

# The High Desert Observer

## April 2019

The Astronomical Society of Las Cruces (ASLC) is dedicated to expanding public awareness and understanding of the wonders of the universe. ASLC holds frequent observing sessions and star parties and provides opportunities to work on Society and public educational projects. Members receive the *High Desert Observer*, our monthly newsletter, plus membership to the Astronomical League, including their quarterly publication, *Reflector*, in digital or paper format.

Individual Dues are \$30.00 per year

Family Dues are \$36.00 per year

Student (full-time) Dues are \$24.00

Annual dues are payable in January. Prorated dues are available for new members. Dues are payable to ASLC with an application form or note to: Treasurer ASLC, PO Box 921, Las Cruces, NM 88004. Contact our Treasurer, Patricia Conley (treasurer@aslc-nm.org) for further information.

*ASLC members receive electronic delivery of the HDO and are entitled to a \$5.00 (per year) Sky and Telescope magazine discount.*

### ASLC Board of Directors, 2019

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*Masthead Image: February 10, 2017 From Las Cruces, Moon rising over the Organ Mts in Penumbral Eclipse.*



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### April Meeting --

Our next meeting will be on **Friday, April 26**, at the Good Samaritan Society, Downstairs Conference Room at 7:00 p.m.

The speaker will be David Lee Summers from Kitt Peak. His topic will be Dark Energy

### Member Info Changes

All members need to keep the Society informed of changes to their basic information, such as name, address, phone number, or email address. Please contact [Treasurer@aslc-nm.org](mailto:Treasurer@aslc-nm.org) with any updates.

### Events

ASLC hosts deep-sky viewing and imaging at our dark sky location in Upham. We also have public in-town observing sessions at both the International Delights Cafe (1245 El Paseo) and at Tombaugh Observatory (on the NMSU Campus). All sessions begin at dusk.

At our Leasburg Dam State Park Observatory, we hold monthly star parties. Located just 20 miles north of Las Cruces, our 16" Meade telescope is used to observe under rather dark skies.

Please see *Calendar of Events* for specific dates and times.

# From the President's Desk

April 2019

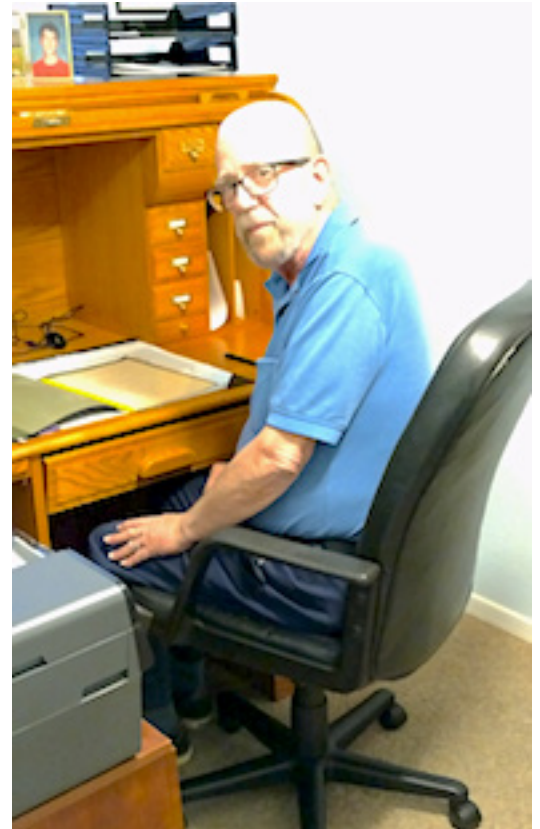
In February of 2016 LIGO announced the first ever detection of a gravity wave, predicted by Einstein about a century ago. Then about a year ago LIGO's two facilities were taken off line so they could under go a series of upgrades to the detectors. Today (April first (no joke) they can back on line. It is expected that the upgrades will allow for almost daily detections to take place. Isn't technology grand!

Our speaker for this month is David Lee Summers who works in Arizona but lives in Las Cruces. David is a telescope operator at Kitt Peak and is also an author of science fiction (one title is Astronomer's Crypt). He will be talking about DESI. That is the Dark Energy Spectroscopic Instrument. This is a project at Kitt Peak that will map the Dark Energy distribution in the universe.

THE ANSWER IS 42.

Tracy Stuart, ASLC President

April 2019



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didn't know the time before I went down, but made a guess. I later joked that I could have answered one of the questions as 42, but they probably would have called an ambulance if I had done that.

A few years ago a visiting Astronomer was at a club meeting and Rich answered one of his questions as 42 (refer to the Hitch Hikers Guide to the Galaxy}. The Astronomer questioned his intelligence and sanity.

I finally convinced every one that I was not injured, or dizzy and that I could drive home. On the way home I noticed I was being followed. Bob Armstrong shadowed me all the way home to make sure I was safe.

I really appreciate all of the concern from the Boy Scouts and Bob Armstrong, and for all of their help. The reason I did not feel well was apparent the next two weeks since it was obvious that I had the flu.

### **Rockhound State Park, Saturday March 2nd**

The weather did not look good, but Mike Nuss decided to go to the Park and see if it cleared. Fortunately, the weather improved dramatically around sunset and he proceeded to give the presentation to about 10-12 hearty souls who showed up to view. It ended up being a decent night with Mike Coulson assisting with his C-8.

### **City Of Rocks SP, Saturday, March 2nd**

The weather looked iffy at CoR but unfortunately, it did not improve. The presentation was cancelled and it did not clear up or improve after sunset.

