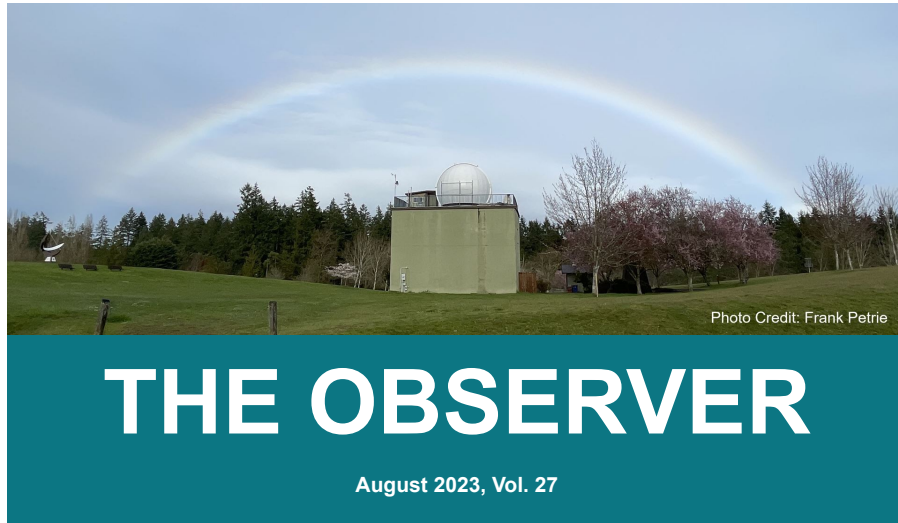


Igniting a passion for science through the lens of astronomy!



John Rudolph Planetarium Dome - Thank You!

Thank you to everyone who donated to the new John Rudolph Planetarium Dome Fund! Donations totaling \$11,500 were received through the Bainbridge Community Foundation Community Grant campaign, and additional gifts were received through Kitsap Great Give as well as directly to BPAA. This successful fundraiser follows last year's campaign that enabled us to purchase the new planetarium projector.

We have placed the order for the new "negative pressure" dome, which works similarly to an inflatable dome but in reverse: a fan pulls the dome fabric into a perfectly hemispherical shape, without the distortions caused by the seams and attachment points of our current dome. It will be a vast improvement to the planetarium experience!

When the new dome arrives in a month or so, we will organize a work party to assemble and install it. Contact Board member Peter Moseley (pmose464@bpastro.org) or Frank Petrie (president@bpastro.org) to volunteer to help "Raise the Dome!"

Special thanks to BCF for facilitating fundraising for the planetarium dome and projector.



More Planetarium News

The BPAA Board of Directors is pleased to announce that long-time member Erin Howard has volunteered to manage the Rudolph Planetarium. In this role Erin will recruit and train volunteers to operate the Planetarium, develop planetarium programming, and create a regular schedule of frequent planetarium shows. Erin is a research assistant at the University of Washington Astronomy Department and is currently on a work-related visit to the soon-to-go-online Vera Rubin Observatory in Chile. Previously, Erin worked at Digitalis Education, the maker of our planetarium projector. If you'd like to volunteer to learn to operate the planetarium, contact Erin at planetarium@bpastro.org. Welcome, Erin!

Ritchie Telescope News

Chief Astronomer Cole Rees has been hard at work upgrading the Ritchie Telescope and making facility improvements to support the telescope's new imaging capabilities. Recognizing his hard work as a volunteer for more than a year, the Board of Directors is pleased to announce his change in status: as of July 24 Cole is now a paid contractor responsible for completing specific tasks related to the telescope and facility. His appointment is for an initial period of three months, at which time the Board will consider possible extension. To avoid any perception of conflict of interest, Cole is resigning from the Board. Please join us in thanking Cole for his many efforts on behalf of BPAA, and welcoming him to his new role.

