

# The Eyepiece Milky Way Edition



**Editor - Mike Jensen**

Hi Everyone!

I hope you will enjoy reading this "Milky Way" edition as much as I enjoyed assembling it. I think for many of us, the Milky Way is one of the things that got us in to astronomy, and also for many of us we have just recently begun to understand what it really is, and NOW it's even much more interesting and mystifying.

I want to thank our group of Astro SIG members who contributed Milky Way images for this edition. Not only are they good at DSO's, but also with a much wider field camera.

This month I've included a short, linked article from Sky & Telescope on the new supernova discovered in M101. Many of us astrophotographers have imaged M101 and to see it have a supernova is even more special.

WHAT? You may ask is a Supernova?

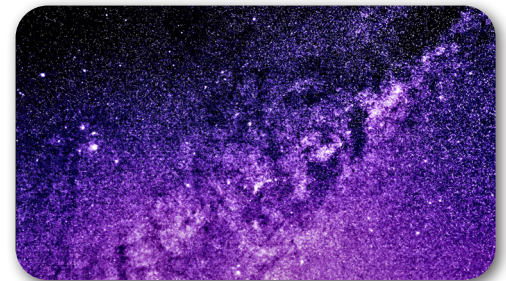
The Short Answer: A supernova is the biggest explosion that humans have ever seen. Each blast is the extremely bright, super-powerful explosion of a star. A supernova is what happens when a star has reached the end of its life and explodes in a brilliant burst of light. Supernovae can briefly outshine entire galaxies and radiate more energy than our sun will in its entire lifetime. They're also the primary source of heavy elements in the universe. According to NASA, supernovae are "the largest explosion that takes place in space." The really cool thing is that this happened over 20 million years ago!

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

## JUNE 2023

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## Club Officers & Positions

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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

Each meeting will have the same  
Zoom link/meeting ID.

Below are the dates for the next six meetings of 2023:

June 1, 2023  
July 6, 2023  
August 3, 2023  
Sept. 7, 2023  
Oct. 5, 2023  
Nov. 2, 2023

Link to join Zoom meeting:  
<https://widener.zoom.us/j/98623448643>

Meeting ID: 986 2344 8643

One tap mobile:  
+13052241968,,98623448643#  
US (or)  
+13126266799,,98623448643#  
US

## SWFAS Bylaws Update You Need To Read This (Please)

Your board of Officers along with member Sandeep Dey have been diligently working on revising the club's bylaws over the last several months. The bylaws were significantly outdated and did not reflect how the club was actually doing business.

Well, we think we are ready to release them, have you read them, provide any input as needed and then vote on approval. We anticipate a vote in September.

Several hurdles have been needed to help with staying in integrity with Robert's Rule of Order and our changing club structure, the electronic age and the snowbird effect. The biggest change will be offering members the ability to vote by electronic resources. A form will be created on the website and members will be encouraged to vote there, or in person at a specified meeting, or by email. Only paid members will be eligible to vote. Also, the currently existing (previous) bylaws required a 2/3-member quorum. This is a number which we have never been able to achieve and should have been changed years ago. The new quorum (in accordance with Robert's Rule of Order will be 50% plus one of the paid members.

We need everyone in the club to VOTE on these Bylaws!

PLEASE, PLEASE take the time to read the [DRAFT bylaws at this link](#):



## President's Report

This month we have another interesting presentation: Dr. Desika Narayanan, Assoc Prof. Astronomy, University of Florida. Forming the Brightest Galaxies in the Universe. John MacLean has been busy lining up speakers for most of the rest of the year as well.

Mike Jensen, Dan Dannenhauer, I and especially John MacLean and Sean Dey have been busy getting the By-Law updates prepared. We do ask that all members please respond to any emails asking for votes or vote at the meeting. We have to follow certain rules to make these changes and that requires FULL membership voting. Mike has done it again! He came in second place in the AL's 2023 Mabel Sterns newsletter competition. He keeps getting better so hopefully next year he comes in first! It is an honor to have him finish in second place this year.

We will have an AL vote that I sent out information on at the meeting. If you have any input on it, let one of the officers know or bring it up prior to the vote at the meeting June 1st.

Not doing a lot observing wise during the summer, the bugs, weather and late hours is just too much to plan events.

Carol Stewart, one of our past presidents, former teacher and longtime member and planetarium curator is leaving us. She has given me 2 dobs to give out to members looking for their first scopes. I sent out details to the club. We will be giving these out at the June 1st meeting. We will miss Carol and all she has done with us, the planetarium and with her school and wish her well on her new adventures. (Carol and I go back to when I was still in high school.)

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## GUEST SPEAKER PRESENTATIONS SERIES

We are excited to announce the initiation of the new "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 2023 on a month-to-month basis.:

June 1, 2023

Dr. Desika Narayanan, Assoc Prof. Astronomy, University of Florida. Forming the Brightest Galaxies in the Universe.

July 6, 2023

Mike Jensen, NCW, presents an exciting, in citeful, frequently self exploring, fun and funny presentation on Astrophotography. Titled **"WOW, You must have a really good camera!"**

## June 1, 2023



**Dr. Desika Narayanan -**  
Forming the Brightest Galaxies in  
the Universe

## 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>

### Reflector Magazine

You should have received an email from the Astronomical League allowing you to download your latest quarterly digital copy of the Reflector magazine on around March 19. It is also available via the web at <https://www.astroleague.org/reflector>

### ALCON 2023

The ALCON conference for 2023 will be held July 26 – 29 in Baton Rouge, LA. Details are available at: What's Up with the Astro League March 2023 | The Astronomical League

### Monthly highlight of the Astronomical League Observing Programs

(Article prepared by SWFAS Astronomical League Coordinator John MacLean)

#### Spectroscopy Observing Program

This month we discuss a new program not covered in this series before and one definitely that will be mainly of interest perhaps only to the more scientific mind-



ed of our membership.

Many of our recent presenters have shown stellar spectra as part of their presentations at our monthly meetings. The new Astronomical League Spectroscopy Observing Program is designed to show that with very modest equipment that amateur astronomers like ourselves are able to develop useful stellar spectra and interpret them.

The details are covered on the Astronomical League website at Spectroscopy Observing Program | The Astronomical League <https://www.astroleague.org/content/spectroscopy-observing-program>

Equipment needed include a spectroscope, camera, mount, and drive along with special low-cost software. Members of our Astrophotography SIG already will own all the materials needed with the exception of the spectroscope and special software.

These are available at very affordable prices, however. A very adequate Star Grating can be obtained for around \$200 and the analyzer software for just above the \$100 mark.

A prerequisite to formally beginning this program is to





## The Night Sky Network



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



### Look Up in the Sky - It's a Bird Theresa Summer

Bird constellations abound in the night sky, including Cygnus, the majestic swan. Easy to find with its dazzling stars, it is one of the few constellations that look like its namesake and it is full of treasures. Visible in the Northern Hemisphere all summer long, there's so much to see and even some things that can't be seen. To locate Cygnus, start with the brightest star, Deneb, also the northeastern most and dimmest star of the Summer Triangle. The Summer Triangle is made up of three bright stars from three different constellations – read more about it in the September 2022 issue of Night Sky Notes. "Deneb" is an Arabic word meaning the tail. Then travel into the triangle until you see the star Albireo, sometimes called the "beak star" in the center of the summer triangle. Stretching out perpendicular from this line are two stars that mark the crossbar, or the wings, and there are also faint stars that extend the swan's wings.

