



# **LONGMONT ASTRONOMICAL SOCIETY**

**JUNE 2023**

**MELOTTE 15**  
**BY MARTIN BUTLEY**

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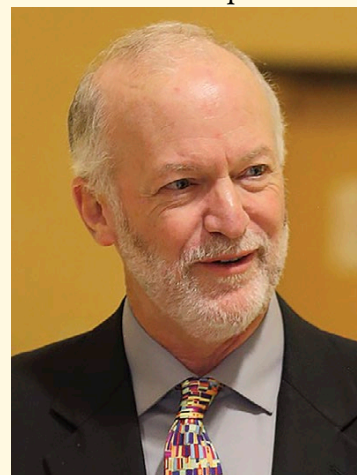
**LAS Meeting Thursday, June 15 at 7 pm**  
**Presentation “Life and climate on Mars: Past, present, and future”**  
**by Dr. Bruce Jakosky**

**Brief Description:**

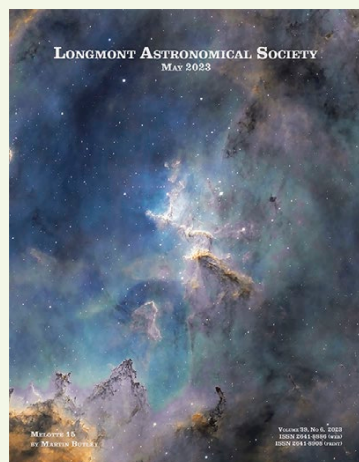
Mars is the closest planet to us that holds the potential to have had life in the past, to have it at the present, or possibly to have it in the future. I'll discuss the history of the climate and habitability of Mars, the current exploration program that has as a major goal searching for evidence of life, and the potential for a future climate to be able to support life.

**Bio:**

Bruce Jakosky has been a Mars researcher since being an undergraduate working on the Viking spacecraft mission in the 1970s. He has been at the University of Colorado for more than 40 years, as a researcher and as a professor. He has written more than 300 papers for the scientific literature, and is author or co-author of three books on life in the universe. He led the MAVEN spacecraft mission to explore Mars' upper atmosphere and climate evolution from its inception in 2003 through seven years of operation in orbit at Mars, and is now heavily involved in planning future Mars exploration.



**Front Cover: Melotte 15 by Martin Butley**



Marty reprocessed image of the center of the Heart Nebule (Melotte 15). It is an SHO image composed of 5 and 10 minute subs taken with both an FLI 16200 camera and an ASI 6200 camera using a Takahashi FSQ 130 telescope. Ha: 8 hours; OIII: 8 hours; SII: 5 hours

Total integration time = 21 hours; Stacked and pro-

cessed in PixInsight; From Marty's backyard in Hygiene.

**Back Cover: NGC 4559 by M. J. Post**

M. J. took 2 hours of OSC imagery of a galaxy about 29 M.ly. distant. It's also known as Caldwell 36 which contains a Luminous Blue Variable star that has supernova-like outbursts about once per year. The smaller spiral to the lower left is NGC 4559a, 350-1500 M.ly. away.



**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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### LAS Officers and Board Members in 2023

Vern Raben, President  
 Hunter Morrison, Vice President  
 Eileen Hall-McKim, Secretary  
 Bruce Lamoreaux, Treasurer

Board Members:  
 David Elmore, Gary Garzone,  
 Mike Hotka, Brian Kimball, and Tally O'Donnell

### Appointed Positions 2023

Sarah Detty, Webmaster; Bruce Lamoreaux, Library Telescope Coordinator; Bill Tschumy,  
 Public Outreach Coordinator;  
 Vern Raben, Newsletter Editor; Eileen Hall-McKim, Newsletter Archives;



## The Planets in June

### Mercury

Mercury is not visible. It is at superior conjunction with the Sun on June 30. In other words it is on a straight line with the Sun and Earth but on the far side.

### Venus

Venus is visible after sunset in the west. It increases in brightness this month from magnitude -4.3 to -4.5 waxing crescent disk increases from 23 to 34 arc sec across.