Telescope Tuesdays

As reported last month, a dedicated group of volunteers continues to work on facility and telescope improvements. Chuck Wraith, Dan Schlesener, Allen Lang, Peter Moseley, Bob Mathisrud, Joe Mulligan, Frank Petrie, and Cole Rees have been building out the new server room and workshop on the 2nd floor. This past weekend they were painting walls! They are also implementing the capability to open and close the telescope dome shutter remotely. Soon the Ritchie Telescope will be able to be operated entirely remotely, from opening the dome, slewing to targets, initiating imaging sequences, storing the data, and closing up when complete!

There is much more to do! If you have particular skills, and even if you don't, volunteer to join in the fun and sense of accomplishment. Contact Frank Petrie at president@bpastro.org to volunteer.

Join Our Next Cosmic Conversation!

Cosmic Conversations is a monthly activity hosted by Peter Moseley at the Ritchie Observatory on the 3rd Tuesday of the month from 7:00 to 8:30pm.

Next meeting August 15, 2023 7:00 PM

The topic for the next meeting will be:

“What's new with JWST?”

For example:

<https://www.space.com/news/live/james-webb-space-telescope-updates>

But come with your own info and questions

Host- Peter Moseley

pmose268@gmail.com

We would appreciate knowing if you are coming, but feel free to just show up.

Hurricane Ridge Star Parties

Despite the loss of the Day Lodge and the vehicle limits in place, Hurricane Ridge IS hosting star parties throughout the summer! BPAA member and “Dark Ranger” John Goar leads the public telescope programs at Olympic National Park. A certified Master Observer by the Astronomical League, John has led telescope programs at Hurricane Ridge since 2010. In a recent email, John indicated that “people attending the astronomy programs are exempt” from the 345-vehicle limit, “and are allowed to go up.” Of the 16 July programs scheduled, 14 were held with clear skies. Please visit www.olympictelelescope.com for information and schedules on the programs.

Volunteers Needed!

Here are some great opportunities to get involved with BPAA outreach. Contact BPAA President Frank Petrie to volunteer: President@BPAAstro.org.

- **Wednesdays in August: Concerts in the Park, 6-9pm**, need at least 3 additional people to greet visitors and show them around the Observatory
 - **Fridays in August: Movies in the Park, 8:30-midnight**, need at least 3 additional people to greet visitors and operate telescopes for stargazing. We will train folks who would like to learn how to do this.
 - **Monday-Thursday, July 31-August 3, 9:30am-3pm: KiDiMu Science Camp at the Observatory**, need 1 or 2 people each day to assist with planetarium shows and other kid-friendly activities.
 - **Thursday August 10, 3-5pm: Girl Scouts Day Camp at Fay Bainbridge Park**, need 2 or 3 people to help with solar telescopes and other astronomy-themed activities (ideas welcome)
 - **Thursday August 10, 8-11pm: Girl Scouts Star Party at Fay Bainbridge Park**, need 2 or 3 people to operate telescopes and talk to girls about astronomy.
 - **Saturday August 12, 10am-2pm: JWST Anniversary event at the Observatory, in collaboration with KiDiMu**, need 4-5 people to interact with visitors (kids and adults). Short planetarium shows, solar telescope, other astronomy-themed outside activities. I would also welcome help in planning this event.
 - **Saturday August 12, 6pm-whenever: 2nd Saturday Program**, need 3-5 people to check-in registered attendees, manage non-registered walk-in attendees, set up and operate telescopes for star party after the program ends.
 - **Docents at the Dome - Every Saturday and Sunday 1-3pm**, need volunteer(s) to greet visitors who are curious about what goes on in the Observatory.
-

M27- Dumbbell Nebula



Image captured by Brian Puhl and Cole Rees, processed by Brian Puhl.

This planetary nebula is a cosmic ghost, depicting the eventual demise of our own solar system many millions of years from now. At the core of the planetary nebula is a white dwarf excreting gasses, causing the shape of the cloud around it. This object was discovered in 1764 by Charles messier. It was the first planetary nebula ever discovered. It is 1360 light years (+/- 20 LY) away. It is in the constellation Vulpecula.

