Skywatchers
Newsletter of the China Lake Astronomical Society

Volume 58 No. 5 April 24, 2021

May 03rd, 2021 CLAS Meeting at Maturango Museum and on Zoom Meet

The May meeting will feature Cerro Coso College Professor Scott Cameron.

The presentation will be about the James Webb Space Telescope, which is supposed to launch in October. Scott will cover its overall design, instrumentation, and science goals.

Finally after some 14 months the C.L.A.S. will be meeting in person at the Maturango Musuem on Monday May 03rd at 7:30 PM. C.D.C. considerations will apply.

In addition we will be on line.

China Lake Astronomical Society

When Mon May 3, 2021 7:30pm – 9:30pm Pacific Time - Los Angeles

Where https://us02web.zoom.us/j/86377850761?pwd=V245Q1hzQWRUVzJCQWYxYzlNN0QzZz09 (map)

Joining info Join with Google Meet

meet.google.com/rxc-ucfn-ukj

more details »
China Lake Astronomical Society is inviting you to a scheduled Zoom meeting.

Join Zoom Meeting
https://us02web.zoom.us/j/86377850761?pwd=V245Q1hzQWRUVzJCQWYxYzlNN0QzZz09

Meeting ID: 863 7785 0761
Passcode: 934331
One tap mobile
+16699006833,,86377850761#,,,,*934331# US (San Jose)
+13462487799,,86377850761#,,,,*934331# US (Houston)

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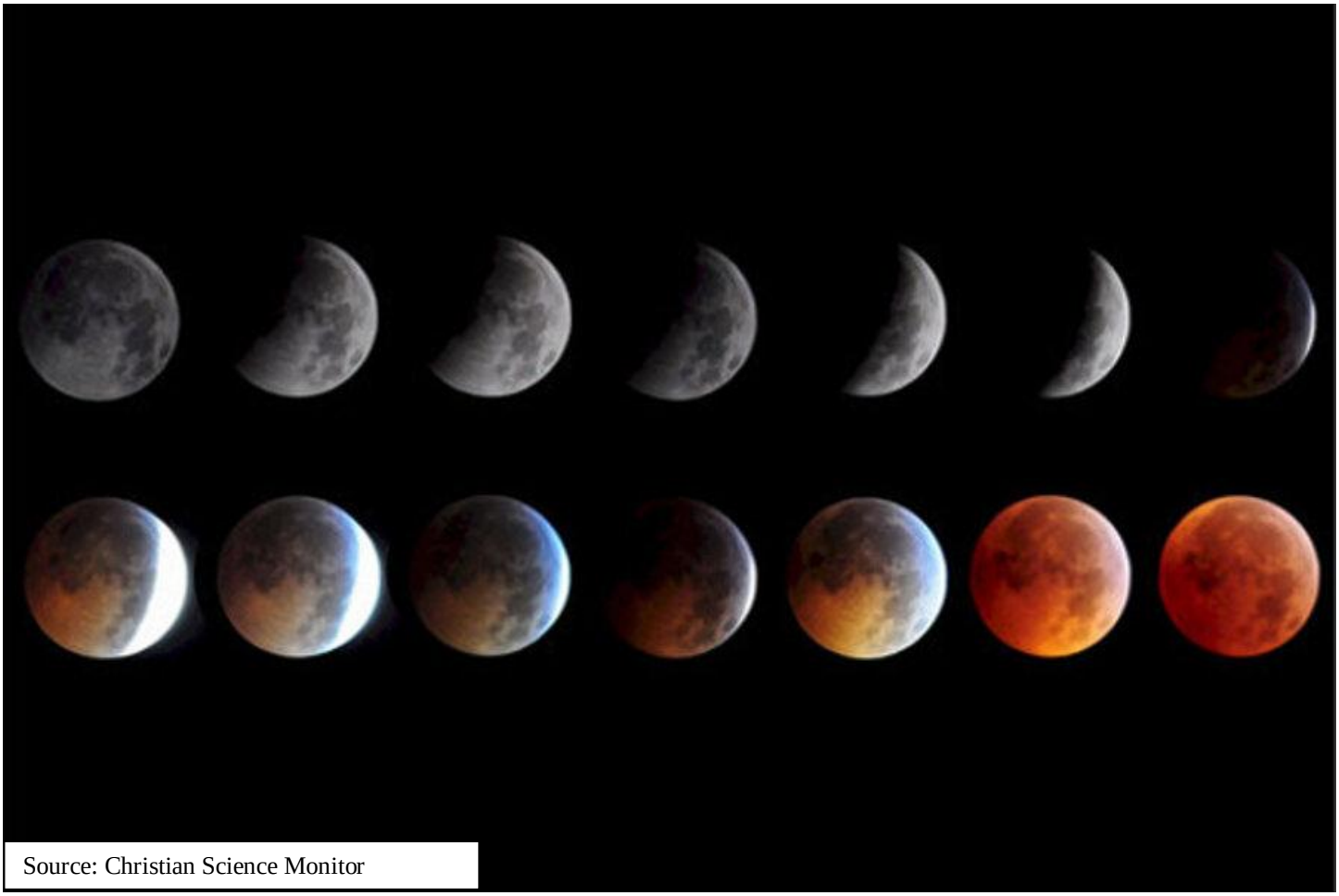
+1 929 205 6099 US (New York)
+1 301 715 8592 US (Washington DC)
+1 312 626 6799 US (Chicago)
Meeting ID: 863 7785 0761
Passcode: 934331
Find your local number: https://us02web.zoom.us/u/kbaKJCgDUL
Going (ghodkinson@sbcglobal.net)? **Yes** - **Maybe** - **No** more options »

