



FEBRUARY 2024

NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

ERIKA HAMDEN – SPEAKER AT THE FEBRUARY HAC MEETING

Title: " Observing the Universe in the Ultraviolet"

Prof. Hamden is a telescope builder, with a focus on UV astronomy and developing new detector technology. She will describe why the UV is so interesting scientifically and why is it criminally understudied. She will also discuss her own work on several different UV missions in development, including FIREBall-2 and Aspera.



WELCOME OUR NEW MEMBERS

Jim McGee joined the club in January. Jim is a long-time amateur astronomer who currently resides in Japan where he works for the US Army. He is considering locating here when he returns to the States.

Several new members joined the club at the January meeting: we welcome Frank and Carol Durham of Benson AZ, Wyatt Christiansen with family members Ricky O'Bryan, Joanna, Faith, Luke, and Zachary, of Sierra Vista, Thomas Armstrong of Sierra Vista and Mark Eby of Sierra Vista.

Joining HAC this month are Michael and Shirley Borland of Benson AZ. Welcome to all – we are glad you joined.

WELL DONE, VINCE!

Congratulations are in order for HAC member Vince Sempronio. On 26 June 2023, Vince, observing near Kartchner Caverns State Park, and David Oesper observing near Tucson, recorded an occultation of the 12.2-magnitude star Tycho 5134-1820-1 in the constellation Aquila by the 15.1-magnitude asteroid 1330 Spiridonia. They each

detected a somewhat different event. After expert analysis by David Gault and David Herald in Australia, it was determined that they had discovered a new double star!

Vince will give us a short recap of the discovery at a future meeting and will be collaborating with Oesper to write a paper about the discovery for a peer reviewed journal.

2024 DUES

Most HAC memberships expire each December. If you have already paid your 2024 dues, thank you. If you still need to pay, there are several options.

1. You can pay your dues in person by cash or check made out to Huachuca Astronomy Club. See the treasurer, Ted Forte, at a meeting or event.
2. You can mail your dues check to the Huachuca Astronomy Club PO Box 922, Sierra Vista AZ 85636
3. You can pay online by visiting www.hacastronomy.org and pulling down the membership menu. You'll be directed to Pay Pal where you can use your Pay Pal account OR your credit card.
4. If you have a Pay Pal account, you can use PayPal Direct to send your payment to paypal@hacastronomy.org
5. If you have a Zelle account with your bank, you can make a dues payment by transferring funds to twforte@powerc.net

If you are unsure of your dues status, contact the treasurer, Ted Forte by email tedforte511@gmail.com.

MEETING NOTE

Renovation should be complete and we should be back in our regular room, A102, Downtown Campus, 2600 E Wilcox Drive for our February 23 meeting. Watch your email, however, for a change of venue in case there are any delays with the room availability. A102 is being converted to a computer lab with terminals at every other seat. Please be respectful of the new equipment.

Our meetings have shifted to later in the month because our formula is to schedule meetings for the Friday closest to full moon.

SOLAR SATURDAY

In January we began a solar observing event at the Sierra Vista Library that we will conduct from 10 am to noon every second Saturday of the month. The January event was very well received. Weather permitting, you are invited to set up your solar telescope (or just come joins us without a scope) on February 10 at 10 a.m.

PATTERSON OBSERVATORY ACCESS

There is still no access to the back of the observatory. The only path is reserved for construction and emergency access. This will be the case for the foreseeable future apparently. The foundation will eventually build an access road, but that could be more than a year in the future.

We greatly appreciate the patience and cooperation of our volunteers participating at Patterson events. Please know that alleviating the inconvenience is very high on the list for the foundation leadership, but a number of business considerations are complicating the matter.

SAGUARO NATIONAL PARK IS THE NEWEST URBAN NIGHT SKY PLACE

BY MARK ORVEK

As all of us know, dark skies are becoming more difficult to find. It is estimated there has been a 400% increase in lighting up the night sky in the last 25 years. The loss of dark skies in being recognition across the world. According to The University of Arizona, light pollution is negatively impacting the reproductive health of animals, the life cycle of plants and even humans.

