Longmont Astronomical Society

May 2023

NGC 4565, Needle Galaxy
by Jim Pollock

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LAS Meeting Thursday, May 18 at 7 pm
Presentation by Dr. Maria Kazachenko on "Golden Age of Solar Physics"

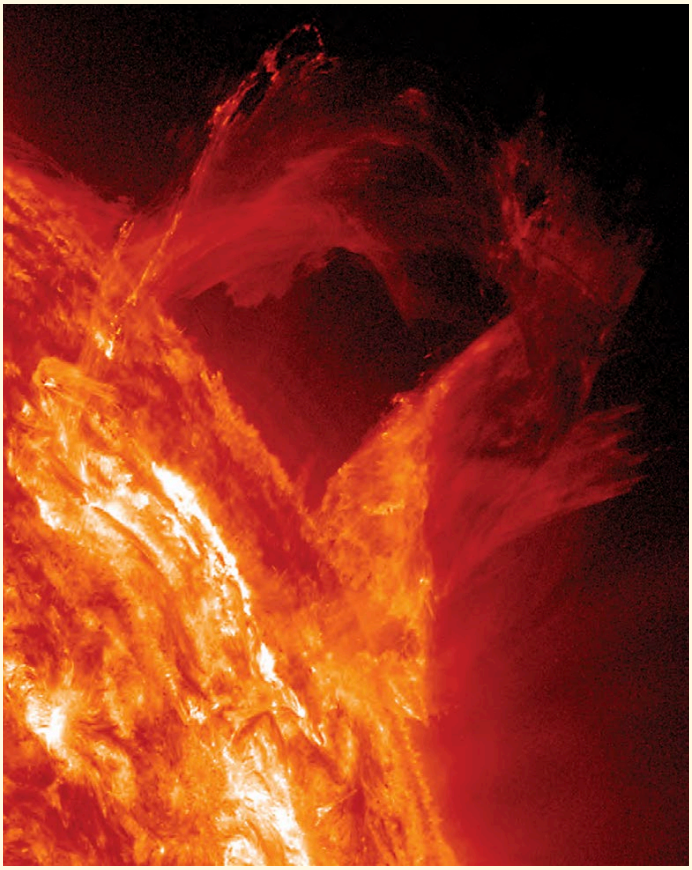
The Golden Age of Solar Physics

Space weather is largely caused by the activity of our Sun. Invisible yet powerful magnetic fields, created within the Sun, determine when and where the next solar eruption will happen. Large solar storms can put our technological society at risk. In this talk, CU Boulder and National Solar Observatory professor, Maria Kazachenko will discuss how advances in solar telescopes allow scientists to understand the Sun in a lot more detail than ever before.

The meeting will be in-person at the First Evangelical Lutheran Church, 805 3rd Ave in Longmont; it will also be available on Zoom.

Bio:

Maria Kazachenko is an assistant professor at Astrophysical & Planetary Science Department (APS) Department at University of Colorado, Boulder and the National Solar Observatory (NSO). Before that, Maria spent seven years at Space Sciences Lab (SSL) at UC Berkeley, first as a postdoctoral fellow and then as a research scientist. Since 2011, Dr. Kazachenko has been part of the Coronal Global Evolutionary Model Team, a collaboration between scientists at UC Berkeley, Stanford, Lockheed Martin et. al. Maria's research group interests range from the storage of magnetic energy in solar active regions, to the release of that energy in solar flares with an emphasis of comparison and integration of observations with simulations. Understanding how this energy is stored and released is necessary to predict solar eruptions and hence the space weather.



About LAS

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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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- Eileen Hall-McKim, Secretary
- Bruce Lamoreaux, Treasurer

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Appointed Positions 2023

Sarah Detty, Webmaster; Bruce Lamoreaux, Library Telescope Coordinator; Bill Tschumy, Public Outreach Coordinator; Vern Raben, Newsletter Editor

The Planets in May

Mercury

Mercury is visible before sunrise after the 26th. It is about 0.5 magnitude in brightness and about 8 arc sec across.

Venus

Venus is visible after sunset in the west. It is about magnitude -4.2 in brightness and the waxing crescent disk increases from 17 to 23 arc sec across.

Mars

Mars keeps getting smaller and dimmer. It is 5.4 arc sec across on the 1st and 4.7 arc sec across by the 31st. It dims from 1.3 magnitude in apparent brightness to 1.6 magnitude by the end of the month.

Jupiter

Jupiter reappears in the morning sky around the 17th. It is magnitude -2.1 in brightness and the disc is 34 arc sec across.

Saturn

Saturn is low in the morning sky in constellation Aquarius. It is magnitude 1.0 in brightness and its disk is 16 arc sec across.

Uranus

Uranus is not visible this month.

Neptune

Neptune is visible low in the East before sunrise. It is magntiude 7.9 in brightness and the disc is about 2.2 arc sec across.

Meteor Showers in May

Eta Aquarids peaks on May 6. Typically around 50 can be seen per hour from a dark location but unfortunately the moon is just a day past full -- so there won't be any dark locations!

Lunar Phases in May

- Full moon: May 5 at 11:35 am
- Third quarter: May 12 at 8:20 am
- New moon: May 19 at 9:45 am
- First quarter: May 27 at 9:23 am

Bright Nebula in May

- SH2-73, LBN 105 in Hercules, mag unknown
- LBN 32, 35, 39 in Ophiuchus, mag unknown

Galaxies in May

- M104, Sombrero Galaxy, in Virgo, mag 9.1
- M82, Cigar Galaxy, in Ursa Major, mag 9.0
- M81, Bode's Galaxy, in Ursa Major, mag 7.8
- NGC 2683, UFO Galaxy, in Lynx, mag 10.0
- NGC 4490, Cocoon Galaxy, in Canes Venatici, mag 9.8
- NGC 4656, Hockey Stick Galaxy, in Canes Venatici, mag 9.8
- NGC 4631, Whale Galaxy, in Canes Venatici, mag 9.5
- M86 in Virgo, mag 9.8
- M87 in Virgo, mag 9.6
- M51,Whirlpool Galaxy in Canes Venatici, mag 8.7
- M64, Black Eye Galaxy, in Coma, mag 9.3
- M101, Pinwheel Galaxy in Ursa Major, mag 8.4

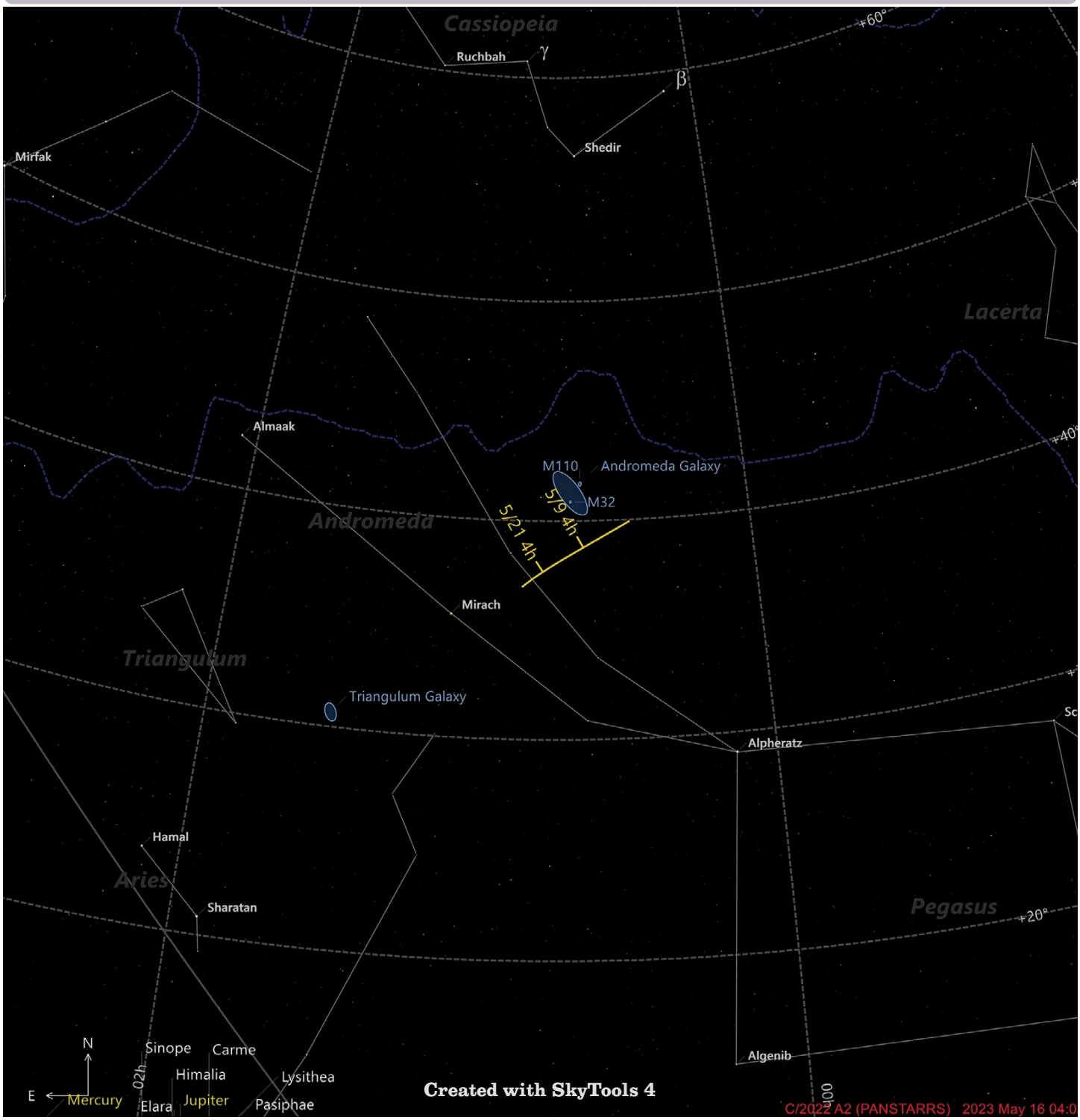
Globular Clusters in May

- M3 in Canes Venatici, mag 6.3
- NGC 5466 in Bootes, mag 9.2
- M53 in Coma, mag 7.7 M15 in Pegasus, mag 6.3
- M5 in Serpens, mag 5.7 M2 in Aquarius, mag 6.6

