March 2022 VOL. 16

THE OBSERVER

BATTLE POINT ASTRONOMICAL ASSOCIATION

WWW.BPASTRO.ORG BAINBRIDGE ISLAND, WA

Another Collaboration Opportunity with KiDiMu 3/26/22

The Bainbridge Island Kids Discovery Museum (KiDiMu) is hosting Fam Jam, an outdoor family celebration on Saturday, March 26th from 10am to 2pm.

BPAA will be staffing a table at the event. We will have telescopes on display, including the solar scope. We'll need volunteers to interact with kids and adults, and hand out brochures and membership forms. Please contact one of the board members if you can help us.

Visit Fam Jam — KiDiMu for more information on the event.

Strategic Planning

The Board has retained strategic planning consultants Linda Maxson and Virginia Rice of 2OB, LLC to assist us in charting BPAA's path forward into the future. As a first step, Linda and Ginny interviewed BPAA members, board members, donors and non-members in the community to gain insight into how we are perceived and what folks see as our strengths, weakness and opportunities. Their findings are contained in a Phase 1 Report that we will share with the BPAA membership soon. Next up: a board workshop to clarify our mission and vision, priorities, opportunities, and plan of action to lay the foundation for strategic decision-making and effective use of resources.

BPAA Board Membership News

First, another huge Thank You! to outgoing Chief Astronomer Nels Johansen for his very long tenure on the Board. His knowledge and leadership have been instrumental in BPAA's success.

New board members:

Vice President: My name is Mario Alejandro Torres. My lovely family and I are fairly new to living on the island but we had been connected to this delightful community for a few years now. I am a musician and an educator, and am the Music Director and Conductor of the Bainbridge Symphony Orchestra. I have always been fascinated with astronomy, and the aspect I love the most is the consistency of new discoveries that are presented in this field. I am honored and thrilled to serve in a wonderful organization as is BPAA and to follow the steps of its founders and board members before me. I am excited to see what the future holds for BPAA and I am committed to do my part to make sure the organization continues to thrive.

Chief Astronomer: I'm Cole Rees, a 24-year old resident of Bainbridge Island. Growing up, I have always had a passion for astronomy. After starting a journey into astrophotography in 2020, I joined the association to meet like-minded individuals who loved astronomy as much as I did. As a board member, I hope to achieve numerous things, specifically related to improving and retrofitting the Ritchie telescope alongside past and present board members, as well as introducing budding astronomers to the world of astrophotography.

Education Officer: My name is Ulysses Glanzrock. I have been in love with science and space from a very young age. When I'm not gazing at the night sky I'm working on fascinating science/engineering projects such as rocket engines or smart 3d printer enclosures. I wanted to be apart of the board to help support the association more personally as well as help grow its outreach to inspire others.

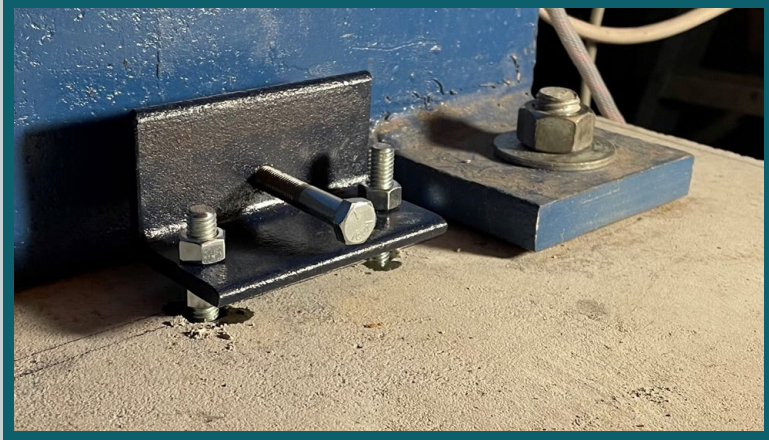
March Zoom Program

Our March speaker will John Goar, board secretary of the Olympic Astronomical Society in Bremerton. His topic "Quest for 100 Comets" details his personal goal to observe comets. John will discuss comet hunting and describe the more interesting comets that he's seen. Please join us!

