The Prairie Astronomer

July 2022 Volume 63, Issue #7

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- Calamus Star Party Report
- Solar Observing at Hyde Observatory

Night Sky Network

The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

NEXT MEETING AND PROGRAM

There will not be a meeting in July. Next meeting is August 30th.

August Meeting: James Webb Telescope First Images.

FUTURE PROGRAMS

September: NSP Review
October: Club Viewing Night
November: How To Buy a Telescope
December: Holiday gathering

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Cover: NASA's James Webb Space Telescope has delivered the deepest and sharpest infrared image of the distant universe so far. Webb's First Deep Field is galaxy cluster SMACS 0723, and it is teeming with thousands of galaxies – including the faintest objects ever observed in the infrared. Image credit: NASA, ESA, CSA, and STScI

CALENDAR

Nebraska Star Party
July 24-29, Merritt Reservoir, Valentine, NE

NO PAC Meeting in July

ALCON, New Mexico, July 28-30

JWST Image release
Hyde Observatory, August 14, 2:30pm

PAC Meeting
August 30, 7:30pm at Hyde Observatory
JWST Image Release with NASA Ambassador

PAC Meeting
September 27, 7:30pm at Hyde Observatory
Review and photos of the Nebraska Star Party

2022 STAR PARTY DATES

	Date	Date
January	**28**	2/5
February	25	**3/4**
March	25	**4/1**
April	22	**29**
May	20	**27**
June	17	**24**
July	22	**29**
NSP	**7/24**	**7/29**
August	19	**26**
September	**23**	30
October	21	**28**
November	18	**25**
December	16	**23**

Dates in BOLD are closest to the New Moon.

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Night Sky Network

www.prairieastronomyclub.org

Meeting Minutes

Jim White

PAC Meeting Minutes 6/28/2022

Bob Kacvinsky started an abbreviated meeting at 6:54 pm as the solar observing was winding down for the evening. Bob distributed a list of upcoming activities to those in attendance.

July – Sept. - The Astronomical League special globular observing challenge, 12 of 32 objects.

July 12th 10:30 am Webinar - JWST First Images release to the public.

July 12th 5-6 pm - Expert Panel Discussion

July 16th 2:30 pm - Expert Panel Discussion (repeat)

PAC Star Parties - July 22nd and 29th, August 19th and 26th, September 23rd and 30th

Nebraska Star Party – July 24th-July 29th Merritt Reservoir Snake River Campsites – Valentine, NE

NE Girl Scout Astronomy Club – NSP Viewing – July 27th and 28th

August 14th – 2:30 pm – JWST First Image Panel Repeat

Hosting: NE Lead Up @ Hyde Observatory Watch and Discussion

August 20th – 7-9 pm – Branched Oak Observatory JWST presentation and star party

August 29th – 6:30 pm – Bennet Martin Library JWST presentation

August 30th – PAC Meeting – JWST Public presentation and discussion

September 9th – 6 pm – Hyde Observatory watch JWST expert panel presentation

Hosting: NE Girl Scout Astronomy Club; Lincoln Home Schooling

September 16th – Lazy Horse Brewery Star Party – Ohiowa, NE

September 23rd – 7-9 pm – Camp Erin Mourning Hope star party – Camp Carol Joy Holling, Ashland, NE (need 5 or 6 members and scopes)

October 1st – Astronomical League designated Fall Astronomy Day

October 22nd – 6:30-8 pm – Audubon Society Evening on the Prairie Star Party – Denton, NE (need 2-4 members and scopes)

September 24th – BOO Star-B-Que

Summer Solar Observing at BOO on Sundays from 1-5 pm

Jim Kvasnicka presented Mike Kearns his award for completing the Astronomical League Messier Observing Program.

Bob adjourned the meeting at 7:15 pm.

The President's Message

Bob Kacvinsky

As we hit mid-summer PAC is beginning to get requests for public star viewing participating. We are finally recovering from the slowdown caused by COVID. We still need to be safe as we gather and share our exciting hobble with others.

This month is the much-awaited release of the first images from the James Webb Space Telescope. They promise to open a new era in our understanding of the origins of the universe. The ability to look back further towards the Big Bang and as we learned in May to when the "lights first turned on." Webb will also allow astronomers to get spectrographs of stars and their planets to determine their composition. Webb will also allow for a peak behind the curtains of dust in nebulas to the birth of stars. By the time of this publications the first images will be released, and you should have already seen the amazing abilities JWST exhibits.

PAC has several activities surrounding the JWST image releases including a special presentation with the public at our August PAC meeting. Please keep checking the schedules for upcoming activities and programs. Your participation in the programs would be deeply appreciated.

The July meeting will not be held due to the Nebraska Star Party. We hope everyone that can will attend. So far, the fires from the west have not created a major smoke barrier as the past couple of years. NSP site can offer some of the darkest skies in North America allowing you to reach much deeper into the dark skies for those dim elusive objects.

At the September meeting we will share Astro Photos from members including those from NSP and any others from the summer viewing. If you have been taking photos, please plan to bring them for a sharing event. September's meeting will also be nominations for our next PAC Board. If you are interested in throwing your hat in the ring, please let one of the Board members know so we can get an idea of who is interested. As PAC activities are opening back up and the excitement around the JWST images, there is a great opportunity for getting in on the ground floor of planning for our future. Please consider joining into the fun.

JWST Image Release Events

July 27-28:
NSP Girl Scout Attendees (W-R)

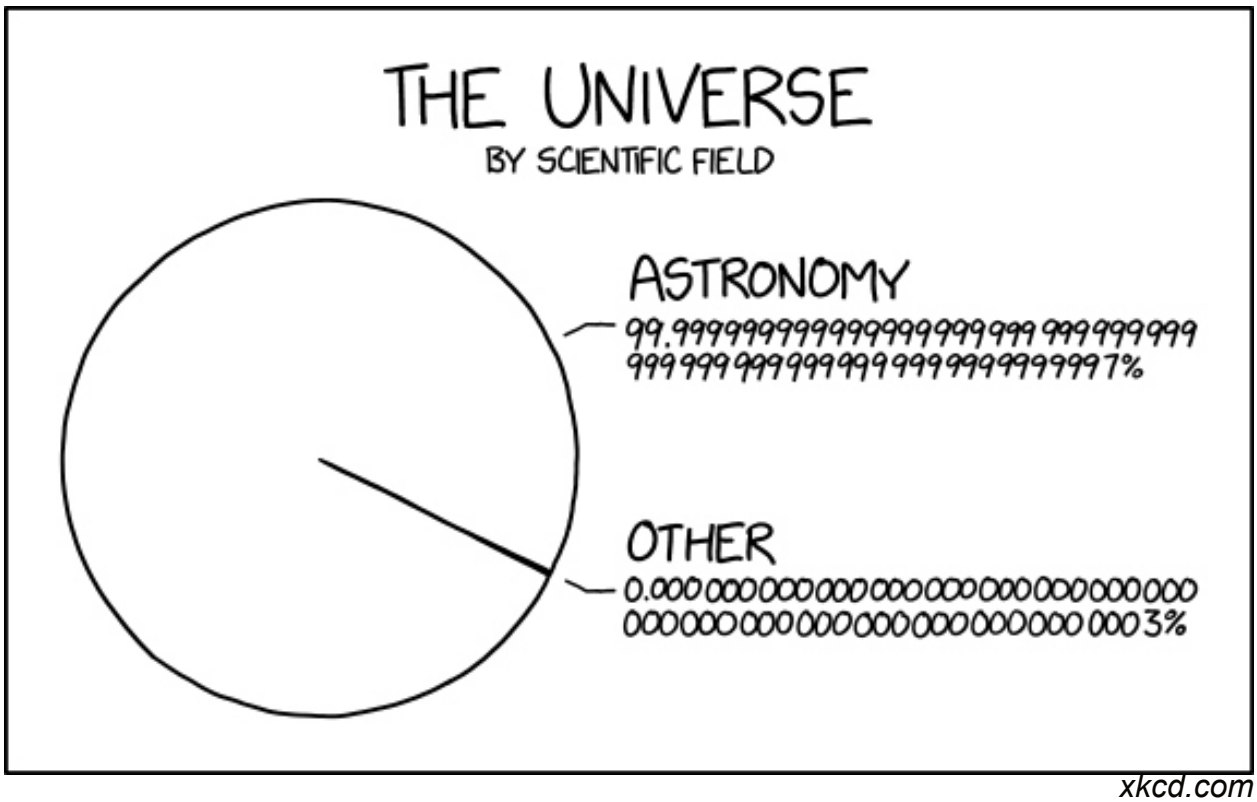
Aug 14 at 2:30pm:
NASA First Images Panel NE Lead Up Hyde (Sunday)