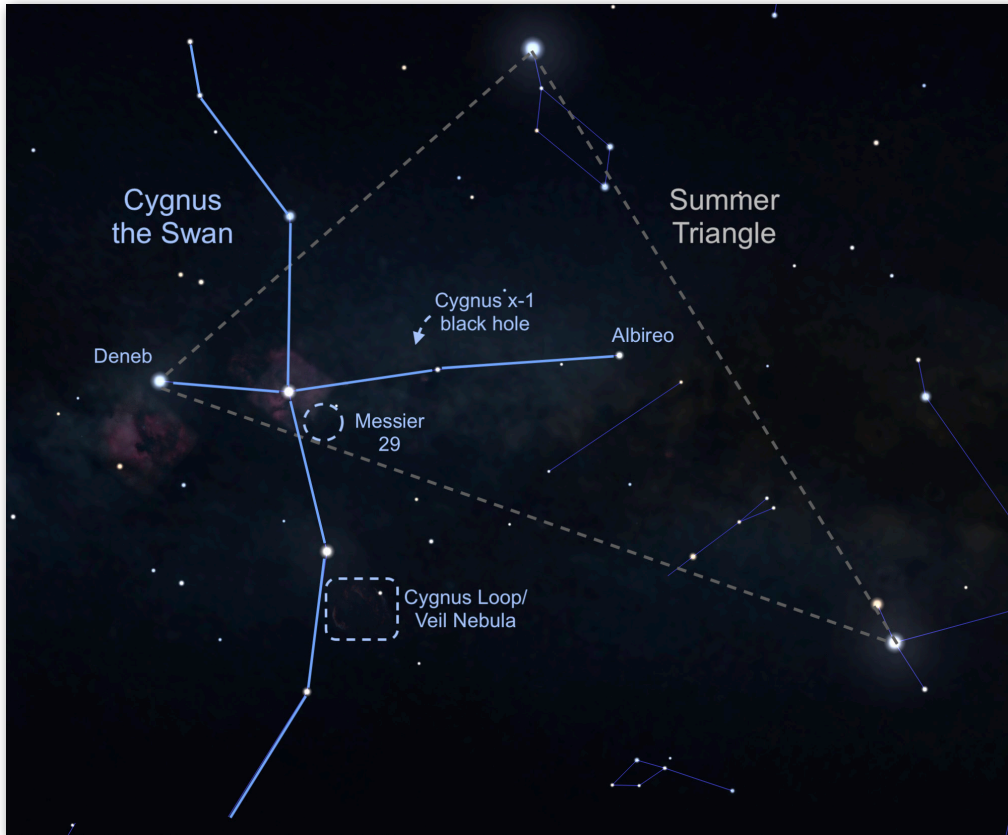
From light-polluted skies, you may only see the brightest stars, sometimes called the Northern Cross. In a darker sky, the line of stars marking the neck of the swan travels along the band of the Milky Way. A pair of binoculars will resolve many stars along that path, including a sparkling open cluster of stars designated Messier 29, found just south of the swan's torso star. This grouping of young stars may appear to have a reddish hue due to nearby excited gas.

Let's go deeper. While the bright beak star Albireo is easy to pick out, a telescope will let its true beauty shine! Like a jewel box in the sky, magnification shows a beautiful visual double star, with a vivid gold star and a brilliant blue star in the same field of view. There's another marvel to be seen with a telescope or strong binoculars – the Cygnus Loop. Sometimes known as the **Veil Nebula**, you can find this supernova remnant (the gassy leftovers blown off of a large dying star) directly above the final two stars of the swan's eastern wing. It will look like a faint ring of illuminated gas about three degrees across (six times the diameter of the Moon).

Speaking of long-dead stars, astronomers have detected a high-energy X-ray source in Cygnus that we can't see with our eyes or backyard telescopes, but that is detectable by NASA's Chandra X-ray Observatory. Discovered in 1971 during a rocket flight, Cygnus x-1 is the first X-ray source to be widely accepted as a black hole. This black hole is the final stage of a giant star's life, with a mass of about 20 Suns. Cygnus x-1 is spinning at a phenomenal rate – more than 800 times a second – while devouring a nearby star. Astronomically speaking, this black hole is in our neighborhood, 6,070 light years away. But it poses no threat to us, just offers a new way to study the universe.

Check out the beautiful bird in your sky this evening, and you will be delighted to add Cygnus to your go-to summer viewing list. Find out NASA's latest methods for studying black holes at [www.nasa.gov/black-holes](https://www.nasa.gov/black-holes).





Look up after sunset during summer months to find Cygnus!

Along the swan's neck find the band of our Milky Way Galaxy.

Use a telescope to resolve the colorful stars of Albireo or search out the open cluster of stars in Messier 29. Image created with assistance from Stellarium: [stellarium.org](http://stellarium.org)



While the black hole Cygnus x-1 is invisible with even the most powerful Optical telescope, in X-ray, it shines brightly. On the left is the optical view of that region with the location of Cygnus x-1 shown in the red box as taken by the Digitized Sky Survey. On the right is an artist's conception of the black hole pulling material from its massive blue companion star.

(Credit: [NASA/CXC chandra.harvard.edu/photo/2011/cygx1/](http://NASA/CXC.chandra.harvard.edu/photo/2011/cygx1/))

## 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](#).

## Astro Sig Schedule 2023

All Meetings at 6:30pm

June 20th  
July 18th  
August 15th  
September 19th  
October 17th  
November 21st  
December 19th

## *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.

### ASTRO SIG MEETING ZOOM LINK

<https://us02web.zoom.us/j/81077794455?pwd=eGpxalRET1BPckdEcmtlQ290WU5jdz09>

Meeting ID: 810 7779 4455  
Passcode: Phot@S!G23

## *Learn About Getting Started In Astrophotography*



Sometimes we feel like clowns trying to do what we do, but we forge ahead and usually end up with some good results!

At the July 6th general meeting, Astro SIG

leader Mike Jensen will present a talk about how many of us got in to Astrophotography, and what it REALLY takes to get in to Astrophotography. You should know you can



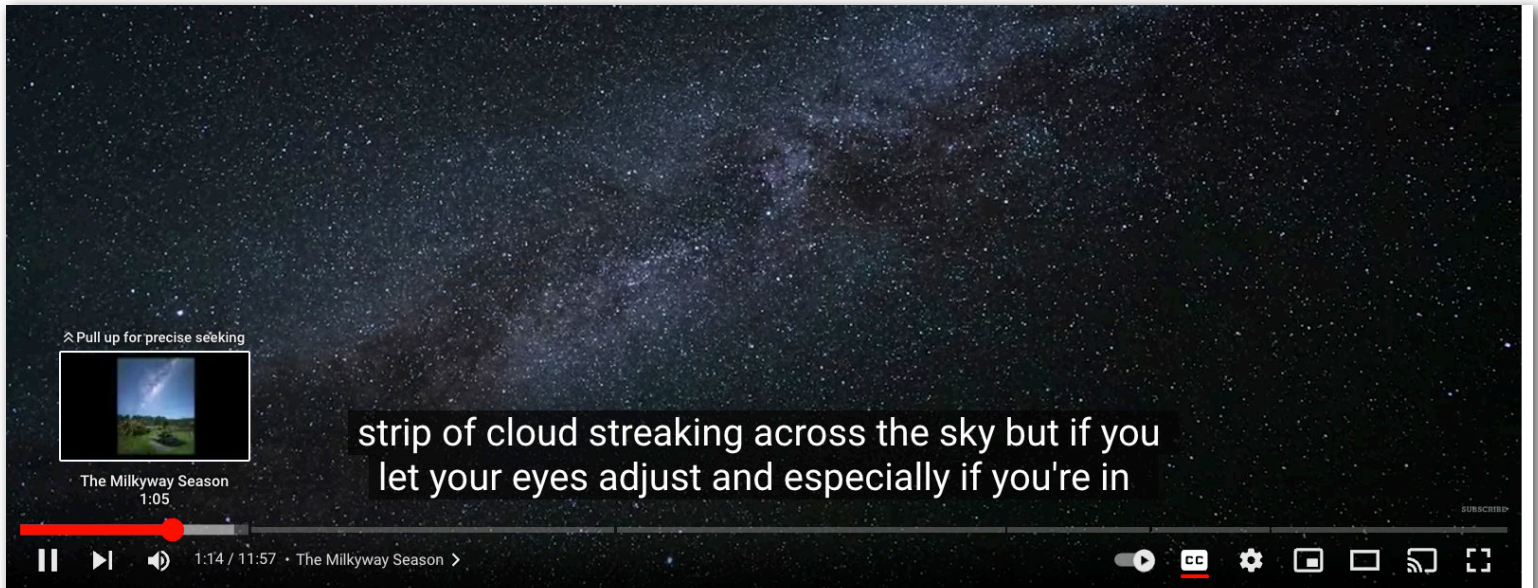
get in at different levels. You don't have to jump in the deep end (yet).