Planetary Nebula in May

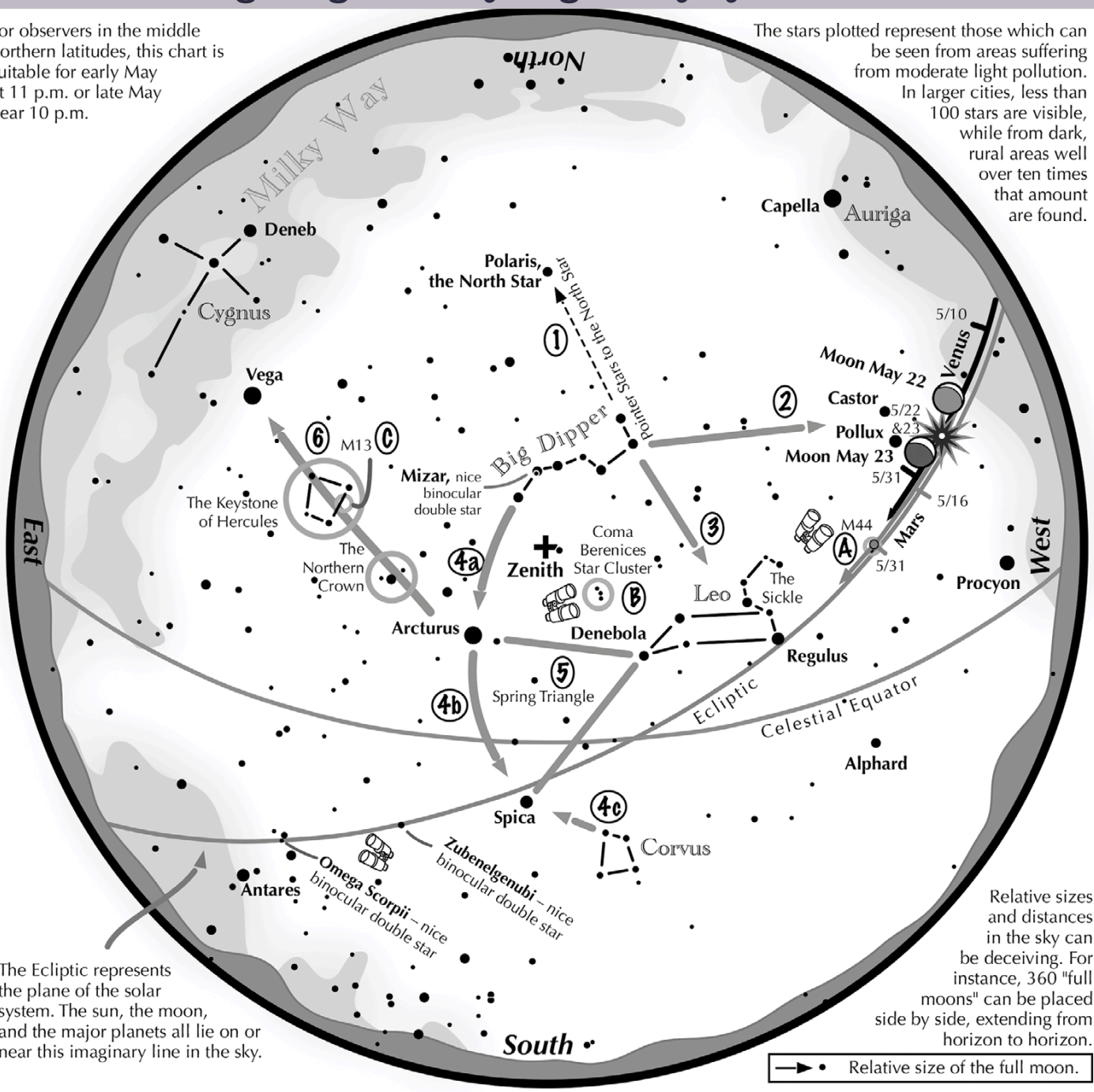
- Abell 33 in Hydra, mag 14.2
- NGC 3242, Ghost of Jupiter, in Hydra, mag 8.6
- M97, Owl Nebula, in Ursa Major, mag. 9.7
- Abel 31 in Cancer, mag 12.2
- NGC 4361, Lawn Sprinkler, in Corvus, mag 10.9
- IC 972 in Virgo, mag 14.9

Comet C/2022 A2 (PANSTARRS)



Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
May 1	4:26 am	00h35m13.2s	+39°30’34”	Andromeda	11.2	1.5
May 7	4:17 am	00h40m03.8s	+39°05’58”	Andromeda	11.3	1.5
May 13	4:07 am	00h45m14.5s	+38°25’34”	Andromeda	11.4	1.5
May 19	3:59 am	00h49m44.2s	+37°52’53”	Andromeda	11.5	1.5
May 25	3:51 am	00h53m32.0s	+37°21’12”	Andromeda	11.5	1.5
May 31	3:47 am	00h56m36.8s	+36°49’43”	Andromeda	11.6	1.5

Navigating the May Night Sky by John Goss



Navigating the May night sky: Simply start with what you know or with what you can easily find.

1. Extend a line northward from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
3. Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
4. Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica.
   Confirm Spica by noting that two moderately bright stars just to its southwest form a straight line with it.
5. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
6. Draw a line from Arcturus to Vega. One-third of the way sits "The Northern Crown." Two-thirds of the way hides the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.

Binocular Highlights

A: M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux. **B:** Look near the zenith for the loose star cluster of Coma Berenices. **C:** M13, a round glow from a cluster of over 500,000 stars.

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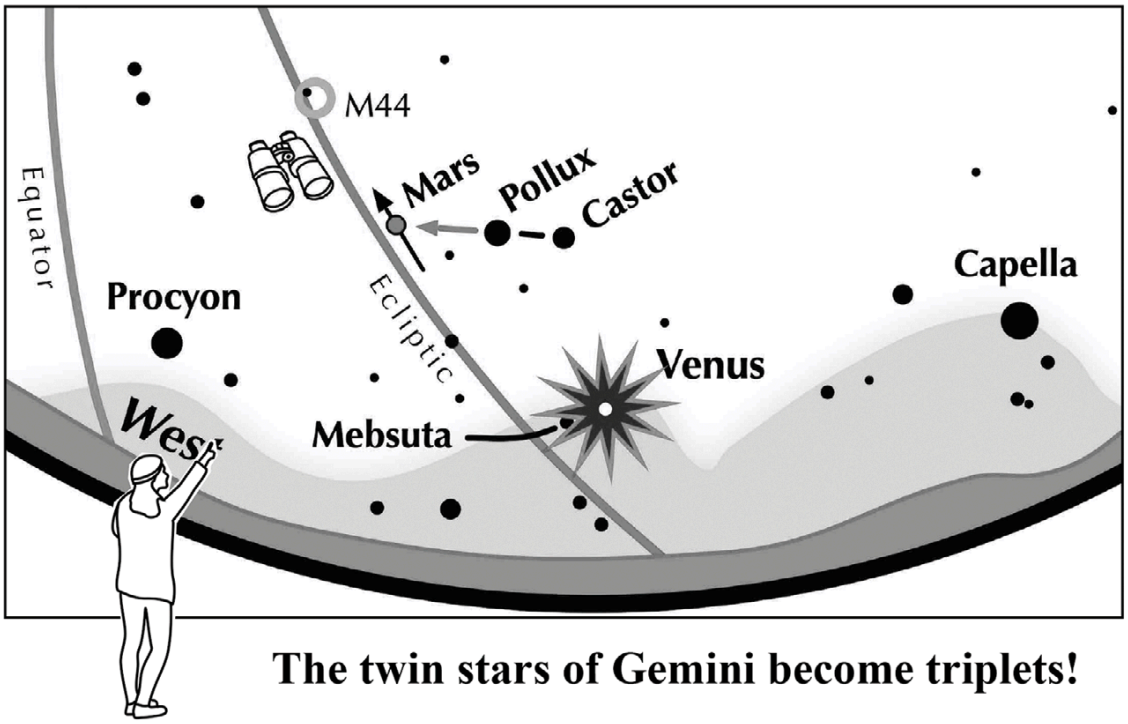
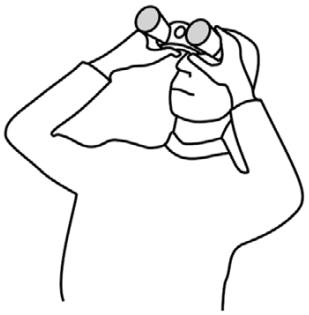
If you can see only one celestial event in the evening this May, see this one.

