

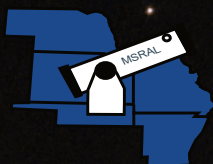
The Prairie Astronomer

April 2023 Volume 64, Issue #4



JWST Images Uranus

IN THIS ISSUE: Webb Spots Clouds on Remote Planet
Solar Eclipses are Coming!
ARP 54



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer



The next regular meeting is March 28th at 7:30pm at Hyde Observatory

NEXT MEETING AND PROGRAM

Our speaker will be Kevin Gallagher.

The Nancy Grace Roman Space Telescope is expected to revise our view of the universe and our understanding of Astronomy. The projected launch window is from late 2026 to mid-year 2027.

UPCOMING PROGRAMS

May: Annual Club Dinner

June: Solar Star Party

July: Review of NSP

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Cover: Webb's first glimpse at this ice giant highlights bright atmospheric features, as well as 11 of the planet's 13 rings. Only Voyager 2 and Keck (with adaptive optics) have imaged the planet's faintest rings before, and never as clearly as this. Credit: NASA, ESA, CSA, STScI, with image processing by Joseph DePasquale (STScI)



CALENDAR

The PAC Calendar is now available as a [Google Calendar](#).

PAC Meeting
 Tuesday, April 25th, 7:30pm at Hyde Observatory
 Program: Nancy Grace Roman Space Telescope - Kevin Gallagher

Annual Club Dinner
 Tuesday, May 30th

PAC Meeting
 Tuesday, June 27th 6pm at Hyde Observatory
 Solar Star Party
 New Club Photo will be taken - bring your telescope!

Nebraska Star Party
 July 16-22 at Merritt Reservoir, Valentine, Nebraska

PAC Meeting
 Tuesday, July 25th, 6pm at Hyde Observatory
 Review of the Nebraska Star Party

<https://www.prairieastronomyclub.org/event-calendar/>

2023 STAR PARTY DATES

	Date	Date
January	13	20
February	10	17
March	17	24
April	14	21
May	12	19
June	9	16
July	7	14
NSP	7/16	7/22
August	11	18
September	8	15
October	6	13
November	3	10
December	8	15

Dates in **BOLD** are closest to the New Moon.

CLUB OFFICERS

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Night Sky Network



www.prairieastronomyclub.org

Solar Eclipses are Coming!

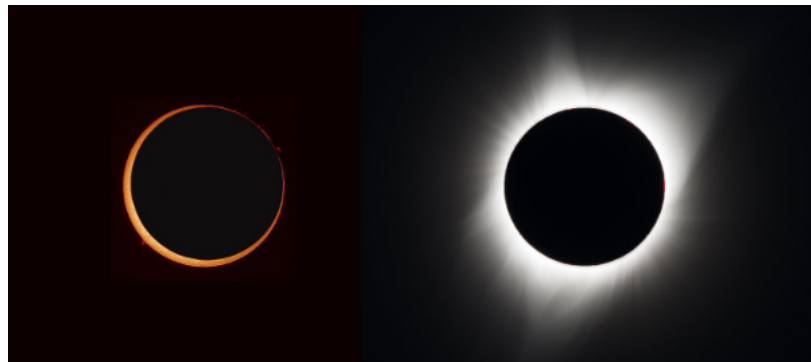
David Prosper



This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Have you ever witnessed a total solar eclipse? What about an annular solar eclipse? If not, then you are in luck if you live in North America: the next twelve months will see two solar eclipses darken the skies for observers in the continental United States, Mexico, and Canada!

Solar eclipse fans get a chance to witness an annular eclipse this fall. On Saturday, October 14, 2023, the Moon will move exactly in front of the Sun from the point of view of observers along a narrow strip of land stretching across the United States from Oregon to Texas and continuing on to Central and South America. Since the Moon will be at its furthest point in its orbit from Earth at that time (known as apogee), it won't completely



block the Sun; instead, a dramatic “ring” effect will be seen as the bright edge of the Sun will be visible around the black silhouette of the Moon. The distinct appearance of this style of eclipse is why it's called an annular eclipse, as annular means ring-like. If you are standing under a tree or behind a screen you will see thousands of ring-like shadows projected everywhere during maximum eclipse, and the light may take on a wan note, but it won't actually get dark outside; it will be similar to the brightness of a cloudy

day. This eclipse must only be observed with properly certified eclipse glasses, or other safe observation methods like pinhole projection or shielded solar telescopes. Even during the peak of the eclipse, the tiny bit of the Sun seen via the “ring” can damage your retinas and even blind you.