In this talk, Mike talks about his interest in photography and astronomy. He also blends in many experiences from current SIG members as well as many other acquaintances Mike knows.

As a professional photographer, Mike thought he had a leg up, but discovered that the step down (from the leg up) was sinking deep in to the "Kool Aid" that is Astrophotography.

Please join us as Mike talks about the highs and lows of Astrophotography.





The Milkyway Season | Where to find the milkyway in the night sky


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4K views 2 years ago #boxheadmike #phototutorials

Today I talk about the milkyway season and how it appears throughout the year, when you can see it, in what direction and how you might plan your milkyway night of photography. Astrophotography is a really fun hobby and you can see some amazing things in the night sky. I've seen may shooting stars, long asteroids burning up and the milkyway many times, and it is all because I am in to milkyway astrophotography. [Show more](#)



Most astrophotographers are familiar with the Gaia star database and it's study of the positioning and color of stars. This also includes the Milky Way. Gaia also created a 3D view of our Galaxy. Check it out by clicking on the image above.





Messier 101 by John Udart. M101 is also known as NGC 5457, or the Pinwheel Galaxy. This galaxy is approximately 20 million light-years from earth and is located in the constellation Ursa Major. On May 19th, Koichi Itagaki discovered a new object in one of the galaxy's outer spiral arms. This object was soon to be designated SN 2023ixf, a Type II Supernova (red arrow, cropped image). The last supernova in this galaxy was in 2011 (2011fe). Fortunately the weekend had a few clear hours at night and I was able to get this image. I plan to get more data as weather and time permits.

Typically, I do not image galaxy's at this distance because of the short focal length I'm using, but this was a once in a decade event. The rough full frame image gives the finished cropped version some context regarding scale.



Gear: William Optics GT71 at 336mm, ASI533MC Pro, EQ6-R Pro. The total integration time was 2 hours and 40minutes (40x240s) and processed using PixInsight.





M101 by Steve Sandor

- Taken Harbor Springs, Northern Michigan
- M101 on 5-29-2023
- Taken Harbor Springs Michigan
- Celestron Omni 150 telescope
- Bresser EOS2 GT mount
- Mix of 60 and 90 second exposures
- Total time approximately 40 minutes
- Canon EOS 600D modified cam-

## BIENVENUE EN LOUISIANE! (WELCOME TO LOUISIANA!)

Join us for this unique and exciting amateur astronomy gathering!



# ALCON 2023



**July 26–29, 2023**

Hilton Baton Rouge  
Capitol Center Hotel  
201 Lafayette Street  
Baton Rouge, LA 70801

### KEYNOTE SPEAKERS

- ★ David Eicher—writer, editor-in-chief of *Astronomy Magazine*
- ★ Fred Espenak—co-author of *Totality: The Great American Eclipses of 2017 and 2024*
- ★ David Levy—author, comet hunter

### FIELD TRIPS

- ★ Irene Pennington Planetarium
  - ★ LIGO (Laser Interferometer Gravitational-Wave Observatory) Livingston\*
  - ★ Louisiana State University Physics & Astronomy
  - ★ Highland Road Park Observatory
- \*Spaces are limited for this trip!

**SPEAKERS** ★ Pranvera Hyseni ★ Guy Consolmagno ★ Dan Davis ★ And many more!

Brought to Baton Rouge by the **Baton Rouge Astronomical Society**

★★ Registration is now open! Check [alcon2023.org](http://alcon2023.org) ★★







M101 by Scott Cruzen

Scott was kind enough to give us some info (on my request) on his set up as well as a bit of history about his journey in astronomy/astrophotography. I'm happy to publish others journey if they wish.

Ioptron 8" F8 Ritchey-Chretien scope

Skywatcher EQ6-R Mount

ASIAIR Plus controller

ASI533MC Pro OSC cooled imaging camera

ASI224MC uncooled guide camera

80mm F4 guide scope

I use Sirilic/Siril and Gimp for processing, haven't made the jump to Pixinsight yet.

I am really new to digital Astrophotography (4 months), so my images so far are pretty crude compared to what



I see coming from some of the other members, but since it is so new to me when I get something that look more or less like it's supposed to, I am like a 70-year old kid with a new toy. When it comes to processing, I'm still in the "I don't know what it is that I don't know" stage. YouTube and the forums are a Godsend.

I got another 8 hours of subs on M101 again last night, 15 hours total so far, working on processing that today to see if there's much improvement.

Regarding your previous email asking folks why/how they got started in AP, here is my history:

Back in the early 1970's I was in a used book store and picked up "Amateur Telescope Making" by Ingalls and Jack Newton's book "Deep Sky Objects" and that got me interested in trying AP. I had access to a really high end machine shop where I worked so I started building an equatorial mount thinking I would also make my own scope, but I never did get to the point of making a mirror. When I graduated college, my Dad asked me what kind of a watch I would like as a present and I talked him into getting me a small refractor instead. I was into B&W film photography at the time and had a decent darkroom in the basement. It turned out to be so incredibly difficult to get any decent images (or any image at all) that I gave up on it after a year or two. Looking back, I'm amazed I kept at it as long as I did.

- Dealing with dry ice to cool the film camera

- No color

- Not being able to tell for sure if your target was in the field of view until after you processed the film, unless it was really bright.

- Working with the relatively primitive mounts with motor drives that were actually flimsy CLOCK MOTORS and didn't track very well

- Having to (hopefully) find your target using fiddly setting circles and dead reckoning

- No such thing as plate solving to know exactly where the scope is really pointing

- No guiding, so short exposures

- No internet forums or YouTube videos to learn from

- Freezing cold winter nights in Michigan, grey skies most of the rest of the year

So what got me back into trying AP recently? I was trying to figure out something other than video games to get my 12-year old grandson for Christmas this past year and happened to see a small, decent-looking Celestron refractor for sale pretty cheap and bought it for him. They came down to visit over Christmas and I showed him how to set it up and showed him Jupiter and Saturn and M42 with it. Sadly, I don't think it interested him too much (did interest his dad quite a bit though, so that's something.) Anyway, just peering at Jupiter's moons again was enough to get me looking at what equipment is now available, and that was enough to get me hooked again. I never thought to check if there was a local astronomy club until after I had ordered a bunch of hardware and gotten started, otherwise I might have gone in a different direction. AP is not easy, but considering what incredible images it's possible to get with readily available, (relatively) affordable equipment (while sitting in the house watching TV) it seems almost like cheating. The pics we can get now in our back yards would've blown the minds of APs 50 years ago.

TLDR version: What got me started in AP (50 years ago): quickly got tired of visual astronomy, looking at dim grey smudges and not being able to show anybody else unless they were willing to sit outside and freeze with me. What got me restarted recently: accidentally stumbling across a small scope while looking for something to get the grandson for Christmas. Serendipity or happenstance, I guess.

Scott

BTW: I find it amazing how many people seem to have no curiosity. I frequently set up the scope in the front yard down by the street to shoot toward the south and dozens of people will walk by a few feet away and not one out of twenty will show any interest or even bother to ask what it is I'm doing.

## Learn About The Milky Way From [Star Walk2](#)



### What is the Milky Way?

The Milky Way galaxy is a huge collection of dust, gas, and stars, including our Sun. The Earth is located inside this galaxy, so it is often called “our home galaxy” or simply “our galaxy.”

It might be hard to believe, but that starry band across the night sky that we can see from the Earth is actually a huge galaxy that extends billions of kilometers around our planet. How big is it? Let’s find out.



### The Size of the Milky Way

The Milky Way is the second-largest galaxy in the Local Group of galaxies; the first place goes to Andromeda. The Milky Way is 105,700 light-years wide while the Andromeda Galaxy is 220,000 light-years in width. By the way, the Local Group — a group of multiple galaxies including the Milky Way — extends for roughly 10 million light-years around us in space.