Aug 20th 7-9pm:
Branched Oak Observatory Public Event (Saturday)

Aug 29 at 6:30pm:
Lincoln Public Library Presentation – Bennett Martin (Monday)

Aug 30 at 7:30pm: PAC Public Meeting with NASA Ambassador

Sept 9 at 6pm:
Hyde Observatory - watch JWST expert panel presentation;
First Images Panel Home School Group Lincoln and Girl Scouts (Friday)



xkcd.com

29th 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 24-29 at Merritt Reservoir, Valentine, Nebraska

Online Registration is now open

ARP 45

Rick Johnson

Arp 45 is two or three or four galaxies 400 million light-years distant in the northwest corner of Bootes. Arp put it in his category for spirals with low surface brightness companions on arms. Arp\'s comment: \"One arm leads towards large companion, other towards small companion.\" Is this coincidence or is there some connection. There\'s another problem. Is the companion that is on the arm a galaxy as Arp indicates or just a blue knot in the arm? I don\'t know. UGC and Sloan, for instance, don\'t list it. Others such as the Vorontsov-Velyaminov Interacting Galaxies catalog as well as the CGCG and MCG list it separately. I find no redshift measurement for it. In the UGC catalog, Arp 45 is 09178. It is a triple galaxy in that catalog but the third member is not the blue knot on the arm. It is somewhat to the northwest, a normal looking disk galaxy, a bit smaller the primary galaxy of Arp 45.

While an obvious spiral NED shows no classification for it. The main spiral of Arp 45 is classed S(B?)c. I thought it a rather obvious barred spiral so I don\'t understand the question mark. The companion, VV2b, is close to being a one-armed spiral though NED doesn\'t attempt to classify it. The blue object on the other arm of VV2a has neither a magnitude nor classification at NED.

Another confusing object in the image is the orange star at the upper right. At 6th magnitude, it blasted across my image causing one heck of a huge halo with my old generation 1 filters which are very prone to such halos. Taming the halo rather distorted the appearance of the star. But what has me confused is that the star is classed A2. That is normally a rather blue-white star. I checked several catalogs all say A2. I know my filters scatter far more blue light than red but never have they changed a

The Mantrap Skies Image Catalog

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 45, continued.

star\'s color that much. The rest in the image are reasonable in color. It is quite red on the Sloan image as well, not shown in my attached images. Though the DSS plates show it brighter in blue than red. I know spectral color changes with whether the star is on the main sequence or off it in some other category but can they change this much? Why is it blue in the DSS but red in Sloan and orange for me? I can understand the IR of the Sloan image making an orange star appear red but how does it happen to a blue-white star? Anyone know what is causing this?

Several quasars are in the image, one at 3 billion light-years is closer than some galaxies in the image. Two however are at more respectable distances being over 9 billion light-years away.

In the upper left of the enlarged cropped image is an odd blue object or objects. NED lists only a 21st magnitude star in that position. In my and the SDSS image, it appears the star is one of three blobs that makes up this object. It is the one to the upper left of the other two. They appear to be galaxies but neither are listed in the SDSS according to NED. My image doesn\'t go as deep as normal so the SDSS lists many galaxies fainter than I am picking up yet misses these.

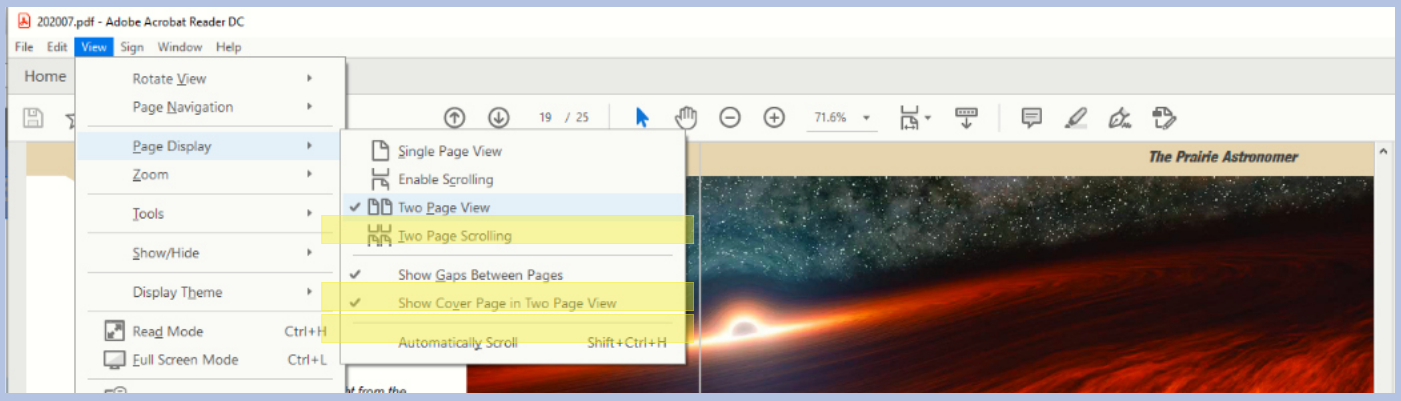
Messier Observing Program Award

Congratulations to Mike Kearns for completing the Messier Observing Program. This is Mike’s first observing award and the first Messier award presented to a PAC member since 2009.

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

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 Constellations

Lyra

Jim Kvasnicka

Lyra, the Lyre is one of the smallest constellations but it contains some big attractions. Vega is the brightest star in the summer and the fifth brightest of all the stars. Lyra has a wondrous deep sky object in M57, the Ring Nebula, one of the most observed and photographed objects in the night sky. Lyra has one other Messier object in the globular cluster M56. Epsilon Lyrae, the Double Double is a favorite telescope object. Lyra has its own meteor shower in the Lyrids which can be seen April 20-22 each year. Lyra is also prominent in astronomy history. Vega was the first star to have its picture taken in 1850. It was also one of the first stars to have its parallax accurately determined. Vega also will play a role in future astronomy history as well. In about 12,000 years Vega will assume the title of North Star.

