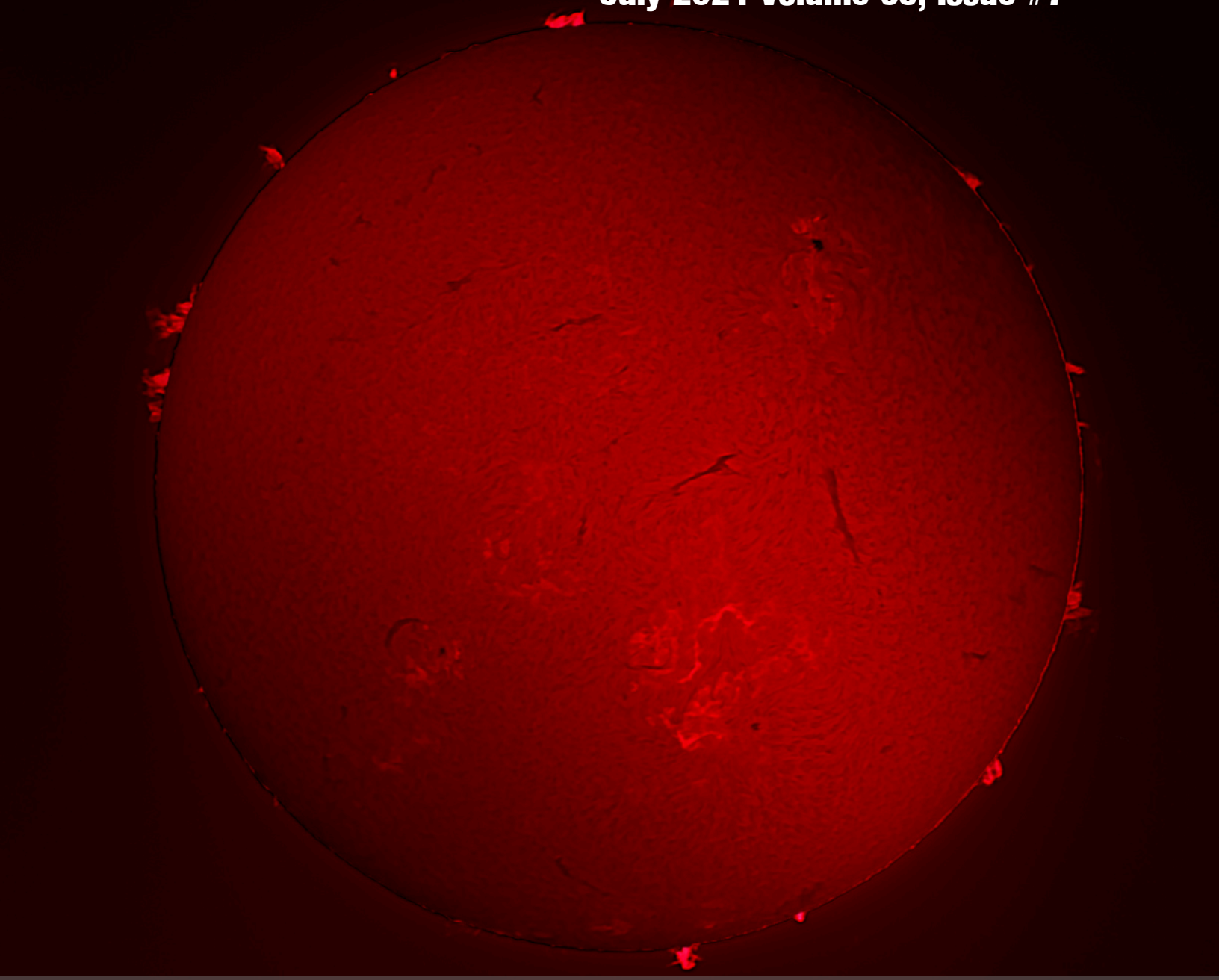
The Prairie Astronomer

July 2024 Volume 65, Issue #7



IN THIS ISSUE:

The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

The next club meeting is August 27th at 7:30pm at Hyde Observatory

NEXT MEETING AND PROGRAM

Please note that since the Nebraska Star Party is the week of July 28th, our **July meeting has been canceled.**

The next regular meeting will be in August.

UPCOMING PROGRAMS

August: Lunar Photogrammetry by Mark Dahmke, and NSP review

CONTENTS

Cover: Solar prominences - by Brett Boller

Background photo: Brett Boller

CALENDAR

Nebraska Star Party
July 28-August 2, Merritt Reservoir, Valentine, NE

PAC Meeting
Tuesday, August 27th, 7:30pm at Hyde Observatory
Lunar Photogrammetry: 3D Views of Apollo landing sites created from Apollo Mission Photos.- Mark Dahmke

PAC Meeting
Tuesday, September 24th, 7:30pm at Hyde Observatory

Most of our club meetings are held at Hyde Memorial Observatory in Holmes Park.

The Observatory is owned and maintained by the City of Lincoln Parks and Recreation Department, but is operated by volunteers, many of whom are also members of the Prairie Astronomy Club.

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

Night Sky Network

www.prairieastronomyclub.org

2024 STAR PARTY DATES

	Date	Date
January	5	**12**
February	2	**9**
March	1	**8**
April	3/29	**5**
May	4/26	**3**
June	5/31	**7**
July	6/28	**5**
NSP	**7/28**	**8/2**
August	7/26	**2**
September	8/30	**6**
October	9/26	**4**
November	11/22	**29**
December	20	**27**

Dates in BOLD are closest to the New Moon.

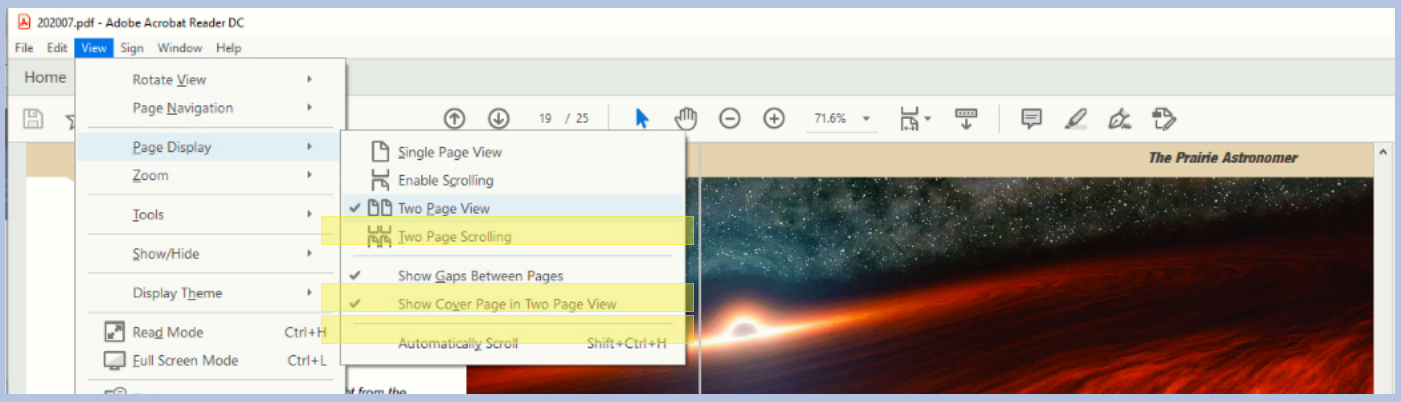
CLUB OFFICERS

President	Jason O'Flaherty jflaher@gmail.com
Vice President	Brett Boller proboller86@yahoo.com
2nd VP (Program Chair)	Bill Lohrberg wmlohrberg89@gmail.com
Secretary	Jim White jrwhite2188@gmail.com
Treasurer	John Reinert jr6@aol.com
Club Observing Chair	Jim Kvasnicka jim.kvasnicka@yahoo.com
Outreach Coordinator	Don Hain dhain00@gmail.com
Website and Newsletter Editor	Mark Dahmke mark@dahmke.com

Notices

Newsletter Page View 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 available online: https://newsletters.prairieastronomyclub.org/

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

The President's Message

Jason O'Flaherty

Dear PAC Members,

I hope this letter finds you well and that you are enjoying the summer skies. As we gaze up at the stars, here's a little chuckle for you: Why did the astronaut break up with his girlfriend? Because he needed space!

I want to remind everyone that there will not be a monthly meeting this month due to the Nebraska Star Party. I'll be attending for a few days and hope to see many of you there. We usually set up on a hill towards the entrance of the observing field so we can enjoy the night sky together as a club. This is your official invitation to join us if you'd like!

Remember to take plenty of photos and videos if you attend. In August, our meeting will feature a sharing session where we'll showcase the photos and videos taken by club members over the summer. Please submit your contributions to me by August 15th so I can compile them for the meeting. Club Member Mark Dahmke will also be giving a presentation on photogrammetry at the same meeting.

Wishing you all safe travels, clear skies, and cool weather!

Jason O'Flaherty

New Members

Welcome to the club!

Camille Owens, Lincoln, NE

ARP 69

The Mantrap Skies Image Catalog

Arp 69/NGC 5579 is located in Bootes. By redshift, it is about 173 million light-years distant. By Tully-Fisher it is only 130 million light-years away. Flip a coin? Arp put it in his category of spirals with small high surface brightness companions on an arm. There is a companion but it isn't exactly on an arm. It is LEDA 214249 and has a redshift distance of 170 million light years so shares about the same redshift as Arp 69 thus likely is a true companion. Arp has another category this could go in, 3 armed spirals. It might also fit his one heavy arm category for the long south going arm that is rather J shaped. NED and Seligman classes it as SABcd. NGC project Sc. I prefer NED's classification.

Did the companion have anything to do with the distortion of Arp 69? On one hand, it is very low mass and doesn't look disturbed. On the other, it is very blue indicating strong star formation is going on. Still, I doubt it had anything to do with Arp 69's present condition. The Kanipe-Webb book indicates it resembles many very early

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.