Fortunately an organization known as Dark Sky International (darksky.org) is leading the effort to reduce light pollution across the globe. And, Arizona is leading the world in designating dark sky locations in our state. As of November 2023, Saguaro National Park has been named an Urban Night Sky Place due to Tucson's first-ever "ordinance to address light pollution for space observation".

The nine Urban Night Sky Places:

- Saguaro National Park - Tucson, US
- Timpanogos Cave National Monument - Utah, US
- Fry Family Park - Ohio, US
- Stacy Park - Missouri, US
- Palos Preserves - Illinois, US
- Valle de Oro National Wildlife Refuge - New Mexico, US
- Joy-La Barreta Ecological Park - Mexico
- Minami-Rokuroshi - Japan
- Parc du Mont-Bellevue – Canada

Arizona Dark Sky Places:

- Flagstaff
- Sedona

- Big Park
- Cottonwood
- Fountain Hills
- Thunder Mountain Pootseev Nightsky

Arizona Dark Sky Parks:

- Chiricahua National Monument
- Grand Canyon National Park
- Kartchner Caverns State Park
- Oracle State Park
- Parashant National Monument
- Pipe Spring National Monument
- Petrified Forest National Park
- Sunset Crater Volcano National Monument
- Tumacácori National Historical Park
- Tonto National Monument
- Walnut Canyon National Monument
- Wupatki National Monument

Read the published article at <https://www.thetravel.com/see-stars-at-saguaro-national-park-arizona/>

NARROW BAND IMAGING

BY LEONARD AMBURGEY

Over the past couple of years there has been a lot of discussion about Narrow Band Imaging with the advent of lesser priced cameras and development of one-shot color cameras (OSC). It has turned out to be a method for urban astrophotographers to participate in near, or at their homes. The narrow band filters pretty much removed substantial light pollution and opens imaging under a bright moon. Narrow band filters do require software to enhance their value. These are referred to as 'false color images' not because they are 'fake' but because they generally processed by the wavelength of the narrow band imaged in. That palette is often more colorful or colored very differently than your eye would expect. In all these images the 'greyscale image' is processed by the spectral color of the narrow band element.

This is a very complicated subject, explained as best I can:

Normally, any color image is made up of 3 greyscale images one for each color (R, G, B) They are combined to make a color image. They need to be processed and at least set a 'white point.' No matter what, they are enhanced (not just color balance) most astronomical images for amateurs have very soft color so enhancement, possibly 'saturation' and 'curves.' The background needs to be balanced etc. The OSC camera does not require 3 greyscale images it has matrix of pixels such as: filtered R,G,G,B The data is converted to a color under those filters (debayer). It is much like a regular digital camera to a point.

With narrow band images the light from what object imaged is pre- filtered to generally Ha and Oiii to the OSC camera. These data to make make a color image it requires a third

image. Which the software manipulates the G,G data to make a 'synthetic green'. How that is manipulated in the final images determines which of the elements are emphasized, and to what degree.



The first image is the nebula with combined RGB (70 min) and HaOiii (70 min) processed as Natural RGB...



The second image is the nebula with the combined data from image 1 and then processed as Narrow Band data.

The difference between the images is obvious. But the information is very precise by the way of the mix:

The HOO process considers Ha as a constant it then allows you to show the data of the narrow band, either in Oiii or SII (which you didn't filter for)

You show the data by a change in color: I set the values for synthetic green: Sii as 1 and the Oiii as 1.7 The spectral

point on the continuum is very light blue so all the area as such is ionized Oxygen. The remaining balance color is a balance of Ha and Sii.

I have posted a very detailed explanation of what I did to the Astrophotography group. If you want more information I can either forward it to you, but it is a large file... or Mark I believe is the administrator and such interests you join the group...

THE BUCKET LIST FEBRUARY 2024

BY VINCE SEMPRONIO

This column highlights interesting non-seasonal nighttime, and sometimes daytime sky events that the reader may not be aware of and may wish to observe. I'll cover one-off events that are special, rare or uncommon.

IN THE SKY

NOTE: All times are AZ MST unless otherwise noted.