### Why is it called the Milky Way?

The name of our home galaxy, like the names of many other astronomy objects, came from the ancient Greek and Roman cultures. Both the Greeks and Romans saw the starry band as the river of milk. The Greeks believed that it was milk from the goddess Hera who spilled it across the sky, and the Romans myth said that the Milky Way was milk from their goddess Ops.

Other cultures had their own myths and beliefs regarding the starry band of light in the night sky. People in eastern Asia called it the Silvery River of Heaven; the Finns and Estonians believed it was the Pathway of the Birds; in Southern Africa, it’s called the Backbone of Night.

### What type of galaxy is the Milky Way?

There are four main types of galaxies: spiral, elliptical, peculiar, and irregular. The spiral-shaped Milky Way belongs to the first type; if you could see it from the top (or the bottom), it would look like a spinning pinwheel.

To be more specific, the Milky Way is a barred spiral galaxy, which means it has a central bar-shaped straight structure composed of stars. This bar contains the galaxy’s nucleus in the center and has two spiral arms attached to its ends. If the Milky Way was a normal spiral galaxy, its arms would lead right to its center (or nucleus) like in the Andromeda Galaxy.

In total, the Milky Way has four known arms — two major connected with the bar (Scutum-Centaurus and Perseus) and two minor (Norma and Sagittarius) located between them. Previously scientists thought that all of



these arms were major, but with the help of infrared images from NASA's Spitzer Space Telescope, they found otherwise.

## Where is the Earth in the Milky Way?

Speaking about our location inside the Milky Way, we're far away from its center, which is good news (unless you've always wanted to neighbor a huge black hole). Our Sun is located nearly 27,000 light-years from the Milky Way's nucleus, or about halfway between its center and the edge.

Our Solar System is placed between two main arms — Scutum-Centaurus and Perseus, within the small partial arm named the Orion Arm or Orion Spur. This arm is about 3,500 light-years wide and more than 20,000 light-years long. It got its name after the constellation Orion. Our location inside it is the reason why we see so many bright objects within the constellation Orion — we're simply looking at our local spiral arm.

## What is at the center of the Milky Way?

The center region of the Milky Way is called the Galactic Center, and it contains a supermassive black hole of about 4 million solar masses called Sagittarius A\*. To see the black hole, you'll need a special radio telescope.

A casual observer can view the Galactic Center, which is very bright despite its enormous distance from the Earth (27,000 light-years). However, its brightness is easy to explain — there are around 10 million stars within one parsec of the Galactic Center.

## How do we know what the Milky way looks like?

From our position inside the Milky Way, it's quite hard to figure out its shape. We don't have pictures of our galaxy from the side as we can't actually leave it for now. However, we have several clues that helped to figure out what it looks like:

Astronomers observe the other galaxies and compare them with the behavior of the one we live in. For example, when they measured the velocities of stars and gas in the Milky Way, they saw that an overall rotational motion differs from random motions. This is a characteristic of a spiral galaxy.

As the Milky Way appears to us as the long stripe across the sky, it means its shape is more likely a disk we see edge-on. We also can find the bulge at the center, and from observing the other galaxies, we know that the spi-



Photo by Mario Motta



ral ones are disks with central bulges.

The gas fraction, color, and dust content of our Milky Way are like in the other spiral galaxies.

How to see the Milky Way?

The good news is the Milky Way is visible all year round, no matter where you are on the Earth.

However, as our planet rotates, the galaxy also moves across the sky, and so does its core — the Galactic Center — the brightest and most spectacular part. And sometimes, the core disappears from our view.

### **Here are things you need to know to get the best of the Milky Way and the Galactic Center:**

The Galactic Center is located in the constellation Sagittarius and like the constellation, it can be visible only from latitudes between  $+55^\circ$  and  $-90^\circ$ . If you live above  $+55^\circ$  latitude, you won't see the Galactic Center! You'll catch only part of the core, and the best time is before and after summer.

From the Northern Hemisphere, the Galactic Center is visible from March to October.

From the Southern Hemisphere, the core is visible from February to October.

The Milky Way's core isn't visible for the rest of the months around the world because, during this time, it's located too close to the Sun.

From the southern latitudes, the observation conditions are better as the peak of visibility there happens in winter when the nights are longer and darker.

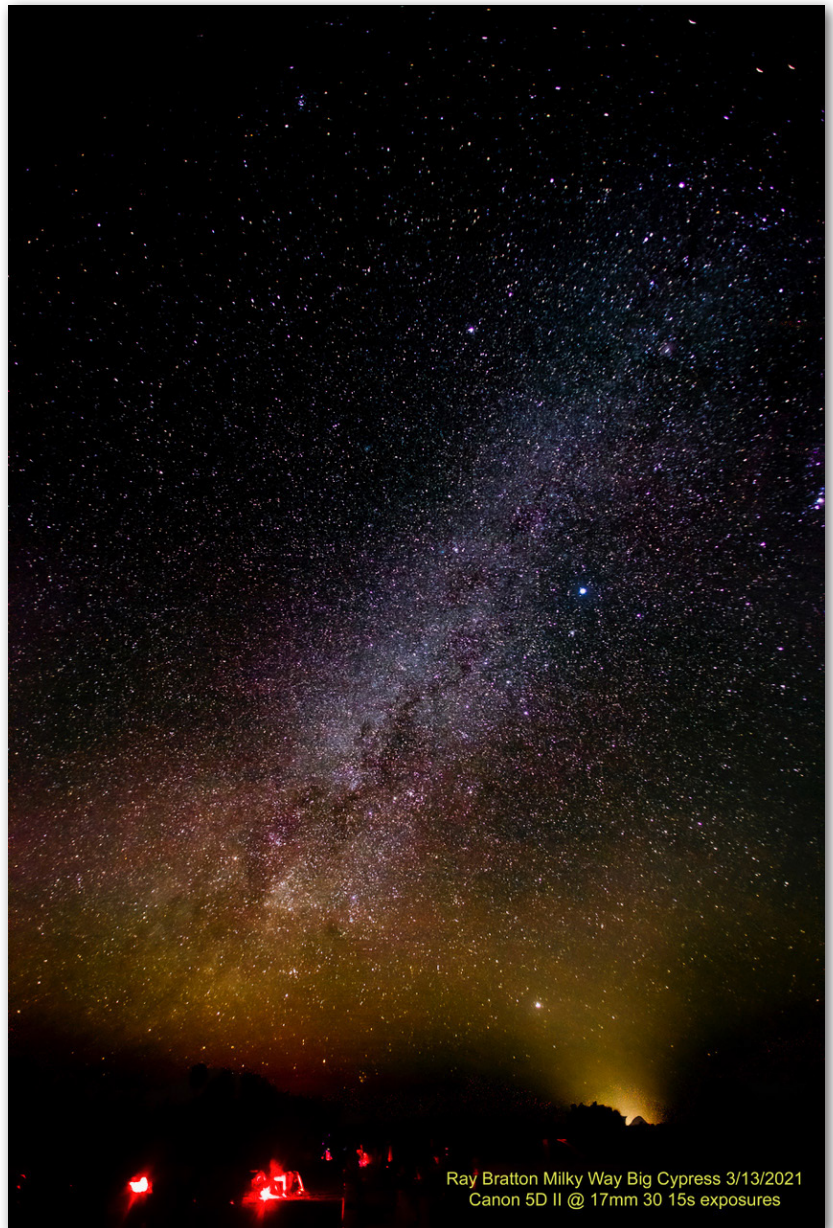
At the beginning of its visibility season, the Galactic Center can be seen shortly before sunrise. Over time, it becomes visible for a longer period each night and reaches its peak in June-July. During these months, the core is visible all night long.

You need a truly dark place free of light pollution. These tools will help you to find such a place: NASA's Blue Marble, International Dark Sky locations, Dark Site Finder. Or find the closest observatory — they're always located in dark sites.

The skies should be cloudless and clear. You can use an astronomy app with a stargazing forecast that indicates observational conditions. For example, Sky Tonight — it's free and works without an internet connection.

The Moon phase is vital. A new Moon is ideal, as it doesn't interfere with observations.