ARP69, continued.

galaxies seen in the Hubble Ultra Deep Field image. An early galaxy seen in today's universe. In the early universe, galaxies were gobbling up their smaller siblings at a high rate leading to rather distorted galaxies. The universe was much smaller then so galaxies were rather tightly packed making this rather common. It may just be Arp 69 is still digesting some small galaxies, similar to the companion. Certainly, star formation is going on in it at a very high rate which a recent meal could easily cause. If you want an external candidate better than the companion look to the northeast. PGC 051285 is a very distorted, sliver of a galaxy beyond the orange star, at virtually the same redshift as Arp 69. Arp 69 was discovered by William Herschel on May 1, 1785. It is not in either of the Herschel 400 observing programs.

Northeast of Arp 69 is a galaxy cluster anchored by a large galaxy. Both are 2.3 million light-years distant. The cluster is MaxBCG J215.23106+35.23001 with 24 members. No size is given but it appears rather condensed around the position of the core galaxy from my image.

Just southeast of Arp 69 is a somewhat elongated, but nearly starlike object I've listed as both a galaxy and a candidate BLAGN (BLAGN stands for Broad L Active Galactic Nucleus, often indicating a quasar). Some catalogs list it as a galaxy, NED lists it both. Since it is elongated and not a point source it appears some hint of the galaxy harboring the black hole is seen. It is quite close, as quasars go at only 2.5 billion light-years. At magnitude 19.5 it is quite faint for a quasar as well. Must be nearly out of fuel.

A couple NGC galaxies are in the image and several more are just outside its borders. This area would be great for someone with a near one degree FOV with quite a few major galaxies besides Arp 69 in the frame. The other two NGC galaxies each have two different NGC entries. NGC 5588 was first seen by William Herschel on May 1, 1785 and given the NGC 5589 entry. Later on May 9, 1826 his son John recorded it as a different galaxy causing the NGC 5588 entry. Later on April 24, 1827 he recorded it again but at the right position. Apparently not realizing it was the same as the one he say 11 months earlier. A similar father son mix-up happened with 5580/90. William saw it first on May 1, 1785 resulting int the NGC 5590 entry. John saw it on May 9, 1826 and recorded it as the same galaxy his dad saw earlier (note this is the same night he didn't do this with the other galaxy. But then on April 27, 1827 he recorded it at a slightly wrong location not realizing it was the same galaxy and thus it got the NGC 5580 entry. Neither of these two are in a Herschel 400 observing program.

While many galaxies in the field had distance data and are listed in the annotated image some rather bright ones did not. In fact, most of these

didn't even have a catalog entry that was more than its position. The lone exception is shown near the bottom left of center with its PGC number and no distance.

I'm often asked how deep do these images go. The faintest object with a magnitude given is a quasar northeast of NGC 5580/90 with a magnitude listed by Sloan as being 23.1 in their green filter. It's also the most distant object with a redshift of over 4 which puts it at over 12 billion light-years distant. This image was taken on April 20, 2010. Then lost on my hard drive until 2016. Back then I had much dryer skies with great transparency. Today I've usually got hazy skies which make it hard to reach even magnitude 22 much to my dismay. The haze seems to have come with warmer weather than we had for decades prior to about 5 years ago. Global warming? If so things will only be getting worse. Doesn't help that seeing has gone down as well which means stars are larger and thus fainter also limiting how faint I can go for point sources. This doesn't bother faint objects that aren't point sources as to how faint I can go but does mean fine detail in them is lost.

August Observing

Jim Kvasnicka

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

Planets

Mercury: At inferior conjunction on August 19, best in morning sky at month's end.

Venus: Evening planet at magnitude -3.8. Sets 40 minutes after the Sun.

Mars: Morning planet at magnitude +0.8.

Jupiter: Morning planet in Taurus at magnitude -2.3 and a disk 38.4" wide. On August 14 Jupiter is next to Mars and both will fit in the same FOV in your telescope.

Saturn: Morning planet at magnitude +0.6 with a disk 19.2" wide.

Uranus and Neptune: Morning planets.

Meteor Showers

Perseids: Peaks the night of August 11-12. Expect up to 90 meteors per hour. The Moon will not interfere, the first quarter Moon will set before midnight.

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.

Focus on Observing Programs

Jim Kvasnicka

Asterism Observing Program

People have looked at the night sky since the beginning of time and used their imagination to create pictures using the stars. Over time these pictures were better defined and organized into the constellations we know today. We identify pictures within the bigger picture as asterisms.

Asterisms are a group of stars that appear to be associated with each other, but are not. The best known asterism is the Big Dipper. The Big Dipper is just a small portion of the larger constellation Ursa Major. We continue to use our imagination to create pictures in the night sky. This program was designed to help everyone appreciate the beauty and uniqueness the night sky offers us.

To qualify for the Asterism Observing Program you must observe and sketch 100 asterisms from the list of 112 asterisms. You can use your own observing logs as long as they provide the following information: date, time, location, seeing conditions, equipment used, magnification, asterism observed, and a simple sketch of the asterism.

At least 5 Naked-Eye asterisms from the list must be submitted. GO-TO and PUSH-TO telescopes are not allowed in finding the asterisms.

Once you complete the Asterism Observing Program you will need to submit your observing logs to me for review. I will contact the Asterism Observing Program chair for approval. Once I receive your certificate and pin I will present them to you at the next PAC meeting.

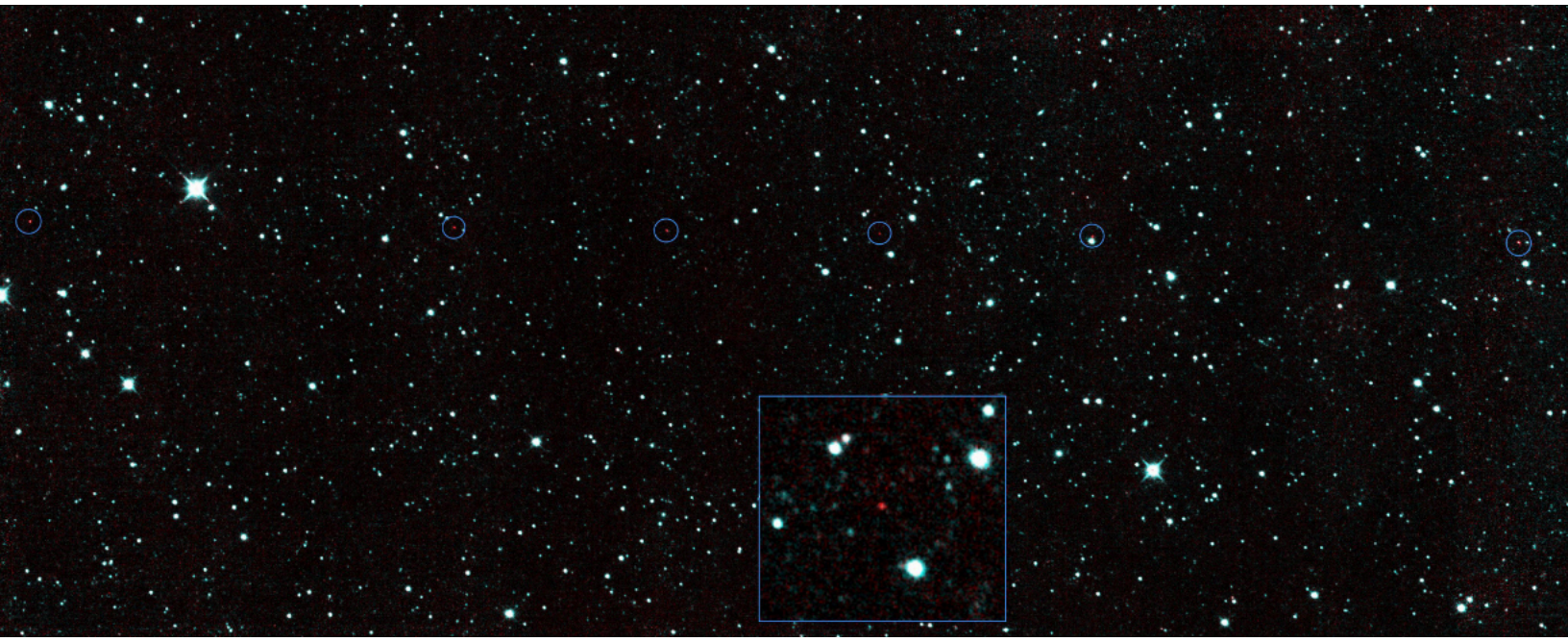
Amateur image of asterism Collinder 399 and surroundings. Photo by Petr Novák. This file is licensed under the Creative Commons Attribution-Share Alike 4.0 International license.

NASA's NEOWISE Infrared Heritage Will Live On

NASA's near-Earth-object-hunting mission NEOWISE is nearing its conclusion. But its work will carry on with NASA's next-generation infrared mission: NEO Surveyor.

After more than 14 successful years in space, NASA's NEOWISE (Near-Earth Object Wide-field Infrared Survey Explorer) mission will end on July 31. But while the mission draws to a close, another is taking shape, harnessing experience gained from NEOWISE: NASA's NEO Surveyor (Near Earth Object Surveyor), the first purpose-built infrared space telescope dedicated to hunting hazardous near-Earth objects. Set for launch in late 2027, it's a major step forward in the agency's planetary defense strategy.