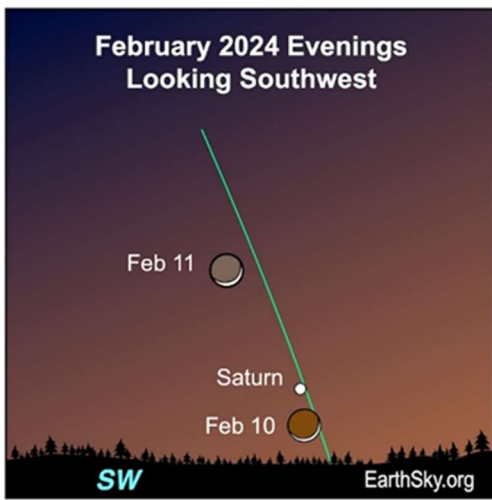
Learning the location of the brightest stars in the sky is one of the first adventures in astronomy that visual astronomers learn. Their prominence in the sky is apparent even in urban environments but in darker skies these stars shine like gemstones scattered across the filament. One of these bright stars, Spica, in the constellation Virgo, is somewhat of a loner. Its closest bright neighbor is the star Arcturus, but looking around the sky near Spica, it doesn't appear that it has many friends. Located near the ecliptic between Regulus, in Leo, and Antares in Scorpio. It is brighter than either of them, but is outshone by its closest friend, Arcturus. Spica is also a member of the "big four" lunar occultation

club. The other members are Regulus and Antares, along with the fourth star Aldebaran in Taurus. To find Spica, start by locating the Big Dipper and follow the curve of the stars in the handle away



from the bowl. Your first stop is Arcturus, and if you keep going around the imaginary curve, you will encounter Spica. On the night of the 1st of February, The Moon and Spica are separated by less than two degrees.

On the evening of February 10th, around 6:15pm, look for the Moon near the 1st magnitude Saturn low in the southwest sky. Be quick as both will set soon around 6:45pm. You'll need a very clear sky and be far enough



away from any mountains to the west to see them. Another chance is available on the 11th as shown in the diagram.

After sunset on the evening of the 23rd, look towards the east as the moon starts to rise. It will be near Regulus in Leo. The next night is the full moon, which is called the Snow Moon.

PRESIDENT'S CONSTELLATION EXPLORATION FEB 2024

Cygnus is a northern constellation on the plane of the Milky Way, deriving its name from the Latinized Greek word for swan. Cygnus is one of the most recognizable constellations of the northern summer and autumn. It was among the 48 constellations listed by the 2nd century astronomer Ptolemy, and it remains one of the 88 modern constellations.

On the evening of the 13th, just before 7pm, the Moon will occult 44 Piscium, a 5.8 magnitude star. The pair will be 30 above the western horizon. You will need a telescope to see this event.

44 Piscium is a double star with a 9th magnitude companion located 1" away. Through a telescope, you can watch as the Moon slowly approaches the star. The star will disappear suddenly, so don't blink! You can use the earth shine as a guide as to when the star is getting close to the edge. I will probably record this event since 44 Piscium is a double.



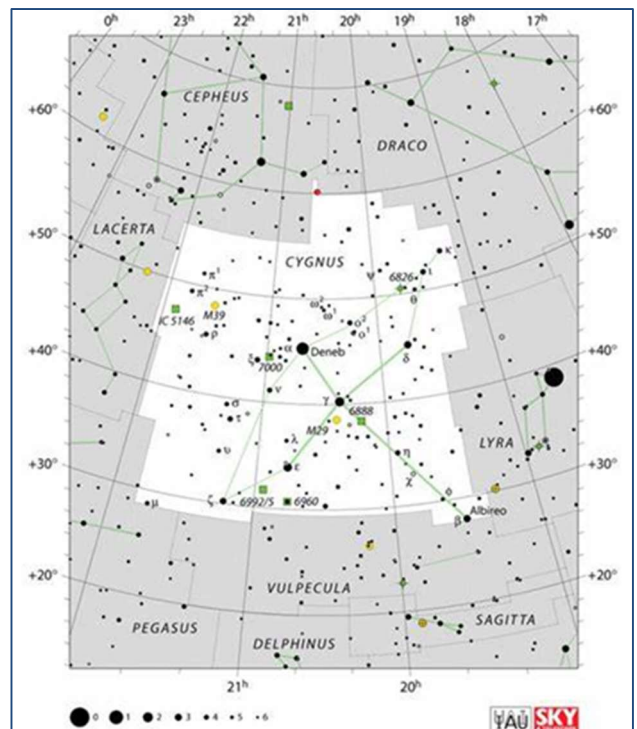
On the 14th and 15th, the Moon will be near Jupiter, always a striking pair, especially when the moon is a crescent. Look for them around 6:45pm, both nights.