Just six months later, a dramatic total solar eclipse will darken the skies from Mexico to northeast Canada, casting its shadow across the USA in a strip approximately 124 miles (200 km)

wide, on Monday, April 8, 2024. While protection must be worn to safely observe most of this eclipse, it's not needed to witness totality itself, the brief amount of time when the Moon blocks the entire surface of the Sun from view. And if you try to view totality through your eclipse viewer, you won't actually be able to see anything! The Moon's shadow will dramatically darken the skies into something resembling early evening, confusing animals and delighting human observers. You will even be able to see bright stars and planets - provided you are able to take your eyes off the majesty of the total eclipse! While the darkness and

accompanying chilly breeze will be a thrill, the most spectacular observation of all will be the Sun's magnificent corona! Totality is the only time you can observe the corona, which is actually the beautiful outer fringes of the Sun's atmosphere. For observers in the middle of the path, they will get to experience the deepest portion of the eclipse, which will last over four minutes - twice as long as 2017's total solar eclipse over North America.

While some folks may be lucky enough to witness both eclipses in full - especially the residents of San Antonio, Texas, whose city lies at the crossroads of both

paths - everyone off the paths of maximum eclipse can still catch sight of beautiful partial eclipses if the skies are clear. The Eclipse Ambassadors program is recruiting volunteers across the USA to prepare communities off the central paths in advance of this amazing cosmic ballet. Find more information and apply to share the excitement at eclipseambassadors.org. NASA has published a fantastic Solar Eclipse Safety Guide which can help you plan your viewing at bit.ly/nasaclipsesafety. And you can find a large collection of solar eclipse resources, activities, visualizations, photos, and more from NASA at solarsystem.nasa.gov/eclipses

This detailed solar eclipse map shows the paths of where and when the Moon's shadow will cross the USA for the upcoming 2023 annular solar eclipse and 2024 total solar eclipse, made using data compiled from multiple NASA missions. Where will you be? This map is very detailed, so if you would like to download a larger copy of the image, you can do so and find out more about its features at: <https://svs.gsfc.nasa.gov/5073> Credits: NASA/Scientific Visualization Studio/Michala Garrison; eclipse calculations by Ernie Wright, NASA Goddard Space Flight Center.



Meeting Minutes

Jim White

Jason O'Flaherty started the meeting at 7:36 p.m. We had several guests in attendance for tonight's meeting. Tonight's meeting is being held at Hyde Observatory and online via Zoom.

The first item on the agenda was Jim Kvasnicka's observing report for April. Before beginning his observing report he stated that there was a nice article in the April edition of Nebraskaland Magazine about Merritt Reservoir being designated as an International Dark Sky Park. Upcoming star parties will be on April 14th and 21st at the Clatonia Recreation Area AKA the Clatonia Creek Reservoir, 1 ½ miles north of Clatonia. With the onset of spring galaxy season is upon us. Jim's complete observing report can be found in this newsletter.

At 7:42 the meeting was turned over to John Reinert for his treasurer's report. No real changes from last

months report to this months report.

At 7:43 the meeting was turned back over to Jason. Jason reviewed the membership rates for individuals, families and students and the additional benefits that you get from being a member. The club just recently started using Google Calendar to keep people up to date on club meetings and events. Members should have received an email with a link to be able to add this to their Google Calendar or other electronic calendar that they may be using. You can also get access to the links by going to the Prairie Astronomy Club website, <https://www.prairieastronomyclub.org>. Christine Parkyn, the clubs Outreach Coordinator will be updating the calendar with events as they get finalized. Club board members also have the ability to add to and edit the calendar. If you are interested in volunteering for or

attending an event check out the calendar. The calendar can also be setup to be used with Outlook, iCal or Thunderbird so if you need help with one of these contact Jason or one of the board members and they will help you get it set up. The Morrill Hall Astronomy Day event is coming up on Saturday April 15th from 5-8 PM. The Texas Star Party is coming up in May from the 14th to the 21st, MSRAL is June 9th and 11th in Jenks, OK. and the 30th annual Nebraska Star Party is July 16th-22nd at Merritt Reservoir.

There was no new business for the club so the meeting was adjourned at 7:48.

Tonight's program is by Nathaniel Cunningham, Ph.D. Professor of Physics, Planetary Science and Astrophysics at Nebraska Wesleyan University on "What's Next for New Horizons".

