The Eyepiece
The Milky Way Edition

SW FL Astronomical Society, Inc.
PO Box 100127
Cape Coral FL 33910

DIGITAL IMAGE OF THE MILKY WAY BY PIKAIA IMAGING (WWW.PIKAIA-IMAGING.CO.UK

NEW MEETING TIME - 7PM!

Mike Jensen - Editor

Hi Everyone! So, I hope this edition will be special and informative for many of you in the club. The idea of a "Milky Way" edition came from my curiosity. Many times that gets me in to trouble but here it was out of a thirst of knowledge. I REALLY wanted to have a reference point for where things were when I pointed my telescopes and cameras in the sky. I wanted to know what was in our galaxy and what wasn't. I wanted to know what arms of our galaxy we saw when we looked at the "Milky Way".

So, from the time I started the first paragraph of this entry to now, amazingly enough they have recorded the first image of a black hole in the center of the Milky Way. How incredible is it that they timed their announcement of their discovery for this Milky Way edition! Ok, well that may be a bit extreme to think that, but it's very cool timing. More about the black hole in the middle of the newsletter. Enjoy!

SWFAS Table Of Contents

Monthly Meetings

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

This month's meeting will be a combined live and Zoom meeting! Masks are optional.

Each meeting will have the same link/meeting ID (see below).

So, mark your calendar for:

June 2, 2022
July 1, 2022
August 4, 2022

How to use Zoom.
1. Download the software for smartphone, tablet or computer
Click the link sent out for the meeting.

2.Click on window that ap-

https://widener.zoom.us/j/96535769204

Meeting ID: 965 3576 9204

One tap mobile:
+13126266799,,96535769204#
(or)
+16465588656,,96535769204#

pears, "Join Zoom Meeting".
3. Then "Join Computer Audio"
4.On entering the meeting, audio is going to be "off" by default. Press down and hold your space bar to talk. Both Brian and the presenter will be unmuted by default. This is being done to cut down on background noise, as it seems to accumulate as our numbers increase.

PROGRAMS STEERING GROUP STATUS SUMMARY FOR June 2022

- The critical path item is getting a reliable Internet connection for Planetarium meetings via wired Ethernet which the Nature Center's network support resource will be installing.
- We are following up to get the latest status. The original estimate was prior to May month end.

2022 Dues

If you have not sent in your check for your 2022 dues, please do so upon reading this announcement.

Dues are an affordable $25.

Make check out to:
Southwest Florida
Astronomical Society
PO Box 100127
Cape Coral, Fl 33910

President's Report

Brian Risley - SWFAS President

Mike has included many members' wide field shots of the Milky Way in this issue.

For this month's program I will be diving into some of the objects that make up our view of the Milky Way that we will have this summer. I will try to make as much of it available for Zoom participants, but any dome star presentations will not translate to Zoom.

As the weather, time and mosquitos cut into our observing/imaging during the summer we are not planning any star parties or other events until fall. The Astrophotography SIG group may hold impromptu events, you will need to join the group to get details. Contact Mike to get on the list.

Don't forget that we have now changed the meeting start time to 7:00 pm instead of 7:30. The link now in this newsletter is able to be used for each of the summer months. You can test that the link is loading earlier, but the meeting will not start until 6:45 pm.

If you did not respond to the unpaid dues emails I sent to those we had no record of payment, you will be dropped from the club mass emails and the Astronomical League. If you have questions about dues, please contact John MacLean.

We can now take membership dues electronically through Paypal via the website. Thanks to John and Mike Jensen for getting this going.

The Lunar Eclipse was very nice. I'd like to thank Tom Segur, the Heiner's and Tom's other cohorts at the Moore Observatory for hosting the event.

Club Officers & Positions

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The Astronomical League Report

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 benefit s for you, visit http://www.astroleague.org

Reflector Magazine
You should have received an email from the Astronomical League linking to your digital copy of the March 2022 Quarterly Reflector magazine on around February 21, You can also directly access copies via the web at https://www.astroleague.org/reflector

ALCON 2022
The Astronomical League has announced that it will hold its National Convention in Albuquerque, New Mexico from July 28 – July 30. Full details are available at the following link: Astronomical League Convention | Hosted by The Albuquerque Astronomical Society (alcon2022.org)
The main conference will be held on Thursday, Friday, and Saturday and features speakers and workshops There will be an evening The special events include an evening presentation by Apollo 17 astronaut Harrison Schmitt on July 29 and a tour of the Karl Jansky Very large Array (VLA) on July 31. Discounted rates are available at The Embassy Suites.

Photo By Don Bishop

Monthly highlight of the Astronomical League Observing Programs
The Astronomical League Messier Observing Programs

The Messier objects include some of the most familiar and spectacular deep sky targets for the amateur observer and the Astronomical League has developed both telescopic and binocular observing programs.

Messier Observing Program

This program requires the use of a telescope and there are two levels of awards. A certificate only is awarded for observing 70 objects and a certificate and pin are awarded for observing all 110 objects – the honorary level.

The procedure is to select and observe 70 objects and turn in the properly filled out observing logs to an officer of the local Astronomical Society (i.e. SWFAS in our case.) The officer will then review and approve the logs and notify the Astronomical League that the observer has met the requirements for receiving the award. The observing logs must include the date and time of the observations, the Lat/Long coordinates for the observing sites, the seeing and transparency conditions, the aperture and magnification, and a description of the Messier object as it appears in the scope. For the honorary level, all 110 objects must be observed and the logs processed again by an officer of the local member club.

Since the purpose of the Messier observing program is to familiarize the observer with the nature and location of the objects in the sky, the use of automated telescopes is not allowed and this includes use of Go-To scopes and both manual and digital setting circles. Navigation must be by manual star-hopping via finder scopes and Telrads or equivalent.

A convenient Messier List is provided which breaks down the Messier objects by season: I. Winter, II. Early Spring, III. Late Spring, IV. Mid-Summer, V. Late-Summer, and VI. Fall and Early Winter.

Binocular Messier Program

This program requires the observation of any 50 of the 110 recognized Messier objects.
Two options are provided depending on binocular size.

- Binoculars with 20 mm – 50 mm diameter lenses (e.g. 7 X 35, 7 X 50, 10 X 50)
- Objects are selected from Appendix A which lists 76 objects with
- 42 classified as Easy
- 18 classified as Tougher, and
- 16 classified as Challenge.
- To obtain the certificate, 50 objects including only 8 of the Tougher are required to be selected and observed.
- Binoculars with 56 mm – 80 mm diameter lenses (e.g. 11 X 80)
- Objects are selected from Appendix B which lists 102 objects with
- 58 classified as Easy
- 23 classified as Tougher, and
- 21 classified as Challenge.

To obtain the certificate, all 50 objects may be selected out of the Easy category for observation.
The observing logs are sent directly to the Astronomical League to receive the award.

Messier Observing Resources. In addition to the online seasonal Messier object listing mentioned above, the AL also publishes “Messier Objects: A Beginner’s Guide” which is available via the online store for $8.

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 to find local clubs, events, and more!