### **Sunrise Elementary, Thursday, March 7**

Montes had telescopes inside, one of them pointed at a picture of the Pleiades on the wall.

It was one of the most impressive programs I have seen, at any of the schools. There were many student science projects set up and a large turnout of students, parents and teachers. Students were allowed to take tablets, loaded with apps that showed what was in the sky, or at least what would have been seen if the clouds were not in the way.

### **Tombaugh Observatory, Friday, March 15**

We had two days of very high winds. I returned from Oz in time to join Steve Shaffer at the open house. It was very cloudy. The Moon was barely visible, and sometimes not visible, so we did not put in an eyepiece, or open the slit in the observatory. We also knew that only the Moon would be visible in the other domes. In retrospect, this might have been a mistake since the Moon would sometimes come into view and there were long lines at the other scopes.

The Moon was as high, near the zenith, as I can remember having seen it.

### **Moongaze, Saturday, March 16**

It started out very cloudy. Chuck Sterling, Steve Wood, Howard Brewington and Jerry McMahan, all wound up at the International Delights. The sky did clear so that we did have a successful outing. We had the Moon and Chuck pointed an 8 inch Meade at the Pleiades.

It was cold, but it did provide the four of us the opportunity to get together and discuss politics. We still have not decided which of us is going to run for President, but I think Steve will declare soon.





## Calendar of Events (Mountain Time - 24 hr. clock)

Apr	01	19:27	Sun Sets
	01	23:22	Mars Sets
	01	01:03	Jupiter Rises
	05	02:51	New Moon
	06	19:30	OUTREACH; NPO Program at Rockhound SP, M. Nuss, B. Nigg, C. Turner
	06	19:30	OUTREACH; Dark Sky Observing at Leesburg Dam State Park - Cub Scouts
	12	13:06	First Quarter Moon
	12	19:35	OUTREACH; Spacefest 2019 Stargazing at La Cueva Picnic Site, Dripping Springs
	12	21:00	OUTREACH; Tombaugh Observatory Open House: 9:00 AM to 10:00 PM
	12	17:30	OUTREACH, Highland Elementary Solar Star Party, 5:30 to 7:30
	13	20:00	OUTREACH; MoonGaze, International Delights Café
	13	20:00	OUTREACH; MoonGaze, Pan Am Plaza on University Ave
	19	05:12	Full Moon
	23	10:00	OUTREACH, Bright Beginnings Solar Star Party: 10:00 AM to 12:00PM
	26	16:19	Last Quarter Moon
	26	19:00	ASLC Monthly Meeting; Good Samaritan Society, Downstairs Conference Room
	27	19:45	OUTREACH; Dark Sky Observing at Leesburg Dam State Park; Music
	27	19:42	OUTREACH; NPO Program at City of Rocks SP, B. Nigg, C. Turner
	28	09:00	Texas Star Party Begins: April 28 to May 5, 2019
May	01	07:53	Sun Sets
	01	23:03	Mars Sets
	01	23:03	Jupiter Rises
	04	16:46	New Moon
	04	19:45	OUTREACH; NPO Program at Rockhound SP, M. Nuss, B. Nigg, C. Turner
	10	21:00	OUTREACH; Tombaugh Observatory Open House: 9:00 AM to 10:00 PM
	11	19:12	First Quarter Moon
	12	20:00	OUTREACH; MoonGaze, International Delights Café
	12	20:00	OUTREACH; MoonGaze, Pan Am Plaza on University Ave
	18	15:10	Full Moon
	23	10:30	OUTREACH, Solar Star Party for Bright Beginnings: 10:30 to 12:30
	24	19:00	ASLC Monthly Meeting; Good Samaritan Society, Activities Meeting Room
	25	20:00	OUTREACH; Dark Sky Observing at Leesburg Dam State Park
	25	20:00	OUTREACH; NPO Program at City of Rocks SP, B. Nigg, C. Turner
	26	10:34	Last Quarter Moon

Be sure to visit our web site for ASLC information: [www.aslc-nm.org](http://www.aslc-nm.org)

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### Announcements

1. The April ASLC meeting will be held on April 24, 2019 at 7:00 PM at the downstairs Conference Room, Good Samaritan Society Las Cruces Village, 3011 Buena Vida Circle, Las Cruces, New Mexico. The program for the April meeting will be a presentation by David Lee Summers. His topic will be about Dark Energy. Maybe he will tell us about the recent Spectroscopy Workshop.



There will Moon Gazes at two locations, International Delights Café and El Milagro Coffee y Espresso, on 13 April. A solar star party will be held for Bright Beginnings on 23 April from 10:30 to 12:30. A 3rd Quarter Moon event with music will be at LDSP on 27 April.

### **New Business:**

Steve Barkes moved to consider Vince Dovydiatis for Life membership in the Society; Ed Montes seconded. The Board will take up the issue.

The April meeting will be in the Conference Room downstairs in the Social Center of the Good Samaritan Society Las Cruces Village. David Lee Summers from Kitt Peak will be the speaker.

### **Presentation:**

This month's presentation was by Society member Steve Barkes on "Amateur Spectrographs". Steve has made previous presentations on spectroscopy and tonight's presentation was an update. Spectroscopy started as the study of visible light but has grown to become the study of the interaction between matter and radiated energy in the form of waves. He talked about why amateur astronomers should consider trying spectroscopy. He also discussed different pieces of equipment. Finally, he demonstrated how some of the equipment works.

