nightwatch
Newsletter of the Pomona Valley Amateur Astronomers

...look up and see the madness organized in the stars.
Kelli Russell Agodon

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Volume 43 Number 7 ***nightwatch*** **July 2023**

Club Events Calendar

July 7	**Virtual General Meeting Gary Fix**
	"Giant Sundials in Italian Cathedrals" 7:30 PM
July 15	**Star Party – GMARS**
July 26	**Board Meeting 6:15 PM**
Aug 4	**Virtual General Meeting 7:30 PM**
Aug 12	**Big Bear – BBVAS Astronomical Star Party**
Aug 19	**Star Party – GMARS**
Sep 16	**Star Party – GMARS**
Sept 20	**Board Meeting**
Sep 29	**Virtual General Meeting 7:30 PM**
Oct 14	**Star Party – Joshua Tree Night Sky Festival**
Oct 18	**Board Meeting 6:15 PM**
Oct 27	**Virtual General Meeting 7:30 PM**
Nov 8	**Board Meeting 6:15 PM**
Nov 9-12	**Nightfall www.NightfallStarParty.com**
Nov 17	**Virtual General Meeting 7:30 PM**
Nov 18	**Star Party – GMARS**
Nov 29	**Board Meeting 6:15 PM**
Dec 9	**Holiday Party**

PVAA Officers and Board

Officers

President ….....	Mathew Wedel	909-767-9851
Vice President ..	Joe Hillberg	909-949-3650
Secretary	position is currently open	
Treasurer	Gary Thompson	909-935-5509

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Jim Bridgewater (2024).....	909-599-7123
Richard Wismer(2024)	
Ron Hoekwater (2023).....	909-706-7453
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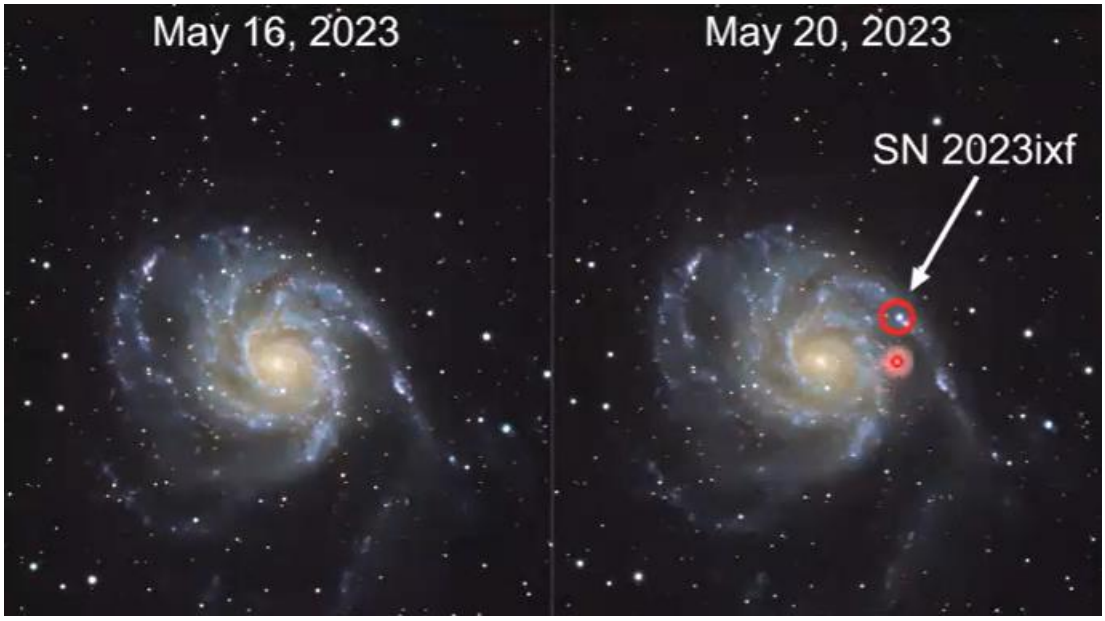
Membership / Publicity....	Gary Thompson .	909-935-5509
Outreach	Jeff Schroeder	909-758-1840
Programs	Ron Hoekwater	909-391-1943

