

THE OBSERVER

BATTLE POINT ASTRONOMICAL ASSOCIATION

WWW.BPASTRO.ORG BAINBRIDGE ISLAND, WA



Photo credit: Mario Alejandro Torres

Welcome New Members!

BPAA is enjoying a surge in new members! People are coming out of Covid isolation and responding to our summertime open houses and star parties. Since our low point of 65 in June 2020, our numbers have increased to around 200 today. Tip of the hat to our landlord, the Bainbridge Island Park District, whose Sounds of Summer Concerts and Movies in the Park have given us the opportunity to welcome visitors to the Observatory. To those visitors who became members, we are excited to welcome you to astronomy. You can look forward to member-only events that we will begin offering soon, such as Basic Astronomy, How to Use a Telescope, Astrophotography, and more star parties. We are also starting up a series of Special Interest Groups where you can discuss topics of interest and share ideas on any number of subjects. Cosmology anyone? Let us know what interests you!

And since BPAA is an all-volunteer-run organization, let us know how you would like to get involved. We have lots of opportunities, contact President Frank Petrie at president@bpastro.org to find out more.

Rudolph Planetarium Fundraising Update

As many of you know, our old planetarium projector died a few years back, leaving us without a major element of our programming and outreach to budding astronomers of all ages. We are now raising funds to purchase a new projector and build a rigid projection dome to replace the cloth dome now hanging in the meeting room. Those of you in attendance at the August 13 program at the Observatory got to see the planetarium in action when Digitalis Education gave us a demonstration of the projector we plan to purchase. All we need is to raise the money!

The total budget for the project is \$60,000 for the projector, the software license, and the rigid dome. To date we've received \$15,000 in grant funding from the Bainbridge Community Foundation, and we are working on additional grant opportunities, such as Rotary. We also received in June a \$15,000 pledge from a BPAA member to match all individual donations in any amount, so you can double your impact by donating now to the planetarium! To date we've received about \$500 in individual donations, which have been matched for a total of \$1,000. Please make your donation now and help bring the Rudolph planetarium back to life!

BPAA Board News

After 14 years as BPAA's treasurer and acting membership manager, Frank Schroer is stepping down for a well-deserved break. Thank you, Frank!

At its August meeting, the Board of Directors appointed Kim Wilkes to step into the treasurer role. Kim is a former CPA who has worked with non-profits, held various accounting jobs, been CFO of a company, had a private practice, and is now working on contract basis from home. She and her husband Chris joined BPAA after moving to Bainbridge from Seattle about a year ago. Welcome Kim and Chris!

We are in the process of forming a membership committee to expand upon the work that Frank was doing as acting membership manager. If you'd like to participate in the committee, please contact Kim at treasurer@bpastro.org.

The Board has accepted the resignations of Vice President Mario Alejandro Torres and Education Officer Ulysses Glanzrock. Mario has left his day job as conductor of the Bainbridge Symphony Orchestra to accept the position of Music Director of Sewanee Symphony Orchestra and Visiting Assistant Professor of Music at Sewanee: The University of the South. He and his family recently relocated to Tennessee.

Ulysses has entered his first year of college at Washington State University in Pullman, where he'll study mechanical engineering.

Thank you, Mario and Ulysses, and best of luck in your new adventures!

Upcoming 2nd Saturday Programs

Our September 10 program features BHS Class of '16 alumnus Natalie Allen, now an astrophysics PhD student studying exoplanet atmospheres at Johns Hopkins University, home of the Space Telescope Science Institute and James Webb Space Telescope mission control center. Check out BPAAstro.org for details of Natalie's presentation: First Results from JWST: Entering the Golden Age of Exoplanet Atmospheres.

Our October 8 program will continue on the theme of exoplanets. Dennis Conti, board member of the American Association of Variable Star Observers and chair of AAVSO's Exoplanet Section, will describe how amateur astronomers play a key role in NASA's search for habitable planets and how we too can participate, in his talk titled The Indispensable Role of Amateur Astronomers in Exoplanet Discoveries. Dennis has worked closely with the Transiting Exoplanet Survey Satellite science team to qualify AAVSO members as official participants in the TESS ground-based follow-up program. TESS has been described as the "finder scope" for the James Webb Space Telescope!

