Longmont Astronomical Society

November 2026



Heart Nebula
by M. J. Post

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LAS Meeting on November 19

Open Forum and LAS Officer Elections

At the meeting we will have officer elections. Then it will be an open forum. LAS members are invited to give a short (about 10 -15 minutes) presentation on an astronomy related topic.

Possible topics
- Tell us how you are using AI to assist you with astronomy. An observing or imaging project that you are doing
- Talk about an image you have taken - what is in it, equipment used, how you processed it
- Interesting techniques you have learned about
- Great objects in some constellation or fun things to observe next month
- Just about anything astronomy related that interests you will probably interest others as well

You may present in-person or via Zoom. Not mandatory but it would be helpful if you let me know that you would like to present and your topic before the meeting.

- President: Conducts meetings, work with other officers and appointees to complete various tasks
- Vice President: Selects speakers for meetings; conduct meetings in abscense of the president
- Treasurer: maintains the club's finances and roster of members
- Secretary: take notes of meetings, records votes, and attendance
- Board of Directors (5 positions): determine club direction and policies; make financial decisions
- Library Telescope Coordinator: work with local libraries to maintain telescopes we have donated to them
- Public Outreach Coordinator: work with local cities, counties, libraries, and other organization to schedule public star party events
- Newsletter Editor: publish the club's monthly newsletter
- Webmaster: maintain the club websites
- Tech Support: set up equipment for meetings

Location

The meeting will be at the First Evangelical Lutheran Church, 803 Third Avenue, Longmont, CO 80501. The meeting starts at 7 pm.

About LAS

The Longmont Astronomical Society Newsletter ISSN 2641-8886 (web) and ISSN 2641-8908 (print) is published monthly by the Longmont Astronomical Society, P. O. Box 806, Longmont, Colorado. Newsletter Editor is Vern Raben. Our website URL is https://www.longmontastro.org and the webmaster is Mike Hotka. The Longmont Astronomical Society is a 501 c(3), non-profit corporation which was established in 1987.

The Longmont Astronomical Society is affiliated with the Astronomical League (https://www.astroleague.org). The Astronomical League is an umbrella organization of amateur astronomy societies in the United States.

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LAS Officers
President: Vern Raben
Vice President: Gary Garzone
Secretary: Eileen Hall-McKim
Treasurer: Bruce Lamoreaux

LAS Board of Directors
Mike Hotka
Brian Kimball
Tally O'Donnell
M. J. Post

Appointed Positions
Webmaster: Mike Hotka
Library Telescope Coord.: Bruce Lamoreaux
Public Outreach Coord.: Aref Nammari
Newsletter: Vern Raben and Eileen Hall-McKim

Planets in November

Mercury

Mercury is visible in binoculars or small scopes this month before sunrise after Nov. 12. It brightens from magnitude +0.5 to -0.5 by the 30th. The disk decreases from 8.3 to 5.4 arc sec across.

Venus

Venus is visible in low in the sky before sunrise. It is magnitude -4.3 to -4.6 this month. The disc decreases from 59 arc sec across to 39.

Mars

Mars brightens a bit from +0.9 to +0.5 this month. The disc increases from 6.5 to 8 arc sec across.

Jupiter

This month Jupiter increases in apparent size from 36 to 39 arc sec across and its apparent brightness increases slightly from -2.1 to -2.3 magnitude. The following are good times to view Jupiter Great Red Spot:

Date	Time	Altitude	Date	Time	Altitude
Nov 1	5:10 am	40 °	Nov 20	5:53 am	65 °
Nov 4	2.40 am	30 °	Nov 21	1:44 am	31 °
Nov 8	5:57 am	64 °	Nov 23	3:23 am	50 °
Nov 11	3:27 am	44 °	Nov 25	5:01 am	64°
Nov 13	5:06 am	60 °	Nov 28	2:31 am	44°
Nov 18	4:14 am	56 °	Nov 30	4:09 am	61°

Saturn

Saturn decreases from +0.4 to +0.7 magnitude in apparent brightness and the disc is 19 arc sec across. It is in constellation Cetus.

Uranus

Uranus is in constellation Taurus. The apparent magnitude +5.6 in brightness and the disc is 3.8 arc sec across. It is in the constellation Taurus.

Neptune

Neptune's apparent brightness is +7.8 and the disc is 2.3 arc sec across. It is in constellation Pisces.

Lunar Phases in November

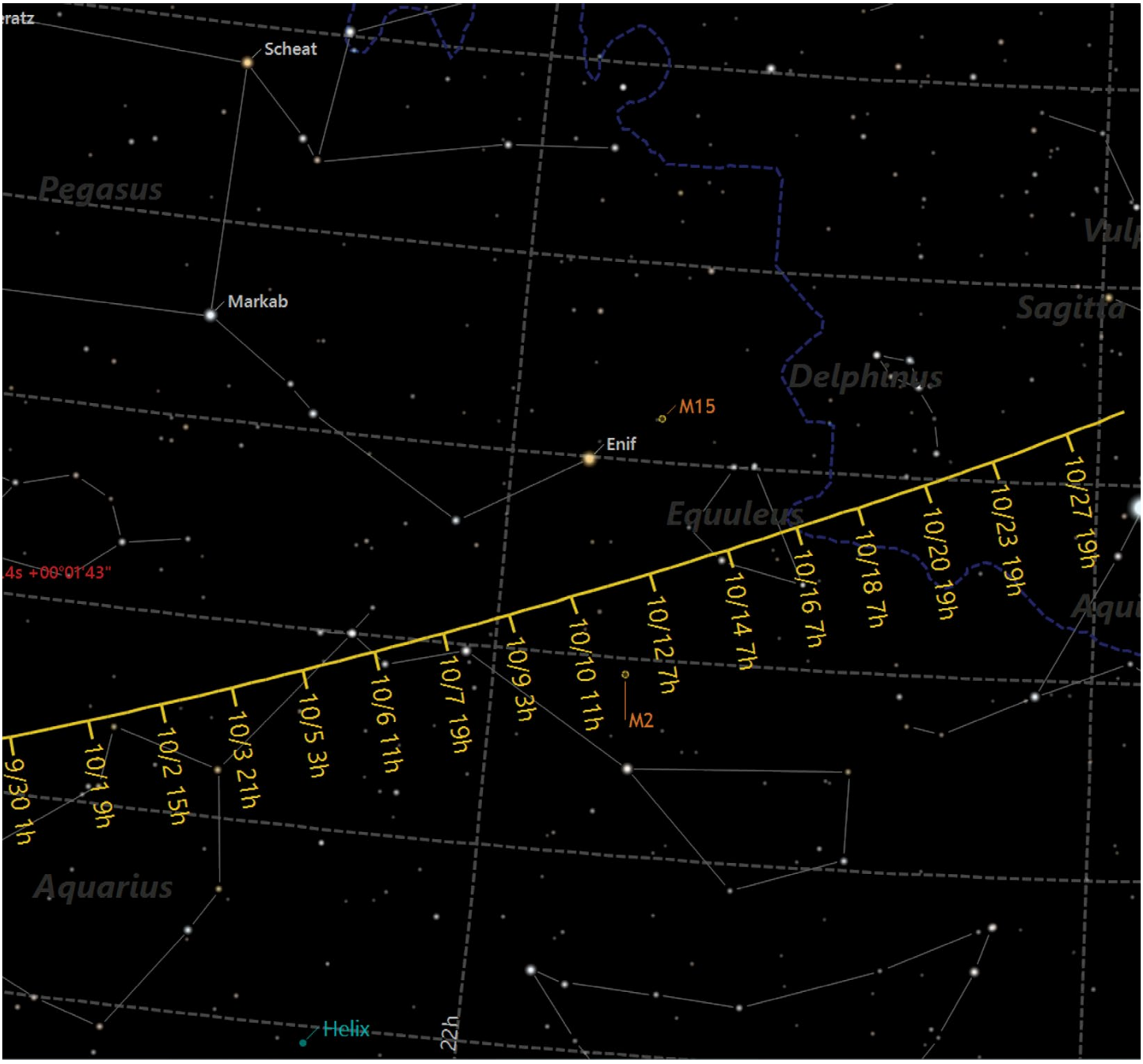
November 1 - Third Quarter Moon at 1:30 pm
November 9 - New Moon at 11:55 am
November 17 - First Quarter Moon at 4:49 am
November 24 - Full Moon 7:55 am

Meteor Showers in November

On night of November 17/18 the Leonids meteor shower peaks. Expect to see 10-15 meteors per hour. The Leonids are debris of comet 15P/Tempel-Tuttle hitting the Earth's atmosphere.

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Comet C/2026 A2 (Bok)



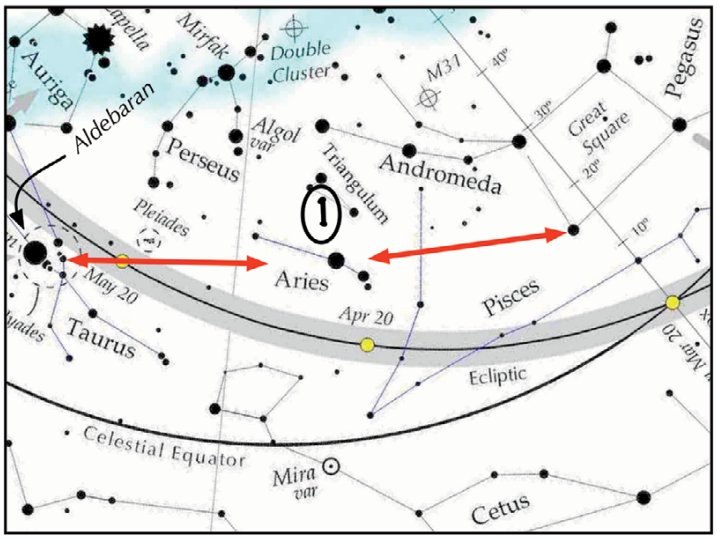
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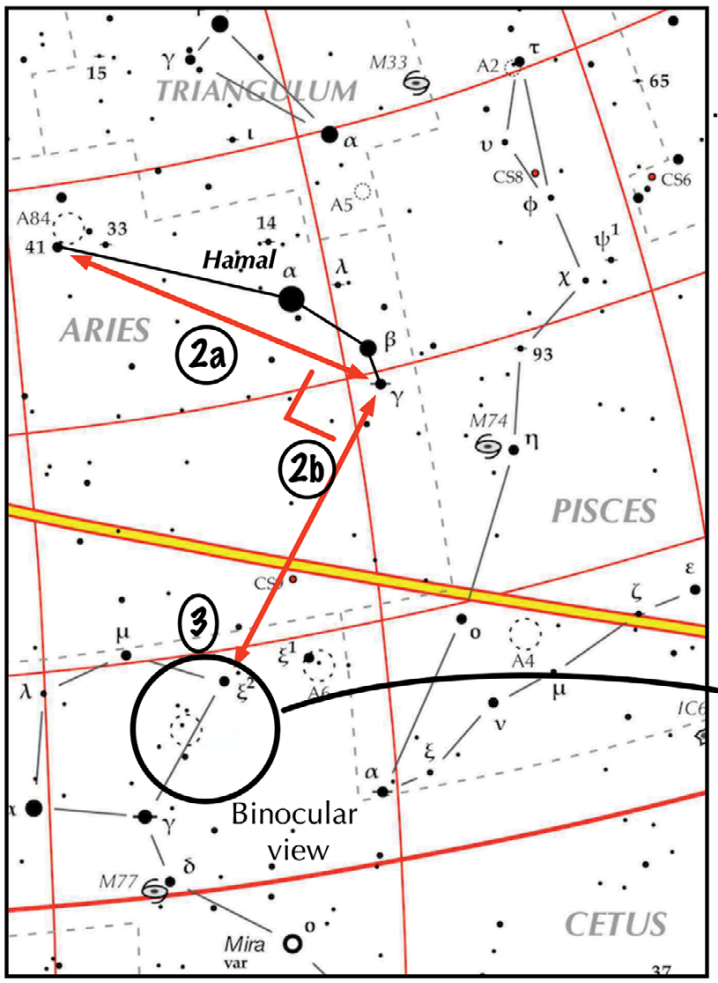
Date	Optimum Time	Right Ascension	Declination	Constellation	Apparent Magnitude	Apparent size in arc min
Oct 1	10:23 pm	23h14m31.7s	-05°09'31"	Aquarius	11.3	2.7
Oct 7	10:04 pm	22h10m29.3s	+00°43'54"	Aquarius	11.3	2.6
Oct 13	8:49 pm	21h19m06.6s	+05°39'23"	Equuleus	11.4	2.3
Oct 19	7:55 pm	20h41m28.8s	+09°16'55"	Delphinus	11.7	2.0
Oct 25	7:33 pm	20h14m49.7s	+11°53'36	Aquila	11.9	1.7
Oct 31	7:16 pm	19h55m59.0s	+13°50'35"	Aquila	12.2	1.5

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The Questionmark, an asterism for binoculars

On the Astronomical League's Asterism list

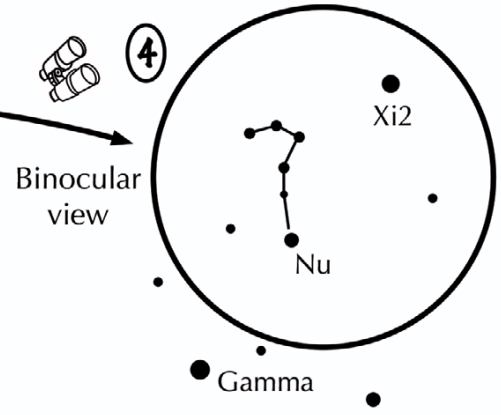




How to find ...