PVAA General Meeting 06-02-2023

The speaker for June's general meeting was Dr. Douglas Leonard of San Diego State University and his topic for the night was "When Will Betelgeuse Explode?" The Orion constellation, known as "The Hunter," is the Doctor's favorite constellation, and contains a very bright and very red star named Betelgeuse. To study this bright star his department had to re-configure the university's telescope at their Mount Laguna Observatory (MLO). MLO is in the Cleveland National Forest, about an hour east of San Diego State University. It took over a year and a half to get the equipment to study something so bright. The timing was perfect, as just when the observatory was coming back online, Betelgeuse was starting to "act strange" and its luminosity started to fluctuate. Many astronomers believe that Betelgeuse is in its 'last act' before it becomes a supernova. Dr. Leonard then showed us a couple of pictures of the Whirlpool Galaxy (M51a)– before and during a star in the galaxy going supernova. The Whirlpool Galaxy is between 23 and 31 million light years away. Last May we had another star go supernova in M101 the Pinwheel Galaxy, which is 21 million light years away. We are so interested in Betelgeuse because it is only 548 light years away. When it explodes it would be visible during daylight, as bright as a quarter-moon. Betelgeuse is a massive star, with a diameter of almost Jupiter's orbit. It is about 100,000 times more luminous than our sun.

So, when will Betelgeuse explode? We believe that what we see on the surface of the star is telling us what is happening at its core. Betelgeuse is in the final phase of its life before exploding. The question is how long will this phase last? Scientists can't answer this question accurately, as estimates vary from 'very soon' to a million years. Dr. Leonard believes it will happen within the next 100,000 years. (It could be tomorrow!) It all depends on how much fuel is left, and how fast Betelgeuse is burning through it. We believe that Betelgeuse has burned through all its hydrogen, and is now burning through its helium, carbon, and oxygen.

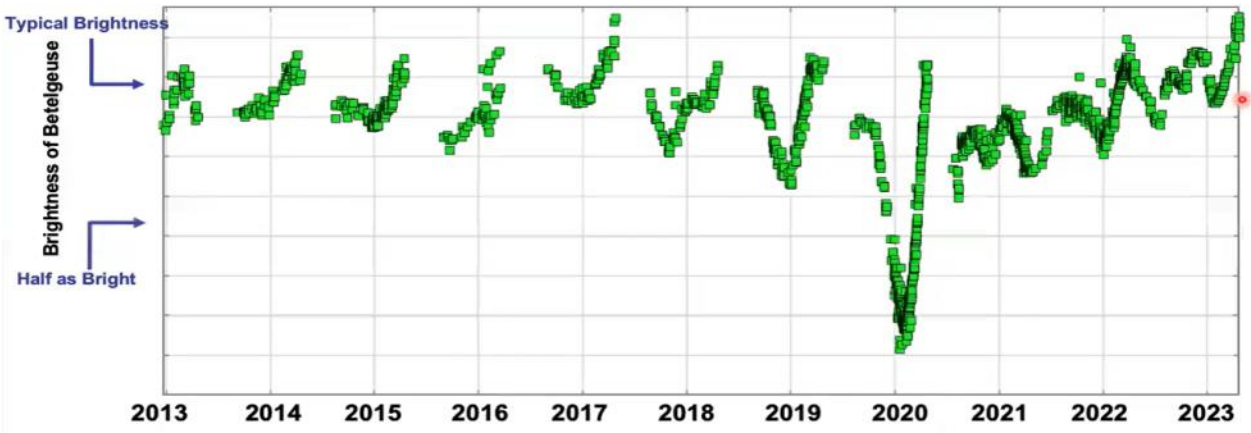
Since the 1830s we have known that Betelgeuse varies in brightness. But in 2019 it went from the 10th brightest star to the 35th brightest star. Looking back at the data we have on other supernovas; we don't show a dimming of the star before the explosion. At the Mount Laguna Observatory, a student did his thesis on the spectroscopic data of Betelgeuse. This showed a temperature variation during 'the great dimming.' The surface temperature can explain about half the dimming, and a proposal of a mass eruption from the star that then cooled and came between the star and Earth can explain the other half of the dimming.



