



The Eyepiece

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



Editor - Mike Jensen

Hi Everyone!

Well, April is upon us and with that our meeting on Thursday April 4th and the solar eclipse on Monday April 8th. We'll have special coverage during the eclipse and I'm personally inviting all our members and the public to tell us your story about experiencing the eclipse. You can send it to us via the website [at this link](#), or on the front page.

Most of you who know me, know that I spent much of February and March in Antarctica. I took over 7,000 photos and hours and hours of video on this ultimate bucket list trip. I'll be working on a YouTube slideshow and presentation to show you the pics and tell you about the trip!

If you are an existing member and HAVE NOT renewed your membership, this will be your last newsletter unless you renew. You can renew [at this link](#). Right now we have about 40 peeps who fall in to this category. Don't miss out!

As you can see from the Astro SIG images starting on page 9, the group has been busy, and taking advantage of the nice Spring weather. Usually it's the Winter weather in Florida we look forward to, but it's been pretty clear lately (knock on wood).

If you're a fan of Astrophotography, please join us in May for Nico Carver's special presentation at our general meeting. Nico's well known nationally and it's a special pleasure to have him present to us.

PRE MEETING DINNER -
Please join me and other members for
a pre meeting dinner at:
Buffalo Wild Wings
9390 Dynasty Dr #101
Fort Myers, FL 33905

Time 4:45pm on Thursday Apr. 4th

Table Of Contents

Club Officers & Positions	2
Monthly Meetings	2
President's Report	3
GUEST SPEAKER PRESENTATIONS SERIES	3
Upcoming Speakers	4
The Astronomical League Report	5
Astronomy for Mere Mortals - An Introductory Astronomy Text	7
Astro Sig Schedule	8
2024	8
The Astrophotography SIG	8
What's Going On in the SIG Group?	8
Astrophotography Images	9
Webb Continues to Confirm Universe Expansion Rage	18
Jupiter's Annual Checkup	21
This is a 1.3 Gigapixel Image of a Supernova Remnant	22
Are Andromeda and the Milky Way Already Exchanging Stars?	24
Starship Reaches Orbit	26
International Dark Sky Week	27
How to fold a piece of paper like a satellite solar panel	28
Sky Chart	29
Meeting Minutes	31

[Click here for some fun facts about solar eclipses!](#)

Club Officers & Positions

President/Equipment
Brian Risley
swfaspres@gmail.com
239-464-0366

Vice President/
Newsletter/Website/Astro SIG
Mike Jensen
info@jensenone.com
913-304-0495

Secretary
Dan Dannenhauer
gawomp@aol.com
239-850-7111

Treasurer/AL Coordinator
John MacLean
john.maclean.arcs1969@gmail.com
239-707-3365

Charlotte Event Coordinators
Tony Heiner
verahei@aol.com
941-457-9700

Thomas Segur
tsegur479@comcast.net
941-249-8726

Big Cypress Viewing Coordinator
Mike Jensen
info@jensenone.com
913-304-0495

FSW Punta Gorda Moore Observatory
Director Thomas Segur
tsegur479@comcast.net
941-249-8726

Club Librarian
Maria Berni
239-940-2935

Club Historian
Danny Secary
asecary@gmail.com
239-470-4764

Calusa Nature Center Planetarium Direc-
tor Heather Preston
heather@calusanature.org
239-275-3435

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:

May 2, 2024
June 6, 2024
July

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:

- Apr 12, 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

Apr 27, 2024 Bayshore Live Oak
May 25, 2024 Gilchrist



President's Report

Brian Risley - President

The eclipse is almost upon us.

I am planning to be setup in Centennial Park on Monday the 8th on the west side by the pavilion. If you are in town and want to see it, stop by.

On the 6th, we are planning a Seahawk Park Star Party.

This may be your last newsletter if you have not renewed for 2024. Check with John MacLean if you have any questions. New by-laws required payment by March 31st for the year.

Everglades National Park is doing a dark sky celebration with events all month long. Refer to their website at <https://www.nps.gov/ever/planyourvisit/everglades-dark-sky-celebration.htm>

Our own Dr. Mario Motta is presenting a program on 'UnHealthy Light' there on March 30th.

Can't wait to see the eclipse photos from those of you lucky enough to get on the full path!

Eclipse Viewing and Stories!

The SouthWest Florida Astronomical Society will have telescopes set up for free observing of the Partial Solar Eclipse on Monday April 8th in Centennial Park in Downtown Fort Myers. (West Side of the park by the Pavilion). The telescopes have special filters to allow safe observing of the sun. We will also have a limited supply of free Solar Eclipse glasses and viewers. Additionally, astronomy related handouts/projects for all ages will also be available. The eclipse's first contact is at 1:44 pm with mid eclipse (about 50% covered) occurring at 3:00 pm and last contact is at 4:14 pm.

Once you've experienced the eclipse, please tell us about your experience and send us some pics! We'll publish them on our newsletter and website! To send us your stories and picks, [click this link](#).



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.:

Apr 4, 2024 **Dr. Amy Williams** - University of Florida, Her research focuses on the interaction between microbial life, the geochemical environment, and the rock record on Earth, and how to recognize habitable environments and potentially preserved microbial life on Mars and the outer world moons.

May 2, 2024 **Nico Carver talk on Astrophotography**

June 6, 2024 **Dr. Mario Motta - Construction of the Home 32" Telescope**

Upcoming Speakers

How To Recognize Habitable Environments and Potentially Preserved Microbial Life on Mars

Presented by Dr. Amy Williams

April 4, 2024



Dr. Amy Williams is an Assistant Professor of Geology in the Department of Geological Sciences at the University of Florida.

Her research interests include the formation and preservation of physical and molecular biosignatures in terrestrial environments as an analog for putative biosignature formation on Mars. She has been a member of the NASA Curiosity rover science team since 2009, and currently works with the Sample Analysis at Mars (SAM) instrument team to explore the distribution of organic molecules on Mars' surface. She also joined the NASA Perseverance rover science team as a Participating Scientist.

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

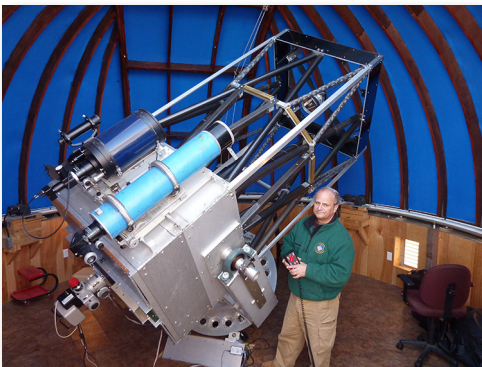
Instagram

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 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](#) (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.

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

The Astronomical League Stellar Evolution Observing Program - Learning some Astrophysics while having fun observing

This observing program, which is suitable for the beginning observer as well as the more advanced, allows one to get a solid grasp of the fundamentals of stellar evolution while tying all the new found knowledge together by completing an observing list of 100 associated objects.

A modest 6 inches of aperture is recommended although several objects are observable via the naked eye or binoculars.

The League provides an excellent downloadable guide to basic stellar astrophysics in the form of the “Observing Stellar Evolution” document. Stellar evolution is presented in an accessible, non-mathematical, but still quite thorough exposition centered around explaining the Hertzsprung-Russell diagram. Clear explanations are provided as to how low-mass stars (up to 8 solar masses) have very different evolutionary paths than high-mass stars (those having more than 8 solar masses.) Topics covered include Stellar Birth, Open Clusters – Early Stars, Main Sequence – Mid Life of Stars, Low mass vs. High mass Stars, and Red Dwarfs. The difference between Type Ia and Type II supernovas is covered as is the well-known O,B,A,F,G,K,M spectral classification sequence. The relevance of the H-R diagram to Variable Stars and Globular Clusters is explained.

The 100 related observing targets are broken down as follows:

Stellar Nurseries	14
Colorful Stars (OBAFGKM)	34
Young Open Clusters	7
Low Mass Stars	8
Red Giant Stars	6
Carbon Stars	5
Planetary Nebulae/White Dwarfs	9
High Mass Main-sequence Stars	6
Red Supergiant Stars	5
Supernova Remnants	2
Variable Stars	4

Tackling this program is an excellent way to learn about “what makes stars tick” and relate that knowledge to specific objects in the sky. This can’t help but make nights at the telescope that much more enjoyable.

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.