NGC 5905



Image credit: Brian Puhl

"NGC 5905 from the Ritchie. Approximately 9 hours of exposure. Doing a little research on some of the tiny little redshifted galaxies in the background... I've already found some that are 5 billion light years away, mag 40 galaxies. I suspect some of these dim ones might double that."

WHAT'S UP(COMING)!

Source for events and links are In-The-Sky.org, Dominic Ford, Editor. The links provide details for each event including a scale on how difficult they are to observe.

[Aug_1](#) – Full Moon

[Aug_9](#) – [Mercury at dichotomy](#)

– [Close approach of the Moon and M45](#)

[Aug_10](#) – [Asteroid 10 Hygiea at opposition](#)

[Aug_13](#) – [Perseid meteor shower 2023 peak](#)

[Aug_14](#) – [Messier 15 is well placed](#)

[Aug_15](#) – [Messier 2 is well placed](#)

[Aug_16](#) – New Moon

[Aug_18](#) – [\$\kappa\$ -Cygnid meteor shower 2023 peak](#)

[Aug_26](#) – [Asteroid 8 Flora at opposition](#)

[Aug_27](#) – [Saturn at opposition](#)

[Aug_28](#) – [Uranus enters retrograde motion](#)

[Aug_30](#) – [Blue Moon](#)

– Full Moon

[Sep_1](#) – [Aurigid meteor shower 2023 peak](#)

[Sep_4](#) – [Conjunction of the Moon and Jupiter](#)

[Sep_9](#) – [September \$\epsilon\$ -Perseid meteor shower 2023 peak](#)

[Sep_14](#) – New Moon

[Sep_18](#) – [Venus at greatest brightness](#)

[Sep_19](#) – [Neptune at opposition](#)

[Sep_22](#) – [September equinox](#)

[Sep_23](#) – [Mercury at highest altitude in morning sky](#)

[Sep_28](#) – [Daytime Sextantid meteor shower 2023](#)

[Sep_29](#) – Full Moon

[Oct_1](#) – [Asteroid 29 Amphitrite at opposition](#)

[Oct_2](#) – [The Andromeda Galaxy is well placed](#)

– [Close approach of the Moon and M45](#)

[Oct_3](#) – [October Camelopardalid meteor shower peak](#)

[Oct_9](#) – [Draconid meteor shower peak](#)

[Oct_10](#) – [Southern Taurid meteor shower peak](#)

[Oct_11](#) – [\$\delta\$ -Aurigid meteor shower peak](#)

[Oct_14](#) – New Moon

– [Annular solar eclipse](#)

[Oct_15](#) – [The Triangulum Galaxy is well placed](#)

[Oct_18](#) – [Venus at highest altitude in morning sky](#)

– [136199 Eris at opposition](#)

[Oct_22](#) – [Orionid meteor shower peak](#)

– [Venus at dichotomy](#)

[Oct_25](#) – [Leonis Minorid meteor shower peak](#)

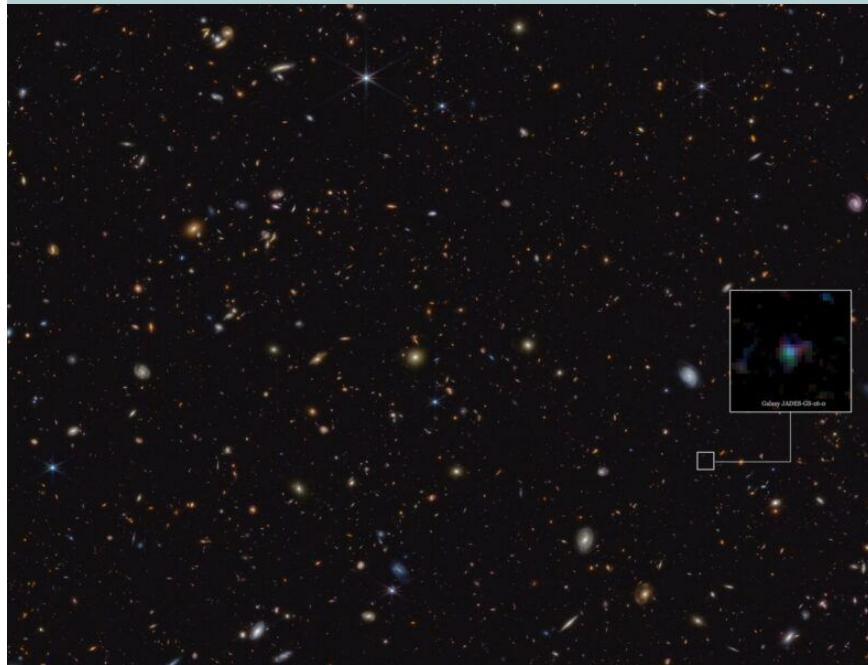
[Oct 27 – The Perseus Double Cluster is well placed](#)