Out of the Archives

The China Lake Astronomical Society first came together on the first Monday of 1958.
It wasn't until January 1964 that the first Newsletter (CLAS01-01) was printed by the President Keith Honey. A pdf file of that Newsletter has been added to the email.
Secondly during the last month or so I've been scanning all of the Newsletters from CLAS01 to date and will have them available at a future time for members.
Also Jim McMahon founding member and Newsletter editor in 1968 wrote a ten page letter about the club's early history. This too will be available shortly on a separate email.
NOW!.....Back to Astronomy…. Gfh

Next Meeting will be on June 07th, 2021

Get Ready for the Lunar Eclipse
May 26th, 2021



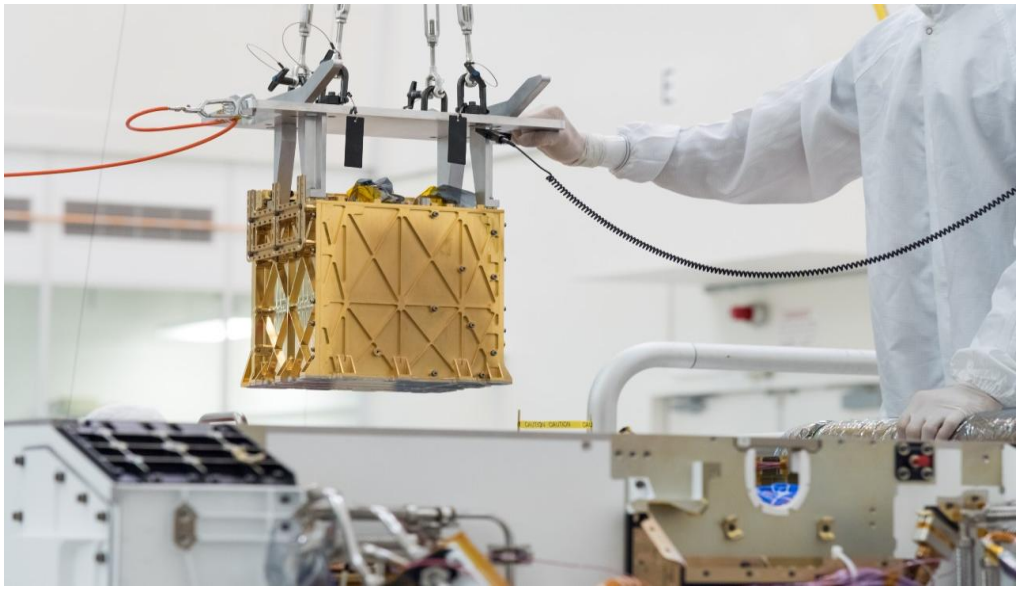
Source: Christian Science Monitor

Please check the following link.