If you plan to photograph the Milky Way and its core, use tools to visualize the galaxy's position in the sky over time. Our advice is the Ephemeris app, which predicts Milky Way visibility, its core's exact position, and more. Ephemeris also helps to quickly find and check the detailed information about the Sun, the Moon, and the Milky Way for any date, time, and place.



## F.A.Q.

### How many stars are in the Milky Way?

It's difficult to give an exact number, but there are at least 100 billion stars in the Milky Way. Scientists' current estimate is between 100 to 400 billion stars.

### How many planets are in the Milky Way?

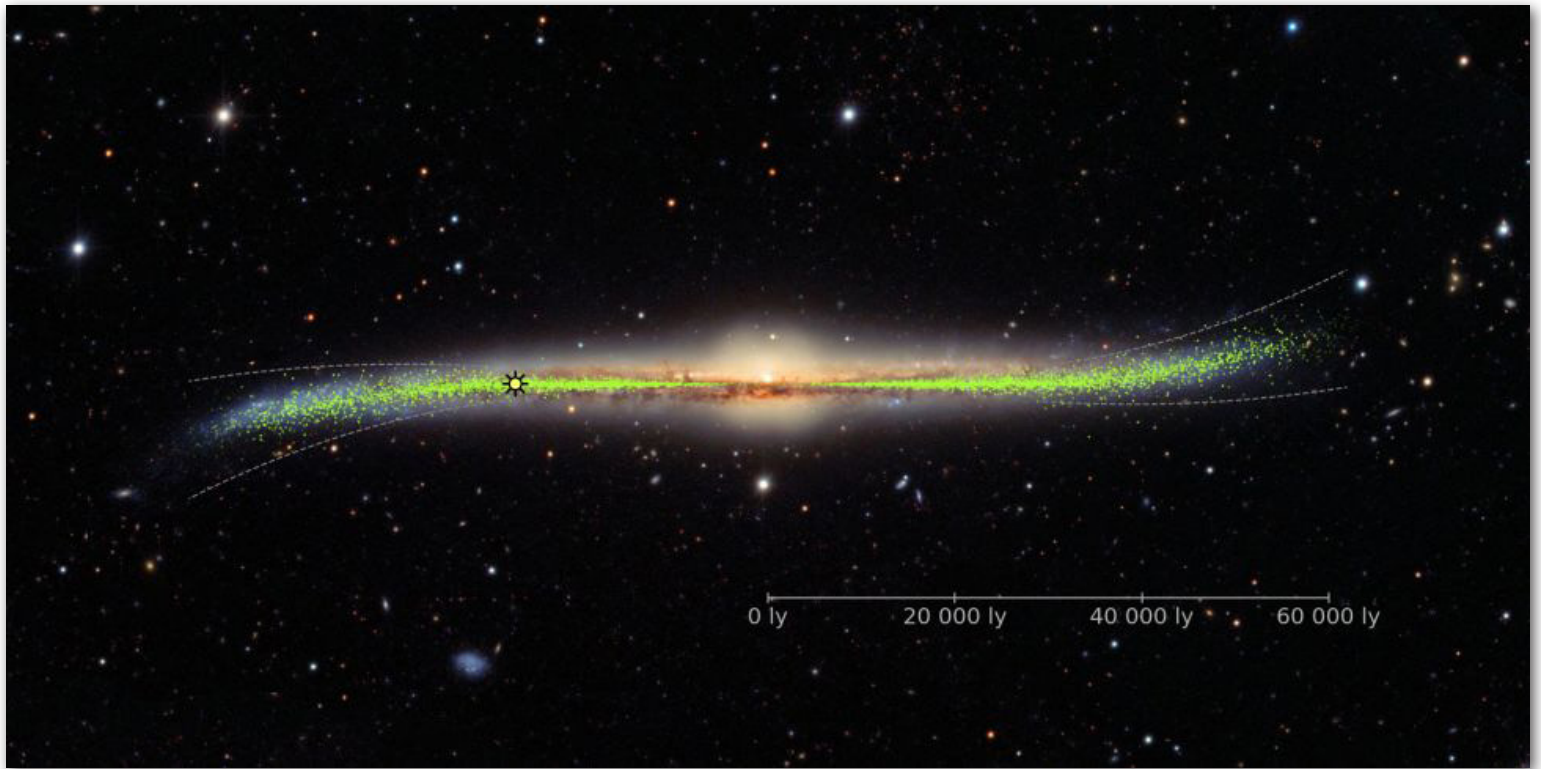
Scientists consider that there are at least 100 billion planets in the Milky Way, and more than 10 billion of them are terrestrial.

### How many Solar Systems are in the Milky Way?

Well, there is only one Solar System in our galaxy, as only ours is officially called so. But astronomers have found more than 3,200 other stars with planets orbiting them in the Milky Way.

### How many constellations are in the Milky Way?

As seen from the Earth, the Milky Way occupies the sky area that includes 30 constellations. The brightest part of our galaxy, the Galactic Center, lies in the constellation Sagittarius.



*This diagram shows a warped shape of a galaxy like our Milky Way as suggested by observations of young variable stars, called Cepheids, our own galaxy. (Image credit: J. Skowron/OGLE/Astronomical Observatory, University of Warsaw)*

Source: <https://www.space.com/milky-way-3d-map-warped-shape.html>

The Milky Way is a spiral galaxy comprised of a bar-shaped core region surrounded by a flat disk of gas, dust and stars about 120,000 light-years wide. Our solar system is located about 27,000 light-years from the galactic center within one of the disk's four spiral arms. One light-year is the distance light travels in a year: about 6 trillion miles (10 trillion kilometers).

Much of the current knowledge regarding the shape and structure of the Milky Way is based on the distances between the sun and various celestial landmarks, informed by extrapolation from what astronomers have seen in other galaxies. However, the distances between the sun and these landmarks are usually measured indirectly.

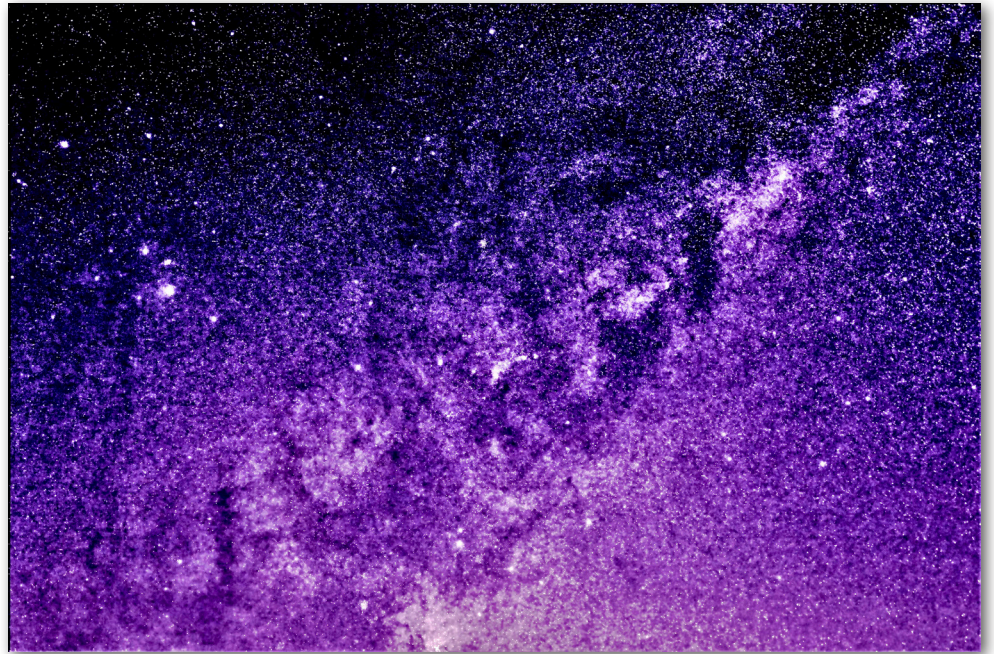


In the new study, researchers sought to directly measure distances between the sun and a large sample of stars to help construct a 3D map of the galaxy. They focused on a specific kind of star known as a Cepheid variable.