"After developing new techniques to find and characterize near-Earth objects hidden in vast quantities of its infrared survey data, NEOWISE has become key in helping us develop and operate NASA's next-generation infrared space telescope. It is a precursor mission," said Amy Mainzer, principal investigator of NEOWISE and NEO Surveyor at the University of California, Los Angeles. "NEO Surveyor will seek out



The six red dots in this composite picture indicate the location of the first new near-Earth asteroid, called 2013 YP139, as seen by NASA's NEOWISE. Moving across a background of stars, the six red dots in this composite picture indicate the location of six sequential detections of the first near-Earth object discovered by NEOWISE after the spacecraft came out of hibernation in 2013: the asteroid 2013 YP139. The inset shows a zoomed-in view of one of the detections. Credit: NASA/ JPL-Caltech

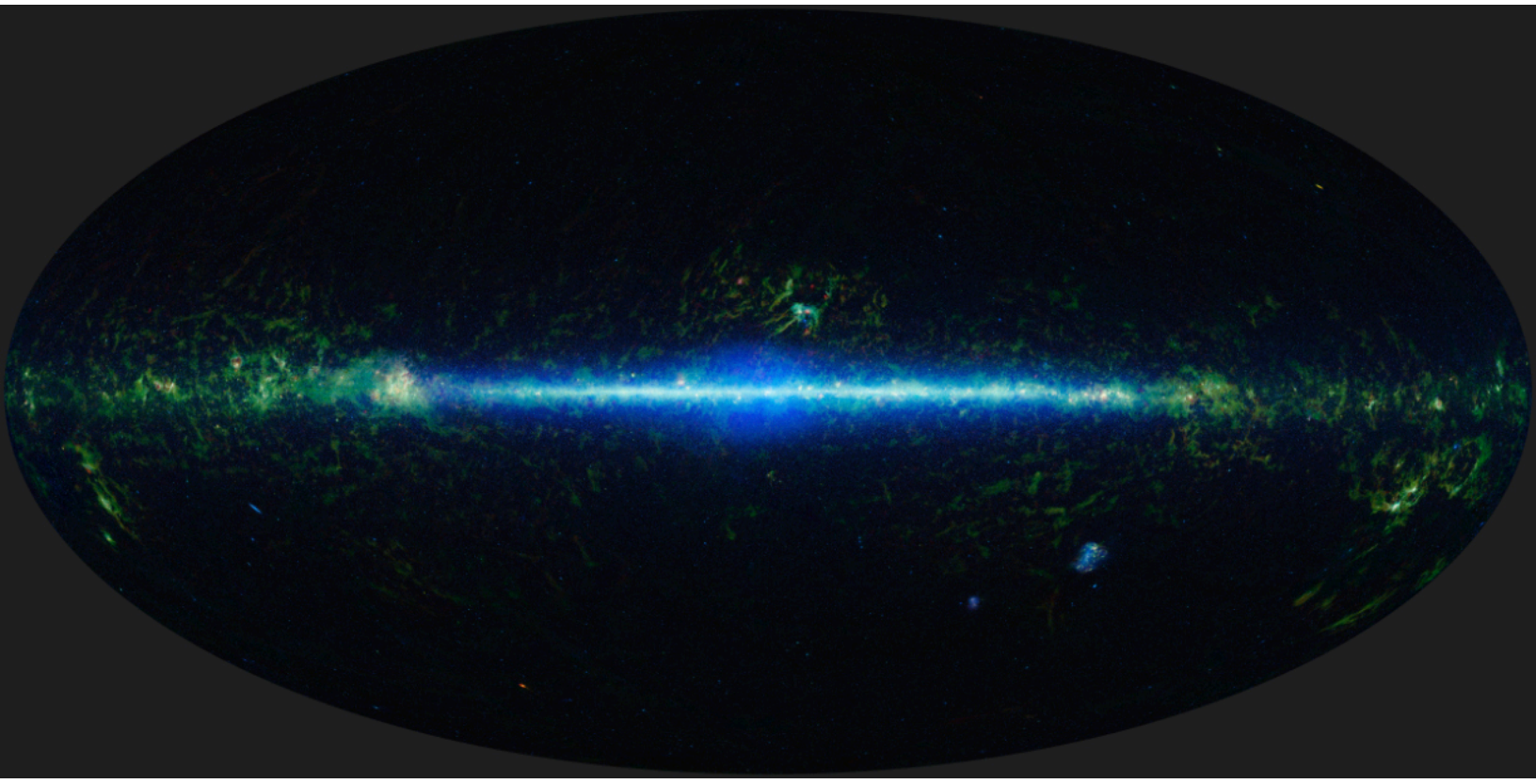
Neowise, continued.

the most difficult-to-find asteroids and comets that could cause significant damage to Earth if we don't find them first."

WISE Beginnings

NEOWISE's end of mission is tied to the Sun. About every 11 years, our star experiences a cycle of increased activity that peaks during a period called solar maximum. Explosive events, such as solar flares and coronal mass ejections, become more frequent and heat our planet's atmosphere, causing it to expand. Atmospheric gases, in turn, increase drag on satellites orbiting Earth, slowing them down. With the Sun currently ramping up to predicted maximum levels of activity, and with no propulsion system for NEOWISE to keep itself in orbit, the spacecraft will soon drop too low to be usable.

The infrared telescope is going out of commission having exceeded scientific objectives for not one, but two missions, beginning as



Observed by NASA's WISE mission, this image shows the entire sky seen in infrared light. Running through the center of the image and seen predominantly in cyan are the stars of the Milky Way. Green and red represent interstellar dust. Credit: NASA/JPL-Caltech/UCLA

Neowise, continued.

WISE (Wide-field Infrared Survey Explorer).

Managed by NASA's Jet Propulsion Laboratory in Southern California, WISE launched in December 2009 with a six-month mission to scan the entire infrared sky. By July 2010, WISE had achieved this with far greater sensitivity than previous surveys, and NASA extended the mission until 2011.

During this phase, WISE studied distant galaxies, outgassing comets, exploding white dwarf stars, and brown dwarfs. It identified tens of millions of actively feeding supermassive black holes. It also generated data on circumstellar disks — clouds of gas, dust, and rubble spinning around stars — that citizen scientists continue to mine through the Disk Detective project.

In addition, it excelled at finding main belt asteroids, as well as near-Earth objects, and discovered the first known Earth Trojan asteroid. What's more, the mission provided a census of dark, faint near-Earth objects that are difficult for ground-based telescopes to detect, revealing that these objects constitute a sizeable fraction of the near-Earth object population.

Infrared Heritage

Invisible to the naked eye, infrared wavelengths are emitted by warm objects. To keep the heat generated by WISE itself from interfering with its infrared observations, the spacecraft relied on cryogenic coolant. By the time the coolant had run out, WISE had mapped the sky twice, and NASA put the spacecraft into hibernation in February 2011.

Soon after, Mainzer and her team proposed a new mission for the spacecraft: to search for, track, and characterize near-Earth objects that generate a strong infrared signal from their heating by the Sun.

"Without coolant, we had to find a way to cool the spacecraft down enough to measure infrared signals from asteroids," said Joseph Masiero, NEOWISE deputy principal investigator and a scientist at IPAC, a research organization at Caltech in Pasadena, California. "By commanding the telescope to stare into deep space for several months, we determined it would radiate only enough heat to reach lower temperatures that would still allow us to acquire high-quality data." NASA reactivated the mission in 2013 under the Near-Earth Object Observations Program, a precursor to the agency's current planetary defense program, with the new name NEOWISE.

By repeatedly observing

Neowise, continued.

the sky from low Earth orbit, NEOWISE has made 1.45 million infrared measurements of over 44,000 solar system objects to date. That includes more than 3,000 NEOs, 215 of which the space telescope discovered. Twenty-five of those are comets, among them the famed comet NEOWISE that was visible in the night sky in the summer of 2020.

"The spacecraft has surpassed all expectations and provided vast amounts of data that the science community will use for decades to come," said Joseph Hunt, NEOWISE project manager at JPL. "Scientists and engineers who worked on WISE and through NEOWISE also have built a knowledge base that will help inform future infrared survey missions."

The space telescope will continue its survey until July 31. Then, on Aug. 8, mission controllers at JPL will send a command that puts NEOWISE into hibernation for the last time. Since its launch, NEOWISE's orbit has been dropping closer to Earth. NEOWISE is expected to burn up in our planet's atmosphere sometime between late 2024 and early 2025.

More About the Mission

NEOWISE and NEO Surveyor support the objectives of NASA's Planetary Defense Coordination Office (PDCO) at NASA Headquarters in Washington. The NASA Authorization Act of 2005 directed NASA to discover and characterize at least 90% of the near-Earth objects more than 140 meters (460 feet) across that come within 30 million miles (48 million kilometers) of our planet's orbit. Objects of this size can cause significant regional damage, or worse, should they impact the Earth.

JPL manages and operates the NEOWISE mission for PDCO within the Science Mission Directorate. The Space Dynamics Laboratory in Logan, Utah, built the science instrument. Ball Aerospace & Technologies Corp. of Boulder, Colorado, built the spacecraft. Science data processing, archiving, and distribution is done at IPAC at Caltech. Caltech manages JPL for NASA.

NASA's Webb Investigates Eternal Sunrises, Sunsets on Distant World

Near-infrared spectral analysis of terminator confirms differences in morning and evening atmosphere

Researchers using NASA's James Webb Space Telescope have finally confirmed what models have previously predicted: An exoplanet has differences between its eternal morning and eternal evening atmosphere. WASP-39 b, a giant planet with a diameter 1.3 times greater than Jupiter, but similar mass to Saturn that orbits a star about 700 light-years away from Earth, is tidally locked to its parent star. This means it has a constant dayside and a constant nightside—one side of the planet is always exposed to its star, while the other is always shrouded in darkness.

Using Webb's NIRSpec (Near-Infrared Spectrograph), astronomers confirmed a temperature difference between the eternal morning and eternal evening on WASP-39 b, with the evening appearing hotter by roughly 300 Fahrenheit degrees (about 200 Celsius degrees). They also found evidence for different cloud cover, with the forever morning portion of the planet being likely cloudier than the evening.