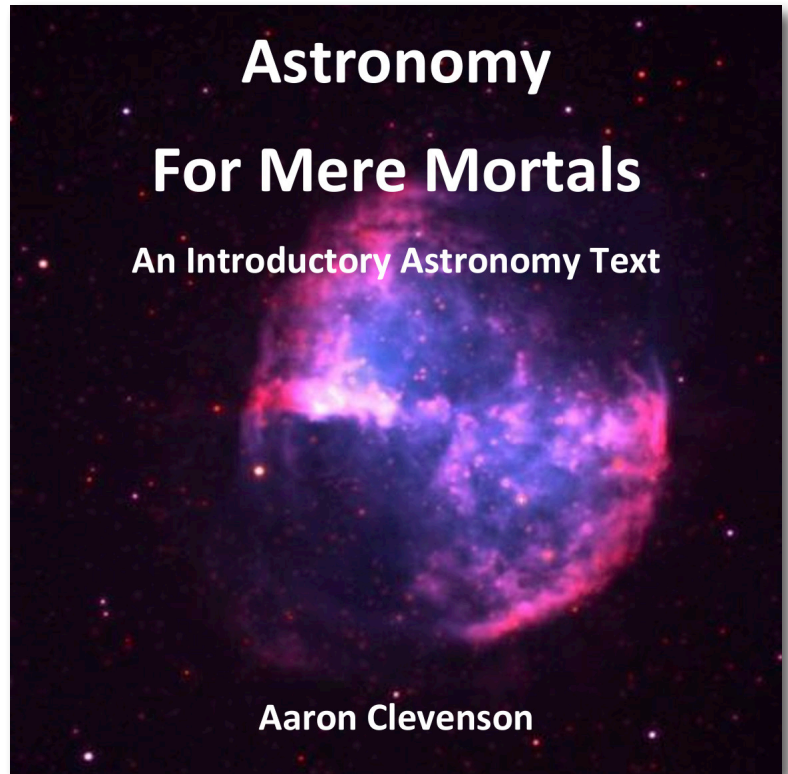
If you are learning the material as two courses, there are some Components that are fundamental to both courses and are part of both courses, Components 1 through 35 and components 96 through 102. These are the Basics, History, Measurements, the Sun, and Cosmology.

- 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

April 16
May 21
June 18th

ASTRO SIG MEETING ZOOM LINK

<https://us02web.zoom.us/j/86238788613?pwd=aHhKa-jluQ2hNejl4YVFyczIxM1R4QT09>

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 gloomy, cloudy, rainy Winter weather has finally broken and we are embracing Spring with clear skies and many nice nights of imaging.

Some of us are learning new softwares like Cyril and PixInsight, Photoshop and Lightroom. Some of us are headed out for the eclipse and I'm looking forward to seeing those pics and hearing those stories.

At our last meeting we had a spirited discussion on getting your monitors calibrated and the impact of doing so on your images. BIG differences have been noticed.

Personally I'm looking forward to getting down to Big Cypress for some deep sky imaging as well as some Milky Way imaging! The Milky Way is the path to deep sky photography, at least for me.

If you're new to the club or just dipping a toe into astrophotography, feel free to join our Google Groups email list and to contact us anytime for help or to just meet up with some like-minded folks. Some of the snowbirds will be headed back north soon, but we always seem to stay connected through Zoom and our email group.

Clear Skies!

Astrophotography Images



M31 by William Brogdon

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

Mount: iExos100

Exposures: 8x300 second exposures OSC, darks, flats, bias

Processing Software: PixInsight



Thor's Helmet by Don Bishop

Brand/Type of Telescope/Lens: Celestron C-9.25 Focal Length - 2,350mm

Mount: Astro-Physics Mach2

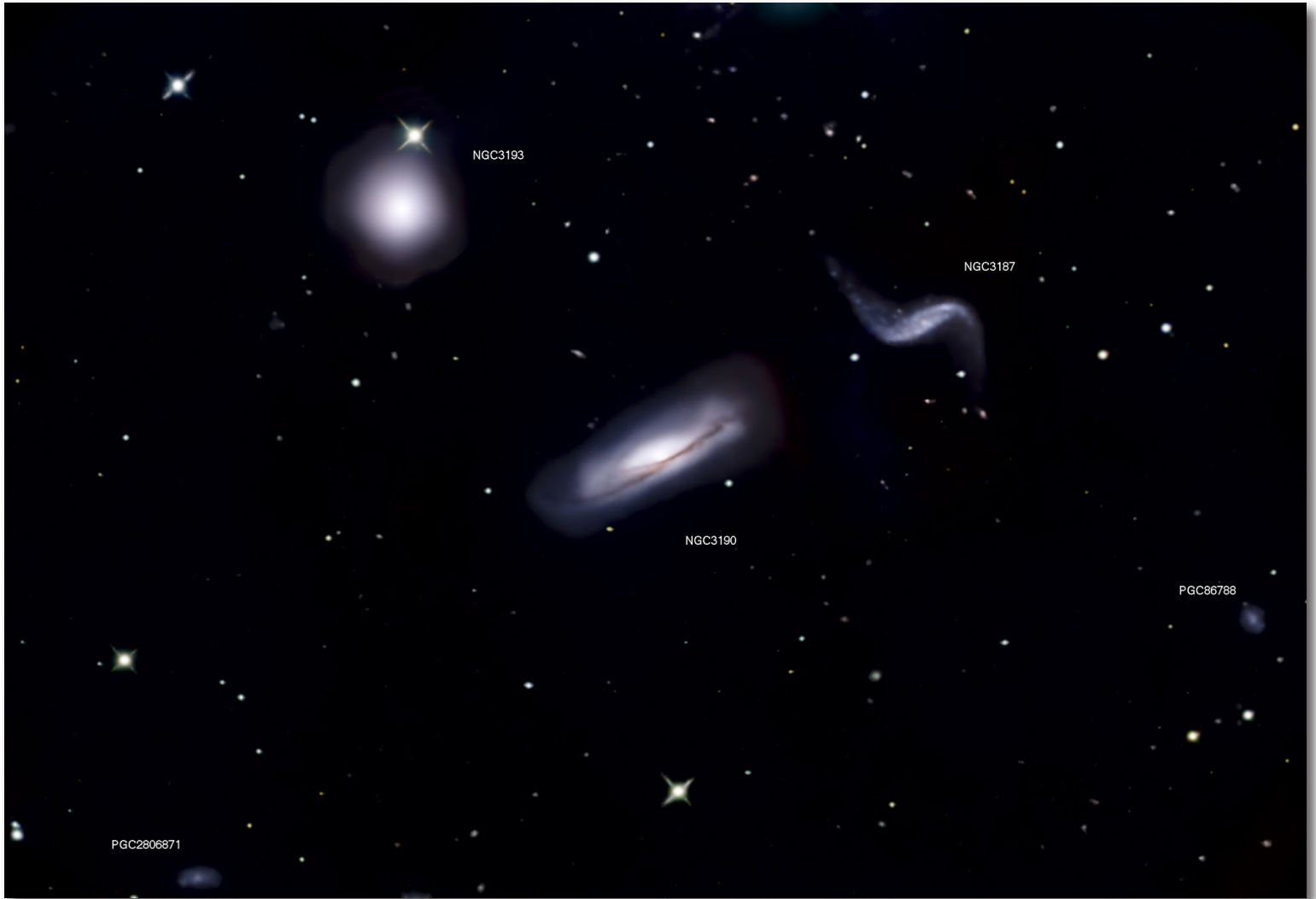
Exposures:

Approximately 20 hours of 5 minute exposures split between the narrowband filters Ha and OIII.

Processing Software: PixInsight with a touchup in Lightroom

Thor's Helmet, NGC 2359, is an emission nebula that is between 12,000 to 15,000 light years away. It is in Canis Major, also the home of M42. A massive Wolf-Rayet star is in the center and is providing much of the radiation that is energizing the nebula. This star is 280,000 times brighter than our sun, 16 times more massive and 1.3 times larger. These stars are relatively short lived and ultimately explode in a super nova. This one is expected to explode soon and in fact it may have already exploded but the light hasn't made it to us yet.

I shot this with my C 9.25 at a focal length of 2,350mm and an ASI294MM-P camera in Ha and OIII only. It was imaged during our recent full moon over seven nights for approximately 20 hours with 5 minute subs. Processed in PixInsight.



NGC3190 plus4 (Hickson 44) by Mario Motta

Brand/Type of Telescope/Lens: 32 inch F6.5 (5600mm), home made

Mount: home made equatorial

Exposures: 3 hours total imaging time, RGB filters

Processing Software: Pixinsight

Here's the story: Its the "object of the month" for April, and I take many close galactic interacting galaxies. Will be in a S&T article next year.



Antennae Galaxies - NGC 4038 by Dick Cogswell

Brand/Type of Telescope/Lens: C-14 reduced at 2800mm f/l

Mount: AP 1100

Exposures: 212 4-minute exposures in LRGBHa

Processing Software: PI, PS

Here's the story:

The Antennae Galaxies (also known as NGC 4038/NGC 4039) are a pair of interacting galaxies in the constellation Corvus which are undergoing a galactic collision. About 1.2 billion years ago, they were two separate galaxies. 900 million years ago, the Antennae began to approach one another, and 600 million years ago, the Antennae passed through each other; 300 million years ago, the Antennae's stars began to be released from both galaxies. Today the two streamers of ejected stars extend far beyond the original galaxies, resulting in the



M97 the Owl Nebula 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: 144 x 240sec Subs

Optolong UV/IR filter, ASI533MC Pro Camera with ZWO EAF

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

Here's the story: M97 is a planetary nebula 2,000 light years away in Ursa Major. The central star is condensing into a white dwarf after spewing gases into the surrounding space to a diameter of about 1 light year. M97 is expanding at about 30Km/Sec. Discovered by Pierre Mechain in 1791. This image was shot in Cape Coral on 13 March 2024.