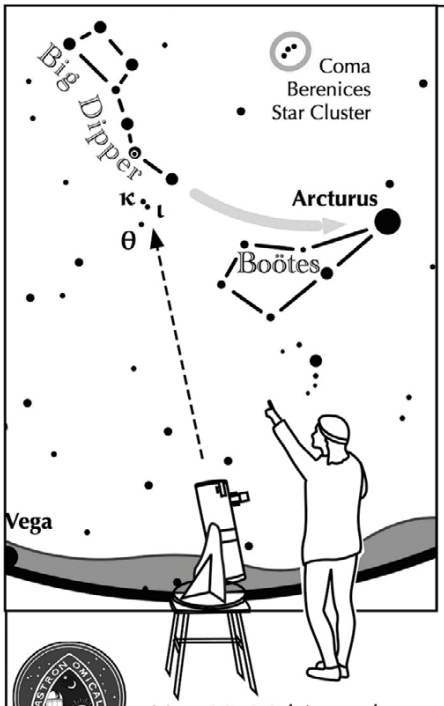


The twin stars of Gemini become triplets!



Beginning in the second week of May, look to the west-northwest 90 minutes after sunset.

- The twin stars of Gemini, Castor and Pollux, will be found forming a horizontal bar.
- Red Mars, sporting a brightness mid way between those two stars, rises nightly, eventually sliding directly to their left.
- On **May 16**, the three luminaries form a straight line, effectively creating another member of Gemini, the Triplets!
- Look at Venus, brilliantly shining below them. Can you see the moderately bright star Mebsuta in the glare of Venus? Binoculars will certainly help.
- The bright stars Procyon and Capella act like opposing bookends for the scene.
- Over next two weeks, watch Mars approach M44, the Beehive cluster, and Venus move near Castor and Pollux.



Use 10x50 binoculars to separate Iota and Kappa.

Other Suns: Iota & Kappa Boötis

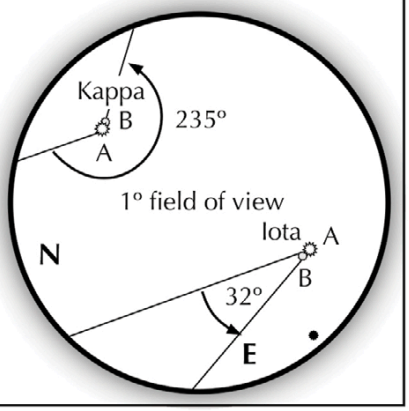
How to find Iota & Kappa Boötis on a May evening

Look northeast toward the Big Dipper. Follow the curve of the handle until it intersects the bright star Arcturus. The other leg extends 2/3 that length from the end star towards the northeastern horizon. It first intesects Iota and Kappa, then Theta.

Suggested magnification: >30x
Suggested aperture: >2 inches

Iota Boötis
A-B separation: 39 sec
A magnitude: 4.8
B magnitude: 7.4
Position Angle: 32°
A & B colors: white

Kappa Boötis
A-B separation: 13 sec
A magnitude: 4.5
B magnitude: 6.6
Position Angle: 235°
A & B colors: white



10 Years Ago, May 2013

From President Bill Tschumy;
We have a great speaker for this meeting John Briggs will be speaking on "Early Telescopes and their Makers".

20 Years Ago, May 2003

Various detailed reports from LAS multi-day star parties from Sterling, Pawnee and Fox Park and Cactus Flats. Saturday night at Sterling: The quote of the star party was from Andrew Planck, at about 4 PM, there were only 3 telescopes at the star party. Gary Garzone had not shown up. Andrew said "with only 3 scopes we are in BIG trouble". Ranger Bob was worried also. Then, Gary showed up with his 30 and it appeared he was leading a convoy. About a dozen more people followed him in, literally, and we were set for the crowds.

ALCor – Jim Crane presented the Astronomical League's Double Star Certificate and Pin to Andrew Planck for observing and drawing 100 double stars.

Short topic talk: Michael Hotka gave a JPL Solar System Ambassador presentation on upcoming JPL/NASA missions.

30 Years Ago, May 1993

From the president, Bob Spohn:
May will require the changing of your observing hat. This month we are looking for globular clusters and open clusters. As most Messier objects go these objects are all substantial photon factories and will provide a real treat for those of you following Messier's footsteps.

MAY MESSIER OBJECTS

M	NGC	R.A. 2000	DEC.	CONSTELLATION	TYPE
04	6121	16 23.6	-26 31	SCORPIUS	GLOBULAR
05	5904	15 16.0	+02 16	SERPENS	GLOBULAR
06	6405	17 40.0	-32 12	SCORPIUS	OPEN
07	6475	17 54.0	-34 49	SCORPIUS	OPEN
09	6333	17 19.2	-18 31	OPHIUCHUS	GLOBULAR
10	6254	16 57.2	-04 06	OPHIUCHUS	GLOBULAR
12	6218	16 47.2	-01 57	OPHIUCHUS	GLOBULAR
13	6205	16 41.7	+36 28	HERCULES	GLOBULAR
14	6402	17 37.6	-03 15	OPHIUCHUS	GLOBULAR
19	6273	17 02.6	-26 16	SCORPIUS	GLOBULAR
62	6266	17 01.2	-30 07	SCORPIUS	GLOBULAR
80	6093	17 17.0	-22 59	SCORPIUS	GLOBULAR
92	6341	17 17.1	+43 08	HERCULES	GLOBULAR
107	6171	16 32.5	-13 03	OPHIUCHUS	GLOBULAR

Steve Albers noted supernova SN3031, the April 19th lunar occultation of Venus, and the upcoming May 16th occultation.

Bob Ross gave the April Messier presentation featuring the "Realm of the Galaxies".

3rd Quarter and New Moon Star Parties coming up at Gold Hill Site.

Secretary Notes Thursday, April 20, 2023
by Eileen Hall-McKim

I. Introduction

The April LAS in-person/hybrid monthly meeting was held on April 20 at the Longmont Lutheran Church. President Vern Raben began the meeting with a self-introduction by all members attending in-person. Nineteen members attended in-person, thirteen attended by zoom.

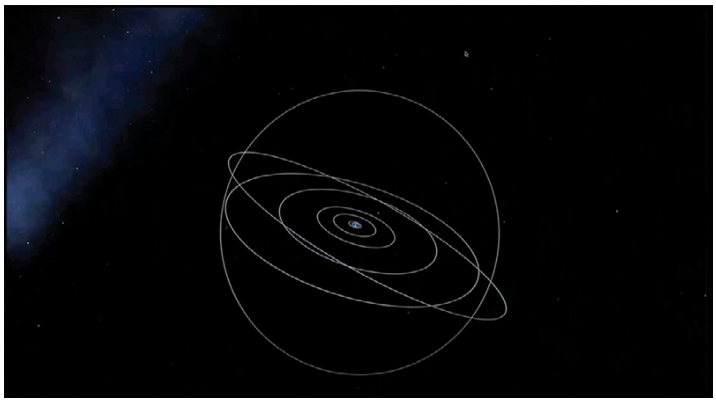
II. Main Presentation

The main presentation for the April meeting "Our Universe" was given by Dr. Jeremy Darling, a Professor of Astrophysics at the University of Colorado, Boulder. His studies include black holes, galaxy evolution, and cosmology. Dr. Darling explores the questions: What is the Universe? What does it contain? What is its history? Its Future? In this presentation, he illustrates what is known of the scale, age, and fate of the Universe. We learn how we observe the universe, how we know what we know, and what is still not known. We also explore alternative Universes as a device for understanding our own.