Astronomers analyzed the 2- to 5-micron transmission spectrum

of WASP-39 b, a technique that studies the exoplanet's terminator, the boundary that separates the planet's dayside and nightside. A transmission spectrum is made by comparing starlight filtered through a planet's atmosphere as it moves in front of the star, to the unfiltered starlight detected when the planet is beside the star. When making that comparison, researchers can get information about the temperature, composition, and other properties of the planet's atmosphere.

"WASP-39 b has become a sort of benchmark planet in studying the atmosphere of exoplanets with Webb," said Néstor Espinoza, an exoplanet researcher at the Space Telescope Science Institute and lead author on the study. "It has an inflated, puffy atmosphere, so the signal coming from starlight filtered through the planet's atmosphere is quite strong."

Previously published Webb spectra of WASP-39b's atmosphere, which revealed the presence of carbon dioxide, sulfur dioxide, water vapor, and sodium, represent the entire day/night boundary – there was no detailed attempt to differentiate between one side and the other.

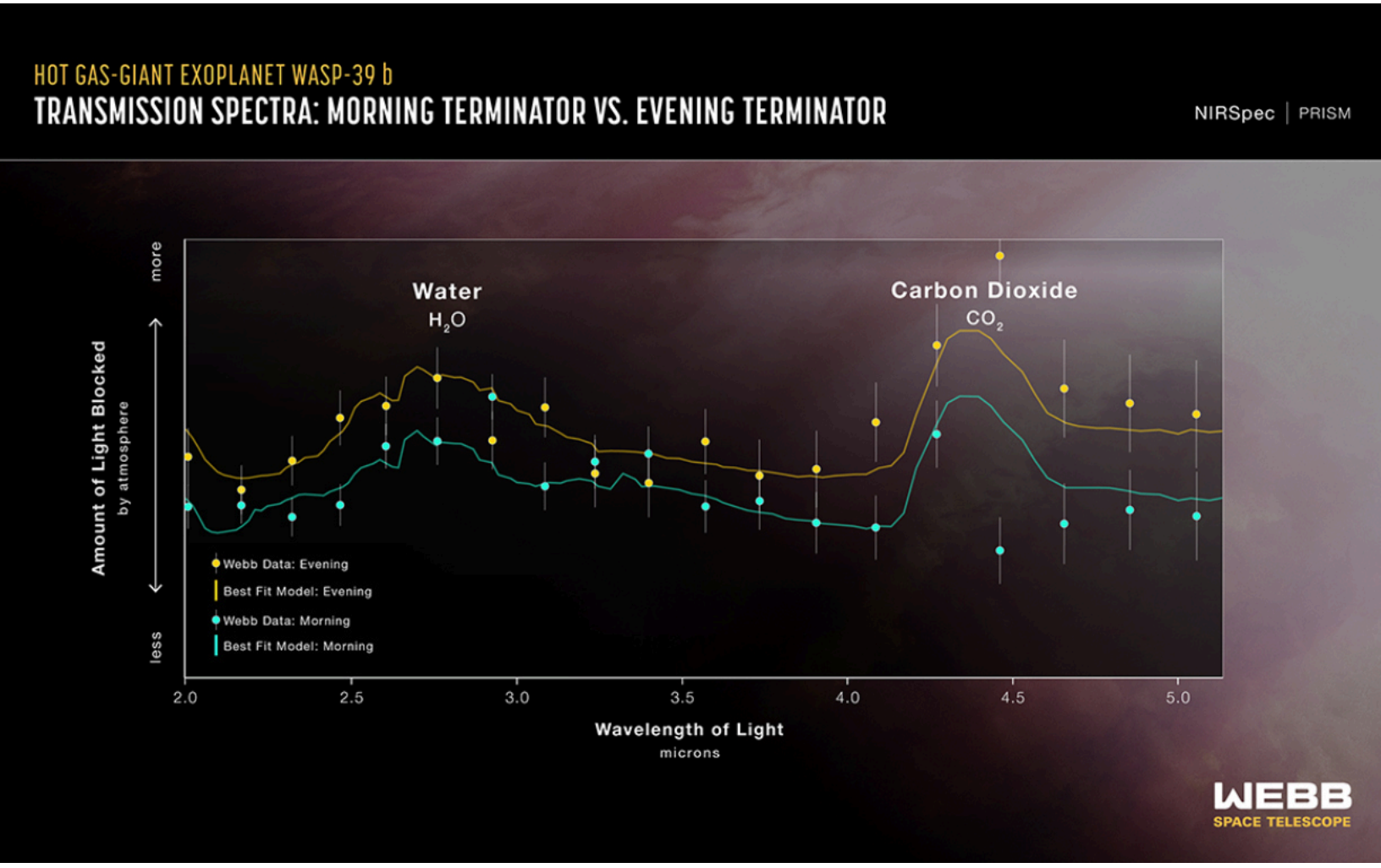
Now, the new analysis builds two different spectra from the terminator region, essentially splitting the day/night boundary into two semicircles, one from the evening, and the other from the morning. Data reveals the evening as significantly hotter, a searing 1,450 degrees Fahrenheit (800 degrees Celsius), and the morning a relatively cooler 1,150 degrees Fahrenheit (600 degrees

Webb, continued.

Celsius).

"It's really stunning that we are able to parse this small difference out, and it's only possible due Webb's sensitivity across near-infrared wavelengths and its extremely stable photometric sensors," said Espinoza. "Any tiny movement in the instrument or with the observatory while collecting data would have severely limited our ability to make this detection. It must be extraordinarily precise, and Webb is just that."

Extensive modeling of the data obtained also allows researchers to investigate the structure of WASP-39 b's atmosphere, the cloud cover, and why the evening is hotter. While future work by the team will study how the cloud cover may affect temperature, and vice versa, astronomers confirmed gas



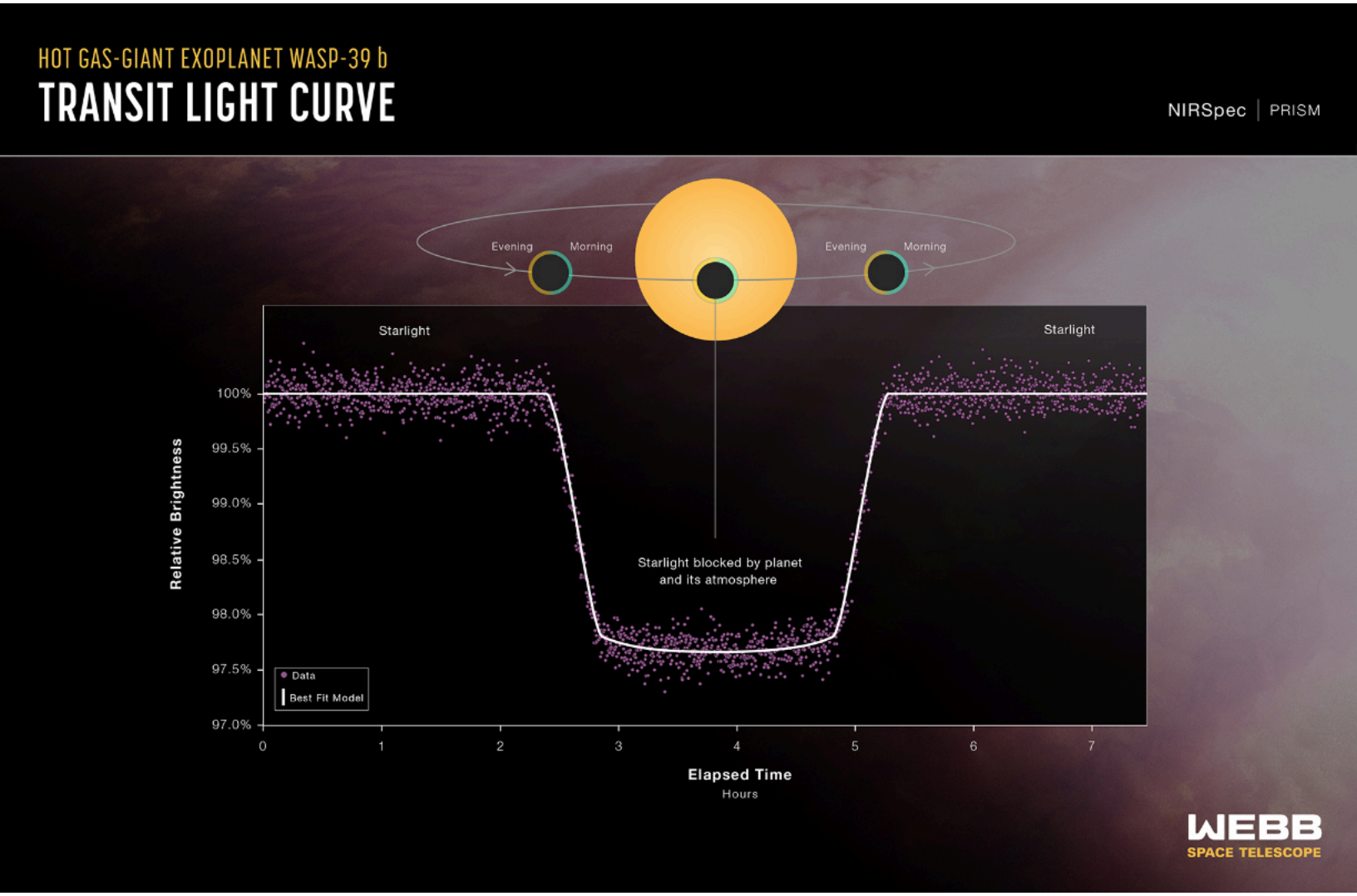
This transmission spectrum, captured using Webb's NIRSpec (Near-Infrared Spectrograph) PRISM bright object-time series mode, shows the amounts of different wavelengths (colors) of near-infrared starlight blocked by the atmosphere of hot gas giant exoplanet WASP-39 b. The spectrum shows clear evidence for water and carbon dioxide, and a variation in temperature between the morning and evening on the exoplanet. NASA, ESA, CSA, R. Crawford (STScI)

Webb, continued.

circulation around the planet as the main culprit of the temperature difference on WASP-39 b.