Webb Captures Stellar Gymnastics in Cartwheel Galaxy



Credits: NASA, ESA, CSA, STScI

NASA's James Webb Space Telescope has peered into the chaos of the Cartwheel Galaxy, revealing new details about star formation and the galaxy's central black hole.

Its appearance is the result of an intense event – a high-speed collision between a large spiral galaxy and a smaller galaxy not visible in this image.

The collision most notably affected the galaxy's shape and structure. The Cartwheel Galaxy sports two rings — a bright inner ring and a surrounding, colorful ring. These two rings expand outwards from the center of the collision, like ripples in a pond after a stone is tossed into it.

Other telescopes, including the Hubble Space Telescope, have previously examined the Cartwheel. But the dramatic galaxy has been shrouded in mystery – perhaps literally, given the amount of dust that obscures the view. Webb, with its ability to detect infrared light, now uncovers new insights into the nature of the Cartwheel.

(Source: nasa.gov)

NASA's Webb Sheds Light on Galaxy Evolution



Image credit: NASA, ESA, CSA, and STScI

Stephan's Quintet, a visual grouping of five galaxies, is best known for being prominently featured in the holiday classic film, "It's a Wonderful Life." Today, NASA's James Webb Space Telescope reveals Stephan's Quintet in a new light. This enormous mosaic contains over 150 million pixels and is constructed from almost 1,000 separate image files. The information from Webb provides new insights into how galactic interactions may have driven galaxy evolution in the early universe.

Combined with the most detailed infrared image ever of Stephan's Quintet from MIRI and the Near-Infrared Camera (NIRCam), the data from Webb will provide a bounty of valuable, new information. For example, it will help scientists understand the rate at which supermassive black holes feed and grow.

(Source: nasa.gov)

Webb's Jupiter Images Showcase Auroras



Webb NIRCcam composite image from two filters – F212N (orange) and F335M (cyan) – of Jupiter system. Credit: NASA, ESA, CSA, Jupiter ERS Team; image processing by Ricardo Hueso (UPV/EHU) and Judy Schmidt.

With giant storms, powerful winds, auroras, and extreme temperature and pressure conditions, Jupiter has a lot going on. Now, NASA's James Webb Space Telescope has captured new images of the planet. Webb's Jupiter observations will give scientists even more clues to Jupiter's inner life.

The two images come from the observatory's Near-Infrared Camera (NIRCcam), which has three specialized infrared filters that showcase details of the planet. Since infrared light is invisible to the human eye, the light has been mapped onto the visible spectrum. Generally, the longest wavelengths appear redder and the shortest wavelengths are shown as more blue. Scientists collaborated with citizen scientist Judy Schmidt to translate the Webb data into images.

In this wide-field view, Webb sees Jupiter with its faint rings, which are a million times fainter than the planet, and two tiny moons called Amalthea and Adrastea.

(Source: nasa.gov)

Webb Reveals Steamy Atmosphere of Distant Planet

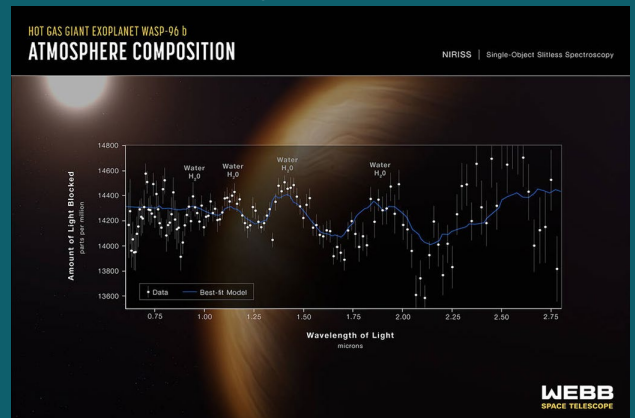


Image credit: NASA, ESA, CSA, and STScI

NASA's James Webb Space Telescope has captured the distinct signature of water, along with evidence for clouds and haze, in the atmosphere surrounding a hot, puffy gas giant planet orbiting a distant Sun-like star.

The observation, which reveals the presence of specific gas molecules based on tiny decreases in the brightness of precise colors of light, is the most detailed of its kind to date, demonstrating Webb's unprecedented ability to analyze atmospheres hundreds of light-years away.