### Mars

Mars continues getting smaller and dimmer. It is 4.7 arc sec across on the 1<sup>st</sup> and 4.2 arc sec across by the 30<sup>th</sup>. It dims slightly from +1.6 magnitude in apparent brightness to +1.7 magnitude by the end of the month.

### Jupiter

Jupiter low in the east about an hour before sunrise. It is magnitude -2.2 in brightness and the disc is 35 arc sec across. A couple opportunities to observe the Great Red Spot at mid transit this month, On June 25 at 5:00 am it will be 30° altitude above the horizon. On June 30 at 4:12 am it will be 24° altitude.

### Saturn

At mid-month about an hour before sunrise Saturn is fairly high up (36°) in the SSE in constellation Aquarius. It is magnitude +0.9 in brightness and the disk is 17 arc sec across.

### Uranus

On the 15<sup>th</sup>, Uranus may be found low in the East just west of the thin waning Moon disk. It is magnitude 5.8 in brightness and the disk is 3.4 arc sec across.

### Neptune

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

## Meteor Showers in June

A couple minor meteor showers this month: the June Lyrids on the 16 and June Böötids on the 27. Expect only 2 or 3 per hour.

## Lunar Phases in June

- Full moon: June 3 at 9:43 pm
- Third quarter: June 10 at 1:33 pm
- New moon: June 17 at 10:38 pm
- First quarter: June 26 at 1:51 am

## Bright Nebula in June

- IC406, Rho Ophiuchi in Ophiuchus, mag 5.1
- IC5070, Pelican Nebula in Cygnus, mag 8.0
- IC5146, Cocoon Nebula in Cygnus, mag 7.2
- Caldwell 9, Cave Nebula in Cepheus, mag 7.7
- IC1396, Elephant Trunk Nebula in Cepheus, mag 5.6
- NGC7822, Nebula in Cepheus, mag 8
- NGC7000, North America Nebula in Cygnus, mag 4.0
- NGC6888, Crescent Nebula in Cygnus, mag 7.4

## Galaxies in June

- M49 Elliptical Galaxy in Virgo, mag 8.4
- M81, Bode's Galaxy, in Ursa Major, mag 6.8
- M94 Spiral Galaxy in Canes Venatici, mag 7.9
- M82, Cigar Galaxy, in Ursa Major, mag 8.0
- M104, Sombrero Galaxy in Virgo mag 8.1
- NGC2403, spiral galaxy in Camelopardalis, mag 8.2
- M106, spiral galaxy in Canes Venatici, mag 8.3
- M51, Whirlpool Galaxy in Canes Venatici, mag 8.4
- M64, Black Eye Galaxy in Coma, mag 8.4
- M101, Pinwheel Galaxy in Ursa Major, mag 8.4

