nightwatch
Newsletter of the Pomona Valley Amateur Astronomers

The most remarkable discovery in all of astronomy is that the stars are made of atoms of the same kind as those on the earth.

Richard P. Feynman

CHECK OUT PVAAs YOUTUBE CHANNEL

Volume 45 Number 3 ***nightwatch*** **March 2025**

Club Events Calendar

Mar 14	**General Meeting 7:30 PM Carey Sublette "It's A Mess"**
Mar 29	**Star Party – Salton Sea Mecca Beach**
Apr 2	**Board Meeting 6:15 PM**
Apr 5	**Cahuilla/Joat Park in Claremont**
Apr 11	**General Meeting 7:30 PM**
Apr 26	**Star Party–GMARS**
Apr 30	**Board Meeting 6:15 PM**
May 9	**General Meeting 7:30 PM**
May 24	**Star Party – GMARS**
Jun 4	**Board Meeting 6:15 PM**
Jun 13	**General Meeting 7:30 PM**
Jun 21	**Star Party – White Mountain**
July 2	**Board Meeting 6:15 PM**
July 11	**General Meeting 7:30 PM**
July 26	**Star Party – GMARS**
July 30	**Board Meeting**
Aug 8	**General Meeting 7:30 PM**
Aug 23	**Star Party – GMARS**
Aug 27	**Board Meeting**
Sep 5	**General Meeting 7:30 PM**
Sept 20	**Star Party – GMARS**
Oct 1	**Board Meeting 6:15 PM**
Oct 10	**General Meeting 7:30 PM**
Oct 18	**Star Party – GMARS**
Oct 29	**Board Meeting 6:15 PM**
Nov 7	**General Meeting 7:30 PM**
Nov 22	**Star Party – GMARS**
Dec 3	**Board Meeting 6:15 PM**
Dec 6	**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

Board

Jim Bridgewater (2026).....	909-599-7123
Richard Wismer(2026)	
Ron Hoekwater (2025).....	909-706-7453
Howard Maculsay (2025)……	909-913-1195

Directors

Membership / Publicity....	Gary Thompson .	909-935-5509
Outreach	Jeff Schroeder	909-758-1840
Programs	Ron Hoekwater	909-391-1943

PVAA February 7th General Meeting

Matt Wedel opened the February Meeting with a thank you to Ken Elchert for sending out a 10-page Messier Marathon guide. The club is planning on meeting at the Salton Sea to try and see as many objects as possible. See our website www.pvaa.us - Star Party Maps for directions.

Ken Elchert was our first speaker of the night. He gave his monthly update on current Astronomical & Aerospace Events for Feb 7th – March 14th. The big astronomical event is the upcoming total lunar eclipse on March 13-14th. The eclipse starts at 10:00pm on the 13th and ends at 1:47am on the 14th.

Upcoming Celestial Events

This is an excellent time to view the planets.
All the planets and the Moon are visible from Feb. 21 to Feb. 25
The Moon and all the planets except Mercury are visible from Feb. 7 to Feb. 26

PST = UTC – 8 hrs
PDT = UTC – 7 hrs
PDT = PST + 1 hr

Date	Day	Visibility (LA Time)	Event	Direction	Altitude (deg)	Moon Phase/ Illumination
Feb 7	Fri	8:10 pm Not Observable	Lunar occultation of β Tauri	SSE	83.5	Waxing Gibbous 79.7%
Feb 9	Sun	11:15 am Not Observable	Lunar occultation of Mars	------	------	Waxing Gibbous 91.9%
Feb 16	Sun	7:00 pm	Venus at greatest brightness mag = -4.87	W	22	Waning Gibbous 81.2%
Feb 17	Mon	4:30 am	Moon-Spica conjunction sep = 0.3 deg	SSW	42	Waning Gibbous 78.6%
Feb 20	Thu	11:00 pm Not Observable	Moon-Antares conjunction sep = 0.4 deg	------	------	Waning Crescent 44.1%
Feb 28	Fri	10:00 pm Not Observable	Lunar occultation of Mercury	------	------	Waxing Crescent 1.9%
Mar 1	Sat	7:20 pm	Moon-Venus conjunction sep = 4.5 deg	W	10 deg	Waxing Crescent 5.9%
Mar 5	Wed	5:00 am Not Observable	Moon-Pleiades conjunction sep = 0.6 deg	------	------	Waxing Crescent 37.2%
Mar 7	Fri	9:30 pm Not Observable	Mercury at greatest elongation 18.2472 deg East of the Sun	------	------	Waxing Gibbous 66.3%
Mar 13-14	Thu-Fri	10:09 pm – 1:47 am	Total lunar eclipse	SE to SSW	50 to 58 deg	Full Moon* 100%