Finally, we end our first half of the month with the Moon passing near the Pleiades on the evening of the 16th. The pair will be high in the sky after sunset.

On the morning of the 21st, Venus and Mars will be close enough together as to be visible in the eyepiece of some telescopes. At 38 arc minutes, their separation will be slightly larger than the apparent diameter of the Moon.



Cygnus is very large constellation bordered by Cepheus to the north and east, Draco to the north and west, Lyra to the west, Vulpecula to the south, Pegasus to the southeast and Lacerta to the east. The three-letter abbreviation for the constellation is "Cyg". It covers 804 square degrees and around 1.9% of the night sky, Cygnus ranks 16th of the 88 constellations in size.



In Greek mythology, Cygnus has been identified with several different legendary swans. Zeus disguised himself as a swan to seduce Leda, the Spartan king Tyndareus's wife, who gave birth to the Gemini twins (Helen of Troy, and Clytemnestra), Orpheus was transformed into a swan after his murder and was said to have been placed in the sky next to his lyre (Lyra); and King Cygnus was transformed into a swan.

Later Romans also associated this constellation with the tragic story of Phaethon, the son of Helios the sun god, who demanded to ride his father's sun chariot for a day. Phaethon, however, was unable to control the reins, forcing

Zeus to destroy the chariot (and Phaethon) with a thunderbolt, causing it to plummet to the earth into the river Eridanus. According to the myth, Phaethon's close friend or lover, Cygnus, grieved bitterly and spent many days diving into the river to collect Phaethon's bones to give him a proper burial. The gods were so touched by Cygnus's devotion that they turned him into a swan and placed him among the stars.

Together with other avian constellations near the summer solstice Cygnus may be a significant part of the origin of the myth of the Stymphalian Birds, one of The Twelve Labours of Hercules.

In Hinduism, the period of time (or Muhurta) between 4:24 AM to 5:12 AM is called the Brahmamuhurtha, which means "the moment of the Universe"; the star system in correlation is the Cygnus constellation. This is believed to be a highly auspicious time to meditate, do any task, or start the day.

In Polynesia, Cygnus was often recognized as a separate constellation. In Tonga it was called Tuula-lupe, and in the Tuamotus it was called Fanui-tai. In New Zealand it was called Mara-tea, in the Society Islands it was called Pirae-tea or Taurua-i-te-haapa-raa-manu, and in the Tuamotus it was called Fanui-raro.

Normally, Cygnus is depicted with Delta and Epsilon Cygni as its wings. Deneb, the brightest in the constellation is at its tail, and Albireo as the tip of its beak.

Deneb was also often a given name in the Islamic world of astronomy. The name Deneb comes from the Arabic name dhaneb, meaning "tail", from the phrase Dhanab ad-Dajājah, which means "the tail of the hen".



Cygnus as depicted in *Urania's Mirror*, a set of constellation cards published in London c.1825. Surrounding it are Lacerta, Vulpecula and Lyra.

Cygnus contains several variable stars as well as being a strong source of cosmic X-rays. The X-ray universe is unstable. It features stars being torn apart by black holes, galactic collisions, and novae, and neutron stars that build up layers of plasma that then explode into space.

There are several asterisms in Cygnus. In the 17th-century German celestial cartographer Johann Bayer's star atlas the Uranometria, Alpha, Beta and Gamma Cygni form the pole of a cross, while Delta and Epsilon form the cross beam.