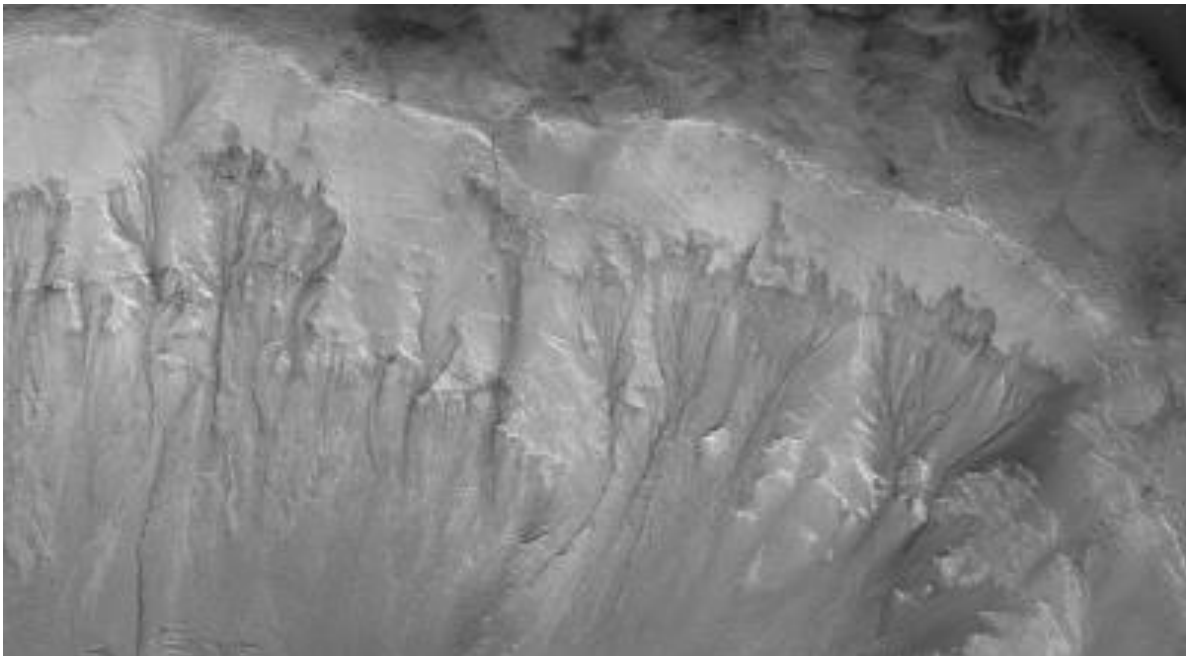
The March meeting of the Astronomical Society of Las Cruces concluded at 8:35 pm. A social time followed at Pecan Grill.

-Respectfully submitted by John McCullough, ASLC Secretary

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## **In Case You Missed it, News from the Heavens April 2019 - By Kevin Brown**

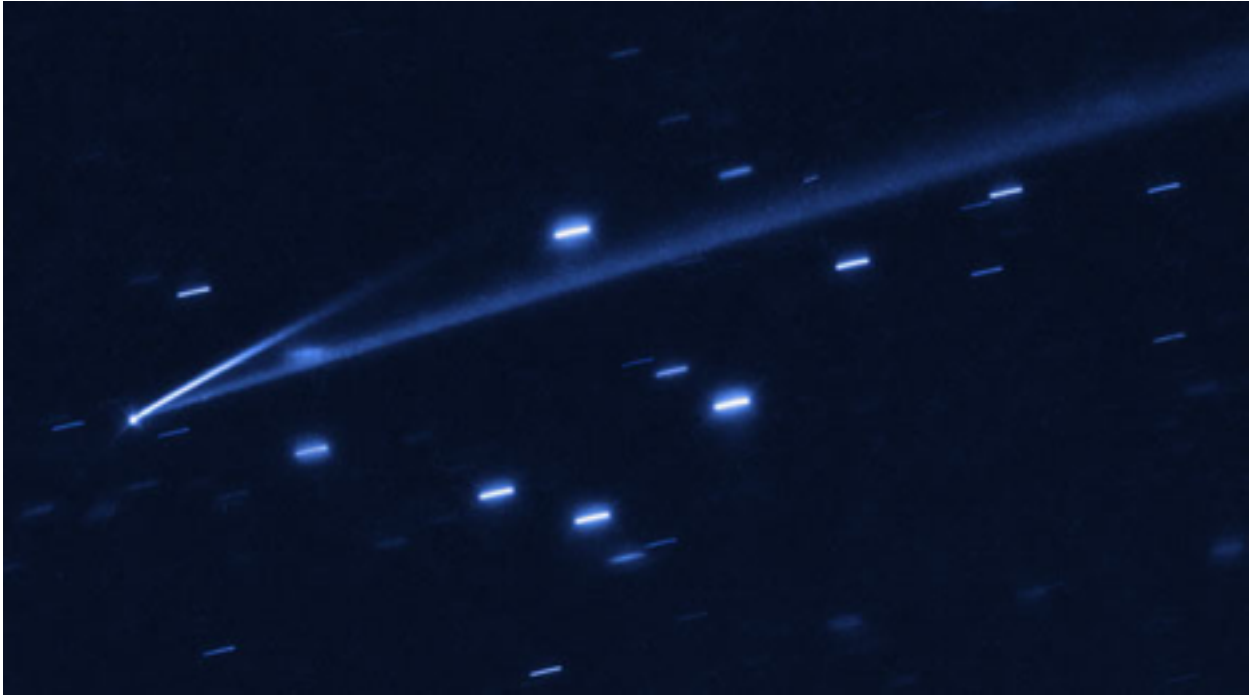
### **Mars Underground Water**







be as large as a few hundred kilometers in diameter, comparable to the largest known asteroids in our Solar System. This is only the second solid planetesimal found in a tight orbit around a white dwarf.



