SIRIUS ASTRONOMER

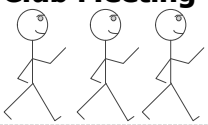
www.ocastronomers.org

The Newsletter of the Orange County Astronomers

May 2025 Free to members, subscriptions $12 for 12 issues **Volume 52, Number 5**

The recent lunar eclipse (14 March 2025) was captured by Carlos Flores using a Seestar S50 telescope from his backyard in Griffin, GA.

Upcoming Events - free and open to the public

Beginner's class	Friday, 6 June at 7:30 to 9:30 PM **ONLINE** This is the 4th session of the Beginners Astronomy Class. It covers the science behind the telescope: how our eyes perceive objects seen by telescope and the physics involved.
Club Meeting 	Friday, 9 May at 7:30 to 9:30 PM **IN PERSON** and **ONLINE** "What's Up": Alex McConahay from RAS **IN PERSON** Main speaker: Charles Cockell from University of Edinburgh **ONLINE** whose talk will be "Settling Space with Microbes"
Astro-Physics SIG	Friday, 16 May CANCELLED
Astro-Imagers SIG	Friday, 6 June at 7:00 to 10:00 PM **IN PERSON** Orange Coast College, Building 40, Astronomy House
Open Spiral Bar	Closed for remodeling
Star Parties	Saturday, 24 May at the OCA Anza site.

The monthly club meeting is viewable in progress on Zoom and our social media platforms. The recording is available on these platforms after the meeting is over.

https://www.facebook.com/OrangeCountyAstronomers
https://www.youtube.com/@ocastronomers

Please consult the calendar on the OCA website to RSVP online meetings (required)

President's Message

By Barbara Toy

As I write this, Alan Smallbone and I have just returned from meeting Gary Schones at our Anza site to assess the work that's been done to make the site more resistant to any fires in the area and more defensible if a fire does cross our site. In spite of the unseasonably cold wind and rain (we were out there on what should have been the day of our star party – if you didn't make the trip yourself that day, you made a wise choice!), we were able to visit all areas of the site and to meet with the neighbor we contracted with to do the work.

There were a few remaining minor issues he was working on, but overall, the site looks good, All of the buildings have a good defensive perimeter around them, some of the roads have been widened, and the areas around our main power panel, well and water tank have all been cleared. He also cleared a firebreak around the perimeter of the site, and another through the brush area above Anza House that runs past Mars Hill and the Lower Pad area, which should provide additional protection for the developed areas of the site.

As Gary commented while we were out there, the worst situation for us would be to have a fire start on our site and spread to neighboring areas – that would create a liability mess that could destroy our club. Doing this clearance work when there was a lot of moisture in the vegetation minimized the risk that the work itself could start a fire. Clearing areas around power panels, electrical receptacles and equipment on the site such as the well and the pump at the club observatory also reduces the chance of sparking a fire. With major work has been done now in those areas, detailed clearing is still needed from individual pad and observatory holders and other members who use pads on the site to be sure that none of the receptacles providing power to pads or outside of observatories has any growth around them that could help a fire get started.

The club has always had concerns about possible fires at Anza and we have a number of long-standing policies aimed at reducing that risk. You've probably heard our annual reminders to pad and observatory holders about keeping the areas around their pads, observatories and any associated structures clear of weeds and brush. Even with this major clearance project, work on individual pads and observatories is still needed. We also have some common-sense rules that have been in effect since the early days after the club got the Anza site to reduce fire risk, including the rule against having any open fire on the site and the rule against smoking anywhere on site other than inside the smoker's car.