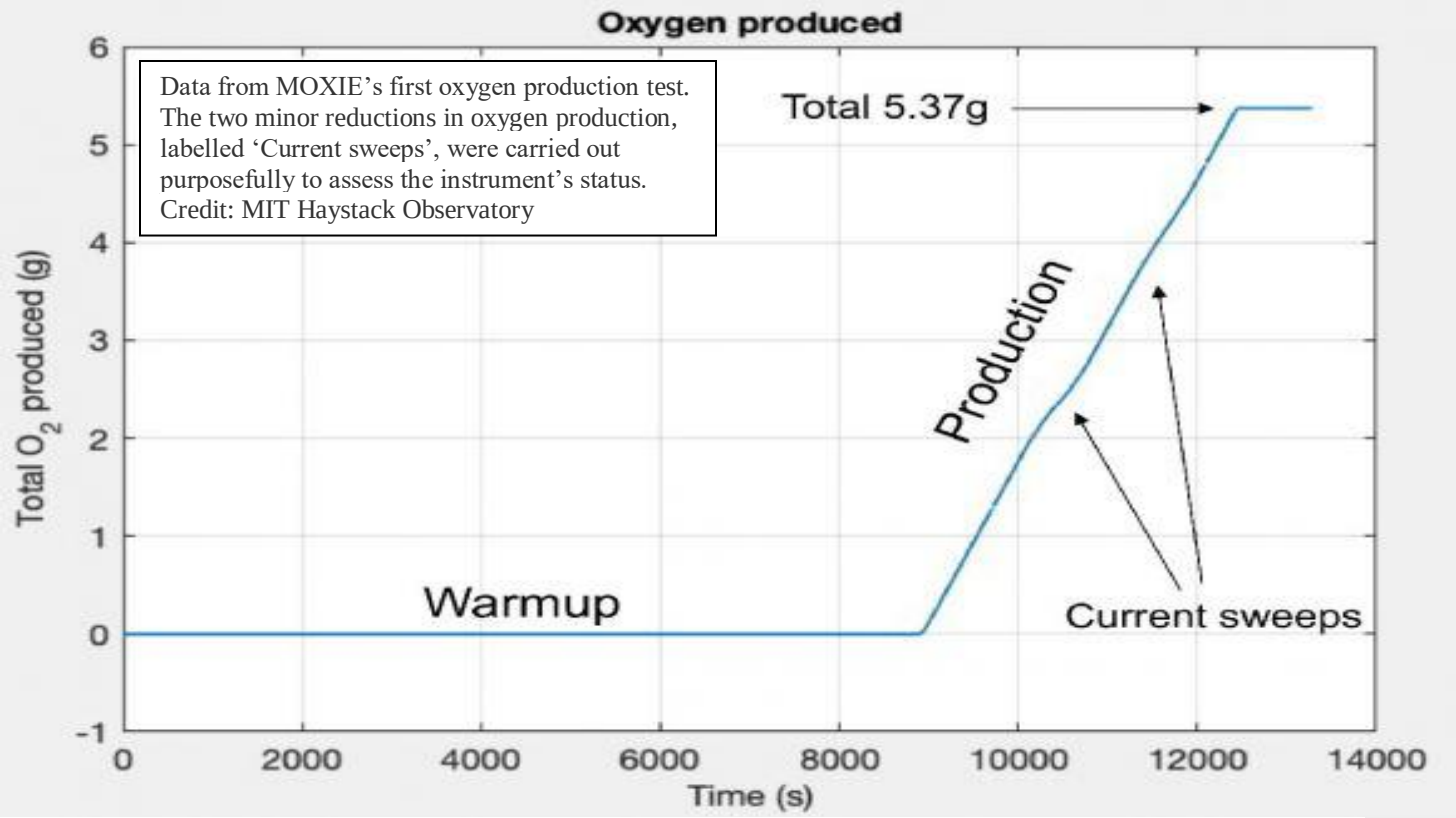
Eclipses visible in Ridgecrest, California, USA (timeanddate.com)