## Globular Clusters in June

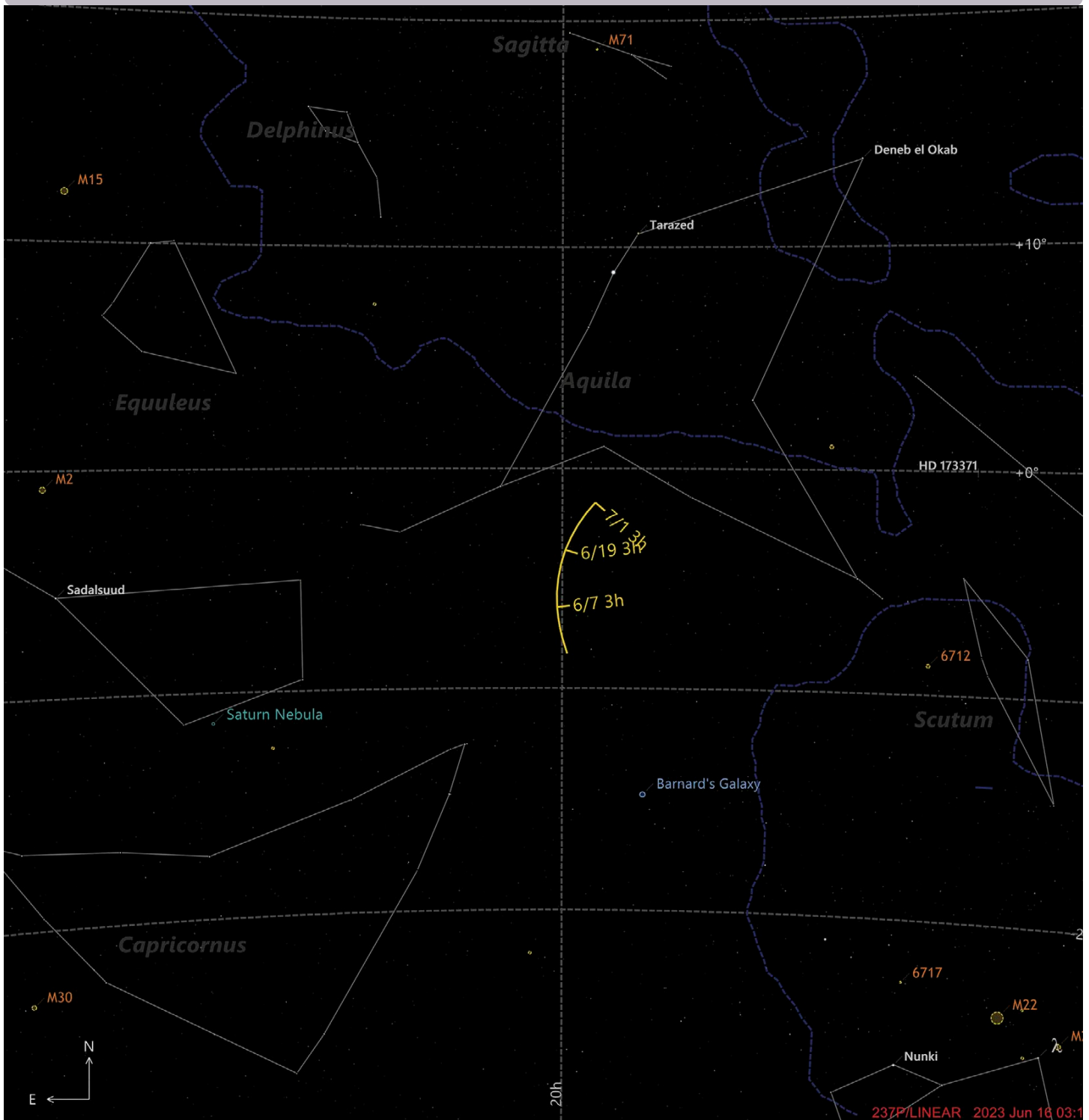
- M4 in Scorpius, mag 5.6
- M5 in Serpens, mag 5.7
- M13 in Hercules, mag 5.8
- M3 in Canes Venatici, mag 6.3
- M15 in Pegasus, mag 6.3
- M92 in Hercules, mag 6.4
- M2 in Aquarius, mag 6.6
- M10 in Ophiuchus, mag 6.6
- M12 in Ophiuchus, mag 6.7
- M53 in Coma, mag 7.7

## Planetary Nebula in June

- M27, Dumbbell Nebula in Vulpecula, mag 7.1
- NGC6572 in Ophiuchus, mag 8.0
- NGC6543, Cat's Eye Nebula in Draco, mag 8.1
- NGC7027 in Cygnus, mag 8.5
- M57, Ring Nebula in Lyra, mag 8.8
- NGC6210 in Hercules, mag 8.8

