



The Eyepiece

SW FL Astronomical Society, Inc.
3236 Forum Blvd #1160
Fort Myers, FL 33905



Editor - Mike Jensen

Hi Everyone!

Well, the eclipse is over and people are still talking about it! The snow-birds are back up north in their nests leaving paradise to us full-timers.

We have a real treat for you this month from a speaker's perspective! Nico Carver, a well known YouTube lecturer/instructor is speaking to us. Nico is known for his expertise in astrophotography but we are assured his program will be relevant to everyone! I hope can join us. If you like him, you can help support him by visiting his Patreon page at: [Patreon patreon.com/nebulaphotos](https://patreon.com/nebulaphotos)

WOW! Speaking of Astrophotography, (I know, this is my thing, but...) our club's astrophotographers have been very busy this month! Start-

ing on page 8

A scheduling note, this years July meeting is/was scheduled for the 4th of July. A club vote was taken at the April meeting and it was decided to cancel the July meeting.

Tom Segur and the Port Charlotte observing team will have two more events in May before taking the Summer off. Details on page 2.

Brian will be hosting a star party on May 4th at Seahawk Park. Details on the website. <https://theeyepiece.org/>

Many of you have been asking to see some of the photos I took on my trip to Antarctica last month. I've placed many of them on my website. [Click here to view them](#) if you're so inclined. Click on the Antarctica menu tab. Next trip, the Arctic Circle in July to see and photograph the polar bears, cariboo, beluga whales, narwal and other gifts from nature.

NGC3372 Carina Nebula by Michael DiMario

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Monthly Meetings

Our monthly meetings are held on the **first Thursday of each month.**
The meetings begin at 7:00pm.

Each meeting is usually a combined live and Zoom meeting.

The in person meeting is held at:
Calusa Nature Center/Planetarium
3450 Ortiz Ave,
Fort Myers, FL 33905

Below are the dates for the meet-
ings of 2024:

June 6, 2024
July - CANCELED
August 1, 2024

Here is the Zoom link:

<https://zoom.us/j/97435302223?pwd=Y3A2dlk2Q3M2eG1ENT-luOXp4TEZEQT09>

Passcode: 874185

Port Charlotte/Punta Gorda Observing Dates

Night Sky Observing At Moore Obser-
vatory & Solar Observing In PG & PC

Our Observatory Team opens up the Moore Observatory at FSW Charlotte Campus (26000 Airport Road, Punta Gorda) on the second Friday of each month. Observation sessions typically begin about 30-45 minutes after it is dark enough to see the stars and continue as long as stargazers linger. Prior to complete darkness, visitors can not be admitted into the observatory as the equipment needs to be setup and aligned with the stars each time but early arrivers are welcome to enjoy views of the lake and the scenery of the campus from the lakeside picnic tables. The public sessions are free and held weather permitting.

Here is the schedule for 2024:

- May 10, 2024

Our observing team also sets up solar telescopes on the 4th Saturday of the month (from 9am - Noon) to look at the Sun, looking for solar flares, prominences and other solar phenom-ena. All events are in Port Charlotte or Punta Gorda.

Solar Observing/Park

May 25, 2024 Gilchrist



President's Report

Brian Risley - President

The eclipse appears to have been a good event for most people. We had a good turnout at Centennial Park. My wife Chris and I along with Tony were at Centennial Park. Weather was good, just a few thin clouds. We had WINK-News, WFTX 36 and WGPU Radio come out. Several hundred people stopped by.

At the Seahawk Park star party we had a few members come out. We were able to locate the Comet very low on the horizon (Phil has a photo of it in the newsletter.) Clouds then moved in on us.

We are winding things down for the season, the Charlotte Country group has just a few more events in May and we have a May 4th Seahawk Park Star Party.



Comet 12P Pons Brooks by Phil Jansen

GUEST SPEAKER PRESENTATIONS SERIES

Here's our lineup for the "SWFAS Guest Speaker Presentations" series of talks. These will cover astronomical science and space exploration along with practical astronomy and astrophotography talks by various subject matter experts. We are lining up prominent scientists and researchers to explain the science and technology behind the exciting discoveries being made in recent years in astronomy.

The following presentations are already scheduled and we will be firming up talks in 2024 on a month-to-month basis.:

May 2, 2024

Nico Carver talk on Astrophotography

June 6, 2024

Dr. Mario Motta - Construction of the Home 32" Telescope

July - CANCELED

August -

Dr. Rana Ezzeddine - University of Florida, The Oldest Stars In The Universe

September -

Michael Dimario, SWFAS Member, Yerkes Observatory

Upcoming Speakers

Astrophotography by Nico Carver

Presented May 2, 2024

Nico Carver is a well known personality in the astrophotography world. With over 166 videos and 18 million views, his [YouTube channel](#) is VERY well watched and he hosts a number of other astrophotography tutorial and discussion venues. He states he tends to focus on education for beginners but as the channel has grown he's moved in to more advanced topics and is now testing new gear for the product companies.

Patreon

patreon.com/nebulaphotos

Discord

discord.gg/nebulaphotos

Website

nebulaphotos.com

Instagram

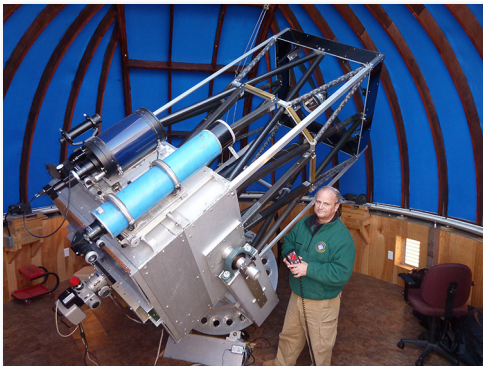
instagram.com/nebulaphotosdotcom



Construction of the 32" Home Telescope

Presented by Dr. Mario Motta

June 6, 2024



Mario tells a great story about the construction of his home telescope (after of course he built a home observatory). The telescope is completely homemade, including optics which were ground and polished by him.

Every part (680 of them) are either recycled scrap, new aluminum, or carbon fiber parts, manufactured at home on my lathe or milling machine.

The dome was also completely homemade.

The Oldest Stars In The Universe

Presented by Dr. Rana Ezzeddine,
Associate Professor, University of Florida

August 1, 2024



My scientific research covers a range of topics in stellar astrophysics. I am primarily interested in observing and interpreting the physical and chemical properties and signatures of first and second generation of stars, to decipher the observational evidence of early star formation, the origin and evolution of stellar populations, and the chemical enrichment events that lead to the present-day abundance distribution of elements via chemical evolution of the Galaxy.

Areas of Expertise

First and Second generation of stars, Origins and evolution of chemical elements, Nucleosynthesis and heavy element production via the r-process, Milky Way assembly and evolution, Stellar spectroscopy and atmospheric modeling.

The Astronomical League Report



The Astronomical League

As a member of the Southwest Florida Astronomical Society you are automatically also a member of the Astronomical League, a nationwide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you including receipt of The Reflector, the AL's quarterly newsletter, use of the Book Service, through which you can buy astronomy related books at a 10% discount. You can also participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others. To learn more about the Astronomical League and its benefits for you, [visit http://www.astroleague.org](http://www.astroleague.org)



RASC 2024 Observer's handbooks & Calendars

The Astronomical League announced in late September that the USA Version of the RASC (Royal Astronomical Society of Canada) 2024 Observer's Handbooks and Calendars are available for PRE-ORDER on the League Sales web store at

<https://store.astroleague.org/>

https://store.astroleague.org/index.php?main_page=index&cPath=12

The Astronomical League sells these items each fall at a fantastic price with their members in mind. Stock will arrive in typically in November and typically ship in December in time for Christmas.