30th Annual Nebraska Star Party



Photo Credit: Fred Hultstrand History In Pictures Collection, NDSU, Fargo, N.D.

Join us this summer as families from all over the US and around the world gather in the sparsely populated sand hills of North Central Nebraska to spend a good week under a galaxy of stars.

**July 16-22 at Merritt Reservoir, Valentine,
Nebraska**

[Online Registration is now open](#)

ARP 54

The Mantrap Skies Image Catalog



Rick Johnson

Rick Johnson, a founding member of the Prairie Astronomy Club, passed away in January, 2019. His legacy lives on through his comprehensive catalog of over 1600 images at www.mantrapskies.com.



Arp 54 is a pair of galaxies, in Cetus 570 million light-years distant. Arp put in his category for spirals with small, high surface brightness, companions. The main galaxy is MCG-01-07-007 at magnitude 17.1 while the companion is 17.8 magnitude PGC 009107. To me, PGC 009107 is larger compared to the main galaxy than many that Arp put into his category for those with large companions. So is this really the galaxy he meant? It isn't on the arm but well away from it. There is a condensation on the end of the long arm that sort of points to PGC 009107. Is this the companion Arp meant? It better fits the description. But Arp apparently does mean PGC 009107 as the "small" companion as his note reads: "Arm toward companion split, contains nodule." NED classes it as SBc with HII emissions. Some call the pair an M51 type system due to the somewhat straightened arm leading toward the companion.

While it is likely that PGC 009107 is a true companion I found no distance estimates to further prove the relationship.

ARP54, continued.

NED is adding data from the VLT Very Deep Survey. This field is covered. The result is far more objects in my field being identified than normal. I can't begin to label all the galaxies with their distances that are in this image. That would label many hundreds of objects making the annotated image illegible. I did pick those brighter than 21st magnitude in red light within 5 minutes of Arp 54. The number would triple if I went to 22nd magnitude so I had to stop there. Beyond 5 minutes I only picked up ones that caught my eye. Wading through the many thousand entries for this field was more than I felt like attempting. Even with automation, I'd be weeks moving labels so as not to cover up other objects. For the beginners out there the VLT stands for Very Large Telescope which is located on Cerro Paranal, Chile at an elevation of 2635 meters (8645 feet). It should be VLTI as it is an array of 4 8.2 meter telescopes plus four movable 1.8 meter telescopes which can be

combined to make very high-resolution interferometric images, far higher than Hubble can achieve. With its 8.2 meter mirrors it gathers over 10 times the light than the 2.5 meter mirror of the Sloan Survey telescope (but with a much narrower field of view). This allows it to pick up far more galaxies in a field it covers than the Sloan Survey does. Too many in my case.

I have some qualms about this survey. Most of the galaxies are star-like in appearance. Even the "close" ones appear to be stars rather than galaxies. It doesn't help that during the L exposures a set screw that has been giving me fits again came loose allowing the left side of the image to defocus. Still I can't tell even the 16th magnitude galaxies seen only in this survey from stars. Are they really galaxies? The redshifts are photographically determined, not spectroscopically. This can be rather accurate for distant galaxies but I've not seen it applied to relatively nearby objects before. Galaxies

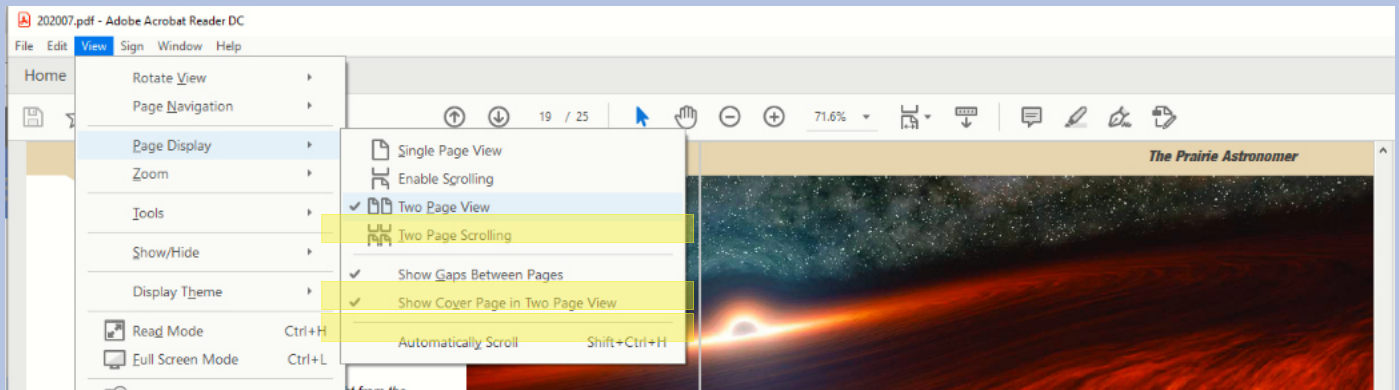
that do show their true nature are all from the usual catalogs, some are also from this survey as well. But many faint fuzzies were not picked up by this survey which bothers me. There were far too many to note but I did put question marks by a few of them. Others that are quite obvious but without redshift data were left blank. These were from plate surveys or the 2MASS IR survey but not picked up by this new survey. So why did this deep survey miss these obvious galaxies yet pick up so many star-like objects? I just don't know.