Solstice Shadows

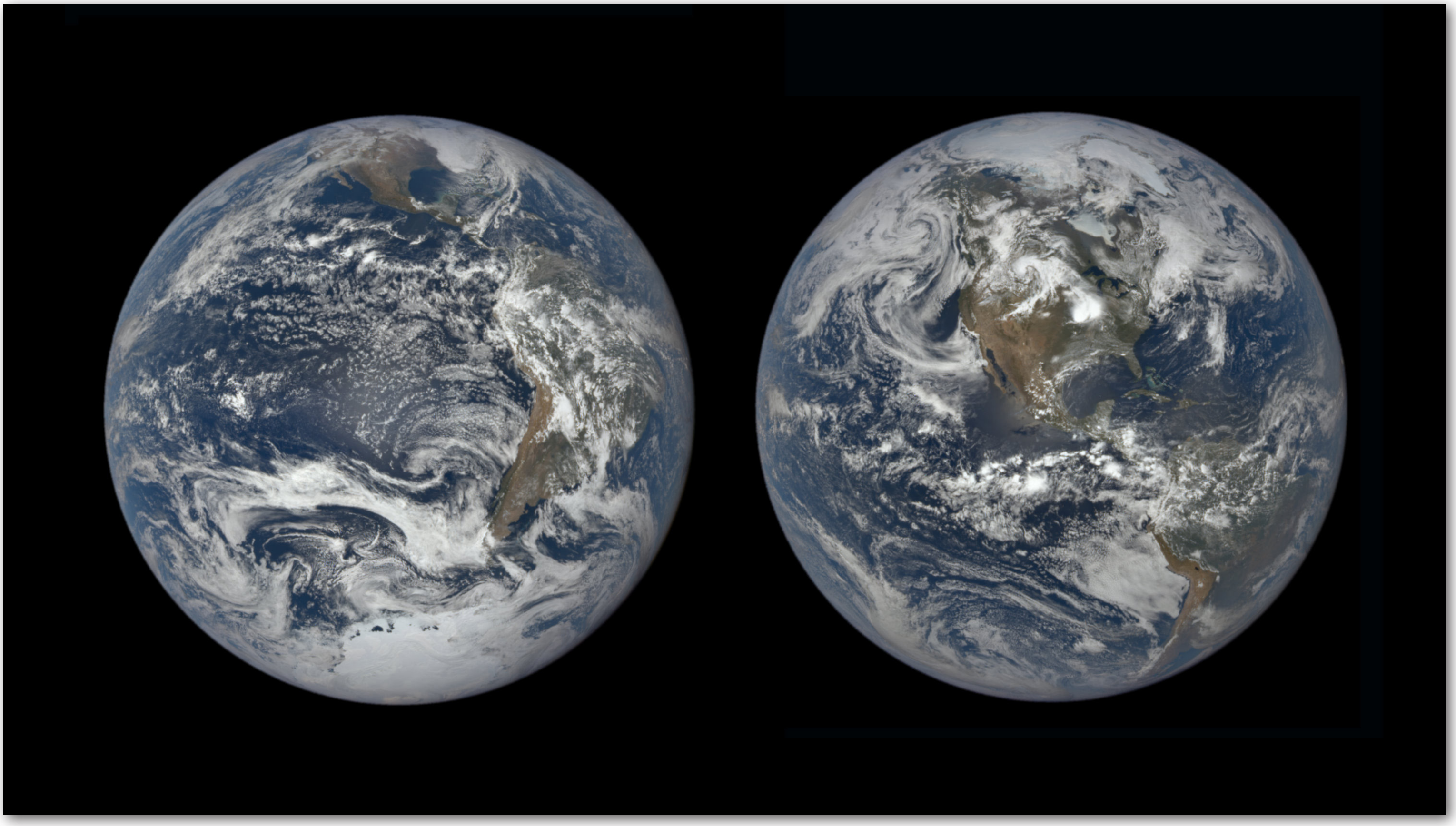
David Prosper

Solstices mark the changing of seasons, occur twice a year, and feature the year's shortest and longest daylight hours - depending on your hemisphere. These extremes in the length of day and night make solstice days more noticeable to many observers than the subtle equality of day and night experienced during equinoxes. Solstices were some of our earliest astronomical observations, celebrated throughout history via many summer and winter celebrations.

Solstices occur twice yearly, and in 2022 they arrive on June 21 at 5:13 am EDT (9:13 UTC), and December 21 at 4:48pm EST (21:48 UTC). The June solstice marks the moment when the Sun is at its northernmost position in relation to Earth's equator, and the December solstice marks its southernmost position. The summer solstice occurs on the day when the Sun reaches its highest point at solar noon for regions outside of the tropics, and those observers experience the longest amount of daylight for the year. Conversely, during the winter solstice, the Sun is at its lowest point at solar noon for the year and observers outside of the tropics experience the least amount of daylight- and the longest night – of the year. The June solstice marks the beginning of summer for folks in the Northern Hemisphere and winter for Southern Hemisphere folks, and in December the opposite is true, as a result of the tilt of Earth's axis of rotation. For example, this means that the Northern Hemisphere receives more direct light from the Sun than the Southern Hemisphere during the June solstice. Earth's tilt is enough that northern polar regions experience 24-hour sunlight during the June solstice, while southern polar regions experience 24-hour night, deep in Earth's shadow. That same tilt means that the Earth's polar regions also experience a reversal of light and shadow half a year later in December, with 24 hours of night in the north and 24 hours of daylight in the south. Depending on how close you are to the poles, the extreme lighting conditions can last for many months, their duration deepening the closer you are to the poles.

While solstice days are very noticeable to observers in mid to high latitudes, that's not the case for observers in the tropics - areas of Earth found between the Tropic of Cancer and the Tropic of Capricorn. Instead, individuals experience two "zero shadow" days per year. On these days, with the sun directly overhead at solar noon, objects cast a minimal shadow compared to the rest of the year. If you want to see your own shadow at that moment, you have to jump! The exact date for zero shadow days depends on latitude; observers on the Tropic of Cancer (23.5° north of the equator) experience a zero shadow day on the June solstice, and observers on the Tropic of Capricorn (23.5° south of the equator) get their zero shadow day on December's solstice. Observers on the equator experience two zero shadow days, being exactly in between these two lines of latitude; equatorial zero shadow days fall on the March and September equinoxes.

There is some serious science that can be done by carefully observing solstice shadows. In approximately 200 BC, Eratosthenes is said to have observed sunlight shining straight down the shaft of a well during high noon on the solstice, near the modern-day Egyptian city of Aswan. Inspired, he compared measurements of solstice shadows between that location and measurements taken north, in the city of Alexandria. By calculating the difference in the lengths of these shadows, along with the distance between the two cities, Eratosthenes calculated a rough early estimate for the circumference of Earth – and also provided further evidence that the Earth is a sphere!
Are you having difficulty visualizing solstice lighting and geometry? You can build a "Suntrack" model that helps demonstrate the path the Sun takes through the sky during the seasons; find instructions at stanford.io/3FY4mBm. You can find more fun activities and resources like this model on NASA Wavelength: science.nasa.gov/learners/wavelength. And of course, discover the latest NASA science at nasa.gov.



These images from NASA's DSCOVR mission shows the Sun-facing side of Earth during the December 2018 solstice (left) and June 2019 solstice (right). Notice how much of each hemisphere is visible in each photo; December's solstice heavily favors the Southern Hemisphere and shows all of South America and much of Antarctica and the South Pole, but only some of North America. June's solstice, in contrast, heavily favors the Northern Hemisphere and shows the North Pole and the entirety of North America, but only some of South America. Credit: NASA/DSCOVR EPIC Source: https://www.nasa.gov/image-feature/goddard/2021/summer-solstice-in-the-northern-hemisphere

A presenter from the San Antonio Astronomy Club in Puerto Rico demonstrating some Earth-Sun geometry to a group during a "Zero Shadow Day" event. As Puerto Rico lies a few degrees south of the Tropic of Cancer, their two zero shadow days arrive just a few weeks before and after the June solstice. Globes are a handy and practical way to help visualize solstices and equinoxes for large outdoor groups, especially outdoors during sunny days!

Credit & Source: Juan Velázquez / San Antonio Astronomy Club

About The Milky Way

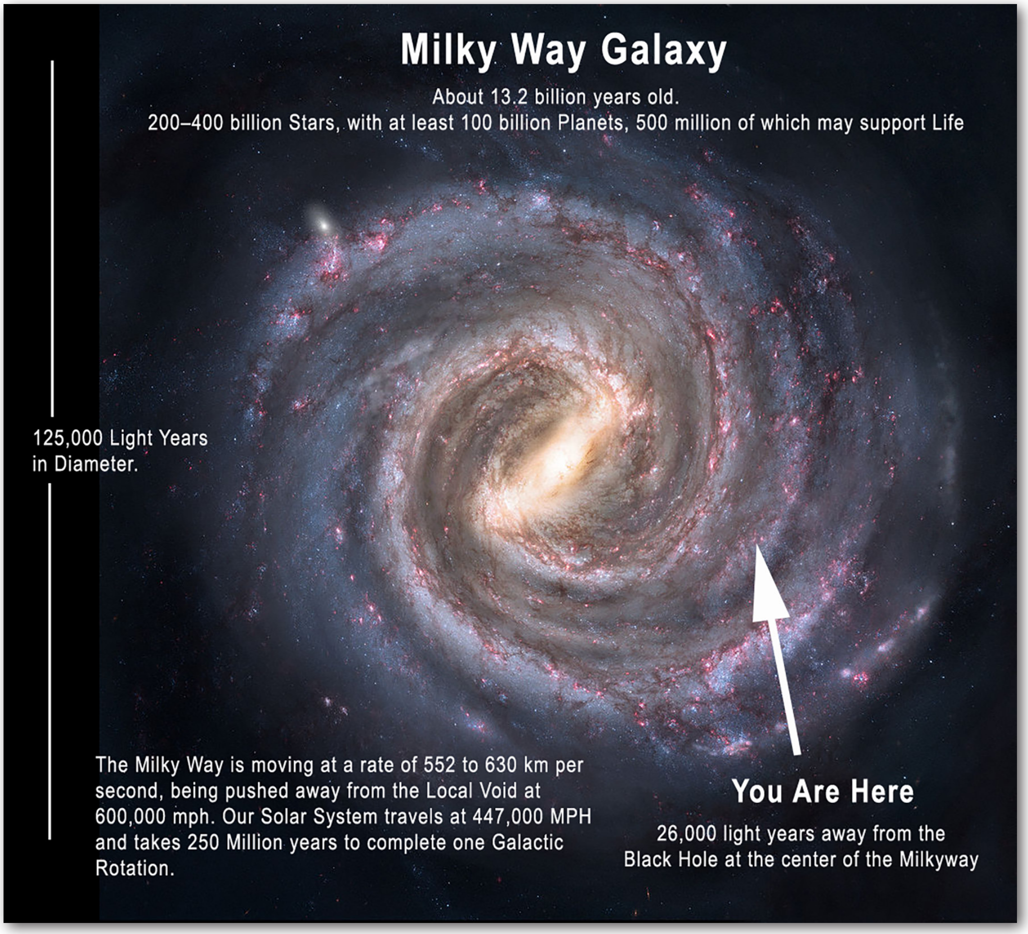
Compiled by Mike Jensen

The Milky Way is a barred spiral galaxy around 13.6 billion years old with large pivoting arms stretching out across the cosmos. Its disk is about 125,000 light-years and just 1000 light-years thick.