1. Find Aries, which sits mid way between the Great Square in Pegasus and bright star Aldebaran in Taurus. Moderately bright Hamal (Alpha Arietis) is easy to spot, lying near the midway point. Find the dimmer stars Gamma and 41 Arietis.
2. Draw a line from Gamma to 41 and make another line of similar length extending 90° to the south–southeast of Gamma.
3. That line ends near Xi2. It occupies the northwestern vertex of the pentagon of Cetus' head.
4. Place Xi2 near the northwestern edge of the binocular field. The stars of the Questionmark are near the center of the field. These stars are arranged by chance, they are nowhere near each other in three-dimensional space.

Asterism Observing Program

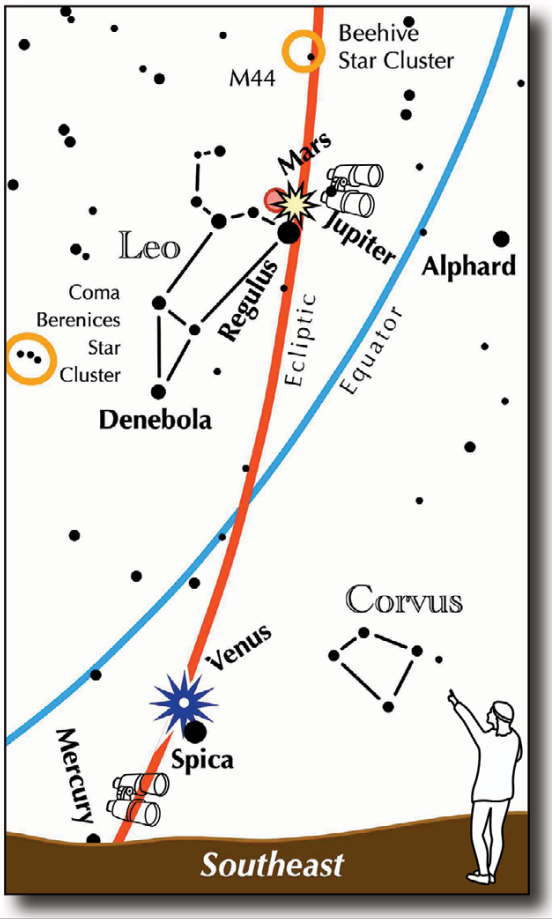


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In the early mornings around November 15-18, try this activity:



Count the bright celestial wonders strung along the ecliptic

1. Red Mars meets bright Jupiter high in the southeast ninety minutes before sunrise. Grouped with them is the brightest star in Leo, Regulus.

2. Much nearer the southeastern horizon shines brilliant Venus sitting just above the bright star Spica.

3. 40 minutes before sunrise, little Mercury pops above the horizon, far below Venus. Binoculars help spot it in the bright twilight.

Grab a quick look at **Venus** through any telescope. Its beautiful, thin, and brilliant crescent awaits! As the mornings pass, the crescent grows smaller, but thicker.



View in the southeast on November 15-18 90 minutes before sunrise

What a great way to start your day!

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LAS Meeting Notes October 15, 2026 by Eileen Hall-McKim

I. Introduction:

Our LAS October meeting was held in-person and by zoom on October 15th at the Longmont Evangelical Lutheran Church, 803 Third Ave. President, Vern Raben began the meeting with self-introductions of those attending in person. Fourteen attended in person, 6 by zoom.

II. Main Presentation:

The speaker at the meeting is David W. Barker and his presentation is "How We Discovered Our Cosmic History and What We Have Left to Explore".



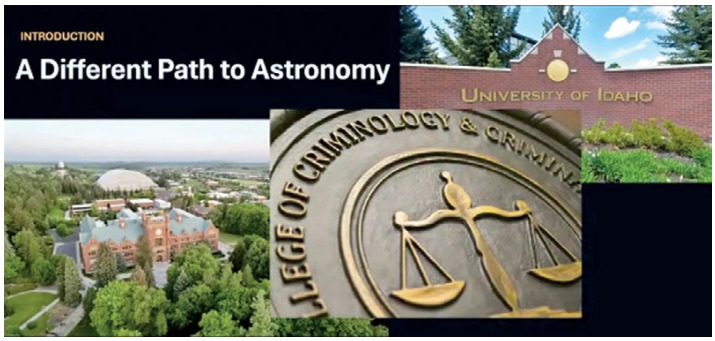
David is a graduate student in the Department of Astrophysical and Planetary Sciences at the University of Colorado Boulder. He began his college career at the University of Idaho in Moscow, ID studying criminology. After graduation he joined the US Navy as a Surface Warfare Officer (SWO), where he served for 4 years. After completing his time in the Navy in 2018, he continued his education at University of Colorado Boulder in the Astrophysical and Planetary Sciences department, graduating in 2022 with distinction. He's now a graduate research assistant working with Professor Emeritus Jack Burns and the 21 cm cosmology group.

David's research focuses on simulations and signal-extraction techniques for lunar radio telescopes such as LuSEE-Night and ROLSES-2. These instruments are designed to operate on the far side of the Moon, where they can search for the extremely faint 21-centimeter signal from the cosmic Dark Ages—the era after the formation of the cosmic microwave background but before the first stars and galaxies lit up the universe. It's exciting, frontier work that uses the unique radio-quiet environment of the lunar far side to probe some of the earliest periods in cosmic history.

"My research focuses on detecting the radio signal from the Dark Ages and using that signal to potentially identify exotic physics. I've worked with groups studying a wide variety of different topics from passive dark matter detectors to cislunar orbital architectures. I enjoy many different research subjects, but am particularly interested in all things cosmology, especially dark matter and its structure and gravitational dynamics at galactic scales. Tonight I'll go through an overview of the early universe and what we can learn from instruments observing at different frequencies, focusing on some cutting-edge radio astronomy from the moon that may allow us to observe the cosmic Dark Ages, an era before the first stars were born that has never been observed."

Starting point of the Big Bang, then into age of Cosmic Microwave Background (380,000 years), the Dark Ages (100 Million Years) between the CMB and the First Stars and Galaxies (100 Million – 1Billion Years) and into the Modern Universe (9+ Billion Years)

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A Different Path to Astronomy

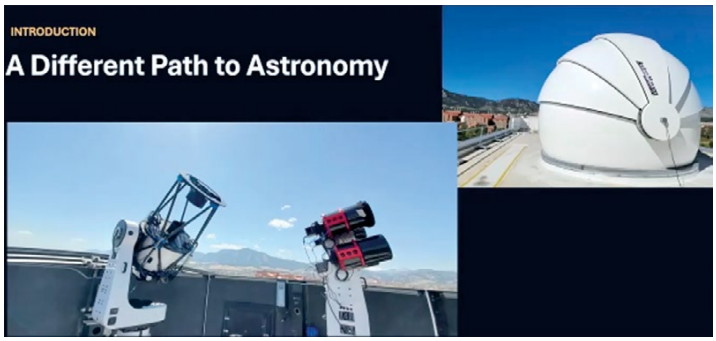
David's first institution was the University of Idaho where he studied Criminology and thought about career in FBI, leading him into the Navy.

Navy ships David served on – stationed in San Diego

- Amphibious Transport Dock LPD-22
- Infamous Gabby Gifford made of aluminum and breaks down a lot but really fast

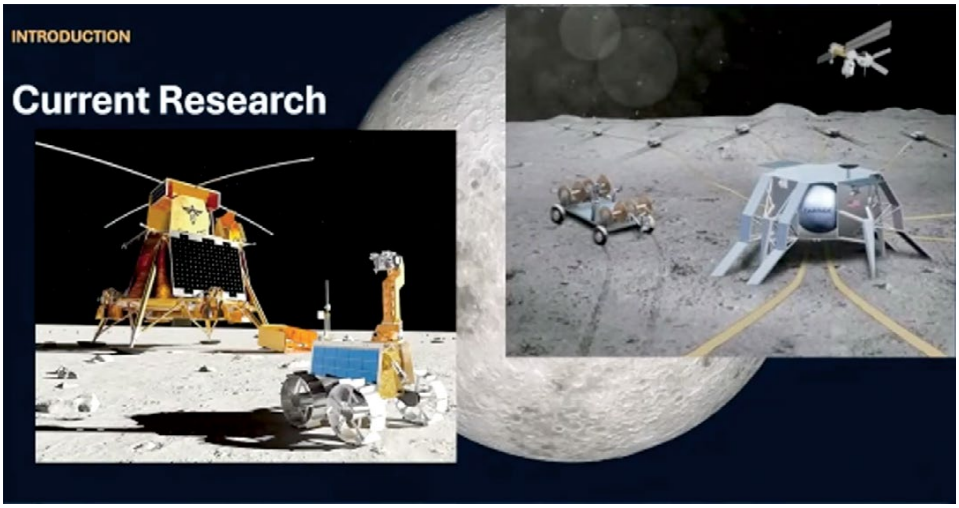


- Worked with group with VADeR Lab CU Boulder Aerospace Department of Defense. I helped automate the observatory - tracked satellites trying to identify "bad actors"
- Ferme Lab Chicago – Worked to develop Pathfinder Dark Matter Detectors - none have worked but are really cool!