[Oct 28 – Full Moon](#)

[Oct 30 – Close approach of the Moon and M45](#)

Here are some interesting things going on in Astronomy. If they pique your curiosity, please follow the link at the bottom of each for the full article!

Another Early-Universe Mystery: JWST Spies Dust at Cosmic Dawn



This image highlights the location of a galaxy, JADES-GS-z6, in an area of sky observed as part of the JWST Advanced Deep Extragalactic Survey (JADES). This early galaxy is already rich in carbon-based dust.
Credit: NASA / ESA / CSA / Webb / B. Robertson (UC Santa Cruz) / B. Johnson (Center for Astrophysics, Harvard & Smithsonian) / S. Tacchella (University of Cambridge, M. Rieke (Univ. of Arizona), D. Eisenstein (Center for Astrophysics, Harvard & Smithsonian) / A. Pagan (STScI)

The primary mission of the James Webb Space Telescope (JWST) is to find the first galaxies. We've seen very little of the first few hundred million years after the Big Bang, but scientists have a lot of theories about how those first generations of stars lived and died.

Now, using JWST, an international team led by Joris Witstok (University of Cambridge, UK) has found a mysterious amount of dust in a number of distant galaxies from this early epoch. The results of their study, published in *Nature*, could pose some problems for some stellar evolution and dust formation theories.

(Source: [skyandtelescope.org](https://www.skyandtelescope.org))

Who Discovered Dark Matter: Fritz Zwicky Or Vera Rubin?



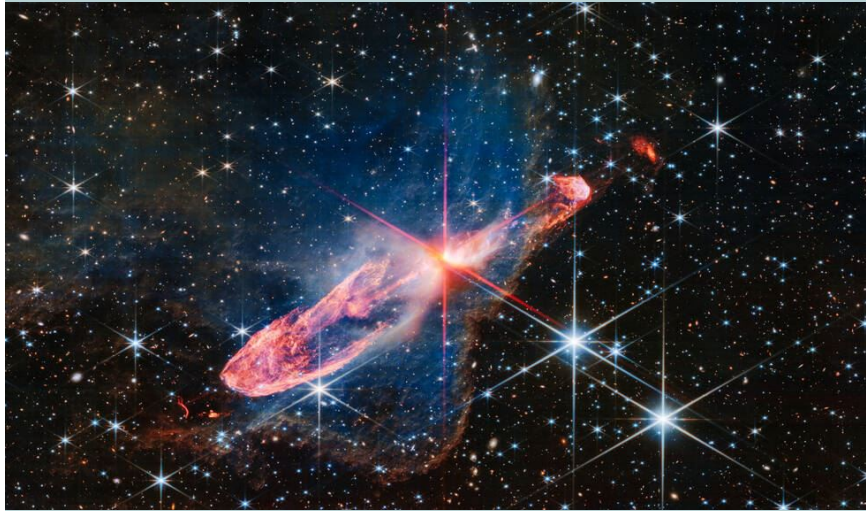
According to models and simulations, all galaxies should be embedded in dark matter haloes, whose densities peak at the galactic centers. On long enough timescales, of perhaps a billion years, a single dark matter particle from the outskirts of the halo will complete one orbit. The idea of dark matter has been with us for nearly a century, although not everyone remembers that fact. Credit: NASA, ESA, and T. Brown and J. Tumlinson (STScI)

Back in the 1930s, Fritz Zwicky postulated the existence of dark matter. No one took it seriously until Vera Rubin's work: 40 years later.