The League suggests ordering early to ensure availability, as stock will be limited once the order comes in. Clubs may place group orders with versions of the RASC Calendar for 6+ units and for the RASC Handbook for 10+ units, both on the League Sales web store. Free shipping and discounted prices apply.

Reflector Magazine

The latest March 2024 copy of the Reflector magazine has been emailed.. It is also available via the web at

<https://www.astroleague.org/reflector>

What's up with the Astronomical League – March 2024

The link to the latest happening is at : [Whats-Up-with-Astro-League-March-2024-v2.pdf](https://www.astroleague.org/whats-up-with-astro-league-march-2024-v2.pdf) (astroleague.org)
Covered in the March 2024 edition are NEAF (April 20-21, 2024) and ALCON 2024 (July 17-20, 2024) which will be held in Kansas City.

Continued next page...

Monthly highlight of the Astronomical League Observing Programs (Article prepared by SWFAS Astronomical League Coordinator John MacLean)

The Astronomical League Planetary Nebula Observing Program

Planetary nebulae are among the most interesting deep sky objects available to the amateur observer and are a frequent target at our star parties.

The complete observing list includes 110 objects, all viewable from southern Florida, ranging from well known, spectacular objects like the Ring and Dumbbell nebulae to challenging, star-like points of light in crowded star fields.

Two levels of awards are available. The Basic level certificate requires the successful observation of a minimum of 60 nebulae accessible with modest instruments in less than dark skies. The Advanced level certificate requires an attempt at all 110 objects. A minimum of 90 objects must be successfully imaged for the Imaging award. The use of computerized Go-To technology is allowed.

To assist with completing the programs, the League has the "[Planetary Nebula Observing Guide](#)" available via the League bookstore for \$17. The Guide includes images of all 110 objects along with an introduction and historical background.

Astronomy for Mere Mortals - An Introductory Astronomy Text

Available in PDF format, FREE from the Astronomical League

[Click here to download this amazing resource.](#)

The text assumes that this information may be conveyed as a single course, or as two courses of study: Solar System Astronomy, and Stars and Galaxies Astronomy.

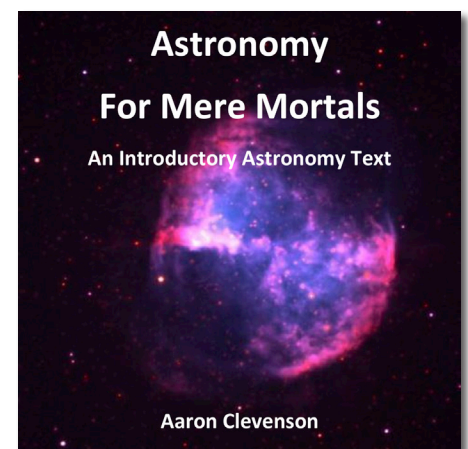
Rather than conventional chapters, the material is organized around Components. If you learn the material of the entire text, then you will have a complete picture of the universe.

If you are learning the material as two courses, there are some Components that are fundamental to both courses and are part of both courses, Components 1 through 35 and components 96 through 102. These are the Basics, History, Measurements, the Sun, and Cosmology.

- Solar System Astronomy includes: Components 1 through 102
- Stars and Galaxies Astronomy includes: Components 1 through 35 and 96 through 191

The courses have also been broken up into teaching units to make the material manageable. The Solar System Astronomy Course has four teaching units, and the Stars and Galaxies Astronomy Course has five teaching units due to a larger amount of content. The first two units are identical when taught as two separate courses.

Read more in the pdf document.



Astro Sig Schedule 2024

All Meetings at 6:30pm

May 21

June 18th

July 9th (Date Change)

ASTRO SIG MEETING ZOOM LINK

<https://us02web.zoom.us/j/86238788613?pwd=aHhKa-jluQ2hNejI4YVFyczIxM1R4QT09>

Meeting ID: 862 3878 8613

Passcode: 730698

ABOUT THE ASTRO SIG

Every month we get together on a Zoom call with a pretty loose agenda and manage to have an absolute blast talking about Astrophotography. I hope you'll join us if you're interested in Astrophotography.

IMAGING TRIPS TO BIG CYPRESS

Big Cypress National Park is about a 75 minute drive from Ft. Myers and it is probably one of the darkest areas in the state of Florida. We have a great place to set up and frequently meet astrophotographers and observers from other parts of the state.

The best way to stay tuned in to our impromptu field trips is to get on our Astro SIG Google Groups email list. [Contact Mike Jensen.](#)

The Astrophotography SIG

Our Astro SIG group is really growing in strength. From a meeting perspective, we are small, but our email list is about 40 and of those about 10 consistently contribute images for use on our website and in the newsletter. I truly believe that some of our images are unequalled in quality.

Many of our group are out imaging almost every possible night and reporting the results on our email group.

I am especially proud at the way our group shares lessons learned and methods taken to get the best out of their gear and the best images. Please see our images beginning on the next page.



What's Going On in the SIG Group?



By Mike Jensen,
SIG Founder/Leader

The Astro SIG group has been busy in April! With over 90% of the nights being clear we were out there doing a LOT of imaging.

We were working on everything from solar eclipses, nebulae, and of course galaxies.

As I write this, tonight is the full moon so we may have one more new moon cycle before the "rainy" season begins. With a "more active" hurricane season than nor-

mal predicted, we are hoping that Summer will provide some opportunities for some shots of some of our favorite summer subjects.

Ok, a bit of housekeeping. Every year after the membership settles I do a culling of the Astro SIG email list. The Astro SIG email list is well used by the dozen or so active users but I don't know how many others are reading the emails. What I do know is how many of our members are attending the monthly Astro SIG meeting. It's usually the same dozen or so active members. It seems to mirror the general membership. So, a culling of the list is needed. Please watch your email for an invited to stay in, or opt out as well as a short survey about why you're in the group and what would get you more involved.