Member Image of the Orion Nebula

New Chief Astronomer Cole Rees captured this image of the Orion Nebula on 2/24/2022. He used his Celestron EdgeHD 8” telescope with the focal reducer, and a ZWO 294MC-Pro camera on an Atlas EQ-G mount.

Ritchie Telescope News



The Ritchie Telescope is getting better and better! It’s always been a great tool for visual observing. A few years back we improved its pointing ability by correcting the sloppy declination bearings and improving the declination drive. That allowed us to add a camera for astro-imaging and live streaming of telescope views. But the camera quickly revealed that the scope’s polar alignment was not perfect. We attempted to adjust the alignment but ran out of room in the mounting holes by which the scope is mounted to its concrete pedestal. So we enlarged the mounting holes using a custom-fabricated carbide-tipped hole saw with a tubular mandrel that guided on the anchor bolts. Now the scope had enough range of motion for the adjustments, but due to its weight it was difficult to move in the necessary very small increments. Our next step was to design, fabricate and install precision horizontal adjustment screws to enable fine-tuning. As I write, we are waiting for the epoxy to cure, and then we should be able to perfect the polar alignment.

Many thanks to Nels Johansen, Cole Rees, Mario Torres, Peter Moseley, David Browning, and Frank Petrie for their persistent efforts to accomplish this improvement. Stay tuned to see the results!

Virtual Telescope Project Captures a View of the James Webb Space Telescope at Its Final Destination

NASA's James Webb Space Telescope is visible at L2 in this image, seen as a tiny white speck next to the arrow. (Image credit: Gianluca Masi/The Virtual Telescope Project)

It's orbiting in the bowl of the Big Dipper, from the perspective of Earth.

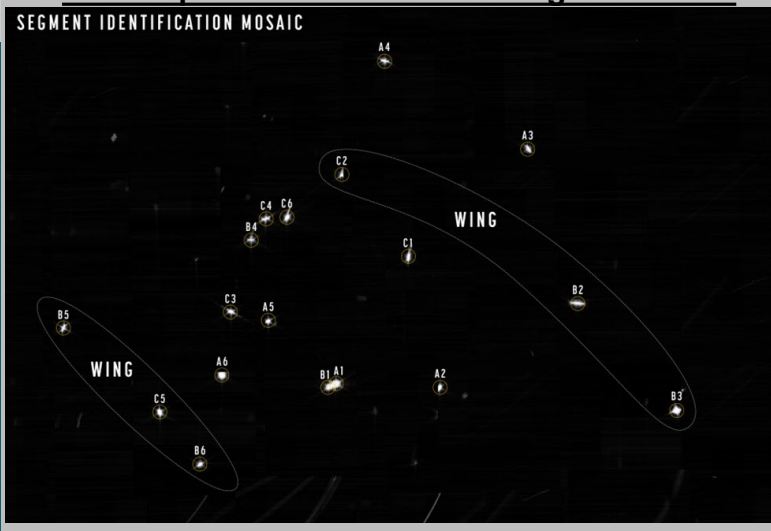
A new image captures NASA's distant James Webb Space Telescope in a sky full of stars.

The Rome-based Virtual Telescope Project took the exposure over five minutes using its robotic telescope, a PlaneWave 17-inch, tracking Webb on a Paramount ME mount.

The image captured Webb just as it was arriving at its destination at the Earth-sun Lagrange Point 2 (L2), which is about 930,000 miles (1.5 million kilometers) away from our planet, project manager Gianluca Masi said in a statement.