M81 Bode's Nebula 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: 238 x 240sec broadband subs with Optolong UV/IR filter

95 x 300 sec Ha subs with 7nm Ha filter

ASI533MC Pro Camera

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

Here's the story: This image was shot in Cape Coral between 7 and 15 February 2024. M81 is sometimes called Bode's Nebula despite obviously being a spiral galaxy rather than a nebula. It lies 12 million light years away in Ursa Major and usually photographed together with its close neighbor M82, an irregular starburst galaxy. M81 exhibits pronounced regions of heated interstellar dust, which show up red in this photo. M81 was discovered in 1774 by Johann Bode.



NGC3198 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: 425 x 240sec broadband subs with Optolong UV/IR filter

96 x 300sec Ha subs with 7nm Ha filter

ASI533MC Pro Camera

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

Here's the story: This image was shot in Cape Coral over a three-day period from 24 Feb - 27 Feb 2024.

NGC3198 is a barred spiral galaxy in Ursa Major, approximately 47 light years away. Two supernovas appeared in NGC3198 indecent times, one in 1966 and another in 1999. NGC3198 has an apparent size of 8 arc minutes x 3 arc minutes and an apparent magnitude of 10.3



M82 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: 285 x 240sec Broadband subs with Optolong UVIR filter, 148 x 240sec Ha subs with 7nm Ha filter, 89 x 300Sec SII subs with 7nm SII filter Ha and SII were blended with pixelmath in SiriL. Shot in Cape Coral 19-22 Feb, 2024. ASI533MC Pro camera

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

Here's the story: M82 is a "starburst" galaxy usually referred to as the Cigar Galaxy because of its elongated shape. It is located near its larger sibling M81 in Ursa Major and its interactions with M81 are responsible for its starburst activity. M82 is 12 million light years distant. A supernova was discovered in M82 in 2014, and M82 contains the brightest pulsar yet discovered.



Ray Bratton

Markarian Chain with M84 & M86 by Ray Bratton

Brand/Type of Telescope/Lens: ES127 FCD Triplet, 952mm, f7.5

Mount: EQ6R Pro with ASI AIR Plus

Exposures: 16 300s (80 minutes) exposures with ZWO Duo filter

Processing Software: APP, PSRAW, & Topaz DeNoise

Here's the story: Markarian's Chain is a string of eight galaxies straddling the boundary between Virgo and Coma Berenices. Messier 84 and 86 (farthest left) dominate together with 'The Eyes', interacting with NGC 4435 and 4438. The home Virgo Cluster is the nearest cluster of galaxies, contains over 2000 galaxies, and has a noticeable gravitational pull on the galaxies of the Local Group of Galaxies surrounding our Milky Way Galaxy. The center of the Virgo Cluster is located about 70 million light years away toward the constellation of Virgo.

Webb Continues to Confirm Universe Expansion Rage

From [ESA](#)

Webb measurements shed new light on a decade-long mystery.

The rate at which the Universe is expanding, known as the Hubble constant, is one of the fundamental parameters for understanding the evolution and ultimate fate of the cosmos. However, a persistent difference, called the Hubble Tension, is seen between the value of the constant measured with a wide range of independent distance indicators and its value predicted from the afterglow of the Big Bang. The NASA/ESA/CSA James Webb Space Telescope has confirmed that the Hubble Space Telescope's keen eye was right all along, erasing any lingering doubt about Hubble's measurements.

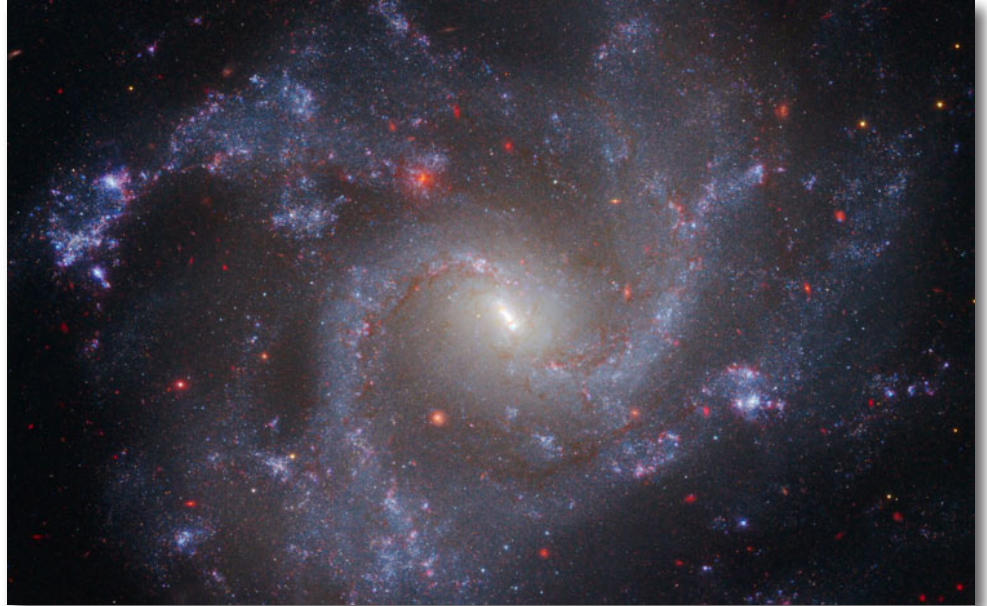


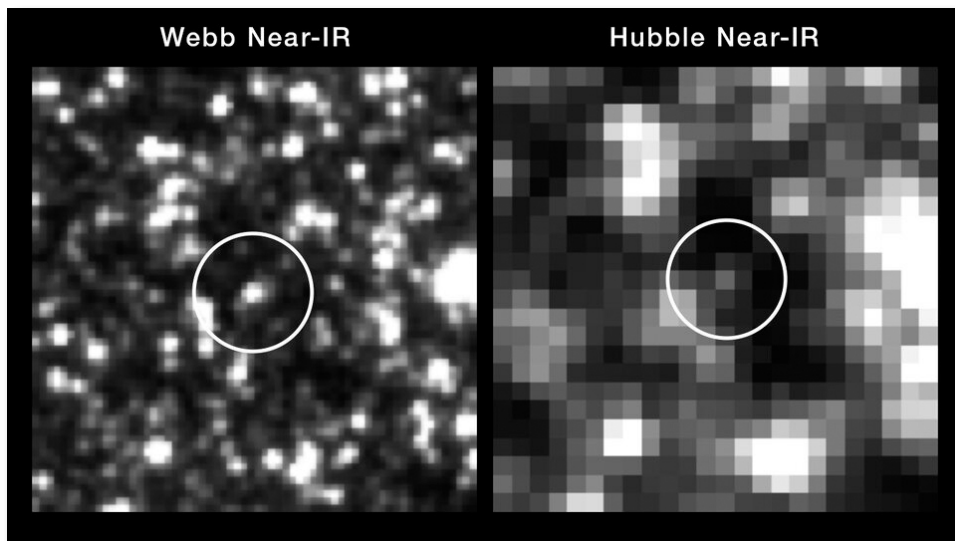
Image of NGC 5468, a galaxy located about 130 million light-years from Earth, combines data from the Hubble and James Webb space telescopes. Credit: NASA/ESA/CSA/STScI/A. Riess (JHU/STScI)

One of the scientific justifications for building the NASA/ESA Hubble Space Telescope was to use its observing power to provide an exact value for the expansion rate of the Universe. Prior to Hubble's launch in 1990, observations from ground-based telescopes yielded huge uncertainties. Depending on the values deduced for the expansion rate, the Universe could be anywhere between 10 and 20 billion years old. Over the past 34 years Hubble has shrunk this measurement to an accuracy of less than one percent, splitting the difference with an age value of 13.8 billion years. This has been accomplished by refining the so-called 'cosmic distance ladder' by measuring important milepost markers known as Cepheid variable stars.

However, the Hubble value does not agree with other measurements that imply that the Universe was expanding faster after the Big Bang. These observations were made by the ESA Planck satellite's mapping of the cosmic microwave background radiation – a blueprint for how the Universe would evolve structure after it cooled down from the Big Bang.