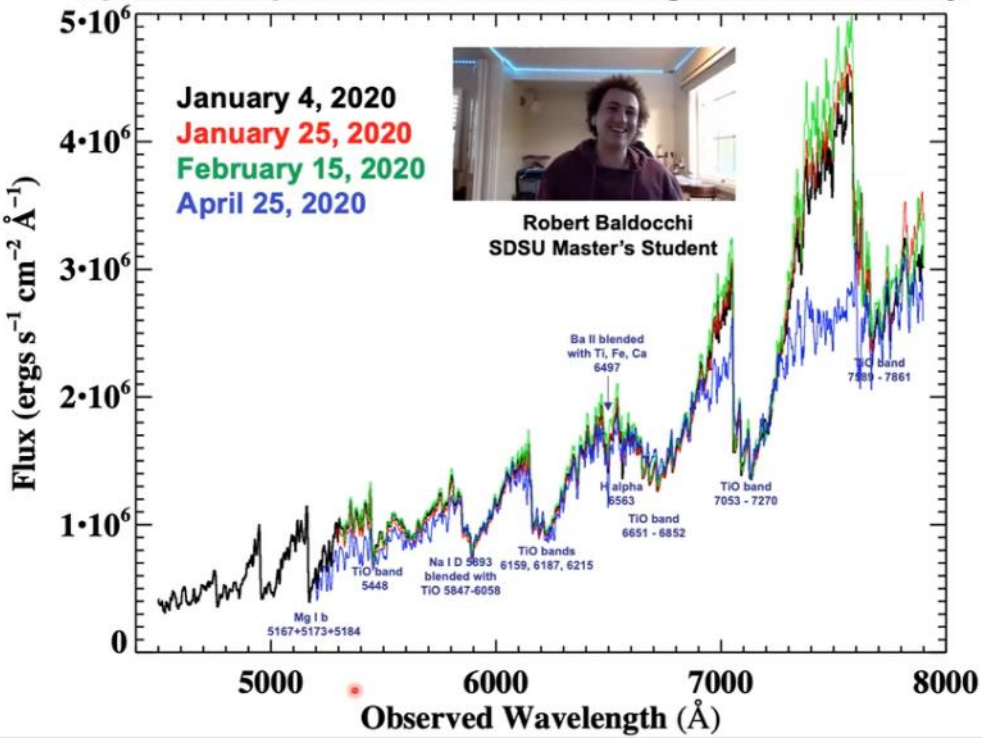
M101- The Pinwheel Galaxy in Ursa Major

Color Images by Seppo Matilla, Supernova by Hubble

The "Light Curve" of Betelgeuse



Spectroscopic Data from Mount Laguna Observatory



A scientific paper just released in June 2023 suggests that Betelgeuse is in the late stage of core carbon burning and is a good candidate for the next Galactic supernova. That means Betelgeuse has already exploded, but being over 500 light years away, we haven't seen it yet.

Our Sun, while larger than most stars, will not go supernova. It will expand and "blow off" its upper envelope and will give us a white dwarf surrounded by the blown away outer envelope, like the Ring Nebula (M57).

Gary Thompson

Here are amateur astronomers doing their nightly setup of tripods, binoculars, and telescopes. Some of the largest stay out all day while others are packed up along with everyone's eyepieces and other expensive bits every evening.

We also contend with rain, or the threat of it, during few nights.

Ron and Laura prepare the 25" Dobsonian scope for a nighttime of viewing. As usual, bigger must be better and there are lines all night long to look through this impressive telescope.

The telescope field at night is a mix of shadows, red lights, and murmured exclamations of wonder.

The shot on the right is of a Starlink satellite train taken about 31 hours after their launch by Space X aboard a Falcon 9 rocket from Vandenberg Space Force Base on June 12 at 2:35pm. 72 spacecraft were launched during this mission.

Aside from the company, the best part of the Star Party was the food!

Therefore, best of all is good food and good company as we enjoy the best of both at El Tovar for brunch one morning.

Dinner of Champions: Popcorn, Pepperoni, cheese, crackers, pickles, jalapeno, and Cheez-Its.

Only food group not represented: Pop Tarts.

Fun and games!

As you may recall from last year, your Club is known for member interactions with local elk. Ludd gets close up and personal with this adult female who soon retrieves her calf from its hiding place and then continues her journey through Mather Campground.

The Park Service kindly placed this Hot Air Guard around the hand dryers in the restrooms out of sympathy for campers whose tents were within earshot of these devices.

I offer no explanation for this photo except to say the name of the establishment was Yippee-Ei-O!