### **Hubble Images Multi-Tailed Active Asteroid**

This Hubble image of 2.5-mile wide asteroid (6478) Gault shows two narrow comet-like tails of debris that indicates the asteroid is slowly disintegrating. Gault is located 214 million miles from the Sun between the orbits of Mars and Jupiter. Gault is only the second asteroid whose disintegration is decisively linked to a spin-up process due to the long-term subtle effects of sunlight.

The sunlight heats the surface of the asteroid and infrared radiation carries off momentum as well as heat. A tiny force is created that can cause the asteroid to spin faster and faster. If this centrifugal force eventually overcomes gravity the surface of the asteroid becomes unstable and landslides send dust and rubble drifting into space. The narrow streamers indicate that the dust was released in short bursts lasting from a few hours to a few days. The astronomers estimated that the longer tail is over half a million miles long and 3,000 miles wide and the shorter tail is about one quarter as long.

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## **The Uranograph - April 2019.**

**By Bert Stevens**

### **Constellation of the Month: Gemini, The Twins.**

The winds of April not only bring us warmer weather, but they blow away the constellations of winter and blow in the constellations of spring. The constellations that have lorded over the frigid nights such as Orion and Canis Major are now moving rapidly westward toward the setting Sun. Their brilliant stars that have shown so brightly in the crisp January evenings are replaced by the more muted stars of the spring constellations.

A little northwest of overhead in the April sky is the constellation Gemini, the Twins. This constellation can be recognized by the pair of very similar stars that mark the heads of the Twins. These two stars, named Pollux and Castor are almost the same brightness, with Pollux being just slightly brighter. When you look at them, you will probably have a hard time deciding which one is the brighter Pollux.

An easy way to tell them apart is to remember that the Twins rise in alphabetical order. Castor comes up first, followed by Pollux. Another way of saying this is that Castor is west of Pollux. So, when you are looking at them in our northwestern sky, Castor will be the lower of the pair. You might also notice a subtle difference in the color of these two. Pollux is the redder of the two stars.

Gemini extends southwest from Castor and Pollux, filling out the image of the two boys standing together arm-in-arm. Greek mythology has it that these are two sons of Leda, were conceived on her wedding night. Castor was derived from her husband, Tyndareus, King of Sparta, and Pollux from Zeus, King of the Gods who had come to her as a swan.

The two boys grew into warriors, but they were always together. They joined Jason and the Argonauts on their epic voyage. On a raid, Castor was killed and Pollux, missing his dear brother, asked Zeus that he be allowed to die as well. Being the son of Zeus, Pollux was immortal and could not die. Zeus was touched by Pollux's love for his brother and allowed them to alternate days. One day they would both be in Olympus, and the next in Hades. Because of their great brotherly love, they were put into the sky together as the constellation Gemini.

This is reflected in the motion of the two stars. Castor rises first and his brother, Pollux, is immediately behind him on their way toward Olympus. In our April evening sky, however, Castor is on the way down from Olympus toward Hades with Pollux still following behind him.

Gemini is one of the constellations of the Zodiac. These constellations all have the Sun passing through them sometime during the year as it travels along the ecliptic through this constellation. The plane of Earth's orbit around the Sun defines the ecliptic. From the Sun, the Earth travels along the ecliptic and vice-versa. All the other planets have orbits that are inclined only slightly to the Earth's orbit. Thereby they also travel near the ecliptic.

Our Moon, whose orbit is tilted only five degrees from the ecliptic, can also be found near the ecliptic. Twice a month, it crosses the ecliptic, once going northward and once going southward. The crossing points are called the nodes and if the Sun is near a node as well, an eclipse will occur. If they are both at the same node, it will be a solar eclipse. If they are at opposite nodes, it will be a lunar eclipse.