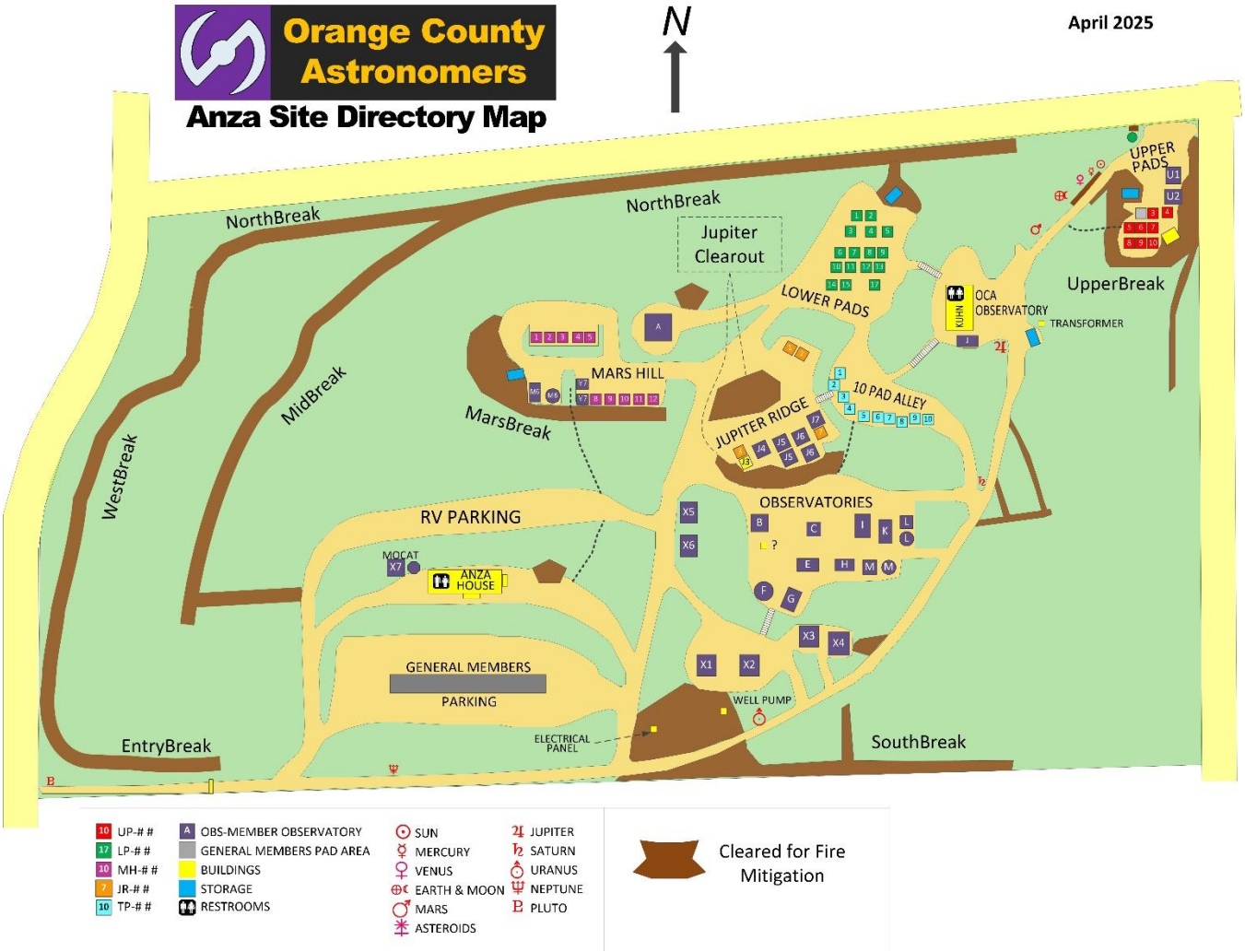
For the future, we need to maintain the areas that have been cleared and also keep any grasses that grow up around structures and pads cut back. If anyone notices anything on site that they think might be a fire hazard or could make the site less defensible if there is a fire, please bring it to the attention of any Board member who may be at the site at the time and send an email to the Board about it.

Turning for a moment to the reason we have the Anza site (astronomy), after the disappointing weather for both the March and April star parties, here's hoping for clear, dark skies for May! I hope to see you out there on May 24!

Help Wanted

- OCA representative to the Western Amateur Astronomers
- Coordinator to organize star parties in Orange County