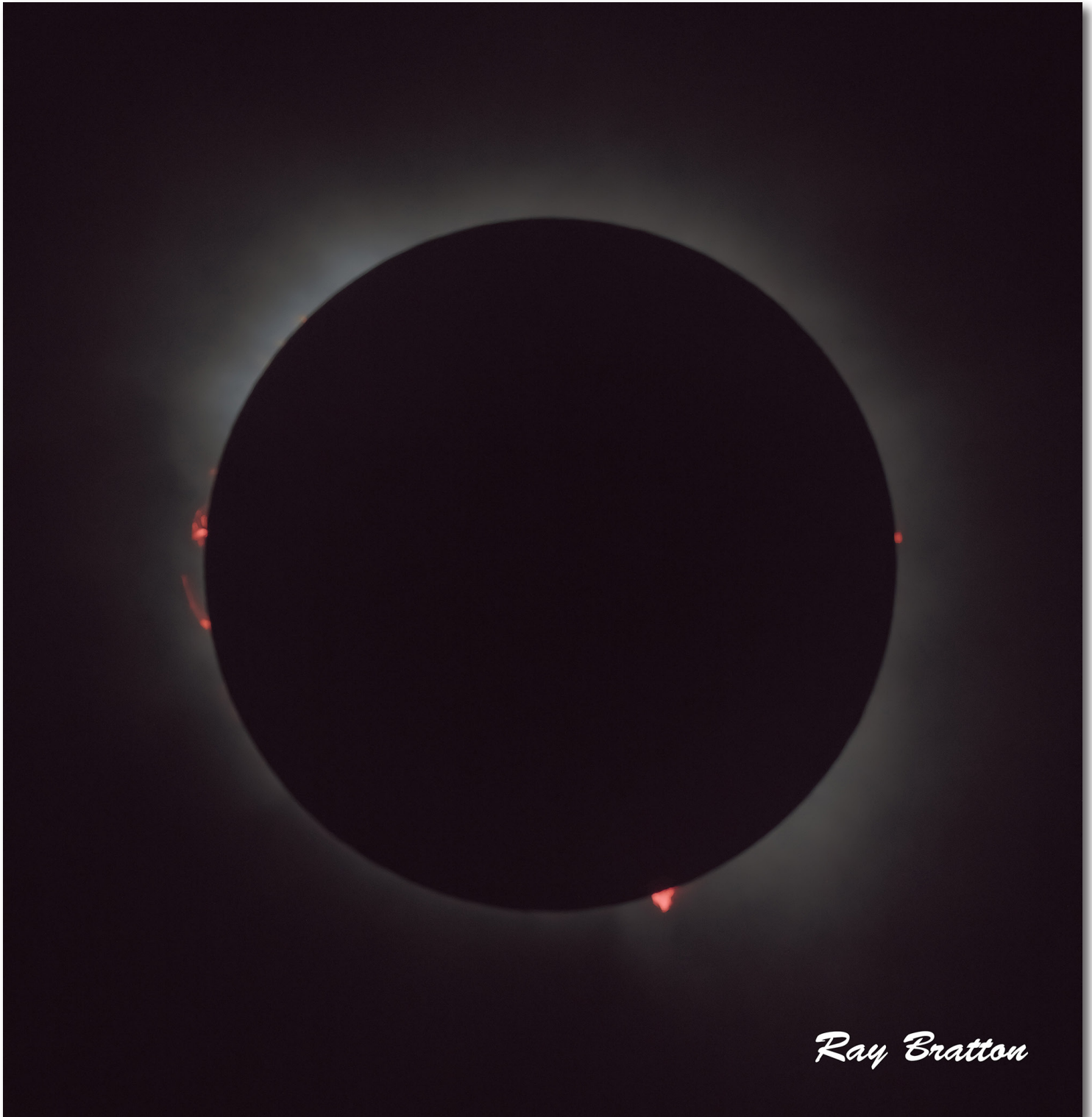
Solar Eclipse Photos



Photos by Tom Segur taken in Columbus, Indiana



SH2 - 274 by Phil Jansen



Ray Bratton

2024 Total Solar Eclipse from Leander Texas by Ray Bratton

Brand/Type of Telescope/Lens: Explore Scientific 127 FCD Triplet 952mm, ZWO ASI2600MC Duo,
Mount: EQ6R Pro

Exposures: 1 exposure, 1ms, Baader solar film filter, ZWO duo filter,

Processing Software: Photoshop RAW, Topaz

Here's the story: Clouds all morning with glimpses of the sun. I had a near focus from the day before. About the time of totality the sky opened. Got a few exposures.



Arp 242 - The Mice Galaxies by Dick Cogswell

Brand/Type of Telescope/Lens: C-14 at 2750 f/l

Mount: AP 1100

Exposures: 231 4-minute exposures in RGB

Processing Software: APP, PI, PS

Here's the story:

NGC 4676A and NGC 4676B form an interacting pair of galaxies in the constellation Coma Berenices. About 290 million light-years distant, they have begun the process of colliding and merging. This interaction has produced long tidal tails and has led to the name The Mice Galaxies, cataloged as Arp 242. It is a possibility that both galaxies, which are members of the Coma Cluster, have experienced collision, starting 170 million years ago, and will continue colliding until they coalesce into one galaxy.



M106 by John Udart

Brand/Type of Telescope/Lens: William Optics GT71, 71mm Lens, 336mm Focal Length

Mount: Sky-Watcher EQ6-R Pro

Exposures: 347, Exposure length: 5 min.

Integration time: 28 hours 55 min.

Camera: ASI533MC-Pro (OSC)

Filter: Optolong L-Pro

Processing Software: PixInsight

Here's the story:

Messier 106 (also known as NGC 4258) is an intermediate spiral galaxy in the constellation Canes Venatici (the Hunting Dogs). It was discovered by Pierre Méchain in 1781 and is at a distance of about 22 to 25 million light-years away from Earth.

I chose this target because of its relatively large size for a galaxy this time of the year. Since I'm imaging at a focal length of 336mm, galaxies are very small in the field of view so cropping is always necessary to accent the subject. The end of March had a string of clear nights and I was fortunate to gather six sessions of data with a total of 33 hours on the target leaving me with almost 29 hours of integration time. This sets a new personal record of time spent imaging a single target.



M51 - The Whirlpool Galaxy by Mike Jensen

Brand/Type of Telescope/Lens: Sky Watcher 127, 698 focal length

Mount: Sky-Watcher EQ6-R Pro

Exposures: 90 Blue, 90 Green, 78 Red, 58 Ha, 30 Lum All taken at 300 secs.

Integration time: 28 hours 45 min.

Camera: ASI1600 Mono

Processing Software: PixInsight & Photoshop (Beta)

Here's the story: This is a fav of mine! M51 is actually colliding galaxies! How cool is that? Discovered by Charles Messier in 1773, M51 is located 31 million light-years from Earth in the constellation Canes Venatici. It has an apparent magnitude of 8.4 and can be spotted with a small telescope most easily during May. The Whirlpool galaxy's beautiful face-on view and closeness to Earth allow astronomers to study a classic spiral galaxy's structure and star-forming processes.

I had imaged this several years ago with my DSLR and a 100-400 lens but everything is better with dedicated astro gear, so here you go!



Michael DiMario NGC3372

NGC3372 Carina Nebula by Michael DiMario

Brand/Type of Telescope/Lens: Takahashi FSQ-85ED Baby Q

Mount: Losmandy GM811

Exposures: 23 subframes at 30 sec; Antilla Triband, ZWO 2600MC Pro

Processing Software: PixInsight

Here's the story:

NGC 3372 Carina Nebula was imaged March 31st at Big Cypress National Preserve 1-2 degrees above the southern horizon making it a very difficult object to capture. Goal is to capture southern sky objects that are not easily captured in the northern sky.

NGC 3372 Carina Nebula is one of our Galaxy's largest star forming regions spanning over 300 light-years at a distance of 7,500 light-years. The Carina Nebula is home to young, extremely massive stars, including the variable Eta Carinae, a star with well over 100 times the mass of the Sun. Eta Carinae is the bright star next to the central dark notch in this field.



Michael DiMario NGC2477

Above
NGC 2477 Electric Guitar
Cluster by Michael DiMario

Brand/Type of Telescope/Lens:
 Takahashi FSQ-85ED Bay Q/455
 mm
 Mount: Losmandy GM811
 Exposures: 60 subframes at 90 sec,
 Antilla Triband, ZWO ASI2600MC
 Pro
 Processing Software: PixInsight

Here's the story:

NGC 2477 Electric Guitar open cluster image was taken March 31st at Big Cypress National Preserve. Located about 2300ly - 6200ly, it is comprised of about 300 stars in the constellation Puppis. Star on left is b Pup, a rotating variable star believed to be a binary.

Right
2024 solar total eclipse by
Carmela

Brand/Type of Telescope/Lens:
 Coronado 60 Solarmax telescope
 Mount: Astrotrac
 Exposures: Zwo 294 color
 Single one shot exposures

Processing Software: Pixinsight
 Here's the story:

Went to Texas to to witness the Solar Total Eclipse
 The weather was not promising with cloudy sky
 But luckily there were clouds breaks and I was able to capture the Totality as the clouds opened up just on time .
 Lucky





M101 by John Udart

Brand/Type of Telescope/Lens: William Optics GT71, 71mm Lens, 336mm Focal Length

Mount: Sky-Watcher EQ6-R Pro

Exposures: Subs: 224/39

Exposure length: 5 min./4 min.