I picked up two asteroids, one is known and one is not. Being the image was taken 14 months ago as I type this there's no way to follow up on it. By coincidence, its trail ends at one of the faint fuzzies no survey, even the very deep one, picked up so earned a question mark. EDIT: The unknown asteroid was discovered two years after this was taken and is (401267) 2012 BF133.

Notices

New Newsletter Format

How to Adjust Adobe Acrobat Settings for Two Page View



To view this newsletter in magazine spread format in Acrobat, select View ->Page Display->Two Page View. Acrobat will then show two pages side by side. Also make sure the checkboxes “Show Cover Page in Two Page View” and “Show Gaps Between Pages” are checked. If you have it setup correctly, the cover page will be displayed by itself and subsequent pages will be side by side with the odd numbered pages on the left.

PAC Newsletter Archive

Back issues of the *Prairie Astronomer* from 1962 to present are now available online:

<https://www.prairieastronomyclub.org/newsletters>

Pay Dues Online

<https://www.prairieastronomyclub.org/pay-dues-online/>

If you're already a member and are renewing within 30 days of your anniversary date, select the early renewal option for a discount.

PAC-LIST

Subscribe through [GoogleGroups](#) or contact Mark Dahmke to be added to the list. You'll need a Google/gmail account, but if you want to use a different email address, just associate that address with your google account to access Google Groups. Once subscribed, you can view message history through the GoogleGroups website.

To post messages to the list, send to this address: pac-list@googlegroups.com

Focus on Observing Programs

Jim Kvasnicka

Lunar Observing Program

Most of us plan our observing around dark skies when the moon is not up. The Lunar Observing Program gives amateur astronomers something to do when the moon is up and we don't have the dark skies we long for.

The Lunar Program allows observers in heavily light polluted areas to participate in an observing program. Since no special observing skills are required the Lunar Program is well suited for the observer just getting started into the hobby of astronomy. The Lunar Program is well balanced because it develops naked eye, binocular, and telescopic observing skills. The Lunar Program was created as a project that can easily be done by schools and school children, especially those in the inner city.

To qualify for the Astronomical League Lunar Program you need to be a member of the Astronomical League which all PAC members are. The Lunar Program includes 100 features on the moon to observe. These 100 features are divided into three groups: 18 naked eye features, 46 binocular features, and 36 telescopic features. Any pair of binoculars and telescope will do. All features can easily be seen with a pair of 7x35 binoculars and a 60mm refractor. If you have trouble with the naked eye features you can

use the binoculars, and if you are having trouble with the binocular features you can use the telescope.

Go to the Astronomical League website and go to Observing Programs, once you are there find the Lunar Program and you can print out the observing log that has all 100 features for you to observe. The observing log is easy to use, just check off when you observe a feature and list the date and time.

It helps to have a good lunar map to use when doing the Lunar Program. There are some good maps you can purchase or you can find some on line to download.

When you complete the Lunar Program you will need to submit a copy of your observing logs to me for review. If your logs are accurate and complete I will submit your name to the Lunar Program chair for approval. The chair will mail to me your lunar certificate and pin which I will present to you at our monthly PAC meeting.

If you have any questions regarding the Lunar Program or need help getting started please contact me and I will be glad to help.

May Observing

Jim Kvasnicka

This is a partial list of objects visible for the upcoming month.

Planets

Venus: In the evening at magnitude -4.3, crescent shaped by the end of the month.

Mars: In the evening after sunset in Gemini at magnitude +1.5.

Jupiter: Morning planet at magnitude -1.9.

Saturn: Morning planet but difficult to see.

Uranus, Neptune, and Mercury: Not visible.