On a highly irradiated exoplanet like WASP-39 b that orbits relatively close to its star, researchers generally expect the gas to be moving as the planet rotates around its star: Hotter gas from the dayside should move through the evening to the nightside via a powerful equatorial jet stream. Since the temperature difference is so extreme, the air pressure difference would also be significant, which in turn would cause high wind speeds.

Using General Circulation Models,



A light curve from NASA's James Webb Space Telescope's NIRSpec (Near-Infrared Spectrograph) shows the change in brightness from the star system over time as the planet transited the star. This observation was made using NIRSpec's bright object time-series mode, which uses a grating to spread out light from a single bright object (like the host star of WASP-39 b) and measure the brightness of each wavelength of light at set intervals of time.

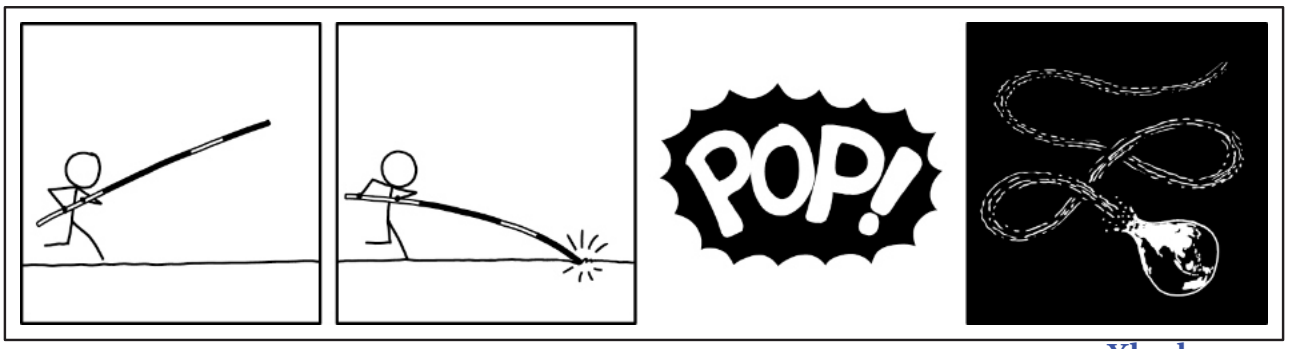
Webb, continued.

3-dimensional models similar to the ones used to predict weather patterns on Earth, researchers found that on WASP-39 b the prevailing winds are likely moving from the night side across the morning terminator, around the dayside, across the evening terminator and then around the nightside. As a result, the morning side of the terminator is cooler than the evening side. In other words, the morning side gets slammed with winds of air that have been cooled on the nightside, while the evening is hit by winds of air heated on the dayside. Research suggests the wind speeds on WASP-39 b can reach thousands of miles an hour!

"This analysis is also particularly interesting because you're getting 3D information on the planet that you weren't getting before," added Espinoza. "Because we can tell that the evening edge is hotter, that means it's a little puffier. So, theoretically, there is a small swell at the terminator approaching the nightside of the planet."

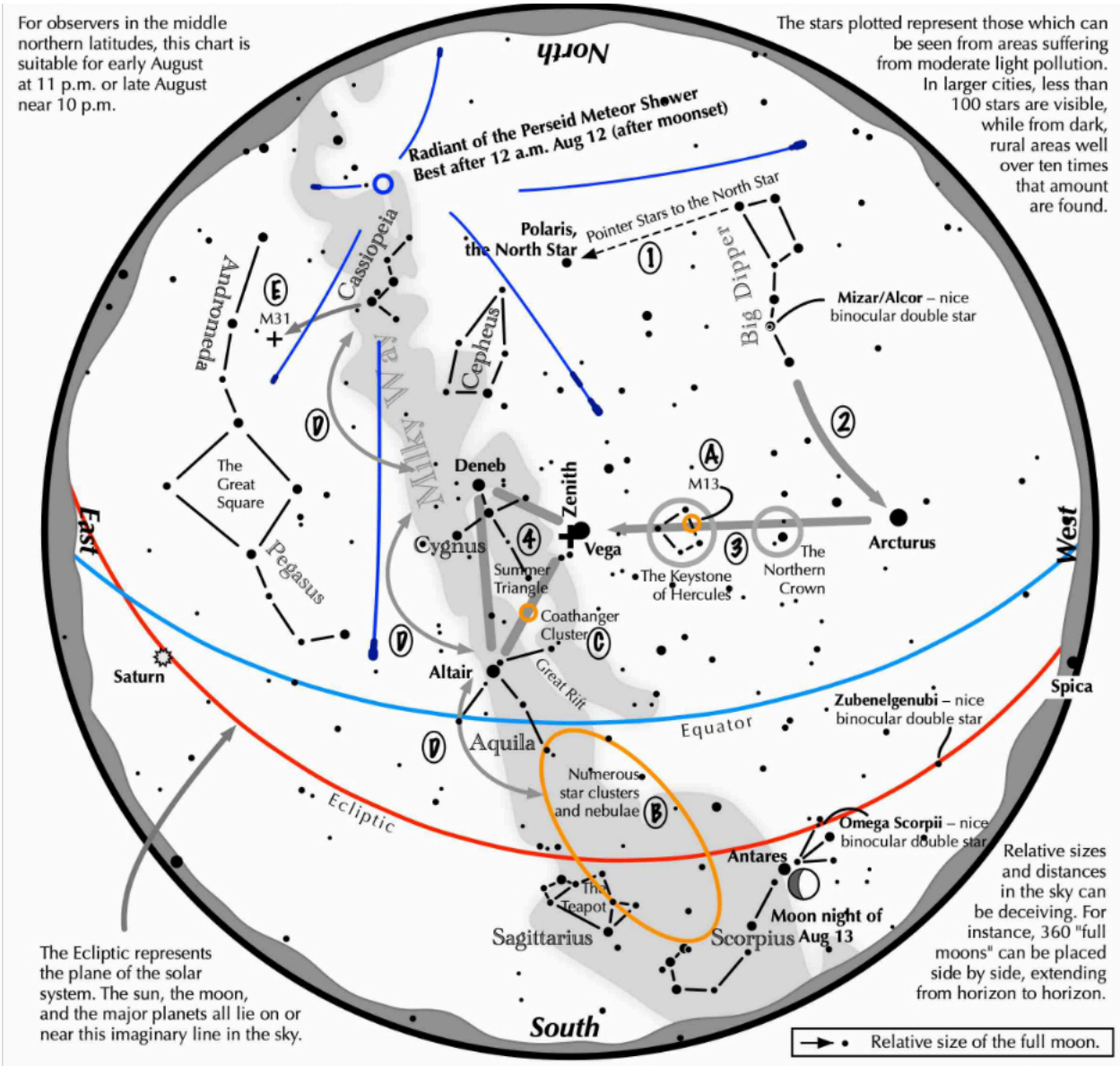
The team's results have been published in Nature. The researchers will now look to use the same method of analysis to study atmospheric differences of other tidally locked hot Jupiters, as part of Webb Cycle 2 General Observers Program 3969. WASP-39 b was among the first targets analyzed by Webb as it began regular science operations in 2022. The data in this study was collected under Early Release Science program 1366, designed to help scientists quickly learn how to use the telescope's instruments and realize its full science potential.

The James Webb Space Telescope is the world's premier space science observatory. Webb is solving mysteries in our solar system, looking beyond to distant worlds around other stars, and probing 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).



Xkcd.com

Navigating the mid August Night Sky



Navigating the mid August night sky: Simply start with what you know or with what you can easily find.

1. Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the June evening sky.
3. To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
4. High in the East lies the summer triangle stars of Vega, Altair, and Deneb.

Binocular Highlights

A: On the western side of the Keystone glows the Great Hercules Cluster.
B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

Hyde Observatory Needs You!

Volunteer at Hyde

Our crew of unpaid volunteers share an interest in Astronomy and they enjoy passing on that interest to the public.

- [x] You don't need to be an expert in astronomy or telescopes. **We'll teach you what you need to know.**

- [x] Volunteers start as telescope operators on the observing deck, which involves keeping one of the three telescopes focused on the sky objects we are showing and explaining them to our visitors. Experienced volunteers can become Deck Leaders who determine what objects to train the telescopes on, and answer the really difficult questions.

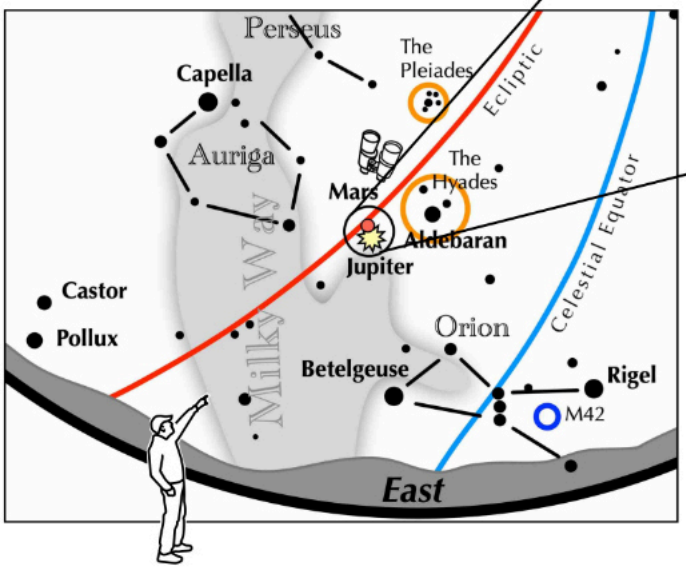
For more information, visit our website

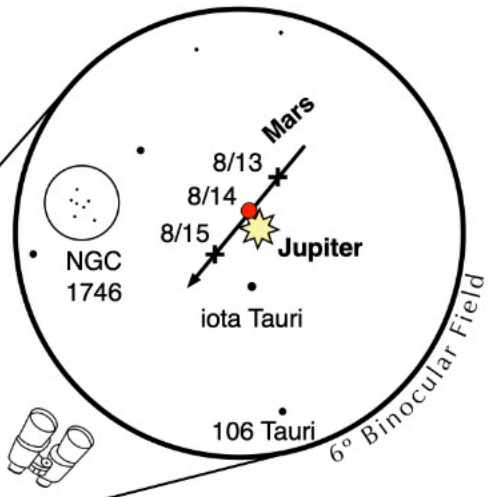
Astronomical League Outreach

If you can view only one celestial event this month, view this one.