Lunation No. 163

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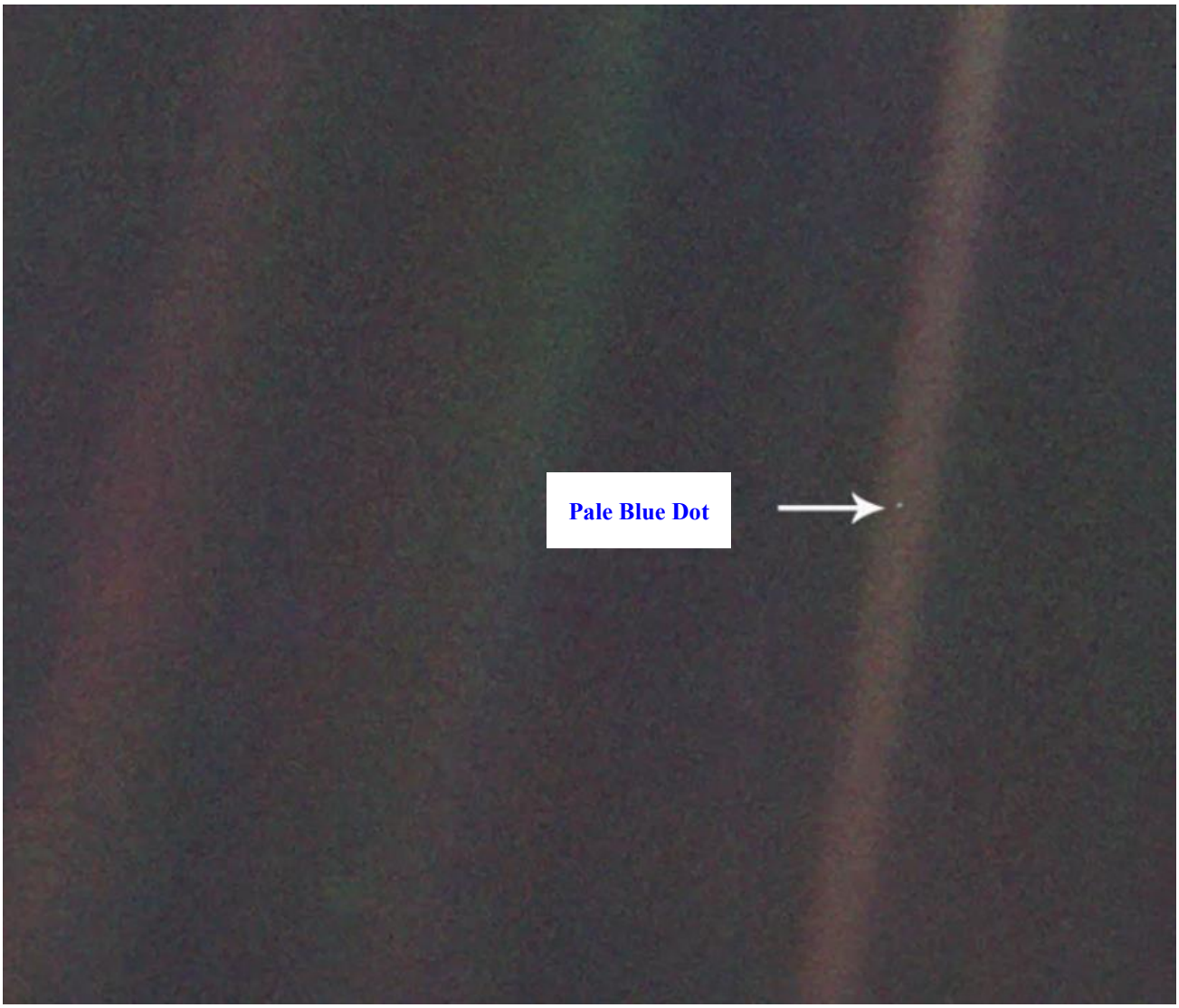
Daylight Savings Time starts at 2:00 am on March 9 – Turn clocks forward 1 hour

Asteroid 2024 YR4 has been in the news with a 1-in-43 chance of hitting Earth in 2032. (Updated from 1-in-83 chance.) Not a lot is known about this asteroid. It is estimated to be about 40 meters (130 feet) to 91 meters (300 feet) wide with a mass similar to the meteor that caused the 1908 Tunguska Event that flattened 80 million trees, or the meteor that created the Meteor Crater in Arizona.