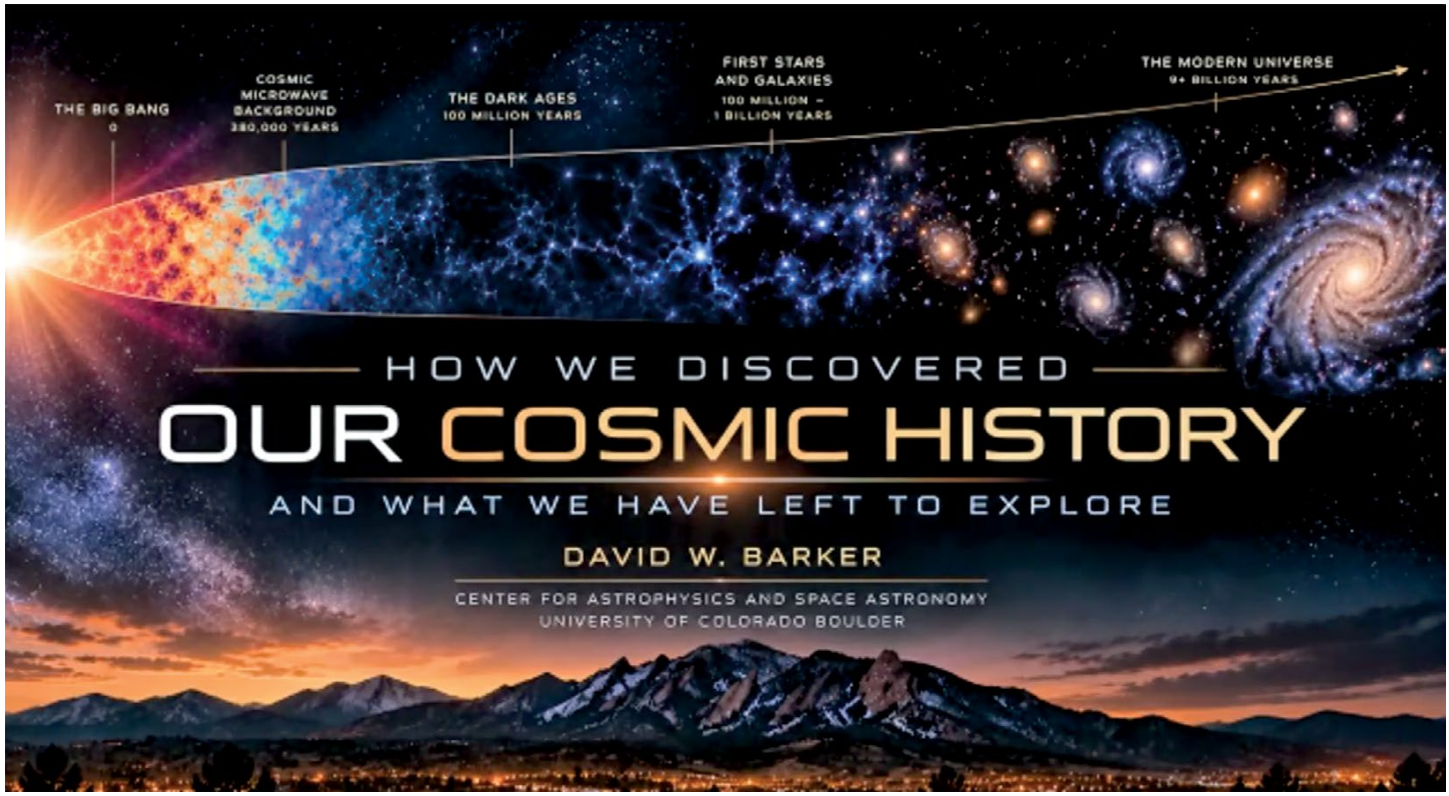


Current Research – Moon Stuff – specifically on far side of the moon

- LuSEE Night – already built, ready to go just have to mount it onto the lander
- Farside – under development



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The History of Modern Cosmology: How Did We Get To Our Current Level of Knowledge?
We will take a journey through history to see how we got to the Big Bang, Inflation, and Lambda Cold Dark Matter cosmology.

Figure from William Hershel's 1785 paper

- What we knew at the turn of the 20th century
- Good to remember – we stand on the shoulders of giants
- The Milky Way is big, but not infinite, we knew very little beyond that
- 1901 This is what we thought we lived in what not understood - the spiral shape

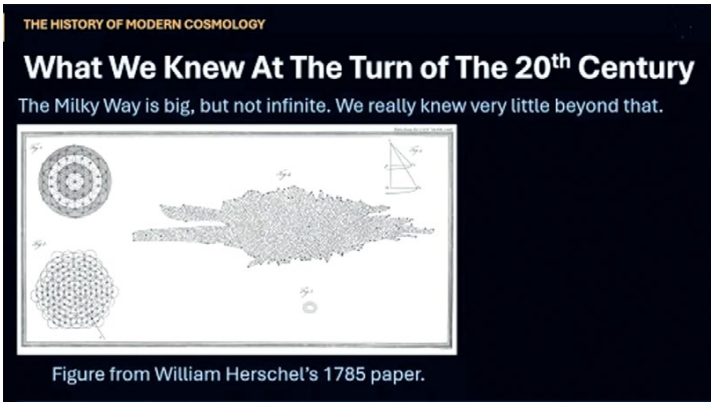
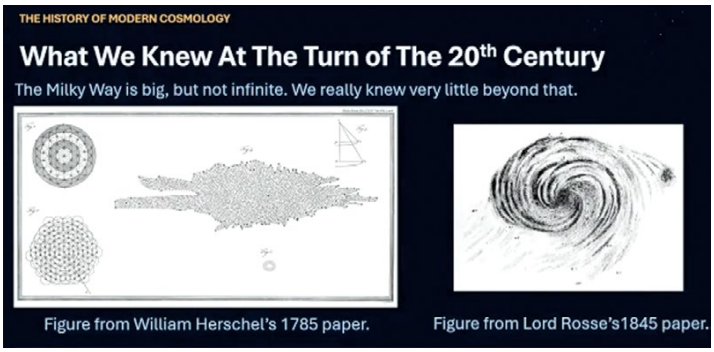


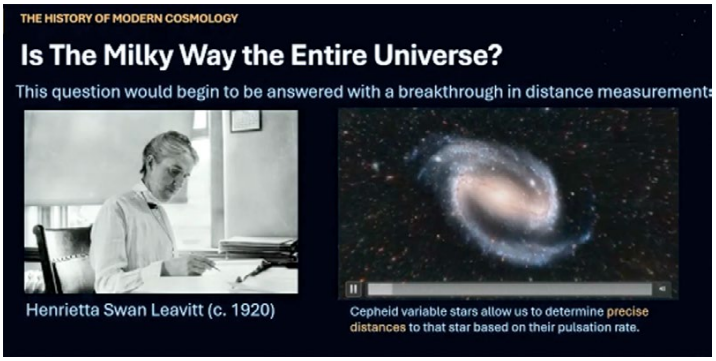
Figure from Lord Rosse's 1845 paper

- Started seeing nebula and more – the question on peoples mind - was the Milky Way the entire Universe? In order to answer this we needed to know the distance to things

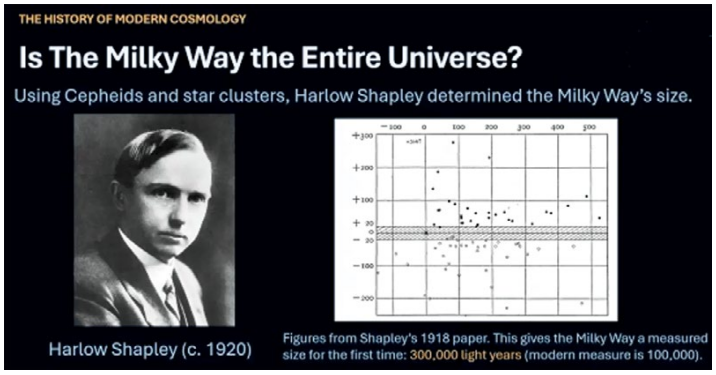


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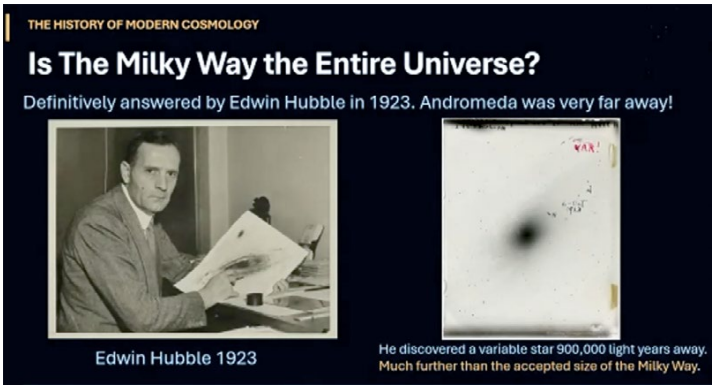
- Henrietta Swan Leavitt (c. 1918) pioneered the breakthrough in distance measurement using Cepheid Variables – well known stars that pulse consistently
- Once the rate of pulsation is determined can take that radius and the perceived brightness and from there can backout the distance to the star and nearby stars



- Harlow Shapley (c. 1920) using Cepheids & star clusters determined the Milky Way's size
- Figures from Shapley's 1918 paper – this gives the Milky Way a measured size for the first time: 300,000 light years (modern measure is 100,000 light years)



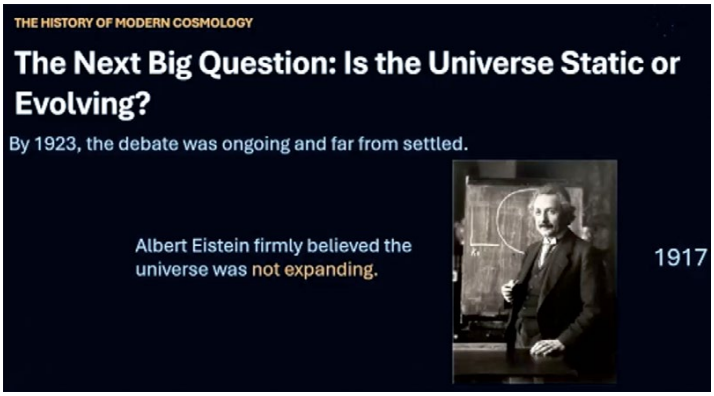
Is the Milky Way the Entire Universe?
- Edwin Hubble looking at Andromeda, discovers a variable star in Andromeda, calculated to be 900,000 light years away, much further than the accepted size of Milky Way
- Now we know for a fact that the Milky Way is not the only galaxy!



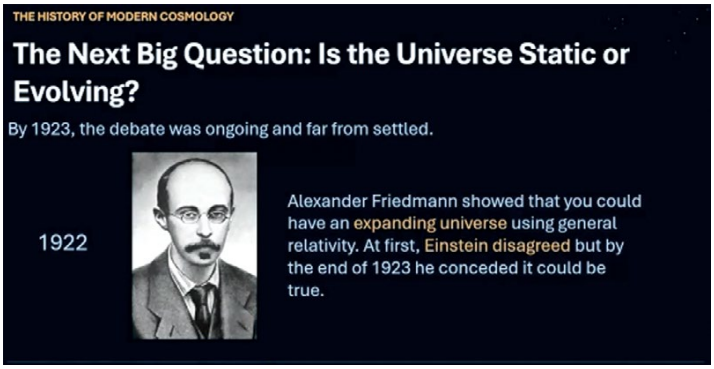
Next Big Question: Is the Universe Static or Evolving?
- By 1923 the debate was ongoing and far from settled, physicists like Einstein wanted to know does this Universe change? Did it exist immediately or has it evolved?
- Vesto Slipher (1912) had discovered "nebula" (later determined to be galaxies) moving away from us (redshifted) moving toward us would be (blueshifted) similar to doppler shift from sound



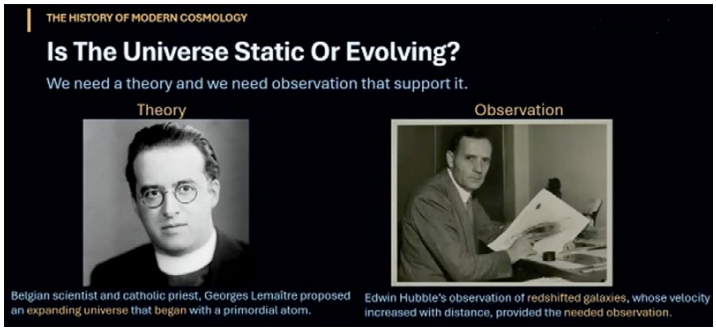
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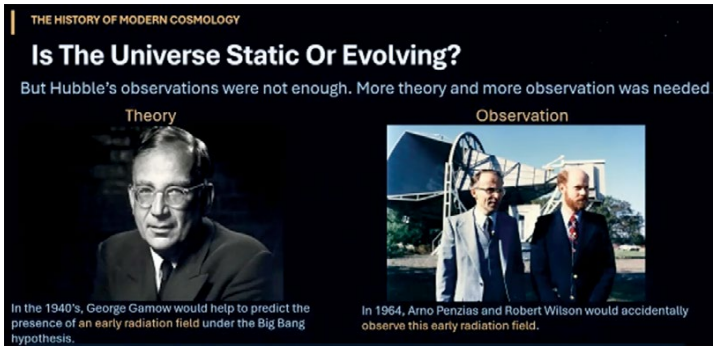
- Albert Einstein (1917) firmly believed the universe was not expanding, said he had done the math and it is not possible



- Alexander Friedmann shows that you could have an expanding universe using general relativity, at first Einstein disagreed but by the end of 1923 he conceded it could be true