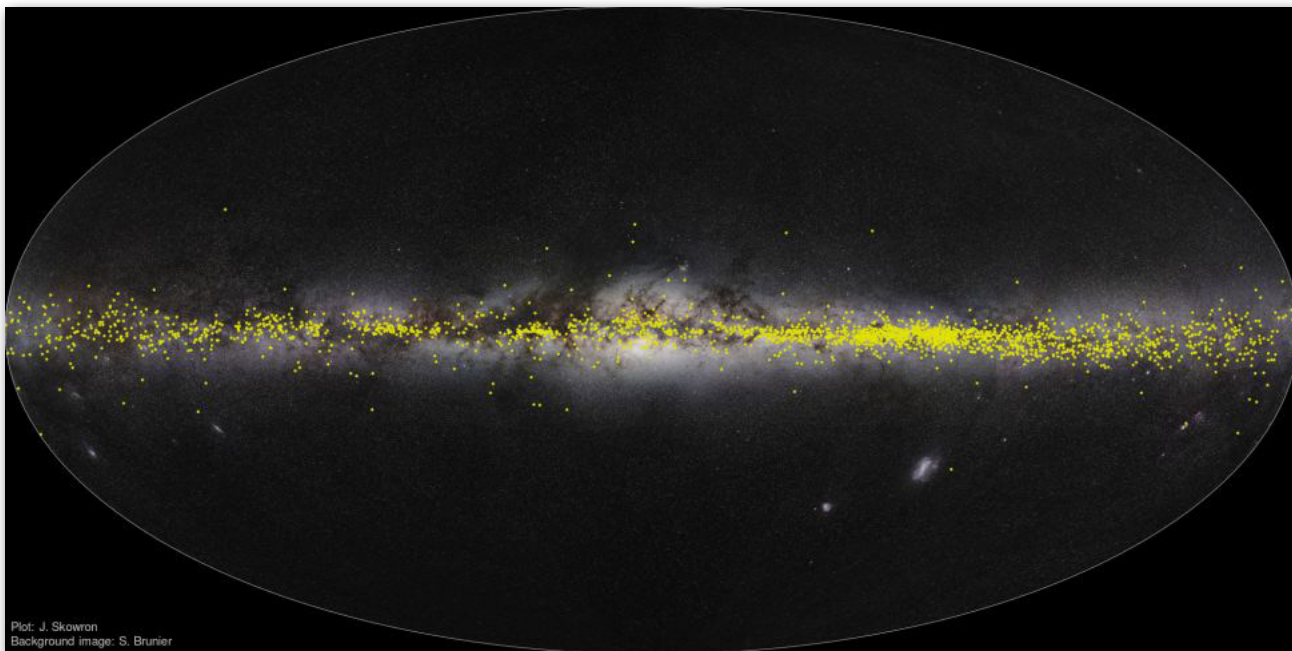
Cepheids are young supergiant stars that burn up to hundreds of thousands of times brighter than the sun. Like lighthouses on foggy shores, Cepheids brighten and dim in predictable cycles and are visible through the vast clouds of interstellar dust that often obscure dimmer stars.

Cepheids appear to pulsate because their gas heats and cools, and expands and contracts, in very regular patterns that can last from hours to months. The well-defined link between a Cepheid's brightness and its pulsation schedule means that by timing its pulsations, astronomers can deduce how bright a Cepheid is intrinsically.

After comparing a Cepheid's intrinsic brightness to its apparent brightness — that is, how bright it appears from Earth — astronomers can then estimate the Cepheid's distance from our planet, given the knowledge that stars appear dimmer the farther away they are from us. Scientists can determine the distances to Cepheids with an accuracy better than 5%.



*Image by Carmela Nobili*



*This diagram shows a view of our Milky Way, as well as a plot of variable Cepheid stars that shows the galaxy's warped shape. (Image credit: Plot by J. Skowron/OGLE, the Milky Way panorama by Serge Brunier)*

Using the Optical Gravitational Lensing Experiment, which monitors the brightness of nearly 2 billion stars, the scientists charted the distance between the sun and more than 2,400 Cepheids throughout the Milky Way. "This took six years but it was worth it," study lead author Dorota Skow-



ron, an astrophysicist at the University of Warsaw in Poland, told Space.com.

These findings helped the astronomers build a large-scale 3D map of the Milky Way. This is the first such map based on directly measured distances to thousands of celestial landmarks across the galaxy.

The new map helped reveal more details on distortions that astronomers had previously detected in the shape of the Milky Way. Specifically, the galaxy's disk is not flat at distances greater than 25,000 light-years from the galactic core, but warped. This warping was potentially caused by the galaxy's interactions with satellite galaxies, intergalactic gas or dark matter.

"Warping of the galactic disk has been detected before, but this is the first time we can use individual objects to trace its shape in three dimensions," study co-author Przemek Mróz at the University of Warsaw said in a statement.

The amount of warping the researchers saw in the Milky Way was surprisingly pronounced, Skowron said. "It is not some statistical fact available only to a scientist's understanding," she said. "It is apparent by eye."

Astronomers can deduce the age of Cepheids based on their patterns of pulsations. They found clusters of Cepheids with very similar ages.

"This is a clear indication that they were created together," Skowron said. "We can see with our own eyes and within our own galaxy that star formation is not constant but indeed is happening in bursts."

Stars might have formed in bursts due to a variety of triggers, Skowron said. Giant clouds of interstellar gas can fragment under their own gravity, collapsing into star-forming pockets. Titanic mergers between galaxies or interstellar winds from catastrophic supernovas can also have smashed clouds together into stars, she explained.

In the future, the researchers plan to refine their 3D map of the Milky Way by charting the distances between the sun and other pulsating stars known as RR Lyrae. Like Cepheids, RR Lyrae pulsate in patterns with predictable spans of time, but they have existed in the galaxy for a much longer time, Skowron said. This would help scientists understand how the oldest parts of the galaxy have changed over time, she added.

A better understanding of the galaxy's shape might then, in turn, shed light on how it has evolved over time, such as how stars move and spread from their birthplaces, what orbits stars take in the warped galaxy, and what exactly might have warped the galaxy's shape in the first place, Skowron added.



**Image by Steve Sandor**  
**Little Traverse Bay looking toward Petoskey Michigan**

## ***Supernova Discovered in M101***

Compiled from data at [Sky & Telescope](#)

***A supergiant star exploded as a supernova in the prominent galaxy M101 in Ursa Major. It's now bright enough to see in a 4.5-inch telescope!***

Superstar supernova hunter Koichi Itagawa discovered the new object, designated SN 2023 ixf, on May 19.7 UT, immediately southwest of the prominent HII region NGC 5461. The pair contrast splendidly in one of the galaxy's outer spiral arms.

I heard the news about a magnitude-14.9 supernova in the galaxy M101 in Ursa Major on Friday evening, May 19th. That same night, a major auroral display lit up the sky here in northern Minnesota. Although the lights were spectacular, I couldn't wait to get my eyes on the new star. As soon as the aurora faded back, I set the telescope up for a look.

Never mind 14.9. The star had skyrocketed to magnitude 13.5 just 11 hours after discovery. It continues to rise. As of Sunday night, May 21st, it had climbed to magnitude 11.1 and showed no signs of stopping. In the space of a weekend, the supernova became within reach of a 4.5-inch telescope!



***The new supernova SN 2023ixf, shines close to a prominent HII region, NGC 5461, in an outer spiral arm of the bright galaxy M101. Discovered on May 19th at magnitude 14.9, it has already brightened to magnitude 11. The object lies approximately 21 million light-years away, making this one of the closest supernovae visible in recent years.***

***~ Image by Dr. Mario Motta***

[Click here to view](#) the entire article as well as some amazing graphics and photos!