(Source: space.com)

The First Images From NASA’s New Space Telescope Show How It’s Coming Into Focus



This mosaic shows images of the same star. Each is labeled with the name of the mirror segment that captured it. "Wing" refers to the two sides of the mirror assembly that unfolded in space. (Source: NASA)

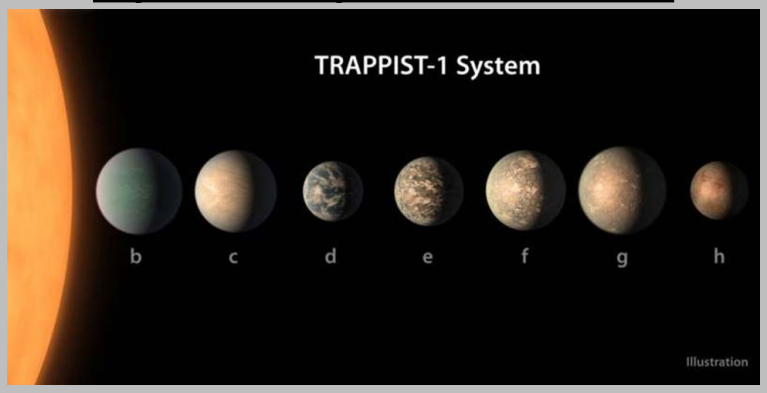
The James Webb Space Telescope's primary mirror is made up of 18 hexagonal segments. Now that the telescope is in space, mission managers need to perfectly align them so the segments work as one giant mirror..

"This amazing telescope has not only spread its wings, but it has now opened its eyes," says Lee Feinberg, Webb's optical telescope element manager at NASA's Goddard Space Flight Center in Greenbelt, Md., who adds that all the initial results match their simulations and expectations. "It is still early, but we are very encouraged with what we are seeing.“

Marshall Perrin, Webb deputy telescope scientist at the Space Telescope Science Institute, says that the mirrors' separate depictions of a single star showed up pretty close together in images taken with the camera, suggesting that the mirrors are already aligned reasonably well.

(Source: npr.org)

Day of Discovery: 7 Earth-size Planets



This illustration shows what the TRAPPIST-1 planetary system may look like, based on available data about the planets' diameters, masses, and distances from the host star. Astronomers have named them the planets TRAPPIST-1a, TRAPPIST-1b, and so forth. Credit: NASA/JPL-Caltech

Newspapers around the world printed the discovery on their front pages: Astronomers had found that a red dwarf star called TRAPPIST-1 was home to a close-knit family of seven Earth-size planets. NASA announced the system Feb. 22, 2017.

Using telescopes on the ground and in space, scientists revealed one of the most unusual planetary systems yet found beyond our Sun and opened the tantalizing question: Are any of these worlds habitable—a suitable home for life?

Five years later, the planets are still enigmatic. Since the first announcement, subsequent studies have revealed that the TRAPPIST-1 planets are rocky, that they could be almost twice as old as our solar system, and that they are located 41 light-years from Earth.

But a real game-changer will be the recently launched James Webb Space Telescope. Larger and more powerful than any previous space telescope, Webb will look for signs of atmospheres on the TRAPPIST-1 planets.

A prime target for Webb is the fourth planet from the star, called TRAPPIST-1e. It's right smack in the middle of what scientists call the habitable zone, also known as the Goldilocks zone. This is the orbital distance from a star where the amount of heating is right to allow liquid water on the surface of a planet.

Scientists use computer models of possible planetary atmosphere formation and evolution to try to narrow down their possible composition, and these will be critical for the TRAPPIST-1 planets,

(Source: phys.org)

Astronomers Map Mysterious Element In Space

A research team led by Lund University in Sweden has provided an important clue to the origin of the element ytterbium in the Milky Way, by showing that the element largely originates from supernova explosions. The groundbreaking research also provides new opportunities for studying the evolution of our galaxy. The study has been accepted for publication in Astronomy & Astrophysics

Ytterbium is interesting because it may have two different cosmic origins. Researchers believe that one half comes from heavy stars with short lives, while the other half comes from more regular stars, much like the sun, and that they create ytterbium in the final stages of their relatively long lives.

