

The High Desert Observer

June 2025



This Month's Meeting - June 27th

IN-PERSON & Zoom, Friday at 7 p.m.
Mesilla Valley Radio Clubhouse
6609 Jefferson Ave. Las Cruces, NM

At the corner of Wilt and Jefferson -- take the Porter exit from US 70, about 5 miles east from the I-25 interchange. Go south on Porter until you come to Jefferson. From there, turn left and go to the corner of Jefferson and Wilt. The meeting will also be available to members via Zoom.

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Tombaugh Lecture Series Presentation for the Month

Mood Swings of Our Sun: How Our Star Affects Life on Earth

Khagendra Katuwal



This talk takes a journey through our amazing star, the Sun, starting from its hot core and moving out to its outer atmosphere. It explains how the Sun creates energy deep inside, how that energy moves through different layers, and how it eventually escapes into space. The talk also explores what makes the Sun active at times, including sunspots, solar flares, and dark patches called coronal holes. These solar events can affect life on Earth, creating beautiful auroras, but also causing problems for satellites and communication systems. Learn how the Sun's changing behavior connects to everyday life here on our planet.

Khagendra Katuwal is a Ph.D. candidate in the Department of Astronomy at New Mexico State University. His research focuses on the formation, expansion, and evolution of coronal holes, open magnetic field regions on the Sun that drive the solar wind and influence space weather. Originally from Nepal, he earned an M.S. in Physics from the Central Department of Physics, Tribhuvan University. He moved to the U.S. in 2021 to pursue a Ph.D. in Astronomy, taking on the significant challenge of switching fields driven by his belief in himself and his passion for space science. He serves as an Ambassador for the Daniel K. Inouye Solar Telescope (DKIST), the world's largest solar telescope.

From Our Vice Pres.



Telescopes, Students & Tools, Oh My!

Nils “Everyone Needs a Telescope” Allen

Many of us know about Messier Marathons, but can you conceive of a Telescope Making Marathon? Yes, that’s right! Well, I can now, as can Steve B. & my old friend Sam White. Even my faithful spouse Bonnie got sucked in to helping! It took all of us nearly 5 days to guide 19 hi-schoolers from Anthony, plus 3 chaperones, to create a total of 22 Dobsonian telescopes. It was an over-grown version of the scope-building class I started over 20 years ago, under the auspices of the ASLC.

Here’s a little background - below is how I would typically introduce this activity back then: “Just what is the Telescope Making Workshop (TMW)? A proven ‘class’ where participants build a quality beginner telescope from a prepared kit for an attractive price, the ever-popular point-&-shoot 4.5" (114mm) F/8 reflector telescope. Why do this? Building a telescope is a fun way to learn how scope's work and end up with a sturdy, customized instrument that you will value more (& is worth more) than the typical Walmart scope. We encourage adult/child building teams (this can create a lasting memory too!), making up to 6 scopes per class.”

You see, I’ve acquired LOTS of small reflector parts over time (Bonnie would say too many) that have sat in storage for over 10 years (or since the last TMW). Before I’m physically unable to, I needed to turn these into scopes. So when Cristina, a local teacher, proposed months ago that a large STEM student group make scopes, I couldn’t pass up the chance to unload lotsa stuff. She was leading this June’s Pathways to Space, a week-long ‘SpaceCamp’ experience at NMSU, for up to 30 special students. So I asked her how many scopes she wanted to end up with - I was thinking 1 per 2-person team. But she said “30”, so everyone has their own.

WOW, 4 times more than I had ever done!

So, despite being ‘rusty’, I proceeded to gear-up for this major effort, cutting up 3 sheets of plywood with Sam, & our Mike Beddo took on the crucial task to modify the mirror cells to fit our tubes. We even needed to fabricate inexpensive PVC focusers & spider/secondary assemblies from plastic plumbing parts

& steel strapping. Why? Turns out most of the plastic Chinese scope parts that were plentiful & cheap years ago have doubled in price & take months to get. Even plywood &

screws/hardware have gone way up...all this puts at risk my goal of keeping the cost of a kit under \$100, so lower-income income folks can participate. Since these students were adult-sized, we also included brackets & screw-in furniture legs to raise the scopes to a more useful operating height. It all adds up!





Effort-wise, I estimate each student put in 15 hours, and of course our club members much more... possibly the biggest overall effort invested by the ASLC in a single event in years(?)

I thought it might be useful to mention what I consider to be “lessons-learned”:

1. Considering how many times I asked the builders “Did you read the instructions??”, I should demo each step better & more clearly & rely less on written words.
2. With this size group, you can’t get too hung up on details (like I often do). I can still hear Steve yelling “Just get it collimated & call it good - we have 15 more to do!”

