Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

January 2026 ***Volume 84, Issue 5***

Celebrating 89 Years of Astronomy

Next Meeting

When: Sat. Jan. 10th, 2026

Time: 7:30 pm

Speakers: Dharma Prasad Agrahar

Where: Online (Zoom)
See instructions for joining the meeting via Zoom on Page 9.

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Image Credit – NASA, ESA, CSA, STScI, Andrew Levan (Radboud University); Image Processing: Alyssa Pagan (STScI)

JWST imaged the earliest supernova seen so far, taking place approximately 700 million years after the Universe began. More information about the image is available at science.nasa.gov/asset/webb/grb-250314a-pull-out-nircam-image/.

Please note that the January Meeting will be online only.

Spectroheliography – Imaging the Sun

Dharma Prasad Agrahar – National Capital Astronomers

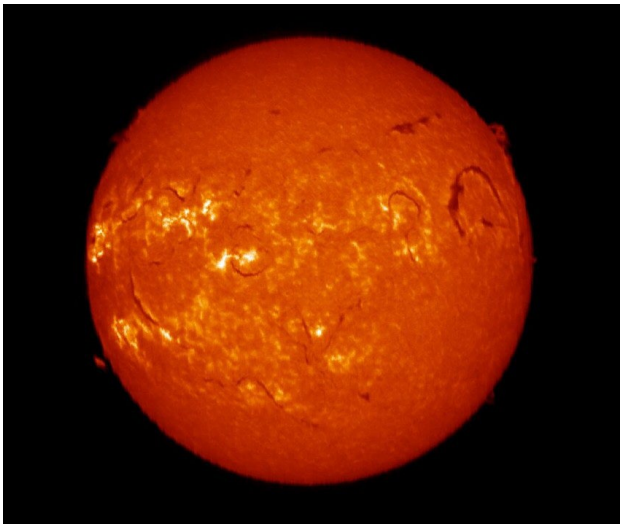

Image Credit – Darma Prasad Agrahar

An SHG - spectroheliograph - is an optical instrument or a device that is used to analyze individual wavelengths of sunlight. The spectroheliograph, in combination with a typical amateur grade refractor telescope and a modern planetary digital camera that supports captures at very high fps (frames per second), mounted on an equatorial telescope mount is used to scan the sun. The spectroheliograph splits the sunlight or the radiation from the sun into individual wavelength of our choice, which is captured in the form of a 16-bit video. The individual frames of the video are then assembled together to create the image of the sun at that specific wavelength. My spectroheliograph is a DIY unit. I built it using two old screw-mount Pentax camera lenses that I bought on ebay, a 50x50mm holographic reflective grating and an 8µm quartz slit, placed inside a 3D-printed housing that is sealed from entry of stray light. My presentation will cover a brief history of spectroheliographs, some theory behind it, how I built my device, how to align it and how to generate the images of the sun at different wavelengths including Hydrogen-α, Hydrogen-β, Sodium-D1 & D2, Helium-D3, Calcium-H, Calcium-K and more.

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Recent Astronomy Highlights

Supermassive-Black-Hole X-ray Flare Created Ultra-Fast Winds

Image Credit - ESA/Hubble & NASA, M. C. Bentz, D. J. V. Rosario

At the center of the spiral galaxy designated NGC 3783 (shown above) lies a supermassive black hole with a mass approximately 30 million times that of our Sun. Recently astronomers observed a short-duration X-ray flare coming from the region surrounding the black hole. Incredibly, the winds created by the flare reached approximately 60,000 kilometers per second, or one-fifth of the speed of light. The X-ray flare seems to have been caused by the realignment of the magnetic field in the region surrounding the black hole. More information on the discovery is available at phys.org/news/2025-12-flaring-black-hole-ultra-fast.html.

JWST Reveals Ancient Milky-Way Twin

A twin of the Milky Way that already existed 1.5 billion years after the Big Bang is calling into question current theories of galactic formation. Named Alaknanda by the Indian astronomers that discovered it, the grand-design spiral galaxy has a central bulge, spiral arms, and star-forming regions along those spiral arms. Such a mature well-organized galaxy was previously believed by asronomers to take billions more years to form. More information on the discovery can be found at www.jameswebbdiscovery.com/discoveries/indian-scientists-discover-alaknanda-with-jwst-2025.