'Nuff said…

Under the heading of "You had to be there" this is a photo of a rare, and seldom seen, Grand Canyon shower token. At one point, we were is possession of 4 of these precious objects.

Exchangeable for 5 minutes, at least, of blissful hot water!

Oh Yeah – there is a Canyon here too!

At some point after getting to the Canyon, setting up our campsites, and getting stargazing equipment ready for nighttime sharing with the public – we figured we'd better check out the big hold in the ground all the fuss is about. Here we have Claire at Mather Point, Ludd enjoying the view just after sunrise at Shoshone Point, Claire walking the Rim trail with Sherry, and Ludd in the shadow of a juniper tree.

This is California Condor E3 hanging out and preening at Mather Point. In the 1980s there were fewer than 30 Condors left in the world. All were brought into captivity to the LA Zoo and the San Diego Wild Animal Park. There are now over 500 birds, about half of which are in the wild. The Grand Canyon flock numbers around 100 birds. The ranger is holding a hand puppet used to feed condor chicks in captivity to prevent them from imprinting on their human handlers.

E3 was born May 23, 2006 at the LA Zoo. Its mate is tagged J1 and they have produced 4 offspring.

Alberio taken at the Grand Canyon Star Party June 16, 2023 with a Cannon digital camera through a C-16 scope.

Sherry Martinez

M101 Before and After - Supernova SN 2023ixf

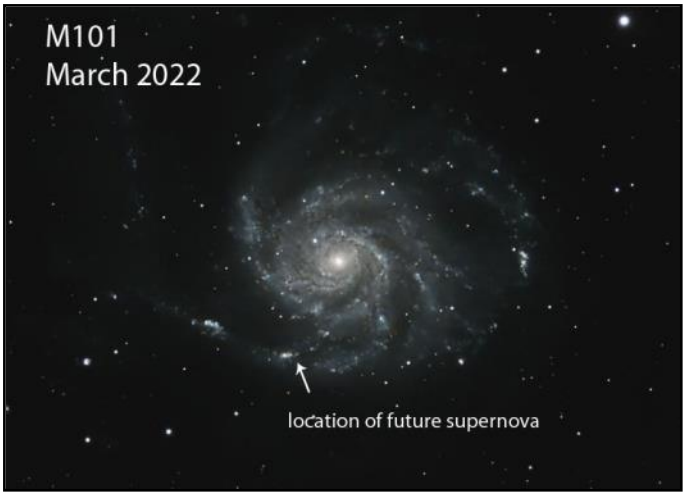
M101 (also known as the Pinwheel Galaxy) is near the constellation of Ursa Major and is about 21 million light years from earth. Supernovas happen when a star exhausts its nuclear fuel supply then collapses and explodes at the end of its life. SN2023ixf was first reported by Koichi Itagaki on May 19, 2023.

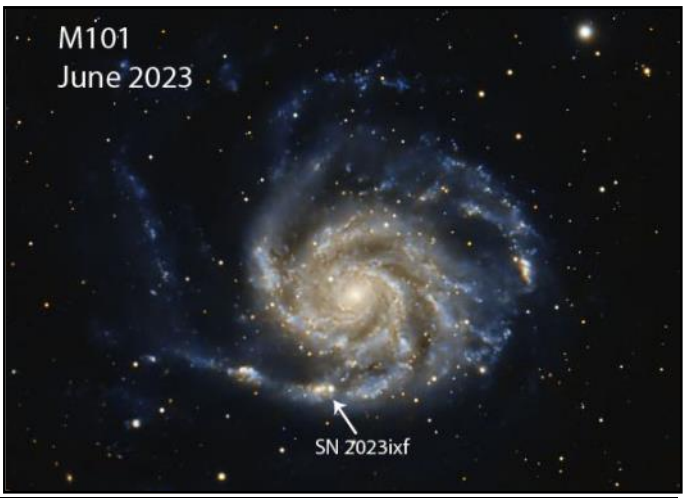
Mike's image of M101 is from March 2022, captured at GMARS. He used his William Optics Grand Torismo 81 (focal length 384 mm with the flattener/reducer) telescope with an IDAS NGS filter and a ZWO ASI2600 MC camera. He captured about 2.4 hours of images.

My image of M101 is from June 2023 captured at GMARS. I used my William Optics RedCat 51 telescope (focal length 250mm) with a L-Pro filter and a ZWO ASI2600 MC camera. I captured about 11.3 hours of images.