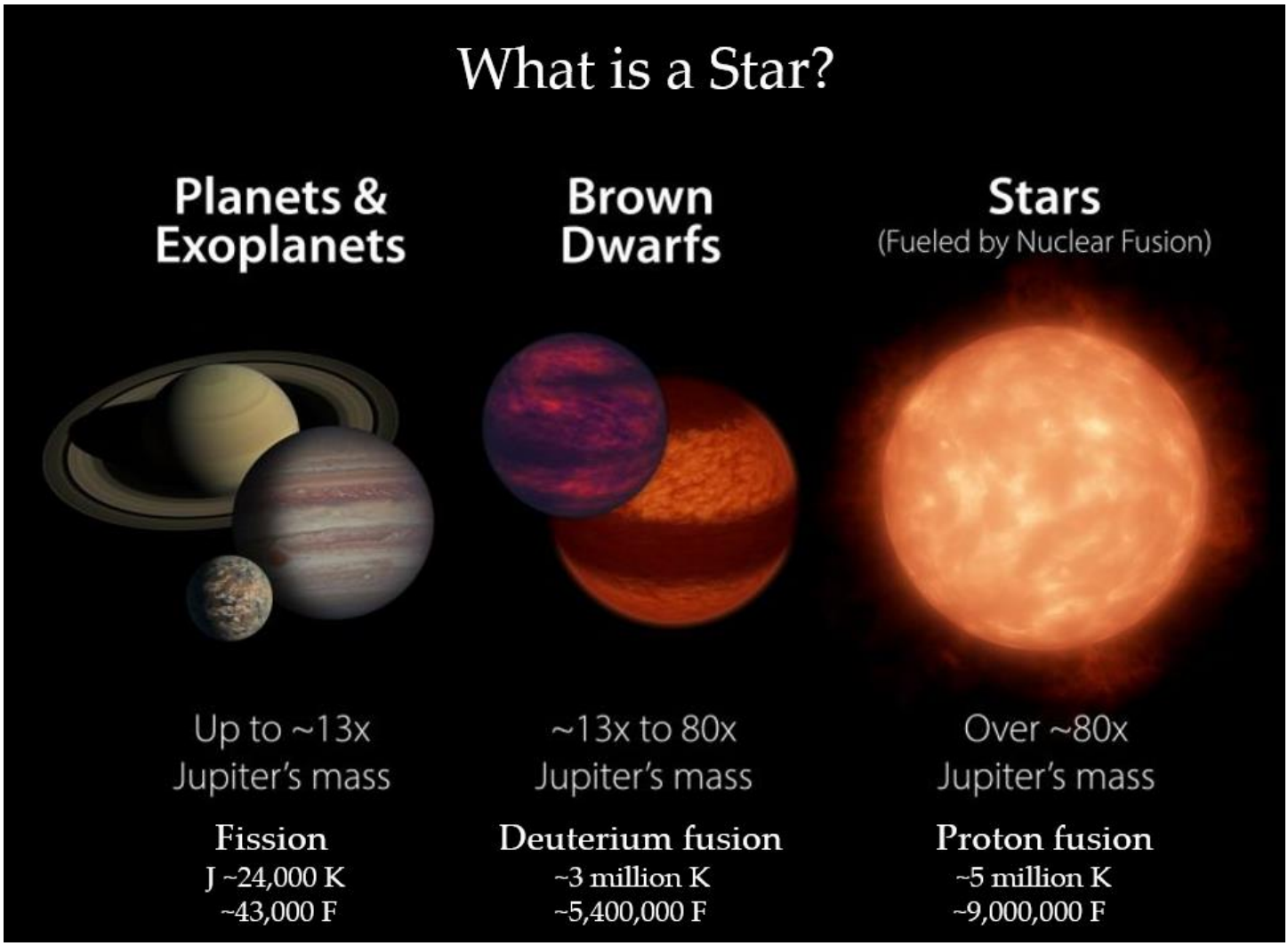
Significant Aerospace anniversaries include the 80th anniversary of the las V-2 launch from Peenemunde in 1945, the 60th anniversary of Ranger 8 hitting Mare Tranquillitatis in 1965, and the 35th for Voyager 1 taking "The Pale Blue Dot" photo in 1990.

Current upcoming space events include the Europa Clipper to make a gravity assist maneuver with Mars on March 1st. March 2nd the Blue Ghost Lander is scheduled to land at Mare Crisium on the Moon. On March 12 ESA's Hera spacecraft is to flyby Mars and its moon Deimos. It is scheduled to arrive at the Didymos – Dimorphos binary asteroid system on December 14th, 2026.

Earth from
3.7 billion miles



Tim Thompson gave the main presentation of the night titled "A Universe of Stars." Tim started out by asking "What is a star?" His slide said that Planets & Exoplanets can be up to approximately 13 times the mass of Jupiter. From about 13 to 80 times the mass of Jupiter there are Brown Dwarfs, with Stars being over 80 times Jupiter's mass. His definition of a star is anything with proton fusion, which, at a minimum, needs to be at least 80 times heavier than Jupiter. Brown dwarfs have Deuterium fusion and only get to about 3 million degrees Kelvin, while proton fusion starts at about 5 million K.



Big Deal #1: While many will say that our sun is an "average star", it is actually bigger than 95% of other stars. Tim then talked about sunspots, and solar eclipses. He asked "If you have never been to a solar eclipse: Why not? And what is holding you back?" He urged everyone to go to a total solar eclipse. "It is not something you see. – It is something you experience." Coronal Mass Ejections (CMEs) leave the sun and can reach the earth. They can cause havoc with electrical grids and satellites.