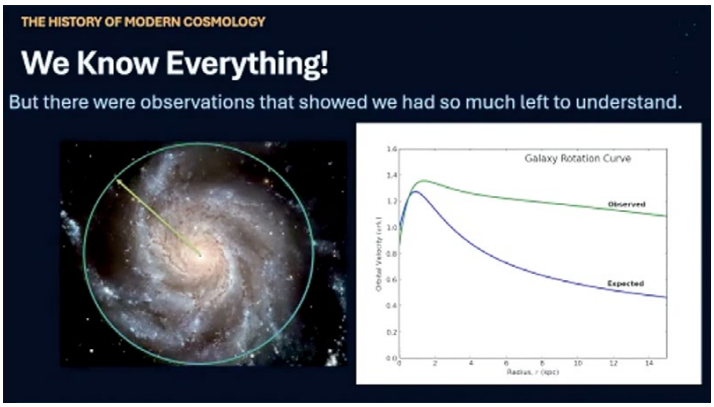
- We needed a theory and we need observations that support it
- Belgian scientist and catholic priest, Georges Lemaitre proposed an expanding universe that began with a primordial atom, some kind of small point
- Observation needed to support this again came from Edwin Hubble's observation of redshifted galaxies whose velocity increased with distance- determined the Hubble constant based on that



But Hubble's observations were not enough; more theory and observations needed

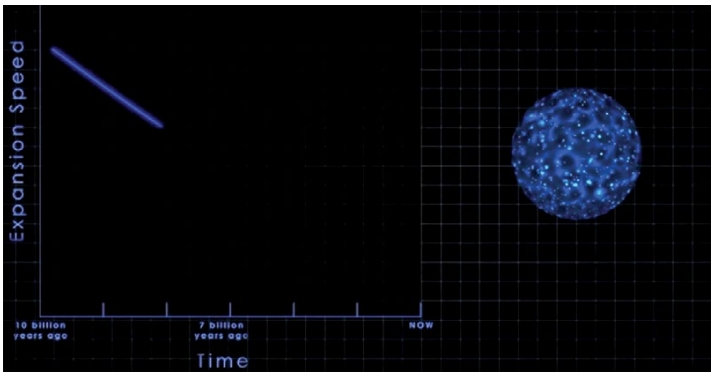
- In the 1940s George Gamow (CU Boulder Professor) would help to predict the presence of an early radiation field under the Big Bang hypothesis, later called the Cosmic Microwave Background
- In 1964, at Bell Labs Arno Penzias and Robert Wilson would accidently observe this early radiation field, working on horn antenna in radio frequency band kept having background noise, other antennas were also picking up background noise, later would be discovered to be the Cosmic Microwave Background, (CMB) finally proving earlier theories that the Universe not static but evolving.
- But there were observations that showed we had so much left to understand

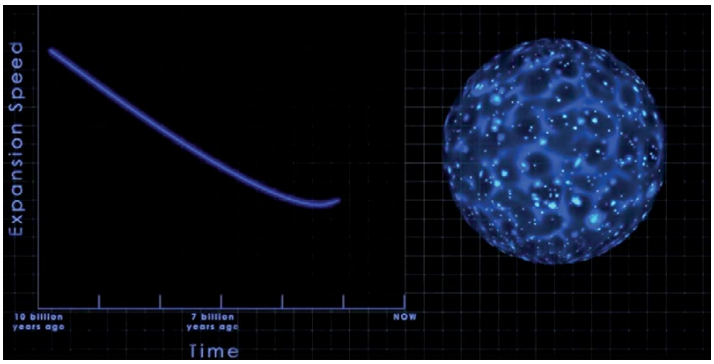
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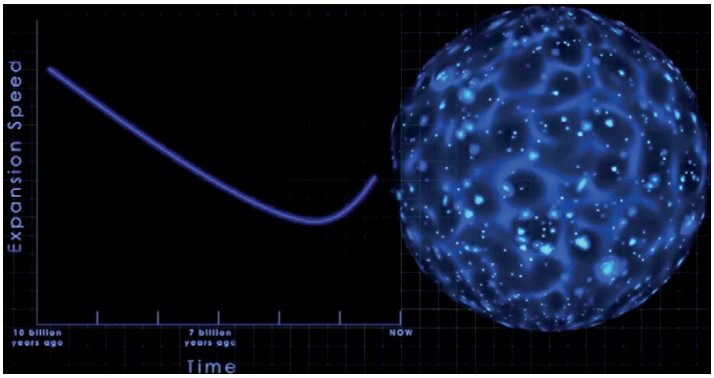
Three observation that throw a wrench into our clean cosmology picture we have up to now

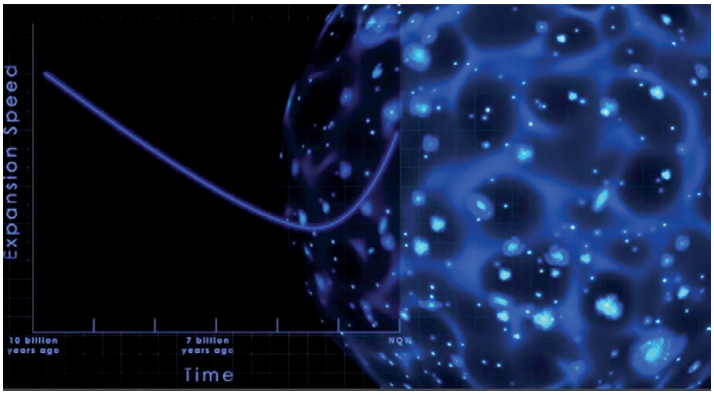
- Stars are moving too quickly within galaxies! There must be more gravity or missing mass than we think. Looking at stars at edge of spiral galaxies, can measure gravity and determine how fast stars are moving, but what we see is they are moving much faster!





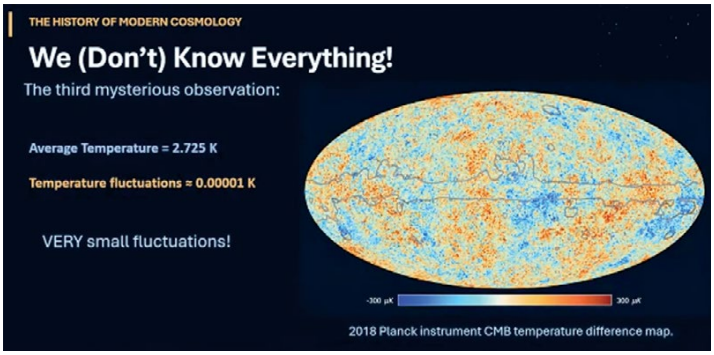
- How quickly the Universe is expanding vs time, speed goes down but then speeds up
- The expansion rate of the universe is accelerating! No physics to explain this!





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- The Cosmic Microwave Background is unusually uniform! – no temperature difference across space – very strange there should some differences in temperature!



What are the current theories for these observations?

1) Stars are moving too quickly within galaxies! There must be more gravity than we think!

- Vera Rubin at the Kitt Peak's 84" telescope – 1970 trying to identify the speed of these stars as they orbit around the center and discovered it gets flat instead of going down
- Original figure from Ford and Rubin's 1970 paper
- Theory is Dark Matter – an invisible halo of massive particles must exist around all galaxies and galaxy clusters – but all that tells us is what is missing
- WIMP (weakly interacting massive particle) – particle does not interact with photons
- Massive - can still exhibit a gravitational field and make things adjust in their orbital speed



Dark Matter Detectors!

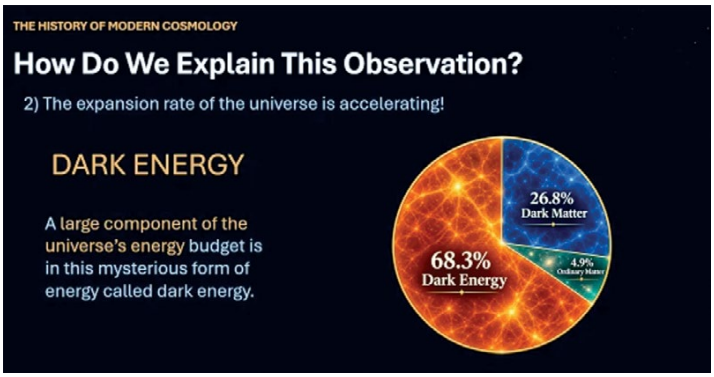
- Left: LZ dark matter experiment. Right: XENONnT experiment

- The expansion rate of the universe is accelerating!
- Nobel Prize winners from left, Saul Perlmutter, Adam Riess, and Brian Schmidt
- Type 1A Super Nova – similar to Cepheid Variable, don't look right, something off- universe expansion is accelerating

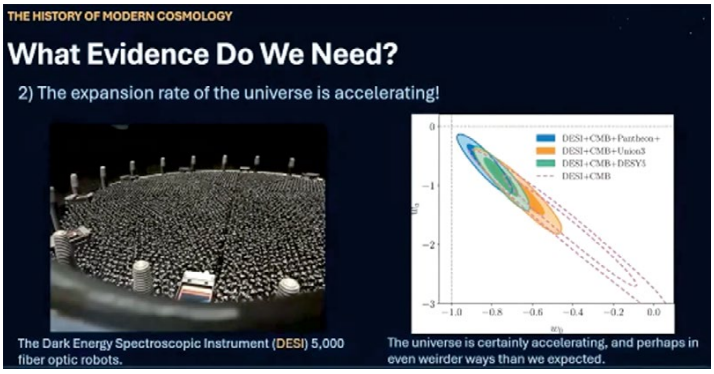


Dark Energy – A large component of the universe's energy budget is in this mysterious form of energy called dark energy – energy that acts very strange

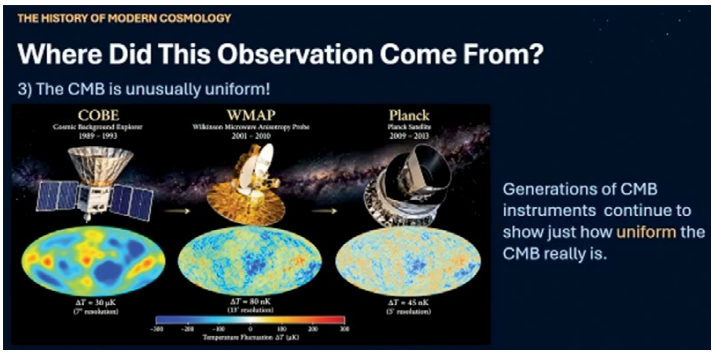
- Has negative pressure - is required in order to explain



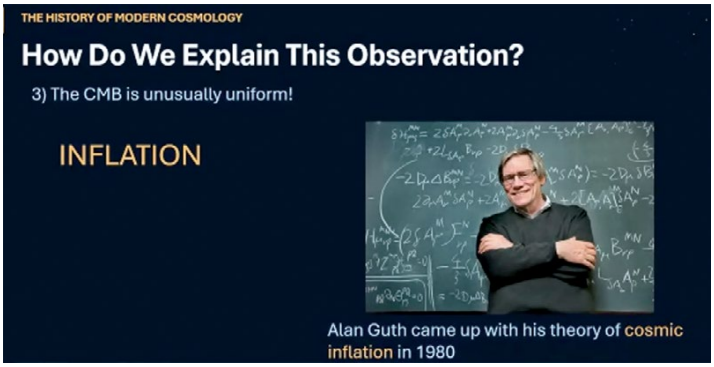
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- The Dark Energy Spectroscopic Instrument (DESI) 5,000 intricate fiber optic robots
- Each can perform redshift or blueshift on galaxies, allows them to do tens of thousands
- The Universe is certainly accelerating, and perhaps in even weirder ways than we expected, also is a changing function



3) The CMB is unusually uniform! – Generations of CMB instruments continue to show just how uniform the CMB really is, as instrumental measures improved, resolution gets better it is becoming even smoother with less of fluctuation than we thought



How Do We Explain This Observation? INFLATION

- Very complex theory to understand, so will talk about basics
- Alan Guth came up with his theory of cosmic inflation in 1980
- The universe underwent a dramatically fast expansion early in its history, temperature in equilibrium early and then dramatic expansion keeping uniformity in the CMB