WASP-96 b is one of more than 5,000 confirmed exoplanets in the Milky Way. Located roughly 1,150 light-years away in the southern-sky constellation Phoenix, it represents a type of gas giant that has no direct analog in our solar system. With a mass less than half that of Jupiter and a diameter 1.2 times greater, WASP-96 b is much puffier than any planet orbiting our Sun. And with a temperature greater than 1000°F, it is significantly hotter. WASP-96 b orbits extremely close to its Sun-like star, just one-ninth of the distance between Mercury and the Sun, completing one circuit every 3½ Earth-days.

The combination of large size, short orbital period, puffy atmosphere, and lack of contaminating light from objects nearby in the sky makes WASP-96 b an ideal target for atmospheric observations.

(Source: nasa.gov)

Webb Captures Dying Star's Final 'Performance'



Image credit: NASA, ESA, CSA, and STScI

The dimmer star at the center of this scene has been sending out rings of gas and dust for thousands of years in all directions, and NASA's James Webb Space Telescope has revealed for the first time that this star is cloaked in dust.

Two cameras aboard Webb captured the latest image of this planetary nebula, cataloged as NGC 3132, and known informally as the Southern Ring Nebula. It is approximately 2,500 light-years away.

Two stars, which are locked in a tight orbit, shape the local landscape. The stars – and their layers of light – are prominent in the image from Webb's Near-Infrared Camera (NIRCam) on the left, while the image from Webb's Mid-Infrared Instrument (MIRI) on the right shows for the first time that the second star is surrounded by dust. The brighter star is in an earlier stage of its stellar evolution and will probably eject its own planetary nebula in the future.

In the meantime, the brighter star influences the nebula's appearance. As the pair continues to orbit one another, they "stir the pot" of gas and dust, causing asymmetrical patterns.

Each shell represents an episode where the fainter star lost some of its mass. The widest shells of gas toward the outer areas of the image were ejected earlier. Those closest to the star are the most recent. Tracing these ejections allows researchers to look into the history of the system.

Observations taken with NIRCam also reveal extremely fine rays of light around the planetary nebula. Starlight from the central stars streams out where there are holes in the gas and dust – like sunlight through gaps in a cloud.

(Source: nasa.gov)

Dinosaur Asteroid Might Not Have Arrived Alone

The asteroid that wiped out the dinosaurs 66 million years ago might not have been alone. In the August 17th Science Advances, scientists report the discovery of what appears to be the scar of a smaller impact that occurred at roughly the same time.

Evidence suggests an extraterrestrial intruder caused the big extinction event at the boundary between the Cretaceous and the Paleogene geological periods (see Sky & Telescope's October 2021 issue). In particular, the cosmic catastrophe left Chicxulub impact crater, 180 kilometers (110 miles) wide, under the current coastline of the Yucatán peninsula in Mexico. The impactor itself was some 12 kilometers wide.

A team led by Uisdean Nicholson (Heriot-Watt University, Edinburgh) now says that a smaller crater in the eastern Atlantic Ocean has approximately the same age as Chicxulub, suggesting that the two impacts may have been related.

The Nadir crater (named after a nearby seamount) is about 9 kilometers across and lies some 350 kilometers out of the coast of the African countries Guinea and Guinea Bissau. It's buried beneath a few hundred meters of sediment, but the characteristic circular structure, raised rim, and central peak show up in seismic measurements.

From the location of the crater with respect to the various geological layers, the authors conclude that it is 66 million years old, although there's an uncertainty of at least 500,000 years in the age estimate.

(Source: skyandtelescope.org)

PUNCH Mission to Launch in 2025; Will Study the Sun



The PUNCH mission will image coronal mass ejections, such as this Aug. 31, 2012, event. The Earth is shown to scale, whereas its distance is not. Credit: NASA Goddard Space Flight

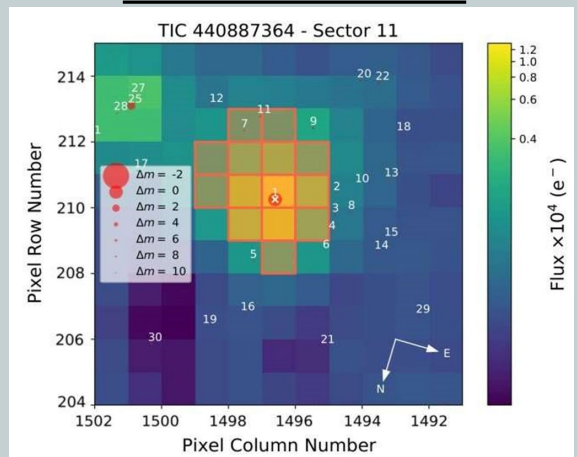
More than 60 engineers and scientists are gathering at Southwest Research Institute to kick off the launch vehicle collaboration for NASA's Polarimeter to Unify the Corona and Heliosphere (PUNCH) mission. PUNCH, which will study the inception of the solar wind, has secured its ride into Earth orbit aboard a SpaceX Falcon 9.