Showpiece Objects

Planetary Nebulae: M57

Globular Clusters: M56

Multiple Stars: Epsilon-1/Epsilon-2 (Double Double)

Mythology

Classical mythology links the lyre and the tortoise shell with the story of Mercury, who found a tortoise shell. He noticed the resonance when he tapped on the shell. This gave him an idea to drill holes in the shell along opposite ends. He then laced the holes with linen threads. The lyre was invented and Mercury played enchanting music. Apollo beseeched Mercury to teach him to play. Mercury traded the lyre to Apollo for the power to fly and Mercury became the swift messenger of the gods with his winged sandals. Apollo gave the lyre to his son, Orpheus, who learned to play with such talent that his music would soothe the wild beasts. After the death of Orpheus, Jupiter placed the lyre in the heavens.

Number of Objects Magnitude 12.0 and Brighter

Galaxies: 3

Globular Clusters: 1

Open Clusters: 2

Planetary Nebulae: 2

Dark Nebulae: 0

Bright Nebulae: 0

SNREM: 0

By Till Credner - Own work: AlltheSky.com, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=20042019

The Star Party that Wasn't - then was - sort of!

Bob Kacvinsky
Jim Kvasnicka

Have you ever looked out at the sky on a star party night, seen clouds or weather and decided not to go? What if it was 5 days long and 675 miles away? That was the dilemma Jim Kvasnicka, Bob Kacvinsky, Mike and Linda Kearns faced on June 19/20th. We had paid registrations and had hotels lined up for the Rocky Mountain Star Stare 45 miles west of Pueblo, Co. We had decided to attend the star party to "check it out" with the promise of 7800' elevations and clear dry air.

By Sunday night the weather forecasts and Clear Sky Clock were predicting 60-90% chances of clouds, rain, and storms for 5 straight days. Should we spend the fuel, time, food, and room costs with the limited chance of viewing. We all have lived through those decisions and the consequences.

By Monday AM Jim and Bob had decided to look at alternatives. We were able to cancel our Colorado hotel rooms, so our only out of pocket costs were $65 RMSS registration fees. We called Lord Ranch, Valentine hotels, Bootleg Brewery cabins, and finally through a past work cohort settled on checking out Calamus State Recreation Area reservoir near Burwell, NE.

Burwell is an easy 200 miles (3:15 hours) from Lincoln with a population of 1200 offering several good restaurants including the Pizza Palace which claims the best pizza for 150 miles. Erickson (23 miles) hosts the Hungry Horse B&G with the claim of best prime rib. Both claims were well deserved. Ord and Taylor both have Micro Breweries that offered options for “Bolo” nights.

Calamus is a large SRA with numerous mowed wildlife parking areas. We found an isolated location just 9 miles from the hotel. The light domes from Burwell, Taylor, Erickson were all less than 5 degrees small arches. We set up Wednesday night at 9 pm under a full cloud cover and breeze with the possibility of skies starting to clear by 12-1 am. One of the downsides we found out is late June means darkness occurs well after 11 PM.

By 11:40 a few sucker holes started opening and we chased a few objects as the clouds blew through. The big surprise was by 12:15 am the clouds cleared out and we enjoyed an incredible dark, stable, and clear full sky that rivaled any NSP night. The only lights we saw were a couple dim specs filtering through the trees from a passing boat or two. The light breeze kept any bugs away. We observed till almost 4 am before the rising moon and light dew ended the night. Bob was logging Herschel II objects and Jim worked on Two in the View and captured a Panstarr Comet in Ophiuchus. The only challenge we had was the chorus of mule deer coming close and snorting at us. Apparently, we were set up in their pathway to water.

Thursday night cleared up by 9:30 pm and we had good skies till about 2:30 am when the temps dropped, and heavy dew finished the night. Thursday was still very

good, but the humidity reduced the seeing and transparency a gradient from Wednesday night. We determined it was hard to beat the excellent Wednesday night skies.

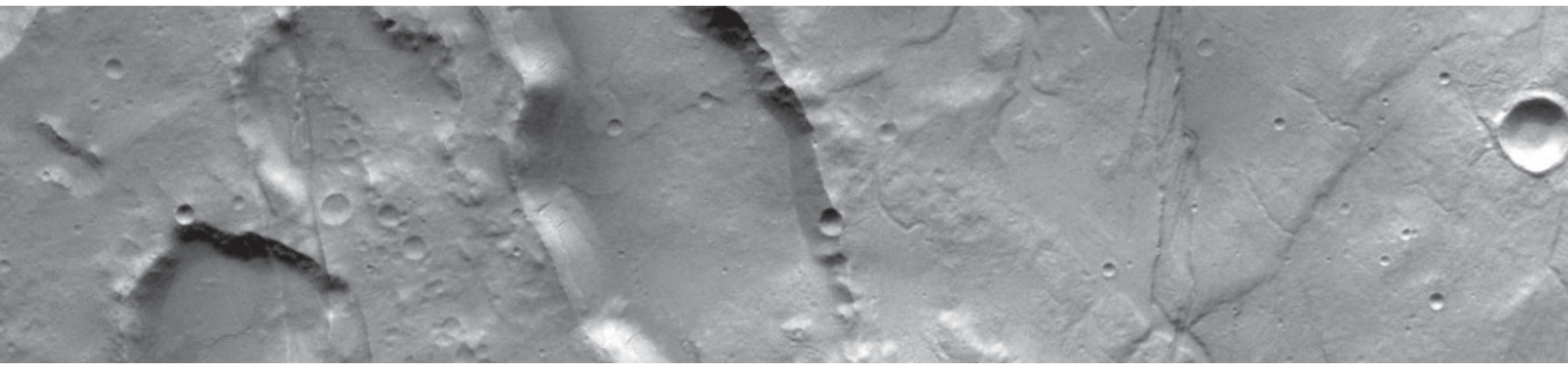
Friday storms came in so we went to Erickson with our local contact for prime rib (wow is all I can say) and ended up enjoying a few drinks and a full night sleep.

The Friday night storms brought a cold front through, and temps dropped into the 70's during Saturday with low humidity. We visited the Scratchtown Brewery in Ord late Friday afternoon for their celebration of the Bike Across Nebraska finale.

Saturday at 8 pm the skies were 80% cloud covered, but as had happened on other nights the entire sky cleared out by 9:30 pm. We were able to start viewing by around 11 pm. By 11:30 we realized that the excellent NSP night of Wednesday had been eclipsed on Saturday. Seeing and transparency were in the dark blues. As an example, we were able to see the full spiral arms of M101 – first time ever. Several favorites were popping with incredible details. There was no humidity, and the temps dropped into the 50's eliminating bugs and any temp gradients. Except for the mule deer chorus this was a special night.

The late morning drive home loomed and 50-degree temps put a chill in the air so we decided to pack up about 4 am to get a few hours sleep before the drive home. Overall, we were able to log over 115 observing program objects in addition to enjoying a few favorites. We decided that Burwell and Calamus checked all the boxes and deserves future star party considerations.

1. VERY clear and dark skies 2. Reservoir provides air stabilizer 3. Easy access to hotels, food, breweries 4. Best prime rib and pizza within driving distances 5. Easy access to observing site with good roads 5. Easy 3+ hour drive from Lincoln.