Fire Mitigation at the OCA Anza Site



North view of northeast corner of site at Upper Pads

Upper Pads clear-out along its southern edge looking east

East view along SouthBreak

West view along SouthBreak, site entrance is just over the rise

Clear-out near electrical panel and water well

Clear-out near electrical panel and water well

MidBreak looking north from its elbow

Midbreak looking north towards NorthBreak and northern edge of the site

NorthBreak looking to the east from junction with MidBreak

South view along WestBreak

MarsBreak

Mars Hill storage container clear-out

Jupiter Landing after clearing

West_view_Jupiter_clear-out

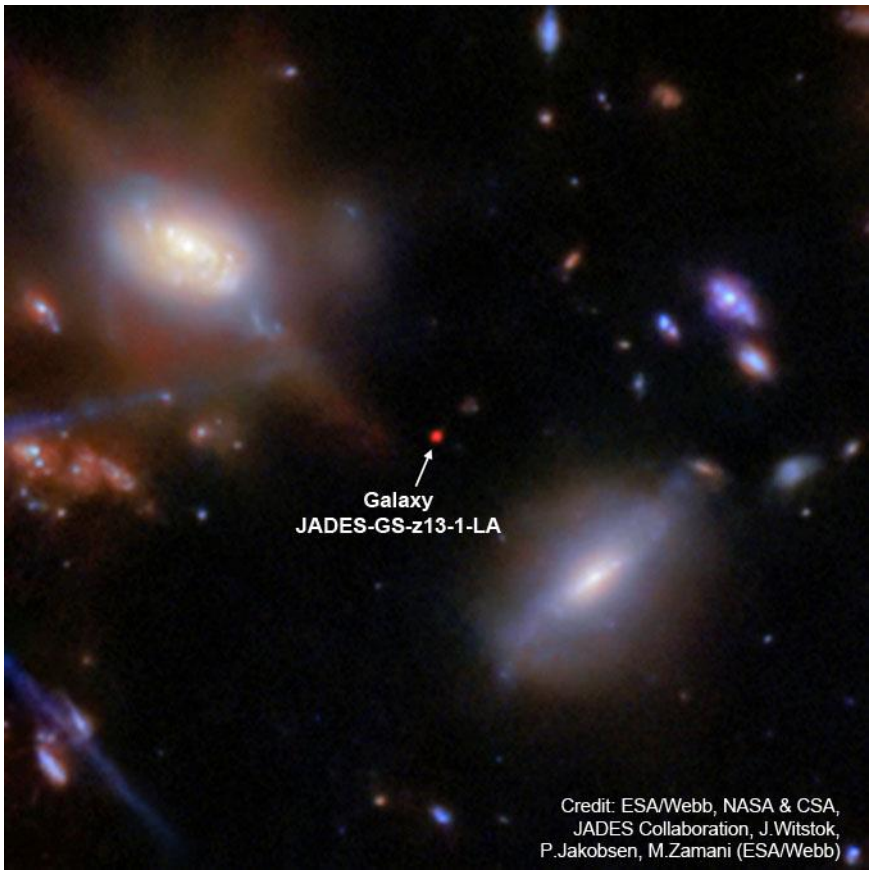
Lower Pads storage container clear-out

AstroSpace Update

April 2025
Astronomy and space news summarized by Don Lynn from NASA and other sources

Possible Life Chemicals Found – Previous studies of an exoplanet known as K2-18b have found methane and carbon dioxide in its atmosphere. The planet is 8.6 times the mass of Earth and 2.6 times the diameter of Earth. The planet orbits in the habitable zone, that is, at the distance from its star where liquid water could exist on its surface. A deep-water-covered planet, which is termed a hycean planet, is the best fit to these observations. The James Webb Space Telescope (JWST) has now found spectroscopically the chemicals dimethyl sulfide and/or dimethyl disulfide in its atmosphere. On Earth, these chemicals are created in nature only by life, principally marine phytoplankton. However astronomers are quick to point out that this is not proof that life has been detected on another planet, as these new found chemicals can be created without life in lab conditions that could possibly be present naturally on other planets. Much more work is needed to determine the source of these chemicals and whether this is truly a hycean planet.

Reionization Seen – Astronomers have long known that for the first few hundred million years of the Universe, space was opaque to some wavelengths of light due to the hydrogen gas everywhere. Then ultraviolet light from early galaxies ionized (electrically charged) the gas which then became transparent. This is called the Reionization (the "Re" is a story for another time).
Observations of very distant galaxies by JWST are being made to try to find when the Reionization occurred. A newly discovered galaxy, so distant that its light left there 330 million years after the Big Bang, shows signs of the Reionization occurring about it. The signs are detection in ultraviolet of the energy necessary to ionize hydrogen. This galaxy is dubbed JADES-GS-z13-1-LA. Only four galaxies more distant than this one are known, but signs of ionization taking place around these have not been found. The source (likely starlight or quasar light) of the ionizing ultraviolet is still being debated, so more observation is needed to settle this debate.