- Dark matter, today, is an invisible, massive type of matter that gravitates, but doesn't interact with any known particle through any of the other main forces.
- Although the gravitational evidence for dark matter is overwhelming, it grew out of observations made by two different legendary astronomers: Fritz Zwicky and Vera Rubin.
- While Rubin, posthumously, is finally being rightfully recognized for her pioneering work, Zwicky was first, and did his equally amazing work way back in the 1930s. Learn about them both!

(Source: [Big Think](#))

Webb Snaps Highly Detailed Infrared Image of Actively Forming Stars



NASA's James Webb Space Telescope has captured a tightly bound pair of actively forming stars, known as Herbig-Haro 46/47, in high-resolution near-infrared light. Look for them at the center of the red diffraction spikes, appearing as an orange-white splotch. Herbig-Haro 46/47 is an important object to study because it is relatively young – only a few thousand years old. Star systems take millions of years to fully form. Targets like this give researchers insight into how much mass stars gather over time, potentially allowing them to model how our own Sun, which is a low-mass star, formed – along with its planetary system. Credits: Image: NASA, ESA, CSA. Image Processing: Joseph DePasquale (STScI)

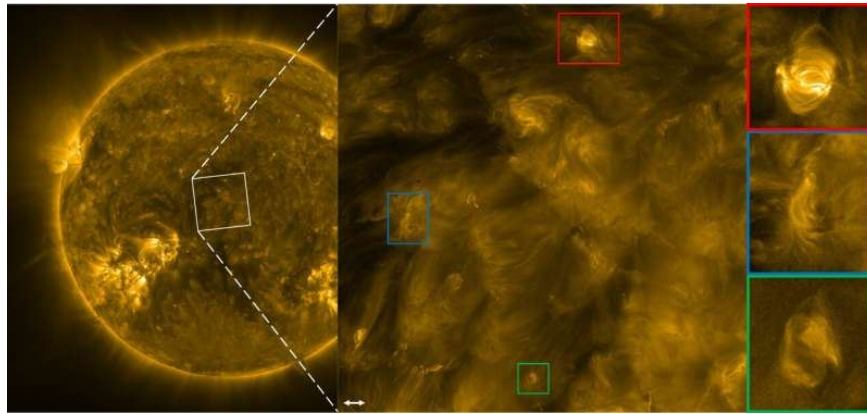
Young stars are rambunctious!

NASA's James Webb Space Telescope has captured the “antics” of a pair of actively forming young stars, known as Herbig-Haro 46/47, in high-resolution near-infrared light. To find them, trace the bright pink and red diffraction spikes until you hit the center: The stars are within the orange-white splotch. They are buried deeply in a disk of gas and dust that feeds their growth as they continue to gain mass. The disk is not visible, but its shadow can be seen in the two dark, conical regions surrounding the central stars.

The most striking details are the two-sided lobes that fan out from the actively forming central stars, represented in fiery orange. Much of this material was shot out from those stars as they repeatedly ingest and eject the gas and dust that immediately surround them over thousands of years.

(Source: [NASA](#))

Astronomers Find High-Frequency Magnetic Waves May Play Essential Role in Coronal Heating



Full sun observation taken on October 12, 2022 by EUI's Full sun Imager (FSI) and a zoom on the center of the sun taken by its High-Resolution Imager (HRI). The white arrow corresponds to a distance of about 10,000 km. Three smaller structures highlighted with red, blue, and green boxes, show magnetic waves that appear as a transverse motion. Credit: Solar Orbiter/EUI Team.