PUNCH, which consists of four suitcase-sized satellites, will study the sun's outer atmosphere, the corona, and how it generates the solar wind. The spacecraft also will track coronal mass ejections—large eruptions of solar material that can drive large space weather events near Earth—to better understand their evolution and develop new techniques for predicting such eruptions.

Following launch, the PUNCH satellites will spread out around Earth along the day-night line to create a continuous, complete view of the sun's corona and the inner solar system. Three of the PUNCH satellites will carry identical Wide Field Imagers, which cover a significant portion of the sky around the sun. The fourth PUNCH satellite carries a Narrow Field Imager coronagraph, which will study regions closest to the sun.

(Source: phys.org)

Two Planets Orbiting Nearby Star Discovered With TESS



Target Pixel File (TPF) from TESS centered on TOI-836 from the Gaia catalog. Credit: Hawthorn et al., 2022.

Using the Transiting Exoplanet Survey Satellite (TESS), an international team of astronomers has discovered two new exoplanets orbiting a nearby star known as TOI-836. The newfound alien worlds were classified as a super-Earth and a mini-Neptune.

TESS is conducting a survey of about 200,000 of the brightest stars near the sun with the aim of searching for transiting exoplanets. So far, it has identified over 5,800 candidate exoplanets (TESS Objects of Interest, or TOI), of which 233 have been confirmed so far.

The host TOI-836 is a 5.4-billion-year-old K-dwarf about 33 percent smaller and less massive than the sun. It has an effective temperature of about 4,552 K and its metallicity is estimated to be -0.284.

(Source: phys.org)

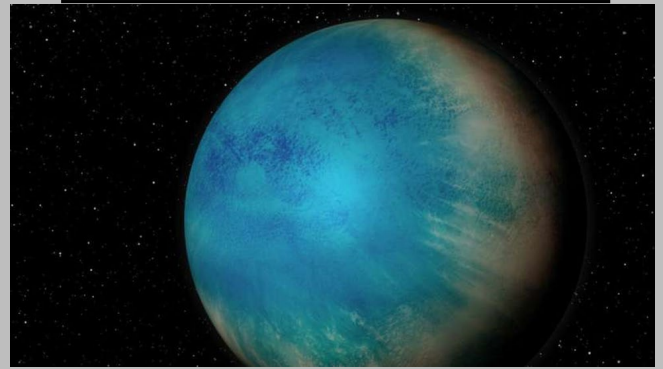
WHAT'S UP(COMING)!

Sep 1 – [Aurigid meteor shower 2022](#)
Sep 7 – [Asteroid 3 Juno at opposition](#)
Sep 9 – [September \$\epsilon\$ -Perseid meteor shower 2022](#)
Sep 10 – Full Moon
Sep 16 – [Neptune at opposition](#)
Sep 22 – September equinox
Sep 25 – New Moon
Sep 26 – [Jupiter at opposition](#)
Oct 1 – [M110 is well placed](#)
Oct 2 – [M32 is well placed](#)
– [M31 is well placed](#)
Oct 6 – [October Camelopardalid meteor shower 2022](#)
Oct 8 – [Mercury at greatest elongation west](#)
Oct 9 – [Draconid meteor shower 2022](#)
– Full Moon
Oct 10 – [Southern Taurid meteor shower 2022](#)
Oct 11 – [\$\delta\$ -Aurigid meteor shower 2022](#)
– [Lunar occultation of Uranus](#)
Oct 15 – [M33 is well placed](#)
Oct 17 – [136199 Eris at opposition](#)
Oct 18 – [\$\epsilon\$ -Geminid meteor shower 2022](#)
Oct 21 – [Orionid meteor shower 2022](#)
Oct 24 – [Leonis Minorid meteor shower 2022](#)
Oct 25 – New Moon
Oct 26 – [NGC 869 is well placed](#)
Oct 27 – [NGC 884 is well placed](#)
Nov 8 – [Total lunar eclipse](#)
– Full Moon
Nov 9 – [Uranus at opposition](#)
Nov 12 – [Asteroid 27 Euterpe at opposition](#)
– [Northern Taurid meteor shower 2022](#)
Nov 17 – [Leonid meteor shower 2022](#)
Nov 18 – [M45 is well placed](#)
Nov 19 – [Asteroid 115 Thyra at opposition](#)
Nov 21 – [\$\alpha\$ -Monocerotid meteor shower 2022](#)
Nov 22 – [Asteroid 324 Bamberga at opposition](#)
Nov 23 – New Moon
Nov 24 – [118P/Shoemaker-Levy at perihelion](#)
Nov 28 – [November Orionid meteor shower 2022](#)
Nov 29 – [Asteroid 30 Urania at opposition](#)