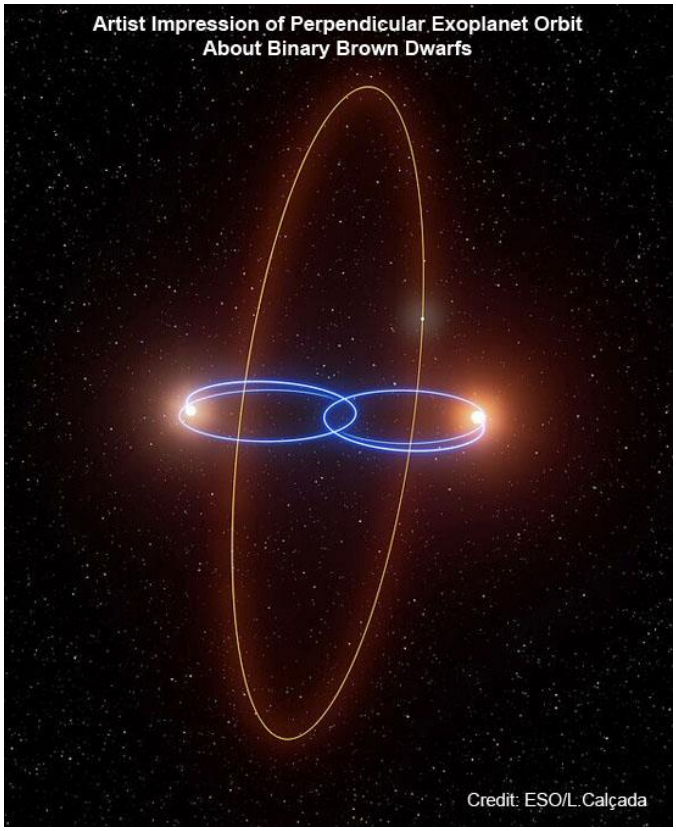
Planet Eaten – JWST was used to monitor a star that underwent a brightening, first in infrared, then in visible light. The brightening was found to be caused by the star eating an exoplanet. At first it was proposed that the star swelled up into a red giant that engulfed the planet, as Sun-like stars do at the ends of their lives, but the observations showed it was not a red giant. Therefore, the planet had to have lost orbital energy and drifted into the star. The planet smeared out as it was torn apart by the star. A remaining disk of gas was found about the star. The brightening was dubbed ZTF SLRN-2020 and was found to originate about 12,000 light-years away.

Galaxy Being Torn Apart – A team of astronomers measured the motions of about 7000 massive stars in the Small Magellanic Cloud (SMC), a small neighboring galaxy. They found that the stars on the side facing the Large Magellanic Cloud (LMC) were moving toward the LMC, while stars on the other side were moving away from the LMC. This indicates that the LMC is tearing apart the SMC through tidal forces. A surprising find was that the stars, and likely the gas, of the SMC are not rotating, though most galaxies do rotate.

Planet-Forming Disks – Using the ALMA radiotelescope array in Chile, scientists observed every protoplanetary (possibly planet forming) disk in the Lupus star-forming region, which is about 400 light-years away. The first surprise was that the average size of the observed disks was much smaller than such disks found in previous studies made all over the sky. This probably indicates that previously known disks tended to be just the larger ones, as they are easier to discover. The newly found disks averaged a radius of only about 6 astronomical units, a bit larger than Jupiter's orbit. The largest disks in the new study tended to have gaps, likely caused by large planets forming there, while the smaller disks tended to have no gaps. The smaller disks tended to form about low-mass (red dwarf) stars. The implication is that gas giant planets form more often in larger disks about larger stars.

Runaway Magnetar – A magnetar is a neutron star that has an incredibly strong magnetic field. The Hubble Space Telescope (HST) and the Swift gamma-ray space telescope discovered a magnetar dubbed SGR 0501+4516, which was found to be moving at runaway speed. The most likely theory of how magnetars form is that they are the result of a supernova explosion. Attempts to find the origin of the runaway magnetar have been unsuccessful since the only nearby supernova remnant was measured not to be on the magnetar's path. There are theories of how magnetars can form, other than by supernova, and this discovery may be an example.

Perpendicular Planet Orbit – Astronomers found an exoplanet, dubbed 2M1510 (AB) b, orbiting a binary star and the orbit of the planet is perpendicular to the orbit of the two stars. Even more unusual, the two stars are actually brown dwarfs, those bodies too small in mass to maintain hydrogen fusion, which powers ordinary stars. Theoretical studies had predicted that planets could orbit perpendicular to a binary star pair, but such has never been confirmed before. Several planets that orbit binary stars are known, but they normally orbit about in the same plane as the orbit of the stars, not perpendicularly. The pair of brown dwarfs was discovered in 2018, but their planet was just found recently. The new discovery is also unusual in that the binary brown dwarfs orbit such that they eclipse each other from our viewpoint. Only one other pair of eclipsing brown dwarfs is known. There is in fact a third star in the system, but it orbits the brown dwarf pair at too great a distance to have much effect on the pair or their planet.

