveloped in perpetual darkness—maybe a good thing if you're an avid stargazer.

If you're on some of the farther planets, though, the dark side might be too cold to survive. But on some of the inner planets, the dark side may be the only comfortable place, as the light side might be inhospitably hot.

On any of the middle planets, the light side would offer a dramatic view of the inner planets as crescents, appearing even bigger than the moon on closest approach. The planets only take a few days to orbit TRAPPIST-1, so from most planets, you can enjoy eclipses multiple times a week (they'd be more like transits, though, since they wouldn't cover the whole star).

Looking away from the star on the dark side, you would see the outer-most planets in their full illuminated glory. They would be so close—only a few times the Earth-moon distance—that you could see continents, clouds, and other surface features.

The constellations in the background would appear as if someone had bumped into them, jostling the stars—a perspective skewed by the 40-light-years between TRAPPIST-1 and Earth. Orion's belt is no longer aligned. One of his shoulders is lowered.

And, with the help of binoculars, you might even spot the sun as an inconspicuous yellow star: far, faint, but familiar.

Marcus Woo

This artist's concept allows us to imagine what it would be like to stand on the surface of the exoplanet TRAPPIST-1f, located in the TRAPPIST-1 system in the constellation Aquarius. Credit: NASA/JPL-Caltech/T. Pyle (IPAC)

Want to teach kids about exoplanets? Go to the NASA Space Place and see our video called, "Searching for other planets like ours": https://spaceplace.nasa.gov/exoplanet-snap/