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An Extrasolar World Covered In Water?



Artistic rendition of the exoplanet TOI-1452 b, a small planet that may be entirely covered in a deep ocean. Credit: Benoit Gougeon, Université de Montréal

An international team of researchers led by Charles Cadieux, a Ph.D. student and member of the Institute for Research on Exoplanets (iREx), has announced the discovery of TOI-1452 b, an exoplanet orbiting one of two small stars in a binary system located in the Draco constellation about 100 light-years from Earth.

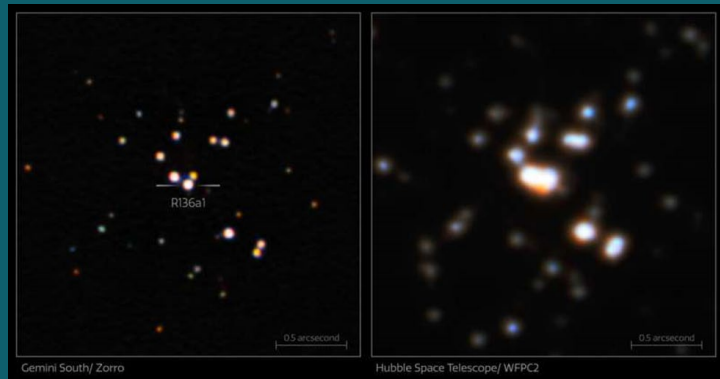
The exoplanet is slightly greater in size and mass than Earth and is located at a distance from its star where its temperature would be neither too hot nor too cold for liquid water to exist on its surface. The astronomers believe it could be an "ocean planet," a planet completely covered by a thick layer of water, similar to some of Jupiter's and Saturn's moons.

In an article published in The Astronomical Journal, Cadieux and his team describe the observations that elucidated the nature and characteristics of this unique exoplanet.

"TOI-1452 b is one of the best candidates for an ocean planet that we have found to date," said Cadieux. "Its radius and mass suggest a much lower density than what one would expect for a planet that is basically made up of metal and rock, like Earth."

(Source: phys.org)

Sharpest Image of Universe's Most Massive Known Star



This comparison image shows the exceptional sharpness and clarity of the Zorro imager on the 8.1-meter Gemini South telescope in Chile (left) when compared to an earlier image taken with the Hubble Space Telescope (right). Credit: International Gemini Observatory/NOIRLab/NSF/AURA
Acknowledgment: Image processing: T. A. Rector (University of Alaska Anchorage/NSF's NOIRLab), M. Zamani (NSF's NOIRLab) & D. de Martin (NSF's NOIRLab); NASA/ESA Hubble Space Telescope

By harnessing the capabilities of the 8.1-meter Gemini South telescope in Chile, which is part of the International Gemini Observatory operated by NSF's NOIRLab, astronomers have obtained the sharpest image ever of the star R136a1, the most massive known star in the universe. Their research, led by NOIRLab astronomer Venu M. Kalari, challenges our understanding of the most massive stars and suggests that they may not be as massive as previously thought.

Previous observations suggested that R136a1 had a mass somewhere between 250 to 320 times the mass of the sun. The new Zorro observations, however, indicate that this giant star may be only 170 to 230 times the mass of the sun. Even with this lower estimate, R136a1 still qualifies as the most massive known star.

"We began this work as an exploratory observation to see how well Zorro could observe this type of object," said Kalari. "While we urge caution when interpreting our results, our observations indicate that the most massive stars may not be as massive as once thought."

(Source: phys.org)