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Abstract and Biography – continued from page 1

Biography: I am a retired individual with engineering background, after a long career in the elevator and escalator business, I have been keeping busy by spending my retirement time in amateur astronomy. I have been a member of NCA for maybe, 16 years or so. I built my 8-inch f/6.3 Newtonian-Dobsonian under the expert guidance of Guy Brandenburg, that included making a Crayford focuser at the telescope workshop at the CCCC. My Newt-Dob won the 2nd place for its optical performance at Stellafane in 2015. See stellafane.org/convention/2015/2015-scopes.html for the listing and photos.

I got interested in solar observation in 2017, soon after the Great American Solar Eclipse. After a few years of visual observing with different white light filters, a Herschel wedge and then an Etalon-based Hα telescope, I progressed into imaging the Sun. In 2023, the use of a spectroheliograph for solar imaging caught my attention. I began studying it. As an active ATMer*, I love making or building my equipment. I tried making one based on a French design that uses entirely 3D printed parts with limited success. Finally, this led me to my current DIY spectroheliograph. Today, I run my DIY spectroheliograph on a DIY "harmonic drive mount" that I have built on which the refractor and the spectroheliograph are mounted.

* Amateur Telescope Maker

Schedule of Upcoming NCA Meetings and Speakers

Bryan Vandrovec and Carl Biagetti

Jan. 10, 2026 – Dharma Prasad Asgrahar (National Capital Astronomers) *Spectroheliography – Imaging the Sun*

Feb. 14, 2026 -- Frank Summers (Space Telescope Science Institute)

Exploring the Sky

The Exploring the Sky program will take a hiatus until April of 2026.

Exploring the Sky is a joint program between the National Capital Astronomers and the National Park Service Rock Creek Park Nature Center and has been run since 1948 at this location, the field at the corner of Glover and Military Roads in the District. There is an adjacent parking lot. It is free and all are welcome who have an interest in observing the heavens. It's not an ideal dark-sky location but we can see Solar System objects, open and globular clusters and maybe a fuzzy galaxy or two.

More information can be found at NCA's web site, www.capitalastronomers.org or the Rock Creek Park web site, www.nps.gov/rocr/planyourvisit/expsky .htm. You can also call the Nature Center at (202) 895-6070. For general information on local astronomical events visit www.astronomyindc.org.

The submission deadline for February's Star Dust is January 30th.

Clear Skies!

President's Corner

Guy Brandenburg

The Past Century or So

Happy New Year! I sincerely hope that 2026 will be better for science, astronomy, and ordinary people than 2025!

But actually, 2025 had some good points, despite what you may think about our current political situation, especially in comparison with 1925.

Compared to the horrible living and working conditions in American farms, factories, and mines a century ago, most of us today (except for certain immigrants) have a pretty cushy life. Indoor plumbing, sewage treatment, clean water, better nutrition, HVAC, fluoride, vitamins, toothbrushes, and vaccines, along with high-tech, high-precision medicine, have made American life expectancies rise from about 47 in 1901 for men to about 79 today and 48 in 1901 for women to 81 today, which is a huge difference! Pellagra – a vitamin B deficiency – no longer kills hundreds of thousands of poor residents of the Deep South, as it did until the 1940s. Scientific groups like NCA no longer have explicitly racist membership clauses, as this group did, right up until about 1969.*

In the fields of astronomy and physics, the past century or so saw amazing advances. In that time, astronomers and others figured out ….

- That the universe is mostly hydrogen
- The size of the Milky Way
- The distances to almost everything out there
- The likely starting date of the Big Bang
- How to study the universe over the entire electromagnetic spectrum, not just in visible light (ROYGBIV)
- How atoms, molecules, and stars work
- That stars enrich their neighborhoods with elements beyond helium when they die
- That we are literally made of star dust
- That we can only detect a small fraction of the stuff that makes up the universe and have no idea what the rest of it is
- How to send robots to take close-up images of all of the planets and other objects in our solar system
- How to send some people to the Moon and get back safely
- That most stars appear to be born alongside a bunch of planets and moons (a large fraction of which get flung into interstellar space)
- Theories of relativity and quantum dynamics
- How to connect all of us, all of the time, via small electronic devices that employ the Theory of Relativity to enable us to find our way without any paper maps

* I can, of course, think of lots of things to complain about, but this column is much too long already.

Sky Watchers

January/February

Mercury rises shortly before the Sun and will be very low to the horizon throughout the period. Venus will be extremely low in the evening sky, probably not very viewable until late January into February. Mars transits to the morning sky, but will also likely be unviewable. Jupiter rises shortly after sunset and will be viewable for much of the night. Saturn will be high in the evening sky, setting well before midnight.	
2/1	Full Moon and Supermoon – 5:04 a.m.