For some interesting information on SN 2023ixf go to https://www.space.com/new-supernova-pinwheel-galaxy-livestream-may-2023

Mike and Sharol Carter





Venus and the Beehive Cluster.

Here is my image of Venus and the Beehive cluster, taken at the Grand Canyon Star Party, with some of the camera noise removed.

It was taken Monday, June 12, at 2032 hrs. It shows Venus shining brightly through and illuminating some thin clouds to the west of the Grand Canyon, along with the Beehive Cluster. Over the course of the week, Venus appeared to move up relative to the Beehive since Venus was more or less fixed relative to the Sun while the Beehive was setting earlier each day by about four minutes with the rest of the sky. This image was captured within about 24 hours of the conjunction (the nearest approach) of these two objects.

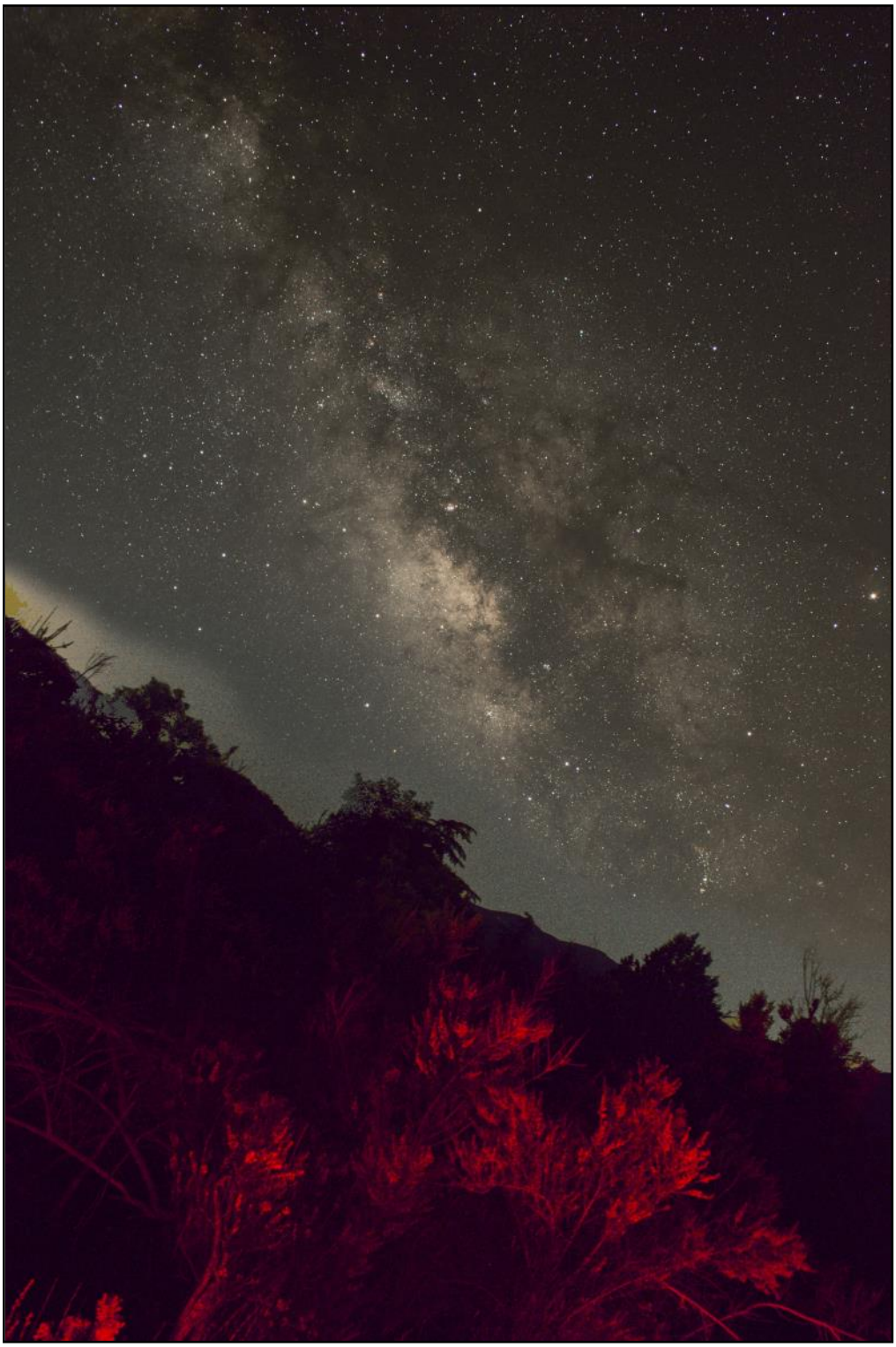
Ludd Trozpek

Father's Day Weekend

The campground was full in May!! While we had alternate plans, the weather (So. Cal May gray) didn't look promising, so we stayed home. I didn't want to get shut out in June, so we booked the weekend early, especially given the weekend was Father's Day. The week before the new moon in June the weather forecast was bouncing all over the place – cloudy, rainy, sunny, repeat – depending on what hour of the day we looked at the forecast. One member of our group had booked Thursday in addition to the weekend so we took a chance and extended our stay from Thursday also. Not unexpectedly, Thursday was not a good evening, but Friday and Saturday nights were.

In order to clean up cabling and untether from the telescope and mount, I added a mini-computer, power box, and router to the setup. During the winter I can now sit inside in the warmth and still monitor how data collection is going. But, before heading out to the dark site, the system needed testing. So the first image is just the target I used to make sure everything was working correctly. M13, the Great Globular Cluster, is a globular cluster of several hundred thousand, gravitationally bound stars in Hercules about 22,000 light years away. You may recognize that I've taken this image several times in the past, but it is bright and high in the sky, so a good target for testing. Globular clusters are very old with M13 clocking in at about 11.6 billion years, only about 2 billion years younger than the Milky Way. Shot on June 6, the image was taken over only 15 minutes. Six frames through red, green, and blue filters, and 12 through the luminance filter, with only dark frames and bias frames used for calibration. Minimal processing was done in PixInsight. The short story, at home, everything worked!