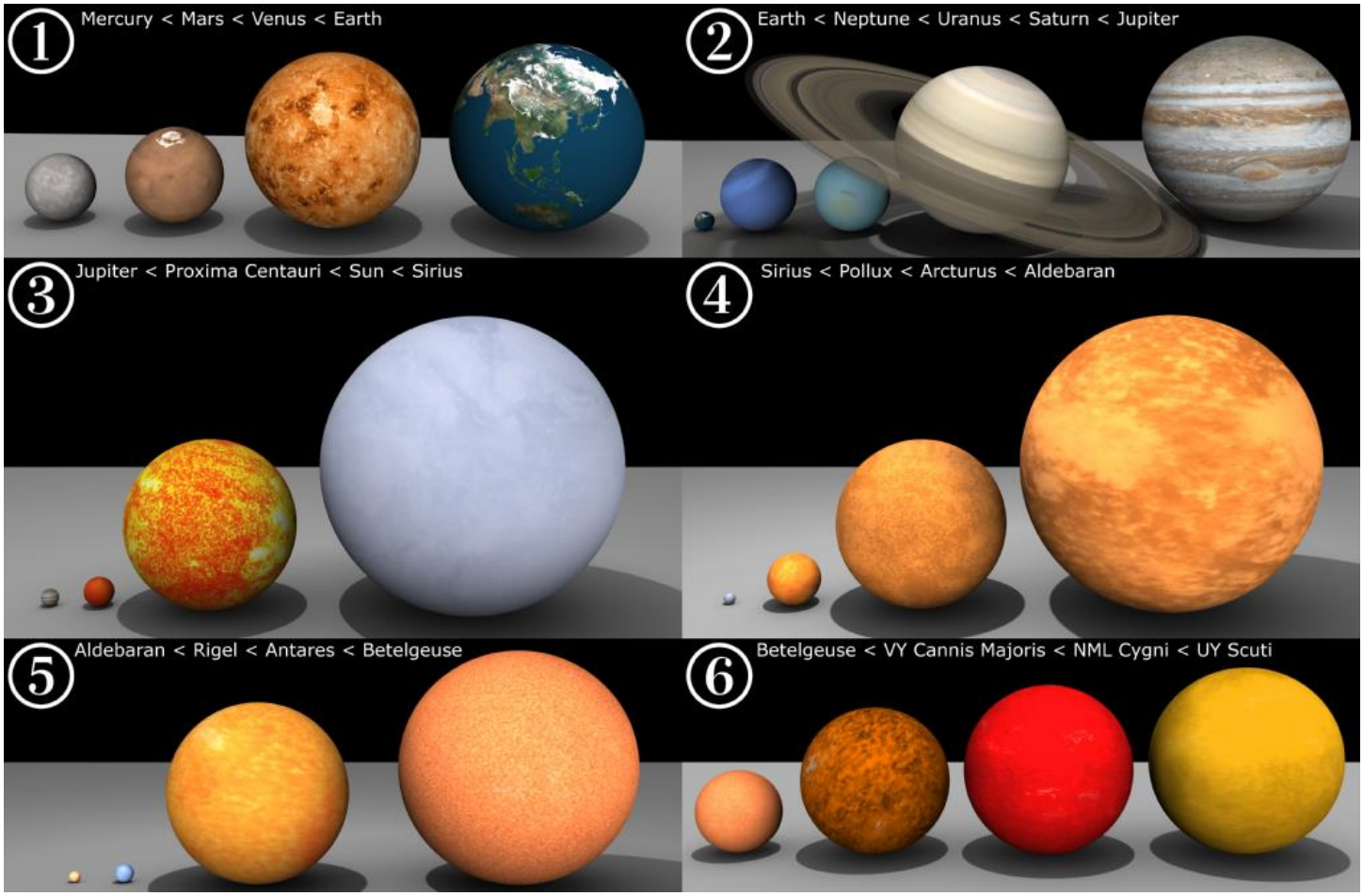
The sun's surface is called the photosphere. Its density is about the equivalent of the earth's atmosphere, an altitude of 50 miles. Then comes the Convective Zone which has a density of our air at sea level. The density gradually increases into the Radiative Zone. Then comes the Core, where it is dense enough to have fusion. At the core it has a pressure of 14.7 million pounds per square inch.