Integration time: 21 hours

Camera: ASI533MC-Pro (OSC)

Filter: Optolong L-Pro

Processing Software: PixInsight

Here's the story:

The Pinwheel Galaxy (also known as Messier 101, M101 or NGC 5457) is a face-on spiral galaxy located 21 million light-years from Earth in the constellation Ursa Major. It was discovered by Pierre Méchain in 1781 and was communicated that year to Charles Messier, who verified its position for inclusion in the Messier Catalogue as one of its final entries.

I chose this target again because of its relatively large size for a galaxy. The middle of April yielded a second string of clear nights and I was fortunate to gather six sessions of data and combine that with two sessions from last year for a total of 21 hours of integration time.



NGC 4565 The Needle Galaxy by Dick Cogswell

Brand/Type of Telescope/Lens: C-14 Edge at 2750mm f/l

Mount: AP 1100

Exposures: 136 4-minute exposures, LRGB imaged in Texas in Bortle 3

Processing Software: Processed in APP, PI, PS

Here's the story:

NGC 4565, The Needle Galaxy, is an edge-on spiral galaxy about 30 to 50 million light-years away in the constellation Coma Berenices. It lies close to the North Galactic Pole and has a visual magnitude of approximately 10. First recorded in 1785 by William Herschel, it is a prominent example of an edge-on spiral galaxy.

NGC 4565 is a giant spiral more luminous than the Andromeda Galaxy. Its exponential shape suggests that it is a barred spiral galaxy.

It is one of the brightest member galaxies of the Coma I Group. It has a population of roughly 240 globular clusters, more than the Milky Way. This edge-on galaxy exhibits a slightly warped and extended disk under deep optical surveys, likely due to ongoing interactions with neighboring satellite galaxies or other galaxies in the Coma I group.



M51 by William Brogdon

Brand/Type of Telescope/Lens: AT72EDII/344focalLength

Mount: Losmandy G11G

Exposures: (330)-60 second exposures OSC ASI533MC Pro

Processing Software: PixInsight

Here's the story: Taken 4-24-24, full moon between the hours of 9pm (23rd) and 4am (24th)



M81 Bode's Galaxy by William Brogdon

Brand/Type of Telescope/Lens: AT72EDII/344focalLength

Mount: Losmandy G11G

Exposures: (168)-60 second exposures taken 3-29-24

Processing Software: PixInsight



M51 Whirlpool Galaxy by Ray Bratton

Brand/Type of Telescope/Lens: Explore Scientific 127 FCD Triplet, 952mm, f7.5

Mount: EQ6R Pro

Exposures: 21 300s exposures with ZWO Duo filter (1.75 hours)

Processing Software: APP, Siril, Photoshop Raw, Topaz

Here's the story:

Discovered by Charles Messier in 1773, M51 is located 31 million light-years from Earth in the constellation Canes Venatici. The graceful, winding arms of the majestic spiral galaxy M51 appear like a grand spiral staircase sweeping through space. They are actually long lanes of stars and gas laced with dust. Such striking arms are a hallmark of so-called grand-design spiral galaxies. In M51, also known as the Whirlpool galaxy, these arms serve an important purpose: they are star-formation factories, compressing hydrogen gas and creating clusters of new stars. This was taken with the ZWO ASI2600MC duo and the 127 ES scope. This was new for me and I got 1.75 hours before clouds rolled in.

This season in Florida has been very non-productive for me. I leave for Illinois May 11 and wanted to get something I had not imaged for several years.



M104 Sombrero Galaxy by Dick Cogswell

Brand/Type of Telescope/Lens: C-14 Edge

Mount: AP1100

Exposures: 202 4-minute exposures in LRGB

Processing Software: APP, PS

Here's the story:

M104 is called the Sombrero Galaxy, possibly so named because the discoverer was wearing a big Mexican hat. William Herschel independently discovered it in 1784 while not wearing a hat.

It is a peculiar galaxy of unclear classification in the constellation borders of Virgo and Corvus, being about 31 million light-years from the Milky Way. It has a relatively large number of globular clusters, observational studies estimate between 1,200 and 2,000. It is thought to have a supermassive black hole at its center, the nearest billion-solar-mass black hole to Earth.



Messier 106 by Scott Cruzen

Brand/Type of Telescope/Lens: Astro-Tech 130mm EDT triplet refractor, 910mm Focal Length

Mount: skywatcher EQ6-R Pro, ASIAir Plus

Exposures: 427 x 240sec broadband subs, 90 x 360sec broadband subs, 101 x 300sec Ha subs
46 hours total integration over 6 nights

Processing Software: siriL/SiriLic, GIMP, DarkTable, Topaz

Here's the story:

M106 is a spiral galaxy in the constellation Canis Venatici. It has a supermassive black hole at its nucleus classified as a Type 2 Seyfert. It is 135,000 light years in diameter and is 24 million light years distant. This galaxy has a very bright core but the spiral arms are much more faint and more difficult to image. Shot in Cape Coral over 6 nights in March and April 2024.



Messier 63 by Scott Cruzen

Brand/Type of Telescope/Lens: astro-Tech 130mm EDT triplet refractor, 910mm Focal Length

Mount: skywatcher EQ6-R Pro, ASIAir Plus

Exposures: 462 x 240sec broadband subs plus, 247 x 120sec broadband subs

39 hours total integration

Processing Software: SiriL/SiriLic, GIMP, DarkTable, Topaz

Here's the story:

M63 is a spiral galaxy 29 million light years away in the constellation Canis Venatici. It is often referred to as the Sunflower Galaxy because of its resemblance to that flower. M63 is considered a "flocculent" galaxy because it lacks a central bar and prominent spiral arms and has a feathery or fluffy appearance.



NGC 4725 by Scott Cruzen

Brand/Type of Telescope/Lens: Astro-Tech 130mm EDT triplet refractor, 910mm Focal Length

Mount: Skywatcher EQ6-R Pro, ASI Air Plus

Exposures: 462 x 240sec broadband subs plus, 247 x 120sec broadband subs

39 hours total integration

Processing Software: SiriL/SiriLic, GIMP, DarkTable, Topaz

Here's the story:

NGC 4725 is a spiral galaxy located 40 million light years away in the constellation Coma Berenices. It is classed as an intermediate spiral Seyfert Type 2 galaxy with a prominent ring structure. It is interacting with the (relatively) nearby galaxy NGC 4747, which has warped its structure. This image was captured over 6 nights in Cape Coral in April 2024.



NGC 5033 by Scott Cruzen

Brand/Type of Telescope/Lens: Astro-Tech 130mm EDT triplet refractor, 910mm Focal Length

Mount: Skywatcher EQ6-R Pro, ASIAir Plus

Exposures: 218 x 240sec subs = 14.5 hours integration

Processing Software: Siril/SiriLic, GIMP, DarkTable, Topaz

Here's the story:

NGC 5033 is called the Waterbed Galaxy because of its long, spidery spiral arms, which make it look like a scuttling bug. NGC 5033 is located about 50 million light years away in the northern constellation Canes Venatici. Three supernovae have been observed in NGC 5033 in the past 75 years. Also in this image are Spiral Galaxies NGC5005 and NGC 5002.