Time is in EST (Eastern Standard Time)

President's Corner – continued from page 3

(This is not to mention the astounding advances in our understanding of, and ability to manipulate, the molecules of life!)

It's also amazing that for well under fifty grand, you can purchase a brand-new, state-of-the-art rig for astro-imaging, and have it shipped to and set up at a location in western Texas that houses over a thousand other such rigs, in perfect safety, with 220 clear nights per year. You can decide objects you want it to photograph, and it will carry out your instructions while you sleep, all night long, so that you can do the photo processing whenever you want – and produce amazing photos that are much better than those from any ground-based telescope of 30 years ago.

Telescopes to Lend

Members-only benefit for joining NCA: an array of telescopes you can borrow and, if you want, purchase and keep. We need additional custodians for these devices. Email me directly at gfbrandenburg@yahoo.com if you are interested.

1. 60 mm refractor with tripod, wooden case, etc. from Tasco
2. 4.6", f/10 refractor from Celestron with tripod
3. 115mm f/3.6 StarSense Jones-Bird Newtonian with tripod, etc.
4. 6" Hardin Deep Space Hunter f/8 Dob-Newt
5. 8" f/8 home-made Dob-Newt (by Jack Booth)
6. 8" f/6 home-made Dob Newt (by Gordon Banks)
7. 8" f/5 Celestron computerized Newtonian with tripod, hand paddle, etc.
8. 8" f/10 SCT with fork, tripod, motor drive, wooden case, etc.
9. 12" f/5 Meade Dob – Newt (manual)

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Recent Astronomy Highlights – continued from page 2

Not an Exoplanet, But A Likely Planetesimal Smashup

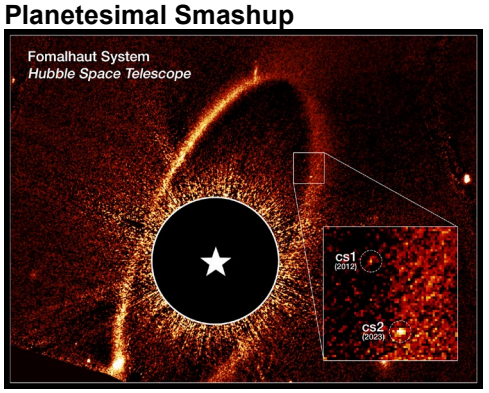

Image Credits – NASA, ESA, Paul Kalas (UC Berkeley)

A bright spot in older images of the dust belts around the star Fomalhaut, was designated as a likely exoplanet candidate and given the label Fomalhaut b. But more recent images have shown that the candidate has faded away and is now presumed to be an expanding cloud of dust created possibly by the collision of two planetesimals. That expanding cloud has now been labeled as Fomalhaut cs1. Surprisingly, another such bright spot, labeled Fomalhaut cs2, has appeared in recent pictures. Unless there is an unusual circumstance, it seems to indicate that planetesimal collisions are far more common than previously believed possible, at least within the Fomalhaut system. Further study may help increase our knowledge of the processes that go into planetary formation. More information is available at phys.org/news/2025-12-hubble-captures-rare-collision-nearby.html#goog_rewarded .

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Occultation Notes

- D following the time denotes a disappearance, while R indicates that the event is a reappearance.
- The times are for Greenbelt, MD, and will be good to within +/-1 min. for other locations in the Washington-Baltimore metropolitan areas unless the cusp angle (CA) is less than 30 deg., in which case, it might be as much as 5 minutes different for other locations across the region.
- Some stars in Flamsteed's catalog are in the wrong constellation, according to the official IAU constellation boundaries that were established well after Flamsteed's catalog was published. In these cases, Flamsteed's constellation is in parentheses and the actual constellation is given in the notes following a /.
- Mag is the star's magnitude.
- % is the percent of the Moon's visible disk that is sunlit, followed by a + indicating that the Moon is waxing and - showing that it is waning. So 0 is new moon, 50+ is first quarter, 100+ or - is full moon, and 50- is last quarter. The Moon is crescent if % is less than 50 and is gibbous if it is more than 50. E indicates a lunar eclipse is in progress, and the value is the percent of the Moon's disk that is NOT in the umbra. So 0E means during the total phase.
- Cusp Angle is described more fully at the main IOTA Web site.
- Sp. is the star's spectral type (color), O,B,blue; A,F,white; G,yellow; K,orange; M,N,S,C red.
- Also in the notes, information about double stars is often given. "Close double" with no other information usually means nearly equal components with a separation less than 0.2". "mg2" or "m2" means the magnitude of the secondary component, followed by its separation in arc seconds ("), and sometimes its PA from the primary. If there is a 3rd component (for a triple star), it might be indicated with "mg3" or "m3". Double is sometime abbreviated "dbl". Often, rather than the separation, I give “dTime” or “dT”, the time difference of the secondary star occultation relative to the primary star’s occultation.
- Sometimes the Axis angle (AA) is given. It is the angle measured around the Moon's disk, from the Moon's axis of rotation. It can be used with a lunar map to tell where a star will reappear relative to lunar features.