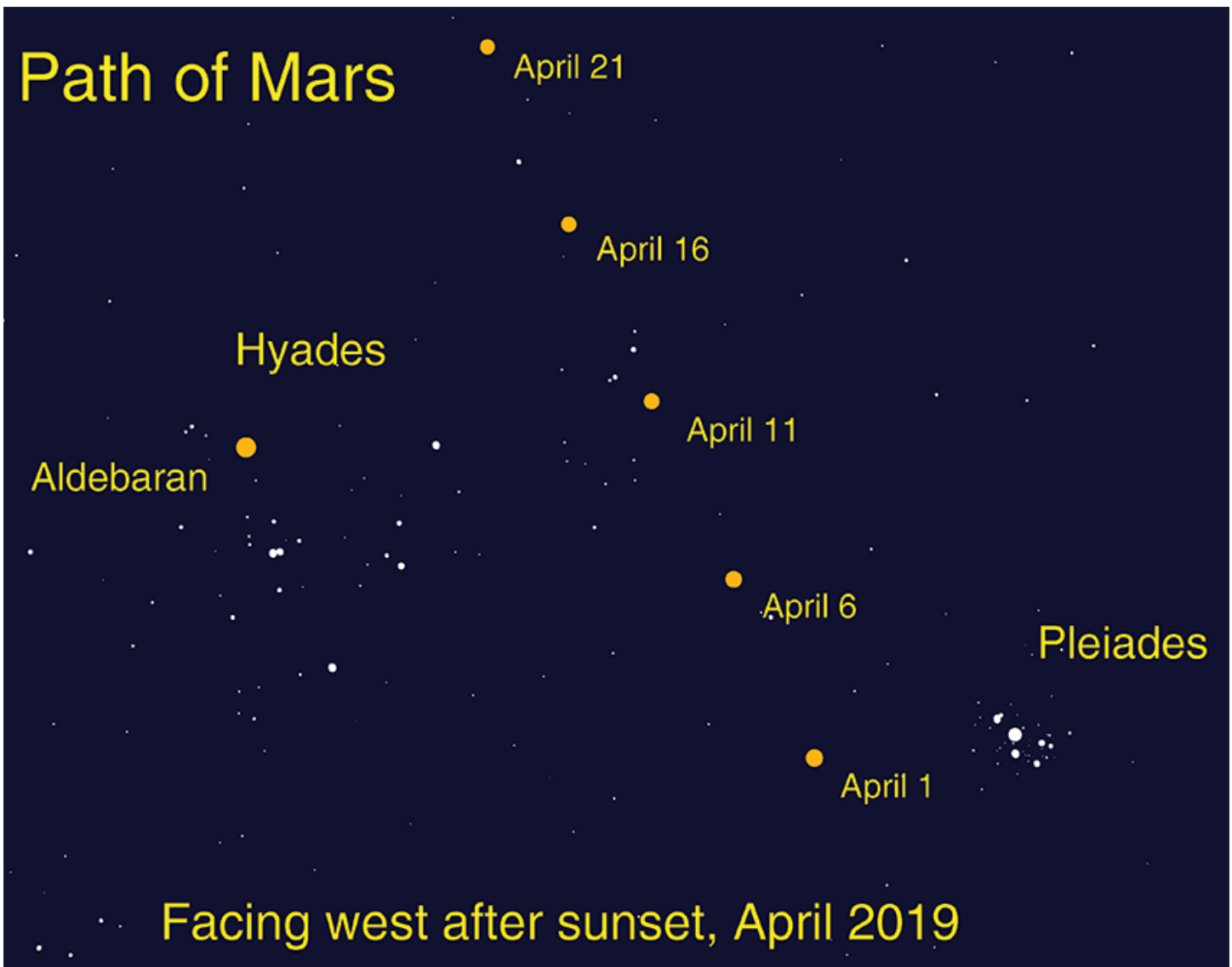
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**Mars the Wanderer**  
**By David Prosper**

April’s skies find Mars traveling between star clusters after sunset, and a great gathering of planets just before sunrise.

Mars shows stargazers exactly what the term “planet” originally meant with its rapid movement across the evening sky this month. The ancient Greeks used the term planete, meaning wanderer, to label the bright star-like objects that travelled between the constellations of the zodiac year after year.

You can watch Mars as it wanders through the sky throughout April, visible in the west for several hours after sunset. Mars travels past two of the most famous star clusters in our night sky: the Pleiades and



**Caption:** The path of Mars between the Pleiades and Hyades in April. Image created with assistance from Stellarium.



Hyades. Look for the red planet next to the tiny but bright Pleiades on April 1st. By the second week in April, it has moved eastward in Taurus towards the larger V-shaped Hyades. Red Mars appears to the right of the slightly brighter red-orange star Aldebaran on April 11th. We see only the brightest stars in these clusters with our unaided eyes; how many additional stars can you observe through binoculars?

Open clusters are made up of young stars born from the same “star nursery” of gas and dust. These two open clusters are roughly similar in size. The Pleiades appears much smaller as they are 444 light years away, roughly 3 times the distance of the Hyades, at 151 light years distant. Aldebaran is in the same line of sight as the Hyades, but is actually not a member of the cluster; it actually shines just 65 light years away! By comparison, Mars is practically next door to us, this month just a mere 18 light minutes from Earth - that’s about almost 200 million miles. Think of the difference between how long it takes the light to travel from these bodies: 18 minutes vs. 65 years!

The rest of the bright planets rise before dawn, in a loose lineup starting from just above the eastern horizon to high above the south: Mercury, Venus, Saturn, and Jupiter. Watch this month as the apparent gap widens considerably between the gas giants and terrestrial planets. Mercury hugs the horizon all month, with Venus racing down morning after morning to join its dimmer inner solar system companion right before sunrise. In contrast, the giants Jupiter and Saturn move away from the horizon and rise earlier all month long, with Jupiter rising before midnight by the end of April.

The Lyrids meteor shower peaks on April 22nd, but sadly all but the brightest meteors will be washed out by the light of a bright gibbous Moon.