Eclipse 2024 by Mario Motta

Brand/Type of Telescope/Lens: 90 mm F5 refractor

Mount: Skywatcher

Exposures: During totality, no filters

Processing Software: PixInsight

Here's the story: Taken from Junction Texas, with the ATMOb group

NASA reveals 'glass-smooth lake of cooling lava' on surface of Jupiter's moon Io

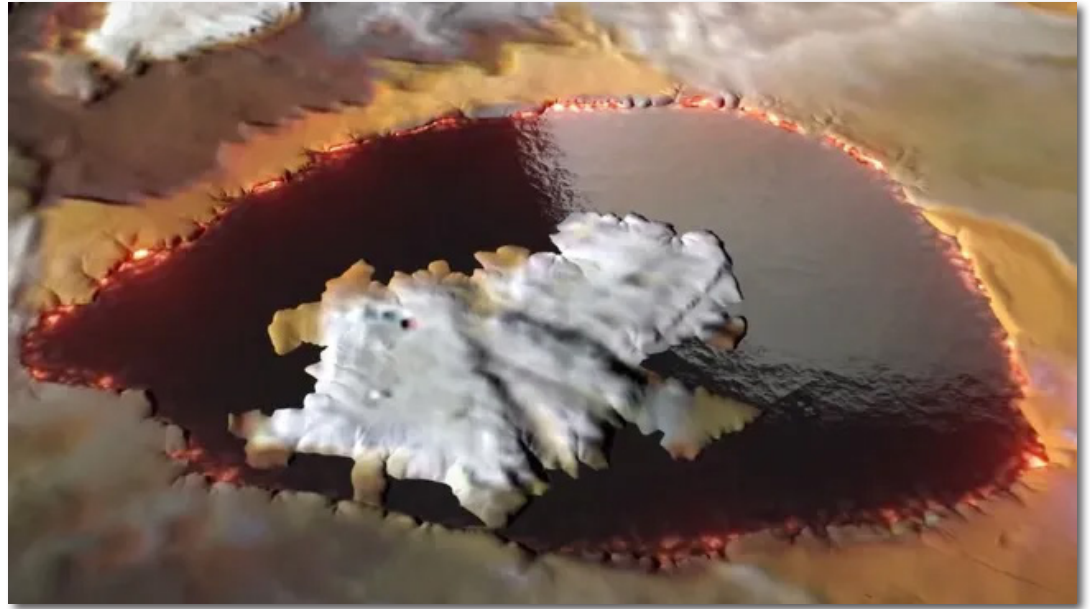
By Stephanie Pappas @[livescience.com](https://www.livescience.com)

The volcanic surface of Jupiter's huge moon Io got a stunning close-up thanks to NASA's Juno mission.

A new animation reveals an enormous lava lake on the surface of Jupiter's moon Io.

The close-up view comes from NASA's Juno spacecraft, which swept within 930 miles (1,500 kilometers) of the volcanic surface of Io in December 2023 and January 2024. These flybys provided the closest look ever at Jupiter's innermost large moon.

Io hosts hundreds of active volcanoes. According to NASA, their eruptions are sometimes so powerful that they can be seen with telescopes on Earth.



The new images show Loki Patera, a 127-mile-long (200 km) lava lake on Io's surface. Scientists have been observing this lava lake for decades. It sits over the magma reservoirs under Io's surface. The cooling lava at the center of the lake is ringed by possibly molten magma around the edges, Scott Bolton, principal investigator for the Juno mission, said during a news conference Wednesday (April 16) at the European Geophysical Union General Assembly in Vienna.

"The specular reflection our instruments recorded of the lake suggests parts of Io's surface are as smooth as glass, reminiscent of volcanically created obsidian glass on Earth," Bolton said.

Rugged islands of rock crowd the lava lake's interior. "There is amazing detail showing these crazy islands embedded in the middle of a potentially magma lake rimmed with hot lava," Bolton said.

Juno's instruments have determined that Io's surface is smoother than the surfaces of Jupiter's three other Galilean moons (Europa, Ganymede and Callisto). Io is slightly larger than Earth's moon, and the surfaces that aren't molten are largely covered with yellow sulfur and sulfur dioxide.

Juno continues to fly over Jupiter, collecting data about its dramatic polar cyclones, each of which is the width of the continental U.S. The mission is also measuring levels of oxygen and hydrogen in Jupiter's atmosphere. The spacecraft will complete its 61st flyby of Jupiter on May 12.

The Milky Way's History is Written in Streams of Stars

[Click here view all graphics/images.](#)

The Milky Way is ancient and massive, a collection of hundreds of billions of stars, some dating back to the Universe's early days. During its long life, it's grown to these epic proportions through mergers with other, smaller galaxies. These mergers punctuate our galaxy's history, and its story is written in the streams of stars left behind as evidence after a merger.

And it's still happening today.

The Milky Way is currently digesting smaller galaxies that have come too close. The Large and Small Magellanic Clouds feel the effects as the Milky Way's powerful gravity distorts them and siphons a stream of gas and stars from them to our galaxy. A similar thing is happening to the Sagittarius Dwarf Spheroidal Galaxy and globular clusters like Omega Centauri.



Rubin Observatory at twilight in May 2022. Among the observatory's many endeavours is the study of dark matter. Credit: Rubin Obs/NSF/AURA

There's a long list of these stellar streams in the Milky Way, though the original galaxies that spawned them are long gone, absorbed by the Milky Way. But the streams still tell the tale of ancient mergers and absorptions. They hold kinematic and chemical clues to the galaxies and clusters they spawned in.

As astronomers get better tools to find and study these streams, they're realizing the streams could tell them more than just the history of mergers. They're like strings of pearls, and their shapes and other properties show how gravity has shaped them. But they also reveal something else important: how dark matter has shaped them.

Since dark matter is so mysterious, any chance to learn something about it is a priority. As researchers examine the stellar streams, they're finding signs of disturbances in them—including missing members—that aren't explained by the Milky Way's mass. They suspect that dark matter is the cause.

Soon, astronomers will have an enormously powerful tool to study these streams and dark matter's role in disturbing them: the Vera Rubin Observatory (VRO).

Astronomers have different methods of studying dark matter. Weak gravitational lensing is one of them, and it maps dark matter on the large scale of galaxy clusters. But stellar streams are at the opposite end of the scale. By mapping them and their irregularities and disturbances, astronomers can study dark matter at a much smaller scale.

The Rubin Observatory will complete its Legacy Survey of Space and Time (LSST) in a ten-year period. Alongside its time-domain astronomy objectives, the LSST will also study dark matter. The LSST Dark Energy Science Collaboration is aimed at dark matter and will use Rubin's power to advance the study of dark energy and dark matter like nothing before it. "LSST will go much further than any of its predecessors in its ability to measure the growth of structure and will provide a stringent test of theories of modified-gravity," their website explains.

As we get closer and closer to the observatory's planned first light in January 2025, the growing excitement is palpable.

"I'm really excited about using stellar streams to learn about dark matter," said Nora Shipp, a postdoctoral fellow at Carnegie Mellon University and co-convenor of the Dark Matter Working Group in the Rubin Observatory/LSST Dark

Energy Science Collaboration. "With Rubin Observatory we'll be able to use stellar streams to figure out how dark matter is distributed in our galaxy from the largest scales down to very small scales."

Astronomers have ample evidence that a halo of dark matter envelops the Milky Way. Other galaxies are the same. These dark matter halos extend beyond a galaxy's visible disk and are considered basic units in the Universe's large-scale structure. These haloes may also contain sub-haloes, clumps of dark matter bound by gravity.

These clumps are what astronomers think are leaving their marks on stellar streams. The dark matter clumps create kinks and gaps in the streams. The VRO has the power to see these irregularities on a small scale and over a ten-year span. "By observing stellar streams, we'll be able to take indirect measurements of the Milky Way's dark matter clumps down to masses lower than ever before, giving us really good constraints on the particle properties of dark matter," said Shipp.

The Lambda Cold Dark Matter (Lambda CDM) model is the standard model of Big Bang Cosmology. One of the Lambda CDM's key predictions says that many sub-galactic dark matter substructures should exist. Astronomers want to test that prediction by observing these structures' effect on stellar streams. The VRO will help them do that and will also help them find more of them and build a larger data set.