The nova P Cygni was then considered to be the body of Christ.

There is an abundance of deep-sky objects, with many open clusters, nebulae of various types and supernova remnants, found in Cygnus due to its position on the Milky Way. Its molecular clouds form the apparent Cygnus Rift dark nebula constellation, which is one end of the apparent part of the apparent Great Rift along the Milky Way's



galactic plane. The rift begins around the Northern Coalsack which obscures the further away, and larger in apparent size, Cygnus molecular cloud complex which the North America Nebula is part of. The North America Nebula (NGC 7000)

is one of the most well-known nebulae in Cygnus, because it is visible to the unaided eye under dark skies, as a bright patch in the Milky Way. However, its characteristic shape is only visible in long-exposure photographs.

Cygnus is one of the constellations that the Kepler satellite surveyed in its search for exoplanets, and as a result, there are about a hundred stars in Cygnus with known planets, the most of any constellation. One of the most notable systems is the Kepler-11 system, containing six transiting planets, all within a plane of approximately one degree. It was the system with six exoplanets to be discovered.

The rich background of stars of Cygnus can make it difficult to make out the open cluster. But M39 (NGC 7092) is an open cluster 950 light-years from Earth that are visible to the unaided eye under dark skies.

Several of our HAC astrophotographers continue to photograph the wonders in Cygnus as they explore the night sky and share their images on the HAC group site. Those of us who are visual observers continue to enjoy the beauty of seeing Cygnus "fly overhead" on public nights and turn our telescopes on Albireo as example of a bright double star. Whether visual or photographically Cygnus captures our attention.



NASA NIGHT SKY NOTES FEBRUARY 2024

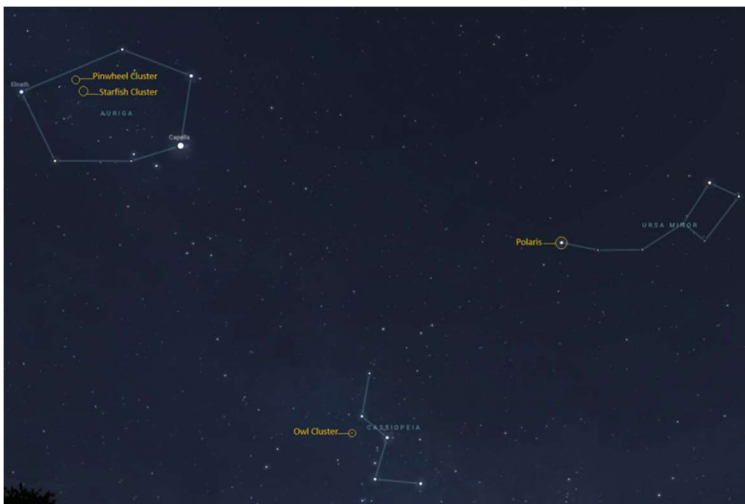
This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

CONSTANT COMPANIONS: CIRCUMPOLAR CONSTELLATIONS, PART I

BY KAT TROCHE

Winter in the northern hemisphere offers crisp, clear (and cold!) nights to stargazers, along with better views of several circumpolar constellations. What does circumpolar mean when referring to constellations? This word refers to constellations that surround the north and south celestial poles without ever falling below the horizon. Depending on your latitude, you will be able to see up to nine circumpolar constellations in the northern hemisphere. Today, we'll focus on three that have gems within: Auriga, Cassiopeia, and Ursa Minor. These objects can all be spotted with a pair of binoculars or a small to medium-sized telescope.