A slowly brightening Mars passes immediately north of the much brighter Jupiter.

1. Look to the east 90 minutes before sunrise on August 13, 14, and 15.
2. Find Mars and Jupiter shining left of the red star Aldebaran. Mars' brightness will nearly match that of Aldebaran.

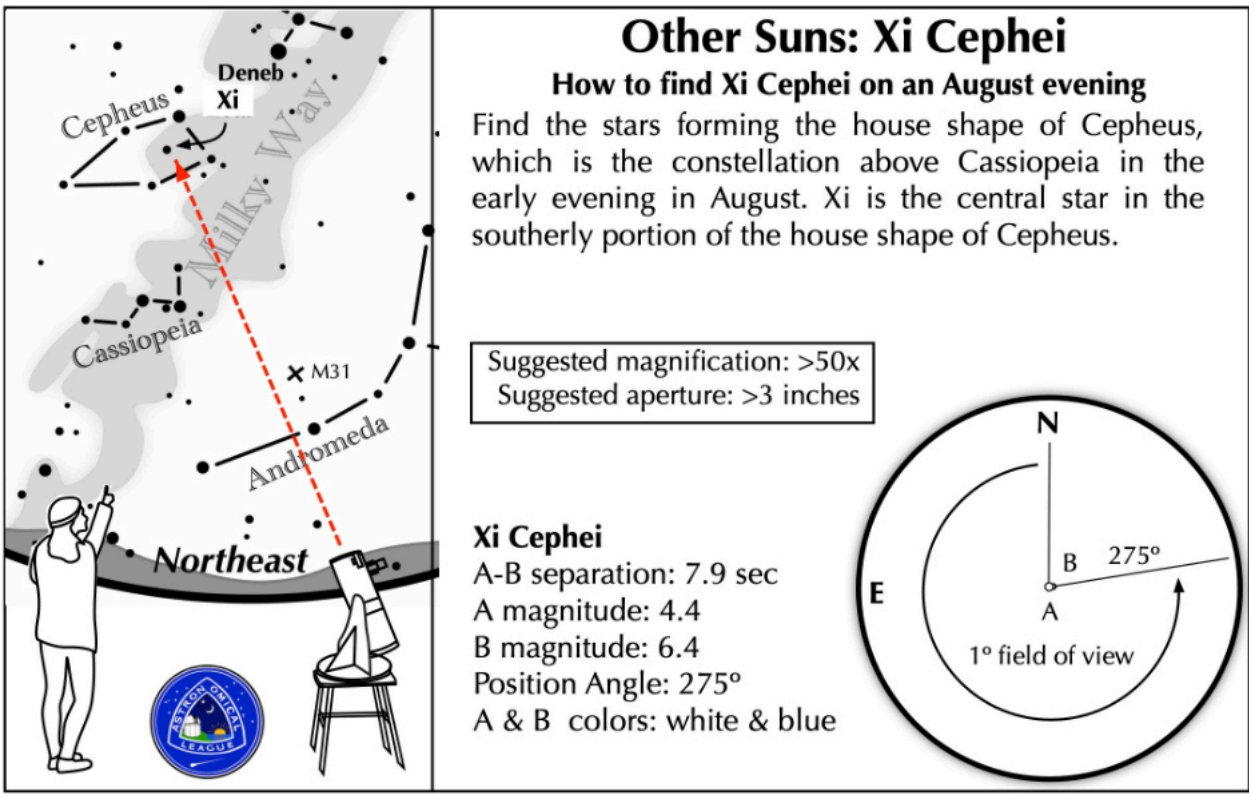




Binocular View

3. Aim binoculars at Mars and Jupiter.
4. On the morning of August 14, they will be only 20 minutes apart.
5. They will be just 1.5° southwest of the open cluster NGC 1746.
6. A telescope at > 100 power will reveal Mars' tiny red disk and Jupiter's larger disk along with its four Galilean moons.

Astronomical League Double Star Challenge



evScope Pad Installed at Hyde Observatory

A 16' x 16' pad has been installed on the east side of the observatory

Astrophotography

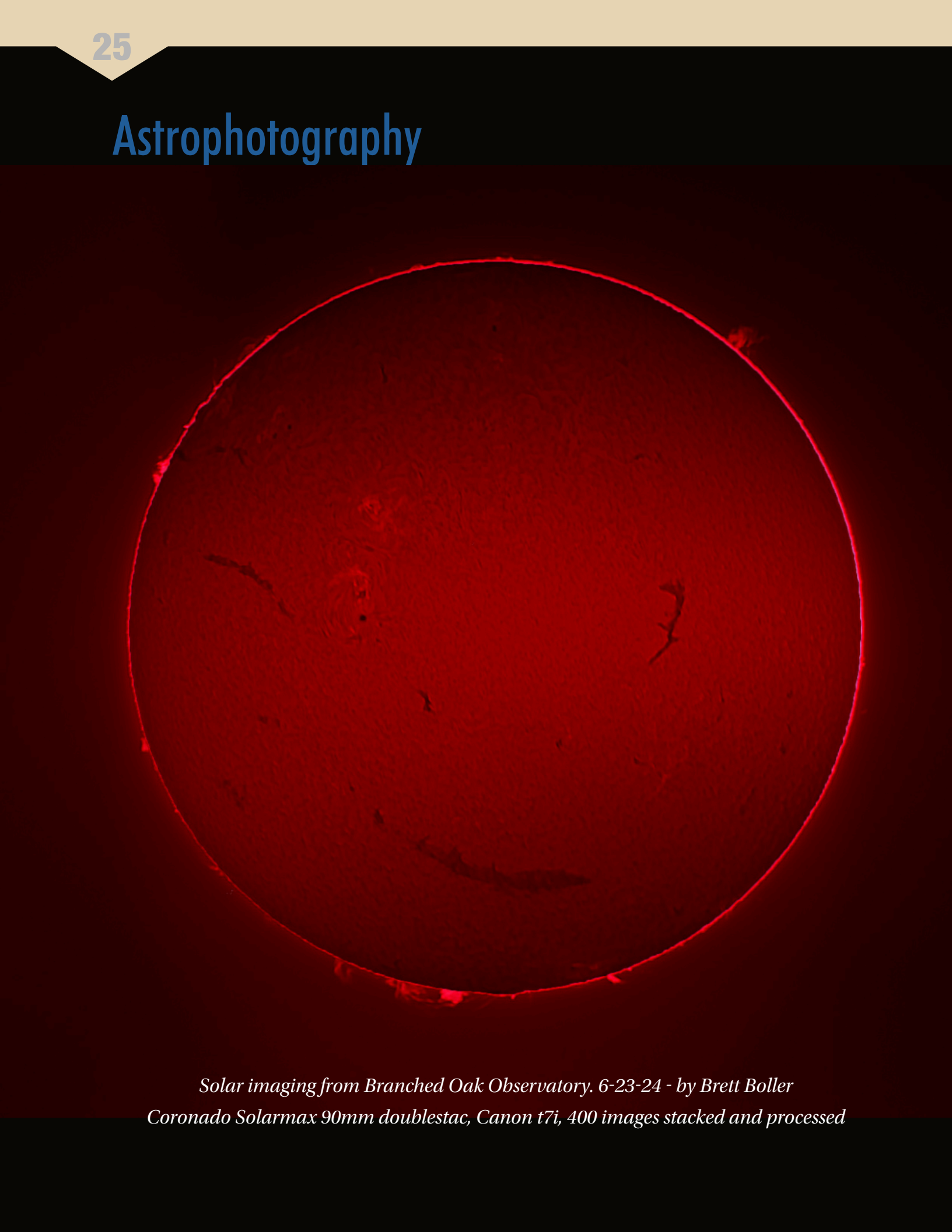
NGC 6946, The Fireworks Galaxy - by Jim White.

I took this on 6/30/2024 from my back patio in Lincoln. The image is 79 - 2 minute exposures along with 25 each darks, flats and flat darks. All of the processing was done in Pixinsight. This was taken using a Celestron 925 EdgeHD with a ZWO ASI2400MC Pro color camera and a Celestron Off-Axis guider with a ZWO174MM Mini monochrome guide camera on a Celestron CGX mount. The camera gain was set at 140 and cooling was at -10 degrees C. Software for camera, guiding and mount control were CPWI, Stellarium, PHD2 and N.I.N.A.