Please take the time to capture some images of this Eclipse and show at the next meeting on June 07th, 2021

Perseverance Successfully Extracts Oxygen From the Martian Atmosphere. About 10 Minutes of Breathing Time for an Astronaut (MOXIE)

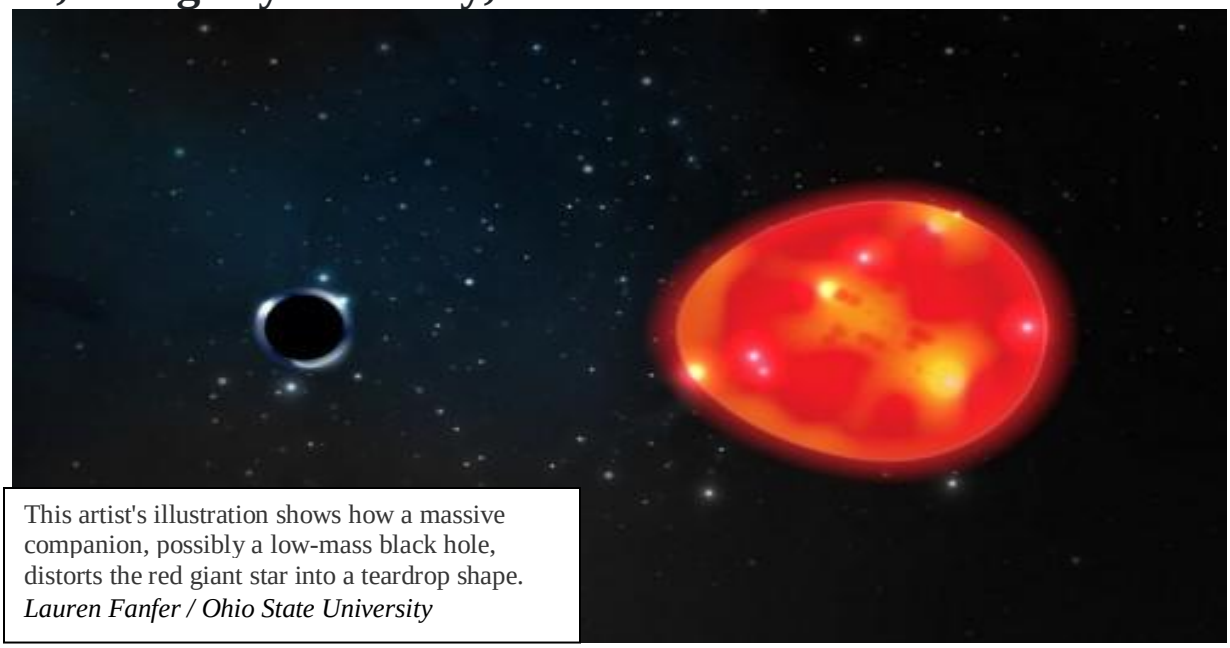


Humanity achieved an incredible series of new milestones on Mars this week. It began on Monday April 19th, when the Ingenuity helicopter demonstrated the first-ever powered, controlled flight on another world. And now, for the first time, the Perseverance rover has used ingredients from the Martian atmosphere to create breathable oxygen, in a test that might pave the way for future astronauts to 'live off the land' on the Red Planet. The feat was achieved by the Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE), a gold-colored cube bolted to the rover's belly. Over the course of an hour on April 20th, MOXIE produced 5.4 grams of oxygen, enough to keep an astronaut breathing for about 10 minutes.