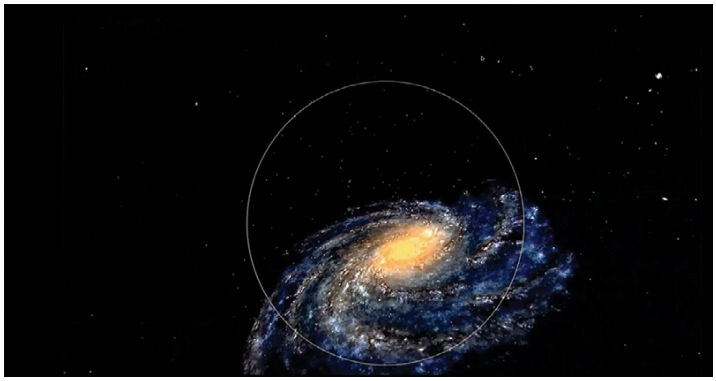
Our Universe
by Dr. Jeremy Darling

Dr. Darling begins his presentation by leading us on a cosmic journey though time and space with an animated video depicting the size and scale of the universe while advancing the scale through 26 powers of 10. Beginning at the surface of Earth (1meter) and advancing back though time and space first in kilometers, then when reaching 10 trillion kilometers, units change into light years (LY) continuing out to 10 billion LY. This is close to the age of the universe, and how far light travels in 10 billion LY, truly an impressive visual illustrating the size and scale of the universe.

10 kilometers from Earth



10 billion kilometers from Earth (size of our solar system)

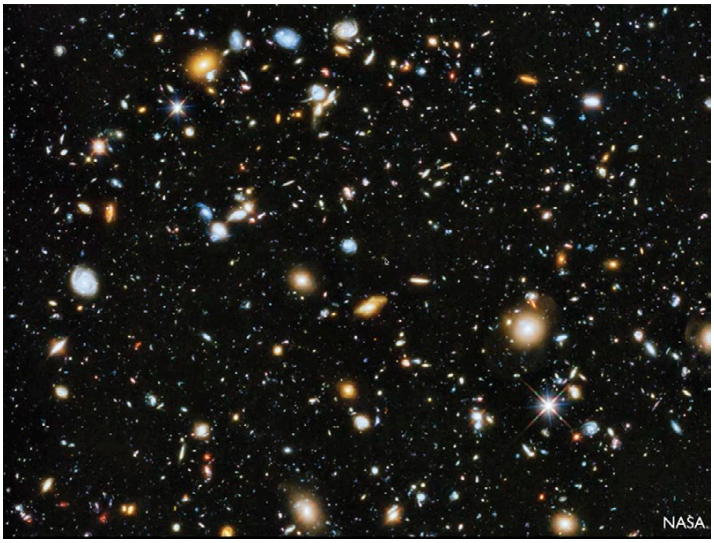


100,000 light years from Earth
(time for light to cross our own galaxy)

10 billion light years from Earth (nearly age of universe, 26th power of 10)

"The Universe is everything and all of time, enormous but also really empty"

1. Telescopes are time machines



- Distance equals Time
- If looking far away, light left it a longer time ago
- To find the earliest galaxies, look as far away as you possibly can at faint, distant objects

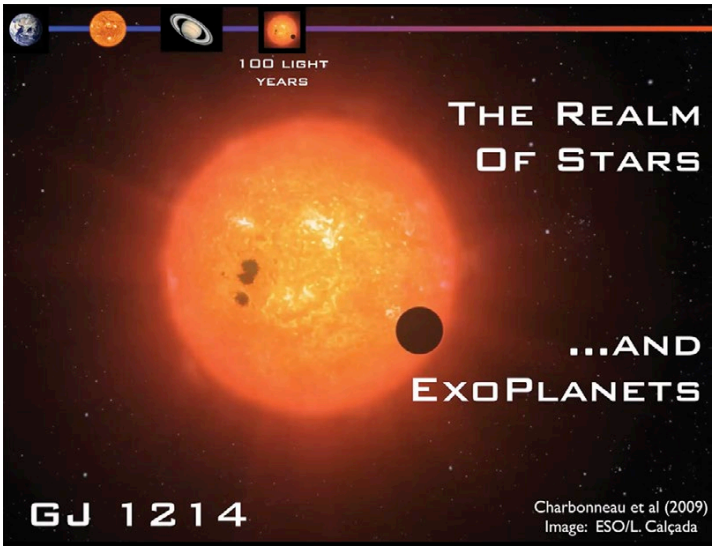
The whole history of the Universe is laid out for us, and because the speed of light is finite, we can pick which time we examine by looking at different distances. To find the earliest galaxies, look as far away as possible. One can pick the distance and that is going to let you study a specific time in the history of the universe, this is how telescopes are time machines.

Objects that are far away and very faint are tiny, this is why astronomers like to build big telescopes to study the very faint and distant objects because they are very early, so we can study the early universe by building large telescopes and this is because of the idea that distance = time.

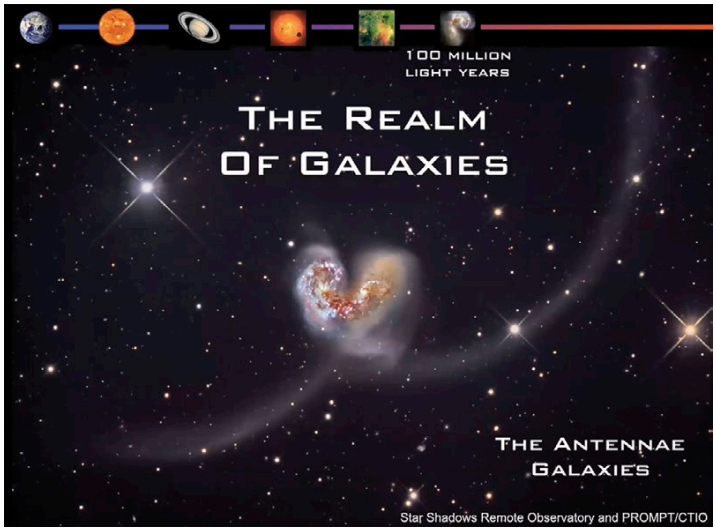
2. Stepping Through Time By Looking Out

As we step though time, whenever we mention 'time' or any 'distance', the two are equivalent. The only place that is NOW in time is here on Earth. For example, if we go out into the sunlight, the sunlight is arriving that is 8 minutes old.

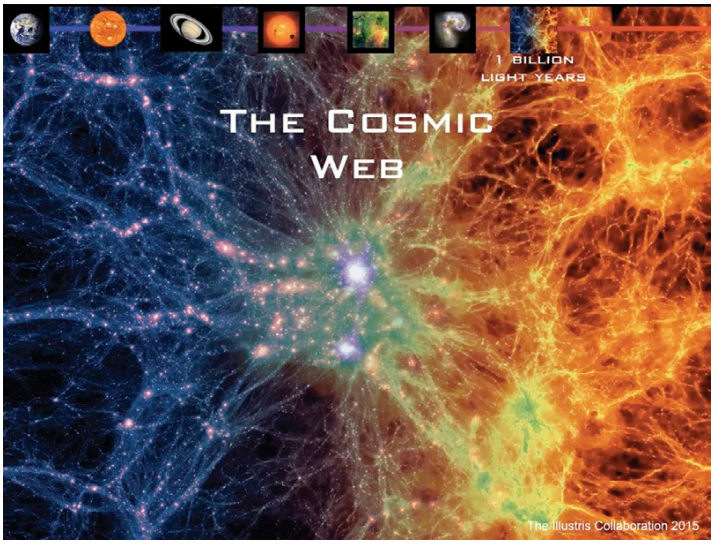
Going out to Saturn, we are seeing it as it was 1 hour ago, our telescopes are not even pointing at Saturn any more, but where it was 1 hour ago, Saturn is moving, and Earth is moving, so when looking at any object, we are not seeing it now but how it was in the past. Looking back as far as we can - 14 billion LY away- we see afterglow of the Big Bang (Cosmic Microwave Background) as far as our time machines can take us, not because there wasn't anything before that, but because we cannot see past this opaque surface.



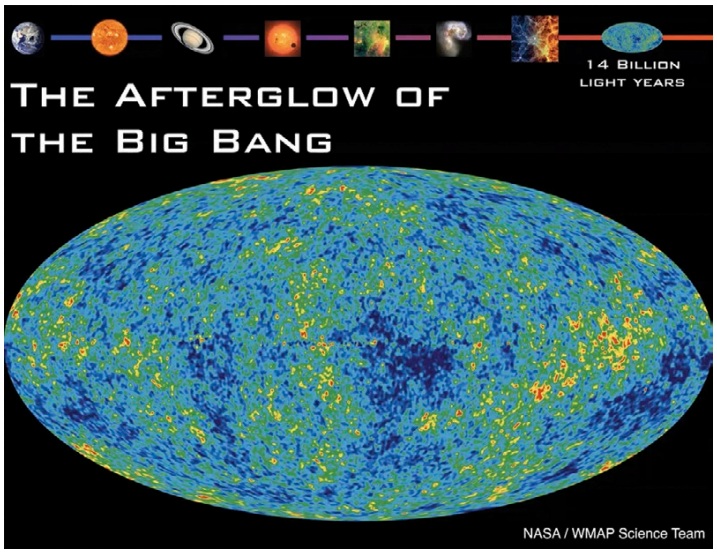
At 100 light years we see nearby stars and exoplanets in our own galaxy. If we want to see where stars are being born in our own galaxy we need to go out to about 10,000 light years. Some young stars don't live very long, so we may be seeing stars that have already died when we look at this region.