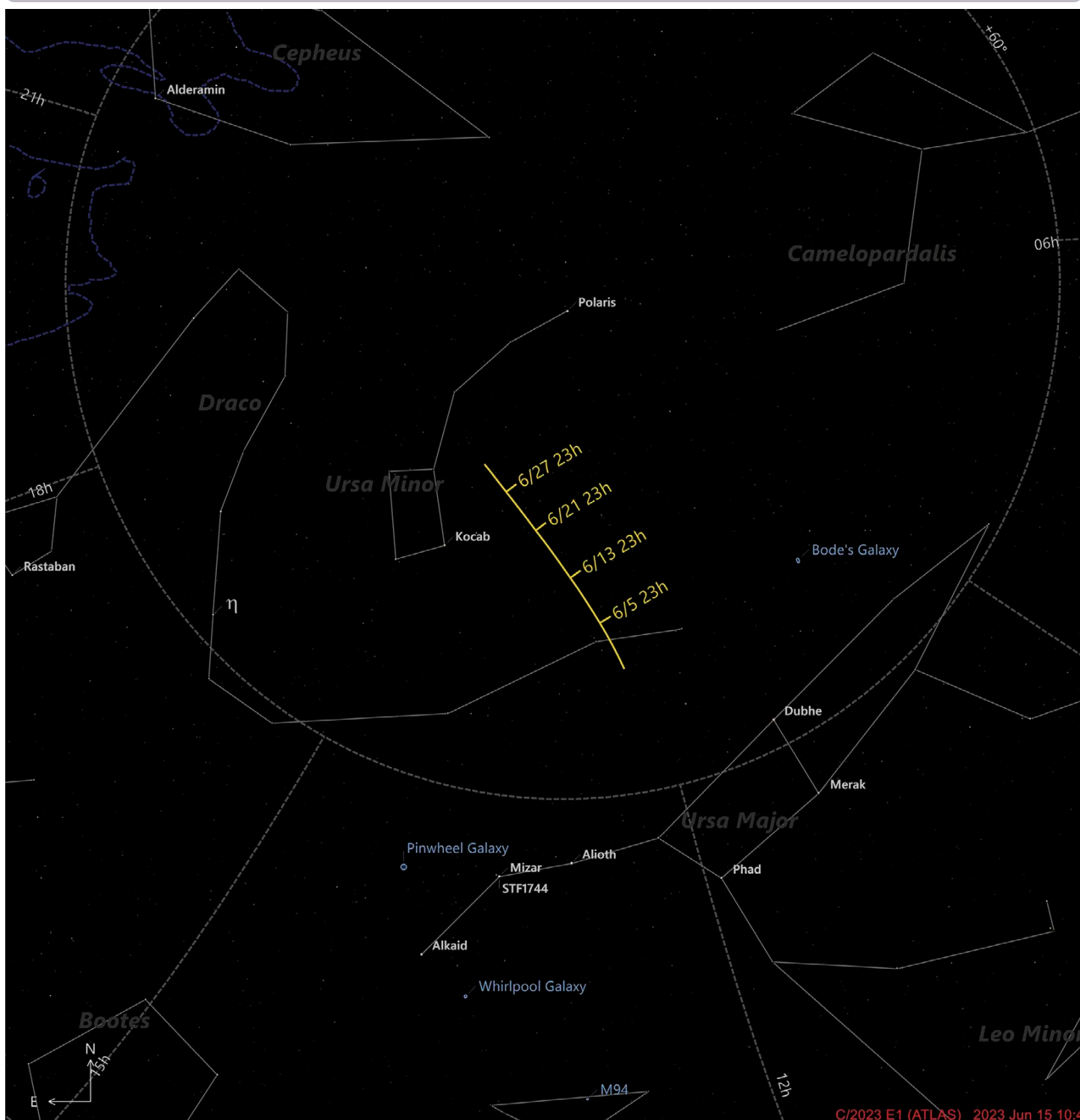


# Comet 237P (LINEAR)



Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
June 1	3:49 am	20h01m28.7s	-07°24'37"	Aquila	12.7	1.3
June 7	2:38am	20h02m13.5s	-06°01'34"	Aquila	12.6	1.4
June 13	3:18 am	20h01m49.5s	-04°41'12"	Aquila	12.6	1.4
June 19	3:04 am	20h00m20.4s	-03°26'46"	Aquila	12.5	1.4
June 25	2:41 am	19h57m53.6s	-02°19'29"	Aquila	12.5	1.5
June 30	3:20 am	19h55m13.4s	-01°29'30"	Aquila	12.5	1.5