At the dark site, I had two rigs running, so two pictures were taken over the weekend. First up is a composite of the Milky Way over Mount Palomar. Intending the shots to be made into an animation, over 500 30-second shots were taken using a Canon D80 on a Sky-Watcher Star Adventurer tracker Friday and Saturday nights, although only the shots from Friday night were used. Stacking was done using Sequator which allows me to freeze the foreground and stack the sky. Final processing was done in Photoshop to clean up the yellow bias, darken the sky, and brighten the stars. Since the camera lens is not optimized for star photos, don't look too closely at the image, especially in the corners!



The main event for June was an emission/reflection region near the Lagoon Nebula in Sagittarius. The area includes NGC 6559, IC 4685, IC 1274, IC 1275, and Barnard 303. NGC 6559 is the bright reflection region at the bottom just left of center of the image with what appears to be a bow shock on its western edge. The pinkish region above and to the right of it is IC 4685 with the serpentine dark nebula Barnard 303 snaking between the two. Some refer to Barnard 303 as the Chinese Dragon due to its snake-like appearance. IC 1274 is the circular emission nebula toward the top of the image, which I think looks like the head of a Chinese dragon, or perhaps a Chinese lion. The round emission region below and left of IC 1274 is IC 1275. The entire region is part of a molecular cloud that is spawning new stars that are buried within the pinkish areas, the pink color being a result of both emission from the new star's UV radiation and reflection of the starlight from dust within the cloud. Located north of the spout of the Teapot asterism in Sagittarius, these nebulae are all about 5000 light years away.

The image is a LRGB composition of about 11.5 hours of 4 minute exposures. Seventy were taken through the luminance filter, 35 through the red and green filters, and 33 through the blue filter. Twenty one flat and dark flat frames were taken through each filter and, since I didn't have 4-minute dark frames, I used 21 5-minute dark frames scaled with 200 bias frames. Calibration, stacking and processing of the frames was done in Pixinsight. The stacked red, green, and blue calibrated frames were first combined and the stars separated from the nebula and background. The star and nebula frames were stretched separately, to avoid blowing out and bloating the stars, and then recombined. The calibrated luminance stack was treated similarly. Both RGB and luminance frames had noise removed before being combined into the LRGB image. A little further contrast enhancement was done to help pull out some details.

We've already booked our campsite for July, so until next month, clear skies!