Just as Earth orbits the sun, the solar system orbits the center of the Milky Way. Despite hurtling through space at speeds of around 515,000mph (828,000kmph) it still takes our solar system approximately 250 million years to complete a single revolution, according to Interesting Engineering. The last time our planet was in this position, dinosaurs were just emerging and mammals were yet to evolve.

If the center of the Milky Way were a city, we would be living in suburbia, about 25,000 to 30,000 light-years from the city center. Life in the outskirts is good, we find ourselves nestled in one of the smaller neighborhoods, the Orion-Cygnus Arm, sandwiched between larger Perseus and Carina-Sagittarius arms. If we were to travel inwards towards the city center we would find the Scutum-Centaurus and Norma arms.

Lying at the very heart of the Milky Way is a supermassive black hole called Sagittarius A*. About 4 million times the mass of the sun, this beast consumes anything that strays too close, gorging on an ample supply of stellar material enabling it to grow into a giant. Though we cannot directly view this glutton at the core of our galaxy, scientists can suggest its presence by investigating its effect on nearby matter.

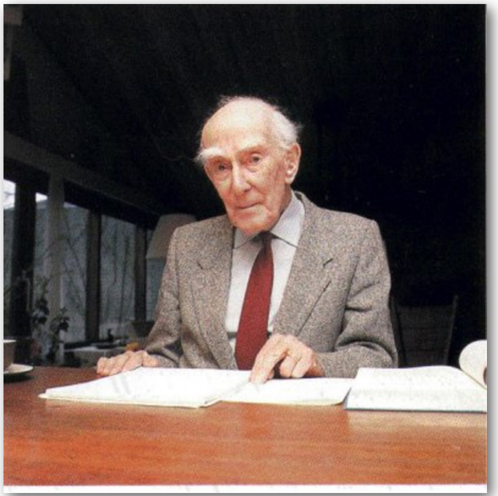


According to the American Museum of Natural History (AMNH), our galactic home is called the Milky Way after its apparent milky white appearance as it stretches across the night sky. In Greek mythology, this milky band appeared because the goddess Hera sprayed milk across the sky.

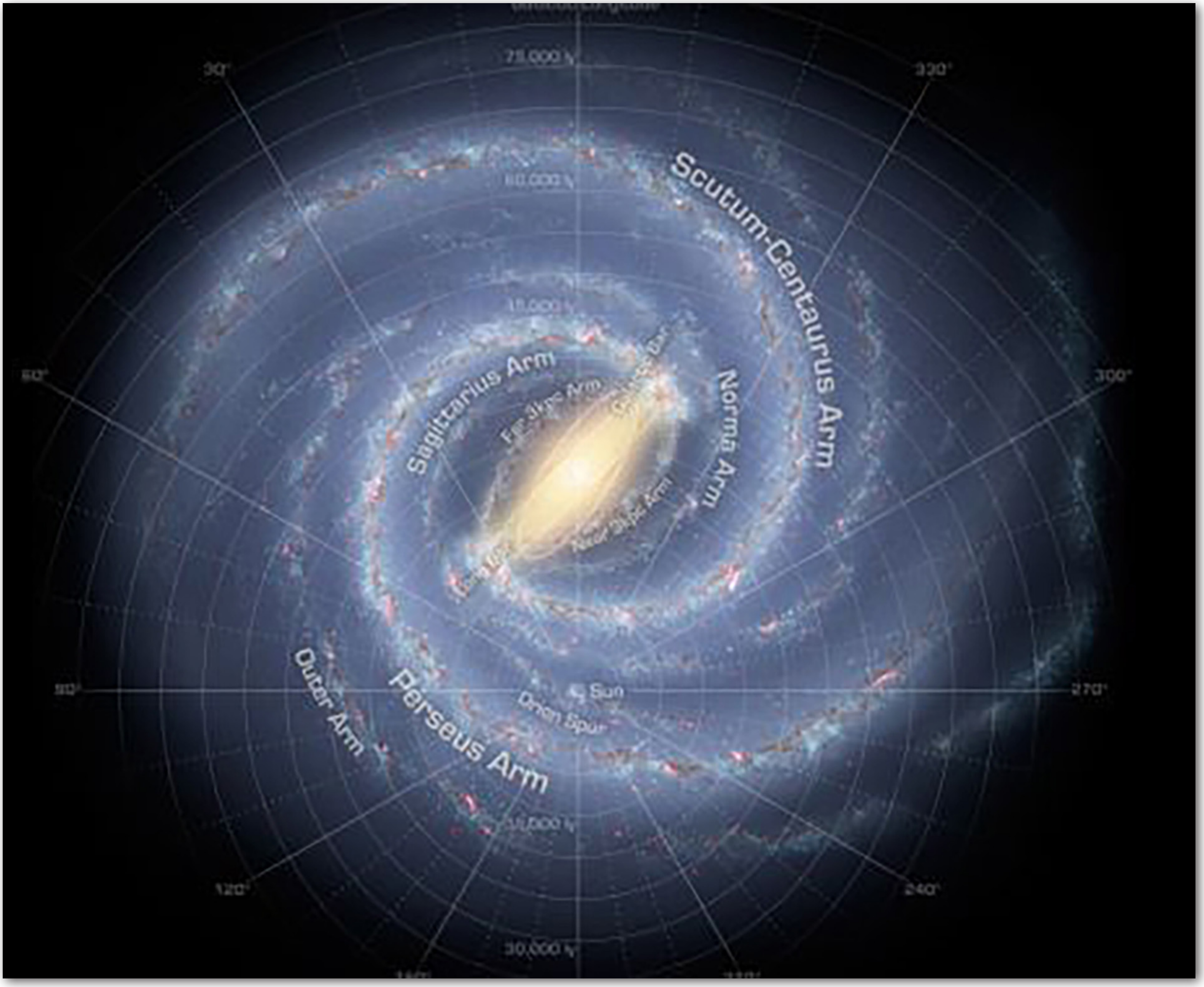
We now know that the Milky Way resides within the Local Group of galaxies, made up of over 30 galaxies including Andromeda, Triangulum and Leo I to name but a few. It turns out that it's pretty good to know who your neighbors are, as they may be closer than you think. The Milky Way is currently hurtling towards Andromeda at 250,000mph (400,000 km/h). Though there is no need to worry just yet, this crash of cosmic proportions is not due for another 4 billion years.

Major strides studying the Milky Way have been made, especially since the 2013 launch of the European Space Agency's (ESA) Gaia mission.

Telescopes enabled astronomers



Dutch Astronomer Jan Oort



to distinguish the basic shape and structure of some of the closest galaxies before they knew they were looking at galaxies. But reconstructing the shape and structure of our own galactic home was slow and tedious. The process involved building catalogs of stars, charting their positions in the sky and determining how far from Earth they are.

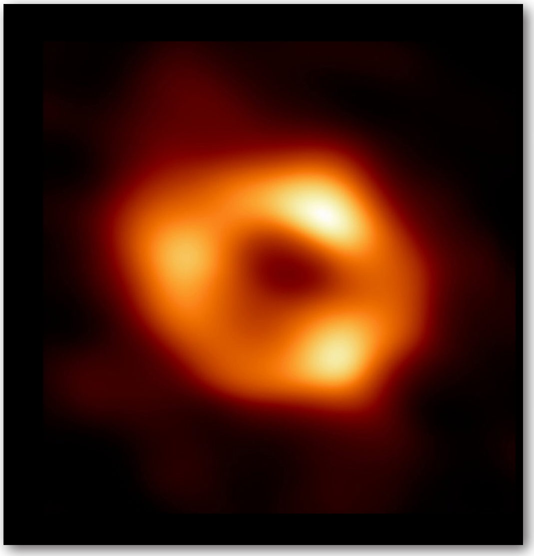
Dutch astronomer Jan Oort, (1900-1992) sometimes dubbed the master of the galactic system, was the first to realize that the Milky Way isn't motionless but rotates, and he calculated speeds at which stars at various distances orbit around the galactic center. It also was Oort who determined the position of our sun in the vast galaxy. (The Oort Cloud, a repository of trillions of comets far from the sun, was named after him.)

Milky Way Black Hole Revealed

Astronomers reveal first image of the black hole at the heart of our galaxy.

May 12, 2022

Compiled by Mike Jensen



Astronomers have unveiled the first image of the supermassive black hole at the center of our own Milky Way galaxy. This result provides overwhelming evidence that the object is indeed a black hole and yields valuable clues about the workings of such giants, which are thought to reside at the center of most galaxies. The image was produced by a global research team called the Event Horizon Telescope (EHT) Collaboration, using observations from a worldwide network of radio telescopes.

The image is a long-anticipated look at the massive object that sits at the very centre of our galaxy. Scientists had previously seen stars orbiting around something invisible, compact, and very massive at the center of the Milky Way. This strongly suggested that this object — known as Sagittarius A* (Sgr A*, pronounced "sadge-ay-star") — is a black hole, and today's image provides the first direct visual evidence of it.

Although we cannot see the black hole itself, because it is completely dark, glowing gas around it reveals a telltale signature: a dark central region (called a "shadow") surrounded by a bright ring-like structure. The new view captures light bent by the powerful gravity of the black hole, which is four million times more massive than our Sun.

"We were stunned by how well the size of the ring agreed with predictions from Einstein's Theory of General Relativity," said EHT Project Scientist Geoffrey Bower from the Institute of Astronomy and Astrophysics, Academia Sinica, Taipei. "These unprecedented observations have greatly improved our understanding of what happens at the very center of our galaxy, and offer new insights on how these giant black holes interact with their surroundings." The EHT team's results are being published today in a special issue of The Astrophysical Journal Letters.