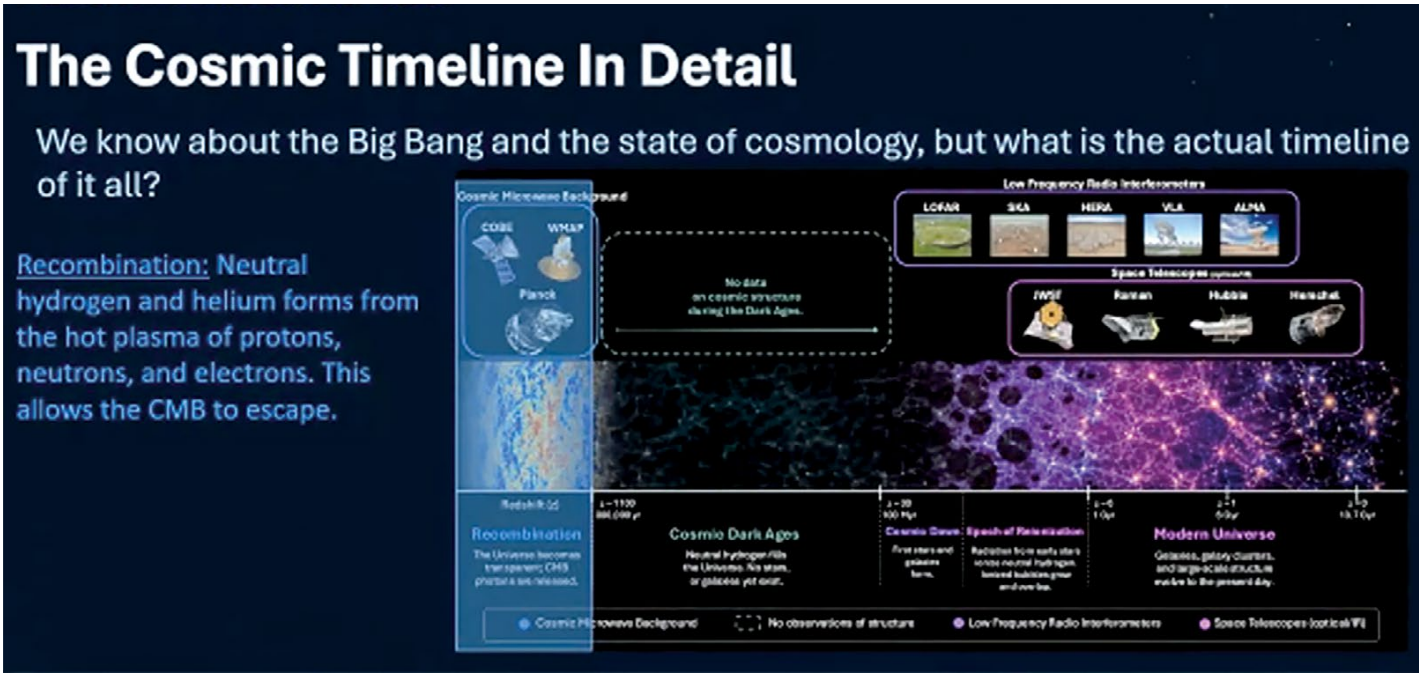


- But how can you identify this kind of rapid inflation going on there must be some kind of very dramatic thing?
- If we can detect the B-mode polarization of the CMB to a high enough precision, could lend evidence to inflation – gravitational waves interact with photons to create spin
- Left: Simons Observatory; Right: BICEP3

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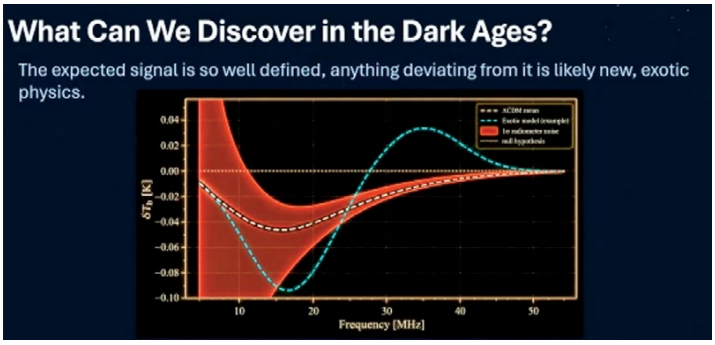
David's Current Research

Mission Statement: To explore a part of the cosmic timeline that no one has ever observed to date. Perhaps our answers lie there. Special interest in the Dark Ages Era. We know about the Big Bang and the state of cosmology, but what is the actual timeline of it all?



The Cosmic Timeline in Detail

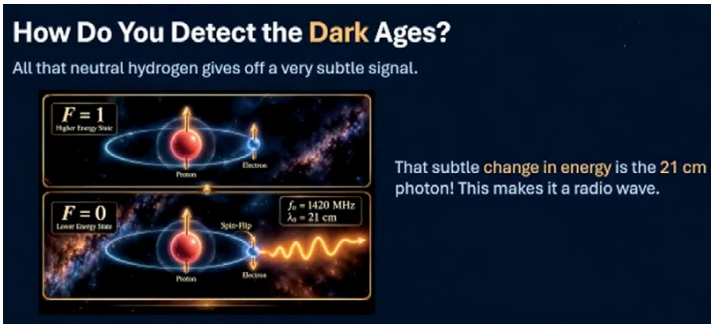
- Following Big Bang Recombination: Neutral hydrogen and helium forms from the hot plasma of protons, neutrons, and electrons. This allows the CMB to escape.
- The CMB does not give us a history of universe, give us a snapshot of when it was a baby
- Cosmic Dark Ages – This is era right after CMB has flown off, no stars yet, very dark not much going on but still hot with a lot of structure
- Cosmic Dawn – first stars and galaxies, population 3 stars far larger than any we have today no metal, very pure, only theory but we do believe they did exist
- Epic of Reionization – intergalactic medium reionize to convert back to ions



The example expected Dark Age signal – graph with temperature vs frequency is so well defined (gold line) anything deviating from it is likely new, exotic physics

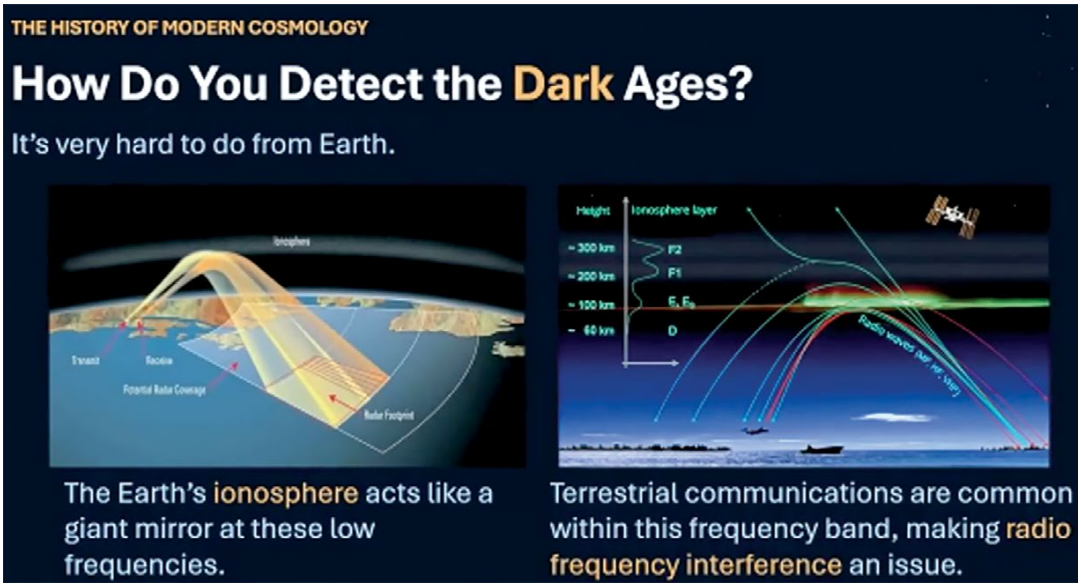
How Do We Detect the Dark Ages?

- All that neutral hydrogen gives off a very subtle signal
- That subtle change in energy is the 21 cm photon!
- This makes it a radio wave and it is very hard to detect from Earth
- 1-50 MHz is what we want to detect but cannot from Earth



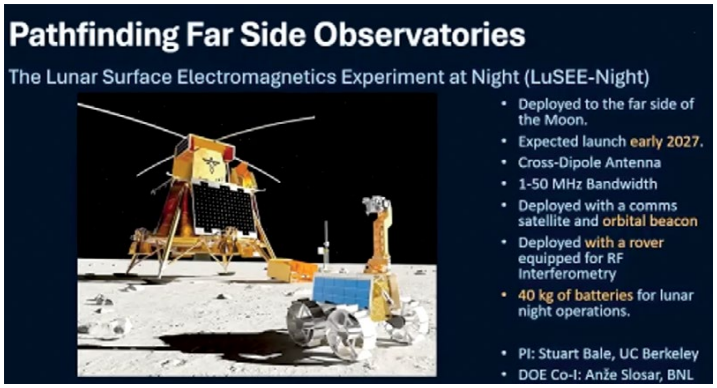
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- The Earth's ionosphere acts like a giant mirror at these low frequencies
- Terrestrial communications are common within this frequency band, making radio frequency interference an issue
- So..we need to go to the far side of the Moon



Pathfinding Far Side Observations
The Lunar Surface Electromagnetics Experiment at Night (LuSEE-Night)

- Deployed to the far side of the Moon
- Expected launch early 2027
- Simple Cross-Dipole Antenna
- 1-50 MHz Bandwidth
- Deployed with a comms satellite and orbital beacon
- Deployed with a rover equipped for RF Interferometry
- 40 kg of batteries for lunar night observations
- PI: Stuart Bale, UC Berkeley
- DOE Co-1: Anze Slosar, BNL





Instrument Eye Candy: antennas that shoot out when they deploy

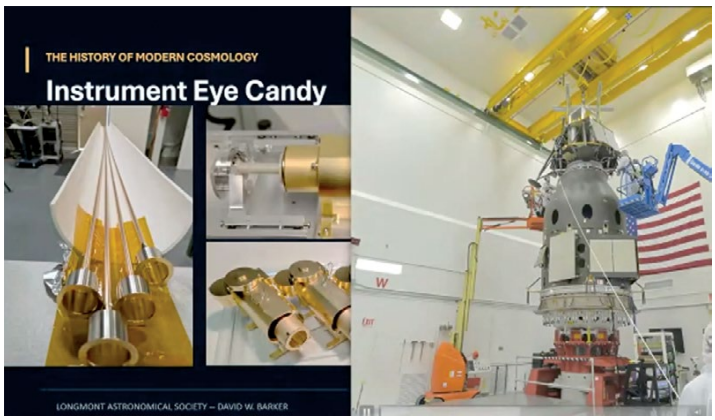
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LuSEE-Night Instrument being mounted on the lander - small gold box at the top









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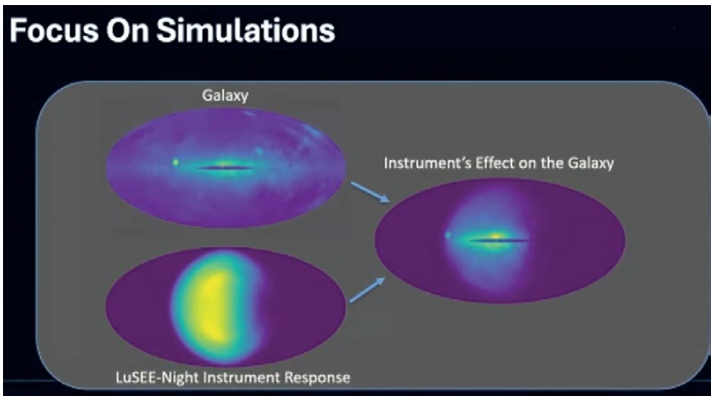
Future Observatories: The Next Steps
(FARSIDE) – The Farside Array for Radio Science Investigations of the Dark Ages and Exoplanets Interferometer is a proposed project under construction from Schmidt Sciences.

Future Observations:
(FARVIEW) Flagship Mission of Interferometers- small dipoles all over the Moon – a couple square kilometers filled with these dipoles (may be several decades)



David's focus on Simulations of LuSEE and Applying Simulation to Detecting Exotic Physics

Focus on Simulations: Instrument effect of LuSEE-Night



antenna on a galactic foreground – this is how it looks when they interact with each other – take that data and plug it into Singular Value Decomposition (machine learning. Trying to work to prepare us to do a quick analysis of data and to better influence how we design instruments that have not yet been made and packaged up to head to the Moon yet.