Messier List

M49: Galaxy in Virgo.

M51: The Whirlpool Galaxy in Canes Venatici.

M61: Galaxy in Virgo.

M63: The Sunflower Galaxy in Canes Venatici.

M64: The Black Eye Galaxy in Coma Berenices.

M85: Galaxies in Coma Berenices.

M94: Galaxy in Canes Venatici.

M101: The Pinwheel Galaxy in Ursa Major.

M102: Galaxy in Draco.

M104: The Sombrero Galaxy in Virgo.

Last Month: M40, M65, M66, M95, M96, M105, M106, M108, M109

Next Month: M58, M59, M60, M84, M86, M87, M88, M89, M90, M91, M98, M99, M100



NGC and other Deep Sky Objects

NGC 4244: The Silver Needle Galaxy in Canes Venatici.

NGC 4651/4656: The Whale Galaxy and Hockey Stick galaxies in Canes Venatici.

NGC 4666: Elongated galaxy in Virgo.

NGC 4754/4762: Galaxy pair in Virgo.

NGC 4866: Elongated galaxy in Virgo.

Double Star Program List

Kappa Bootis: Yellow and blue stars.

Iota Bootis: Yellow and dim blue pair.

Pi Bootis: Pair of white stars.

Epsilon Bootis: Yellow and greenish yellow stars.

Xi Bootis: Yellow pair.

Delta Bootis: Yellow primary with a blue-white secondary.

Mu Bootis: Two yellow stars.

Zeta Corona Borealis: Light blue and greenish yellow stars.

Challenge Object

Markarian's Chain: Galaxy group along the Virgo and Coma Berenices border. How many can you fit in your FOV?

Club Member Profile: Rachel Scheet

*Rachel joined
PAC in 2022*



I am the Earth and Space Education Coordinator at Morrill Hall. At the museum I am charged with k-12 and general programming around Earth and space science, this includes the planetarium. I had no idea when I got the job that planetariums and the astronomy community were so tightly knit and supportive. I have spoken with planetarium directors and educators across the Midwest and worked with them on training, creating programs and seeing what other planetariums are doing. I am enjoying these connections and look forward to the day when I can return the favor. I have also been doing a lot of learning. My

degree is from the University of Wyoming in secondary science ed. biology, not much astronomy in this degree... It has been fun to learn more and more about astronomy and all its different aspects. I started with an online class through Kearney and depended on my new contacts (shout out to Jack Dunn and Ken Murphy) and google for resources and connections with organizations like JPL. I look forward to learning even more about our night sky with PAC on Saturdays at Hyde.

I joined PAC this fall after starting my job at the museum in order to connect with and be a part of the Lincoln astronomy community. I am hoping to develop a

partnership between PAC and Morrill Hall so we can work together to expose communities to the wonders of astronomy and STEM. In February the museum had an adult only night centered around the planetarium called Cosmos and Cocktails. This month was the relaunching of Astronomy Night at Morrill Hall, which PAC helped make a fun and successful event (thank you Don and Bill)! Lastly our Astro camp will run again this summer.

When I am not at the museum, I am spending time with my partner Eric. We have been together for almost seven years and lived in Lincoln for almost five. Eric and I recently

adopted an eight-year-old dog from Capitol Humane Society, Tess, who has been getting most of our time. We have been enjoying our evening dog walks, as there is no light pollution where we

live, because we chat about the contents of what we see when we look up. For the past six years I have been taking riding lessons, I also lease a horse named Annie. Recently, I started a master's

program at UNL in applied science for educators and am learning a lot so far.

I am looking forward to the warmth of this season and the stars!!!!

Outreach Opportunities

Christine Parkyn

Here are our upcoming outreach events. To volunteer to support an event, let Christine Parkyn know at cpparky@gmail.com.

Wild Adventures: April 29, 2023 at Pioneers Park from 1 to 4 p.m. Have 1 volunteer; would like 2-3 more. Solar observers desired for this daytime event.

Lunar Observations: April 29, 2023 at Filley Stone Barn from 8:30 to 10 p.m. Have 1 volunteer; would like 3 more.

Lazy Horse Brewery, May 26, 2023, all volunteer slots filled.

Constellation Talk/Stargazing: June 27, 2023 at Camp Carol Joy Holling from 10:30 to 11:30 p.m. Have 1 volunteer; would like 2-3 more.

Constellation Talk/Stargazing: July 25, 2023 at Camp Carol Joy Holling from 10:30 to 11:30 p.m. Have 1 volunteer; would like 2-3 more.