3. Learn quickly which builders are tentative, delicate (& thus slow), and which are heavy-handed, ‘more power’ workers who overdo what’s called for (especially with paint or glue!)
4. Motivation & team-work make all the difference- find ways to foster improvements in both. Example: instead of messy, slow painting of the tube exterior, we ‘wrapped’ each tube with its own unique color of adhesive-backed vinyl, which really needs 4 hands to place properly.

All-in-all, I think we achieved all our major goals (barely, but yes). The kids (& adults) seemed proud of their efforts & results; they learned about reflecting telescopes & how they work; and they picked up a few useful shop-skills. Because we got behind & ran short of time, they missed out on a planned evening training session to give them hands-on scope-operating experience...that’s a biggie to me. BUT Cristina said a local science teacher could help with that, & hopefully introduce them to astronomy.

Would I be willing to do a similar TMW effort in the future?? I don’t know...maybe if it could done with less physical & mental stress. What I really need to do is ‘pass the torch’ - find & train a young(er) astronomer/builder who is willing to take-on this public service task & run with it.

Anyone interested?? 🤔 😊 😄 🤗 🚀



Upcoming Events - Check [ASLC-NM.org](https://www.aslc-nm.org) Event Calendar for details

Friday, June 27th - 7:00 to 9:00 p.m. — ASLC Monthly Meeting

Saturday, July 5th - at sunset — ASLC MoonGaze at the Plaza de Las Cruces

Saturday, July 12th - 9:00 to 10:30 p.m. — Dona Ana Village Association, Private Event

Saturday, July 19th - at sunset — ASLC Leasburg Dam State Park Public Observing

Friday, July 25th - 7:00 to 9:00 p.m. — ASLC Monthly Meeting

****Note that the ASLC-West outreach events at Rockhound and City of Rocks State Parks are on a monsoon hiatus until September****

The Astronomical Society of Las Cruces

(ASLC) is a 503(c)(3) non-profit group dedicated to expanding public awareness and understanding of the wonders of the universe. ASLC holds frequent observing sessions and star parties, providing opportunities to work on Society and public educational projects. Members receive electronic delivery of The High Desert Observer, our monthly newsletter, plus membership in the Astronomical League including their quarterly publication, Reflector, available in either paper or digital format. ASLC members are also entitled to a discount on a subscription to Sky and Telescope magazine. Annual Individual Dues are \$36; Family \$42; Student (Full Time) \$24. Dues are payable in January and partial year prorated for new members. Please contact our Treasurer, Patricia Conley, treasurer@aslc-nm.org for further information.

Regular Events

Monthly, on an evening close to the first-quarter moon, ASLC hosts a public “MoonGaze” observing session in Las Cruces. We also hold periodic special evening sessions at Tombaugh Observatory on the NMSU campus.

Also monthly, the ASLC welcomes public viewing at the Haas Observatory in Leasburg Dam State Park, located just 20 miles north of Las Cruces. Our 16-inch Meade LX200 telescope at this site is used to observe under rather dark skies.

Keep updated on the dates, times, and locations through this [link](#) with additional information available at our website www.aslc-nm.org as well as our [Facebook](#) page.



ASLC-West Update

ASLC-West events held at Rockhound and City of Rocks State Parks are on monsoon-hiatus until September.

Check our ASLC Website event calendar for updates as the summer progresses.

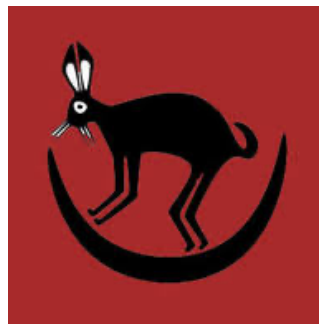


Member Article

Do We Live in a Black-Hole Universe?