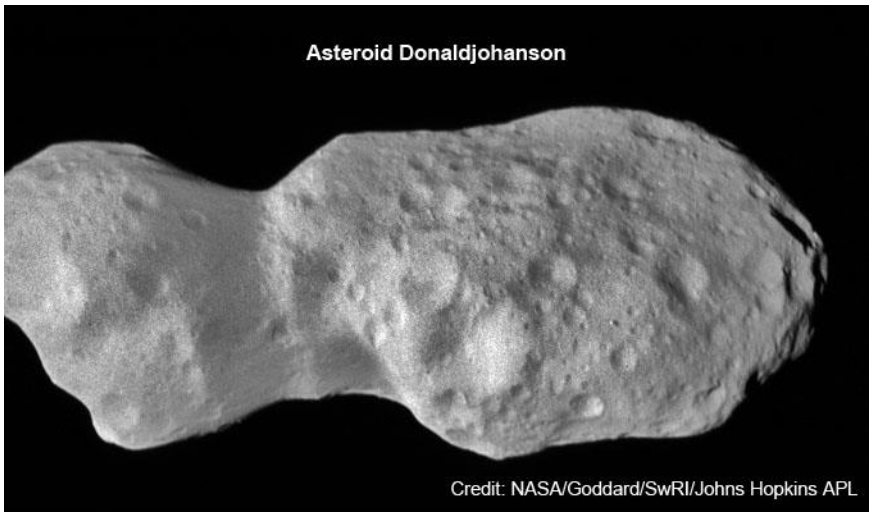


Black Hole Flickering – Archived observations from the Chandra X-ray Space Telescope were used to study the supermassive black hole at the center of the nearby Andromeda Galaxy. Chandra is the only X-ray telescope with good enough resolution to distinguish the central black hole from other X-ray sources in Andromeda. As is usual for X-rays from a supermassive black hole, the observations showed flickering caused by changes in the amount of material being swallowed by the black hole. It has also been shown that neutrinos detected by the Ice Cube neutrino detector at the South Pole correlated with the Andromeda flickering.

Dark Galaxy – Researchers found that a cloud of gas near our Milky Way may be a small galaxy consisting mostly of dark matter rather than just a gas cloud. It is known as AC G185.0-11.5. Radiotelescope observations showed AC G185.0-11.5 to be rotating disk-like as a galaxy would. It has a substantial content of dark matter, but strangely little in the way of stars. Rough calculations show it to have a mass of 300 million Suns. Its distance is about 900,000 light-years. More work is needed to confirm this is a galaxy rather than just a gas cloud with unusual motions.

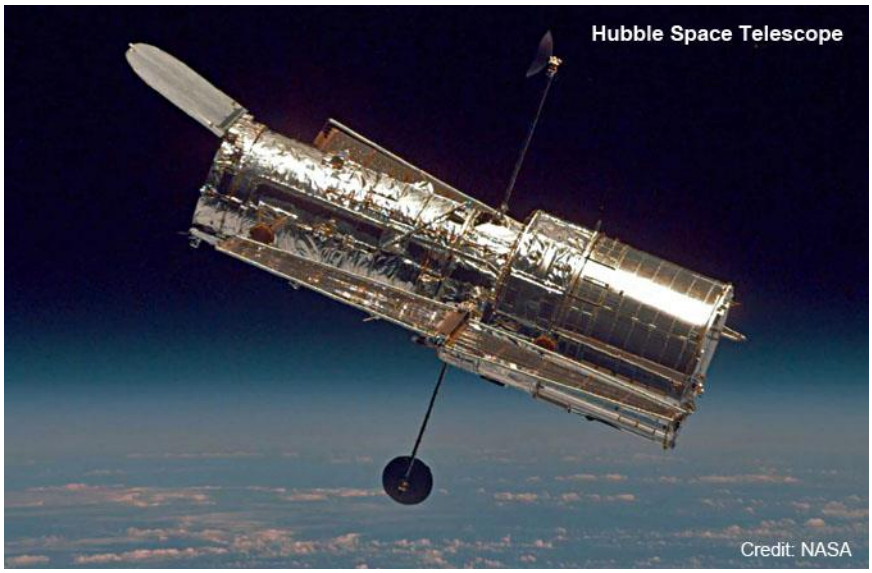
Jupiter Energy Mystery Solved – Calculations have long shown that sunlight at Jupiter's distance should warm the planet's upper atmosphere to a temperature (about minus 100°F) that is much lower than the measured temperature (about plus 800°F). This Jupiter energy crisis has apparently been solved by observations from the Juno and Hisaki spacecraft and the Keck II telescope in Hawaii. Jupiter's auroras, the strongest in the Solar System, were observed to strongly heat the upper atmosphere about the magnetic poles, and that this heat was found to flow to the equator, heating the entire upper atmosphere.

Lucy – The Lucy spacecraft, named after the 3 million year old hominin fossil, flew by the asteroid Donaldjohanson, named after the scientist who codiscovered the Lucy fossil. Excellent images of the asteroid were obtained. It is a little larger than previously estimated, at about 5 miles long and 2 miles wide. It appears that it formed when two smaller bodies collided and stuck together. The mission of Lucy is to explore several Trojan asteroids, those bodies that share Jupiter's orbit. Asteroid Donaldjohanson is not a Trojan, but a main belt asteroid. The first Trojan to be reached by Lucy will be Eurybates in August 2027.