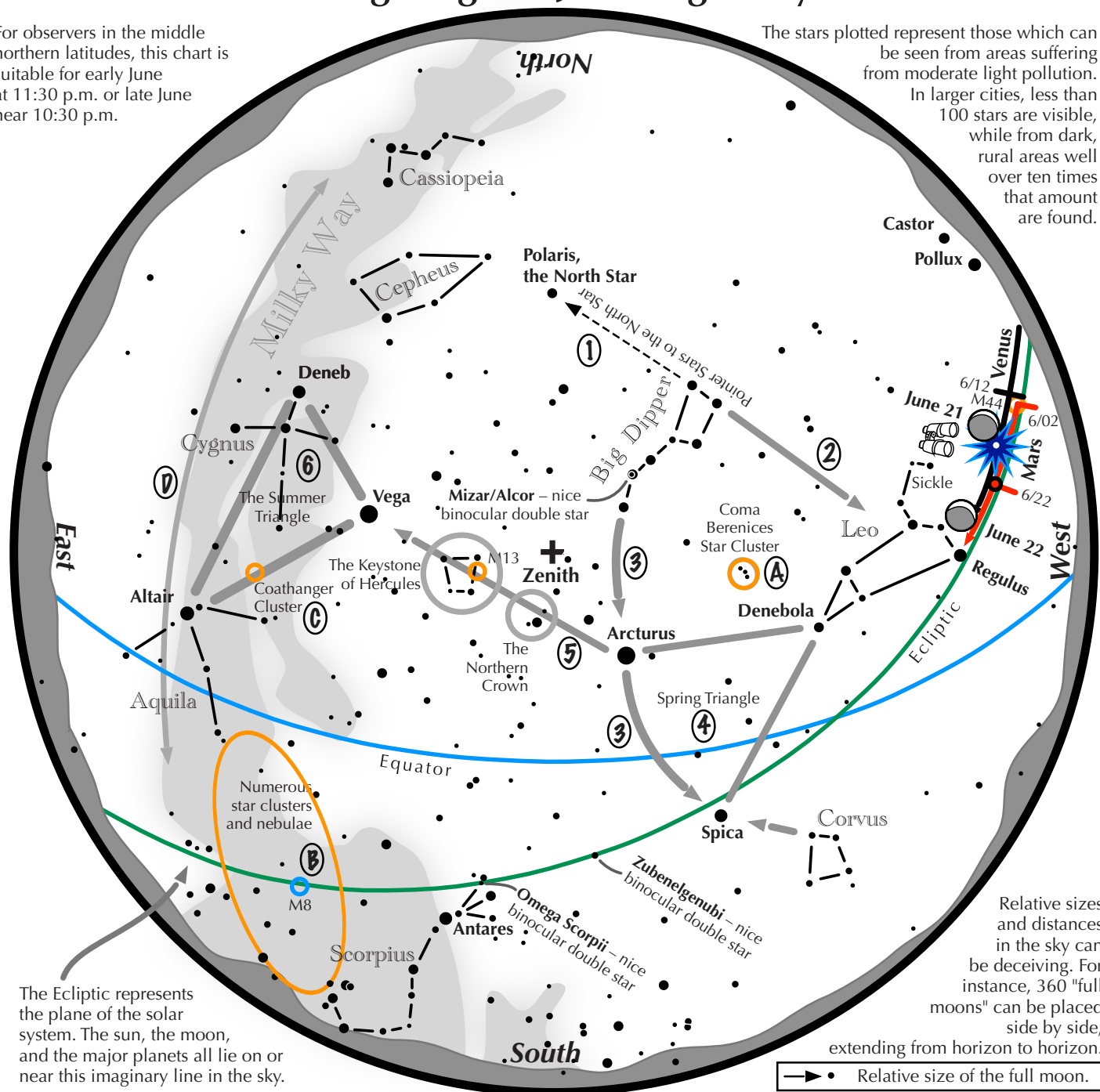


# Sky Chart

## Navigating the June Night Sky

For observers in the middle northern latitudes, this chart is suitable for early June at 11:30 p.m. or late June near 10:30 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 June night sky: Simply start with what you know or with what you can easily find.

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Draw another line in the opposite direction. It strikes the constellation Leo high in the west.
- 3 Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the June evening sky, then Spica.
- 4 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
- 5 To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 6 High in the east are the three bright stars of the Summer Triangle: Vega, Altair, and Deneb.

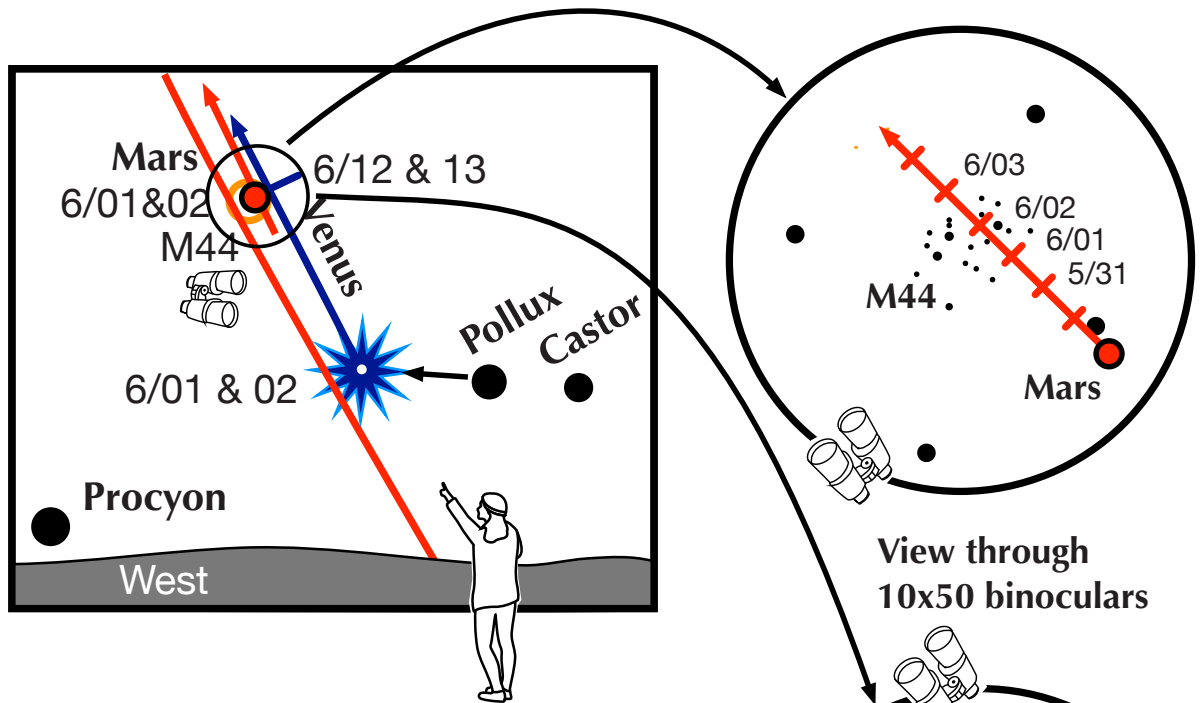
#### Binocular Highlights

- A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
- B: Between the bright stars of Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D. Sweep along the Milky Way for an astounding number of faint glows and dark bays.





## A must see celestial planetary play: Two planets visit the Beehive

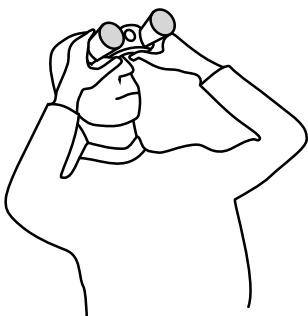


Beginning on June 1, look to the west-northwest 90 minutes after sunset.

- The twin stars of Gemini, Castor and Pollux, will be found forming a horizontal bar low above the horizon.
- Brilliant Venus shines to their left effectively forming the very bright third member of a set of triplets!
- On the same evening and the next, red Mars slides in front of M44, aka the Beehive Star cluster, positioned above Venus. Use

binoculars to find Mars sitting amid the many stellar bees.

- Ten nights later, it is Venus' turn to stay at the Beehive for two consecutive nights. The planet travels along the outskirts, farther from Beehive central than Mars moved. Again, bring out the binoculars. How does the glare of brilliant Venus affect the scene?





## Planet Positions

Click on the graphic above to go to Time and Date for a great simulation of the rotation of the constellations and the rising/setting of the planets. The chart below is set for the date of our meeting but can be programmed for any date and time. The chart can also be found at [this link on Heavens Above](#).