MOXIE works by sucking in carbon dioxide (which makes up about 96% of Mars' thin atmosphere) while filtering out unwanted particles. The compressed carbon dioxide is then heated, breaking the molecules into oxygen and carbon monoxide. Further heating is required to separate the two new gasses, releasing the unwanted carbon monoxide back into the atmosphere, and leaving behind the breathable oxygen. MOXIE's gold plated exterior is designed to protect the other instruments on the rover from the process's extreme heat, which reaches over 800 degrees Celsius/1470 Fahrenheit. Like Ingenuity, MOXIE is a technology demonstration: neither has any impact on Perseverance's primary science goals. Instead, they are meant to provide proofs of concept for future missions. Future Ingenuity-like drones might be able to explore places a rover can't go, like a cliff edge or a fissure, for example. Similarly, future missions could use MOXIE-like technology to enable long-term exploration. Creating a breathable atmosphere for humans isn't the only application. It could also be used to refuel a rocket for its return journey home. As MOXIE's principal investigator Michael Hecht explains, "To get four astronauts off the Martian surface on a future mission would require 15,000 pounds (7 metric tons) of rocket fuel and 55,000 pounds (25 metric tons) of oxygen…The astronauts who spend a year on the surface will maybe use one metric ton between them to breathe." In other words, most of the oxygen created by future MOXIE-like gadgets won't be for life-support, but rather for propulsion. Future tests will push the limits of MOXIE's capabilities. It should be able to double its output to 12 grams of oxygen per hour, and over the next two years it will be tested at least nine more times in different conditions (different seasons and times of day). The team is also currently analyzing the purity of the oxygen produced: preliminary results show near-perfect success. In the meantime, Ingenuity has about a week and a half left in its test period, in which it will make progressively more complicated flights. When it's done, Perseverance will rove away on its own mission – bringing MOXIE with it – to collect samples of Martian soil and rock. The samples will be picked up by a future sample-return mission, bringing them home to Earth for a close-up examination. Source: Perseverance Successfully Extracts Oxygen From the Martian Atmosphere. About 10 Minutes of Breathing Time for an Astronaut - Universe Today

Astronomers again think they have found the black hole nearest to us, just 1,500 light-years away, but the find still needs to be confirmed.