The simple solution to the dilemma would be to say that maybe the Hubble observations are wrong, as a result of some inaccuracy creeping into its measurements of the deep-space yardsticks. Then along came the James Webb Space Telescope, enabling astronomers to crosscheck Hubble's results. Webb's infrared views of Cepheids agreed with Hubble's optical-light data. Webb confirmed that the Hubble telescope's keen eye was right all along, erasing any lingering doubt about Hubble's measurements.

The bottom line is that the so-called Hubble Tension between what happens in the nearby Universe compared to the early Universe's expansion remains a nagging puzzle for cosmologists. There may be something woven into the fabric of space that we don't yet understand.



Does resolving this discrepancy require new physics? Or is it a result of measurement errors between the two different methods used to determine the rate of expansion of space?

Hubble and Webb have now teamed to produce definitive measurements, furthering the case that something else – not measurement errors – is influencing the expansion rate.

“With measurement errors negated, what remains is the real and exciting possibility that we have misun-

derstood the Universe,” said Adam Riess, a physicist at Johns Hopkins University in Baltimore. Adam holds a Nobel Prize for co-discovering the fact that the Universe’s expansion is accelerating, owing to a mysterious phenomenon now called ‘dark energy’.

As a crosscheck, an initial Webb observation in 2023 confirmed that Hubble’s measurements of the expanding Universe were accurate. However, hoping to relieve the Hubble Tension, some scientists speculated that unseen errors in the measurement may grow and become visible as we look deeper into the Universe. In particular, stellar crowding could affect brightness measurements of more distant stars in a systematic way.

The SH0ES (Supernova H0 for the Equation of State of Dark Energy) team, led by Adam, obtained additional observations with Webb of objects that are critical cosmic milepost markers, known as Cepheid variable stars, which can now be correlated with the Hubble data.

“We’ve now spanned the whole range of what Hubble observed, and we can rule out a measurement error as the cause of the Hubble Tension with very high confidence,” Adam said.

The team’s first few Webb observations in 2023 were successful in showing Hubble was on the right track in firmly establishing the fidelity of the first rungs of the so-called cosmic distance ladder.

Astronomers use various methods to measure relative distances in the Universe, depending upon the object being observed. Collectively these techniques are known as the cosmic distance ladder – each rung or measurement technique relies upon the previous step for calibration.

But some astronomers suggested that, moving outward along the ‘second rung’, the cosmic distance ladder might get shaky if the Cepheid measurements become less accurate with distance. Such inaccuracies could occur because the light of a Cepheid could blend with that of an adjacent star – an effect that could become more pronounced with distance as stars crowd together on the sky and become harder to distinguish from one another.

The observational challenge is that past Hubble images of these more distant Cepheid variables look more huddled and overlapping with neighbouring stars at ever greater distances between us and their host galaxies, requiring careful accounting for this effect. Intervening dust further complicates the certainty of the measurements in visible light. Webb slices through the dust and naturally isolates the Cepheids from neighbouring stars because its vision is sharper than Hubble’s at infrared wavelengths.

“Combining Webb and Hubble gives us the best of both worlds. We find that the Hubble measurements remain reliable as we climb farther along the cosmic distance ladder,” said Adam.

The new Webb observations include five host galaxies of eight Type Ia supernovae containing a total of 1000 Cepheids, and reach out to the farthest galaxy where Cepheids have been well measured – NGC 5468, at a distance of 130 million light-years. “This spans the full range where we made measurements with Hubble. So, we’ve gone to the end of the second rung of the cosmic distance ladder,” said co-author Gagandeep Anand of the Space Telescope Science Institute in Baltimore, which operates the Webb and Hubble Telescopes for NASA.

Together, Hubble’s and Webb’s confirmation of the Hubble Tension sets up other observatories to possibly settle the mystery, including NASA’s upcoming Nancy Grace Roman Space Telescope and ESA’s recently launched Euclid mission.

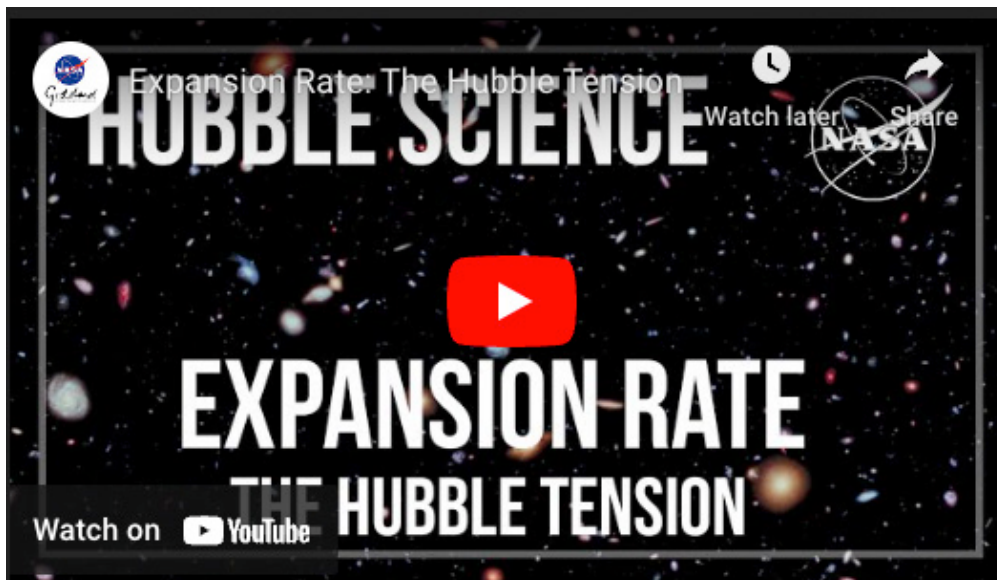
At present it’s as though the distance ladder observed by Hubble and Webb has firmly set an anchor point on one shoreline of a river, and the afterglow of the Big Bang observed by Planck from the beginning of the Universe is set firmly on the other side. How the Universe’s expansion was changing in the billions of years between these two endpoints has yet to be directly observed. “We need to find out if we are missing something on how to connect the beginning of the Universe and the present day,” said Adam.

These findings were published in the 6 February 2024 issue of The Astrophysical Journal Letters.

More information

Webb is the largest, most powerful telescope ever launched into space. Under an international collaboration agreement, ESA provided the telescope’s launch service, using the Ariane 5 launch vehicle. Working with partners, ESA was responsible for the development and qualification of Ariane 5 adaptations for the Webb mission and for the procurement of the launch service by Arianespace. ESA also provided the workhorse spectrograph NIRSpec and 50% of the mid-infrared instrument MIRI, which was designed and built by a consortium of nationally funded European Institutes (The MIRI European Consortium) in partnership with JPL and the University of Arizona.

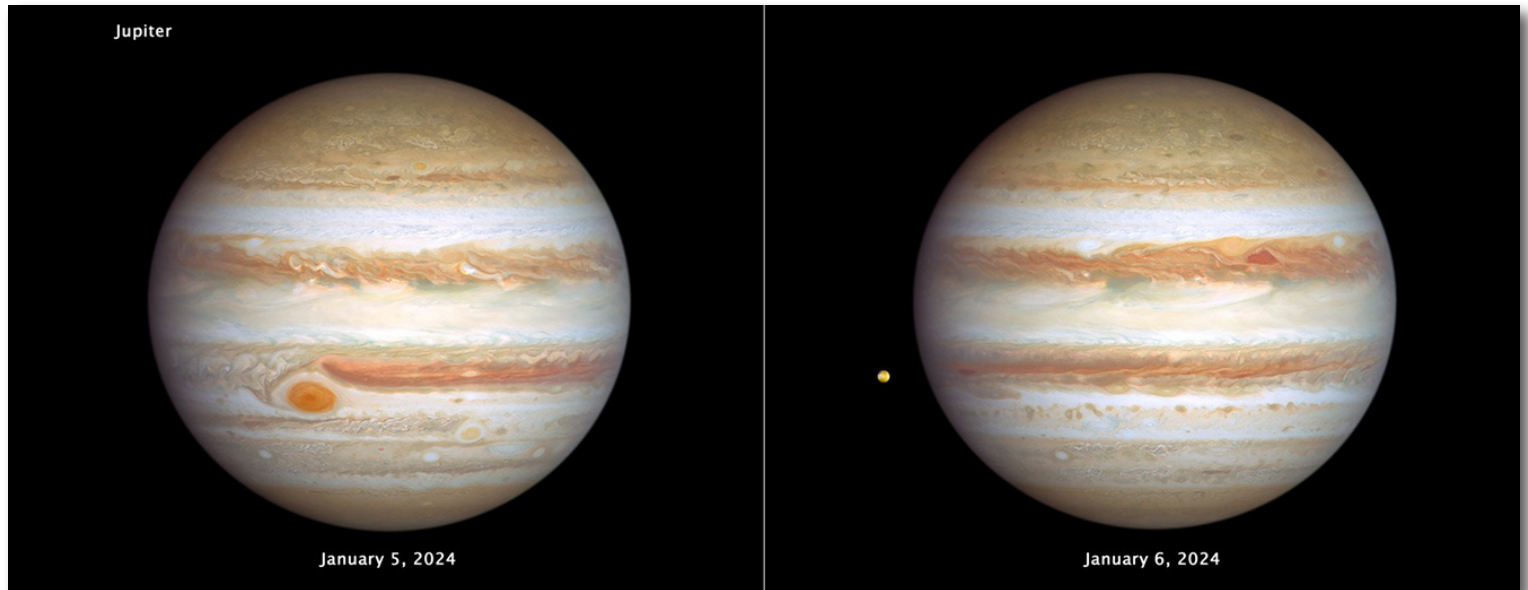
Webb is an international partnership between NASA, ESA and the Canadian Space Agency (CSA).