Ron Ugolick

https://www.astrobin.com/users/ruccdu/

NASA Night Sky Notes July 2023

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

Find A Ball of Stars – M55

Linda Shore, Ed.D

French astronomer Charles Messier cataloged over 100 fuzzy spots in the night sky in the 18th century while searching for comets – smudges that didn't move past the background stars so couldn't be comets. Too faint to be clearly seen using telescopes of the era, these objects were later identified as nebulas, distant galaxies, and star clusters as optics improved. Messier traveled the world to make his observations, assembling the descriptions and locations of all the objects he found in his *Catalog of Nebulae and Star Clusters*. Messier's work was critical to astronomers who came after him who relied on his catalog to study these little mysteries in the night sky, and not mistake them for comets.

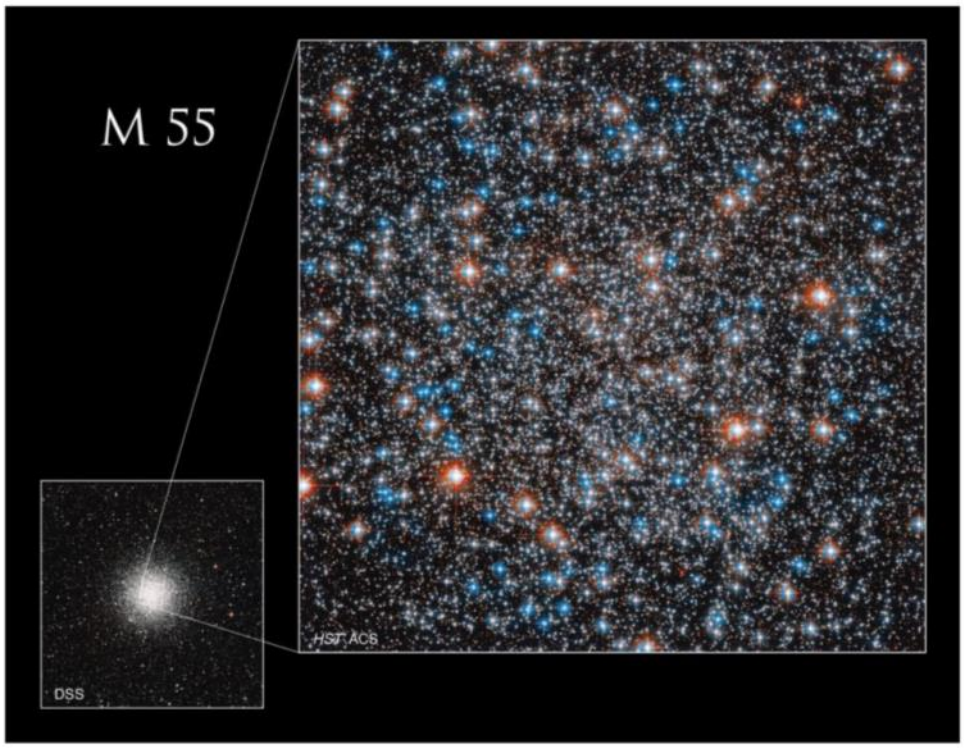
Most easily spotted from the Southern Hemisphere, this "faint fuzzy" was first cataloged by another French astronomer, Nicholas Louis de Lacaille in 1752 from Southern Africa. After searching many years in vain through the atmospheric haze and light pollution of Paris, Charles Messier finally added it to his catalog in July of 1778. Identified as **Messier 55 (M55)**, this large, diffuse object can be hard to distinguish unless it's well above the horizon and viewed far from city lights.

But July is great month for getting your own glimpse of M55 – especially if you live in the southern half of the US (or south of 39°N latitude). Also known as the "Summer Rose Star," M55 will reach its highest point in northern hemisphere skies in mid-July. Looking towards the south with a pair of binoculars well after sunset, search for a dim (mag 6.3) cluster of stars below the handle of the "teapot" of the constellation Sagittarius. This loose collection of stars appears about 2/3 as large as the full Moon. A small telescope may resolve the individual stars, but M55 lacks the dense core of stars found in most globular clusters. With binoculars, let your eyes wander the "steam" coming from the teapot-shaped Sagittarius (actually the plane of the Milky Way Galaxy) to find many more nebulas and clusters.