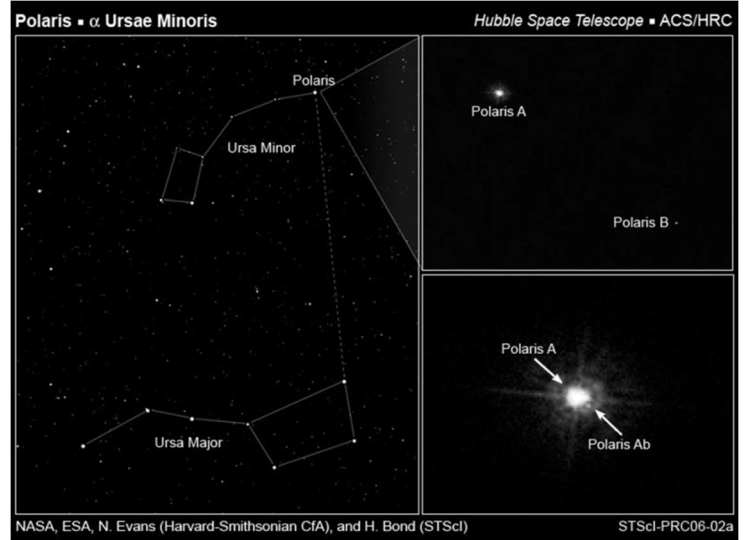


The counterclockwise circumpolar constellations Auriga, Cassiopeia, and Ursa Minor in the night sky, with four objects circled in yellow labeled: Pinwheel Cluster, Starfish Cluster, Owl Cluster, and Polaris. Credit: Stellarium Web

- **The Pinwheel Cluster:** Located near the edge of Auriga, this open star cluster is easy to spot with a pair of binoculars or small telescope. At just 25 million years old, it contains no red giant stars and looks similar to the Pleiades. To find this, draw a

line between the stars Elnath in Taurus and Menkalinan in Auriga. You will also find the Starfish Cluster nearby.

- **The Owl Cluster:** Located in the 'W' or 'M' shaped constellation Cassiopeia, is the open star cluster known as the Owl Cluster. Sometimes referred to as the E.T. Cluster or Dragonfly Cluster, this group of stars never sets below the horizon and can be spotted with binoculars or a small telescope.



A black and white image from the Hubble Telescope of the Polaris star system, showing three stars: Polaris A, Ab, and Polaris B. Credit: NASA, ESA, N. Evans (Harvard-Smithsonian CfA), and H. Bond (STScI)

- **Polaris:** Did you know that Polaris is a triple star system? Look for the North Star on the edge of Ursa Minor, and with a medium-sized telescope, you should be able to separate two of the three stars. This star is also known as a Cepheid variable star, meaning that it varies in brightness, temperature and diameter. It's the closest one of its kind to Earth, making it a great target for study and conceptual art.

Up next, catch the King of the Planets before its gone for the season with our upcoming mid-month article on the Night Sky Network page through NASA's website!