Stellar streams are difficult to detect. Their kinematics give them away, but sometimes, there are only a few dozen stars in the streams. This obscures them among the Milky Way's myriad stars. But the VRO will change that.

The VRO will detect streams at much further distances. On the outskirts of the Milky Way, the streams have interacted with less matter, making them strong candidates for studying the effect of dark matter in isolation.

"Stellar streams are like strings of pearls, whose stars trace the path of the system's orbit and have a shared history," said Jaclyn Jensen, a PhD candidate at the University of Victoria. Jensen plans to use Rubin/LSST data for her research on the progenitors of stellar streams and their role in forming the Milky Way. "Using properties of these stars, we can determine information about their origins and what kind of interactions the stream may have experienced. If we find a pearl necklace with a few scattered pearls nearby, we can deduce that something may have come along and broken the string."

The VRO's powerful digital camera and its system of filters make this possible. Its ultraviolet filter, in particular, will help make more streams visible. Astronomers can distinguish stellar streams from all other stars by examining the blue-ultraviolet light at the end of the visible spectrum. They'll have thousands upon thousands of images to work with.

In fact, the VRO will unleash a deluge of astronomical data that scientists and institutions have been preparing to handle. AI and machine learning will play a foundational role in managing all that data, which should contribute to finding even more stellar streams.

"Right now it's a labor-intensive process to pick out potential streams by eye—Rubin's large volume of data presents an exciting opportunity to think of new, more automated ways to identify streams."

Astronomers are still finding more stellar streams. Earlier this month, a paper in *The Astrophysical Journal* presented the discovery of another one. Researchers found it in Gaia's Data Release 3. It's likely associated with the merger of the Sequoia dwarf galaxy.

It seems certain that astronomers will keep finding more stellar streams. Their value as tracers of the Milky Way's history is considerable. But if scientists can use them to understand the distribution of dark matter on a small scale, they'll get more than they bargained for.

Neutron Stars Could be Heating Up From Dark Matter Annihilation

From [universetoday.com](https://www.universetoday.com)



*Artist's impression of the magnetar in the star cluster Westerlund 1.
Credit: ESO/L. Calçada*

One of the big mysteries about dark matter particles is whether they interact with each other. We still don't know the exact nature of what dark matter is. Some models argue that dark matter only interacts gravitationally, but many more posit that dark matter particles can collide with each other, clump together, and even decay into particles we can see. If that's the case, then objects with particularly strong gravitational fields such as black holes, neutron stars, and white dwarfs might capture and concentrate dark matter. This could in turn affect how these objects appear. As a case in point, a recent study looks at the interplay between dark matter and neutron stars.

Neutron stars are made of the most dense matter in the cosmos. Their powerful gravitational fields could trap dark matter and unlike black holes, any radiation from dark matter won't be trapped behind an event horizon. So neutron stars are a perfect candidate for studying dark matter models. For this study, the team looked at how much dark matter a neutron star could capture, and how the decay of interacting dark matter particles would affect its temperature.

The details depend on which specific dark matter model you use. Rather than addressing variant models, the team looked at broad properties. Specifically, they focused on how dark matter and baryons (protons and neutrons) might interact, and whether that would cause dark matter to be trapped. Sure enough, for the range of possible baryon-dark matter interactions, neutron stars can capture dark matter.

The team then went on to look at how dark matter thermalization could occur. In other words, as dark matter is captured it should release heat energy into the neutron star through collisions and dark matter annihilation. Over time the dark matter and neutron star should reach a thermal equilibrium. The rate at which this occurs depends on how strongly particles interact, the so-called scattering cross-section. The team found that thermal equilibrium is reached fairly quickly. For simple scalar models of dark matter, equilibrium can be reached within 10,000 years. For vector models of dark matter, equilibrium can happen in just a year. Regardless of the model, neutron stars can reach thermal equilibrium in a cosmic blink of an eye.

If this model is correct, then dark matter could play a measurable role in the evolution of neutron stars. We could, for example, identify the presence of dark matter by observing neutron stars that are warmer than expected. Or perhaps even distinguish different dark matter models by the overall spectrum of neutron stars.

Reference: Bell, Nicole F., et al. "Thermalization and annihilation of dark matter in neutron stars." *Journal of Cosmology and Astroparticle Physics* 2024.04 (2024): 006.

Stellar Winds Coming From Other Stars Measured for the First Time

From [universetoday.com](https://www.universetoday.com)



Infrared image of the shockwave created by the massive giant star Zeta Ophiuchi in an interstellar dust cloud. Credit: NASA/JPL-Caltech; NASA and The Hubble Heritage Team (STScI/AURA); C. R. O'Dell, Vanderbilt University

head of the Star and Planet Formation group, and the lead coordinator of the ERASMUS+ program. She was joined by other astrophysicists from the University of Vienna, the Laboratoire Atmosphères, Milieux, Observations Spatiales (LAMOS) at the Sorbonne University, the University of Leicester, and the Johns Hopkins University Applied Physics Laboratory (JHUAPL).

Astrospheres are the analogs of our Solar System's heliosphere, the outermost atmospheric layer of our Sun, composed of hot plasma pushed by solar winds into the interstellar medium (ISM). These winds drive many processes that cause planetary atmospheres to be lost to space (aka. atmospheric mass loss). Assuming a planet's atmosphere is regularly replenished and/or has a protective magnetosphere, these winds can be the deciding factor between a planet becoming habitable or a lifeless ball of rock.

While stellar winds mainly comprise protons, electrons, and alpha particles, they also contain trace amounts of heavy ions and atomic nuclei, such as carbon, nitrogen, oxygen, silicon, and even iron. Despite their importance to stellar and planetary evolution, the winds of Sun-like stars are notoriously difficult to constrain. However, these heavier ions are known to capture electrons from neutral hydrogen that permeates the ISM, resulting in X-ray emissions. Using data from the XMM-Newton mission, Kislyakova and her team detected these emissions from other stars.

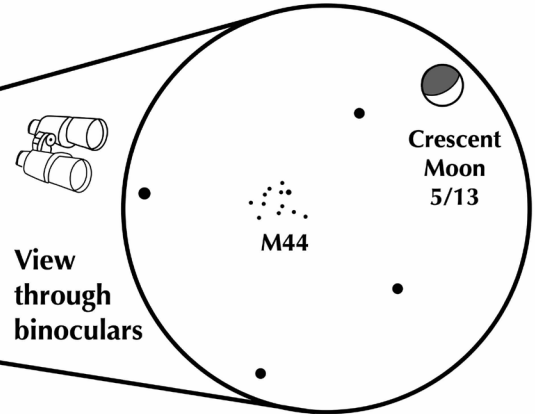
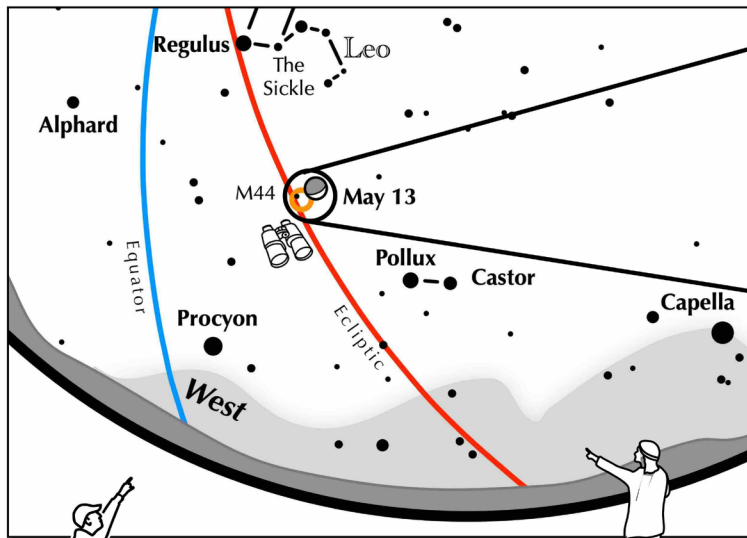
These were 70 Ophiuchi, Epsilon Eridani, and 61 Cygni, three main sequence Sun-like stars located 16.6, 10.475, and 11.4 light-years from Earth (respectively). Whereas 70 Ophiuchi and 61 Cygni are binary systems of two K-type (orange dwarf) stars, Epsilon Eridani is a single K-type star. By observing the spectral lines of oxygen ions, they could directly quantify the total mass of stellar wind emitted by all three stars. For the three stars surveyed, they estimated the mass loss rates to be 66.5 ± 11.1 , 15.6 ± 4.4 , and 9.6 ± 4.1 times the solar mass loss rate, respectively.