Sirenum Fossae, Mars. The linear features in this VIS image are tectonic graben. These graben are called Sirenum Fossae. Graben are formed by extension of the crust and faulting. When large amounts of pressure or tension are applied to rocks on timescales that are fast enough that the rock cannot respond by deforming, the rock breaks along faults. In the case of a graben, two parallel faults are formed by extension of the crust and the rock in between the faults drops downward into the space created by the extension. The Sirenum Fossae graben are 2735km (1700 miles) long. Captured 3/18/2022. Photo credit: NASA/JPL-Caltech/ASU. For more info see: https://www.jpl.nasa.gov/images/pia25399-sirenum-fossae

Tiny Dust Could Yield Big Answers Under Webb Telescope's Gaze

NASA's James Webb Space Telescope is preparing to deliver fantastic new images of faraway worlds and galaxies, but it'll also give us an unprecedented look at a tiny component of our universe: space dust. One category of dust could shed new light on some big processes, like the way stars and galaxies form and evolve.

The tiniest of these dust particles are, technically speaking, polycyclic aromatic hydrocarbons. They go by their initials, PAHs (sounds like "pa's" as in "Grandpa's slippers"), and they're one of the most abundant types of molecules in space. They include a whole family of large molecules with a structure like chicken wire – a latticework of hexagons organized in different patterns.

After they were identified in the 1980s, astronomers discovered PAHs just about everywhere they pointed their telescopes: in gas clouds where stars form, in some of the earliest galaxies, and – closer to home – in the atmosphere of Saturn's moon, Titan.

In the past, space dust was a nuisance for astronomers, because telescopes couldn't see through the dark, massive dust clouds spread across galaxies. With the advent of infrared astronomy, telescopes peered through those obscuring clouds, and we learned that space dust is actually a vital part of star and planet formation. And Webb is poised to be a game-changer for unlocking its secrets.

"Webb has capabilities that dwarf those of previous infrared telescopes and will revolutionize astronomy," said Louis Allamandola, one of the pioneers of the PAH field and a researcher at NASA's Ames Research Center in California's Silicon Valley.

Unprecedented Detail Ahead in Webb's Dust Data

When NASA's Spitzer telescope launched in 2003, with its next-generation infrared technology, PAH research took off.

"Now, Webb will bring superb spatial and spectral resolution," said Christiaan Boersma, an astronomer at Ames and joint principal investigator on a project that will use Webb to study PAHs in space. "We'll be able to see details – better details – on smaller scales than ever before. This will reveal how PAHs form and evolve in very different astronomical environments. And that will allow us to unravel the photophysics and chemistry that drive how star-forming structures arise and explain the remarkable diversity of objects we observe, from exoplanets and stars to galaxies."

Boersma is excited for the detailed spectra Webb will provide. These are like fingerprints for light. When dust molecules are heated by the Sun or another star's rays, they emit infrared light to cool off. The light patterns, or spectra, can help identify the different types of PAH molecules the light came from – if we can capture it well enough.

This image of the Orion nebula, the brightest spot in the sword of the constellation Orion, shows carbon-rich molecules called polycyclic aromatic hydrocarbons (PAHs) as wisps of red and orange. This image was captured through a team-up of the Hubble and Spitzer telescopes, two predecessors of the James Webb Space Telescope. "With Webb

Continued on next page.

With lower-resolution infrared telescope technology, astronomers have detected broad PAH populations or families. Deciphering the spectrum of a single type of PAH is possible, but it's painstaking work, requiring the synergy of telescope observations, lab work, and advanced computing that underlies Ames' Laboratory Astrophysics group. The field was brought to maturity at Ames, allowing scientists to recreate in the lab the PAH-forming conditions of interstellar space and measure the spectral fingerprints of the molecules that result.

So far, they've nailed down the "light fingerprint" of around 100 different PAHs by studying molecules in the lab and another 4,000 with the help of computers. Armed with all that data, astronomers match known spectra to PAH populations observed in the sky.

It's a big job, but researchers expect the powerful Webb telescope will bring a whole new approach.

"The holy grail for us is to be able to identify and quantify – directly from the telescope data – the specific PAH types making up the families we see," said Boersma. "We're closer than ever, thanks to the fundamental work that came before."

With Webb's resolution, they'll be able to tease out smaller PAH subsets – defined by characteristics such as size, shape, and electric charge – that contribute to the observed spectra. To analyze and interpret the PAH observations, researchers will turn to a database of research built up by NASA scientists. The NASA Ames PAH IR Spectroscopic Database is freely available to the global scientific community and offers libraries of data and sophisticated tools.

"We're entering the era of 'PAH research 2.0'," said Allamandola. "Looking at a spectrum is like listening to a symphony. Webb will allow us to hear all the different kinds of PAHs in the orchestra for the very first time. That is a giant step forward."

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 the Canadian Space Agency.

Photo caption continued from previous page:

we'll be able to see far more detail, including variation in the wisps of PAHs that we currently must paint with a relatively broad brush," said Christiaan Boersma, an astronomer at Ames and joint principal investigator on a project that will use Webb to study PAHs. Boersma is an extended core team member on a Webb Early Release Science project studying this exact region in Orion.

Credits: NASA/JPL-Caltech/STScI

August Observing

Jim Kvasnicka

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

Planets

Mercury: In the evening just after sunset.

Jupiter: Rises just before midnight in Cetus at magnitude -2.5.

Saturn: Rises just before midnight in Capricornus at magnitude +0.4.

Mars: Rises after midnight in Aries.

Venus: In the morning at -3.8 magnitude.

Uranus and Neptune: In Aries and Pisces.

Meteor Showers

Perseids: Peaks the night of August 12-13. Expect up to 90 meteors per hour, a near full Moon will interfere with your viewing.

Messier List

M6/M7: Open clusters in Scorpius.

M8: The Lagoon Nebula in Sagittarius.

M9/M10: Class VIII and VII globular clusters in Ophiuchus.

M12/M19: Class IX and VIII globular clusters in Ophiuchus.

M20: The Trifid Nebula in Sagittarius.

M21/M23: Open clusters in Sagittarius.

M62/M107: Class IV and X globular clusters in Ophiuchus.

Last Month: M3, M4, M5, M53, M68, M80, M83

Next Month:
M13, M14, M22, M28, M54, M69, M70, M92

NGC and other Deep Sky Objects

NGC 6717: Palomar 9, Class VIII globular cluster in Sagittarius.

NGC 6741: Planetary nebula in Aquila.

NGC 6781: Planetary nebula in Aquila.

NGC 6818: Little Gem, planetary nebula in Sagittarius.

B86: The Ink Spot, dark nebula in Sagittarius.

Double Star Program List

Struve 2404: Close pair of orange stars in Aquila.

57 Aquilae: Pair of white stars.

Beta Cygni: Albireo, gold and blue stars.

31 Cygni: Yellow primary with a blue secondary.

61 Cygni: Two orange stars.

Epsilon Lyrae: The Double Double.

Zeta Lyrae: Yellow pair.

Beta Lyrae: Yellow primary with multiple white stars.

Challenge Object

NGC 6822: Barnard's Galaxy in Sagittarius.

Club Member Profile: Jim Kvasnicka

Jim has been a member of PAC since 2004

I grew up in Princeton, a small town south of Lincoln on Hwy. 77. I went to school at Norris and later received my BA degree from Doane College. My wife Andrea and I have been married for 44 years. We have a son who is not married and a daughter who is and has four children. The four grandkids keep us busy.

I retired in September last year. I've had various jobs but most of my career, 27 years, was spent at Pfizer, now Zoetis, here in Lincoln. The plant in Lincoln is a veterinary biological plant. I worked in the Virus Production department as a Production Supervisor and later as the Department Manager. We grew mammalian cells using tissue culture methods and infected the cells with virus. The viral fluids were harvested and used in the assembly of the vaccines we produced. Pfizer started downsizing and I was let go in 2010. I finished my working career at Sensory Effects Cereal Systems here in Lincoln. We did contract manufacturing for the biggest cereal companies in the country. We produced the cereal and packaged it. We would produce up to 2 million pounds of cereal a month. I was the Supply Chain Manager while I was there.