David applies these simulations to see how likely we are to detect certain exotic signal basically showing that there are strange and interesting things out there that are occurring during these Cosmic Dark Ages that can be detected. "I have the best job in the world and I get to show pretty pictures of cool "Moon Stuff".

Questions and Comments

- Are the dark ages called dark ages because the medium is opaque or because there isn't anything beyond these radio waves to produce light?
- I assume since you are on the farside of the moon you can't really communicate directly to it so it goes up to an orbiting satellite?
- If you could improve one thing about this instrument would you rather have it more sensitive or more precise?
- Arecibo is essentially a telescope dish put into a volcanic crater, and I hear the dark side of the moon has a few craters to work with.
- With the moon mission on the screen, how do you think they would handle deploying all those individual dipoles in the spots needed, especially on the far side of the moon?
- Because it's on the Moon and in the shadow, do you get an advantage because the electronics now are not so noisy?
- Speaking of the antennas do you have any capability of what I call transmatch where the output of the transmitter might be 50ums but the antenna might be 300ums, there are circuitries you can use to match those impedance so the antenna still works pretty well do you have any kind of capability like that?
- If there is going to be an orbiting calibration source its transmits a different wavelength and you see the responsive.

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- If you used a natural source such as a quasars which are extremely stable and consistent you wouldn't have to putz with all this.

III. LAS Treasurer's Report by Bruce Lamoreaux

Longmont
Astronomical Society

P.O. Box 806
Longmont, CO 80502-0806

LAS Treasurer's Report - Bruce Lamoreaux **10/15/2026**

Main Checking Account (xxx-1587)			(x8379)
Begin Balance:	$	4,245.00	**9/1/2026**
Deposits:	$	50.00	Membership
Expenses:	$	(204.00)	Website, Stripe
Current Balance:	**$**	**4,091.00**	**9/30/2026**

2-Year Savings Account (xxx-1478) (matures 10/23/25)			(x7771)
Past Balance:	$	8,355.00	**9/1/2026**
Interest:	$	-	
Balance:	**$**	**8,355.00**	**9/30/2026**

Telescope Fund (xxx-0165)			(x2469)
Past Balance:	$	1,090.00	**9/1/2026**
Deposits:	$	-	
Expenses:	$	-	
Balance	**$**	**1,090.00**	**9/30/2026**

Petty Cash		
Past Balance:	$	50.00
Deposits:	$	-
Expenses:	$	-
Balance	**$**	**50.00**

Total Assets	**$**	**13,586.00**	($154.00) Down from September

Active Membership:	**94**	
Student Membership:	**0**	
Total	**94**	Active

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IV. Upcoming Events / Announcements

Public Star Parties

- Erie Elementary STEM class – November 9th from 6:00-8:00 pm. Last time we had 200-300 people so if we have good weather that night we are going to need some scopes!
- Rabbit Mountain Star Party – November 13th from 4:30-7:00 pm
- Longmont Public Library – November 19th from 5:00-7:30 pm

Update on 40th Anniversary Celebration

We thought with our 40th anniversary coming in January 2027 it would be fun to do something more special for our banquet and have a larger space to ourselves. Vern, Bob and Eileen went to look at Isaac Walton Clubhouse on Sunset, Longmont, right on the river, nice facility.

- Right now there is a fee for renting the building at $340.00 ($85.00/hr x 4 hrs) 5:00-9:00 pm to allow time to set up and clean up afterwards, putting chairs away, etc.
- There is a form we can fill out and we may be a able to get a discount
- We want to try to find something easy and affordable to cater in for dinner so we will be talking about that this coming month
- If any old-timers are listening and you have any pictures or anything like that we will be putting together memories how this whole thing started
- Need to allocate some money but the amount should be able to be approved by board

Calendars

Some members met to select images to put together our 2027 Calendar
This year will include birthdays of famous astronomers and moon phases, meeting dates
Should be available at next meeting and at the January Banquet

Little Thompson Observatory has public nights of viewing on some Friday nights. More than telescopes, seismometers, meteor scanners, radio telescopes, and more! New Observatory Dome being built west of Berthoud.

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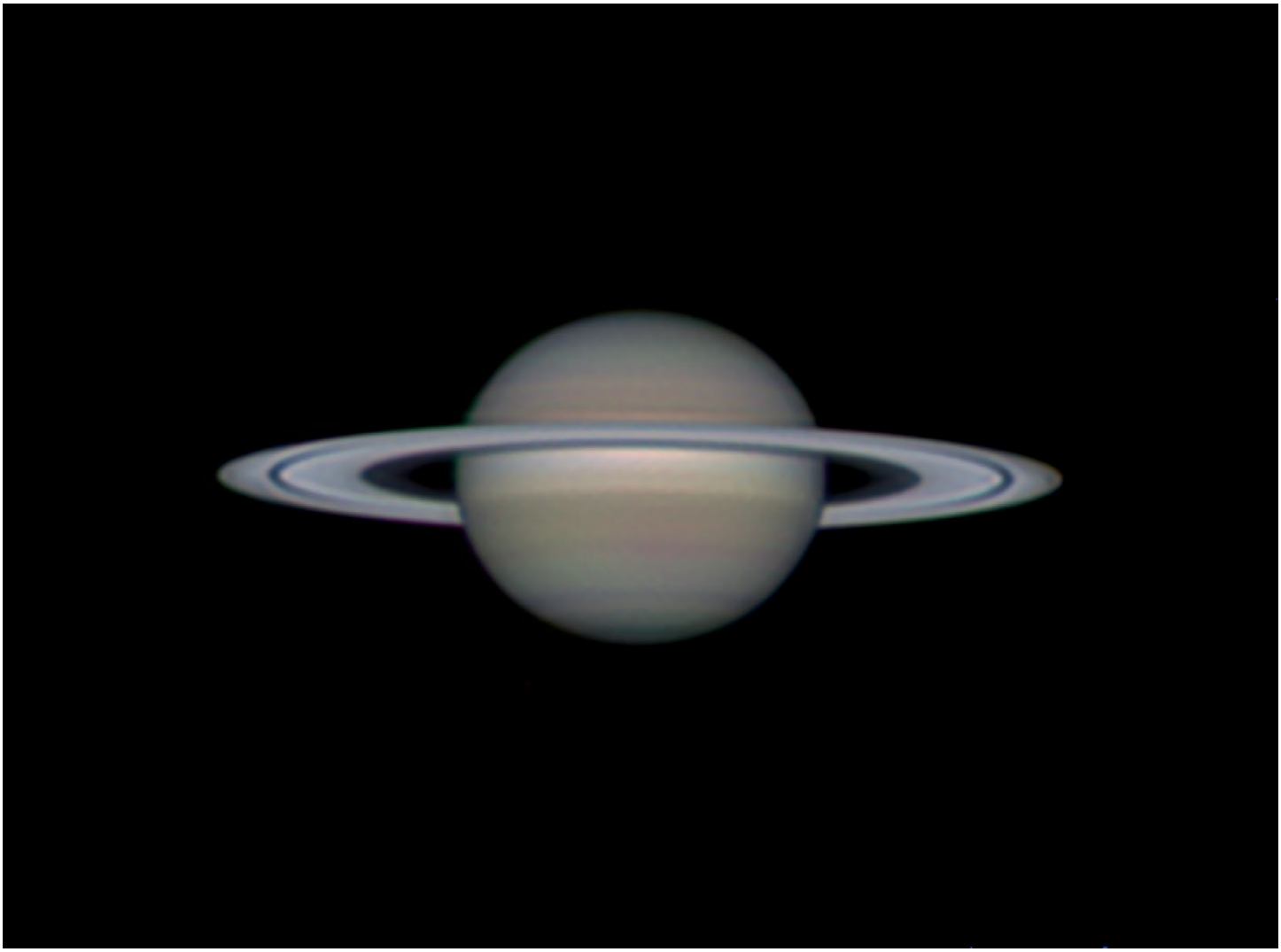


M33 by Martin Butley

Inspired by Jim Pollock's great image of M33, I decided to try imaging it at Starry Meadows. Mew moon and right time of year, reasonablu above the horizon, all evening long. I used my Takajashi 130 FSQ with ASI6200. LRGB subs of 300 sec; Ha 600 sec; 31 Ha (?)
43 subs each of RGB (300 sec); 31 of Ha (600 sec)

Marty

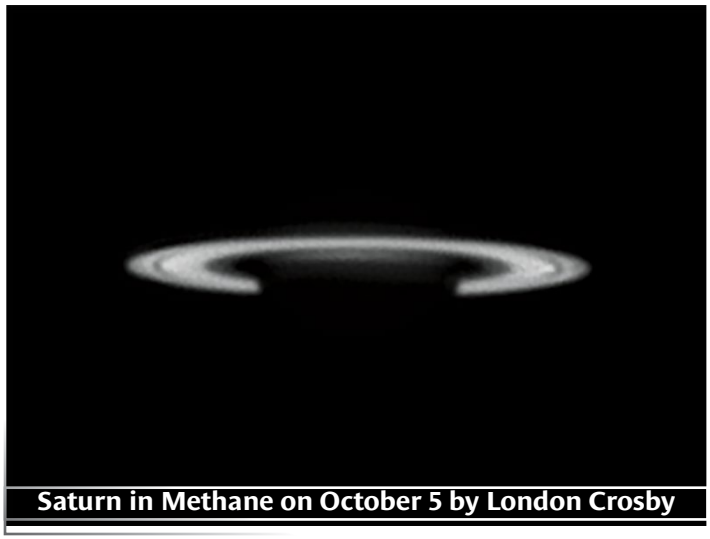
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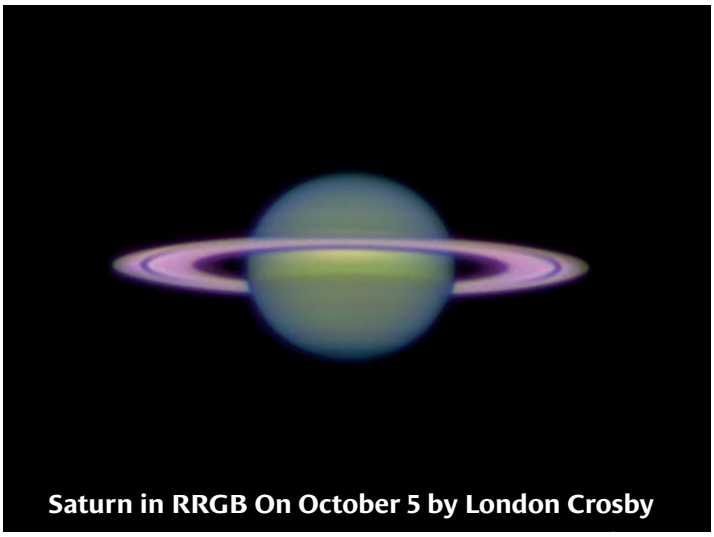
Saturn on October 5 by London Crosby

Monday morning we got a nice, dry, and calm patch of air which allowed me to capture my best image of Saturn ever!

London



Saturn in Methane on October 5 by London Crosby



Saturn in RRGB On October 5 by London Crosby

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Sharpless 2-246 by David Elmore

Folks,

Sharpless 2-246 is an HII star-forming region containing a lot of dust. It is part of the Taurus Dark Cloud Complex though it lies just inside the constellation of Orion.

The Sharpless Catalogue lists a size of 0.5° x 1.5° though its full extent fills much of this 5°x7° field of view.

This is a narrow band image with Hydrogen-alpha as red to pink, Sulfur II as red, and Oxygen III as teal.

Borg 107FL refractor. ASI6200MM Pro camera. Chroma H-alpha 1h50m, Oxygen III 2h, and Sulfur II 1h10m. iOptron CEM70G mount.

David

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NGC 7822, North Component, SHO by Stephen Garretson

This is the emission nebula NGC 7822, or the northern half of it to be more precise. The southern section is long and skinny, with one large triangular structure just below the vertical center, but is otherwise not inspiring [to me]. I imaged the two together last year with the Borg 107, WO Star 71 combo, but wanted to get in closer on this northern part as it has a nice mix of structure and dark areas. The target is especially pleasing as it has strong Ha and SII signals, and a decent amount of OIII. I experimented with NBCM, but selected the SHO version as I find the colors more satisfying.