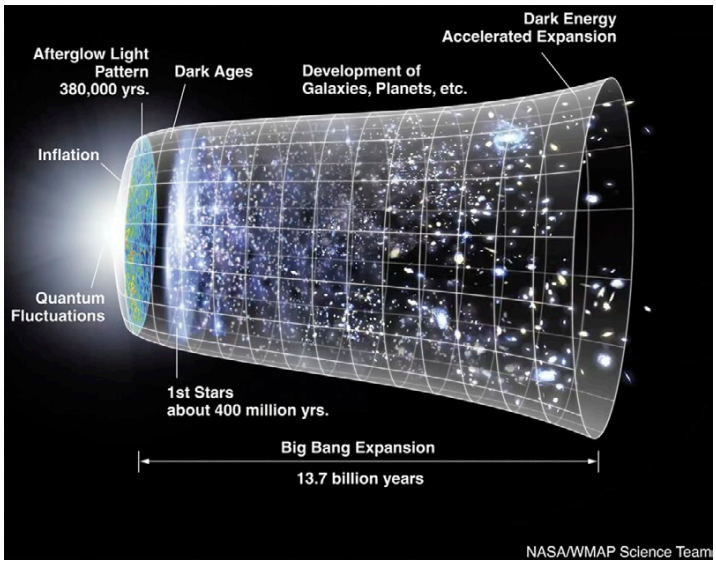


As we go out 100 million light years we are seeing nearby galaxies. The image of the Antenna Galaxies shows as it was 100 million light years ago.



If we go out a billion light years we begin to see something we call the cosmic web -- an association of many galaxies that come together through gravity and form very large structures.





Schematic of the History of Universe; an overview of both the space and the time of the Universe. Starting on the left, see some early time, then some afterglow light patterns, then there was some dark time before the first stars were born, then more stars and galaxies formed. We then had a process of building up galaxies, planets and metals, until today, far right.

3. How do we know these things?

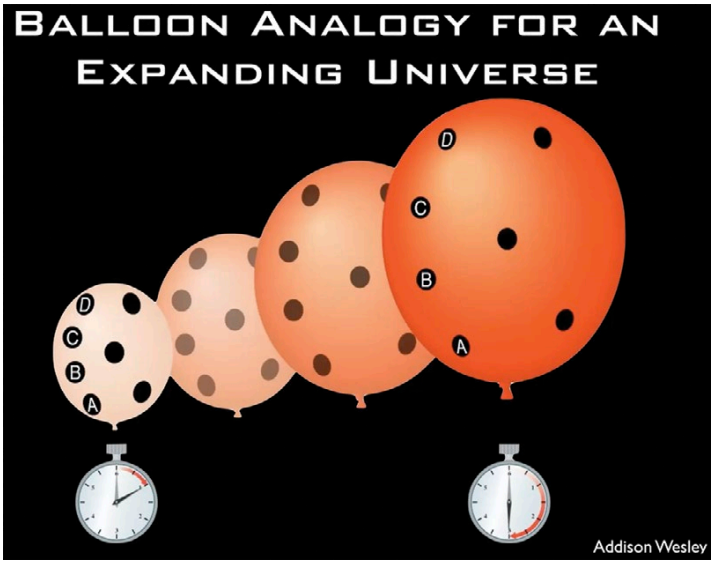
Based on Four Fundamental Cosmological Observations:

1. The Night Sky is Dark

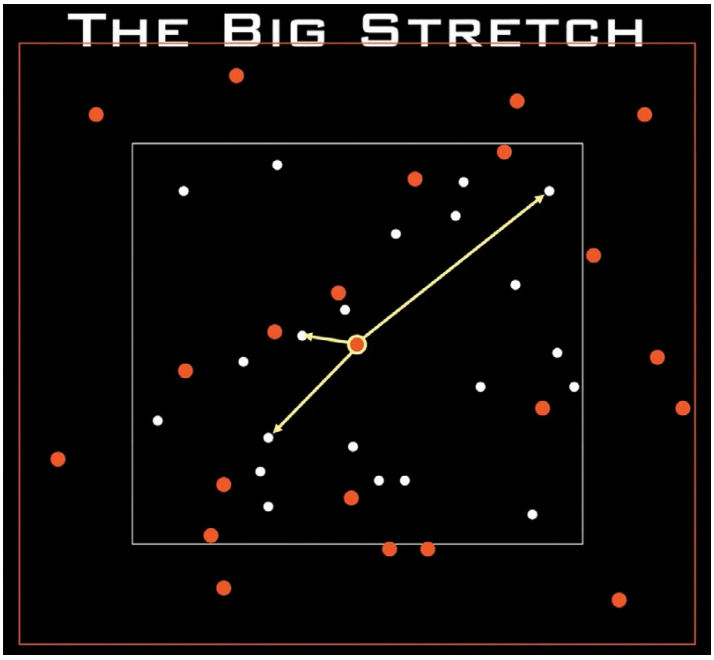
- When we look out, we do not see a star in every direction, sky does not look white, if we saw a star in every direction, it would look as bright as the sun
- We can infer from this dark night sky that the universe is finite in size and finite in age

2. The Universe is Expanding

- Galaxies move away from us in every direction
- Every galaxy is moving away from every other galaxy, we can see this by just measuring their speeds, and the more distant a galaxy, the faster it is moving away
- Balloon Analogy for an Expanding Universe: When a balloon inflates, the space between the dots grows, every dot moves away from all other dots; when deflated return closer together



- The Big Stretch Diagram: When dots are stretched all move away from each other, but notice that more distant dots have moved farther away from each other than those in close proximity



The big ramification for this observation, which has been known for more than a century now is; Imagine running time backwards. Now all galaxies appear to come toward us, with the most distance objects moving toward us faster, the closer objects moving slower, proportional to their distance.

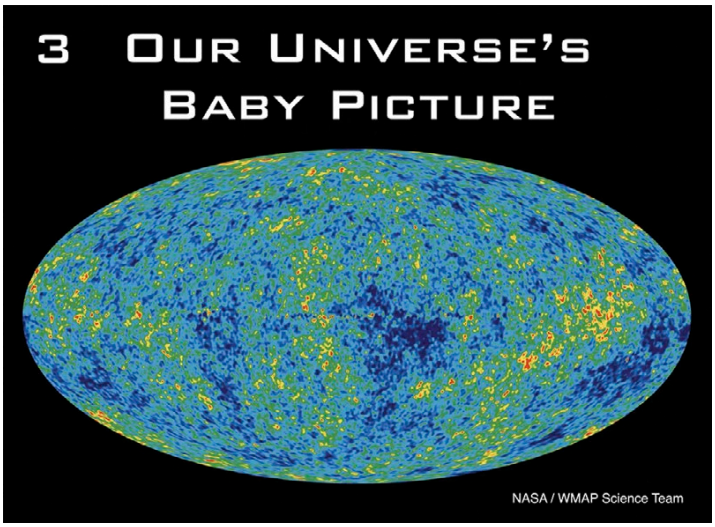
The end results of this is that, as the balloon deflates, all those points are now approaching each other, at speeds proportional to their distance, and as the deflation continues, everything ends up at the same place at the same time, even very distant things end up here at the same time as nearby things arrive, and this expansion observation tells us that all galaxies were in the same place at the same time. This expansion observation is evidence for a beginning of the Universe with what we call a Hot Big Bang. If all the stuff in the universe is piled up at one place at one time and everything is compressed into a small space, it's going to get dense and hot. So the simple observation that galaxies are receding from us suggests that the Universe had a hot, dense early start, so there was a start to time and it was hot and dense at that early time, so this tells us the Universe and time itself had a beginning.

When thinking about an expanding universe, it's a mistake to think about it as an explosion out into empty space; the space itself grows. What this means is that the Universe has no center, no edges- weird until you think about the Earth, you can travel around the globe but will never find any edges or center.

The Universe began everywhere as everything was in the same place at one time.

3. The Universe is Filled with Microwaves

- The Big Bang Afterglow



- The afterglow is the fossil light from a hot young universe
- 14 billion year ago it looked like the surface of a star with temperatures (3000°Kelvin)
- Universe has stretched and expanded, so light also has stretched and expanded and now shows up in radio waves and microwaves
- Static seen on some channels of older televisions with antennas are remnants of this afterglow of the Big Bang

This is telling us in fact that, early on, the Universe was in this hot, dense phase and looked like the surface of a star. It was opaque, hot gas that was cooling as the Universe expanded, and this is direct evidence of the prediction that we had a hot, dense, early Universe.