Since retiring in September I started taking classes to earn my PMA (Parish Ministry Associate) certification in my church. I have 13 classes I must take plus 5 credit hours of electives, a total of 34 credits to complete. Besides working towards the PMA position, I keep busy with our grandkids and friends.

I have always been interested in astronomy and my interest peaked when I was in 6th grade. Earl Moser came to our class to give a presentation on astronomy, Earl's son Brad was in my class. After Earl's presentation I knew someday I would have my own telescope. That day came in 2003 on Christmas when Santa brought me an Orion 6-inch reflector on an EQ mount. I started using the telescope but realized I could use some help. I joined PAC in May of 2004 and was able to get the help I needed. Members Bob Kacvinsky and Dave Churilla helped me a great deal and I am forever grateful for their help. I started working immediately on the Messier Observing Program. The next year in April of 2005 I purchased an Orion 10-inch Dob and I was able to sell my 6-inch scope. I used the 10-inch Dob for ten years and in April 2015 I received my dream telescope with some persuasion from Dan Dalzell, a custom-made Teeter 16-inch Newtonian Reflector on a Dobsonian mount. The telescope is a joy to use.

As I stated I joined PAC in May of 2004. In 2007 I was asked to be Observing Chair for the club. I said yes and I have been doing it ever since. I have also served as club

Jim Kvasnicka, continued.

president for four years. I am very involved in outreach with the club and attend as many of the club outreach events as I can. I also host 2-3 Lunar parties at my house each year. I live on an acreage, and I have ample room for members to set up their telescopes. Our club observing site is on land my brother-in law farms. I have been maintaining our observing site for as long as we have been going there.

My first NSP was in 2005. Since then, I have missed a couple, but NSP is an event I look forward to each year. I love the sandhills and observing under such dark skies. I enjoy doing different observing programs and sketching my observations. But most of all I enjoy the friends I go with. I have developed some strong friendships over the years with some of my fellow PAC members. We have some wonderful memories from PAC Hill at NSP that we will cherish forever. Besides NSP I have attended the Heart of America Star Party south of Kansa City with Bob Kacvinsky, Dan Delzell, and Dave Churilla. I try to attend the star parties we have at Lord Ranch. It's a great place to observe and an opportunity to bond with fellow PAC members.

I enjoy doing observing programs and have completed the following observing programs; Messier, Binocular Messier, Double Star, Lunar, Herschel 400, Globular Cluster, Caldwell, Urban, Sketching, Deep Sky Binocular, and Comet (Silver Award). I am currently working on these observing programs; Stellar Evolution, Two in the View, ARP Peculiar Galaxies, and I have four comets left to observe to earn the Comet Gold award. In 2018 I traveled to Minneapolis for ALCON and received the Master Observing Award along with fellow PAC member and good friend Bob Kacvinsky. By far this has been my greatest achievement, what I am the proudest of, since becoming an amateur astronomer. At the banquet they call your name to come forward and they also announce the name of the astronomy club you belong to. It was an honor to represent the Prairie Astronomy Club.

Solar Viewing at Hyde Observatory

June 28, 2022

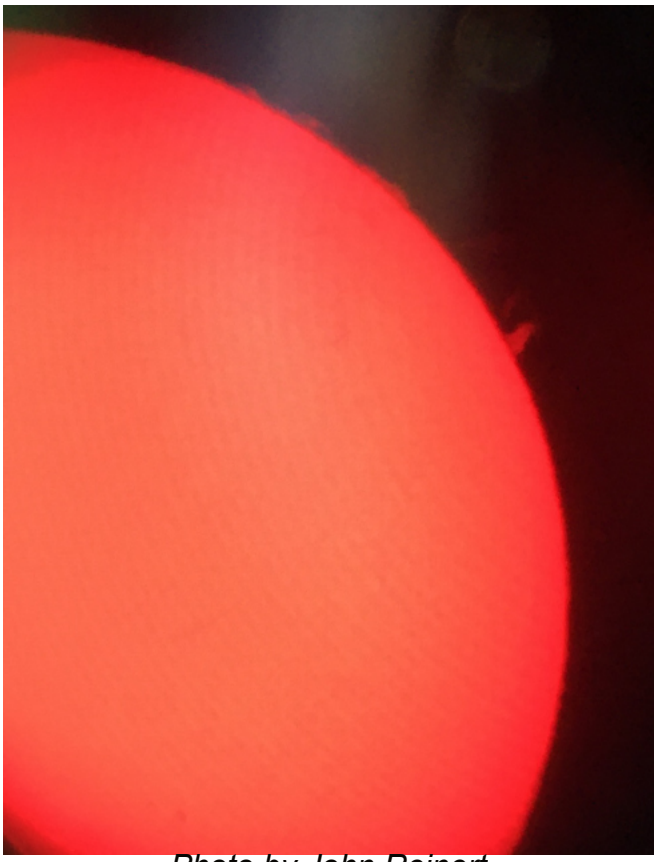


Photo by John Reinert
IPhone 6s Plus, 12MP

NASA's Webb Delivers Deepest Infrared Image of Universe Yet

NASA's James Webb Space Telescope has delivered the deepest and sharpest infrared image of the distant universe so far. Webb's First Deep Field is galaxy cluster SMACS 0723, and it is teeming with thousands of galaxies – including the faintest objects ever observed in the infrared.

Webb's image is approximately the size of a grain of sand held at arm's length, a tiny sliver of the vast universe. The combined mass of this galaxy cluster acts as a gravitational lens, magnifying more distant galaxies, including some seen when the universe was less than a billion years old. This deep field, taken by Webb's Near-Infrared Camera (NIRCam), is a composite made from images at different wavelengths, totaling 12.5 hours – achieving depths at infrared wavelengths beyond the Hubble Space Telescope's deepest fields, which took weeks. And this is only the beginning. Researchers will continue to use Webb to take longer exposures, revealing more of our vast universe.

This image shows the galaxy cluster SMACS 0723 as it appeared 4.6 billion years ago, with many more galaxies in front of and behind the cluster. Much more about this cluster will be revealed as researchers begin digging into Webb's data. This field was also imaged by Webb's Mid-Infrared Instrument (MIRI), which observes mid-infrared light.

Webb's NIRCam has brought distant galaxies into sharp focus – they have tiny, faint structures that have never been seen before, including star clusters and diffuse features.

Light from these galaxies took billions of years to reach us. We are looking back in time to within a billion years after the big bang when viewing the youngest galaxies in this field. The light was stretched by the expansion of the universe to infrared wavelengths that Webb was designed to observe. Researchers will soon begin to learn more about the galaxies' masses, ages, histories, and compositions.

Other features include the prominent arcs in this field. The powerful gravitational field of a galaxy cluster can bend the light rays from more distant galaxies behind it, just as a magnifying glass bends and warps images. Stars are also captured with prominent diffraction spikes, as they appear brighter at shorter wavelengths.

Webb's MIRI image offers a kaleidoscope of colors and highlights where the dust is – a major ingredient for star formation, and ultimately life itself. Blue galaxies contain stars, but very little dust. The red objects in this field are enshrouded in thick layers of dust. Green galaxies are populated with hydrocarbons and other chemical compounds. Researchers will be able to use data like these to understand how galaxies form, grow, and merge with each other, and in some cases why they stop forming stars altogether.