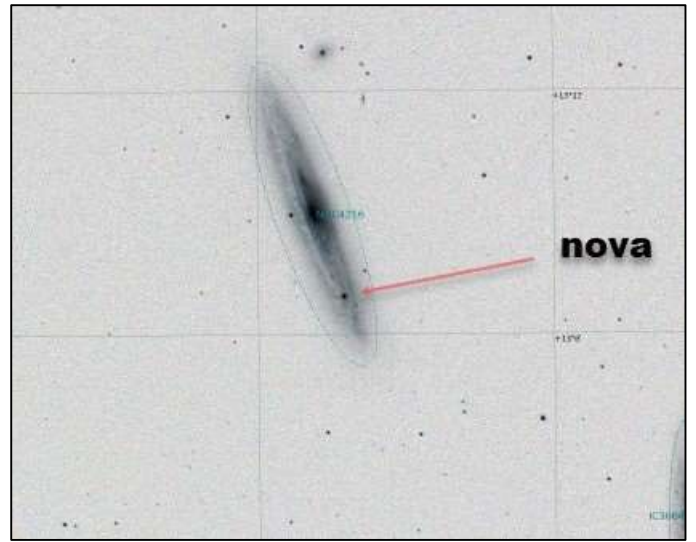
PICTURES FROM HAC ASTRO



IC 405 FLAMING STAR NEBULA BY RICHARD LIGHTHILL



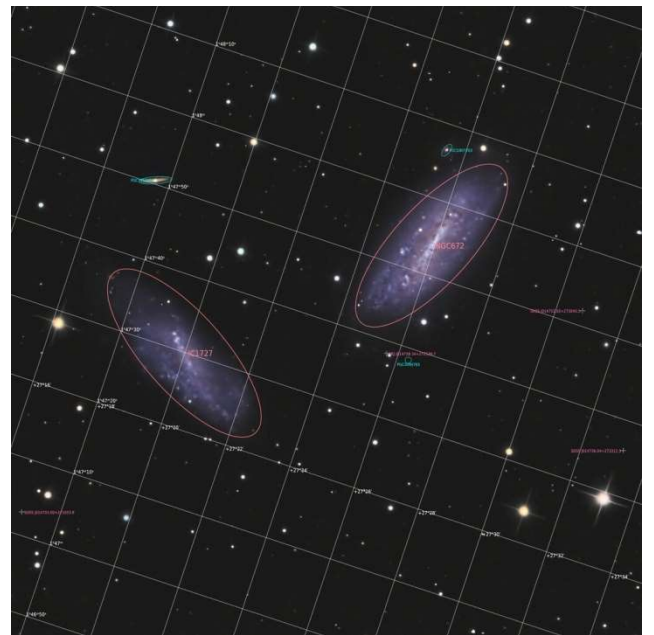
NOVA IN NGC 4126 BY LEONARD AMBURGEY



NGC 4126 NOVA DIAGRAM BY LEONARD AMBURGEY



NGC 4126 WITH (TOP) AND WITHOUT (BOTTOM) NOVA BY DAVID ROEMER



NGC 672 (RIGHT) AND IC 1727 (LEFT) BY GLEN SANNER



NGC 1232 BY GLEN SANNER



CORE OF NGC 2244 BY LEONARD AMBURGEY



M78 BY MARK ORVEK



SH2-275 (ROSETTE NEBULA) BY MARK ORVEK

FOR SALE:

Astro-Physics Mach2GTO German Equatorial Mount with GTOCP5 Control Box from the 2023 production run. Includes all of the parts shipped with the mount. I am the second owner of this mount and have not removed it from the shipping carton.

Asking \$10,500 with local pick-up.

David Kiefner, Patagonia, AZ 85624. Call with any questions you might have: (520) 264-8709.

CLUB OFFICERS AND CONTACTS

President: Penny Brondum	Vice President: Jim Reese
Secretary: Katherine Zellerbach	Treasurer: Ted Forte
Past President: David Roemer	

Board Members-at-Large

Vince Sempronio Mike Morrison Gary Grue Richard Lighthill

Nightfall Editor:	Cynthia Shomonta	cindy.jean.lund@gmail.com
Webmaster:	Ken Kirchner	
Facebook Editor:	Richard Lighthill	

Website: <http://www.hacastronomy.org>

Facebook: <http://www.facebook.com/HuachucaAstronomyClub>

Email: info@hacastronomy.org

HAC Feb / Mar Calendar of Events

SU	MO	TU	WE	TH	FR	SA
Feb 4 Antares/Moon 0.6°	5	6	7 Venus/Moon 5°	8 Mars/Moon 4°	9  3:59PM	10 Solar SaturdayS.V. Library 10 AM
11	12	13	14	15 Public Night at Patterson 6:30 PM	16  8:01PM	17
18		20	21	22	23 HAC Meeting Room A102 Downtown	24  5:30AM
25	26	27	28	29	Mar 1	2
3  8:23 AM Juno Opposition	4	5	6	7	8	9 Solar SaturdayS.V. Library 10 AM
10  3:00 AM	11	12	13	14 Public Night at Patterson 7:00 PM	15	16  10:11PM
17	18 Outreach at Leman Academy 6PM	19 Hiking club at Patterson 7:30PM Vernal Equinox	20	21 Venus/Saturn 0.3°	22 HAC Meeting Room A102 Downtown	23
24 Mercury Greatest Eastern Elongation	25  1:00AM Penumbral Lunar Eclipse	26	27	28	29	

All times local MST

Join HacAstro to keep up to date with all of the Huachuca Astronomy Club events
 Send an email to: HACAstro+subscribe@groups.io