Astrophotography

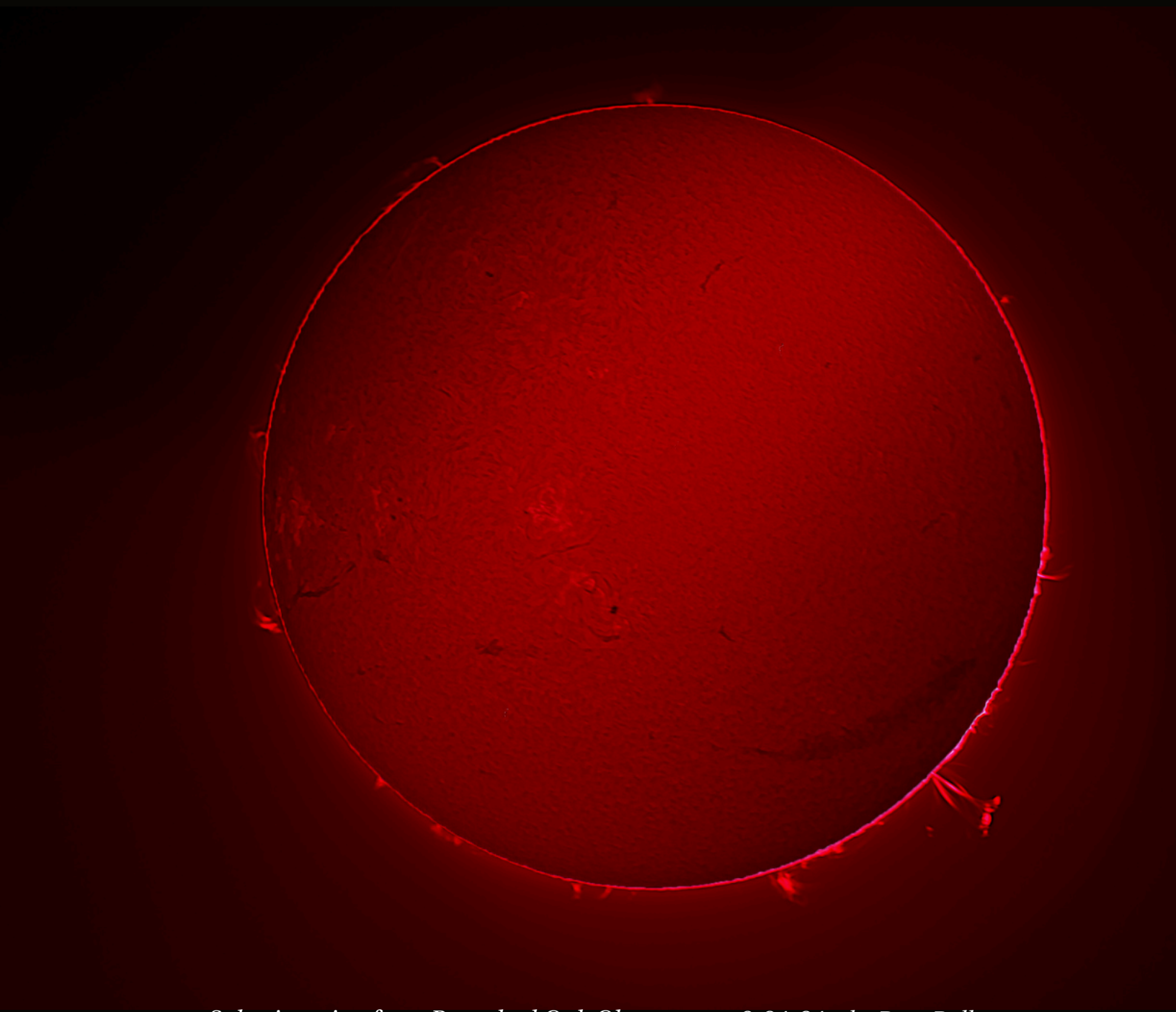
M27 - Tasty Cosmic apple - by Leona Barratt
Vespera 1 - 4 hours - 200mm - post processing in Photoshop

Astrophotography



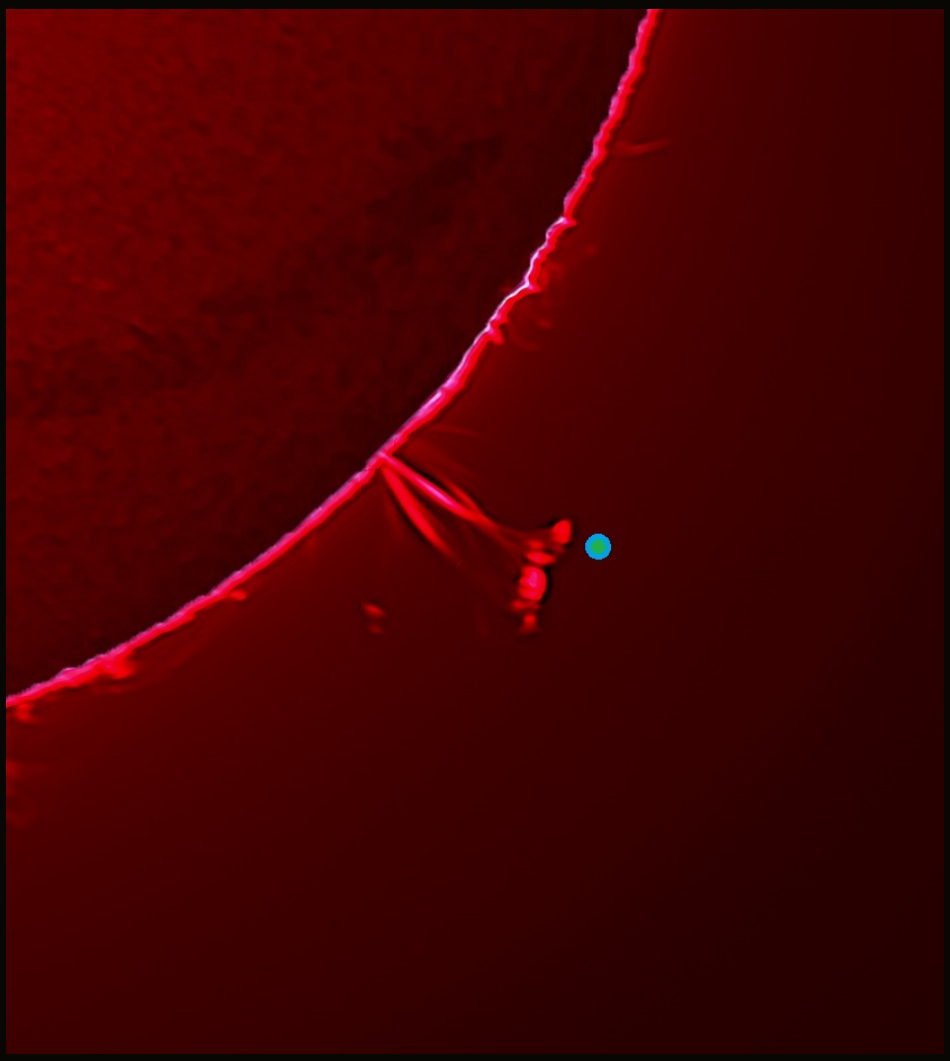
Solar imaging from Branched Oak Observatory. 6-23-24 - by Brett Boller
Coronado Solarmax 90mm doublestac, Canon t7i, 400 images stacked and processed

Astrophotography



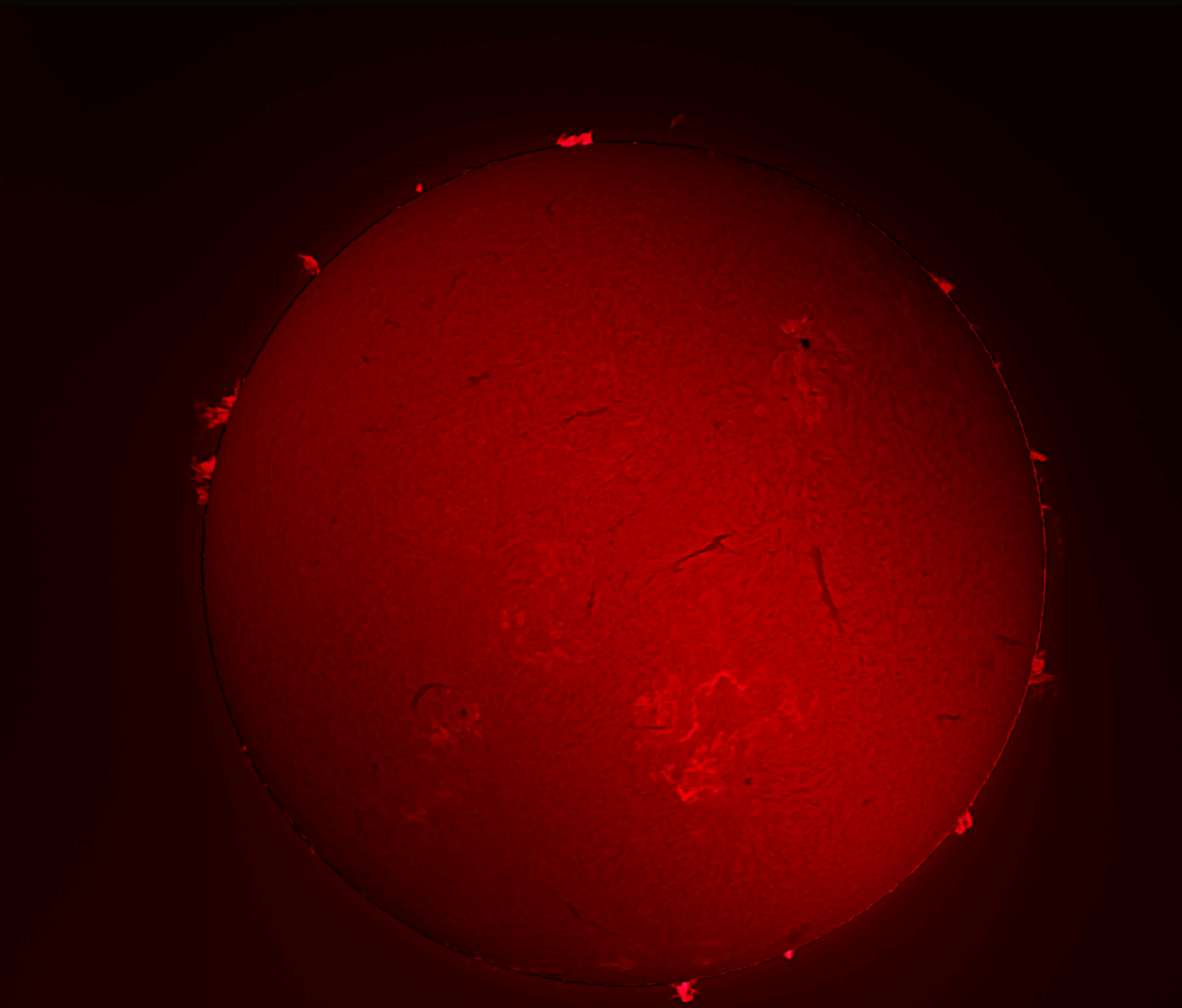
Solar imaging from Branched Oak Observatory. 6-24-24 - by Brett Boller. Coronado Solarmax 90mm doublestack. Canon t7i, 1100 images stacked and processed. Could be the longest solar prominence I've ever seen. My estimate is around 96,000 miles reaching off the surface of the sun. The Earth is 7,917.5 miles in diameter. 2nd picture represents the size of this compared to the Earth.