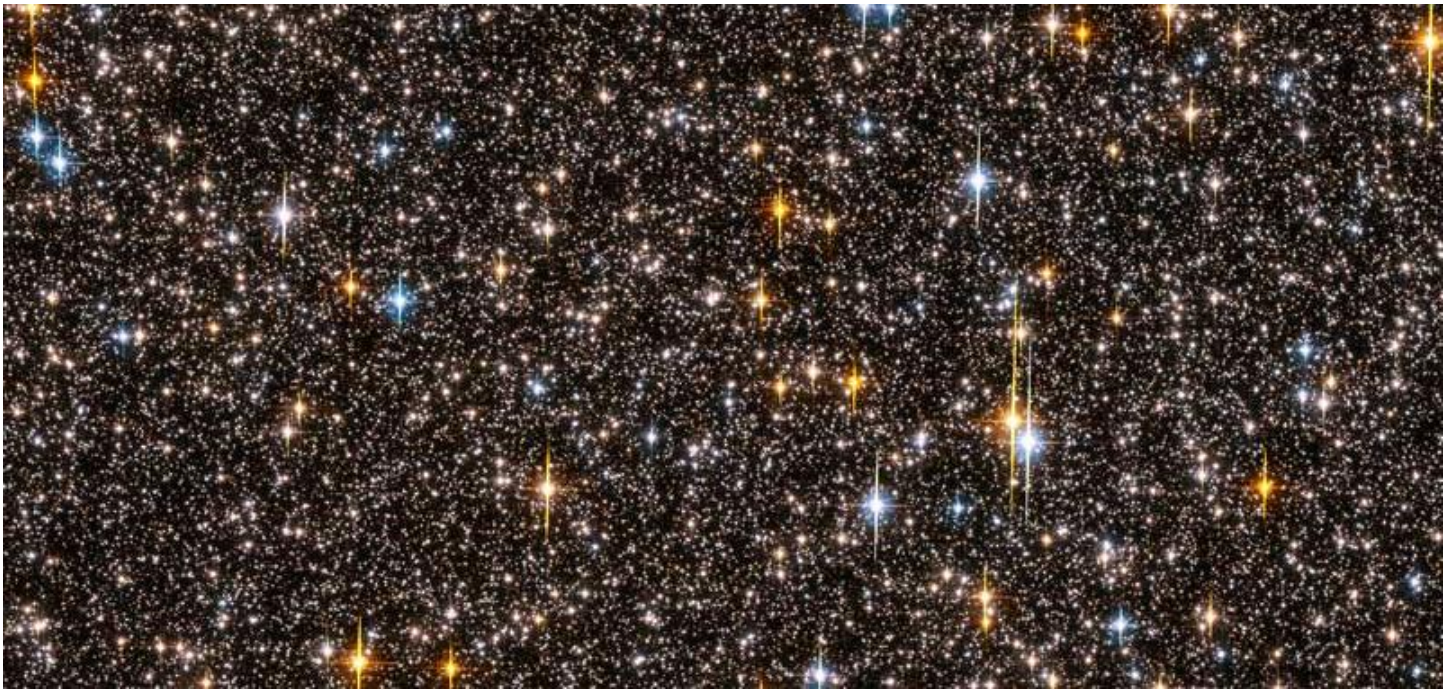
Big Deal #2: The proton-proton fusion cycle can take 8 billion years. This determines stellar lifetimes via slow reaction rate and radiation pressure. While our sun is bigger than most stars, there are massive stars that make the sun look puny. The largest found so far is bigger than the orbit of Jupiter, going out to almost the orbit of Saturn!

Big Deal #3: Everything we know about stars is derived from the light we see. Astronomy is the ultimate remote sensing science. Stars have brightness and color, but their light is all we get. From the color of the star, we can tell how hot it is. Using a spectrograph, we can tell what elements are in the stars.

Our sun, like all stars, is going through its evolution. Right now, it is known as a “main sequence” star but will eventually become a red giant in about 5 billion years, followed by ending up as a white dwarf in 6 billion years.