Jupiter's Annual Checkup

It's Time for Jupiter's Annual Checkup by Hubble

Each year, the Hubble Space Telescope focuses on the giant planets in our Solar System when they're near the closest point to Earth, which means they'll be large and bright in the sky. Jupiter had its photos taken on January 5-6th, 2024, showing off both sides of the planet. Hubble was looking for storm activity and changes in Jupiter's atmosphere.



The images are part of OPAL, the [Outer Planet Atmospheres Legacy program](#). These yearly images provide a long-time baseline of observations of the outer planets, helping to understand their atmospheric dynamics and evolution as gas giants. Jupiter was at perigee — its closest point to Earth — back in November 2023.

Jupiter's colorful clouds present an ever-changing medley of shapes and colors, as it is the stormiest place in the Solar System. Its atmosphere is tens of thousands of kilometers/miles deep, and this stormy atmosphere gives the planet its banded appearance. Here you can find cyclones, anticyclones, wind shear, and other large and fantastic storms.

The largest and most famous storm on Jupiter is the Great Red Spot. In the image on the left, you can see the Great Red Spot and a smaller spot to its lower right known as Red Spot Jr. The two spots pass each other every two years on average. In the right image, several smaller storms are rotating in alternating atmospheric bands.

"The many large storms and small white clouds are a hallmark of a lot of activity going on in Jupiter's atmosphere right now," said OPAL project lead Amy Simon of NASA's Goddard Space Flight Center in Greenbelt, Maryland.

Hubble tracks these dynamic changes every year (see a few of our previous articles about Hubble's view of Jupiter here, here and here.) There is always lots of activity and changes taking place from year to year.

Toward the far-left edge of the right-side image is Jupiter's tiny moon Io. The variegated orange color is where volcanic outflow deposits are seen on Io's surface.

This is a 1.3 Gigapixel Image of a Supernova Remnant

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

This colorful web of wispy gas filaments is the Vela Supernova Remnant, an expanding nebula of cosmic debris left over from a massive star that exploded about 11,000 years ago. This image was taken with the Department of Energy-fabricated Dark Energy Camera (DECam), mounted on the US National Science Foundation's Víctor M. Blanco 4-meter Telescope at Cerro Tololo Inter-American Observatory in Chile, a Program of NSF's NOIR-Lab. The striking reds, yellows, and blues in this image were achieved through the use of three DECam filters that each collect a specific color of light. Separate images were taken in each filter and then stacked on top of each other to produce this high-resolution image that contains 1.3 gigapixels and showcases the intricate web-



like filaments snaking throughout the expanding cloud of gas.

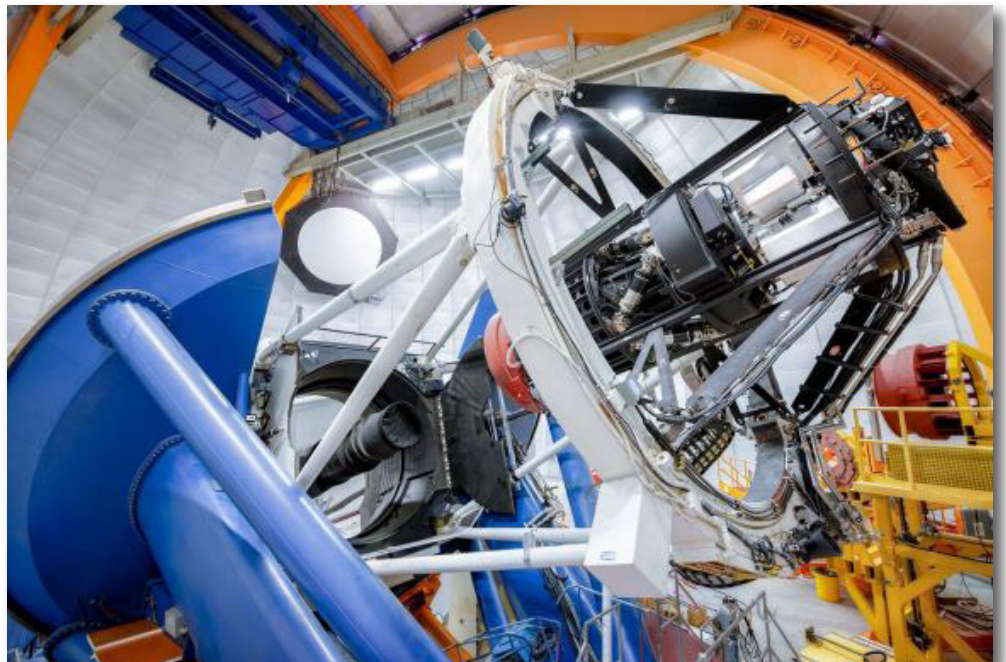
tars more massive than the Sun blow themselves to pieces at the end of their life. Usually leaving behind either a black hole, neutron star or pulsar they also scatter heavy elements across their host galaxy. One such star went supernova nearly 11,000 years ago creating the Vela Supernova Remnant. The resultant expanding cloud of debris covers almost 100 light years and would be twenty times the diameter of the full Moon. Astronomers have recently imaged the remnant with a 570 megapixel Dark Energy Camera (DECam) creating a stunning 1.3 gigapixel image.

The Vela supernova remnant is visible in long exposure photographs in the constellation Vela. It is the result of a star more massive than the Sun reaching the end of its life. As the progenitor star evolved the fusion deep in its core ceased. The lack of fusion means the cessation of the outward pushing thermonuclear force, the star instantly implodes under the immense force of gravity. The inward rushing material rebounds leading to the supernova explosions we see. The shockwave from the event is still travelling through the surrounding gas cloud thousands of years later.

The image recently released is one of the largest images ever taken of the object with the DECam camera. The instrument, built by the Department of Energy, was mounted upon the 4 metre Victor M Blanco telescope in Chile. It reveals amazing levels of detail with red, yellow and blue tendrils of gas. The image was taken through three colour filters in a technique familiar to amateur astronomers. The filters capture specific wavelengths of light and are then stacked on top of each other during processing to reveal the stunning high resolution colour image.

Supernova explosions of this type take hundreds of thousands of years for the effects to dissipate however the core of the collapsed star does remain. As the star collapses, the core is compressed leaving an ultra dense sphere of neutrons, the result of protons and electrons having been forced together under extreme pressures. The Vela Pulsar is only a few kilometres across but contains as much mass as the Sun. The stellar remnant is rotating rapidly, sweeping out a powerful beam of radiation across the Galaxy at a speed of 11 times per second.

Previous images from other instruments highlight the incredible capabilities of DECam. Coupled up to the 4 metre telescope in Chile, it operates like a conventional camera. Light enters the telescope and is redirected back up the tube by the large mirror. The light passes into DECam, through a 1 metre corrective lens and then arrives at its final destination, a grid of 62 charge-coupled devices. These little sensor generate current dependent on the amount of light that falls upon them. With an array of these sensors (570 million of them to be exact), a high resolution image can be recreated!



The Dark Energy Camera mounted on CTIO's Blanco 4-meter telescope. Credit: DOE/FNAL/DECam/R. Hahn/CTIO/NOIRLab/NSF/AURA

Are Andromeda and the Milky Way Already Exchanging Stars?

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

I often drag out the amazing fact that the Andromeda Galaxy, that faint fuzzy blob just off the corner of the Square of Pegasus, is heading straight for us! Of course I continue to tell people it won't happen for a few billion years yet but a recent study suggests that we are already seeing hypervelocity stars that have been ejected from Andromeda already. It is just possible that the two galaxies have already started to exchange stars long before they are expected to merge.



Artist's illustration of Andromeda/Milky Way Merger. Credit: NASA; ESA; Z. Levay and R. van der Marel, STScI; T. Hallas; and A. Mellinger

We tend to think of stars as stationary objects in the sky, except for their slow westward drift across the sky as the Earth rotates. The reality is different though, stars do move but due to the vast distances in interstellar space, that motion is largely not noticeable. There are exceptions such as Barnard's star in the constellation Ophiuchus. This inconspicuous red dwarf star moves 10.39 seconds of arc each year (by comparison, the full Moon is 1,900 seconds or arc in diameter.)