Stargazing for Camp Erin Johnson: September 22, 2023 at Carol Joy Holling from 9:00 to 10:00 p.m. Need 4 volunteers.

Welcome New Members!

Paul Spieker
Kale Strizek
Diana Nevins
Lindsey Nielsen

NASA's Webb Spots Swirling, Gritty Clouds on Remote Planet

In just a few hours of observations, the space telescope revealed a dynamic atmosphere on a planet 40 light-years from Earth.

Researchers observing with NASA's James Webb Space Telescope have pinpointed silicate cloud features in a distant planet's atmosphere. The atmosphere is constantly rising, mixing, and moving during its 22-hour day, bringing hotter material up and pushing colder material down. The resulting brightness

changes are so dramatic that it is the most variable planetary-mass object known to date. The team, led by Brittany Miles of the University of Arizona, also made extraordinarily clear detections of water, methane, and carbon monoxide with Webb's data, and found evidence of carbon dioxide. This is the

largest number of molecules ever identified all at once on a planet outside our solar system.

Cataloged as VHS 1256 b, the planet is about 40 light-years away and orbits not one, but two stars over a 10,000-year period. "VHS 1256 b is about four times farther from its stars than Pluto is from our Sun, which makes it a great target for Webb," Miles said. "That means the planet's light is not mixed with light from its stars." Higher up in its atmosphere, where the silicate clouds are churning, temperatures reach a scorching 1,500 degrees Fahrenheit (830 degrees Celsius).

Within those clouds, Webb detected both larger and smaller silicate dust grains, which are shown on a spectrum. "The finer silicate grains in its



This illustration shows the swirling clouds identified by the James Webb Space Telescope in the atmosphere of exoplanet VHS 1256 b. The planet is about 40 light-years away and orbits two stars. The planet's clouds, which are filled with silicate dust, are constantly rising, mixing, and moving. Credit: NASA, ESA, CSA, Joseph Olmsted (STScI) Full Image Details

Webb Spots Clouds, continued.

atmosphere may be more like tiny particles in smoke,” noted co-author Beth Biller of the University of Edinburgh in Scotland. “The larger grains might be more like very hot, very small sand

particles.”

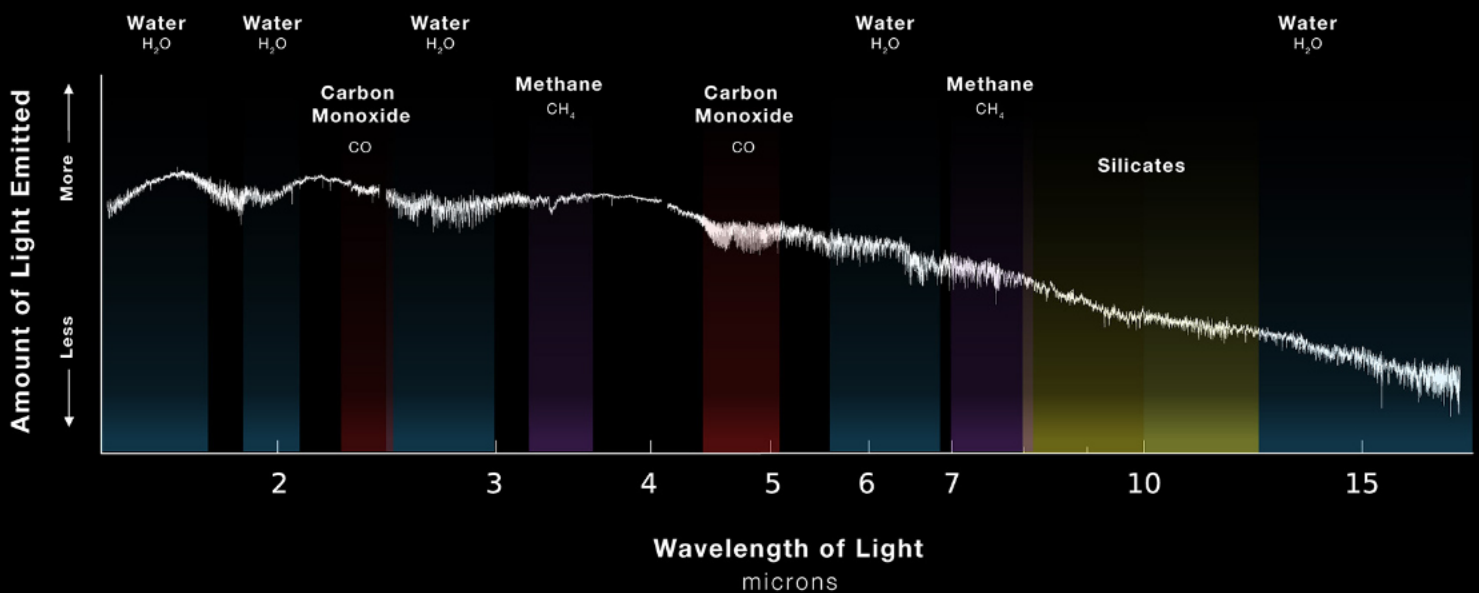
VHS 1256 b has low gravity compared to more massive brown dwarfs, which means that its silicate clouds can appear and remain higher in its atmosphere