It has been speculated that ytterbium was thrown into space by supernova explosions, stellar winds and planetary nebulae. There, it accumulated in large space clouds from which new stars formed.

By examining high-quality spectra of about 30 stars in the sun's vicinity, the researchers were able to provide important experimental support for the theory of the cosmic origin of ytterbium. It seems that ytterbium largely originates from supernova explosions.

Since the ytterbium analysis was done using infrared light, it will now be possible to study large areas of the Milky Way that lie behind impenetrable dust. Infrared light can get through the dust in the same way that red light from a sunset can get through the Earth's atmosphere.

"Our study opens up the possibility of mapping extensive parts of the Milky Way that have previously been unexplored. This means that we will be able to compare the evolutionary history in different parts of the galaxy," concludes Rebecca Forsberg, doctoral student in astronomy at Lund University.

(Source: phys.org)

Death Spiral: A Black Hole Spins On Its Side

Researchers from the University of Turku, Finland, found that the axis of rotation of a black hole in a binary system is tilted more than 40 degrees relative to the axis of stellar orbit. The finding challenges current theoretical models of black hole formation.

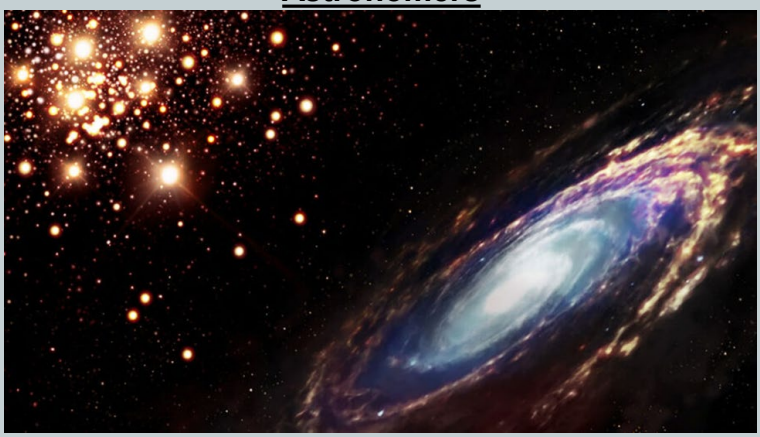
Often, the rotation axis of a central massive body is to a high degree aligned with the rotation axis of its satellites. This is true for the solar system: The planets orbit around the sun in a plane, which roughly coincides with the equatorial plane of the sun. The inclination of the sun rotation axis with respect to orbital axis of the Earth is only 7 degrees.

"The expectation of alignment, to a large degree, does not hold for the bizarre objects such as black hole X-ray binaries. The black holes in these systems were formed as a result of a cosmic cataclysm—the collapse of a massive star. Now, we see the black hole dragging matter from the nearby, lighter companion star orbiting around it. We see bright optical and X-ray radiation as the last sigh of the infalling material, and also radio emission from the relativistic jets expelled from the system," says Juri Poutanen, professor of astronomy at the University of Turku and the lead author of the publication.

The results, published in Science, open interesting prospects toward studies of black hole formation and evolution of such systems, as such extreme misalignment is hard to get in many black hole formation and binary evolution scenarios.

(Source: phys.org)

Fast Radio Burst's Unlikely Home Puzzles Astronomers



A cluster of ancient stars at the outskirts of spiral galaxy M81 is the source of extraordinarily bright and short radio flashes. ASTRON / Daniëlle Futselaar, artsource.nl

A baby shower in a retirement home – that would surely raise some eyebrows. Likewise, astronomers were surprised to find a fast radio burst in a globular cluster. Astronomers think the enigmatic, millisecond-duration flashes of radio waves arise on newborn neutron stars. However, the stars in globular clusters are almost as old as the universe itself.

Fast radio bursts (FRBs) were first discovered in 2007. In about one-thousandth of a second, they release as much energy as the Sun does in days. Fortunately, some FRBs are repeaters – a sure sign that the "engine" that produces the bursts isn't completely destroyed in the event. With a bit of patience and luck, astronomers can study multiple bursts from the same source, just by aiming their instruments on the location of one of the two-dozen known repeaters.