Because the black hole is about 27,000 light-years away from Earth, it appears to us to have about the same size in the sky as a donut on the Moon. To image it, the team created the powerful EHT, which linked together eight existing radio observatories across the planet to form a single "Earth-sized" virtual telescope [1]. The EHT observed Sgr A* on multiple nights, collecting data for many hours in a row, similar to using a long exposure time on a camera.

The breakthrough follows the EHT collaboration's 2019 release of the first image of a black hole, called M87*, at the centre of the more distant Messier 87 galaxy.

The two black holes look

remarkably similar, even though our galaxy's black hole is more than a thousand times smaller and less massive than M87* [2]. "We have two completely different types of galaxies and two very different black hole masses, but close to the edge of these black holes they look amazingly similar," says Sera Markoff, Co-Chair of the EHT Science Council and a professor of theoretical astrophysics at the University of Amsterdam, the Netherlands. "This tells us that General Relativity governs these objects up close, and any differences we see further away must be due to differences in the material that surrounds the black holes."

This achievement was considerably more difficult than for M87*, even though Sgr A* is much closer to us. EHT scientist Chi-kwan ('CK') Chan, from Steward Observatory and Department of Astronomy and the Data Science Institute of the University of Arizona, US, explains: "The gas in the vicinity of the black holes moves at the same speed — nearly as fast as light — around both Sgr A* and M87*. But where gas takes days to weeks to orbit the larger M87*, in the much smaller Sgr A* it completes an orbit in mere minutes. This means the brightness and pattern of the gas around Sgr A* was changing rapidly as the EHT Collaboration was observing it — a bit like trying to take a clear picture of a puppy quickly chasing its tail."

The researchers had to develop sophisticated new tools that accounted for the gas movement around Sgr A*. While M87* was an easier, steadier target, with nearly all images looking the same, that was not the case for Sgr A*. The image of

National Science Foundation YouTube video of the press conference announcing the imaging of Sagittarius A*

the Sgr A* black hole is an average of the different images the team extracted, finally revealing the giant lurking at the centre of our galaxy for the first time.

The effort was made possible through the ingenuity of more than 300 researchers from 80 institutes around the world that together make up the EHT Collaboration. In addition to developing complex tools to overcome the challenges of imaging Sgr A*, the team worked rigorously for five years, using supercomputers to combine and analyse their data, all while compiling an unprecedented library of simulated black holes to compare with the observations.

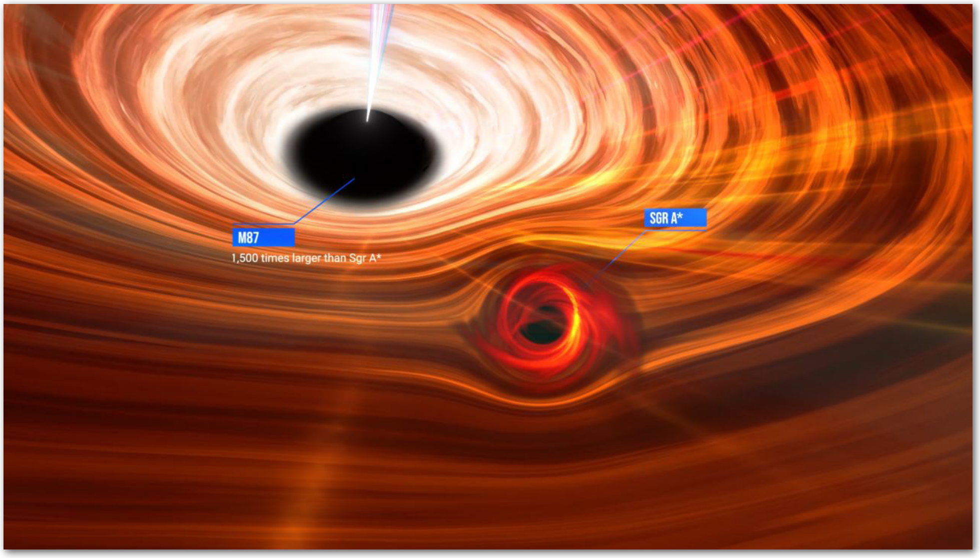
Scientists are particularly excited to finally have images of two black holes of very different sizes, which offers the opportunity to understand how they compare and contrast. They have also begun to use the new data to test theories and models of how gas behaves around supermassive black holes. This process is not yet fully understood but is thought to play a key role in shaping the formation and evolution of galaxies.

"Now we can study the differences between these two supermassive black holes to gain valuable new clues about how this important process works," said EHT scientist Keiichi Asada from the Institute of Astronomy and Astrophysics, Academia Sinica, Taipei. "We have images for two black holes — one at the large end and one at the small end of supermassive black holes in the Universe — so we can go a lot further in testing how gravity behaves in these extreme environments than ever before."

Progress on the EHT continues: a major observation campaign in March 2022 included more telescopes than ever before. The ongoing expansion of the EHT network and significant technological upgrades will allow scientists to share even more impressive images as well as movies of black holes in the near future. Read More...

Capturing an impossible image

Source: https://www.cnn.com/2022/05/12/world/milky-way-center-black-hole-image-scn/index.html



Although the Milky Way's black hole is closer to Earth, it was much harder to image.

"The gas in the vicinity of the black holes moves at the same speed – nearly as fast as light – around both Sgr A* and M87*," EHT scientist Chi-kwan Chan at the Steward Observatory and Department of Astronomy and the Data Science Institute of the University of Arizona, said in a statement.

"But where gas takes days to weeks to orbit the larger M87*, in the much smaller Sgr A* it completes an orbit in mere minutes. This means the brightness and pattern of the gas around Sgr A* was changing rapidly as the EHT Collaboration was observing it – a bit like trying to take a clear picture of a puppy quickly chasing its tail."

The global network of astronomers had to develop new tools to allow for the quick movement of gas around Sagittarius A*. The resulting image is an average of different ones taken by the team. Taking the Sagittarius A* image was like capturing a photo of a grain of salt in New York City using a camera in Los Angeles, according to California Institute of Technology researchers.

"This image from the Event Horizon Telescope required more than just snapping a picture from telescopes on high mountaintops. It is the product of both technically challenging telescope observations and innovative computational algorithms," Katherine Bouman, Rosenberg scholar and assistant professor of computing and mathematical sciences, electrical engineering and astronomy at the Caltech, said during a press conference.

Bouman also worked on capturing the M87 image shared in 2019. Despite the fact that the Sagittarius A* image may seem blurry, "it's one of the sharpest images ever made," Bouman said.

Each telescope was pushed to its limit, which is called a diffraction limit, or the maximum fine features that it can see.

"And that's basically the level that we're seeing here," Johnson said at the press conference. "It's fuzzy because to make a sharper image, we need to move our telescopes further apart or go into higher frequencies."

On the horizon

Having images of two very different black holes will allow astronomers to determine their similarities and differences and better understand how gas behaves around supermassive black holes, which could contribute to the formation and evolution of galaxies. It is believed that black holes exist at the center of most galaxies, acting like an engine that powers them.

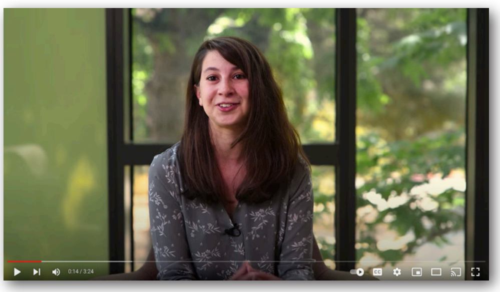
Meanwhile, the EHT team is working to expand the telescope network and conduct upgrades that could lead to even more stunning images, and even movies, of black holes in the future.

Capturing a black hole in motion can show how it changes over time and what the gas does as it swirls around a black hole. Bouman and EHT member Antonio Fuentes, who will join Caltech as a postdoctoral researcher in October, are developing methods that will allow them to stitch images of the black hole together to reflect this motion.

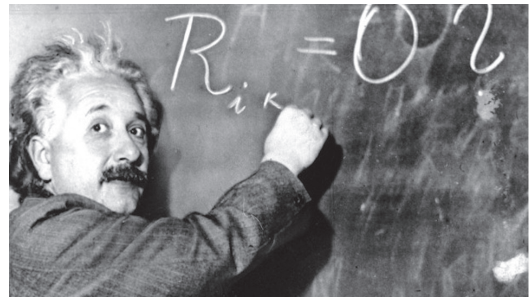
This "first direct image of the gentle giant in the center of our galaxy" is just the beginning, said Feryal

Özel, member of the EHT Science Council and a professor of astronomy and physics and associate dean for research at the University of Arizona, during the press conference.

"This image is a testament to what we can accomplish, when as a global research community, we bring our brightest minds together to make the seemingly impossible, possible," National Science Foundation Director Sethuraman Panchanathan said in a statement. "Language, continents and even the galaxy can't stand in the way of what humanity can accomplish when we come together for the greater good of all."



Einstein's bad dream



Black holes were an unwelcome consequence of the general theory of relativity, which attributed gravity to the warping of space and time by matter and energy, much in the way that a mattress sags under a sleeper.