# Comet C/2023 E1 (ATLAS)



C/2023 E1 (ATLAS) 2023 Jun 15 10:4

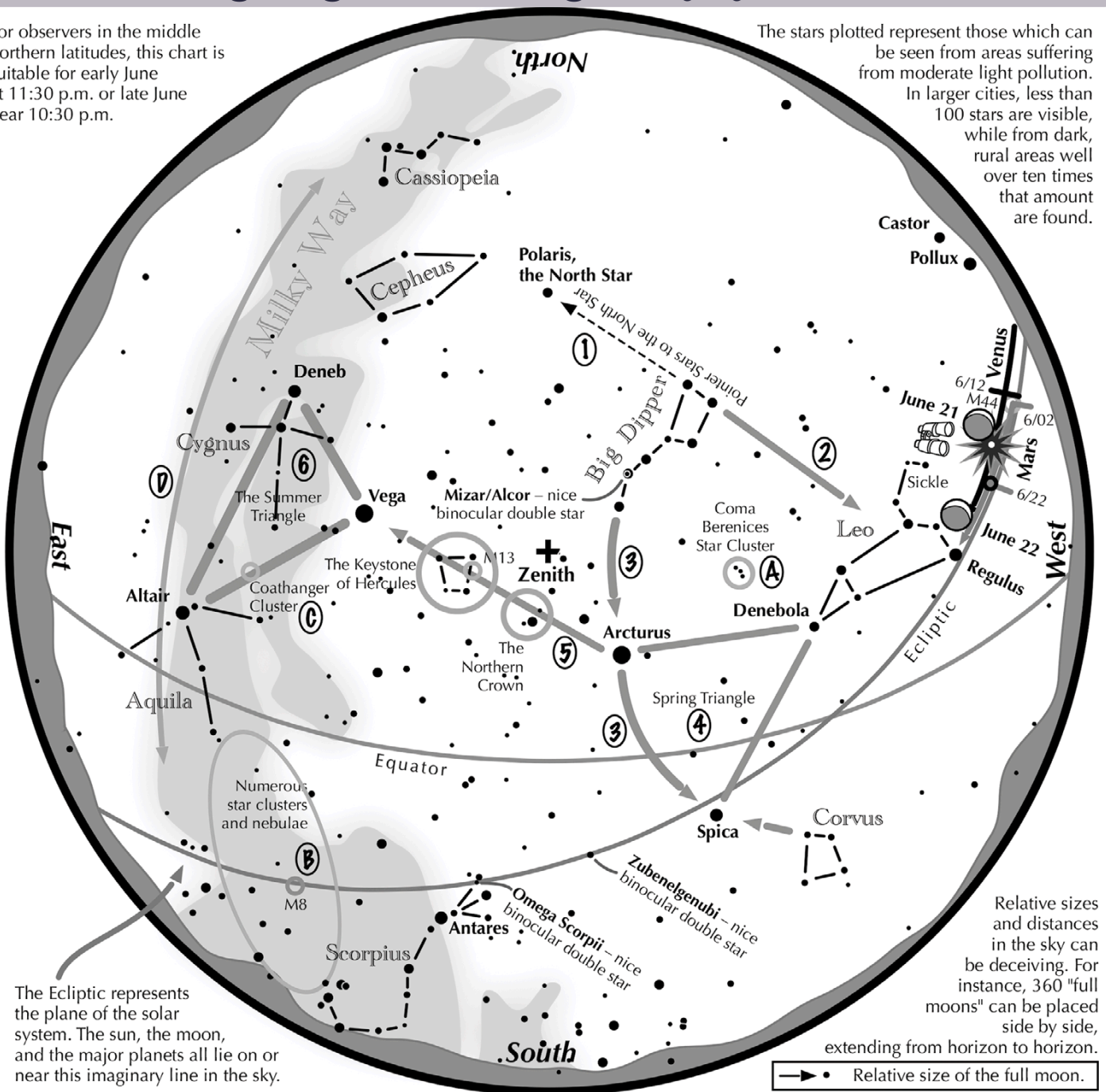
Date	Optimal time	RA	Dec	Constellation	Magnitude	Size (arc min)
June 1	3:33am	12h23m27.0s	+69°20'59"	Draco	12.4	2.7
June 7	10:38 pm	12h34m35.9s	+71°32'55"	Draco	12.2	2.8
June 13	10:43 pm	12h51m41.8s	+73°46'40"	Draco	12.1	2.9
June 19	10:47 pm	13h16m55.7s	+75°57'19"	Ursa Minor	11.9	3.0
June 25	10:56 pm	13h54m47.0s	+78°00'59"	Ursa Minor	11.8	3.1
June 30	10:18 pm	14h43m02.7s	+79°32'26"	Ursa Minor	11.7	3.2