As optics improved, this fuzzy patch was discovered to be a globular cluster of over 100,000 stars that formed more than 12 billion years ago, early in the history of the Universe. Located 20,000 light years from Earth, this ball of ancient stars has a diameter of 100 light years. Recently, NASA released a magnificent image of M55 from the Hubble Space Telescope, revealing just a small portion of the larger cluster. This is an image that Charles Messier could only dream of and would have marveled at! By observing high above the Earth's atmosphere, Hubble reveals stars inside the cluster impossible to resolve from ground-based telescopes. The spectacular colors in this image correspond to the surface temperatures of the stars; red stars being cooler than the white ones; white stars being cooler than the blue ones. These stars help us learn more about the early Universe. Discover even more:
https://www.nasa.gov/feature/goddard/2023/hubble-messier-55

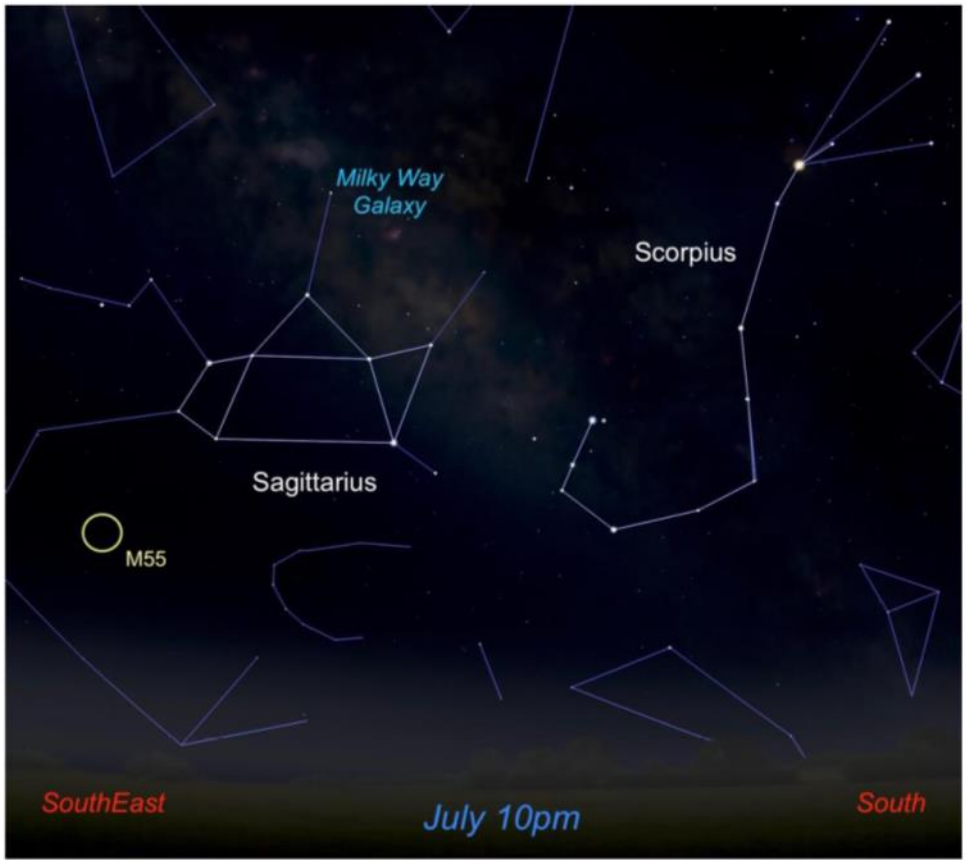
The Hubble Space Telescope has captured magnificent images of most of Messier's objects. Explore them all:
https://www.nasa.gov/content/goddard/hubble-s-messier-catalog/

NASA Night Sky Notes July 2023



The large image shows just the central portion of M55 taken by the Hubble Space Telescope. Above Earth's atmosphere, this magnificent view resolves many individual stars in this cluster. How many can you count through binoculars or a backyard telescope?

Original Image and Credits: NASA, ESA, A. Sarajedini (Florida Atlantic University), and M. Libralato (STScI, ESA, JWST); Smaller image: Digital Sky Survey; Image Processing: Gladys Kober



Look to the south in July and August to see the teapot asterism of Sagittarius. Below the handle you'll see a faint smudge of M55 through binoculars. More "faint fuzzies" can be found in the steam of the Milky Way, appearing to rise up from the kettle.

Image created with assistance from Stellarium: stellarium.org