3. Fossil Helium

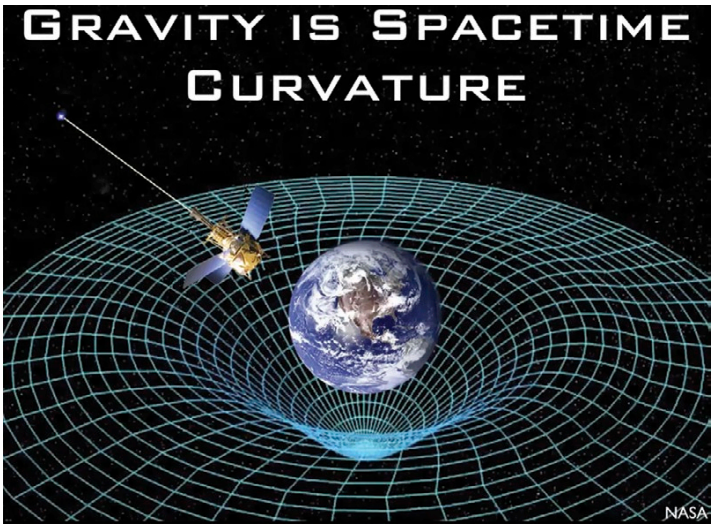
Matter in the Universe is about ¾ hydrogen (H) and ¼ helium (He), with hydrogen being the simplest element, helium being the 2nd simplest element. Our sun is fusing (H) into (He), in its core its very hot and dense, there is a thermonuclear fusion reaction that is fusing (H) into (He). However, if we look out into space that is unaffected by stars, we see this ratio of ¾ (H)/¼ (He).

The only way we can make that (He) from (H) is through fusion. This tells us that not only was the universe hot and dense enough to look like the surface of a star, but going back even earlier, just like going from the surface of the sun into its hotter core, at one point the universe everywhere resembled the core of a star. The Universe was fusing hydrogen into helium, that is where that helium comes from. The sun is about ¼ (He) and that's all from the Big Bang. In the first 10 minutes of the Universe it was making (He) then it got too cool and no longer looked like the core of a star.
Fossil helium made by hydrogen fusion is incredibly strong evidence that the Universe had a hot, dense early phase.

These four fundamental observations all point toward a Universe that's dynamic, that's expanding, and had a hot, dense beginning.

4. History of the Universe

To know the history of the universe, and talk about the future, we need to know its contents.
We have some hints of the history with basic observations, but if we want to know more details and also want to know where we are going and what is going to happen in the future of the Universe, we need to know what's in it. So we need to make a census of what is in the Universe, because that dictates everything.



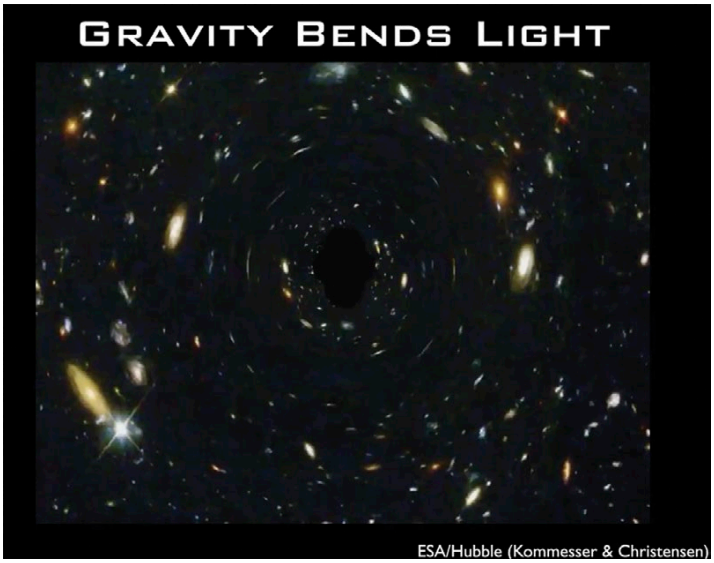
Einstein tells us through general relativity that matter tells space how to curve, and space tells matter how to move. General Relativity tells us that, as seen in image above, the Earth's gravity causes a dimple in space-time, a curvature, and this space-time curvature and is what the spacecraft responds to.

- Einstein's equation: $E=MC^2$ energy is equivalent to mass, can take pure energy and make matter out of it, can take matter and make pure energy out of it
- This tells us energy also produces and responds to gravity

Now going to add that:

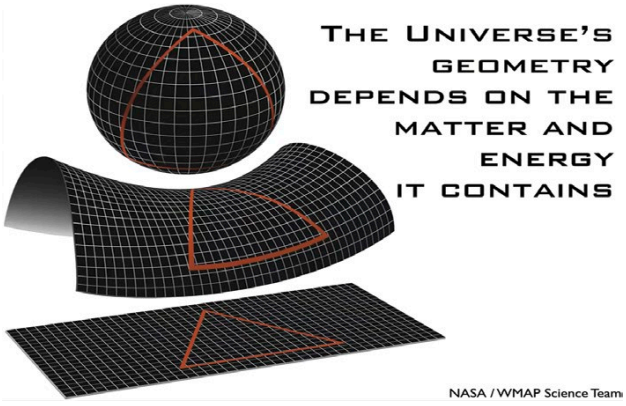
- Matter and Energy tells Space-time how to curve
- Space-time tells Matter and Energy how to move
- The curvature of the gravity depends on both the matter and energy
- Gravity bends light

Response of energy to gravity is most dramatically shown when gravity bends light (gravitational lensing)

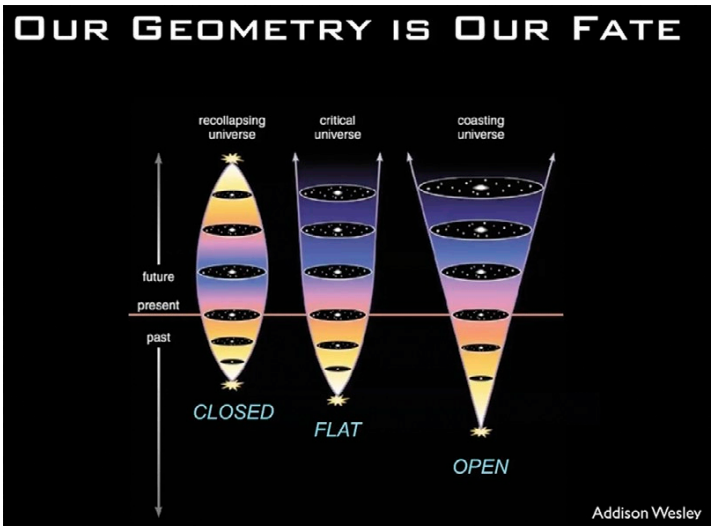


Simulation of black hole bending the light of galaxies as it passes in front of them, can see entire universe inside of the lens

- The Universe's geometry depends on the matter and energy it contains



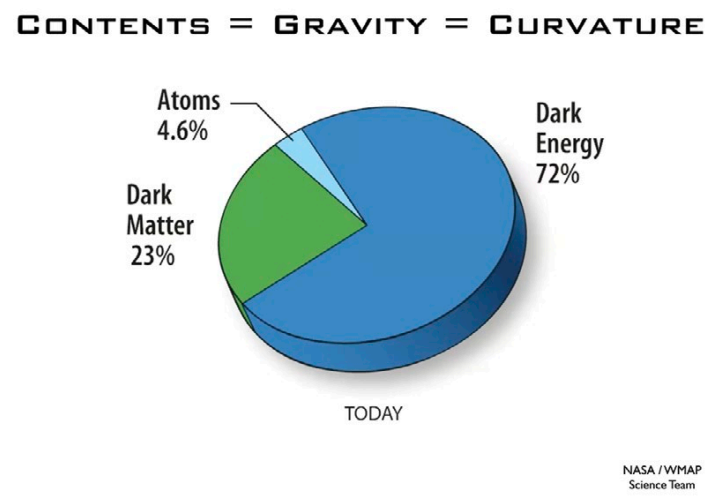
- Our Geometry is our fate



- Different shapes tell us what happened in the past as well as what is going to happen in the future
- The amount of gravity tells us the shape: lots of gravity, slows down expansion
- Geometry also tells us about the age: the open Universe is the oldest, the flat one is next, the closed one is the youngest
  - Re-collapsing Universe: (Closed) Universe with lots of gravity, goes from Big Bang to Big Crunch
  - Critical Universe: (Flat) energy is slowing and slowing but never turns around
  - Coasting Universe: (Open) not enough gravity, will it just expand forever?

Finding out how much "stuff" in the universe, tells us the geometry, tells us its fate

Pie Chart Contents



Atoms = 4.6% Stuff we are made of
Dark Matter 23%
Dark Energy 72%

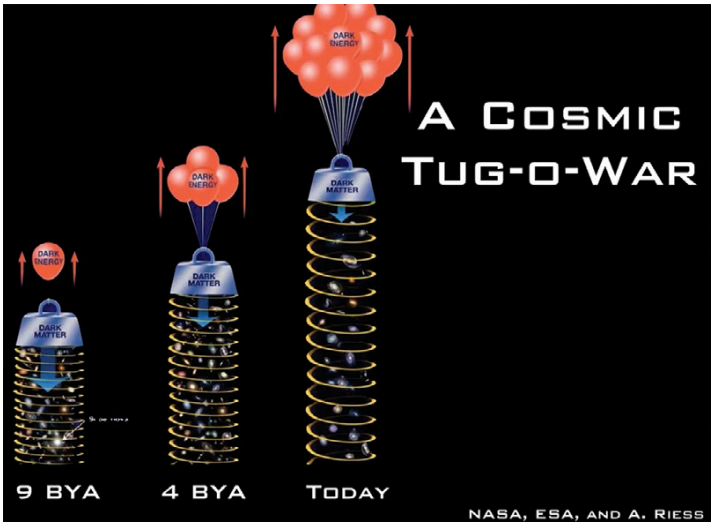
The pie chart is showing a census of all of the sources of energy, whether its matter, or energy or dark energy, all the things that have an impact on the Universe's evolution. What matters most is not the total amounts, but it is the fraction of things that really matters for how the universe evolves.