# Navigating the June Night Sky by John Goss

For observers in the middle northern latitudes, this chart is suitable for early June at 11:30 p.m. or late June near 10:30 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

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

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Draw another line in the opposite direction. It strikes the constellation Leo high in the west.
- 3 Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the June evening sky, then Spica.
- 4 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
- 5 To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 6 High in the east are the three bright stars of the Summer Triangle: Vega, Altair, and Deneb.

### Binocular Highlights

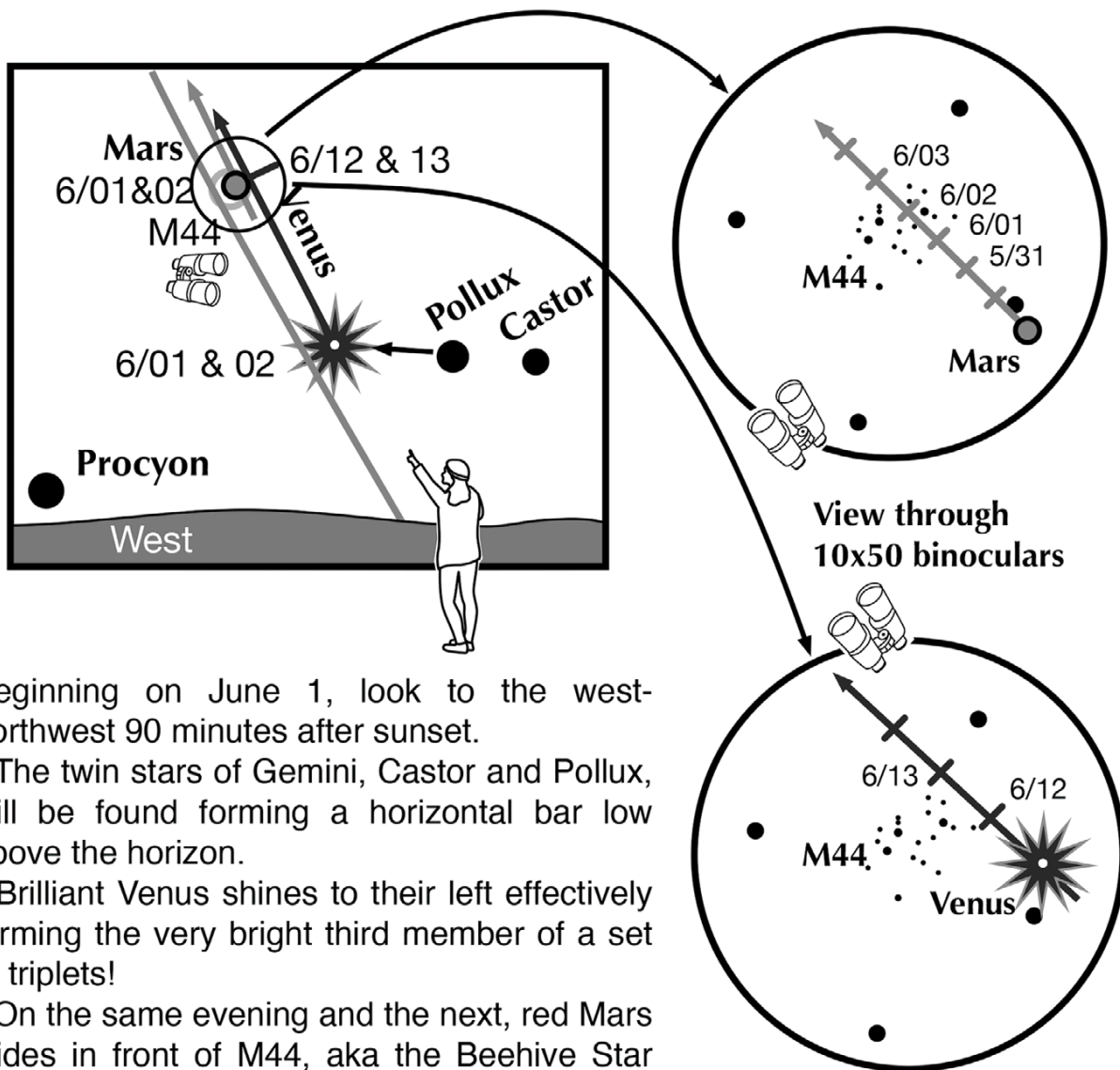
- A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
- B: Between the bright stars of Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep along the Milky Way for an astounding number of faint glows and dark bays.