Einstein's insight led to a new conception of the cosmos, in which space-time could quiver, bend, rip, expand, swirl and even disappear forever into the maw of a black hole, an entity with gravity so strong that not even light could escape it.

Einstein disapproved of this idea, but the universe is now known to be speckled with black holes. Many are the remains of dead stars that collapsed inward on themselves and just kept going.

But there appears to be a black hole at the center of nearly every galaxy, ours included, that can be millions or billions of times as massive as our sun. Astronomers still do not understand how these supermassive black holes have grown so big.

Paradoxically, despite their ability to swallow light, black holes are the most luminous objects in the universe. Materials — gas, dust, shredded stars — that fall into a black hole are heated to millions of degrees in a dense maelstrom of electromagnetic fields. Some of that matter falls into the black hole, but part of it is squirted out by enormous pressures and magnetic fields.

Black Hole Imaging Rock Star

Katie Bouman is a 32 year old engineer and computer scientist working in the field of computer imagery. She led the development of an algorithm for imaging black holes, known as Continuous High-resolution Image Reconstruction using Patch priors (CHIRP), and was a member of the Event Horizon Telescope team that captured the first image of a black hole.

Katie describes her research: *"My research focuses on computational imaging: designing systems that tightly integrate algorithm and sensor design, making it possible to observe phenomena previously difficult or impossible to measure with traditional approaches. My group at Caltech combines ideas from signal processing, computer vision, machine learning, and physics to find and exploit hidden signals for both scientific discovery and technological innovation."*

Astrophotography (SIG)
Special Interest Group

Join Our Astrophotography Special Interest Group (SIG)
– Mike Jensen, Group Lead

REGULAR MEETINGS
Regular meetings have been set for the 3rd Tuesday of each month at 6:30 on Zoom
The next meeting is Tuesday June 21st at 6:30.

https://us02web.zoom.us/j/81077794455?pwd=MHJVL2VvZGZRK3JyM-1d5QVJiZE1TUT09

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

ABOUT THE ASTRO SIG

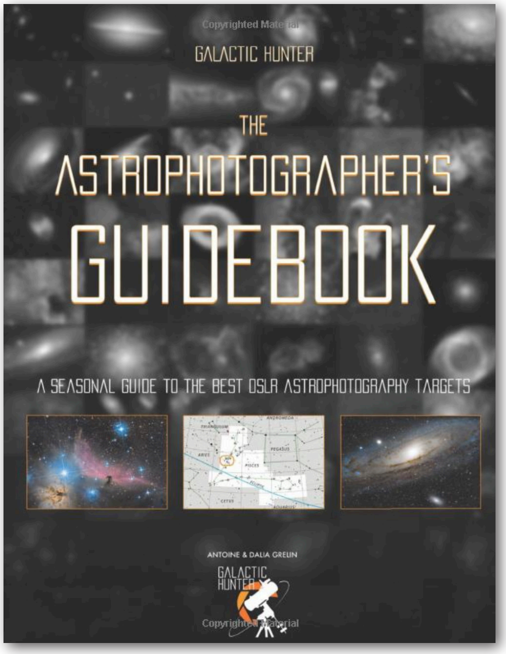
Every month we get together on a Zoom call with a pretty loose agenda and manage to have an absolute blast talking about Astrophotography. I hope you'll join us if you're interested in Astrophotography.

We have a nice, diverse group with a wide range of skill sets and interests. Some DSLR/Mirrorless shooters mixed in with telescope shooters. Some use Star Trackers, some use goto mounts, some use laptops and some use a fun little unit called the ASIAIR (a small little computer inside a box about the size of a cell phone that connects to a tablet or smart phone).

On any given day or moment we can shoot an email out to the group and get suggestions and answers, how cool is that?

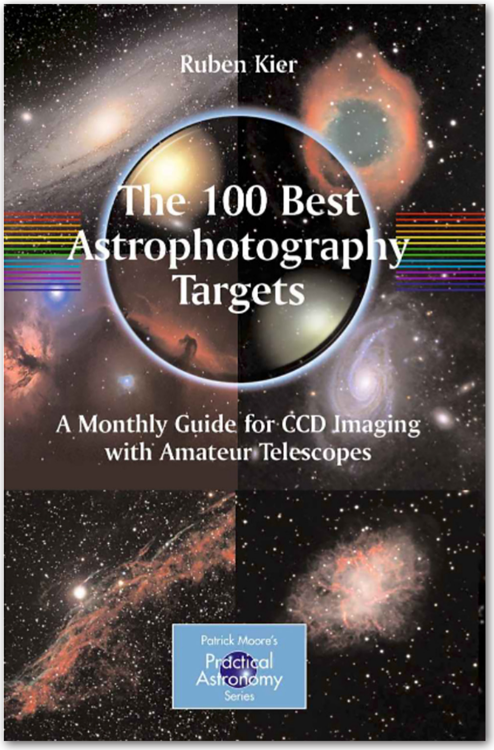
Now, the REALLY cool thing is that it looks like the pandemic is FINALLY starting to ease off so that means we can finally start getting together and be safe! That means more helping each other, more show and tell, more mentorship which is exactly why we created the Astro SIG.

So, if you want to learn Astrophotography (like Astro 101) with a LOT of fun people, join us.



Discover 60 Deep Sky Objects that will considerably improve your Imaging and Processing skills!Whether you are a beginner, intermediate, or advanced astrophotographer, this detailed book of the best deep sky objects will serve as a personal guide for years to come!

Astro Photography Books



Any amateur astronomer who is interested in astrophotography, particularly if just getting started, needs to know what objects are best for imaging in each month of the year. These are not necessarily the same objects that are the most spectacular or intriguing visually.

Dedicated Astro & Camera Cleaning

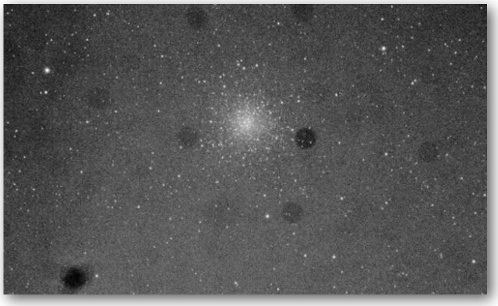
By Mike Jensen

One of the things that has helped me adapt to astrophotography so (relatively) easily is the concept that a telescope to an astrophotographer is really just another large lens. So, as a professional photographer I apply what I know about photography to my astrophotography and (much of) it makes sense! (Insert Happy Face Wink Wink emoji)

In my classes and workshops one of the things that I've constantly taught is to never used compressed air on any of my gear. Compressed air contains gas and liquid that can moisten and stain your gear, not good!

TREAT SENSORS AND LENSES/ OTA'S THE SAME

You know that saying the (insert naughty word) Happens! Well, in our world the IT is dust and moisture. Dust and moisture are not our friend! When you see a picture



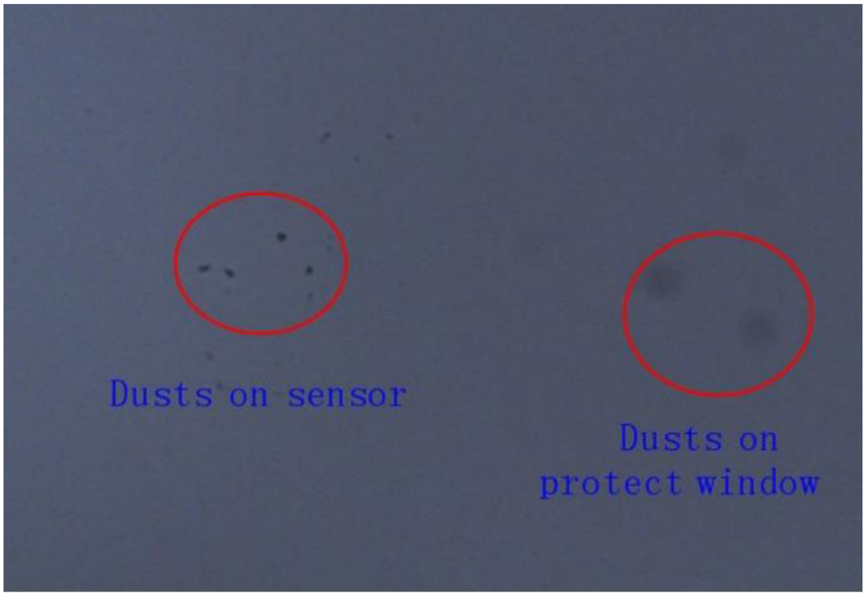
like this, remember don't panic, it happens to all of us!

For dedicated astro cameras I went to the source of most of our cameras, ZWO (see below).

For DSLR's and Mirrorless cameras I first recommend having a professional clean your camera. Sony, Canon and Nikon all have Pro Services groups that offer this. If you prefer to do it yourself I found [this article online] that I can endorse. I also recommend [this article] from B & H. One other thing, go easy on the fluid, you don't need much and too much will really damage things.