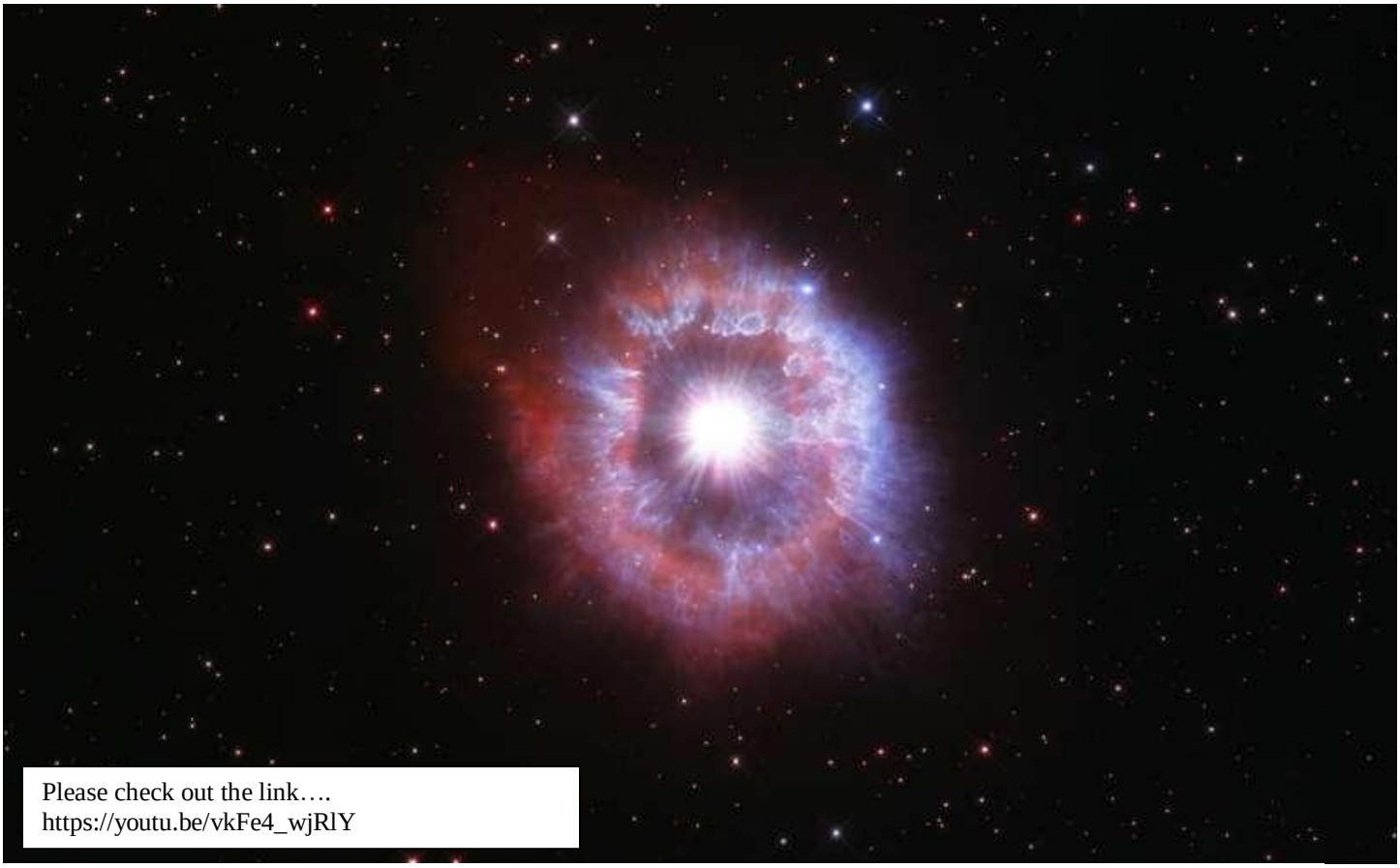
This artist's illustration shows how a massive companion, possibly a low-mass black hole, distorts the red giant star into a teardrop shape. *Lauren Fanfer / Ohio State University*

If Ohio State University astronomers are right, the invisible companion of the red giant star V723 Monocerotis (in the constellation the Unicorn) is the nearest black hole in the universe, just of 1,500 light-years away. But not everyone is convinced. V723 Mon is an 8.3-magnitude variable red giant star about as massive as our Sun but some 25 times larger. Astronomers had previously catalogued it as an *eclipsing binary*, in which a second, unseen star passes over it from Earth's perspective about every 60 days. However, when Ohio State PhD candidate Tharindu Jayasinghe took a close look at archival data from three automated telescopes — the All-Sky Automated Survey (ASAS), the Kilodegree Extremely Little Telescope (KELT), and the Transiting Exoplanet Survey Satellite (TESS) — he found that the brightness variations observed before instead indicated that tidal forces from a more massive companion had distorted the star into a tear-drop shape. In a study that will appear in *Monthly Notices of the Royal Astronomcial Society* (preprint available here), Jayasinghe's team uses the system's period, the orbital velocity, and the inferred distortion of the red giant to derive the mass of its invisible companion: three solar masses. They claim that a single compact body, that is, a low-mass black hole, is the most likely explanation. Based on an independent analysis, Kento Masuda (Osaka University, Japan) and Teruyuki Hirano (NINS, Japan) arrive at a similar conclusion in a paper posted on the arXiv preprint server. If confirmed, the "Unicorn," as Jayasinghe and his colleagues have dubbed the object — both for its location on the sky and its uniqueness — would be the closest known black hole. However, Ed van den Heuvel (University of Amsterdam) says he is skeptical about the purported evidence for such "non-interacting" low-mass black holes, where there's no mass transfer, accretion disk, and X-ray emission to support the claim. When a team led by Jayasinghe's coauthor Todd Thompson (also at Ohio State) published the discovery of another non-interacting 3.3-solar-mass black hole companion to a remote red giant star in *Science*, van den Heuvel and Thomas Tauris (Aarhus University, Denmark) were quick to point out in a follow-up , also in *Science*, that the invisible object could very well be a close pair of faint companions instead. Earlier claims of non-interacting black holes – including one in the binary star system HR 6819, at a mere 1,120 light-years away – also didn't stand the test of time. So it remains to be seen how many scientists will be convinced of the existence of the Unicorn. Van den Heuvel, for one, believes it is more likely that here, too, the invisible companion is a close pair of low-luminosity stars. "I don't think they have presented rock-solid proof," he says.