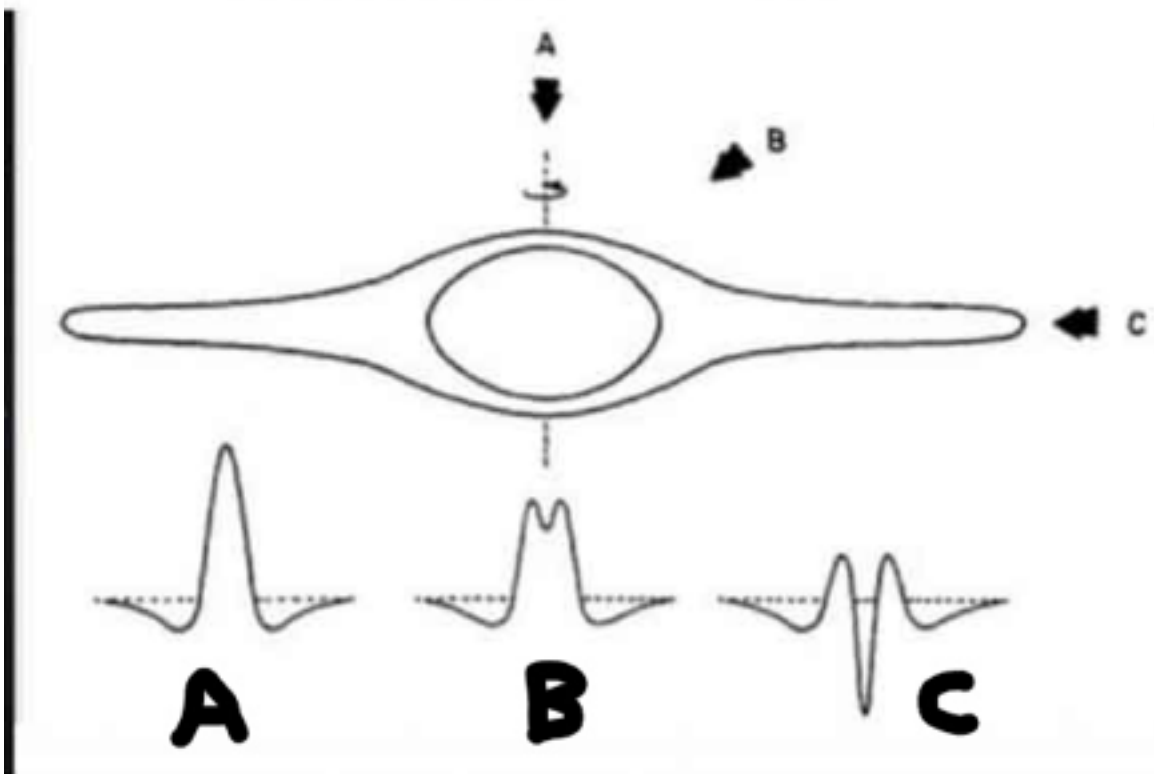
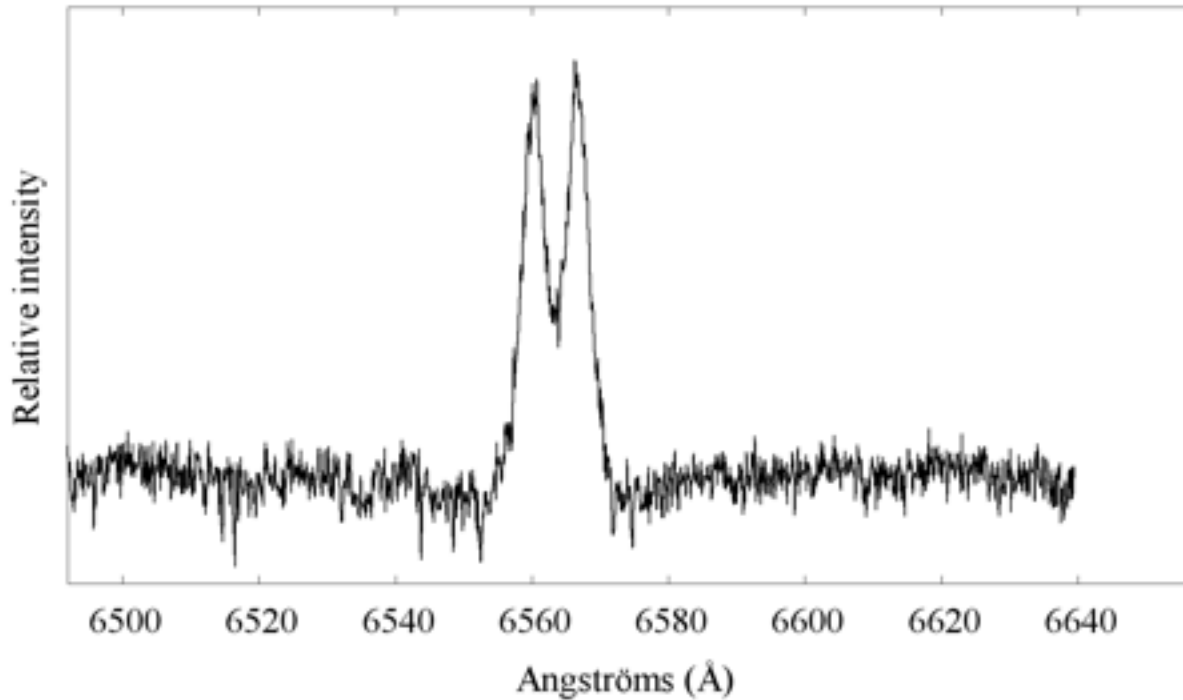
You can catch up on all of NASA’s current and future missions at [nasa.gov](http://nasa.gov)

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## **Spectrum of a Be Star in Canis Major** **by David Doctor**

This is a high resolution spectrum of the H alpha region of the Be star (B emission) HD43544. This is a 6th magnitude star in Canis Major. Captured with the Lhires III spectrograph, C14, Atik 460EX from Las Cruces. Many B spectral type stars exhibit emission lines in H alpha rather than absorption. These are actively researched now because it is believed that several, possibly most B stars, are actually part of close binary systems with a small “type O subdwarf” or white dwarf ( or in some cases neutron star or even black hole!) accounting for mass transfer which gives rise to the rapid rotation of the B star and formation of a gaseous disc surrounding the star.