Another type of star can be observed, hypervelocity stars (HVSs), and these are among the fastest objects in the Galaxy. They are defined as stars that have a velocity which is of the order 1,000 km per second and by comparison, the Earth travels through space at a velocity of around 30 km per second! The first was discovered in 2005 but since then a number of HVSs have been found, and some of them have the potential to escape from the Milky Way.

Typically the motion of stars is the result of their motion around the centre of a galaxy. Our own star the Sun, takes 220 million years to complete one orbit of the centre of the Milky Way. The origin of the HVSs high velocity is believed to stem from gravitational interactions between binary stars and black holes. The idea was pro-

posed by Jack Gilbert Hills is a stellar dynamicist, born on 15 May 1943. In this process, a black hole (stellar or the supermassive black hole at Galactic centre) captures one of a binary star system while the other gets ejected at high velocity. Other theories include ejection of one of a binary star system when the other goes supernova or from galactic interactions.

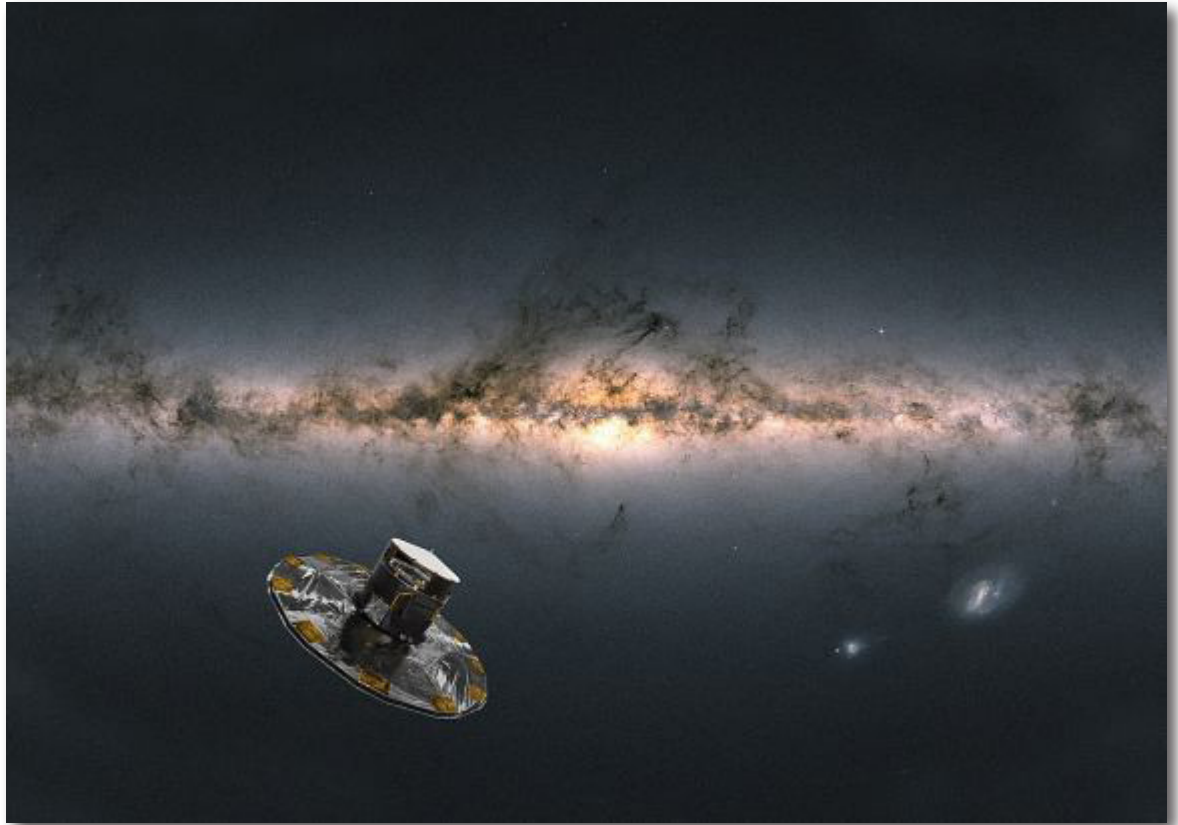
To understand the interactions between the Milky Way and the Andromeda Galaxy the team (led by Lukas Gülzow from the Institute for Astrophysics in Germany) had to go through painstaking analyses. First they had to understand the relative motion of the two galaxies, they then had to model the gravitational potential of the entire system – this is the total acceleration acting upon an object at any position in either of the galaxies at any time. Finally the team could generate simulations of stellar motion to model the HVSs trajectories.

The study calculated the trajectories of 18 million HVSs for two different scenarios taking into account the two galaxies having equal mass and the other with the Milky Way having about half the mass of the Andromeda Galaxy.

The starting positions of the HVSs in the simulation were randomly generated around the centre of Andromeda. The ejection directions were random and the results showed that 0.013 and 0.011 percent of HVSs are now within a radius of 50kpc around the Milky Way center.

The explored the velocity of HVSs on arrival with both galaxy mass simulations and found that many approximately retain their initial velocity. Interestingly due to the time taken for the journey, a significant proportion may well evolve off the main sequence during their journey. Some of the HVSs slow down sufficiently to be captured by the Milky Way.

The team mapped the simulated position of stars against the sky and ran the data against high velocity star positions from Gaia data (Release 3) and found the simulated position distribution consistent with the Gaia data. The study concludes that it is highly likely that HVSs from Andromeda could indeed migrate to the Milky Way. Whilst they are not expected in their thousands, they are expected to distribute equally around the Milky Way centre. It might even be possible to detect them based on stellar velocity and trajectories but further studies are now required to take that next step.

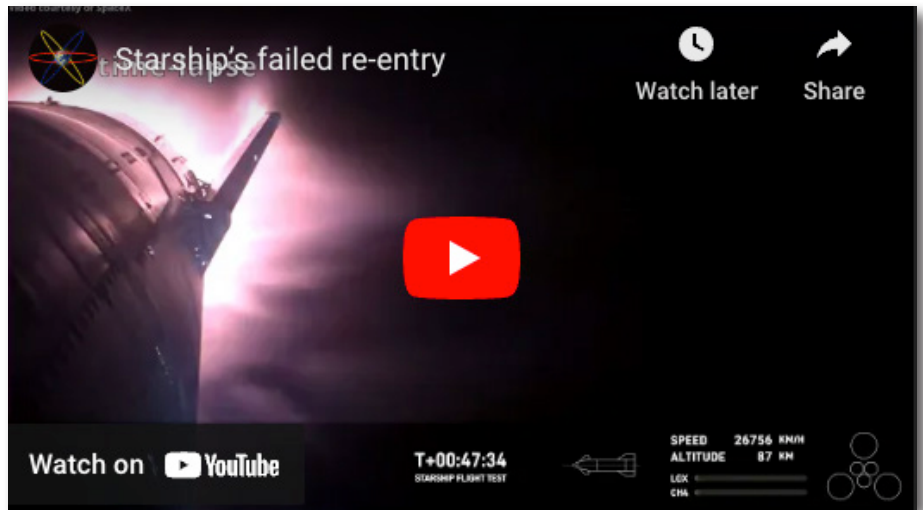


Artist impression of ESA's Gaia satellite observing the Milky Way (Credit : ESA/ATG medialab; Milky Way: ESA/Gaia/DPAC)

Starship Reaches Orbit on SpaceX's Third Test but Breaks Up on Re-Entry

After falling short in its first two attempts, SpaceX got its Starship super-rocket to an orbital altitude today during the launch system's third integrated flight test. Now it just has to work on the landing.

Today's test marked a major milestone in SpaceX's effort to develop Starship as the equivalent of a gigantic Swiss Army knife for spaceflight, with potential applications ranging from the deployment of hundreds of Starlink broadband satellites at a time to crewed odysseys to the moon, Mars and beyond.



The 396-foot-tall (120-meter-tall) rocket lifted off from SpaceX's Starbase facility in South Texas at 8:25 a.m. CT (1325 GMT), with all 33 of the first-stage booster's methane-fueled Raptor engines firing. The Super Heavy booster is considered the world's most powerful launch vehicle, with 16.7 million pounds of thrust at liftoff.

Minutes after launch, the rocket's second stage — known as Ship — successfully executed a hot-staging operation to start up its six engines while still attached to the Super Heavy booster. After stage separation, Ship continued onward at orbital velocity to an altitude of about 140 miles (230 kilometers). Meanwhile, the booster began a series of burns that were meant to bring it down to a soft splashdown in the Gulf of Mexico.

The Super Heavy splashdown turned out to be not as soft as SpaceX hoped. Only a few of the booster's engines were able to light up again for the intended landing burn. The last telemetry from the booster seemed to suggest that it hit the water at almost 700 mph (1,112 kilometers per hour). "We didn't light all the engines that we expected, and we did lose the booster," SpaceX commentator Dan Huot said during today's webcast. "We'll have to go through the data to figure out exactly what happened, obviously. ... But wow, Ship in space!"