where Webb can detect them. Another reason its skies are so turbulent is the planet’s age. In astronomical terms, it’s quite young. Only 150 million years have passed since it formed – and it will continue to

EXOPLANET VHS 1256 b

EMISSION SPECTRUM

NIRSpec and MIRI | IFU Medium-Resolution Spectroscopy



WEBB
SPACE TELESCOPE

Instruments aboard the James Webb Space Telescope known as spectrographs, one on its Near Infrared Spectrograph (NIRSpec) and another on its Mid-Infrared Instrument (MIRI), observed planet VHS 1256 b. The resulting spectrum shows signatures of silicate clouds, water, methane, and carbon monoxide. Credit: NASA, ESA, CSA, J. Olmsted (STScI); Science: Brittany Miles (University of Arizona), Sasha Hinkley (University of Exeter), Beth Biller (University of Edinburgh), Andrew Skemer (University of California, Santa Cruz)

Webb Spots Clouds, continued.

change and cool over billions of years.

In many ways, the team considers these findings to be the first “coins” pulled out of a spectrum that researchers view as a treasure chest of data. They’ve only begun identifying its contents. “We’ve identified silicates, but better understanding which grain sizes and shapes match specific types of clouds is going to take a lot of additional work,” Miles said. “This is not the final word on this planet – it is the beginning of a large-scale modeling effort to fit Webb’s complex data.”

Although all of the features the team observed have been spotted on other planets elsewhere in the Milky Way by other telescopes, other research teams typically identified only one at a time. “No other telescope has identified so many features at once for a single target,” said co-author Andrew Skemer of the

University of California, Santa Cruz. “We’re seeing a lot of molecules in a single spectrum from Webb that detail the planet’s dynamic cloud and weather systems.”

The team came to these conclusions by analyzing data known as spectra gathered by two instruments aboard Webb, the Near-Infrared Spectrograph (NIRSpec) and the Mid-Infrared Instrument (MIRI). Since the planet orbits at such a great distance from its stars, the researchers were able to observe it directly, rather than using the transit technique or a coronagraph to take this data.

There will be plenty more to learn about VHS 1256 b in the months and years to come as this team – and others – continue to sift through Webb’s high-resolution infrared data. “There’s a huge return on a very modest amount of telescope time,” Biller added.

“With only a few hours of observations, we have what feels like unending potential for additional discoveries.”

What might become of this planet billions of years from now? Since it’s so far from its stars, it will become colder over time, and its skies may transition from cloudy to clear.

The researchers observed VHS 1256 b as part of Webb’s Early Release Science program, which is designed to help transform the astronomical community’s ability to characterize planets and the disks where they form.

The team’s paper, entitled “The JWST Early Release Science Program for Direct Observations of Exoplanetary Systems II: A 1 to 20 Micron Spectrum of the Planetary-Mass Companion VHS 1256-1257 b,” will be published in *The Astrophysical Journal Letters* on March 22.

Webb Spots Clouds, continued.