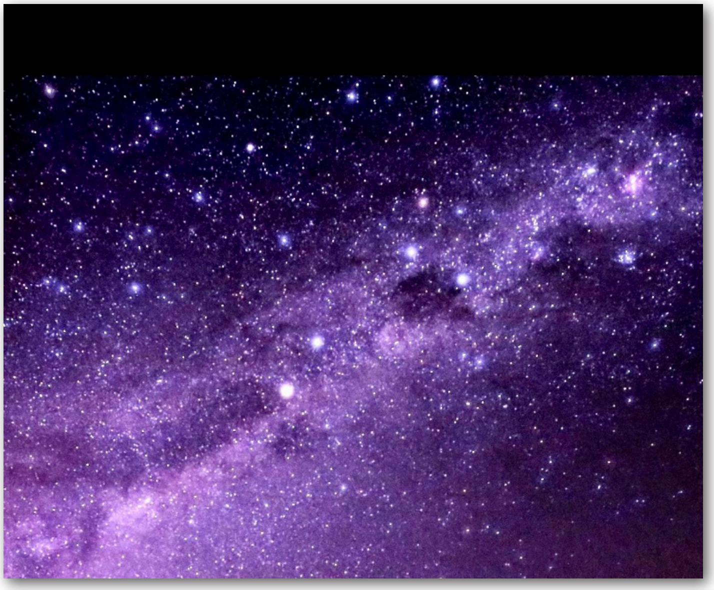
How to clean ASI cameras and redry the desiccant

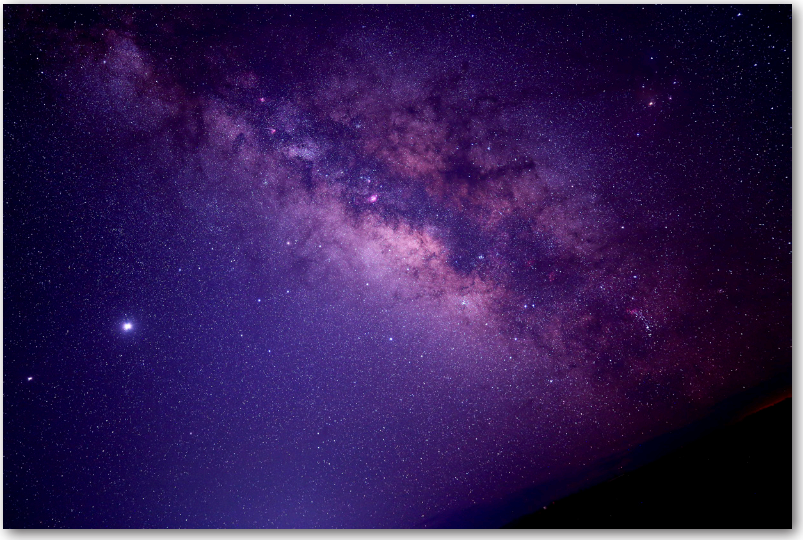
The camera comes with an protective window, which can protect the sensor from dust and humidity. Should you need to clean the sensor, it's better to do so during the daytime. To see the dust, you just need to setup your telescope and point it to a bright place. A Barlow is required to see these dusts clear. Then attach the camera and adjust the exposure to make sure not over exposed. You can see an image like below if it's dirty.



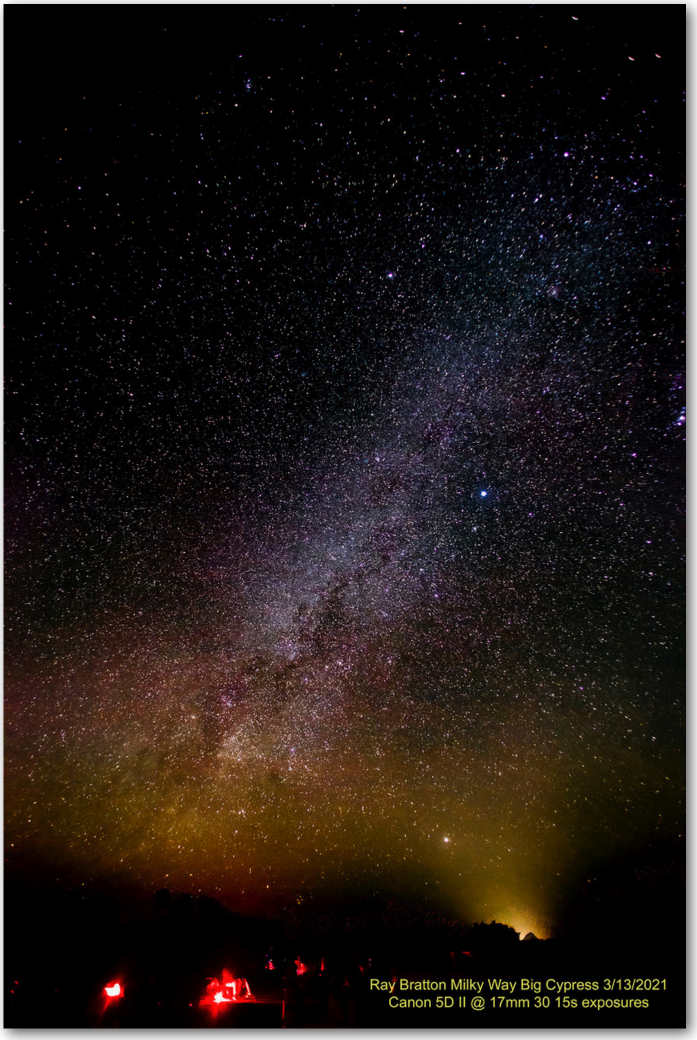
The big dim spot on the image (at right) are the shadows of dust on the protect window.
The very small but very dark spot in the image (at left) are the shadows of the dusts on the sensor.
The suggested way to clean them is try to blow them away with a manual air pump. To clean the dust and spots on the sensor, you will need to open the camera chamber.
Please read the following steps carefully, and follow our instructions to clean a cooled camera.

Milky Way Photos From our SIG





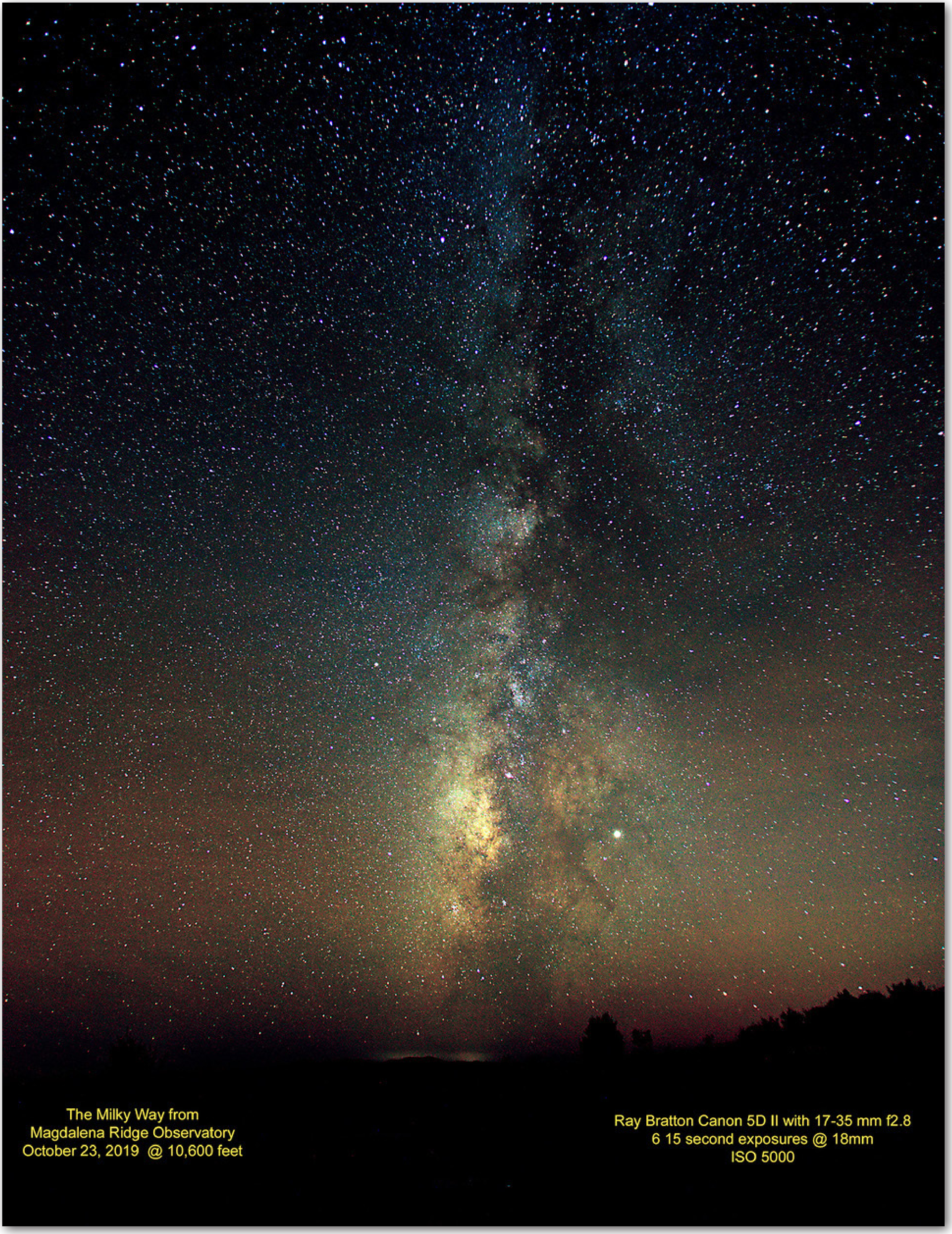
Images From Carmela Nobili



Ray Bratton Milky Way Big Cypress 3/13/2021
Canon 5D II @ 17mm 30 15s exposures

Green River State Wildlife Area - Harmon, Illinois
Ray Bratton 8/13/2021, Canon EOS Ra,
14mm f2.8 Rokinon, 25seconds, ISO 1600
28 images stacked with Starry Landscape Stacker

MilkyWay, Clouds, Windmills, & Saturn
rising above the Trees


The Milky Way from
Magdalena Ridge Observatory
October 23, 2019 @ 10,600 feet
Ray Bratton Canon 5D II with 17-35 mm f2.8
6 15 second exposures @ 18mm
ISO 5000

Photos By Don Bishop

Shot in the Arches National Park at the Windows area around 3am last May. This was using the Sony a7R3 on a Sky Guider Pro mount and approximately a 10 minute exposure for the sky and tracking. The ground was shot with the tracker off and then the two resultant images were merged together.