Gary Thompson



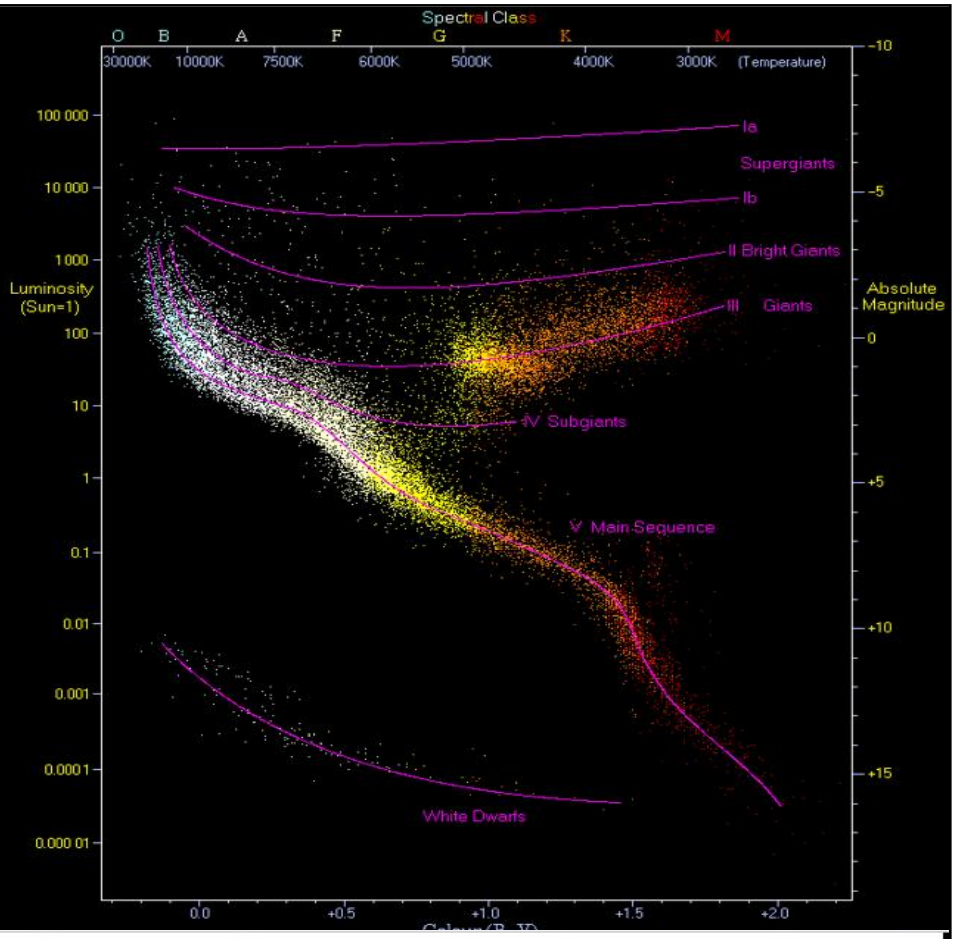


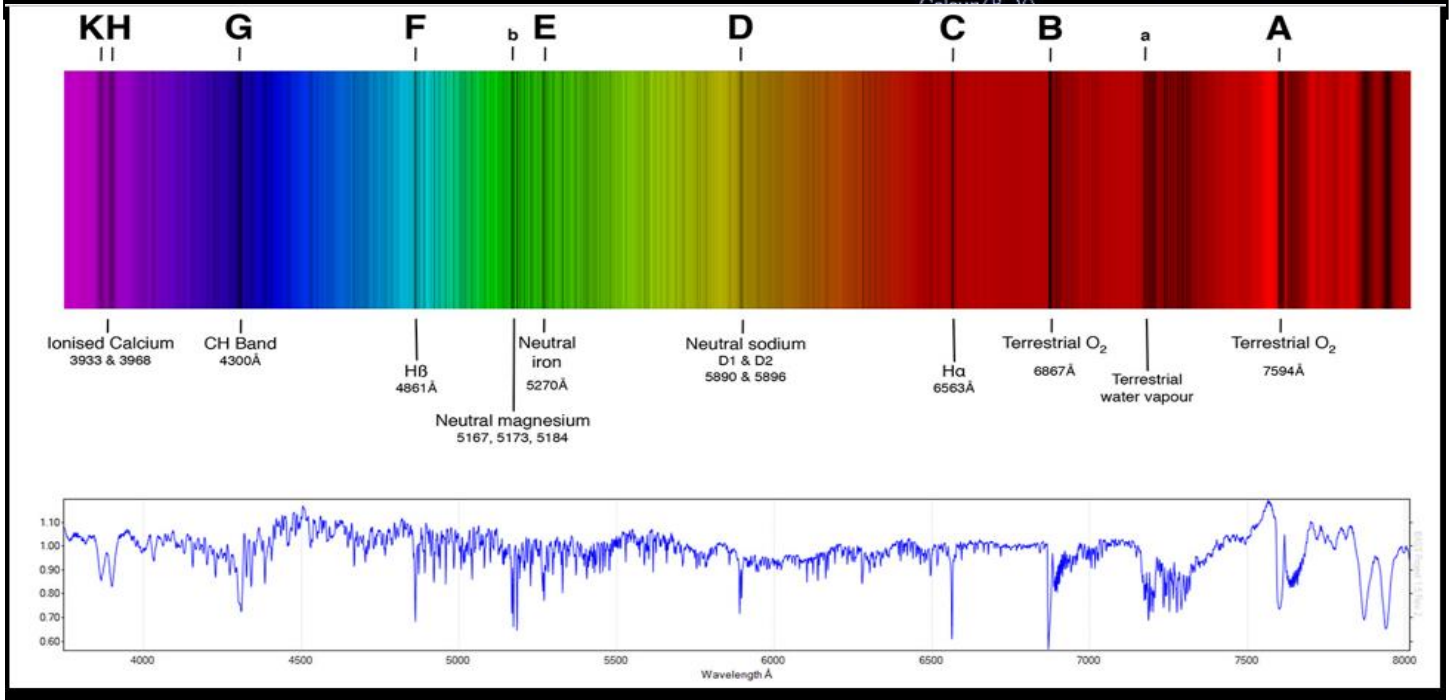
Hertzsprung-Russell or Color Magnitude Diagram (CMD)

22,000 stars from the Hipparcos Catalog
1,000 low luminosity stars from the Gliese catalog of nearby stars

Modern usage replaces the temperature with the B-V color index
B = 0.442μ
V = 0.540μ
UBV or Johnson photometric system

Diagram by Richard Powell, Atlas of the Universe





The Solar Spectrum showing the Fraunhofer lines

William Wollaston [1766-1828] was the first observe the solar spectrum (1802).
Joseph von Fraunhofer [1787-1826] expanded greatly on Wollaston's earlier discovery (1814).