Dark energy only just recently has become dominant, if the pie chart was done a few billion years ago, it would have been dominated by dark matter. When the Universe was younger it was denser, not as much vacuum. Pie chart not static, it is todays pie chart.

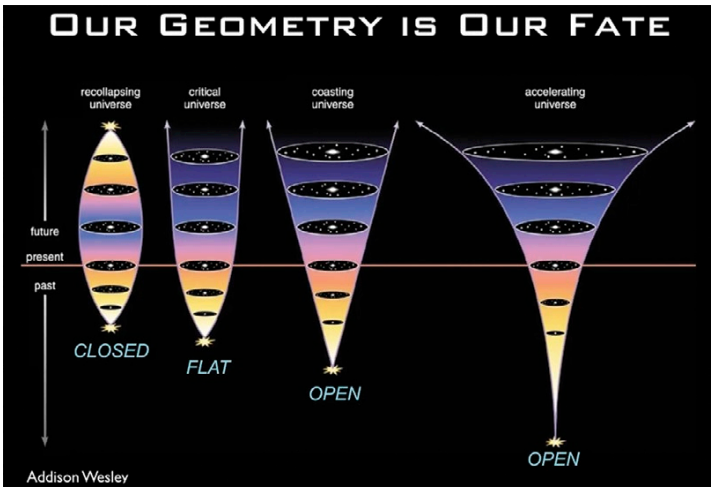
Dark matter was first postulated by Fritz Zwicky, Vera Rubin really showed us that there is dark matter. What Vera showed us is that galaxies are embedded in Dark Matter, when you see a picture of a galaxy, you are only seeing that little bit in the middle of luminous matter, the stars that are making light, but they are living in this vastly 10X larger dark matter halo, the luminous matter falls to the center, and most of the galaxy is actually dark matter by mass and by size. ***Most of the matter is dark in the Universe.***

Dark Energy the evidence for this is that we are not only seeing an expanding universe, but as it expands, it is accelerating. It's as if you throw a ball up in the air and instead of coming back down, it zips away from you and accelerates. The easiest interpretation for this is that there is an energy in the vacuum. Dark energy may be a vacuum energy that accelerates the expansion of the Universe. If you have a big universe that is mostly empty, that's a lot of vacuum and a lot of dark energy. And as the universe grows and expands and becomes even more empty, there is even more vacuum, and even more dark energy.

A Cosmic Tug-O-War



So what is going on is there is a cosmic tug-of-war: there is the expansion, that is the spring trying to push up the dark matter, the dark matter is resisting though gravity, additionally there is dark energy trying to pull it up. As the universe expands, it becomes bigger and more empty so there is more dark energy and eventually, like today, the Dark Energy overcomes the gravity of Dark Matter, and is accelerating our Universe, expanding it and making it even more empty and more Dark Energy, so Dark Energy is winning the Cosmic tug-of-war.



Adding new type of Universe to the group; the Accelerating Universe, the one we think we actually live in, not just growing, but growing faster and faster. Notice that this is also the oldest Universe. With this Accelerating Universe that we live in, once again, to know its shape and know what's in it, we know how old it is, so we also know it's future: and the future is to get very empty and very dark, and eventually our own Milky Way Galaxy will become an isolated galaxy and we won't actually be able to see anything else in the Universe.

Dr. Darling leaves us with three puzzles..."Science is most fun when we say we don't know things and there are mysteries...plenty of mysteries in Cosmology"

1. What is Dark Energy?
Energy in the vacuum?
Larger question: Why is there Dark Energy? Why is there energy in a vacuum?

2. What is Dark Matter? We don't know what it is, scientist think it is probably a particle, is not one that we currently know of. There could be anti-dark matter equal to dark matter, or it could be one particle, we don't know. The Answer will rework physics.

3. Why do we exist?
Not a philosophy question a physical question. When you look around everything is made of matter. Modern physics tells us we should have a universe full of light, but no matter. Should be equal balance between Matter vs. Antimatter. What happened instead is a tiny imbalance in Matter vs. Antimatter, this happened in the first few milliseconds of the Big Bang. Thanks to that tiny imbalance we were left over with 1part/per/billion matter and that is why we even exist. Why this happened is another question we have no idea about.

Dr. Darling has led us on a thought-provoking journey through time and space, enhancing our understanding of 'Our Universe' and ends this presentation with his closing thoughts:

"The universe is everything and everything includes us. What is amazing about Cosmology is that we are a part of the universe studying itself. It is astonishing to me that we can learn about the universe from where we are; we can't leave, we can't look at it from the outside, we can't go to the end or the beginning, but somehow we can figure out an awful lot about how the universe works, its history and

also its future. ”

The discussion continues with many interesting and engaging questions and comments from members concerning Dark Energy, Dark Matter, Anti-Dark Matter, Size of Early Universe and Opaqueness of Cosmic Background Radiation, Space-time Quantum Effects, Pie Chart Ratio of Dark Matter/Dark Energy, Supernovas and Measurement, and Cosmological Constant/Dark Energy, Primordial Gases and more.

III. Business Report

Bruce Lamoreaux, gives the monthly Treasurers report:

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

LAS Treasurer's Report - Bruce Lamoreaux **4/20/2(**

Main Checking Account (xxx-1587)

Begin Balance:	$ 10,135.00	**3/3/2023**
Deposits:	$ 185.00	Membership
Expenses:	$ (230.00)	Bank Charges, Website
Current Balance:	**$ 10,090.00**	**4/4/2023**

2-Year Savings Account (xxx-1478) (matures 10/23/23)

Past Balance:	$ 8,135.00	**12/30/2023**
Interest:	$ 15.00	
Balance:	**$ 8,150.00**	**3/31/2023**

Telescope Fund (xxx-0165)

Past Balance:	$ 1,100.00	**2/27/2023**
Deposits:	$ -	
Expenses:	$ -	
Balance	**$ 1,100.00**	**3/30/2023**

Petty Cash

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

Total Assets **$ 19,390.00** $ (30.00) Down from last report

Active Membership:	**116**
Student Membership:	**3**
Total	**119**

- M.J. Post raises question of creating new account with CD interests going up, could possibly be small income increase

IV. New/Old Business

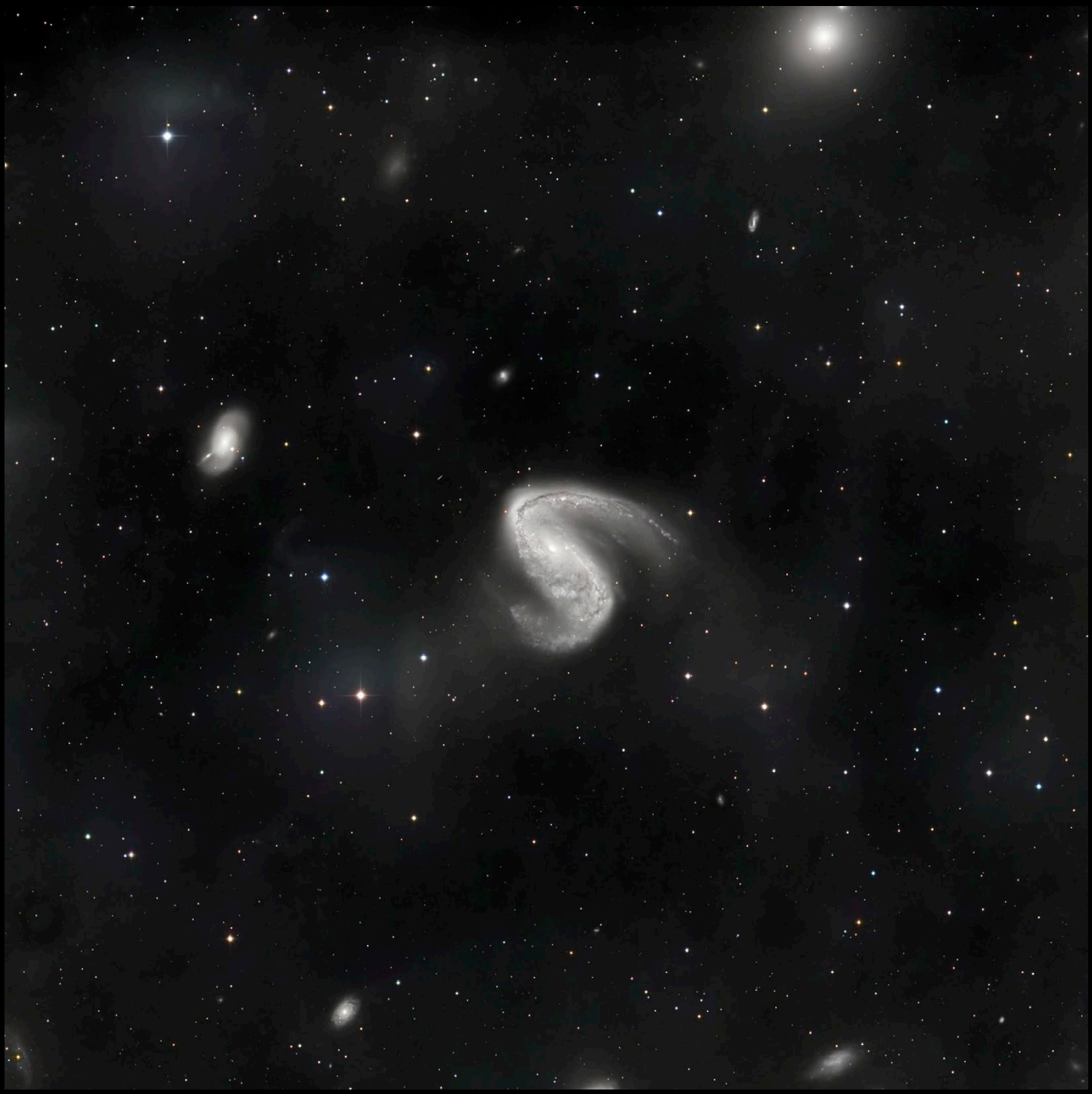
- The LAS website has moved to Squarespace
- New site looks great, Sarah Detty, LAS webmaster, did a wonderful job
- There are some issues moving member information from WildApricot to Squarespace, this is currently being worked on
- Next in-person/hybrid meeting May 18th at Longmont Lutheran Church
- Rabbit Mountain Star Party May 19th, weather permitting, should be a great night for telescope viewing with a New Moon