In short, this means that the winds from these stars are much stronger than our Sun's, which could result from the stronger magnetic activity of these stars. More images at: <https://www.universetoday.com/166626/stellar-winds-coming-from-other-stars-measured-for-the-first-time/>

An international research team led by the University of Vienna has made a major breakthrough. In a study recently published in *Nature Astronomy*, they describe how they conducted the first direct measurements of stellar wind in three Sun-like star systems. Using X-ray emission data obtained by the ESA's X-ray Multi-Mirror-Newton (XMM-Newton) of these stars' "astrospheres," they measured the mass loss rate of these stars via stellar winds. The study of how stars and planets co-evolve could assist in the search for life while also helping astronomers predict the future evolution of our Solar System.

The research was led by Kristina G. Kislyakova, a Senior Scientist with the Department of Astrophysics at the University of Vienna, the deputy

In the early evening on May 13, try this challenge:



View through binoculars

Crescent moon meets the Beehive

On the evening of May 13, the crescent moon floats right of M44, the Beehive star cluster. Look in the west 90 minutes after sunset.

Be sure to use binoculars to spot the many stellar bees of M44. The cluster has over 1000 stars, but only two dozen will be picked out with binoculars.

View to the west on May 13 90 minutes after sunset



Even though they lie near each other in binoculars, they are nowhere near each other in three-dimensional space. M44 is 150 million times farther than the moon!

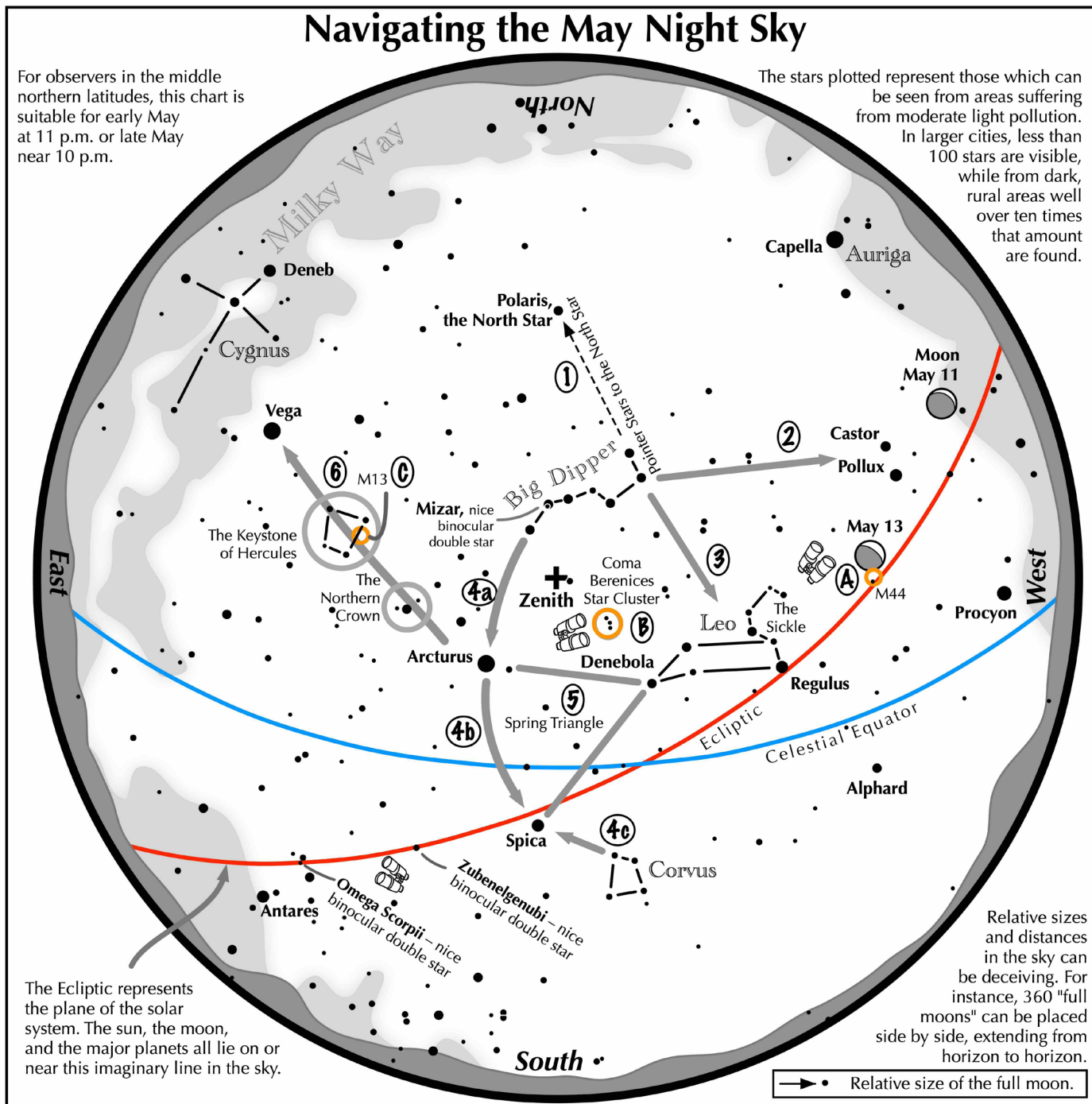
It has taken the light from M44's stars over 600 years to reach your eyes!

Sky Chart

Navigating the May Night Sky

For observers in the middle northern latitudes, this chart is suitable for early May at 11 p.m. or late May near 10 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

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

- 1 Extend a line northward from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
- 3 Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
- 4 Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica. Confirm Spica by noting that two moderately bright stars just to its southwest form a straight line with it.
- 5 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
- 6 Draw a line from Arcturus to Vega. One-third of the way sits "The Northern Crown." Two-thirds of the way hides the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.