Occultations For the DMV During 2026

David Dunham

In my late 2025 *Star Dust* occultations maps and lists (and elsewhere), I asked if anyone would be willing to continue the monthly articles. Since nobody volunteered, I am instead giving here links and information about occultations throughout 2026.

Predictions for 47 total lunar occultations of stars and planets of mag. 6.0 and brighter computed for Washington, DC for 2026 are given in the middle column of the plain text file at occultations.org/publications/rasc/2026/MasWasChi.txt . It has the same data as the table on p. 167 of the *2026 RASC Observer’s Handbook*. The times are U.T.; subtract 5h for EST and 4h for EDT; beware that evening events are then on the Eastern time date previous to the UT date. More explanation of the data are in pages 2-4 of a .pdf document at occultations.org/publications/rasc/2026/lunar26.pdf which includes the text on pages 163, 164, and 171 of the *Handbook*. The best occultations will be on Feb. 3 UT (evening of Feb. 2 EST) when a nearly full Moon will occult 1.4-mag. Regulus (ZC 1487); the evening of April 25 EDT, there will be a better Regulus occultation by the 70% sunlit waxing Moon. There will be daytime occultations of Venus (mag. -4) on June 17 and of Jupiter (mag. -1.7) on Sept. 8. Most spectacular will be an occultation of Jupiter by a 20% waning crescent Moon the morning of Oct. 6; the dark-side reappearances of the Galilean satellites might also be seen. Pleiades passages will occur the evening of Feb. 23 EST (Moon 45% sunlit waxing) and the evening of Oct. 27 EDT (Moon 95% sunlit waning).

Maps of lunar grazing occultation paths, and accompanying data, for 150 events to mag. 6.5 under good conditions, throughout the “lower 48” US and s. Canada, are given at occultations.org/publications/rasc/2026/nam26grz.htm. Some notable 2026 grazes are (RASC maps path # in 1st col.):

#	Date	EDT	Star	Mag.	Limit	%snl	Closest to DC Place
46	Apr 25	21:03	Regulus	1.4	north	70+	n.e. Penn., cen. NJ
75	Jul 24	20:24	tau Sco.	2.8	south	81+	Arlington VA sunlit
87	Sep 3	2:55	7 Tauri	6.0	north	62-	over DC & Baltimore
113	Oct 7	6:43	44 Leonis	5.6	north	12-	Baltimore

If you might be interested in trying these, contact IOTA member Kevin Hartnett at kevin.nmi.hartnett@gmail.com.

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Occultations For the DMV During 2026 – continued from page 5

For asteroidal occultations, you can compute your own with instructions and data files at occultations.org/publications/rasc/2026/nam26MBoccs.htm or you can use Occult Watcher with the link given there. Posted on the NEUS occultations page at iota.jhuapl.edu/exped.htm (if this site has at the top, Updated 2025 December 10, see instead occultations.org/publications/rasc/2026/nam26MBoccs.htm - that site also has worldwide information about asteroidal occultations, with links to RASC maps and information) will be a list of occultations of stars of mag. 10.3 and brighter, of 526 asteroidal occultations whose paths pass within 600 km of DC. There are some shorter lists, including one with 14 occultations of stars to mag. 8.0 passing within 200 km of DC; a corresponding Occult map will show those paths. The first of those was of a 5.5 mag. star on Jan. 3; it was hopelessly clouded out along the path from Mississippi to the Virginia coast. The next of these will be on Jan.10 at 6:25 pm EST (shortly before the NCA meeting) with a 7.7-mag. star by (46564) 1991 RA11 near Frederick, MD. For any of these, as explained in the online information, interactive maps and complete details can be generated at cloud.occultwatcher.net/events but only for events that are 60 days or less in the future. For information about observing occultations, see George Viscome's primer at occultations.org/documents/OccultationObservingPrimer.pdf.