### Planet Summary

Ho

Year  Month  Day  Time

	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Right ascension	2 <sup>h</sup> 59 <sup>m</sup> 6.4 <sup>s</sup>	7 <sup>h</sup> 53 <sup>m</sup> 46.8 <sup>s</sup>	8 <sup>h</sup> 37 <sup>m</sup> 31.2 <sup>s</sup>	2 <sup>h</sup> 5 <sup>m</sup> 31.0 <sup>s</sup>	22 <sup>h</sup> 35 <sup>m</sup> 56.9 <sup>s</sup>	3 <sup>h</sup> 10 <sup>m</sup> 14.7 <sup>s</sup>	23 <sup>h</sup> 51 <sup>m</sup> 24.1 <sup>s</sup>	20 <sup>h</sup> 10 <sup>m</sup> 20.0 <sup>s</sup>
Declination	13° 30' 15"	23° 33' 21"	20° 2' 21"	11° 33' 52"	-10° 28' 31"	17° 25' 3"	-2° 14' 51"	-22° 42' 37"
Range (AU)	0.880	0.732	2.005	5.723	9.674	20.592	30.182	34.109
Elongation from Sun	24.6°	45.4°	56.0°	37.4°	93.9°	20.7°	73.5°	130.7°
Brightness	0.4	-4.2	1.6	-2.0	1.0	5.8	7.9	14.4
Equatorial Diameter	7.65"	22.80"	4.67"	34.45"	17.18"	3.42"	2.26"	0.10"
Phase Angle	95.7°	88.4°	30.3°	7.1°	5.9°	1.0°	1.9°	1.3°
Constellation	Aries	Gemini	Cancer	Aries	Aquarius	Aries	Pisces	Capricornus
Meridian transit	10:19	15:14	15:58	09:27	05:58	10:32	07:13	03:33
Rises	04:19	09:14	09:58	03:28	23:55	04:33	01:14	21:30
Sets	16:20	21:14	21:58	15:26	11:57	16:31	13:12	09:32
Altitude	1.5°	62.4°	69.6°	-11.6°	-62.3°	4.1°	-45.3°	-65.0°
Azimuth	283.5°	329.7°	349.6°	281.8°	247.0°	287.5°	266.8°	156.2°
Inferior Conjunction	2023-May-01 2023-Sep-06	2022-Jan-09 2023-Aug-13	-	-	-	-	-	-
Opposition	-	-	2022-Dec-08 2025-Jan-16	2022-Sep-26 2023-Nov-03	2022-Aug-14 2023-Aug-27	2022-Nov-09 2023-Nov-13	2022-Sep-16 2023-Sep-19	2022-Jul-20 2023-Jul-22
Superior Conjunction	2023-Mar-17 2023-Jul-01	2022-Oct-22 2024-Jun-04	2021-Oct-08 2023-Nov-18	2023-Apr-11 2024-May-18	2023-Feb-16 2024-Feb-28	2023-May-09 2024-May-13	2023-Mar-15 2024-Mar-17	2023-Jan-18 2024-Jan-20
Max. eastern elongation	2023-Apr-11 2023-Aug-10	2021-Oct-29 2023-Jun-04	-	-	-	-	-	-
Max. western elongation	2023-May-29 2023-Sep-22	2022-Mar-20 2023-Oct-23	-	-	-	-	-	-
Perihelion	2023-Mar-31 2023-Jun-27	2023-Apr-17 2023-Nov-28	2022-Jun-21 2024-May-08	2023-Jan-20 2034-Dec-05	2003-Jul-26 2032-Nov-28	1966-May-22 2050-Aug-17	1876-Aug-26 2042-Sep-03	1989-Sep-05 2237-Sep-15
Aphelion	2023-May-14 2023-Aug-10	2022-Dec-26 2023-Aug-07	2023-May-30 2025-Apr-16	2017-Feb-17 2028-Dec-28	2018-Apr-17 2047-Jul-15	2009-Feb-27 2092-Nov-23	1959-Jul-17 2125-Dec-01	1866-Jun-04 2114-Feb-19

## Meeting Minutes

Southwest Florida Astronomical Society, Inc. member minutes May 4, 2023 Calusa Nature Center Planetarium and Zoom Meeting

President Risley called the meeting to order at 7:04PM, thanked all for attending, introduced new attendees (Peter Elliott, Brenda Stinson and Frank), thanked Tom Klein for again setting up the zoom computer and asked John MacLean to introduce tonight's speaker.

John stated that Michael Corvese was our guest speaker. Mike is an officer with the Rhode Island Skyscrapers and he is an avid visual astronomer. Mike stated that the moon has always held fascination with mankind. There was a 1902 French silent movie, mythology from the Aztecs, Maori, Greeks and Hindus. The Romans name the moon Luna as a Goddess. The Chinese have an annual festival to the moon, their second largest after New Year's. Anaxagoras was the first to state that the Sun illuminated the moon and was exiled for stating that the moon was not a deity. Mike explained the Binary Accretion, Fission and Capture theories. Hopeful that the Apollo program would add light as to the correct theory, and in 1984 it was generally accepted that the giant Impactor Hypothesis was the reason for the moon's formation. Mike answered many questions and was thanked by all for an informative presentation.

Review Outreach Events:

Seahawk Park Star Party was held on 4/22/23. Brian used a 5" refractor scope with Joe Delany's assistance. Not many in attendance.

Upcoming Outreach Events:

Seahawk Park Star Party will be held on 5/20/23 at sunset. Brian advised that this would be the last one of the year.

Tom Segur advised of the following Charlotte Observing Events:

- 1) Solar Observing 5/6/23 Bayshore Live Oak Park will be a good one as the Sun is very active and one ought to be able to view a dozen Sun spots.
- 2) FSW Observing 5/19/23 Moore Observatory in Punta Gorda will be the last of the season and all are invited. Volunteers welcomed.

Brian Risley advised that on July 5, 2023 there will be an Educator Training/ Observing season at Big Cypress. Brian will be giving the presentation and all are welcome.

By Laws Review is taking place. John MacLean and Sean Dey are holding meetings to present needed revision updates to bring before the membership. Both requested that the committee is in need of two members to serve at large.

Officer and Committee Reports:

President Risley advised that he is looking for several Orion children scopes for future events.

Vice President Jensen advised that his attempts to have a June or July membership meeting assisting members on how to use their scopes has little interest given the efforts needed to lug scopes to the Calusa center and he has canceled these efforts.



Newsletter Editor Mike Jenson said to look forward to next month's edition regarding the Milky Way and requested that all submit articles to him.

Secretary Dan Dannenhauer asked for approval of the April minutes. Sean Dey moved the motion and John MacLean seconded. Tom Segur asked that said minutes be revised to state that the Charlotte FSW is an Observatory and not a Planetarium.....amended motion was approved unanimously.

Treasurer John MacLean advised that his report was in the newsletter and approved by the officers.

Librarian's Report.....none

Social Membership Report.....none Club Historian Report.....none

Equipment Coordinator Brian Risley advised that he was working on it given his time commitments and that he was hopeful to have various items up for sale.

Website Coordinator Mike Jensen advised that the system is performing well.

Program Committee Coordinator John MacLean advised that Doctor Desika Narayanan, Associate Professor of Astronomy at the University of Florida, will be our speaker on June 1, 2023 with the topic, ' Forming the Brightest Galaxies in the Universe. John is still working on July and August as Nestor Espinosa desired a high fee and representatives from NASA and the Sky Night Network have yet to respond. John asked for assistance from all. Brian echoed such and thanked John for his difficult and hard work as Program Chairman.

Astronomical League Coordinator John MacLean advised that there was nothing to report.

Charlotte Events/FSW Moore Observatory Director Tom Segur advised that there would be a July 8,9 & 10, 2023 viewing of the Solar eclipse at the Harold Avenue Regional Park. Tom also discussed his desire to hold events on October 14, 2023 and again in April of 2024.

President Risley asked for any other old or new business.....there being none he asked for a motion to adjourn.... John MacLean so moved seconded by Sean Dey.....Secretary Dan Dannenhauer