For more than 40 minutes, a camera on the second stage transmitted stunning views of Earth as seen from an orbital height. SpaceX also tested the opening and closing of a payload door that's meant to be used for satellite deployment in orbit — and tried out a refueling procedure that involved transferring liquid oxygen between tanks.

The flight plan for this test didn't call for doing a complete orbit. Rather, the trajectory was designed to have Ship come down for its own soft splashdown in a remote stretch of the Indian Ocean.

The climax of the descent came when Ship's onboard camera captured the glow of plasma generated by the craft's descent at speeds in excess of 16,500 mph (26,700 kilometers per hour). The atmospheric heating was expected to reach 2,600 degrees Fahrenheit (1,425 degrees Celsius).

"We've never seen anything like this before," SpaceX commentator Kate Tice said of the fiery real-time video, which was transmitted down to Earth via SpaceX's Starlink network.

A few minutes into the descent, SpaceX lost the signal from Ship — and the prolonged silence led SpaceX's mission controllers to assume that the ship was lost

[*Continue Reading...*](#)

International Dark Sky Week

April 2-8

Even the moon and sun are getting involved, gifting those of us in North America with a few extra moments of natural darkness during the total solar eclipse that will pass over Mexico, the United States, and Canada on April 8.

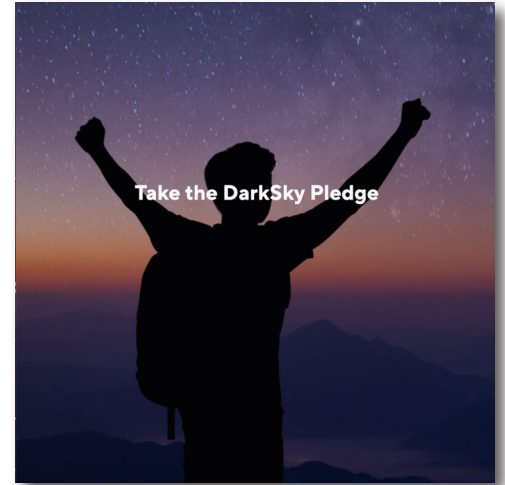
So mark your calendars and shield your lights as we prepare for a fun-filled week of learning and action to reduce light pollution worldwide!

Take the pledge!

This simple activity takes no time at all! Show the world your support for dark skies and the protection of nighttime environments by linking your name to the cause. Let's see if we can get 10,000 pledges for the night!

When sharing the pledge with friends and family, be sure to use your unique code to track how many people you've recruited!

[Click here to take the pledge.](#)



Discover the night.

Learn about the importance of the night through our special Night Matters Lecture Series. Hear directly from subject matter experts and dark sky advocates about how light pollution affects wildlife, human health, and more.

Also, be sure to explore the night on your own, or hold a small event with friends and family!

[LEARN MORE](#)



How to fold a piece of paper like a satellite solar panel

The art of origami goes beyond paper cranes and boats. In 2016, a team of Harvard researchers led by L. Mahadevan introduced a groundbreaking fold called the Miura-ori. This fold revolutionizes approaches to creating three-dimensional structures and has a wide range of potential applications, from surgical stents to space-bound payloads.

The Miura fold, as explained on [Wikipedia](#), is a method of folding a flat surface, like a sheet of paper, into a smaller area:

The crease patterns of the Miura fold form a tessellation of the surface by parallelograms. In one direction, the creases lie along straight lines, with each parallelogram forming the mirror reflection of its neighbor across each crease. In the other direction, the creases zigzag, and each parallelogram is the translation of its neighbor across the crease. Each of the zigzag paths of creases consists solely of mountain folds or of valley folds, with mountains alternating with valleys from one zigzag path to the next. Each of the straight paths of creases alternates between mountain and valley folds.

It has been instrumental in the Japanese space program for deploying large solar

panel arrays. What makes this fold unique is its ability to maintain rigidity, making it applicable to materials other than paper, such as metal or plastic. This makes it an invaluable tool for developing compact and efficient designs that can be deployed in challenging environments, whether it be outer space or inside the human body.

What sets this research apart is the use of an algorithm to create complex shapes using variations of the Miura-ori fold. As Levi Dudte, a graduate student in the Mahadevan lab, points out in Science Daily, "This fold is capable of creating many more shapes than we imagined."

Try it at home! Print out and fold this [PDE](#), created by Dmcq – Own work, CC BY-SA 3.0

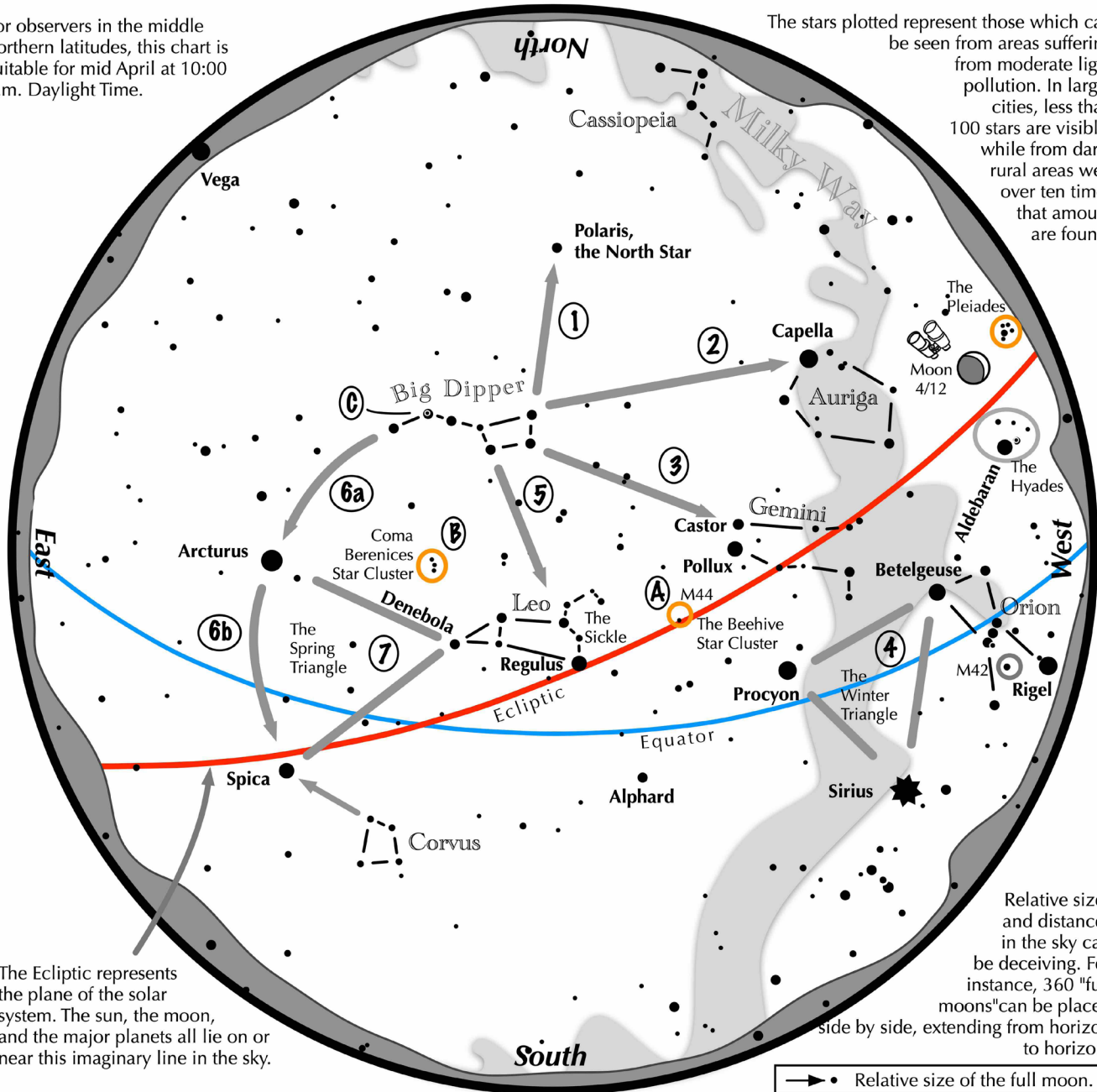


Sky Chart

Navigating the April Night Sky, Northern Hemisphere

For observers in the middle northern latitudes, this chart is suitable for mid April at 10:00 p.m. Daylight Time.

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 April night sky: Simply start with what you know or with what you can easily find.

- 1 Extend an imaginary line north from the two stars at the tip of the Big Dipper's bowl. It passes Polaris, the North Star.
- 2 Draw another imaginary line west across the top two stars of the Dipper's bowl. It strikes Capella low in the northwest.
- 3 Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
- 4 Look in the west-southwest for the bright Winter Triangle stars of Sirius, Procyon, and Betelgeuse.
- 5 Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
- 6 Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica.
- 7 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.