More About the Mission

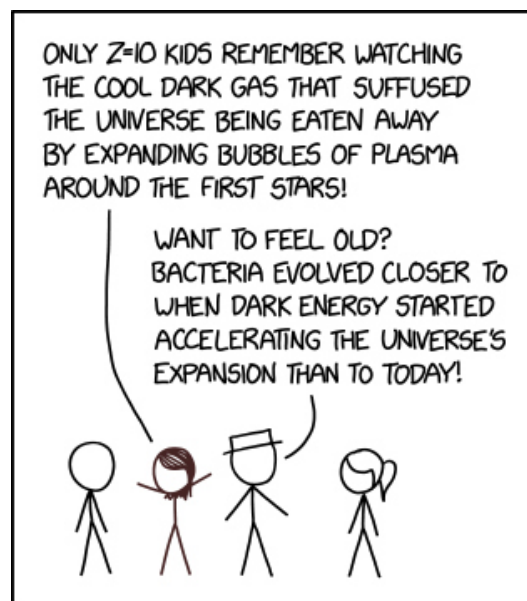
The James Webb Space Telescope is the world's premier space science observatory. Webb will solve mysteries in our solar system, look beyond to distant worlds around other stars, and probe the mysterious structures and origins of our universe and our place in it. Webb is an international program led by NASA with its partners, ESA (European Space Agency), and CSA (Canadian Space Agency).

MIRI was developed through a 50-50 partnership between NASA and ESA. NASA's Jet Propulsion Laboratory led the U.S. efforts for MIRI, and a multinational consortium of European astronomical institutes contributes for ESA. George Rieke with the University of Arizona is the MIRI science team lead. Gillian Wright is the MIRI European principal investigator. Alistair Glasse with UK ATC is the MIRI instrument scientist, and Michael Ressler is the U.S. project scientist at JPL. Laszlo Tamas

with UK ATC manages the European Consortium. The MIRI cryocooler development was led and managed by JPL, in collaboration with Northrop Grumman in Redondo Beach, California, and NASA's Goddard Space Flight Center in Greenbelt, Maryland. Caltech manages JPL for NASA.

For more information about the Webb mission, visit:

<https://www.nasa.gov/webb>



xkcd.com

COSMOLOGICAL NOSTALGIA CONTENT

Astrophotography

By Brett Boller



NGC 4565, Sunflower Galaxy M63, Gracie Creek Cabin near Burwell, NE 4-16-23 to 4-17-23, Canon t7i , Guided with PHD2, Skywatcher Esprit 150mm, CGE PRO Mount, 5 min subs with Dark frames, NGC 4565 total time 100 minutes, M63 total time 75 minutes.



Astrophotography

By Brett Boller



M105, M106, Gracie Creek Cabin near Burwell, NE 4-16-23 to 4-17-23, Canon t7i, Guided with PHD2, Skywatcher Esprit 150mm, CGE PRO Mount, 5 min subs with Dark frames, M105 total time 50 minutes, M106 total time 65 minutes.



From the Archives

April, 1986

Halley's Comet Certificates, \$1.00

Saturday April 12th from around 11pm until 2:30am down at the Princeton Rest Area, somewhere between one and two thousand people came to catch a glimpse of Halley's Comet.

We had approximately six telescopes set up down at the rest area ranging in size from 3 inches to 12 inches.

I want to thank everyone who came down to help show the enormous crowd of people Halley's Comet.

The comet itself was extremely unimpressive. There was no visible tail and the comet looked about like it did in October 1985. It was fairly bright and easy to

pick out in binoculars.

Despite a poor show put on by the comet, we made a fairly good sale with Halley Comet Certificates.

I had placed all of the certificates on a lawn chair, plus one certificate mounted on cardboard stuck to the back of the chair with a flashlight shining on it. I then walked around (carrying the lawn chair) to all of the telescopes shouting "Halley Comet Certificates certified by the Prairie Astronomy Club that you saw Halley's comet! Only \$1.00!"

The crowd standing around the telescope would laugh, and some

of the people would say "now that's the American Way!"

Plus, every time I walked by Russ Genzmer's scope he would say "Here comes that hotdog seller again."

But, despite this constant abuse by the crowd and club members, the club made \$134.00! The whole evening was a lot of fun, and I'm sure everyone there would agree to that!

I'll see you at the next meeting...

Andy Corkill

CLUB MEMBERSHIP INFO

REGULAR MEMBER - \$30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - \$35.00 per year. Same as regular member except gets 2 votes at club meetings.

STUDENT MEMBER - \$10.00 per year with volunteer requirement.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

CLUB TELESCOPES

To check out one of the club telescopes, please contact a club officer. Scopes can be checked out at a regular club meeting and kept for one month. Checkout can be extended for another month if there are no other requests for the telescope, but you must notify a club officer in advance.

100mm Orion refractor: Available
 10 inch Meade Starfinder Dobsonian: Available
 13 inch Truss Dobsonian: Needs repair
 10 inch Zhumell: Needs mount

Buy the book! The Prairie Astronomy Club: Fifty Years of Amateur Astronomy. Order online from Amazon or lulu.com.

ADDRESS

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