By Alex Woronow

Cosmologists have come a long way since Anaximander's Cosmology, but an assumption-free origin story for the Universe has remained elusive. Assumptions are the opposite of facts, and cosmologies reliant on assumptions invite suspicion of invalidity. Most prevailing theories of the Universe's origin assume it originated from a singularity. That seems somewhat logical because the Universe is expanding now, and tracing that expansion back to time zero eventually results in a point-size universe of zero radius and infinite density, and Penrose showed that classical physics does not forbid this initial condition. Not surprisingly,



our known laws of physics just break down in that environment of zeros and infinities (a lot of dividing by zero and such); even the laws of Einsteinian General Relativity cannot describe that presumed initial state of our Universe. If the laws of nature cannot be applied to this stage in the Universe's history, we cannot trace how the Universe evolved from a singularity to current conditions. That is, we cannot say much about the size, mass, curvature, or future of the Universe unless we make some approximations or assumptions from the very start that allow the equations of state to be solved—even if only approximately. However, those assumptions do more than just open the way to analysis; they also dictate the evolutionary path of the Universe. Being

more for convenience than based on factual knowledge, the validity of the assumptions will always be suspect, as will the evolutions they enumerate. To achieve valid histories and predictions, we require a theory that does not have a singularity yet explains the Universe, past and present, while also predicting the Universe's future and making testable hypotheses about what we should observe around us. (We call those conditions on a theory "Science.")

The most popular current theories of the Universe's origin have arbitrary assumptions, such as a brief period when, hypothetically, the Universe suddenly and rapidly expanded, then went back to a slower rate of expansion. This period is known as a time of Cosmic Inflation (CI). CI was invented to explain what we observe in the Universe today and for no sounder reason. No theory explains what caused CI; it simply must have happened to make our Universe the way we see it today.

We encounter another example of an unexplained phenomenon: the Universe appears to be expanding at an increasingly rapid rate; that is, the expansion is accelerating. To explain this observation, cosmologists invented a "Dark Force" to drive the expansion ever faster. No causal explanation for it exists. It was introduced into cosmology models as a constant to make the models match observation. (However, see the last paragraph for one possible explanation. Scientists are creative!)

Enter [1] with their quantum mechanics view of nature! Applying the "Quantum Exclusion Principle" (QEP, aka Pauli Exclusion Principle), they conclude that the Universe could never have been a singularity. Take a collapsing black hole, for example. The prevailing wisdom of classical physics (as postulated by Penrose) is

they can form a singularity—a conclusion based on classical physics. There, as in the case of the Universe, all physical laws break down.

However, QEP states that no two identical fermions (subatomic particles) can occupy the same quantum state at the same place and time; therefore, a limit exists to how far matter can be compressed—it cannot have a zero size and infinite density. Consequently, a black hole can never create a singularity. In fact, when it reaches its compression limit, according to the equations of General Relativity (GR), there would be a bounce; particles would expand away from the center of gravity and continue to expand in size, like an inflating balloon, for some long, but not finite time.

OK, so what if our Universe started out as a black hole? Apparently so. The bounce predicted by the GR would correspond to the "Inflation" event. Mystery force be gone!—explained by "simple" known physics! CI is a direct consequence of the physics of black holes. However, to receive this bounce and not just sit there at some maximum fermion density, certain boundary conditions must exist. These are essentially predictions of what the early Universe looked like, but they are probably untestable predictions. One is that the Universe is of finite size and bounded by an Event Horizon. That means it remains a black hole forever, as seen from outside, and will never have communications with anything beyond its event horizon. It also implies that our Universe has a very slight positive curvature. This arises from the prediction of a finite Universe, and this, in turn, predicts that the Universe will eventually cease expansion and begin to contract.

Another assumption introduced in most cosmological models is that of a Dark Force that

accelerates the observed expansion of our universe. No one knows what causes this force; it is simply assumed to exist to explain observations. However, it is not necessary in a black-hole universe model, as it is a predicted and inevitable part of the behavior after the bounce. Finally, the black-hole, finite universe explains a baffling “anomaly” in the Cosmic Microwave Background: a cutoff of features at 66 degrees. This, too, comes from the fact that the Black-Hole Universe must have an event horizon at a finite distance.

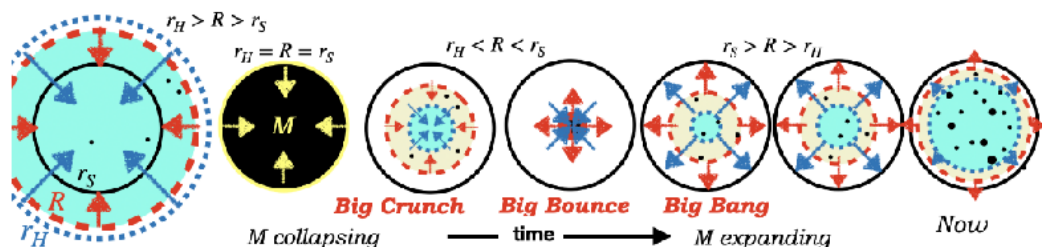
But perhaps the most interesting feature of this model is that it provides a means to calculate the total size and mass of our Universe:

$$\text{Radius} = 5.1 \pm 0.1 \text{ Gpc}$$

$$\text{Mass} = (5.4 \pm 0.1) \times 10^{22} \text{ M}_{\odot}$$

Yes, there are competing models and hypotheses about the Universe. One intriguing hypothesis suggests that the expansion acceleration is not actual but an artifact resulting from the local nonuniform mass distribution in our region of the Universe. We live in a galaxy, in a galaxy cluster, and in a network of galaxy clusters, all of which have gravity, of course, and gravity slows the passage of time. So, we experience a slowing of time not experienced in the voids of our Universe. This difference in our rate of time passage manifests itself as an apparent acceleration of distant objects. Of course, this idea is not a complete theory of the origin and evolution of our Universe, but it could influence which theories we favor and which we do not.

A quick overview of how our Universe came to be the one we live in today would go like this:



Starting at the left, materials start condensing until, in the second stage, the matter forms an “event horizon” and, therefore, forms a black hole. Inside that event horizon (the black circle in the third and subsequent diagrams), the matter in the very center is compressed to the maximum possible for a fermion soup (the Big Crunch), which inevitably leads to the Big Bounce, which triggers the Big Bang and the Cosmic Inflation. “Normal” expansion continues until we have our Universe as it is now, with still a little room for expansion (the white ring) within the event horizon. (Fig 3 in [1])

While alternative models abound, the Black Hole Universe appears to be making a major step in a direction with great promise.

Sources:

Gaztanaga, et al., Gravitational Bounce from the Quantum Exclusion Principle, *Phy Rev D*, 2025. (The above recount of their work was gleaned from an unreviewed preprint.)

Various summaries of the Gravity-Bounce theory found on the internet.

Monthly Meeting Minutes May 2025

John McCullough - Secretary

Call to Order:

Rani Bush, President, Astronomical Society of Las Cruces (ASLC, the Society), called the May 2025 meeting to order at 7:00 pm on 23 May 2025 at the Mesilla Valley Radio Clubhouse. There were sixteen (16) members, spouses, and guests in attendance, as well as seven (7) attendees via Zoom at the start of the meeting.

Rani welcomed the group to tonight's meeting. She announced that the meeting minutes from April 2025 were published in the May 2025 issue of the Society newsletter, the High Desert Observer (HDO). Rich Richins moved that the April minutes be accepted as published and Bruce Wiseman seconded the motion. Rani asked if there were corrections, clarifications, or modifications required. None being offered, the minutes were accepted by acclamation.

Presentation:

Tonight's Tombaugh Series presentation was by Dr. Candice HansenKoharcheck, on "JunoCam Images of Jupiter and Its Moons: A New Perspective". The Juno spacecraft in orbit around Jupiter carries a camera on its payload, JunoCam, used for both science and outreach. Juno's unique polar orbit yields polar perspectives unavailable to earth-based observers or previous spacecraft. In a highly elliptical orbit Juno's closest approach comes within 3500 km of Jupiter's cloud tops. Evolution of the orbit has allowed the spacecraft to pass close to Ganymede, Europa, and Io. Members of the public have been invited to process JunoCam images. Contributions by artists yield products suitable for framing and help us all to appreciate the beauty of the largest planet in our solar system.

Dr. Hansen-Koharcheck is a senior research scientist at the Planetary Science Institute. Her primary interest is the study of ices, polar caps and seasonal processes throughout the solar system. With a B.S. in Physics from California State University, Fullerton, she began her career at NASA's Jet Propulsion Laboratory in 1977, working with the Voyager Imaging Science team. She continued working on Voyager through the Jupiter, Saturn, Uranus and Neptune flybys. In 1994, she earned her Ph.D. at the University of California, Los Angeles. She was the deputy Principal Investigator for the Mars Reconnaissance Orbiter high-resolution camera ("HiRISE"), in its 19th year of operation, and was the science theme lead for the study of Mars' seasonal CO₂ polar caps until her retirement in 2024. As a Co-Investigator on the Juno mission, in orbit around Jupiter since 2016, she is responsible for the development and operation of the JunoCam outreach camera that engages the public in processing images of Jupiter. She is a Co-Investigator on the Europa Clipper mission that launched in October 2024.

There were no additional visitors or guests present at tonight's meeting.

Officer/Committee Reports:

Treasurer:

Trish Conley, Treasurer, was not present at tonight's meeting. In her place, Rani Bush gave a report on the Society's finances. The Society had income of \$139 since the last meeting. However, a large expenditure of \$791 for a 12-month payment on the ASLC's larger storage unit resulted in a negative cash flow of -\$652 for the month. The Society remains +\$610 for the fiscal year. Members can contact Trish for detailed expenditure/income reports.