This is a 105 second exposure shot in Canyonlands National Park. The skies are Bortle 2 and this was shot around 3am last May.

This was shot in Monticello, Utah last May around 3:30am. It is a single 14 second exposure shot with a Sony a7R3 and an ultra wide angle lens on a regular tripod. In my presentation last month I mentioned the 300 Rule for shooting the Milky Way and this is an example of that.

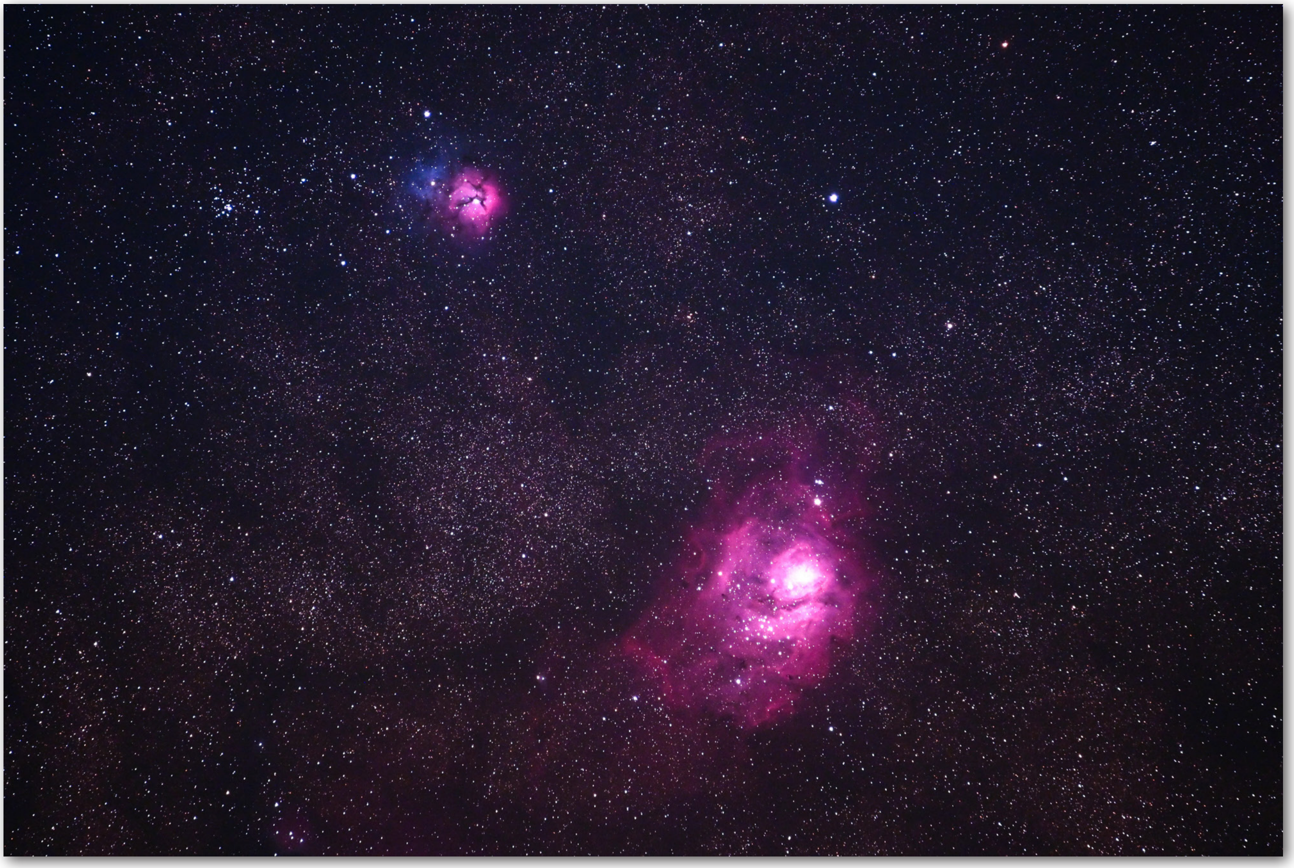
Photo by Mike Jensen

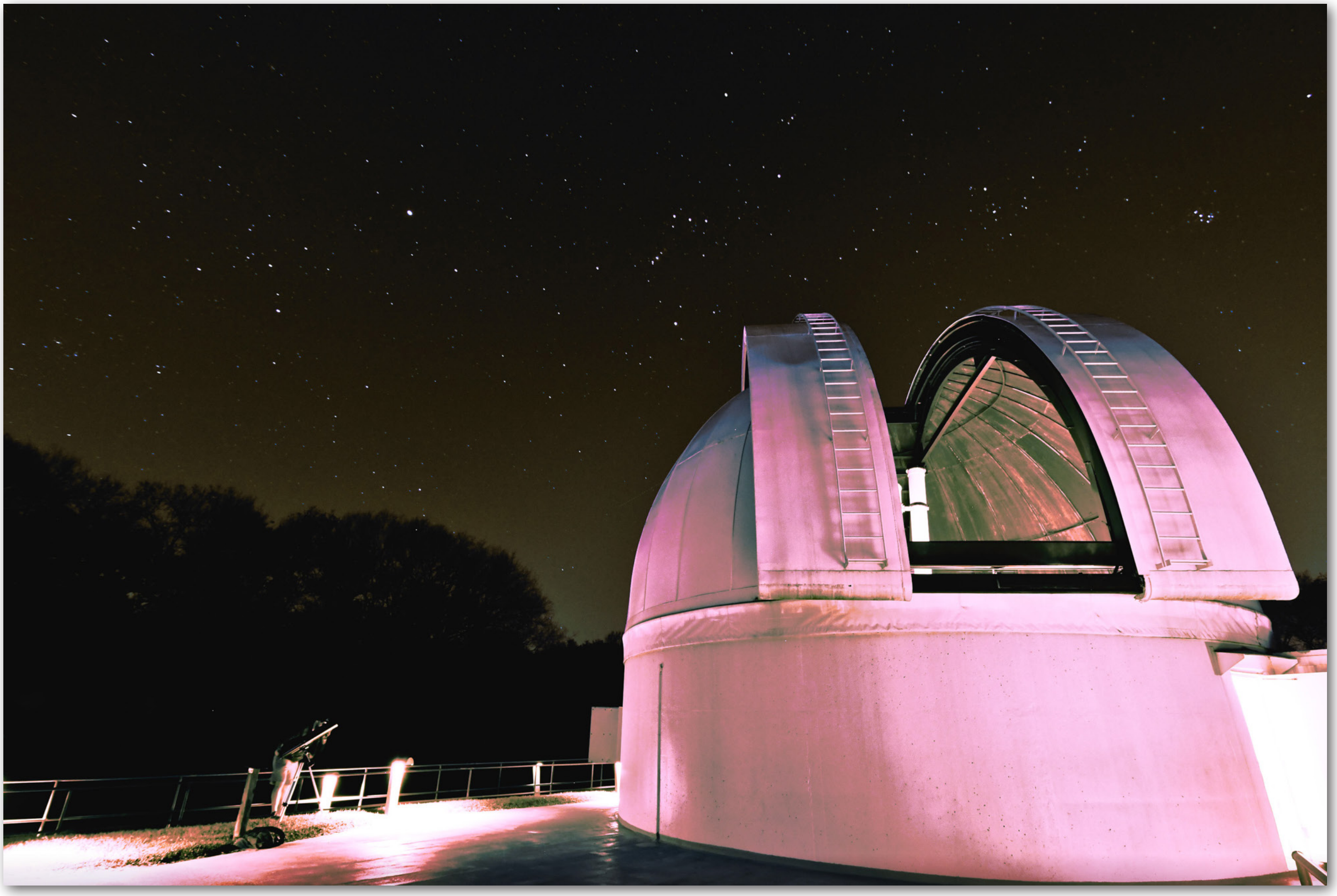
I took this while leading a Fall Colors Photo Workshop last Fall.
This is a (non-tracked) stacked image. About 30 images taken at 20 secs at 400 ISO. Taken in Crested Butte, CO. last Fall at about 8,000 feet elevation. Bortle 2 site. Probably one of the darkest places I've ever been in .

Photo By Mike Jensen

Taken on the 2018 Fall Colors Workshop. This was taken outside of Montrose, CO. Settings on my Sony A7Riii were ISO 3200, F2.8 for 20 secs. I love this shot because I've been able to capture Mars in the lower left (right above the tree line) and also had a meteor zip through in the upper right.