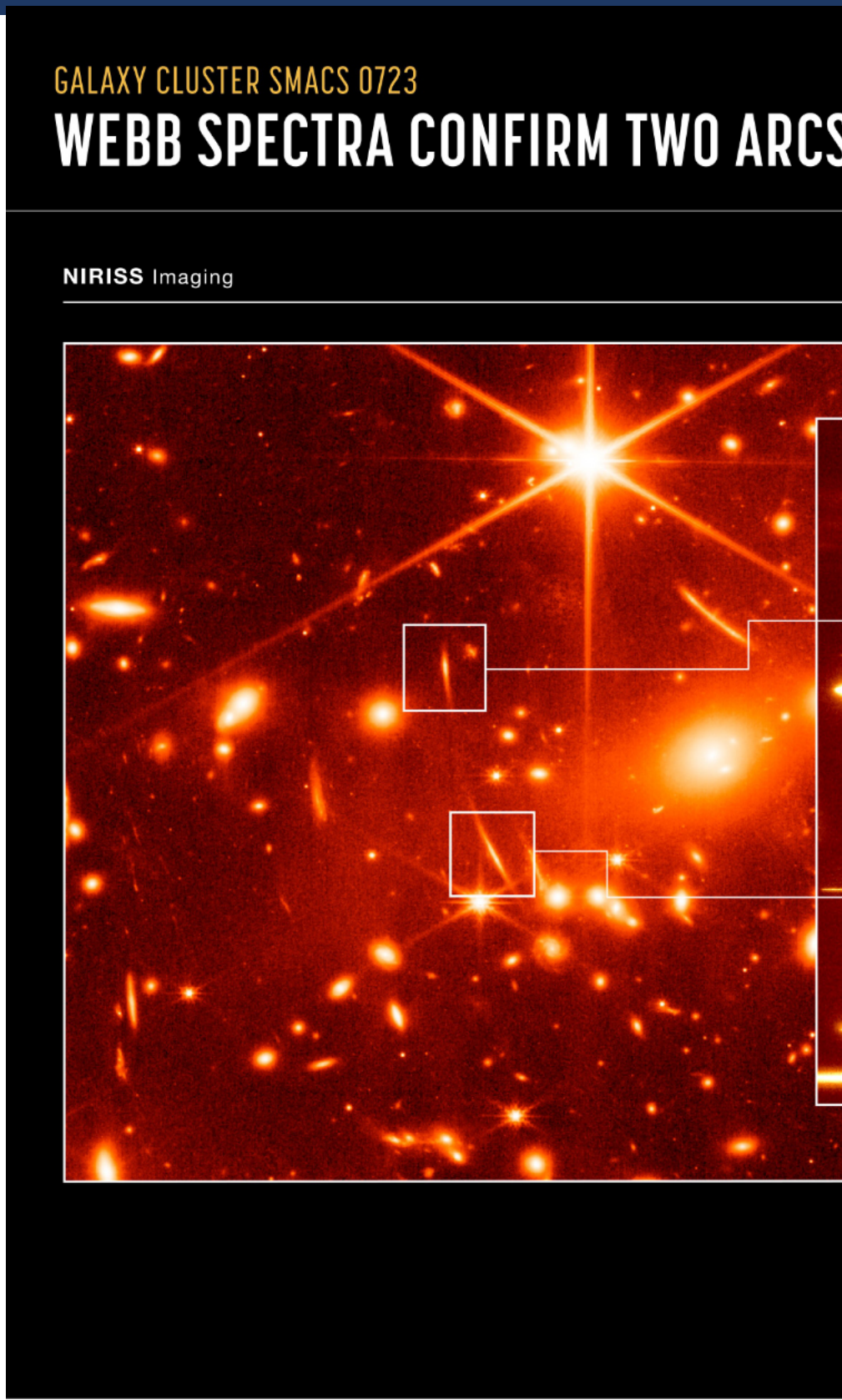
In addition to taking images, two of Webb's instruments also obtained spectra – data that reveal objects' physical and

JWST DEEP FIELD

chemical properties that will help researchers identify many more details about distant galaxies in this field. Webb's Near Infrared Spectrograph (NIRSpec) microshutter array observed 48 individual galaxies at the same time – a new technology used for the first time in space – returning a full suite of details about each. The data revealed light from one galaxy that traveled for 13.1 billion years before Webb's mirrors captured it. NIRSpec data also demonstrate how detailed galaxy spectra will be with Webb observations.

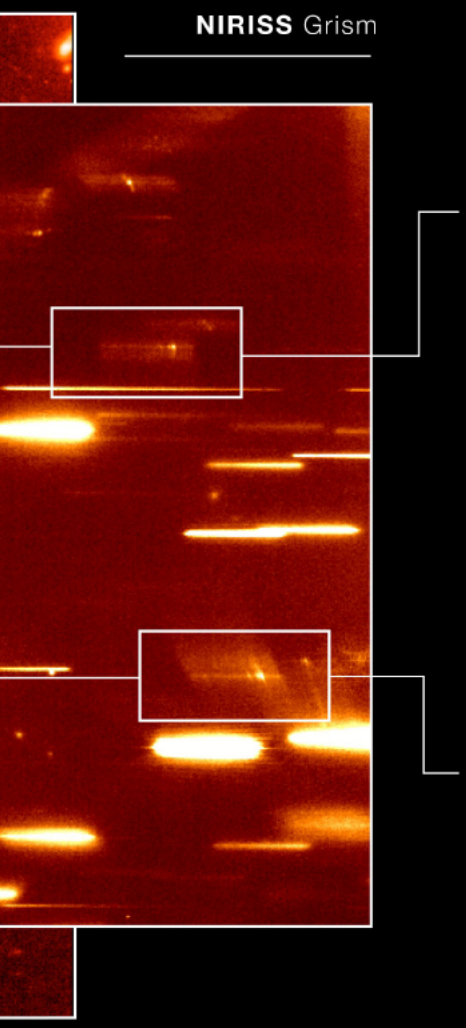
Finally, Webb's Near-Infrared Imager and Slitless Spectrograph (NIRISS) used Wide-Field Slitless Spectroscopy to capture spectra of all the objects in the entire field of view at once. Among the results, it proves that one of the galaxies has a mirror image.

SMACS 0723 can be viewed near the constellation Volans in the southern sky.