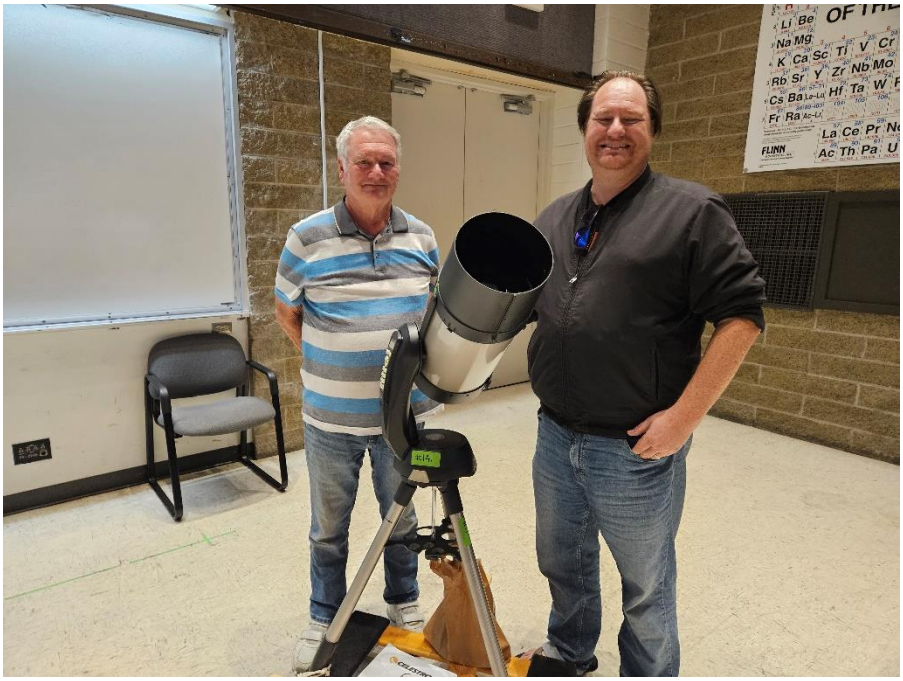


Uranus Rotation – HST periodically monitors Uranus, as well as the other outer planets. A study was made of archived images of Uranus, particularly in wavelengths that show auroras. These are caused by solar wind particles traveling down the magnetic field of the planet. From this study they were able to determine the daily rotation period of the magnetic field of the planet (and presumably the entire interior) much more precisely than any other method of rotation measurement. The result is 17 hours, 14 minutes and 52 seconds. This is 28 seconds longer than the best previous measurement that was made by the Voyager 2 spacecraft in 1986.

HST Anniversary – On April 24 the 35th anniversary was celebrated of the launch of HST aboard the Space Shuttle Discovery. It has been the most productive telescope in history. It has made about 1.7 million observations of about 55,000 celestial objects. 22,000 scientific papers have resulted from its observations, the most from any telescope ever. It made the first measurements of exoplanet atmospheres (despite no exoplanets being known at the time of HST's launch), measured the expansion of the Universe and its acceleration caused by dark energy, and observed galaxies so distant that their light took over 13 billion years to reach us. The telescope was repaired and updated 5 times by astronauts.



Adopt-a-Scope Raffle at the OCA Club Meeting in April



The winner of the Raffle for April was Rory McLendon.

From the Editor

The editor would appreciate comments and suggestions for helping the newsletter take advantage of it no longer being bound to a set number of pages. It will continue to be paginated for printing.

The newsletter is once again looking for front cover picture contributions.

Due dates for submission of articles, pictures and advertisements are tentatively 13 days prior to the next general club meeting.

Issue	**Due date**	
June	31 May	Changed because we are no longer printing the newsletter
July	28 June	
August	26 July	

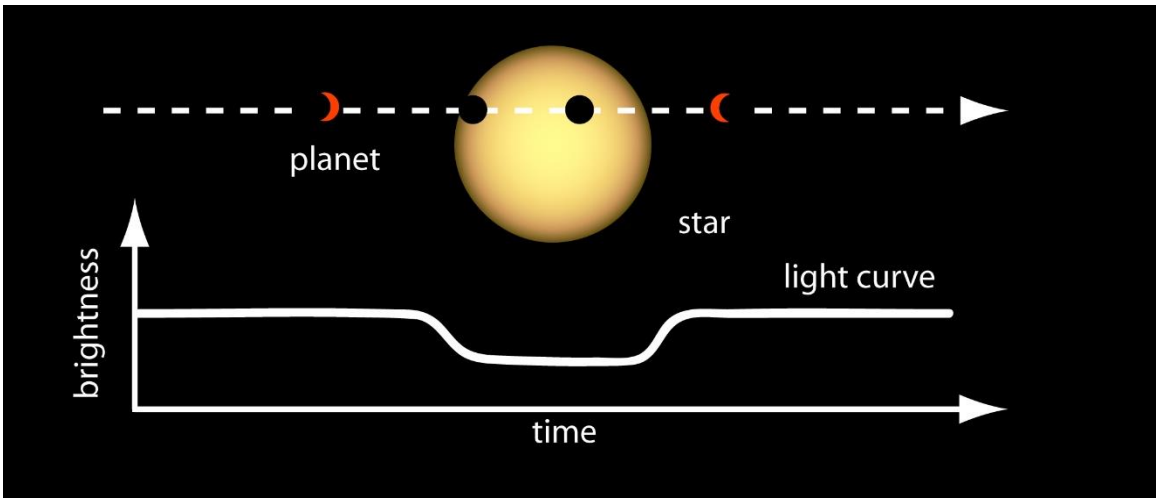
May's Night Sky Notes: How Do We Find Exoplanets?