Outreach:

Stephen Wood, outreach coordinator, reported on recent and upcoming local events. Events and attendance were:

Event	Date	Members	Visitors
May Moon Gaze	03 May	5	30
Stars at the Station	09 May	7	25
LDSP (3rd Qtr. Moon)	17 May	6	30

Upcoming events are:

Event	Date
May Moon Gaze, Pt. 2	31 May
LDSP (3rd Qtr. Moon)	21 Jun.

Contact Stephen if you can support any or all events. He would like to see more members support the smaller events with telescopes.

Apparel:

Don Dapkus, coordinator, has Society-related shirts and caps available. An order for additional items will be placed in the future.

ASLC-West:

Charles Turner reported on recent events. Activities at Rockhound State Park continued to be hampered by weather and on 16 May was eventually clouded out. City of Rocks State Park on 17 May was much better weatherwise but had competition (and added dust and headlights) from a cos-play group meeting in the park and participating in a fantasy game enactment of medieval times. Barry Flansburg, Bill Nigg, John Gilkison, Mike Nuss and Charles were presenters to 2530 visitors.

Mike Nuss and Bobby Franzoy provided a STEM astronomy session at Hatch Elementary on 30 April. Winds were 10 to 15 mph but the seeing was very good.

Pagosa Springs, CO:

Dena Laterza will be making a presentation at the library in Pagosa Springs. She is also coordinating several viewing events around the area.

New Mexico Dark Skies (NMDS):

Jon Holtzman reported on recent state level happenings with International Dark Skies. NMDS is also addressing lighting issues around Las Cruces. NMDS continues to consider Leasburg Dam State Park as a Dark Sky Park/Reserve. Dena Laterza noted she is also working on lighting issues in Pagosa Springs. Contact her if you have ideas on the issue.

Old Business:

- PiFinder build – There was no update on build status.
- Post-meeting gathering – Members will gather at Bosque Brewing Company after the meeting.
- There was no additional old business for discussion.

New Business/Announcements:

- “Astro-Ladies Lunch” – Lydia Tamez was not at tonight’s meeting and Rani Bush reported on the last group gathering at The Bean at Josephina’s in Old Mesilla on 01 May – all attendees had a great time. The next meeting will be at Hacienda de Mesilla on 14 June at 11:30 am.
- Posters – Charles Turner brought posters of the Pleiades and Andromeda Galaxy that can be used for outreach.
- Tim Kostecky noted that ASLC was mentioned in a recent New Mexico magazine article on space tourism in New Mexico. Rani Bush was interviewed at a Moon Gaze for the article.
- Jon Holtzman mentioned recent severe federal funding cuts to science research in general and to NASA efforts specifically.
- There were no additional new business or announcements offered for discussion.

The May 2025 meeting was adjourned at 8:26 pm.

-Respectfully submitted:
John McCullough
Secretary, ASLC

ASLC Board of Directors

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Vice President:	Nils Allen	vp@aslc-nm.org
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Calendar:	Stephen Wood	outreach@aslc-nm.org
Education:	Open	
Loaner Program:	Tim Kostecky	loanerScopes@aslc-nm.org
Observatories:		
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Analemma Imaging Project

Bob Kimball



I am working on a permanent mount for my old Sony camera. At Cruces Creative I been using a 3D printer to make the parts. I plan on practicing from now until the equinox to get the framing right. I'll then start the year long process of imaging the sun every two weeks for a year. Interesting project.

Shown here is my final setup. All 3D printed. Even the solar filter cover!

NGC 6302 - Planetary Nebula in Scorpius

Out of Violence Comes Grace & Beauty
Alex Woronow



Target Description:

A well-known bipolar planetary nebula that, to many, resembles a butterfly. NGC 6302 is young; just 1,000 to 2,000 years ago, the source star expelled the material, and about 900 years ago, the butterfly wings formed. The star that died was about 5 solar masses and is now a white dwarf with a surface temperature of about 200,000K. The image hints at a dark ring of dust pinching the central region and constricting the outflow to feed the wings (as in the Mz 3, the “Ant Nebula,” shown and described here). Currently, the outflow speed is clocked at about 100 km/s, making the lifetime of such objects in the range of thousands of years. (Gemini Deep Research)

Processing Description:

Speaking of data, this data set is near the bottom. Horizontal banding, a big irregular blob in the middle, and subs with 1000% fewer stars as the best ones with the same filter. I tossed 53% of the subs.