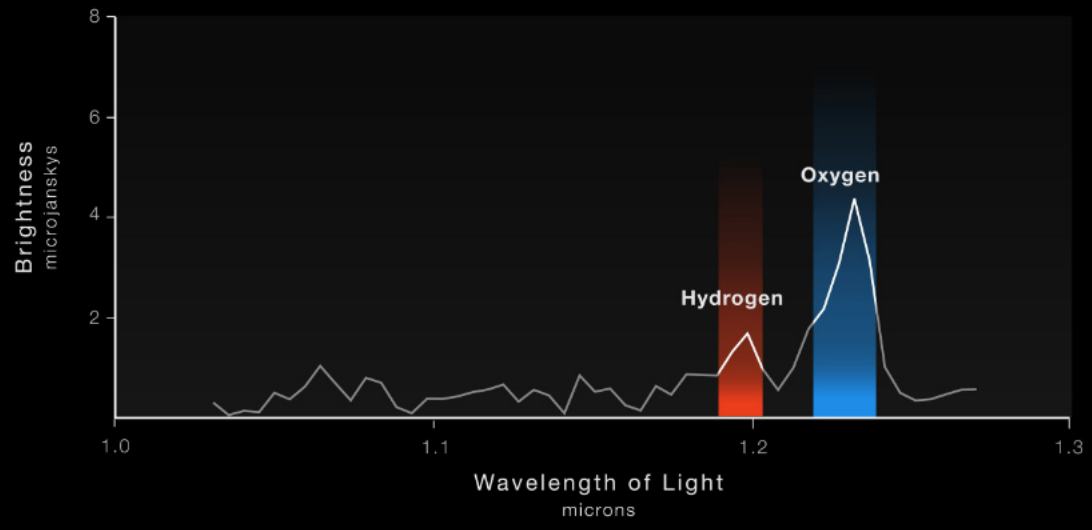


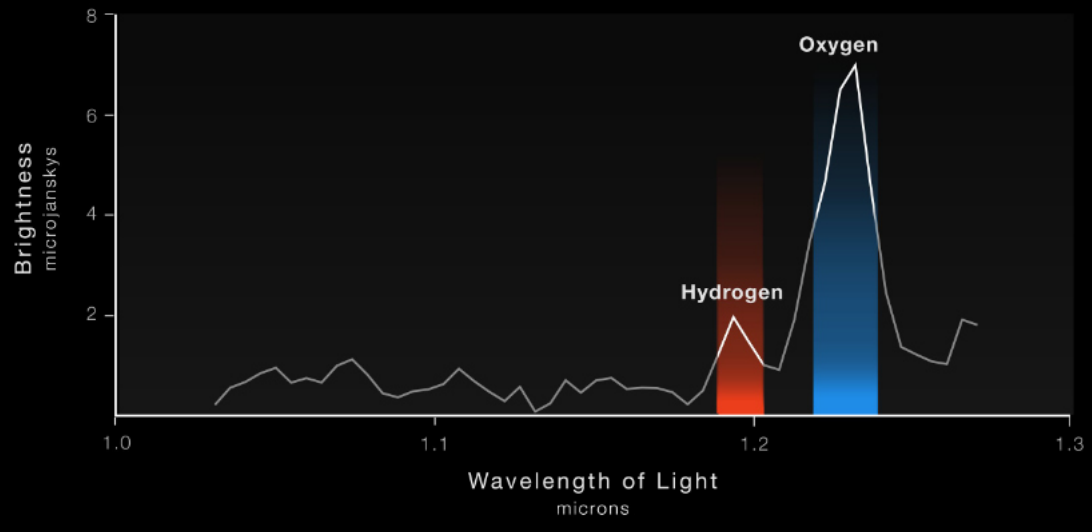
S ARE THE SAME GALAXY

NIRISS Grism



NIRISS Wide Field Slitless Spectroscopy





WEBB
SPACE TELESCOPE

Astrophotography

M57 by Ethan Johnson using Hyde's eVScope. Exposure time: 4 minutes.

Astrophotography

M51 by Ethan Johnson using Hyde's eVScope. Exposure time: 11 minutes.

Astrophotography

Milky Way at RMSS, June 24, 2022, James Quach.

Canon EOS 5DS-R with the Rokinon SP 10mm f/3.5 lens (130˚ angle of view) at f/3.5, 30 seconds, ISO 1600 (I should have used ISO 2000 or 2500 as it was more underexposed than I wanted.) Lens wide open has more coma than the less expensive Rokinon/Samyang 14mm f/2.8 lens (115˚ angle of view).

Astrophotography

Albireo, by David Knisely.
Five second exposure, 9.25 inch f/10 SCT
using a Canon EOS Rebel XT Model 350D at ISO1600.

One Star Flies Past the Milky Way's Black Hole at 3% the Speed of Light

Carolyn Collins Petersen
Universe Today

There's a population of stars in the heart of our galaxy whipping around Sagittarius A* (the Milky Way's central supermassive black hole). Astronomers just found the closest, fastest one (so far). It's called S4716 and it orbits Sag A* once every four years. That makes it officially the fastest star moving at the heart of our galaxy. To give you some perspective, the Sun moves around the center of the galaxy at a much more leisurely pace once every 230 million years.

A Population of Squeezars

S4716 and its high-speed cluster neighbors have been dubbed "squeezars". The name was first suggested by scientists Tal Alexander and Mark Morris in 2003 to describe a class of star that follows a highly eccentric orbit (more elongated than circular) around a supermassive black hole. This cluster of stars fits that bill pretty well. They have really close orbits around Sag A*. The letter S in their names denotes that proximity.

Over the past decade, astronomers have identified this cluster, starting with a star called S2 they thought was the closest to the black hole. It was measured traveling at approximately 3% of the speed of light. Then, they found another one even closer to the black hole, and eventually identified others called S4714, S4711, S4713 and S4715—all moving quite fast. So, S4716 is just the latest discovery in the cluster of Sag A*-circling stars.

Why So Fast, Little Stars?

Why are the stars in the cluster zipping around like bees near a hive? It's all really just orbital mechanics. An orbiting object's speed is affected by the mass of the object being orbited and the radius of the orbiting body. In this case, we use the mass of the black hole and the radius of the star's orbit. Sag A* has a mass of about 4.1 million solar masses. That generates a tremendous gravitational pull, which affects the orbit of anything nearby. The closer a star gets to the black hole, the faster it orbits. And, that's why S4716 is moving so fast. It has an orbital radius (at its closest approach) of 100 astronomical units. That's only a hundred times the distance between Earth and the Sun—pretty darned small in astronomical terms.

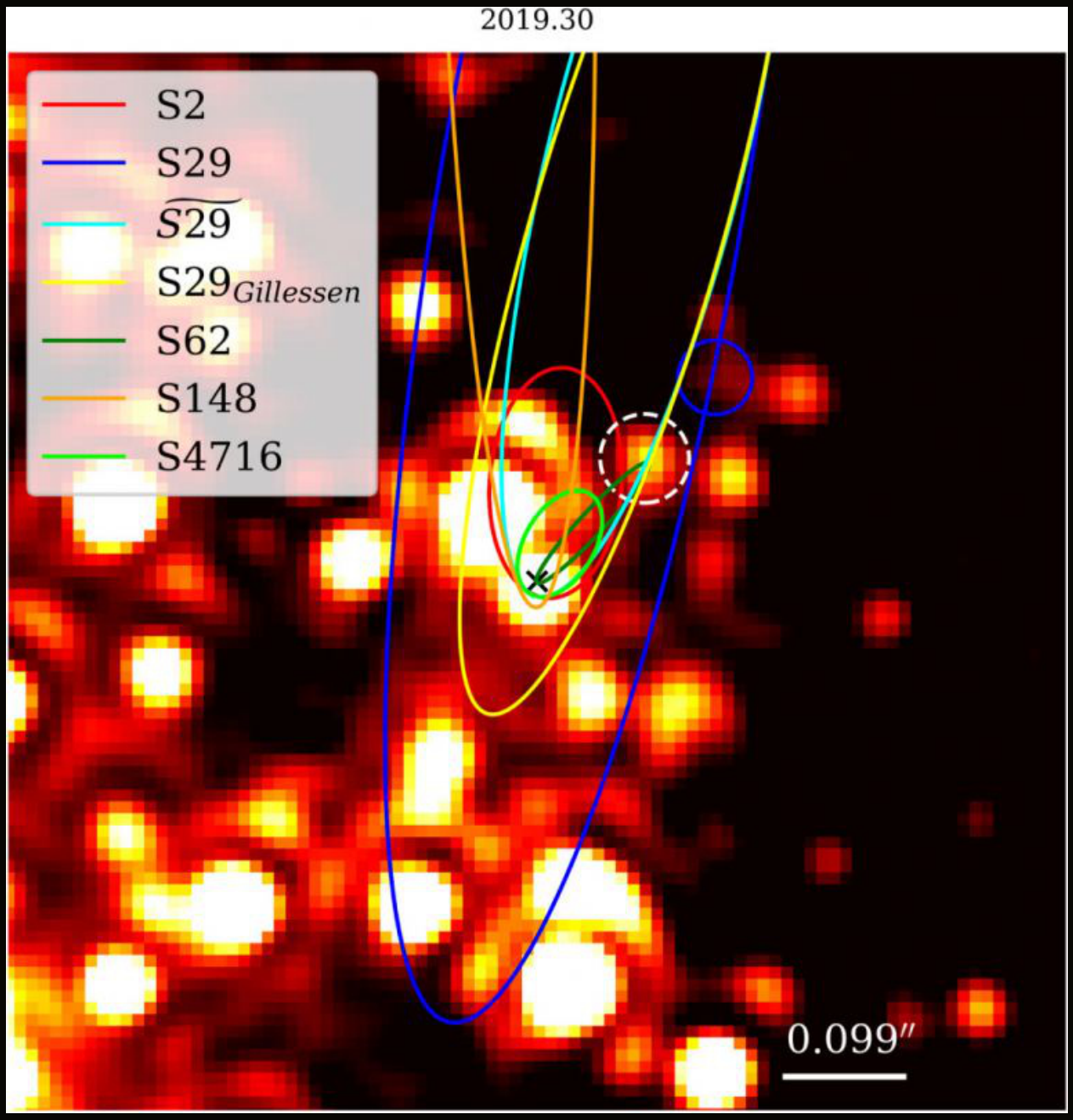
Researchers at the University of Cologne and Masaryk University in Brno (Czech Republic) observed the star and analyzed their data to figure out its orbital radius and speed. That's how they clocked it moving at a very small fraction of the speed of light.