Photos From Phil Jansen





Photos by Don Bishop

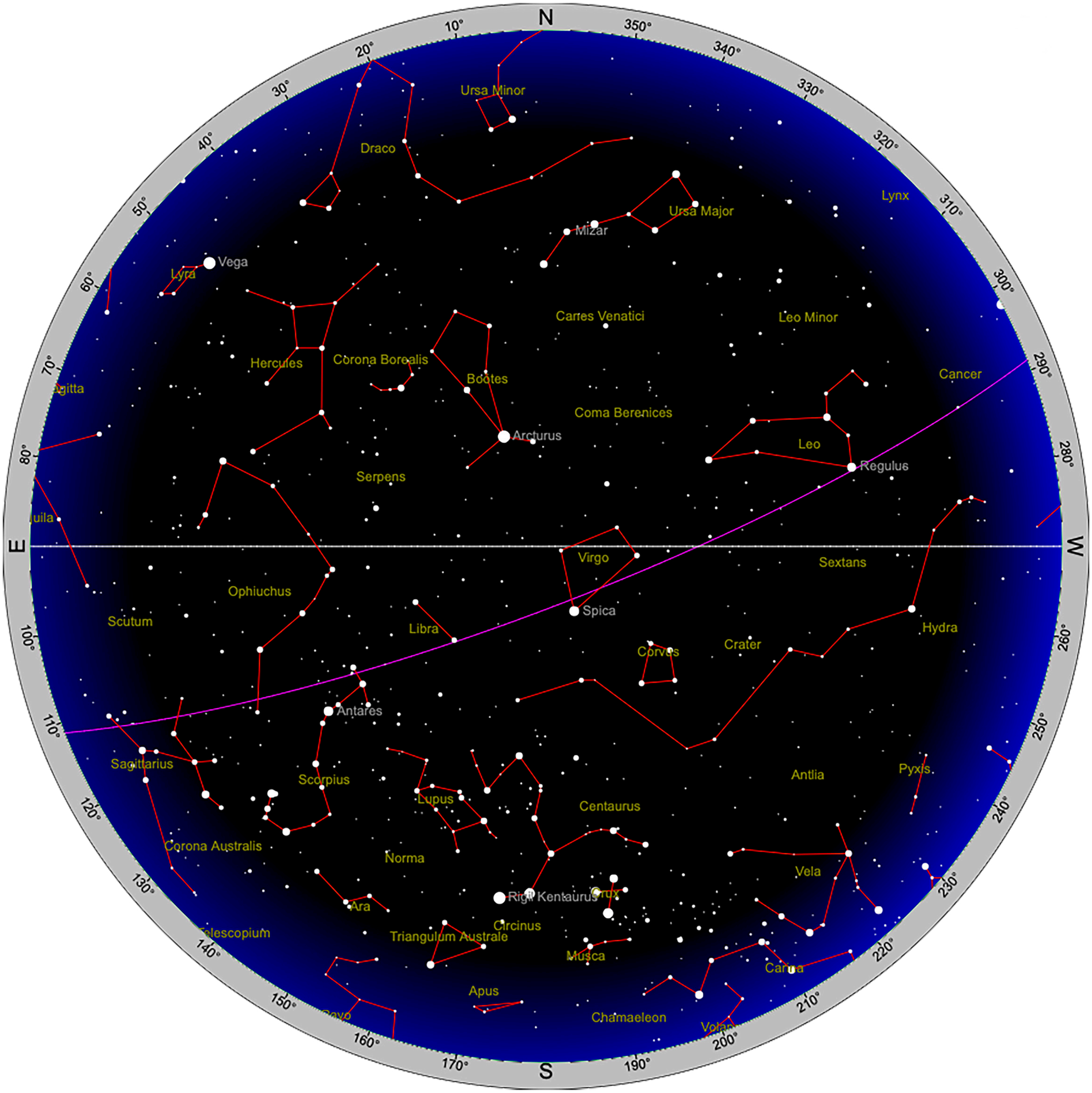
Opposite Page - Photos by Don Bishop
Here you can see two views of M51. Upper page 22 by Don and upper page 23 by Mike Jensen.
Don says of his image: "This is M51, the Whirlpool Galaxy shot with a Stellarvue SVA130 and their reducer. This was also shot with the ASI294MC Pro color camera. This was an all night project down at Big Cypress comprised of 142 three minute exposures and 20 five minute exposures for a total time of 8 hours and 46 minutes."

Next image left on page 22. This was my first light with the Celestron 9.25 mounted on the CEM40 and controlled with the ASIAir Pro. This is NGC4565 the Needle Galaxy. I had to focus manually since the Optec focuser is not supported by the ASIAir. Polar alignment was marginal but good enough and this was my first time to setup and use an OAG. This was shot with my ASI294MC Pro color camera at 3 minute exposures for a total of 87 minutes. This was shot in Babcock Ranch.

IC2118 the Witch Head Nebula was shot down at Big Cypress when we were last there together. The was shot with an ASI294MM Pro mono and I only shot Luminance. The scope was a Televue 85 with a 0.8 reducer/flattener. It was mounted on the CEM40 and it was ~140 minutes of exposure at 5 minutes each.

MIke's image of M51 above was shot from his back yard in Port Charlotte. Five nights of shooting 3 minute images of Luminance, Red, Blue, Green and Hydrogen Alpha channels. Taken in April.

June 2022 Sky Chart



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 April 7th but can be programmed for any date and time. The chart can also be found at [this link on Heavens Above](#).

Planet Summary

Year 2022 Month June Day 2 Time 21:02:12 Update Reset to now

	Mercury	Venus	Mars	Jupiter
Right ascension	$3^h\ 37^m\ 33.6^s$	$2^h\ 16^m\ 56.0^s$	$0^h\ 25^m\ 57.1^s$	$0^h\ 15^m\ 32.5^s$
Declination	15° 32' 7"	11° 35' 41"	0° 53' 8"	0° 24' 10"
Range (AU)	0.613	1.232	1.447	5.252
Elongation from Sun	16.6°	36.2°	65.7°	68.3°
Brightness	2.4	-3.9	0.7	-2.1
Equatorial Diameter	10.98"	13.55"	6.47"	37.54"
Phase Angle	141.0°	55.4°	41.9°	10.9°
Constellation	Taurus	Aries	Pisces	Pisces
Meridian transit	10:54	09:31	07:42	07:32
Rises	04:55	03:31	01:42	01:33
Sets	16:53	15:32	13:41	13:31
Altitude	-58.7°	-76.3°	-69.6°	-67.0°
Azimuth	301.0°	328.0°	87.5°	89.0°
Inferior Conjunction	2022-May-21 2022-Sep-23	2022-Jan-09 2023-Aug-13	-	-
Opposition	-	-	2020-Oct-13 2022-Dec-08	2021-Aug-20 2022-Sep-26
Superior Conjunction	2022-Apr-02 2022-Jul-16	2021-Mar-26 2022-Oct-22	2021-Oct-08 2023-Nov-18	2022-Mar-05 2023-Apr-11
Max. eastern elongation	2022-Apr-29 2022-Aug-27	2021-Oct-29 2023-Jun-04	-	-
Max. western elongation	2022-Feb-16 2022-Jun-16	2022-Mar-20 2023-Oct-23	-	-
Perihelion	2022-Apr-13 2022-Jul-10	2022-Jan-23 2022-Sep-04	2020-Aug-03 2022-Jun-21	2011-Mar-17 2023-Jan-20
Aphelion	2022-May-27 2022-Aug-23	2022-May-15 2022-Dec-26	2021-Jul-13 2023-May-30	2017-Feb-17 2028-Dec-28

	Saturn	Uranus	Neptune	Pluto
Right ascension	$21^h\ 50^m\ 26.1^s$	$2^h\ 54^m\ 57.9^s$	$23^h\ 43^m\ 20.2^s$	$20^h\ 2^m\ 14.1^s$
Declination	-14° 15' 47"	16° 18' 37"	-3° 4' 4"	-22° 33' 25"
Range (AU)	9.541	20.608	30.128	33.824
Elongation from Sun	107.1°	25.9°	77.0°	133.9°
Brightness	0.7	5.9	7.9	14.3
Equatorial Diameter	17.42"	3.42"	2.27"	0.10"
Phase Angle	5.6°	1.3°	1.9°	1.2°
Constellation	Capricornus	Aries	Pisces	Sagittarius
Meridian transit	05:08	10:11	07:00	03:20
Rises	23:05	04:12	01:01	21:17
Sets	11:07	16:10	12:59	09:19
Altitude	-29.7°	-66.7°	-58.8°	-3.4°
Azimuth	106.5°	315.2°	95.9°	112.6°
Inferior Conjunction	-	-	-	-
Opposition	2021-Aug-02 2022-Aug-14	2021-Nov-04 2022-Nov-09	2021-Sep-14 2022-Sep-16	2021-Jul-17 2022-Jul-20
Superior Conjunction	2022-Feb-04 2023-Feb-16	2022-May-05 2023-May-09	2022-Mar-13 2023-Mar-15	2022-Jan-16 2023-Jan-18
Max. eastern elongation	-	-	-	-
Max. western elongation	-	-	-	-
Perihelion	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	2018-Apr-17 2047-Jul-15	2009-Feb-27 2092-Nov-23	1959-Jul-17 2125-Dec-01	1866-Jun-04 2114-Feb-19