David Dunham, iotadunham@yahoo.com or dunham@starpower.net.

President's Corner – continued from page 4

DIY Spectroheliograph

NCA will start the year off with an online-only talk on January 10 by our own Prasad Agrahar, who has built his own spectroheliograph and shared its amazing images with our email list. Tune in and find out how he did it!

Rock Creek Golf Course

You may recall considerable discussion last year about the National Park Service and the National Links Trust redeveloping the Rock Creek Golf Course. NCA's main concern with this project was the plan to build an illuminated nighttime driving range near the old clubhouse, within a mile of where NCA has been doing Exploring the Sky sessions with the National Park Service and the public every month (except winters) since 1948. (Driving ranges are generally very bright.)

However, Trump has declared that he is taking over all three of DC's golf courses from NLT, accusing them of not abiding by the terms of their contract. His environmental record is extremely poor. Stay tuned.

Bezos, Musk, and Space Travel

Bryan Vandrovec and Guy Brandenburg

While some recent public conversations about the future of humanity in space can sound a bit over-the-top, it's worth grounding ourselves in what astronomy actually tells us.

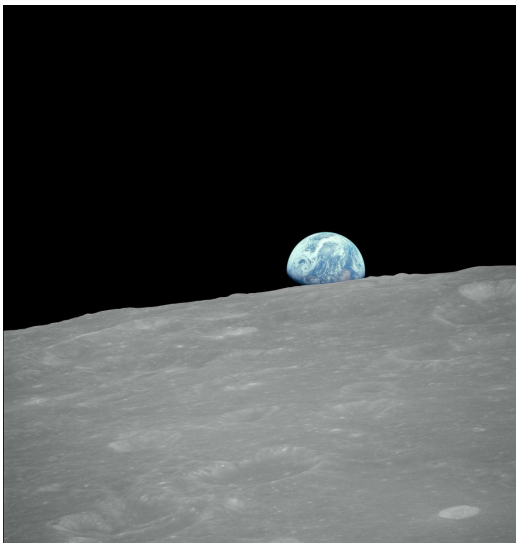
To start with, our Sun is only about halfway through its expected 9-billion-year lifespan. It will remain stable and hospitable for billions of years to come, so there's no need to worry about any imminent solar catastrophe. In cosmic terms, we're living in a wonderfully calm and predictable era.

There's also been renewed talk about moving large-scale industry to the Moon, Mars, or even asteroids. It's an imaginative idea—and imagination has always been part of astronomy's charm—but the physics remains stubborn. Escaping Earth's gravitational well requires tremendous energy, and even with impressive recent reductions in launch costs, sending heavy equipment into space is still extraordinarily expensive. For the foreseeable future, Earth will remain the most practical and economical place for manufacturing.

The same realism applies to interstellar travel. The nearest known exoplanet, Proxima Centauri b, is tantalizingly close in astronomical terms, yet still unimaginably distant by human standards. Voyager 1, launched in 1977, has spent nearly half a century traveling just one light-day. Even our fastest probes would require thousands of years to reach the nearest star system. These numbers don't diminish the excitement of exoplanet discovery—they simply remind us how vast and awe-inspiring our universe truly is.

Science fiction has long inspired us to dream big, and those dreams have value. But astronomy also teaches us to appreciate the remarkable planet we already inhabit. As Jeff Bezos once put it, "This is the only good planet in the solar system… So, we have to take care of it." Or, as Mike Berners-Lee wrote, "There is No Planet B." William Shatner famously felt the same thing when he briefly traveled into space. In fact, anyone who has looked through a telescope at the heavens has probably felt the fragility and beauty of our world.

Caring for Earth includes caring for the people who keep our society running. Ensuring that workers are supported, healthy, and able to thrive is just as essential as any technological ambition. After all, stewardship of our planet begins with stewardship of one another.