Three Galaxies and a LOOOONG Exposure

New moon weekend just passed. Initially, it looked promising that Feb. 27 to Mar. 2 would be clear. Unfortunately, the outlook deteriorated as the weekend got closer, so once again, we didn't head to the dark site. But the week before was nice so I set up the equipment in the backyard again.

The target this month was difficult to decide on. Galaxy season is just getting started, but there are still a few larger nebulae to focus on. Most of them I've attempted in the past, so while looking through a file of targets, I ran across this interesting trio of galaxies. It was more difficult to capture than I had anticipated and using a longer focal length might have made it easier. Once I got started, though, I was committed. Total exposure time spent was over 50 hours, the most time I've spent on a single target, taken from Feb. 21 to Feb. 26.

There are two images provided this month, one is the "out of camera", full-sized version of the galaxy trio and a crop of the galaxies of interest. The main galaxy, the face-on spiral, is NGC 2805 located in Ursa Major. There appears to be some dispute about its distance, but the most likely distance is about 88 million light years. The larger, edge-on galaxy northeast of NGC 2805 is NGC 2820, about 90 million light years away, placing it relatively near to the former. The smaller edge-on galaxy is NGC 2814 located about 81 million light years away, placing it also in the same vicinity. If you're sharp-eyed, you will have noticed something odd about NGC 2820. There is a small smudge, yet another galaxy in the group, IC 2458. It's a small irregular galaxy about 80 million light years away. This group of galaxies is known as Holmberg 128, which is a list of double and multiple galaxies. I had hoped to get more definition in the outer northeastern arm of NGC 2805, but under the bright LA skies, this was all I could do. Please spend some time looking closely in the background of the pictures to see lots of tiny galaxies.

The two photos are LRGB images taken through a 120mm SkyWatcher triplet refractor with a ZWO ASI294MM Pro monochrome camera operating at -10C and Astrodon filters. NINA sequence control software was used to take individual exposures of 300s each with 4 luminance frames taken for each RGB frame. A total of 614 unguided exposures were made totaling 51 hours and 10 minutes of data. There were 349 luminance frames, 91 red frames, 90 green frames, and 84 blue frames used. Each of the frames was calibrated with 15 dark, 15 flat, and 15 flat dark frames which took 7 hours to calibrate and stack. Processing was done completely in PixInsight treating the luminance and color frames separately. The general workflow was to remove blur and noise, color correct the RGB image, separate the stars from the background, and stretch all four of the starless and star images before recombining them. The color was then added to the luminance detail and final contrast enhancements were added. I hope you enjoy the images.

Hopefully, we will get under dark skies again soon. Clear skies until next time.

Ron Ugolick

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

NASA Night Sky Notes March 2025

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!

March's Night Sky Notes: Messier Madness

By Kat Troche

March is the start of spring in the Northern Hemisphere; with that, the hunt for Messier objects can begin!

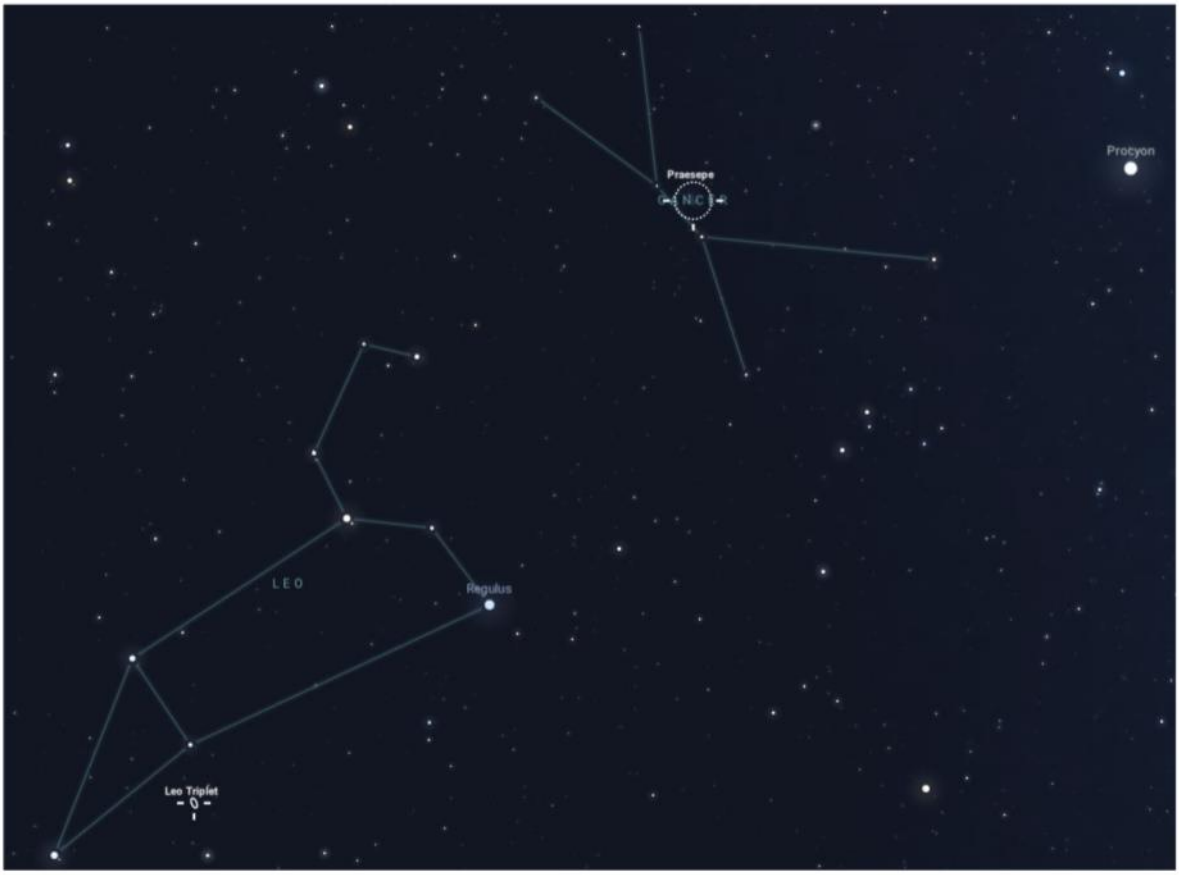
Showing a large portion of M66, this Hubble photo is a composite of images obtained at visible and infrared wavelengths. The images have been combined to represent the real colors of the galaxy. Credit: NASA, ESA and the Hubble Heritage (STScI/AURA)-ESA/Hubble Collaboration; Acknowledgment: Davide De Martin and Robert Gendler