That's just what a large collaboration led by Franz Kirsten (Onsala Space Observatory, Sweden) did last year. Using the 12 radio telescopes of the European Very Long Baseline Interferometry (VLBI) Network, they observed the location of FRB 20200120E, a fast radio burst in the outskirts of the spiral galaxy M81 some 12 million light-years away in Ursa Major.

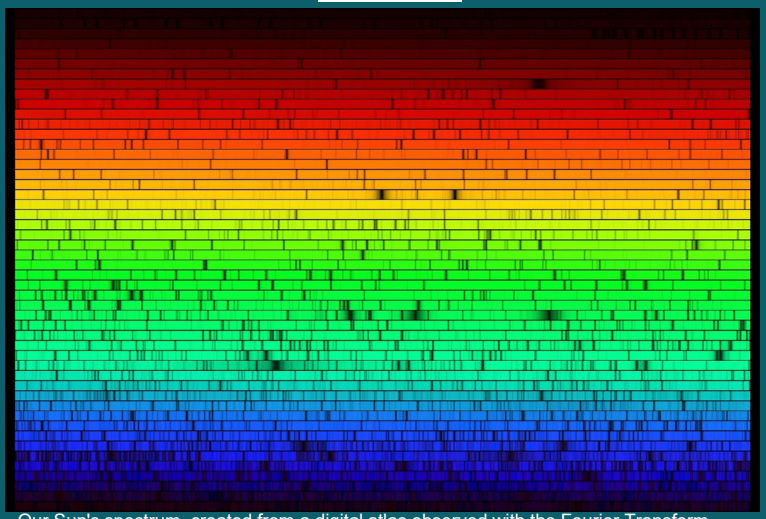
Using interferometry, the team pinpointed the position of the repeater on the sky to a precision of a mere 1.25 milli-arcsecond. They were surprised to see that the energetic flashes originated in one of M81's many globular clusters.

One thing is clear, though: Fast radio bursts are a diverse bunch. They span a wide range of radio luminosities and have been discovered in massive star-forming galaxies, in small dwarf galaxies, and in mid-size spirals — in stellar nurseries but also in stellar retirement homes. Apparently, the engines that power them can be born in a variety of ways.

As team member Jason Hessels (ASTRON) says, "I would be surprised if FRBs stop surprising us. We're still very much in the discovery phase of understanding what these sources are."

(Source: skyandtelescope.org)

How We Use Starlight to Look For Alien Life



Our Sun's spectrum, created from a digital atlas observed with the Fourier Transform Spectrometer at the McMath-Pierce Solar Facility at the National Solar Observatory on Kitt Peak. (Image: N.A.Sharp, NOAO/NSO/Kitt Peak FTS/AURA/NSF)

Stars and their planets are always emitting signals for scientists to decode. But, unlike the technological messages in science fiction, these signals are created by nature — and we can detect them with a process called spectroscopy.

When we look at a planetary system beyond our own, 99% of the time all we can see is its star, even with the best camera on the biggest telescope. This is just because planets are much smaller and fainter than their stars.

Spectroscopy is the study of light and all its colors, and it works because a planet is still emitting light even if we can't resolve it with our cameras on Earth. The key concept of spectroscopy is that light from stars, which usually appear to be white, is actually composed of the full electromagnetic spectrum, from radio to X-ray. When white light passes through a glass prism, the light spreads out into a rainbow of colors.

If you look at a star through a prism, you will notice something unusual: the rainbow it produces has some dark patches in it. This is because stars are made largely of hydrogen and helium — atoms that "catch" very particular colors of light and prevent them from leaving the star. When we look at a planet's spectrum, it can tell us which atoms and molecules are present, including potential biosignatures like methane.