If V723 Mon *does* harbor a bona fide black hole, it would be the smallest one ever found. So far, the lowest-mass black hole that astronomers are sure of weighs in at just over 6 solar masses, leaving a "mass gap" between black holes and neutron stars, the latter of which are about twice as massive as the Sun at most.

Finding black holes in this mass gap would shed new light on their formation mechanisms. According to van den Heuvel, current theories can only form them when a neutron star accretes enough material to further collapse into a black hole. Meanwhile, Jayasinghe and his colleagues think their Unicorn may not be entirely unique after all. Based on a rough statistical analysis, they estimate that our Milky Way Galaxy might contain a few hundred similar systems. Future large spectroscopic surveys like APOGEE (part of the ongoing Sloan Digital Sky Survey) and the Chinese LAMOST survey (carried out with the Large-sky Area Multi-Object fibre Spectroscopic Telescope) are expected to yield more compact-object binaries and black hole candidates, they write. According to Jayasinghe, V723 Mon stands out because of its proximity. "It is very bright, so it is relatively cheap to follow up with ground-based facilities," he says. Source: Is the "Unicorn" the Closest Black Hole? - Sky & Telescope - Sky & Telescope (skyandtelescope.org)

Hubble captures giant star on the edge of destruction



The expanding shell of gas and dust that surrounds the star is about five light-years wide, which equals the distance from here to the nearest star beyond the Sun, Proxima Centauri. The huge structure was created from one or more giant eruptions about 10,000 years ago. The star's outer layers were blown into space—like a boiling teapot popping off its lid. The expelled material amounts to roughly 10 times our Sun's mass. These outbursts are the typical life of a rare breed of star called a luminous blue variable, a brief convulsive phase in the short life of an ultra-bright, glamorous star that lives fast and dies young. These stars are among the most massive and brightest stars known. They live for only a few million years, compared to the roughly 10-billion-year lifetime of our Sun. AG Carinae is a few million years old and resides 20,000 light-years away inside our