Astrophotography



Solar imaging from Branched Oak Observatory. 6-24-24 - by Brett Boller. Coronado Solarmax 90mm doublestack. Canon t7i, 1100 images stacked and processed. Could be the longest solar prominence I've ever seen. My estimate is around 96,000 miles reaching off the surface of the sun. The Earth is 7,917.5 miles in diameter. 2nd picture represents the size of this compared to the Earth.

Astrophotography



Solar imaging from Branched Oak Observatory.76-13-24 - by Brett Boller
Coronado Solarmax 90mm doublestac, Canon t7i, 720 images stacked and processed

August Night Sky Notes: Seeing Double

Kat Troche

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!

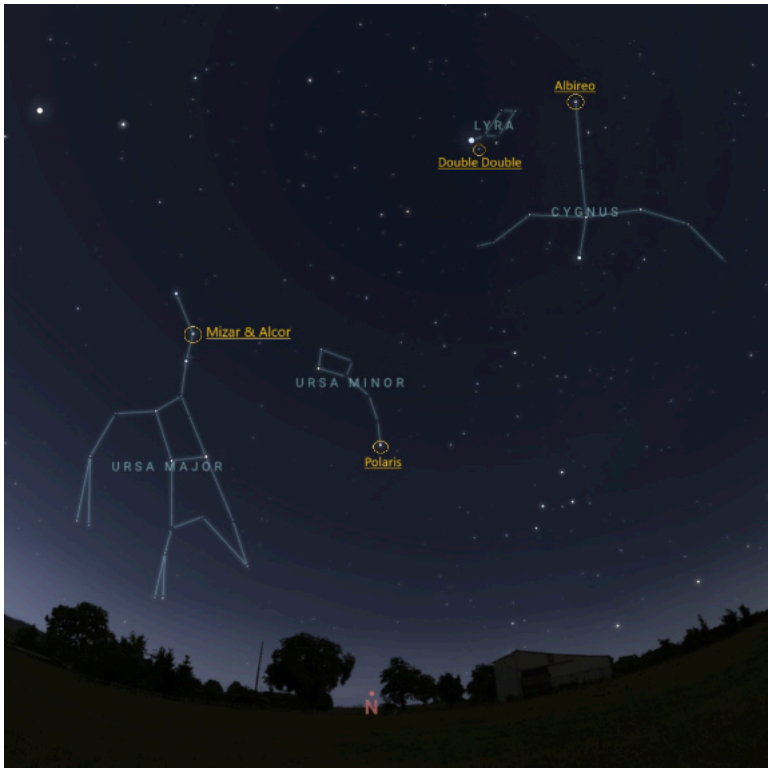
During the summer months, we tend to miss the views of Saturn, Jupiter and other heavenly bodies. But it can be a great time to look for other items, like globular star clusters such as Messier 13, open star clusters such as the Coma Star Cluster (Melotte 111), but also double stars!

What Are Double Stars?

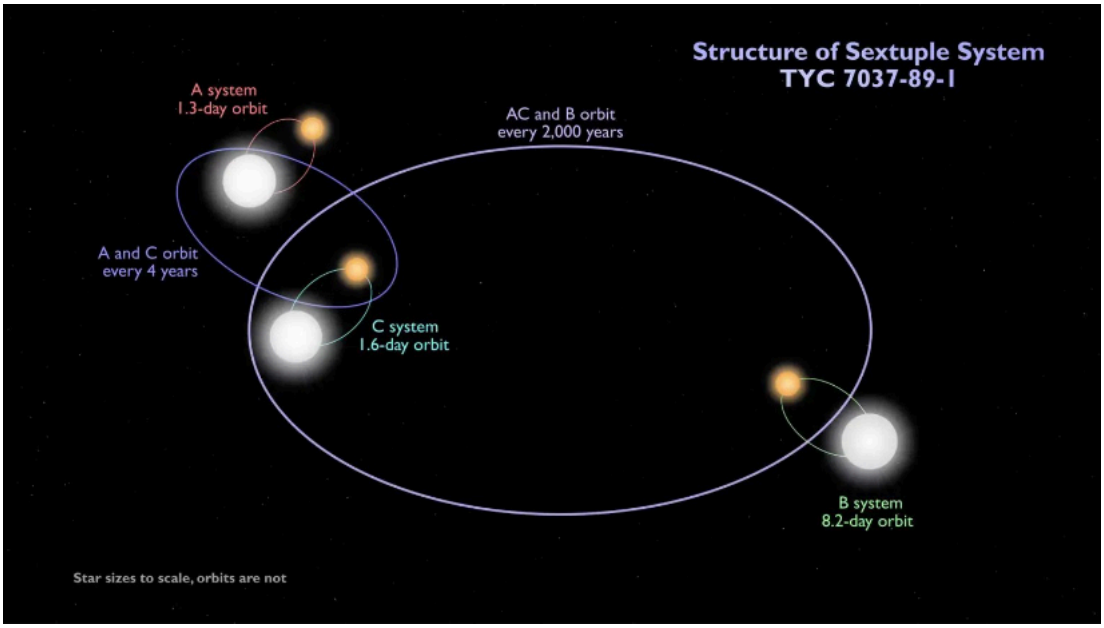
If you have seen any movies or read any books that refer to having two suns in the sky, that would be a double star system. These star systems typically come in two types – binary and optical doubles. Binary stars are two stars that are gravitationally bound and orbit each other, and optical double stars only appear to be close together when viewed from Earth, but in reality, are extremely far apart from another, and are not affected by each other's gravity. With a small telescope, in moderately light polluted skies, summer offers great views of these stellar groupings from the Northern Hemisphere:

- Double Double: also known by its technical name, Epsilon Lyrae, this multiple star system appears as one star with naked eye observing. But with a small telescope, it can be split into 'two' stars. A large telescope reveals Epsilon Lyrae's secret – what looks like a single star is actually a quadruple star system!
- Albireo: a gorgeous double star set – one blue, one yellow – in the constellation Cygnus.
- Polaris: while technically a multiple star system, our North Star can easily be separated from one star to two with a modest telescope.
- Mizar and Alcor: located in the handle of the Big Dipper, this pair can be seen with the naked eye.

Aside from looking incredible in a telescope or binoculars, double stars help astronomers learn about measuring the mass of stars, and about stellar evolution. Some stars orbit each other a little too closely, and things can become disastrous, but overall, these celestial bodies make for excellent targets and are simple crowd pleasers.



Mid-August night sky constellations with the following multiple star systems highlighted: the Double Double in Lyra, Albireo in Cygnus, Polaris in Ursa Minor, Mizar and Alcor in Ursa Major. Credit: Stellarium Web



This schematic shows the configuration of the sextuple star system TYC 7037-89-1. The inner quadruple is composed of two binaries, A and C, which orbit each other every four years or so. An outer binary, B, orbits the quadruple roughly every 2,000 years. All three pairs are eclipsing binaries. The orbits shown are not to scale. Credit: NASA's Goddard Space Flight Center

From the Archives

July, 1999

You Know You're an Amateur Astronomer When...

- you plan all your vacations around New Moon.
- you can't recognize any of your friends in the daylight.
- you have a dog named Sirius.
- the first thing you do when buying a new car is measure the back seat to make sure your scope will fit.
- your PIN number is your favorite NGC object.
- you start talking like Jack Horkheimer around your co-workers.
- you buy a surface-to-air missile launcher because you're tired of planes ruining your photos.
- you force the Greyhound driver to pull over at gunpoint because a comet is rising.
- you hate Christmas because of all the extra lights.
- you can identify 8 species of owl by their calls.
- you replace your car's headlights with red bulbs.
- you try to buy a Nagler with food stamps.
- you thought the movie "Space Jam" was a documentary about the early universe.
- you buy your kid a 20-inch "starter scope" for his sixth birthday.
- you know all the Greek lower case letters, but none of the upper case.
- you ask your friend if she'll sew you a big black hood without any eye holes for your birthday.
- you have to explain to the police why you were prowling around wearing a black hood without any eye holes.
- you ask a complete stranger if you can use his bean field next Friday night.
- you travel to Namibia for the Gamma Normids every year.
- you have a copy of "Norton's" in your gym locker.
- you've been looking forward to an occultation of SAO95788 by asteroid 354 Eleonora for three months.
- you spend 18 hours on your weekend teaching your dog to hold a hair dryer in his teeth while standing on a bar stool. ("Why are you teaching Sirius to do that, Daddy?")
- the kids can't come on the Grand Canyon vacation because "there'd be no room for the scope!"
- you're coming home when your neighbor's getting up to go fishing.
- you buy your kid a Clyde Tombaugh lunchbox (R.I.P., Mr. T).
- you've gone through three lawn chairs in the past two years.

From the Beaver Valley Astronomy Club's Stargazer's Gazette

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

The Prairie Astronomer
c/o The Prairie Astronomy Club, Inc.
P.O. Box 5585
Lincoln, NE 68505-0585

info@prairieastronomyclub.org

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