Colorized version of the first picture of Earth taken from the Moon by astronaut William Anders on Apollo 8 shortly before the more famous Earthrise picture. Image Credit – NASA/William Anders

Recent Astronomy Highlights – continued from page 4

Nancy Grace Roman Telescope Plan to Survey Milky Way Galactic Plane Released

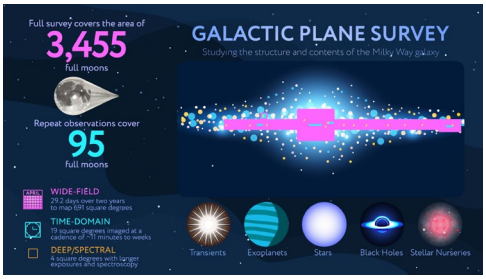


Image Credit – NASA's Goddard Space Flight Center

Last month, NASA released details of a plan for the upcoming Nancy Grace Roman Telescope to survey the galaxy using 29 days of observing time spread within the first two years of its mission. Sensitive to infrared light, the telescope will be able to map regions of the galaxy obscured by dust clouds. More information about the proposed study is available at phys.org/news/2025-12-nasa-milky-roman-space-telescope.html.

Calendar of Events

The NCA Telescope Making, Maintenance, and Modification Workshop (TMMW) is held on Tuesdays & Fridays, from 6:00 to 9:00 PM, in the basement wood shop of the Chevy Chase Community Center. The CCCC is located at the intersection of McKinley Street and Connecticut Avenue, NW, a few blocks inside the DC boundary, on the northeast corner of the intersection. There is no cost to attend. At the TMMW, you can make a telescope from scratch, or else get assistance with collimating or modifying a scope you already own. We can also re-aluminize mirrors up to 12.5" in diameter for much less money than you would pay anywhere else. For additional information visit Guy Brandenburg's Website. To contact Guy, call 202-262-4374 or Email Guy.

Open House talks and observing at the University of Maryland Observatory in College Park are temporarily suspended. When they resume, they will be on the 5th and 20th of every month at 8:00 pm (Nov.-Apr.) or 9:00 pm (May-Oct.). Updates are posted at www.astro.umd.edu/openhouse.

Next NCA Meeting - Feb. 14, 2025 -- Frank Summers (Space Telescope Science Institute)

National Capital Astronomers

Online Membership Application and Renewal

To submit or renew a membership to the National Capital Astronomers, and pay dues, please visit capitalastronomers.org/. There is a Google form for membership on the upper right. Please fill out the Google form, including your email address, in order to continue receiving issues of Star Dust.

Membership Rates

$ 20 – 1 year Individual/Family
$ 45 – 3 years Individual/Family
$ 5 – 1 year Student
$200 -- Life Member

(Please note that membership dues will go up in coming years, so consider joining/renewing with the 3-year option in order to save money.)

If you prefer to pay membership dues by check,

- make check payable to ***National Capital Astronomers*** then
- mail to: **Jim Simpson, NCA Treasurer; 3845 Wayson Road, Davidsonville, MD 21035.**
- Don't forget to also fill out the membership Google form, even if renewing!

NCA can use your help! Please indicate on the membership Google form which astronomy activities are of interest to you. In addition, we are also looking for volunteers! We need new officers, help with our website and social media, and help with outreach and science fair events.

Thank you!

Celebrating 89 Years of Astronomy

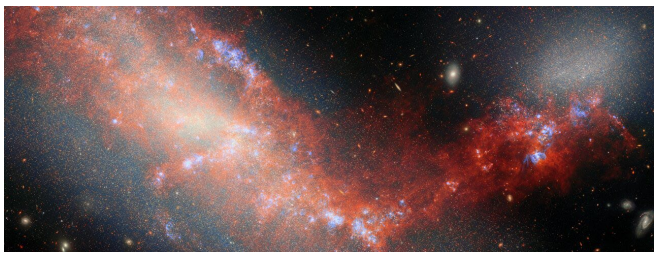


Image Credit - ESA/Webb, NASA & CSA, A. Adamo (Stockholm University), G. Bortolini, and the FEAST JWST team

Interacting dwarf galaxies, NGC 4490 and NGC 4485 have a stream of gas between them, shown in red, in this image captured by the James Webb Space Telescope. The galaxies lie about 200 million light years away. More informaton about the image is available at esawebb.org/images/potm2511a/.

To join or renew online, visit capitalastronomers.org and look in the right column for the Membership Form and PayPal links.

Next NCA Meeting:

2026 Jan. 10th

7:30 pm

Dharma Prasad Agrahar

(Online only meeting)

To join the meeting via Zoom, use the following link:

umd.zoom.us/j/95619565617?pwd=uqwxzZ39zgVfgOypmcp8cy6xFaCcRb.1

Please note that NCA Zoom meetings are often recorded.

Inside This Issue