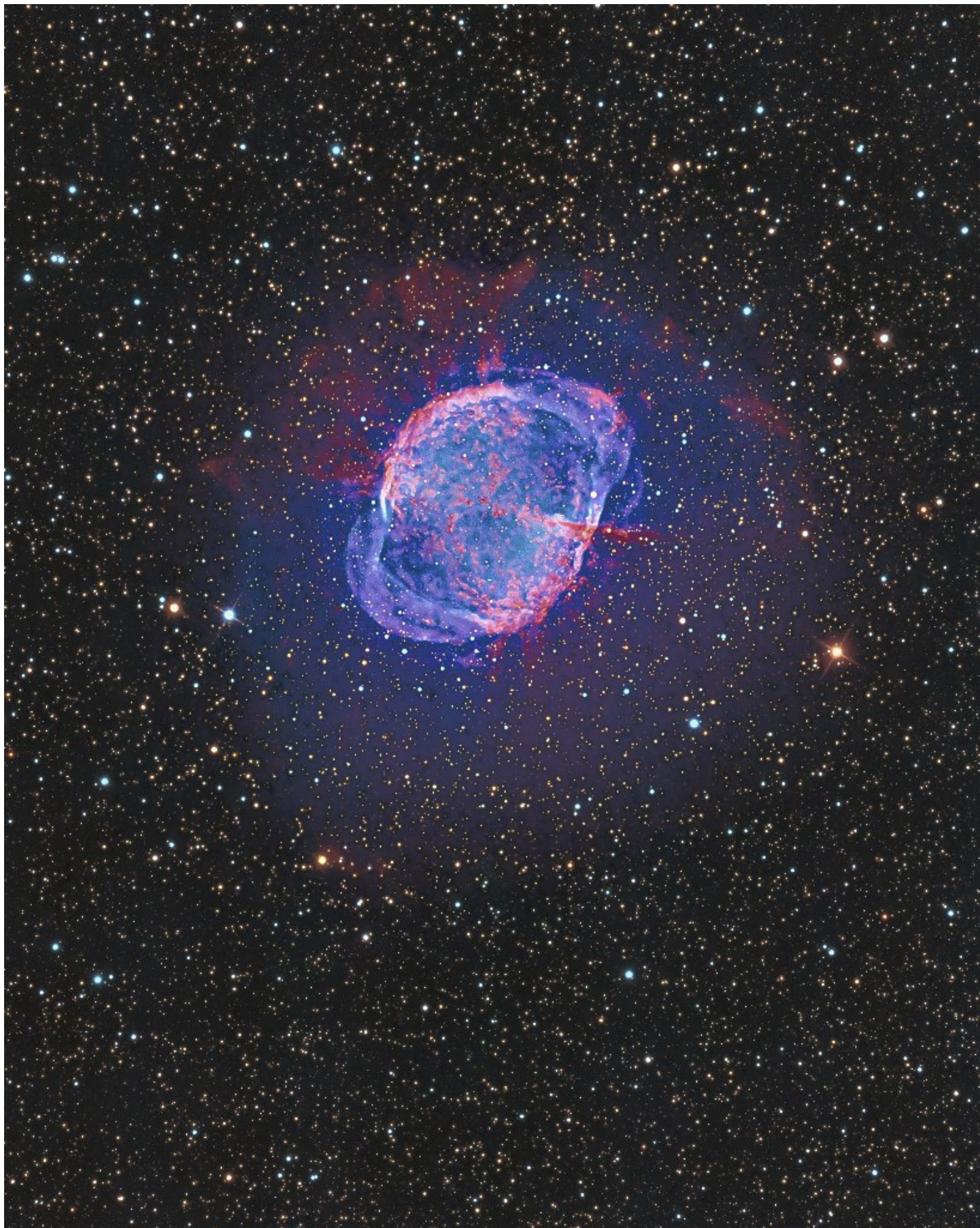
This is the reason for the emission feature. Close analysis of the emission profile changes over time in the HA region or other regions in the spectrum can yield a solution for orbital parameters of a binary system, thus proving they exist! The peaked nature of the Ha emission shown is dependent on line of sight from earth as shown in this schematic:



Pictured is a star with a surrounding disk of gas seen edge on. Position 'A' viewed from Earth would be looking directly 'above' the star where we see only an emission peak. Position 'B' is an oblique view where we would see 2 peaks with central dip depending on degree of obliquity but this "dip" gradually increases in depth toward the "C" position where we see the full absorption component at the H alpha 6563 angstrom point when we are looking at the star edge on!

\* \* \* \*





Messier 27: The Dumbbell Nebula



This image I worked on a lowest-end ACER laptop available in Tucson. Boy! do the colors change with even the slightest change in viewing angle on that \$200 machine. So, I re-adjusted the colors and saturation on my regular machine, and produce this image. It is actually an older image that I was just using to test a new image-sharpening method I read about. (There are a bunch of methods that are not in Gimp, PI, PS....) I like the result, which was really a huge improvement on the original (unsharp) method--or at least on my capability to manipulate sharpness??? Interesting the Sobel Operator method that I "invented" is closely paralleled by a number of methods using Laplacian operators and other first and second derivatives...in fact, these other methods have may be guides to improving my Sobel work-flow. I am going to purchase MatLab so I can test ideas more easily (once I learn to deal with Matlab's programming language). Anyway,

Enjoy!