Binocular Highlights

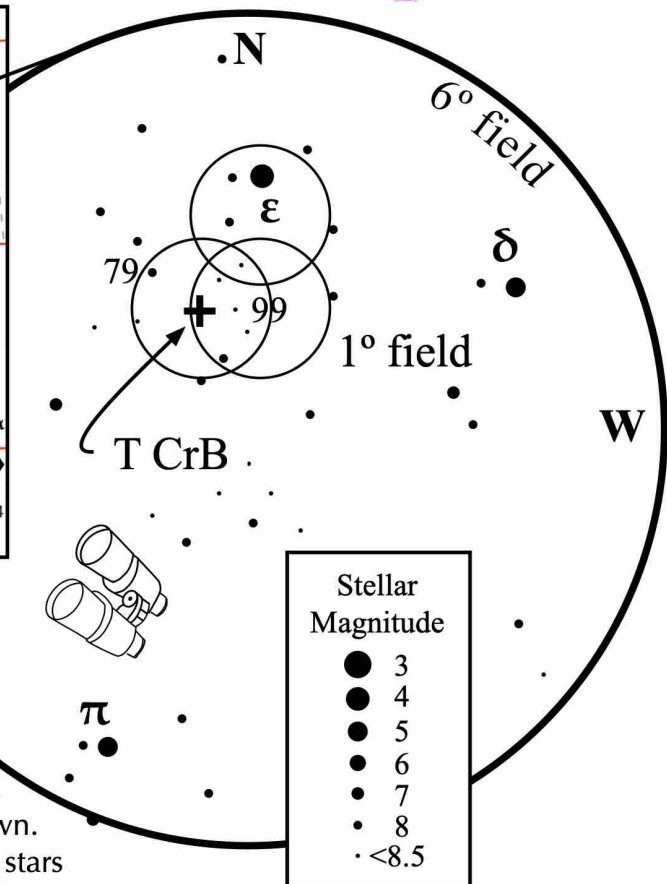
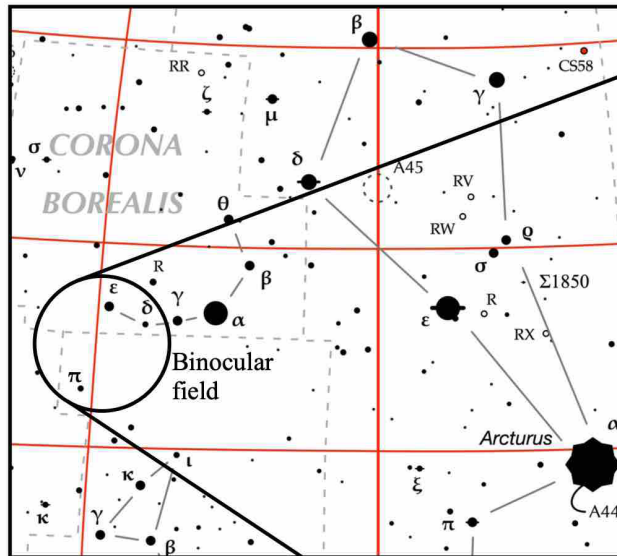
A: M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux. **B:** Look near the zenith for the loose star cluster of Coma Berenices. **C:** M13, a round glow from a cluster of over 500,000 stars.



T Coronae Borealis

A nova waiting to happen – soon!

also known as HIP 78322 and the "Blaze Star"



How to find T Coronae Borealis

- Locate bright Arcturus and the kite shaped constellation Boötes.
- Corona Borealis lies directly east of Boötes.
- Trace the semi-circle of the stars of the crown.
- Epsilon and Delta are fourth magnitude stars shining east of Alpha (Gemma), the brightest member of the crown.
- Place Epsilon in the northern half of the binocular (or finder) field. Fifth magnitude Pi Serpentis lies near the bottom of the field.
- T Coronae Borealis is about 1/4 the distance between Epsilon and Pi.
- Move two low power eyepiece fields south of Epsilon.
- Then move 1/2 low power eyepiece field east.
- This is the vicinity of 10th magnitude T CrB.

- The star normally is magnitude 10.3.
- Ten years before its outburst, it rises to magnitude 9.8. It did this 10 years ago.
- It then dims to about magnitude 12 one year before outburst. It did this in April 2023.

Between now and September, T CrB is predicted to nova, quickly reaching 2nd magnitude and rivaling the brightness of Alpha CrB (Gemma).

- Its brightness rise will take one day or less.
- It will likely remain near maximum brightness (2nd mag.) for only a few days.



Meeting Minutes

Southwest Florida Astronomical Society Member Minutes of April 4, 2024 both Zoom and at the Caloosa Planetarium

Opening Remarks: President Brian Risley opened the meeting at 7:03PM by welcoming the 14 present, the 9 on Zoom and giving a shout out to Glenn from Naples attending his first Planetarium meeting and thanking Tom Klein for his IT assistance. John MacLean then introduced our speaker, Amy Williams, PHD, Assistant Professor of Geology in the Department of Geological Sciences at the University of Florida.

Program: Doctor Williams's topic was 'The Curiosity to Explore and the Perseverance to Rove'....A Decade of Discoveries on Mars...1) Five Decades of Mars Discoveries resulted in the launching of Curiosity on September 26, 2011 landing on August 6, 2012 with a one year prime mission of the Aeolis Mons crater area performing the Sky Crane Maneuver analyzing key chemical ingredients of life....2) On July 31, 2020 Perseverance was launched, landing on February 18, 2021 with a 1.5 year mission around the Jezero Crater area analyzing microbial life, core rock samples and maneuvering the Ingenuity helicopter testing powered controlled flight.... 'The universe is a pretty big place. If it's just us, seems like an awful waste of space'... Carl Sagan... All applauded, asked many questions and President Risley thanked Doctor Williams for a thought provoking presentation.

Review of Past Events:

Charlotte County....Tom Segur stated that on March 8th there were 100 people viewing at the FSW Observatory.... Tom also stated that the March 23rd Ponce DeLeon Park Solar observing was cancelled due to weather.

Lee County... Brian Risley said that Tom Klein and he had around 100 participants at the Cape Coral Rotary Park Star Party

on March 8th and except for a few clouds it all went well.... Brian further stated that no one attended the March 9th Big Cypress event.

Upcoming Events:

Charlotte County....Tom Segur said that he was hopeful to hold the FSW Observatory viewing on April 12th as planned.....Tom further advised that the Bayshore Live Oak Park Solar observing event will be held on April 23rd from 9AM until Noon, and that Tom had hopes of the event moving to the grassy parking area of the newly created Sunseeker resort for future events next season.

Lee County.....Brian Risley stated that the Seahawk Park Star Party will be held on April 6th and that he needs help, please... Brian also stated that he will hold an April 8th Solar Eclipse viewing at Centennial Park in Fort Myers from 1:45 PM until 4:15 PM with the peak being at 3 PM.

Officer and Committee Reports:

President....Brian Risley asked for input from all regarding Thursday July 4th meeting. Brian further stated that the SWFAS has a lease with the Planetarium for the first Thursday of the month and to alter such would be difficult if not impossible. Dan Dannenhauer asked that the July meeting be cancelled and not rescheduled giving Brian a well deserved vacation. Mike Jensen said no, it is not proper to cancel a monthly meeting. Mario Motta moved to cancel the July meeting and Dan Dannenhauer seconded. All voted in favor with only Mike dissenting..

Vice President...Mike Jensen said he had no report from the Vice President, none for the newsletter, none for the Website and that 4 attended the social dinner just before this meeting.

Secretary... Dan Dannenhauer asked for his March minutes in the newsletter to be approved. There was not discussion. Motion made by Sean Dey, seconded by Mario Motta, passed unanimously.

Treasurer....John MacLean advised that his full report is in the Newsletter, that only 90 members have renewed by the end of March out of the 110 for 2023 and that he is hopeful more will comply before he has to report to the Astronomical League. John also stated that we were very much on budget given the Winter Star Party rev-

venues from the sale of surplus equipment and the delay of the of an equal amount of budgeted expenses. No motion needed.

Equipment Coordinator.... Brian Risley advised that Tony Costanzo sold \$550 worth of surplus equipment at the February Winter Star Party in the Keys. Brian said he will re-inventory the supply room equipment and advise at a later date.

Program Committee Coordinator...John MacLean advised that he has speakers set for May, June, August and September. John asked that if anyone has a speaker in mind, to get with him for the remaining months of the year.

Adjourn...President Risley advised that there were no other reports from any of the other committees and asked for a motion to adjourn.....so moved by Mario Motta and seconded by John MacLean passing unanimously.



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