Virgo Cluster (starless) by David Elmore

David Elmore - LBN 8, 10, 11, 16, 18, and 23. The large dark molecular clouds are quite interesting but not at H-alpha. Images acquired with Borg107FL F/3.9, ASI6200MM, Chroma HS0 filters expressed as HOO with SII added as yellow.

David Elmore - Medusa Nebula, Sh2-274. Image was captured using my telescope at Dark Sky New Mexico. Borg 107FL F/3.9 hextuplet apochromatm ZWO ASI6200MM Pro, Chroma 3nm H-alpha, OIII, & Sulfur II filters. 6/5/5 exposures 10-minutes each for a total of 2 hours 40 minutes OAG with ASI290

Eddie Hunnell - Large Magellanic Cloud. With all these clouds in Colorado, I decided to process an image from Telescope.live (remote telescope). This is a large set of 10 min subs taken with LRGB with a CCD camera and a Takahashi scope southwest of Sydney, Australia. I put all the details of the setup and processing in the attached file for those who want to dig in. Keep in mind that I am a rookie processing monochrome images. So if I did something wrong (or not ideal) in the processing, I would be glad to get the input. Thx for looking at both the image and processing.



Eddie Hunnell - NGC 2442. Another remote telescope image waiting for a moonless clear weekend night (tomorrow I hope).

I wanted to find an interesting galaxy south of where I could image from home. This one looked nice. I used all three Xterminator tools (tried without StarXterminator and it came out worse).

All of the details are contained in the attached text file if you are interested in them. Short summary:
CCD camera
Planewave CDK24 OTA
6.33 total hours integration utilizing LRGB

M27 by Gary Garzone

M57 by Gary Garzone

Gary Garzone - NGC 2236. Need lots more time, this was only 40 minutes, planned on 2 hours but, next time. I need to start earlier too, did not start till 12:30 got lots noise, but did get it. I will try again next clear night. C 14 ZWO asi 6200 camera

Gary Garzone M27 and M57 - First time using new filter, Sony CLS light pollution filter. I had to redo white flats, seemed to work okay in processing.
C 14- F 7 ZWO ASI 6200 camera, over hour each.

Jim Elkins - Bode's Galaxy (M81) from my Vaonis Vespera (50 mm f/4) smart telescope on March 26, 2023 with no filter and 362 images x 10 seconds in standard mode (total 30 ⅓ minutes) from my backyard (Bortle 5).

Jim Elkins - Waxing Gibbous Moon (85%) on Sunday night (April 2). Taken with Unistellar eQuinox (4.5” f/4) smart telescope and Baader Planetarium Moonglow and Skyglow filter. I made a panorama of seven images at 0.3 ms (1/3333 second) using Affinity Photo 2, Topaz AI for denoise, sharpening, and enhancing resolution, and finally brightening with MacOS Photos app. This bright moon would become troublesome for my galaxy quest tonight.

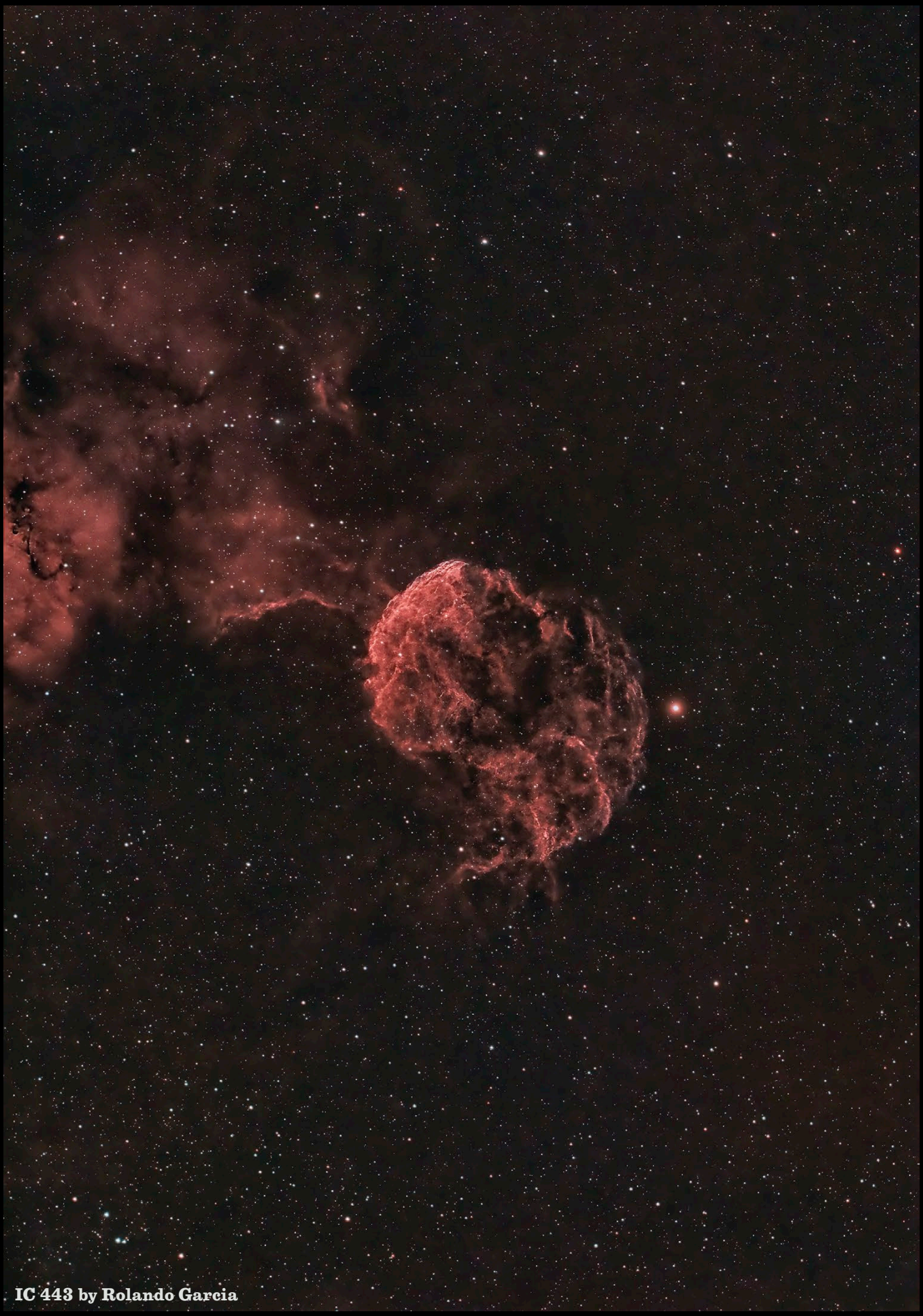
M101, Pinwheel by Jim Pollock

Bubble Nebula by Martin Butley

NGC 2841 by M. J. Post

NGC 2805 by M. J. Post

SH2-74 by M. J. Post



IC 443 by Rolando Garcia

M82 and M82 by Rolando Garcia

IC 417 and 410 by Stephen Garretson

Spider, fly, and Starfish Cluster by Stephen Garretson

IC 2177, Seagull Nebula by Tally O'Donnell

Longmont Astronomical Society
PO Box 806, Longmont, CO
https://www.longmontastro.org

SH2-273 by Tally O'Donnell