By: Dave Prosper
Updated by: Kat Troche

Astronomers have been trying to discover evidence that worlds exist around stars other than our Sun since the 19th century. By the mid-1990s, technology finally caught up with the desire for discovery and led to the first discovery of a planet orbiting another sun-like star, Pegasi 51b. Why did it take so long to discover these distant worlds, and what techniques do astronomers use to find them?

The Transit Method

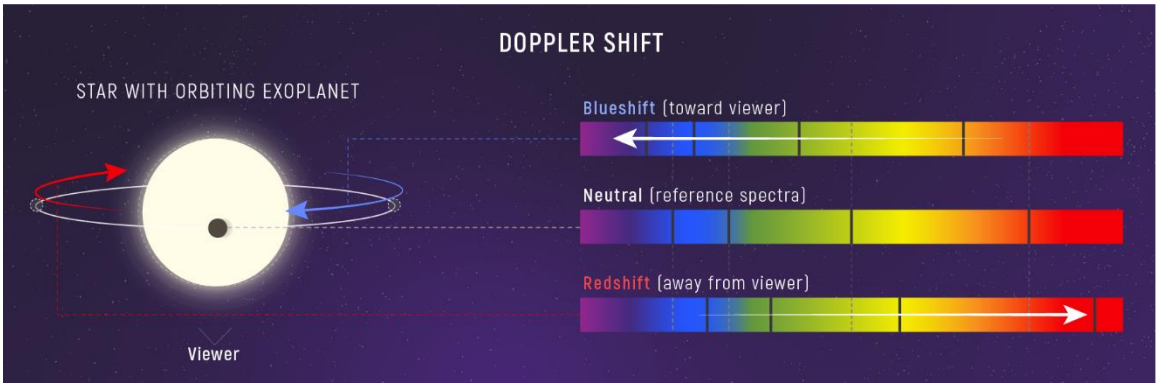
One of the most famous exoplanet detection methods is the **transit method**, used by Kepler and other observatories. When a planet crosses in front of its host star, the light from the star dips slightly in brightness. Scientists can confirm a planet orbits its host star by repeatedly detecting these incredibly tiny dips in brightness using sensitive instruments. If you can imagine trying to detect the dip in light from a massive searchlight when an ant crosses in front of it, at a distance of tens of miles away, you can begin to see how difficult it can be to spot a planet from light-years away! Another drawback to the transit method is that the distant solar system must be at a favorable angle to our point of view here on Earth – if the distant system's angle is just slightly askew, there will be no transits. Even in our solar system, a transit is very rare. For example, there were two transits of Venus visible across our Sun from Earth in this century. But the next time Venus transits the Sun as seen from Earth will be in the year 2117 – more than a century from now, even though Venus will have completed nearly 150 orbits around the Sun by then!



A planet passing in front of its parent star creates a drop in the star's apparent brightness, called a transit. Exoplanet Watch participants can look for transits in data from ground-based telescopes, helping scientists refine measurements of the length of a planet's orbit around its star. Credit: NASA's Ames Research Center

The Wobble Method

Spotting the Doppler shift of a star's spectra was used to find Pegasi 51b, the first planet detected around a Sun-like star. This technique is called the **radial velocity or "wobble" method.** Astronomers split up the visible light emitted by a star into a rainbow. These spectra, and gaps between the normally smooth bands of light, help determine the elements that make up the star. However, if there is a planet orbiting the star, it causes the star to wobble ever so slightly back and forth. This will, in turn, cause the lines within the spectra to shift ever so slightly towards the blue and red ends of the spectrum as the star wobbles slightly away and towards us. This is caused by the blue and red shifts of the planet's light. By carefully measuring the amount of shift in the star's spectra, astronomers can determine the size of the object pulling on the host star and if the companion is indeed a planet. By tracking the variation in this periodic shift of the spectra, they can also determine the time it takes the planet to orbit its parent star.