Light waves from an approaching object are compressed toward the blue end of the spectrum, and light waves from a receding object are stretched toward the red. So when a planet orbits its star, its spectrum is either red- or blue-shifting, while the star's spectrum does not shift. That means it can be subtracted out, leaving behind just the planet's spectrum, and some noise. This whole process is called emission spectroscopy.

This method of seeing the planet's spectrum through the star's is our biggest key to the search for life.
(Source: planetary.org)

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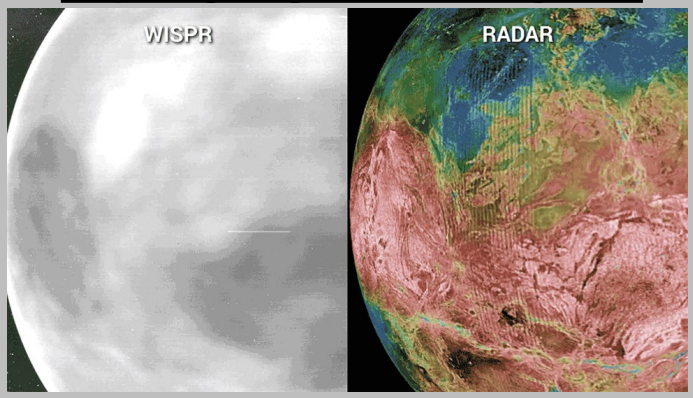
The Parker Solar Probe Captures Surprising Images Of Venus Nightside



The Magellan mission used radar to map the surface of Venus in the 1990s. The images gave the first global view of what was below Venus' thick clouds. Surface features seen in the WISPR images (left) match ones seen in those from the Magellan mission (right). (Images: NASA / Johns Hopkins APL / Naval Research Laboratory (left); Magellan Team / Jet Propulsion Laboratory / United States Geological Survey (right))

NASA's Parker Solar Probe, launched in 2018, is using a series of seven gravity-assist flybys of Venus to gradually spiral closer to the Sun. The spacecraft's widefield camera, dubbed WISPR, was designed to take images of the outermost reaches of the Sun's atmosphere and the solar wind in visible light. But turned toward Venus, WISPR revealed some unexpected results.

Visible light images of the planet's nightside captured during the third and fourth flybys astonished the mission team, who published their findings in the February 16th Geophysical Research Letters. These pictures contain tantalizing clues that may help solve one of observational astronomy's oldest and most enduring mysteries.

In 2006 Frederick Taylor (Oxford University, UK) speculated that the clouds and hazes might also be translucent in the visible region of the spectrum. Indeed, that's exactly what the Parker Solar Probe's images reveal: WISPR's visible-light images of the planet's nightside look like slightly blurred, reduced-contrast versions of the near-infrared images. Although four-fifths of the surface's reddish glow is absorbed and scattered by Venus's dense atmosphere and low-lying clouds of sulfuric acid aerosols, one-fifth manages to penetrate the blanket of gas and mist.

The Parker Solar Probe team plans to acquire more data during the spacecraft's final flyby of Venus in November 2024, which will give the probe a final opportunity to capture the planet's nightside.

(Source: skyandtelescope.org)

WHAT'S UP(COMING)!

Mar 2 – New Moon
Mar 14 – γ-Normid meteor shower 2022
Mar 18 – Full Moon
Mar 20 – March equinox
Mar 28 – 136472 Makemake at opposition
Mar 31 – New Moon
Apr 2 – M104 is well placed
Apr 5 – M94 is well placed
Apr 15 – M51 is well placed
Apr 16 – Full Moon
Apr 18 – M3 is well placed
Apr 19 – 136108 Haumea at opposition
Apr 22 – Lyrid meteor shower 2022
Apr 24 – M101 is well placed
Apr 28 – Mercury at highest altitude in evening sky
Apr 30 – New Moon
May 6 – η-Aquariid meteor shower 2022
May 8 – η-Lyrid meteor shower 2022
May 13 – M5 is well placed
May 15 – Total lunar eclipse
– Full Moon
May 30 – New Moon