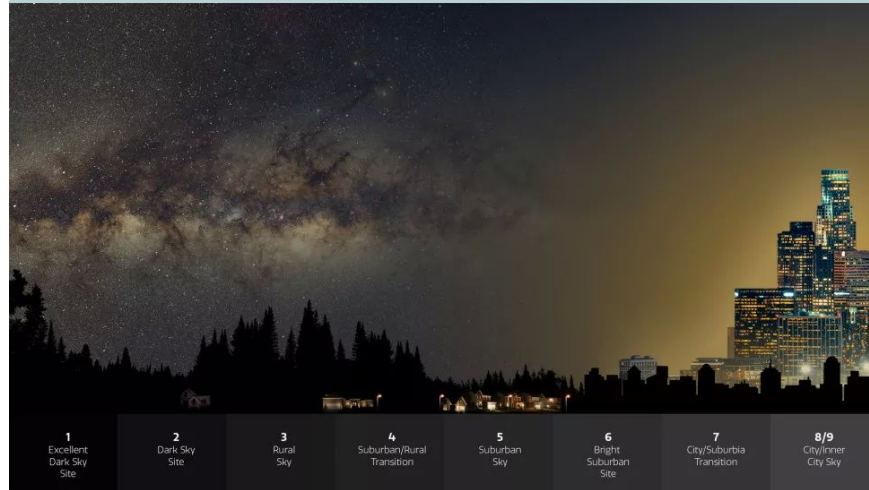
A joint scientific team led by the Royal Observatory of Belgium (ROB) and the KU Leuven has found that high-frequency magnetic waves could play an essential role in keeping the sun's atmosphere at millions of degrees. This finding sheds a new light on the most intriguing solar mystery: what makes the sun's atmosphere hotter than its surface?

This new insight has been developed from observations by the Extreme Ultraviolet Imager (EUI) telescope onboard Solar Orbiter, a spacecraft of the European Space Agency ESA, that is currently observing the sun from behind.

The scientific team performed a meta-analysis, which is a statistical method of using multiple scientific studies to derive common unknown truths. Dr. Daye Lim, lead author, concluded that high-frequency waves give a more significant contribution to the total heating generated by waves than low-frequency waves.

(Source: phys.org)

Light Pollution Poses Serious Threat to Astronomy, Skywatching And More, Study Says



Light pollution is worsening globally, erasing stars from the night sky in many locations. (Image credit: NOIRLab/NSF/AURA, P. Marenfeld)

Astronomers are once again ringing alarm bells about rising light pollution destroying pristine night skies. This time, though, their worries extend beyond their core discipline.

With eyes on the sky, astronomers have long voiced concerns about increasing yet mostly unregulated [artificial urban lighting](#) and satellite megaconstellations such as SpaceX's [Starlink](#) impacting valuable observations of deep-space objects by ground-based observatories, which are considered the real workhorses of space science and are more severely impacted by light pollution than their space-based counterparts.

Now, a study published on June 15 provides a comprehensive summary of the harmful effects of light pollution and paints a rather grim picture of the future for professional and amateur astronomers.

(Source: [Space.com](#))

A Jekyll-Hyde White Dwarf



Artist's illustration of Janus, a two-faced, blue-hot cinder of a star that appears to have one side covered in hydrogen and the other in helium. This white dwarf lies about 1,300 light-years away in the constellation Cygnus, the Swan. K. Miller / Caltech / IPAC

Astronomers have found a bizarre, two-faced white dwarf: one side hydrogen, the other helium.

White dwarfs are the dense embers left behind when Sun-like stars die. They shove a Sun's worth of mass into a sphere the size of Earth, giving them surface gravities some 100,000 times that of our world. As a result, the atoms in these erstwhile stellar cores separate by mass — the heavier stuff sinks, and the lighter stuff rises.

Since hydrogen is the lightest element, it winds up on top. Helium comes next. But sometimes when a white dwarf cools down from its initial blaze (more than 100,000 Kelvin) to a slightly less startling 50,000K, convection in the helium layer begins to dilute the overlying hydrogen. Eventually helium conquers, and the white dwarf continues its slow chill-out wrapped in a helium blanket.

Astronomers have seen a handful of white dwarfs that appear to have varying levels of helium across their surfaces, presumably because they're in the midst of this hydrogen-to-helium transition. The newfound ZTF J2033 may be an extreme example.

(Source: skyandtelescope.org)

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