M 27 Dumbbell Nebula

OTA: RCOS (14.5" f/8)

Camera: SBIG STX-16803

Observatory: Deep Sky West

EXPOSURES USED (selected from a larger number of frames and combined using custom weighting):

Hydrogen: 19 x 1800 sec

Oxygen: 12 x 1800

Sulfur: 16 x 1800

Red 12 x 300

Green 24 x 300

Blue 24 x 300

Total exposure 28.5 hours

Image Width: ~.5 deg

Processed by Alex Woronow using PixInsight in 2018

Messier 27 is a "planetary nebula"; a gas and dust cloud that forms when a low-mass, dying star ejects its outer layer at the end of its life. This ejection occurs when hydrogen becomes depleted to the point that the core's H-burning cannot produce the necessary radiation pressure to support the star against its own gravitational force. Consequently, the core collapses, until the growing pressure and temperature (T rising from around 15M degrees K to around 100M degrees K) ignites He burning. This violent burst of new energy ejects the outer shell of the star through a strong stellar wind. Typically, a star ejects 50% to 70% of its mass! The re-ignited core emits strong ultra-violet radiation, which ionizes the cast-off shell and causes it to glow and us to be able to see and image it. The small star at its center is the white dwarf (actually bluish in color) remnant of the exploded star.

This particular planetary nebula is "bipolar," in that the material was ejected in two opposite directions, rather than as a spherical shell.

M 27 is estimated to have arisen about 3500 years ago (late Stone Age). It lies at a distance of about 1,400 light-years and is about 3 light-years across.

Comments, suggestions, questions, objections... always welcomed

Alex



**NGC 2403 and friends**

OTA: Star-Fire 175 (f/8) Camera: FLI - PL16070AE Observatory: Deep Sky West  
EXPOSURES: Red: 21 x 900 sec Blue: 24 x 900 Green: 26 x 900 Lum. 23 x 900  
Hydrogen: 11 x 1200 Total exposure ~27 hours Image Width: ~3/4 deg  
Processed by Alex Woronow using PixInsight & Astra-Image in 2019

NGC 2403 is an outlying member of the M81 group. Although readily visible in binoculars, it was missed by the early comet hunter and cataloger of fuzzy objects in the night sky (aka comet impostors), Charles Messier whose catalog was published in 1771. NGC 2403 has many regions of active star formation and young blue stars as well as prominent Hydrogen-alpha regions (the pink clouds).

The subframe images comprising this rendition were plagued by clouds. By many accounts, the skies of the SW are becoming more and more cloudy, probably a result of the recently measure 1o C in the earth's temperature. Various quality checks on the subframe quality resulted in rejecting an unprecedented 97 out of 207 subframes (or about half of the imaging time was wasted due to climate change-which, of course, is a hoax!) Even with a rather high selection hurdle, the resolution is a bit lacking.

BTW, The subframes are rejected or accepted with a weighting factor using the new SubframeSelector Process in PixInsight and a custom Excel spreadsheet implementing the selection/rejection and weight interactively with graphs and correlations of the subframe variables. You can request the spreadsheet and instructions from alex(a)awkml(.)com.





**IC 5146 Cocoon Nebula:** This started out to be a test of the program StarNet++, which removes stars from an image using a Neural Network--an algorithm that learns what to do you feeding it a large number of examples--i.e., by "training" it. The StarNet++ NN is already trained, so using it is easy. I've run SN++ on several cases now, and it did most of them really well. This image, not so much. But with a little extra help from PixelMath, the outcome was just Jim Dandy! Strangely, though, both PixInsight and PS render the image with less intense reds than my "image viewer" apps??? So, if it looks too red here, try this link <http://www.astrobin.com/397179/> and see if there is a diff. Anyway, here are some notes on the object and the processing....

OTA: RCOS 14.5" f/8      Camera:      SBIG STX-16803  
EXPOSURES: Red: 18 x 600 seconds Blue: 16 x 600 Green: 11 x 600 Lum.: 26 x 600  
Total exposure ~12 hours Image Width: ~1/2 deg Observatory: Deep Sky West  
Processed by Alex Woronow using PixInsight, Affinity, and StarNet++ in 2018

The star cluster IC 5146 and its associated reddish cloud, the Cocoon Nebula (Sh2-125), are embedded in an extensive faint reflection/dark nebula. The faint nebula seldom becomes a featured element of the image in amateur-processed images. My image illustrates the fact that the Cocoon Nebula actually appears somewhat hazy due to the envelopment by the broader nebula. Again, many images are processed to suppress that natural haze as much as possible. In addition, note the faint loops and streamers at the outer edges of the nebula--likely spawned by the ignition of YSOs.

The Cocoon molecular cloud is a highly active stellar nursery, with hundreds of identified YSOs (Young Stellar Objects). According to (Herbig & Dahm, The Young Cluster IC 5146, AJ, 2002) the bright 'central' star BD+46°3474

"...formed near the near surface of the present cloud and evacuated a blister cavity out of which gas and dust are now flowing through a funnel-shaped volume in the approximate direction of the Sun. It is suggested that the IC 5146 cluster stars formed in a dense foreground section of the molecular cloud that was dissipated following the appearance of +46°3474."      Alex





### **M 81 Bode's Galaxy**

This is one of the “Grand Design” galaxies with two major spiral arms. It was discovered in Germany by J. Bode in 1774. M81 is located “nearby” at 11.8 million light years from Earth in Ursa Major. It’s a very bright galaxy, just below the limit of naked-eye visibility. Containing about 250 billion stars and 90,000 light years in diameter, M81 is the largest galaxy in the 34-member M81 Group, which includes M82 the Cigar Galaxy. As can be seen in this image, many reddish H-Alpha emission regions dot the arms. These are active star-forming regions where infrared observations show young stars (not visible in this image) streaming out into the disk of the galaxy as it rotates.

Taken in 2016 and 2017. Total integration time was 3.26 hours in H-alpha and LRGB.

By Kent DeGroff