Tracking the Latest Squeezar and What Its Existence Means

To get their observations, the astronomers used five telescopes on Mauna Kea (Hawai'i) and in Chili, equipped with special instruments that let them measure the star's motion. They combined four of these telescopes into one giant eye on the sky to get more details. Then they applied specific algorithms to analyze the data and understand the orbit of the star. Finding one so close was still a surprise to the team. "For a star to be in a stable orbit so close and fast in the vicinity of a supermassive black hole was completely unexpected and marks the limit that can be observed with traditional telescopes," said Florian Peissker, leader of the research team.

One question that astronomers keep asking is how these stars got so

close to the black hole. It's not likely they formed there since the action of the black hole disrupts star-forming factories. That prevents stars from being born in the near vicinity of Sag A*. But, there's another explanation. "The short-period, compact orbit of S4716 is quite puzzling," said team member Michael Zajacek, an astrophysicist at Masaryk University. "Stars cannot form so easily near the black hole. S4716 had to move inwards, for example by approaching other stars and objects in the S cluster, which caused its orbit to shrink significantly."



The K-band (near-infrared) view of the GC observed with NIRC2 (Keck) in 2019.30. This image is high-pass filtered and shows the position of several S stars close to Sgr A, which is indicated by a black cross. Note that the newly discovered S4716 (lime green elliptical orbit) is the smallest and closest to Sgr A*. Here north is up and east is to the left. Credit: The Astrophysical Journal (2022). DOI: 10.3847/1538-4357/ac752f*

From the Archives

July, 1986

(These notes were provided by Ron Veys in his very own handwriting. The Secretary / Editor is grateful to Veys for taking the meeting minutes for him, but takes no responsibility for interpreting certain indecipherable words found in the meeting notes., Ed.)

The meeting was called to order at PRECISELY 7:30pm, whereupon the Annual picnic at Wagontrain was discussed and set up for August starting at 6pm.

It was reported that John Lortz preparing the new member packets that they would be ready by the meeting.

Earl Moser gave a report on the Mid-States Convention held at Columbia, MO which approximately 90 people attended. Earl mentioned seeing a slide of Halleys Comet taken by the Russian spacecraft which looked like “a bread loaf chewed by mice.” Next year the convention will be in Kansas City.

Curt Rolle sent the club a letter which Andy read to the members.

Lee Thomas then took over the meeting and talked about the proposed observing site.

Here are some of the questions discussed..

- an inactive Atlas missile site owned by the Firth Co-op, 2 miles southwest of Firth and approx 25 miles south of Lincoln.

- Advantages... It is in a section of land away from lights and has a paved road right into it, has lots of concrete pads and some very dark skies. However the site has vandalized and there is a shaft could be somewhat dangerous.

- Commitments: need legal advice.

- Need to do: determine the extent of the vandalism and see what security measures would have to be taken, determine what liability insurance we would need, secure the shaft entrance, determine the condition of the road and the easement agreement for the road.

- Info from attorney... extent of club liability, would we be able to get liability insurance.

- Taxes… about $287/yr, could we get out of taxes somehow.

Following the discussion motions were passed by a quorum of the club members (19/48)..

MOTION (by Dave Knisely) the club will proceed and file a feasibility study (up to $500 for legal fees) by August 26th. (Second by Jack Dunn, vote was unanimous in Favor of).

MOTION (by Russ Genzmer): the Board of Directors can examine the results of the study and determine whether to make an offer for a maximum of 5 acres for a maximum of $200/ acre.

(Second by Dave Knisely, vote was unanimous in Favor of). After all discussion ended, Dan Neville provided the evenings program concerning his 6 inch planetary telescope.

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.

ADDRESS

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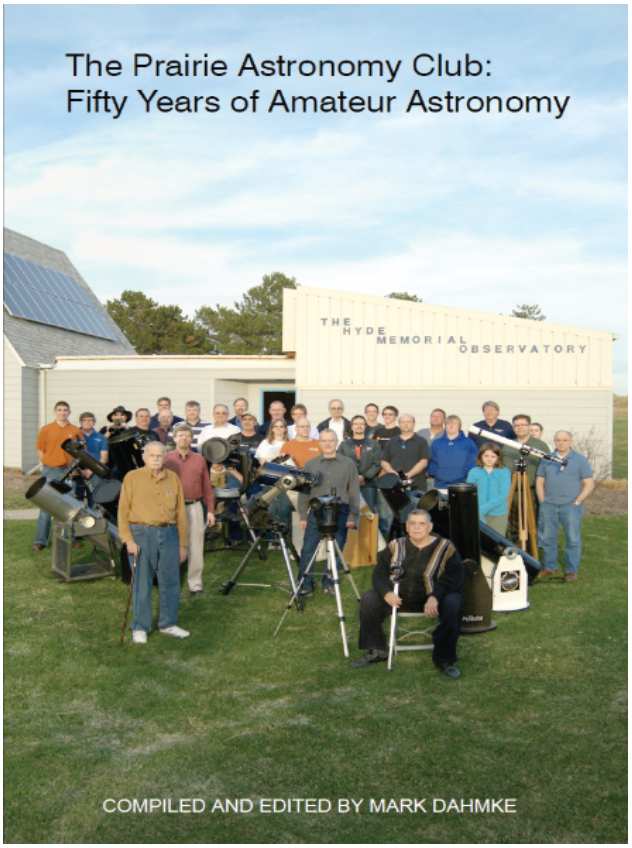
CLUB TELESCOPES

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.