What Are Messier Objects?

During the 18th century, astronomer and comet hunter Charles Messier wanted to distinguish the 'faint fuzzies' he observed from any potential new comets. As a result, Messier cataloged 110 objects in the night sky, ranging from star clusters to galaxies to nebulae. These items are

designated by the letter **'M'** and a number. For example, the Orion Nebula is Messier 42 or **M42**, and the Pleiades are Messier 45 or **M45**. These are among the brightest 'faint fuzzies' we can see with modest backyard telescopes and some even with our eyes.

Stargazers can catalog these items on evenings closest to the new moon. Some even go as far as having "Messier Marathons," setting up their telescopes and binoculars in the darkest skies available to them, from sundown to sunrise, to catch as many as possible. Here are some items to look for this season:



M44 in Cancer and M65 and 66 in Leo can be seen high in the evening sky 60 minutes after sunset. Credit: Stellarium Web

Messier 44 **in Cancer:** The Beehive Cluster, also known as Praesepe, is an open star cluster in the heart of the Cancer constellation. Use Pollux in Gemini and Regulus in Leo as guide stars. A pair of binoculars is enough to view this and other open star clusters. If you have a telescope handy, pay a visit two of the three galaxies that form the Leo Triplet - **M65** and **M66**. These items can be seen one hour after sunset in dark skies.

NASA Night Sky Notes March 2025

Locate M3 and M87 rising in the east after midnight. Credit: Stellarium Web

Messier 3 Canes Venatici: M3 is a globular cluster of 500,000 stars. Through a telescope, this object looks like a fuzzy sparkly ball. You can resolve this cluster in an 8-inch telescope in moderate dark skies. You can find this star cluster by using the star Arcturus in the Boötes constellation as a guide.

Messier 87 in Virgo: Located just outside of Markarian's Chain, M87 is an elliptical galaxy that can be spotted during the late evening hours. While it is not possible to view the supermassive black hole at the core of this galaxy, you can see M87 and several other Messier-labeled galaxies in the Virgo Cluster using a medium-sized telescope.

Locate M76 and M31 setting in the west, 60 minutes after sunset. Credit: Stellarium Web

Messier 76 in Perseus: For a challenge, spot the Little Dumbbell Nebula, a planetary nebula between the Perseus and Cassiopeia constellations. With an apparent magnitude of 12.0, you will need a large telescope and dark skies. You can find both M76 and the famous Andromeda Galaxy (M31) one hour after sunset, but only for a limited time, as these objects disappear after April. They will reappear in the late-night sky by September.

Plan Ahead

When gearing up for a long stargazing session, there are several things to remember, such as equipment, location, and provisions:

- **Do you have enough layers to be outdoors for several hours?** You would be surprised how cold it can get when sitting or standing still behind a telescope!
- **Are your batteries fully charged?** If your telescope runs on power, be sure to charge everything before you leave home and pack any additional batteries for your cell phone. Most people use their mobile devices for astronomy apps, so their batteries may deplete faster. Cold weather can also impact battery life.

- Determine the **apparent magnitude** of what you are trying to see and the **limiting magnitude** of your night sky. You can learn more about apparent and limiting magnitudes with our Check Your Sky Quality with Orion article.
- When choosing a location to observe from, select an area you are familiar with and bring some friends! You can also **connect with your local astronomy club** to see if they are hosting any Messier Marathons. It's always great to share the stars!

You can see all 110 items and their locations with NASA's Explore the Night Sky interactive map and the Hubble Messier Catalog, objects that have been imaged by the Hubble Space Telescope.