Milky Way galaxy.Luminous blue variables exhibit a dual personality: They appear to spend years in quiescent bliss and then they erupt in a petulant outburst. These behemoths are stars in the extreme, far different from normal stars like our Sun. In fact, AG Carinae is estimated to be up to 70 times more massive than our Sun and shines with the blinding brilliance of one million suns. "I like studying these kinds of stars because I am fascinated by their instability. They are doing something weird," said Kerstin Weis, a luminous blue variable expert at Ruhr University in Bochum, Germany. Major outbursts such as the one that produced the nebula occur once or twice during a luminous blue variable's lifetime. A luminous blue variable star only casts off material when it is in danger of self-destruction as a supernova. Because of their massive forms and super-hot temperatures, luminous blue variable stars like AG Carinae are in a constant battle to maintain stability. It's an arm-wrestling contest between radiation pressure from within the star pushing outward and gravity pressing inward. This cosmic match results in the star expanding and contracting. The outward pressure occasionally wins the battle, and the star expands to such an immense size that it blows off its outer layers, like a volcano erupting. But this outburst only happens when the star is on the verge of coming apart. After the star ejects the material, it contracts to its normal size, settles back down, and becomes quiescent for a while. Like many other luminous blue variables, AG Carinae remains unstable. It has experienced lesser outbursts that have not been as powerful as the one that created the present nebula. Although AG Carinae is quiescent now, as a super-hot star it continues pouring out searing radiation and powerful stellar wind (streams of charged particles). This outflow continues shaping the ancient nebula, sculpting intricate structures as outflowing gas slams into the slower-moving outer nebula. The wind is traveling at up to 670,000 miles per hour (one million km/hr), about 10 times faster than the expanding nebula. Over time, the hot wind catches up with the cooler expelled material, plows into it, and pushes it farther away from the star. This "snowplow" effect has cleared a cavity around the star. The red material is glowing hydrogen gas laced with nitrogen gas. The diffuse red material at upper left pinpoints where the wind has broken through a tenuous region of material and swept it into space. The most prominent features, highlighted in blue, are filamentary structures shaped like tadpoles and lopsided bubbles. These structures are dust clumps illuminated by the star's reflected light. The tadpole-shaped features, most prominent at left and bottom, are denser dust clumps that have been sculpted by the stellar wind. Hubble's sharp vision reveals these delicate-looking structures in great detail. The image was taken in visible and ultraviolet light. Ultraviolet light offers a slightly clearer view of the filamentary dust structures that extend all the way down toward the star. Hubble is ideally suited for ultraviolet-light observations because this wavelength range can only be viewed from space. Massive stars, like AG Carinae, are important to astronomers because of their far-reaching effects on their environment. The largest program in Hubble's history—the Ultraviolet Legacy Library of Young Stars as Essential Standards—is studying the ultraviolet light of young stars and the way they shape their surroundings. Luminous blue variable stars are rare: Less than 50 are known among the galaxies in our local group of neighboring galaxies. These stars spend tens of thousands of years in this phase, a blink of an eye in cosmic time. Many are expected to end their lives in titanic supernova blasts, which enrich the universe with heavier elements beyond iron. Source: Hubble captures giant star on the edge of destruction (phys.org)

Comet Atlas

Visible Comets. Please check out the link:

ASTRONOMY COLUMN
MAY EVENTS:

1. The next club meeting May 3rd. Great news we will be having our meeting back in the Maturango Museum! The time will be 7:30 PM masks and social distancing will be required. Scott Cameron is scheduled to speak.

2. A Covid safe star party will be discussed at the meeting..

MAY CELESTIAL CALENDAR:

1. Jupiter and Saturn in the morning sky this month. Look for them in the southeast before sunrise.

2. Mars can be seen in the west soon after sunset.

3. Venus and Mercury are both in the evening sky this month where they put on a great show. If you have never seen Mercury this is the time to see it. On the evening of the 28th The two have a very close conjunction. Look for them low in the west about 30 minutes after sunset.

4. A total lunar eclipse occurs the morning of May 26th. Most of the eclipse will be visible on the west coast.

INFORMATION:

Please visit us at our website ChinaLakeAstro.org.

For more information, contact the China Lake Astronomical Society at 760-446-0454 or 760-384-8666.

Roger Brower

Basic CLAS dues are $25.00 per year - due in January. Students and Skywatchers Newsletter are FREE.

Members also receive discounted rates for Astronomy Magazine and /or Sky and Telescope Magazine.

The fee schedule is as follows: Verify current magazine prices with Roger!

Basic membership $25.00 per year.
Membership with Astronomy magazine is $59.00 per year.
Membership with Sky and Telescope magazine is $58.00 per year.
Membership with both S & T and Astronomy is $92.00 per year.

Send your Check or Money Order to:

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Meetings of the China Lake Astronomical Society are held at the Maturango Museum at 7:30 p.m. on the first Monday evening of each month, except when the first Monday is a holiday.

WESTERN AMATEUR ASTRONOMERS WEB SITE http://www.waa.av.org/
New! CHINA LAKE ASTRONOMICAL SOCIETY WEB SITE http://chinalakeastro.org/