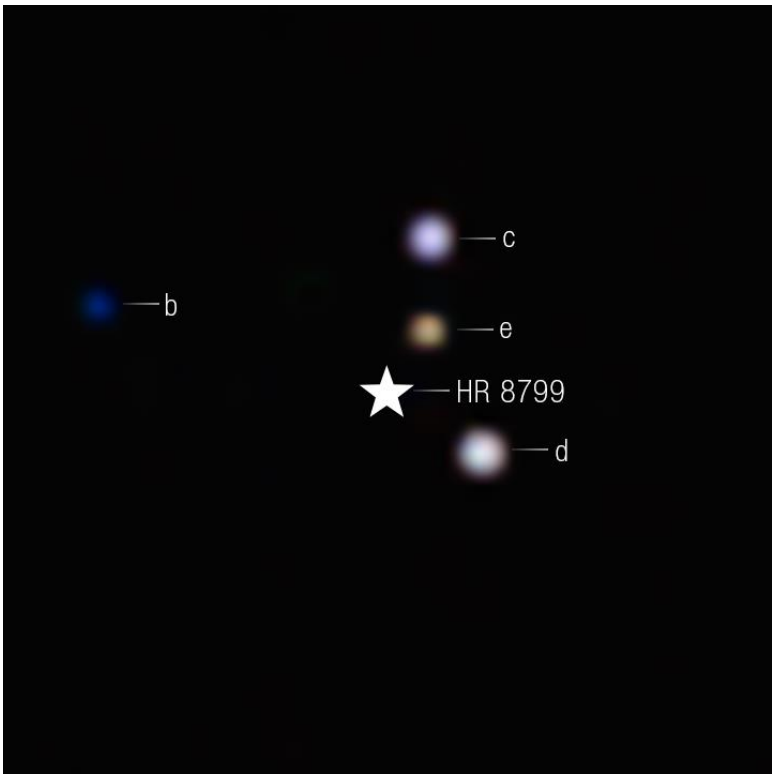


As a planet orbits a star, the star wobbles. This causes a change in the appearance of the star's spectrum called Doppler shift. Because the change in wavelength is directly related to relative speed, astronomers can use Doppler shift to calculate exactly how fast an object is moving toward or away from us. Astronomers can also track the Doppler shift of a star over time to estimate the mass of the planet orbiting it. Credit: NASA, ESA, CSA, Leah Hustak (STScI)

Direct Imaging

Finally, exoplanets can be revealed by **directly imaging** them, such as this image of four planets found orbiting the star HR 8799! Space telescopes use instruments called **coronagraphs** to block the bright light from the host star and capture the dim light from planets. The Hubble Space Telescope has captured images of giant planets orbiting a few nearby systems, and the James Webb Space Telescope has only improved on these observations by uncovering more details, such as the colors and spectra of exoplanet atmospheres, temperatures, detecting potential exomoons, and even scanning atmospheres for potential biosignatures!

Image taken by the James Webb Space Telescope of four exoplanets orbiting HR 8799. Credit: NASA, ESA, CSA, STScI, Laurent Pueyo (STScI), William Balmer (JHU), Marshall Perrin (STScI)



You can find more information and activities on NASA's Exoplanets page, such as the Eyes on Exoplanets browser-based program, The Exoplaneteers, and some of the latest exoplanet news. Lastly, you can find more resources in our News & Resources section, including a clever demo on how astronomers use the wobble method to detect planets!

The future of exoplanet discovery is only just beginning, promising rich rewards in humanity's understanding of our place in the Universe, where we are from, and if there is life elsewhere in our cosmos.

Advertisements

Buy, Sell or Trade some of your gear? This is where club members can place advertisements. Please contact the editor at newsletter@ocastronomers.org to place an advertisement or to learn more about placing one. There is no cost to club members for non-commercial advertisements in the newsletter. The editor may resize and re-arrange ad content to fit and will feed back the formatted ad for approval prior to publishing.

Some policy changes have been made to reflect the expanded capacity of the electronically published newsletter.

- Each advertisement may now occupy up to ½ of a printed page and may include small pictures within the space permitted. The editor may resize and re-arrange ad content to fit and will feed back the formatted ad for approval prior to publishing.
- Each advertisement may be run for 3 consecutive issues, after which it will be removed unless the advertiser requests extension of the ad by contacting the editor of the newsletter.

For Sale contact Rich Cormier rich.cormier3@gmail.com (949) 547-8808

Hard case for Explore Scientific ED152 telescope, in mint condition $ 159

- This hard case can store refractors in the 127 mm to 152 mm range
- Back wheels allow for dolly like handling
- Essentially brand new ($299 new but on backorder at ES)

I had my ED152 serviced and had ES ship it back in the case

This item is local pickup only. If interested, please send me email requesting a complete description.

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