- [18] 600s guided Ha subs
- [18] 600s guided OIII subs
- [18] 600s guided SII subs

Total integration: 9 hours

Capture:

- Dual scopes each having the following components:
- William Optics FLT 132 APO Triplet, 0.8x reducer/ flattener, running at f/5.6
- ZWO 2600MM Pro
- ZWO EFW
- Chroma 3nm Ha filter
- Wanderer Astro Mini V2 Rotator
- Bahtinov mask modified Wanderer Astro Eclipse
- PLL Sesto Senso 3 focus controller

Guiding:

- William Optics WhiteCat f/4.9 Astrograph
- ZWO 220 Mini
- Paramount MX+

From the Beevo Dome

- TheSkyX, SGP, PHD2
- PixInsight, MacOS Photo, Preview

...Stephen

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Sh2-183 and 181, SHO + NBCM by Stephen Garretson

This image combines data processed using the NBCM [NarrowBand Colour Mapper] and SHO palettes, 50% each. Then there was significant futzing to bring down the background and add back the stars. It'll take a week to remove all the trial balloons in my workspaces! But I am reasonably happy with the final result. I particularly like the cockatoo crest of OIII on 181 and worked to have that stand out. Initially I thought the larger of the two prominent objects was 181, but that's actually 183. These are faint objects. When gathering data the individual 600s subs don't reveal a lot of nebulosity, but when aggregated it shows up.

- [24] 600s guided Ha subs
- [40] 600s guided OIII subs
- [12] 600s guided SII subs
- Total integration: 12 hours 40 minutes

Capture:
Dual scopes each having the following components:
- William Optics FLT 132 APO Triplet, 0.8x reducer/flattener, running at f/5.6
- ZWO 2600MM Pro
- ZWO EFW
- Chroma 3nm Ha filter
- Wanderer Astro Mini V2 Rotator
- Bahtinov mask modified Wanderer Astro Eclipse
- PLL Sesto Senso 3 focus controller

Guiding:
- William Optics WhiteCat f/4.9 Astrograph
- ZWO 220 Mini
- Paramount MX+

From the Beevo Dome
- TheSkyX, SGP, PHD2
- PixInsight, MacOS Photo, Preview

Stephen

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NGC 891 by Gary Garzone

NGC 891 taken last night from my yard scope in dome here in Niwot.
C 14 scope F7 ZWO 6200 one shot color,
Pixinsight, 2 hours in 5 minute frames.

I have 30" scope put together in Barn here, was out late last night, clear skies all night.
Light pollution kills my 30 views. Dark skies have us spoiled, my old motto, "Have scope will travel".

Cheers, Gary

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Orion by Eddie Hunnell

Orion returns over my house. Good to see an old friend . Two pictures at 6:15am this morning. Photo details:

- camera - iPhone 15 2 and 5 lens selection
- mount - my left arm
- processing - none except for what the iPhone camera does automatically
- Exposures - 1 each at 3 seconds

Amazed to see how it looks on a 3-year-old camera. Can't wait to try on an iPhone 18 on a tripod and some stacking.

Eddie

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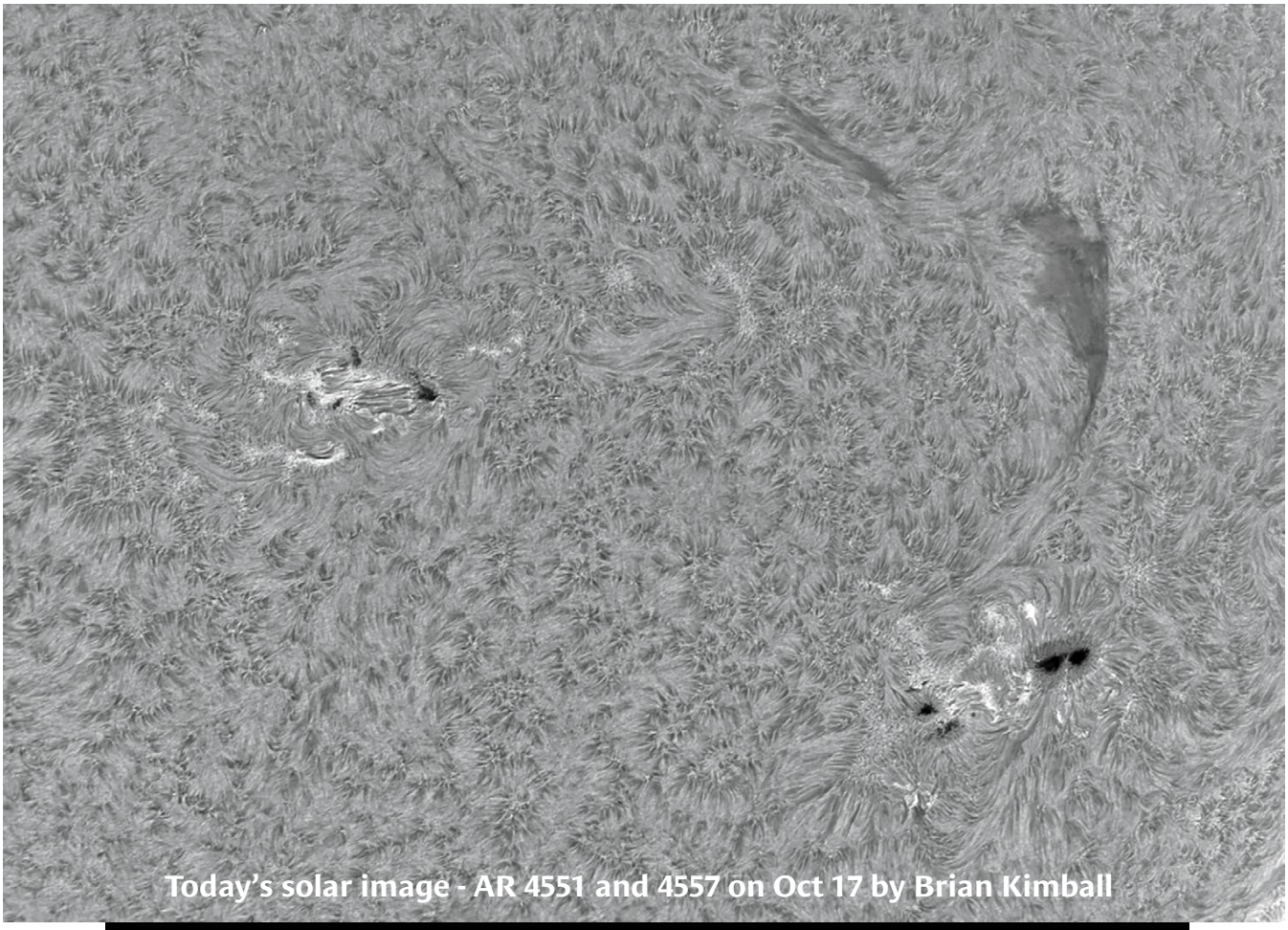


SpaceX Rocket - This Morning Oct 13 by Eddie Hunnell

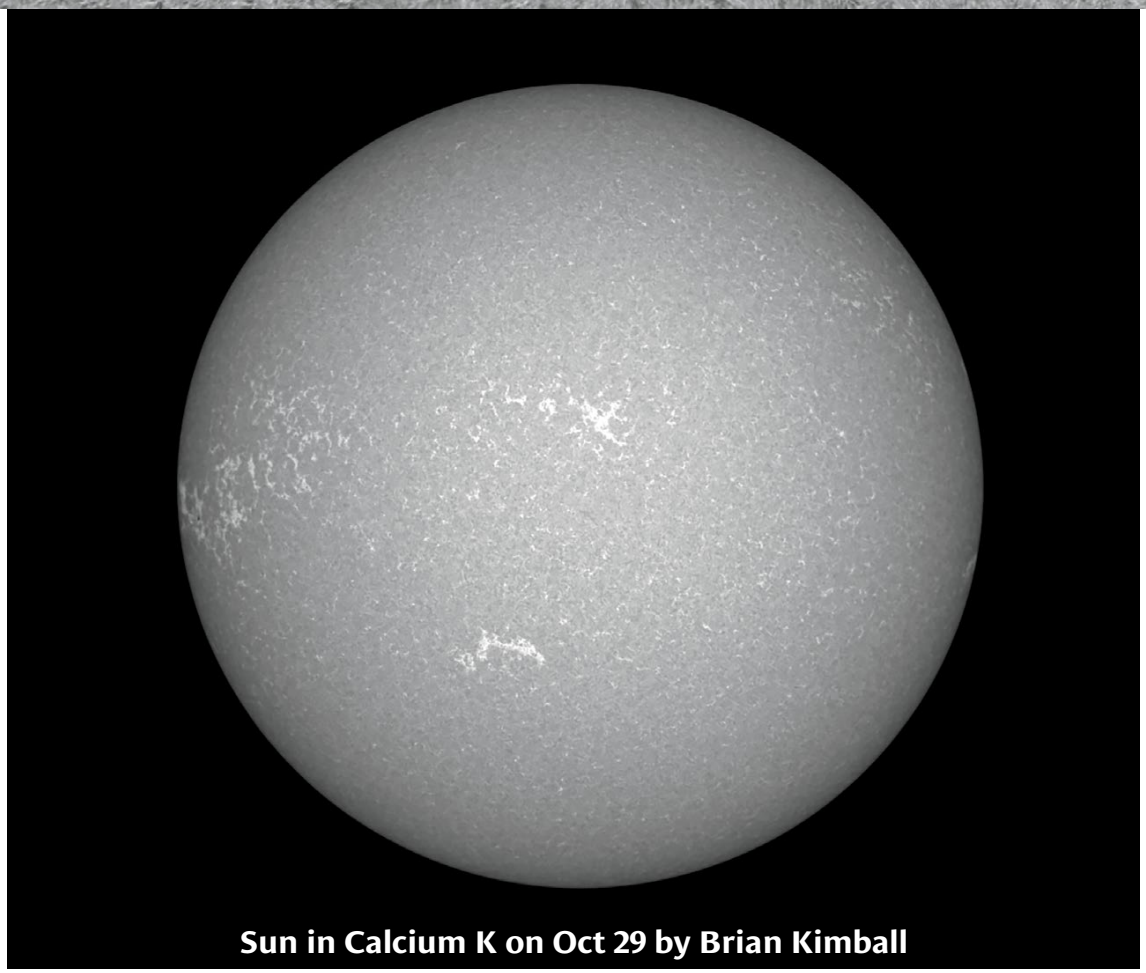
I took these with my iPhone from Raleigh about 6:45am today. Eddie



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Today's solar image - AR 4551 and 4557 on Oct 17 by Brian Kimball



Sun in Calcium K on Oct 29 by Brian Kimball

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Saturn on Oct 17 by Brian Kimball

Saturn taken last night around 10:00pm, and Jupiter taken around 6:00am this morning. Both with above average seeing. Taken with a 10" f16 Dall Kirkham.



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Pelican by Tally O'Donnell

Good afternoon,

This is an SHO image of the Pelican nebula with the Gulf Of Mexico in the lower right from the North American Nebula. This image is four hours each of Ha, OIII, and SII. The sulfur really brings out the shock waves.

Tally

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The Soul Nebula (or Beast) of the Milky Way by Jim Pollock

NGC1848 is the soulful half of the Heart & Soul nebulae pairing in Cassiopeia. Rather than the Soul, I prefer to call this one The Beast. Using MJ's new term, an Etherism (the nebular version of an Asterism) it obviously has a bond, two legs and a bobbed tail… attached to a very tough looking head. The head has a Shrek-like ear, a nose with a swaying doo-dad, mouth and a deep set eye.

But, if you go astro, there are several dark hollows in the body due to massive stars that have blown out the nearby gases and created pillars pointing toward the driving stars. There is star formation happening in the tips of those pillars. Look in the upper left of the body for a gorgeous set of pillars as well as above the front leg and in the jaw line.

N1848 Soul Nebula: 71 frames of 180 secs each for a total of 3.6 hours exposure on my 9.25" EdgeHD at f/2 Hyperstar into my ZWO 2600mc DUO color camera located at StarFront Observatories in Texas
--
Jim Pollock

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Hello fellow star gazers!

I switched my 9.25” EdgeHD scope at StarFront in Texas to my fast f/2 configuration after having a lot of fun with irregular galaxies at the narrower f/7 field of view. I have to say, I love that Hyperstar!!! And, since our astro guys with scopes in New Mexico sent their clouds over to me last week, those clouds have headed to join up with the Gulf Hurricane… so I’ve had 3 days in a row of clear clear moonless skies.