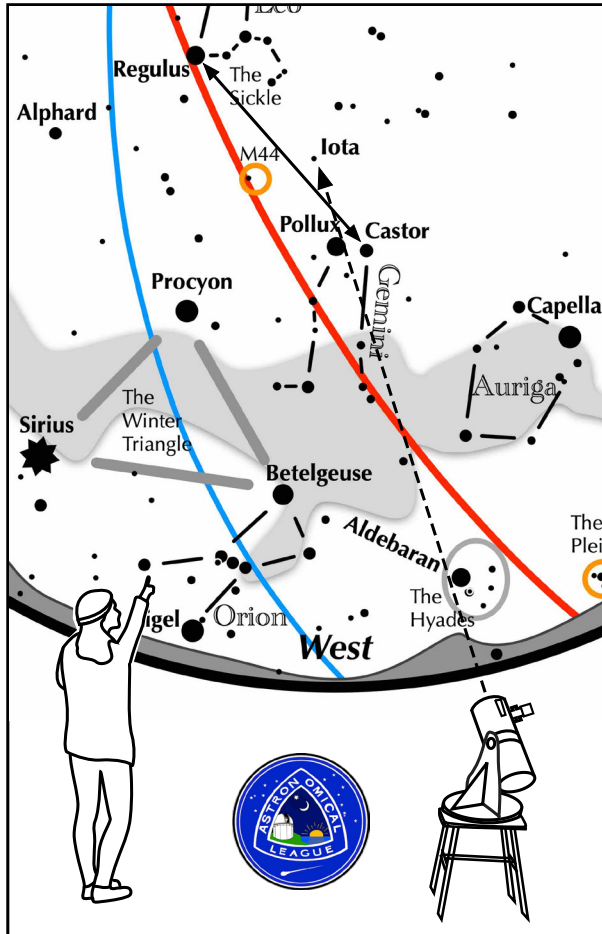
Binocular Highlights

- A: M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.
- B: Look nearly overhead for the loose star cluster of Coma Berenices.
- C: In the Big Dipper's handle shines Mizar next to a dimmer star, Alcor.



Astronomical League
www.astroleague.org

ASTRONOMICAL LEAGUE Double Star Activity



Other Suns: Iota Cancri

How to find Iota Cancri on an April evening

Face west. Look for the twin stars of Gemini, Castor and Pollux. Find Regulus. Iota lies about mid way between Castor and Regulus. It will be a moderately dim star.

Suggested magnification: >20x
Suggested aperture: >3 inches

Iota Cnc

A-B separation: 31 sec

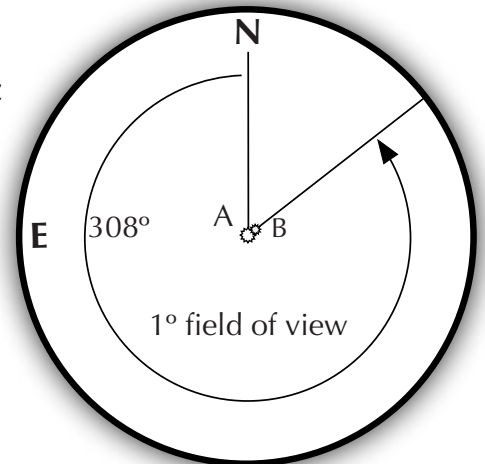
A magnitude: 4.1

B magnitude: 6.0

Position Angle: 308°

Colors:

yellow
blue





ALCON 2024

STARS AND ALL THAT JAZZ!

JULY 17-20, 2024




To register for ALCon, first click on the link, then choose "buy tickets."
<https://www.tickettailor.com/events/astronomicalsocietyofkansascity/1187693#>

It's ASKC's 100th anniversary! We are honored to be the official host for this year's Astronomical League Convention – ALCon 2024 – this July.

Held at the beautiful Overland Park DoubleTree Hotel

See you at ALCon!

Astronomical Society of Kansas City

Meeting Minutes

Southwest Florida Astronomical Society member minutes of March 7, 2024 both Zoom and at the Caloosa Planetarium

Southwest Florida Astronomical Society member minutes of March 7, 2024 both Zoom and at the Caloosa Planetarium

Opening Remarks: President Risley opened the meeting at 7:08 PM, thanked all for attending, 8 on Zoom and 13 in person. Brian introduced Heather Preston, director of the Caloosa Planetarium, to present the new program 100 Years of Eternity. Heather stated that SWFAS was the first to view this German/American initiative. Why?

Because in 1924 the first planetarium was constructed in Germany, which caused a worldwide sensation, and in the next year, a planetarium was constructed in Chicago.....with thousands to follow. Man had now embarked on exploring the universe with public participation. This program walked us through the origins of man, early knowledge of the sky by the Greeks, the 360 day calendar with 5 floating days by the Romans, to the technics of time. The clock of two 12 hour segments copying the number of full moons, the rotation of time to 360 degrees, and the final establishment of the current day calendar. Heather answered questions and all applauded her efforts. Heather stated that the planetarium will be open on April 8th for viewing of the solar eclipse from 12-5 PM.

Review of Past Events:

Charlotte County.....Tom Segur stated that February 9th Observatory viewing began well, but then became partially cloudy. He had a wonderful attendance of 70-80 people.....Tom further stated that the February 24th Gilchrist Park Solar viewing went extremely well from 10:30 until 12:30 along side the Art show permitting over 100 viewers.

Lee County..... Brian Risley advised that no one attended the February 10th Big Cypress event.....Brian further stated that STEMtastice February 10th event at the Caloosa Sound Convention Center with his wife was well attended and was very successful Brian also said that the Cape Coral Burrowing Owl Festival on February 24th has near 3,600 people attend and he was extremely

busy.....Brian advised that the March 2nd Seahawk Park Star Party was cancelled due to weather.....Dan Dannenhauer reported on the Winter Star Party held from February 5th thru the 10th on Scout Key near Big Pine in the Keys. Dan advised that attendance was 205 down from 650 in pre-pandemic days, that the weather was cloudy 90% of the time, and that Tony had sold \$500 of equipment which he will give John MacLean with a list of the items sold. Mario Motta, Tony Costanzo, Steve Salloway and Mike Corvese also attended.

Upcoming Events:

Charlotte County.....Tom Segur was hopeful that there would be good weather on March 8th for the FSW Observatory event..... Tom further stated that the last Solar event of the season will be held on March 23rd at Ponce DeLeon Park from 9AM until 12:00PM

Lee County.....Brian Risley advised that he needs scopes and help for the Cape Coral Rotary Park star party on March 9th from 6PM until 10PM.....Brian stated that the weather predictions of cloudy for March 8th Big Cypress viewing was very poor and he was not attending, asking if anyone else was going, no one replied..... Brian asked for assistance in both the April 6th Seahawk Star Party and the April 8th Solar Eclipse events at Centennial Park from 1:45 PM until 4:15PM advising that he is crafting an article for the Florida Weekly concerning the Solar Eclipse.Brian said that SWFAS has been requested to attend a Lakes Park Earth Day event on April 20th, but that he was unable to attend, thus asking for volunteers.

Officer and Committee Reports:

President.... Brian Risley urged all members to pay their annual dues and said that he was sending out an email to those who have yet to pay. Brian reminded all that the new bylaws require payment by March or said member will be dropped from membership. Brian further advised that Mike Jensen was in Antarctica and that his reports for Vice President, the Newsletter and Website coordinator will be given in the April meeting.

Secretary.....Dan Dannenhauer confirmed that the February minutes were accurate and at the very end of the recent newsletter. John MacLean moved approval, seconded by Don Bishop and approved unanimously.

Treasurer..... John MacLean stated that the specific have been reviewed by the officers and approved. That the YTD budget is secure at \$3,468, that we have purchased the new computer for \$1,053 and discussed other items of revenue and expenses. No action needed by the membership.

Equipment Coordinator..... Brian advised that he will get with Tony Costanzo regarding the sale of various items at the Winter Star Party.

Program Committee Coordinator..... John MacLean advised that Amy Williams from the University of Florida will be our April speaker and that both June and August have programs and speakers. In July there will be no meeting.

Adjourn..... President Risley called for adjournment at 8:32PM.... So moved by Sean Dey and seconded by John MacLean, passing unanimously.



ALCON 2024

STARS AND ALL THAT JAZZ!

JULY 17-20, 2024




To register for ALCon, first click on the link, then choose "buy tickets."

<https://www.tickettailor.com/events/astronomicalsocietyofkansascity/1187693#>

It's ASKC's 100th anniversary! We are honored to be the official host for this year's Astronomical League Convention – ALCon 2024 – this July.

Held at the beautiful Overland Park DoubleTree Hotel

See you at ALCon!

Astronomical Society of Kansas City