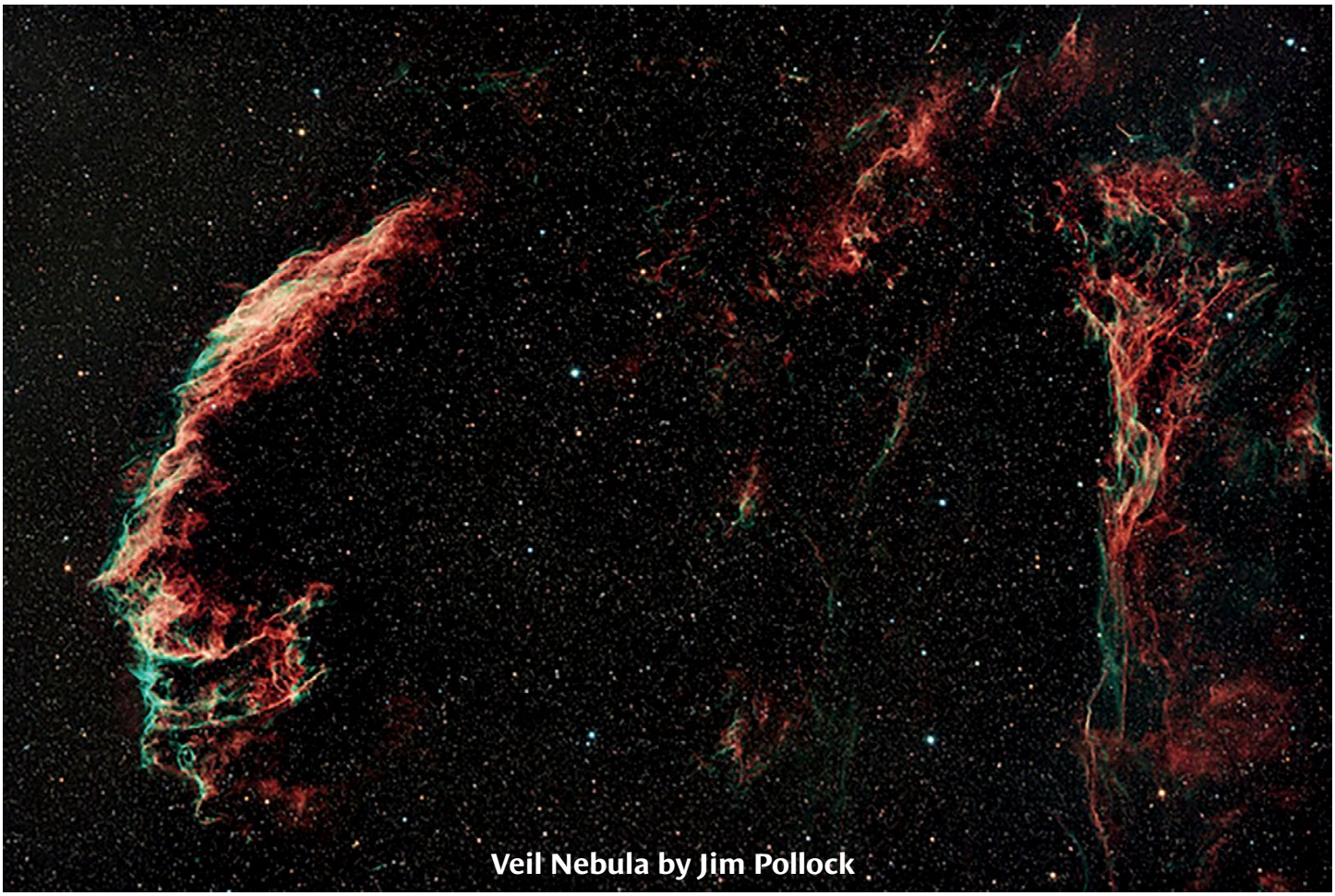
Here are 3 images from the last 3 nights with my Hyperstar’s 2.4 x 1.6° Field of View:

Jim



M45, Pleiades by Jim Pollock

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Veil Nebula by Jim Pollock



Lagoon Nebula by Jim Pollock

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The Core of the Heart - Mellotte 15 by M. J. Post

Here is the central part of the Heart Nebula, star cluster Melotte 15. The hot stars in this cluster are responsible for "blowing out the core" with their strong stellar winds and for ionizing the many remaining clouds in the Heart. Please notice planetary nebula WeBo1 in the lower left corner.

MJ

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NGC 7129 by M. J. Post

This nebula is also known by several different names - the Cosmic Rosebud, NGC 7129, and IC 5134. It contains two dark nebulae - LDNs 1181 and 1183 - and open cluster NGC 7142 lies just 1/2 degree to its southeast. Strangely, there are many star-forming HII regions within this complex, uncharacteristic of van den Bergh objects (primarily reflection nebulae). I spent extra time adding H-alpha data to the OSC data to emphasize those regions.

Distance is about 3300 l.y., and it was found by none other than William Herschel on October 18, 1794 - almost exactly 232 years ago.

Three hours with CDK14 scope (OSC image) and one hour with RASA scope (H-alpha image), DSNM. FOV is about 24 x 16 arc minutes.

Another oddity: In the upper left corner of this frame there should be another NGC object, NGC 7133. But nothing resides there except a few ordinary stars. In today's updated NGC catalog NGC 7133 is listed as "lost or non-existent".

M.J. Post

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LAS Archives for October '96, 06' and '16 by Eileen Hall-McKim

30 Years Ago – 1996

Image: Bob (Jake Views) Spohn

Dear Members and Friends:

The year is racing to an end and we are busy with all of our year-end activities. November is, of course, officer nomination night – a topic that strikes fear in the hearts of even the most stalwart members! Remember, volunteer for an office and save 20 bucks! The December meeting will be election night. Saturday, January 4th is the occasion of our 10th annual banquet. It will be held at the same place as last year – Tony & Sal's restaurant. Look for your reservation form in the mail or at the meeting. The cost will be $13 per person. We are pleased to announce that our good friend Dr. Bob Stencel will be our keynote speaker. He will bring us up to speed on developments at Meyer-Womble Observatory on Mt. Evans.

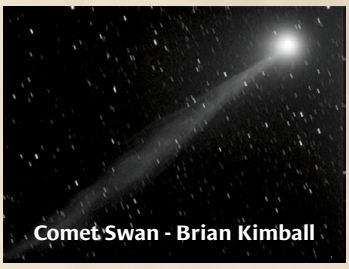
The Astronomical League is Celebrating its 50th Birthday. The Golden ALCON 1997. This celebration, an international event, is open to all members of the league. How are we celebrating? By reserving a Colorado Rocky Mountain convention equipped major winter ski resort (Copper Mountain) to host the 1997 Astronomical League Convention. We are taking advantage of this facilities size and getting low off season rates, creating an International Celebration within the reach of most of our 14,000 members. Assuring dark skies at 9.000-14,000 ft above sea level, 60 miles from any real light pollution with many observing sites 6.5-7.5 magnitude skies are common. Inviting the AAVSO, the Royal Astronomical Society, IOTA, The Dark Sky Association and many other national and international groups.

20 Years Ago – 2006

From the President, Gary Garzone:

"I headed for our old dark sky site Cactus Flats North once again. No interruptions from car lights or campfires or anything, true dark skies, which is becoming almost impossible to find. Well the weather looked pretty bad when Carol and I left for dark skies, it was blowing and snowing a little even, she thought I was crazy again. I checked out clear clocks and it called for clearing so I took the chance once again. Well the winds quit and the clouds cleared and we were in dark sky heaven again".

"Vern and I were counting the meteors, at least 20 per hour. Orionids are the fastest of all the meteor showers, quick bright trails that last for quick second or two. Meteor showers are fun in dark sky places, they really get bright then. Nothing like the Leonids of several years ago, but well worth the drive to dark skies just for that. We viewed Comet Swan, found it right away with help from Cheyenne W., who knew where to look. It was pretty darn good, with a very faint tail in dark skies with 30 scope. Brian Kimball had the best picture of Comet Swan."



Comet Swan - Brian Kimball

"Mercury Transit was another amazing weather day. It was cloudy for the week before and the week after it seemed. Every day was looking not so good. For good Solar viewing it has to be totally clear for best views. Not only was it clear but for the entire afternoon with zero clouds, we lucked out again. Andrew Planck had 5 scopes to view the Mercury Transit at the Platt Middle school in Boulder, he had over 300 kids see the transit, Way to go Andrew, we just cannot get those retired teachers to quit teaching I guess. Vern and Brian got a few good Mercury Transit pictures in also."

"The Discovery channel had a film crew here at my yard with seven of the diehards from DAS, BASS and LAS clubs. Wayne Green, President of DAS got in touch with me and asked to do it in yard here. We got small group of Amateur Astronomers for them to film. They came over before dark and watched and filmed as we all set up several different kinds of scopes. Refractors, Cassegrains, Dobsons, Binoculars. They interviewed each person with their scopes. It was one of those spectacular sunsets that day so they went up to top of my yard and filmed it for a great sunset

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shot over the mountains- very cool. The crew was from London, so I served them some tea during breaks from the cold night. Thanks to Vern Raben, Steve Hartung, Wayne Green, Cheyenne Wills, Pete Petersen, Brad from DAS, and myself. They just got in from filming LBT at MT Graham in Tucson, Arizona. They said it was a show on the Large Binocular Telescope, there, but they wanted to throw in an amateur side to it all, and we were once again in the right place at the right time."

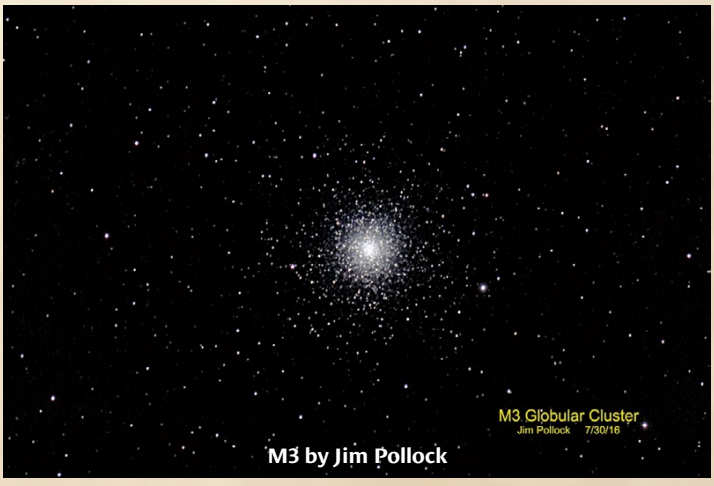
10 Years Ago – 2016

- Telescope Program shows continued progress: Longmont Library has 10 people on the wait list (3 weeks to get one). The Horkheimer Foundation telescope received from the Astronomical League was modified and delivered on Oct. 7 to the Louisville Public Library
- Eclipse Planning – Members signed up to stay at Ft. Robinson State Park Aug 18 to Aug 21, 2017: 182 people have signed up with ~ 60 vehicles
- Letters ready to send to 8 ranchers along center line offering $1000 for viewing site
- Thanks to Leonard for checking possible viewing sites, visiting the area such the Agate Fossil Beds National Monument, etc.)
- The next LAS meeting is Nov 17th and the speaker will be David Elmore

Software Bisque Presentation by Dan Bisque, Vice President of Software Bisque
- In 1983 Steve Bisque released 'TheSky', written in Pascal for Microsoft DOS. He developed and supported the product out of his basement while holding down a day job.
- 1989 Steve Bisque invents "push to" or "software-guided" telescope technology by combining optical encoders with a "serial decoder" (BBox) with TheSky for DOS to drive the telescope.
- 1992 Steve hired Dan and Matt to port Sky from DOS to Windows
- 1996 TheSky Version 4 was released and (in possibly one of the most important decisions the brothers ever made, all manufacturing was moved in house to company facilities in Golden, CO
- 2007 Software Bisque issued patent US7313763 B1: "A system for operating an astronomical observatory in real time using http."
- Software Bisque was featured in Timothy Ferris' "Seeing in the Dark" film.


Horseead Nebula by Tally O'Donnell


NGC 7331 by Gary Garzone



M3 by Jim Pollock

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