Astronomical League [www.astroleague.org/outreach](http://www.astroleague.org/outreach); duplication is allowed and encouraged for all free distribution.





## A must see celestial planetary play: Two planets visit the Beehive

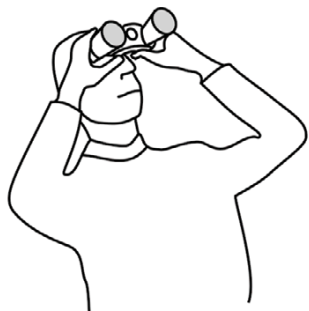


Beginning on June 1, look to the west-northwest 90 minutes after sunset.

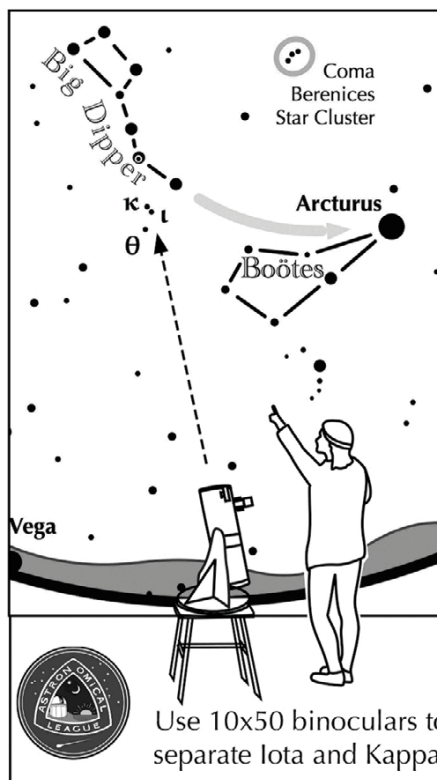
- The twin stars of Gemini, Castor and Pollux, will be found forming a horizontal bar low above the horizon.
- Brilliant Venus shines to their left effectively forming the very bright third member of a set of triplets!
- On the same evening and the next, red Mars slides in front of M44, aka the Beehive Star cluster, positioned above Venus. Use

binoculars to find Mars sitting amid the many stellar bees.

- Ten nights later, it is Venus' turn to stay at the Beehive for two consecutive nights. The planet travels along the outskirts, farther from Beehive central than Mars moved. Again, bring out the binoculars. How does the glare of brilliant Venus affect the scene?







## 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 intersects Iota and Kappa.

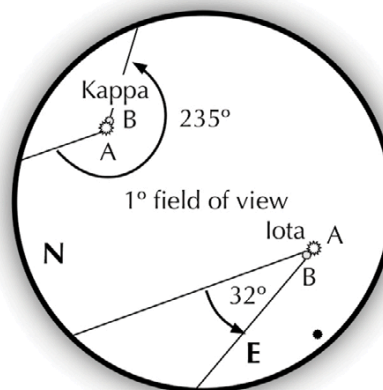
Suggested magnification: >30x  
Suggested aperture: >2 inches

#### 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



**BIENVENUE EN LOUISIANE! (WELCOME TO LOUISIANA!)**

Join us for this unique and exciting amateur astronomy gathering!



# ALCON 2023



## KEYNOTE SPEAKERS

- ★ David Eicher—writer, editor-in-chief of *Astronomy Magazine*
- ★ Fred Espanak—co-author of *Totality: The Great American Eclipses of 2017 and 2024*
- ★ David Levy—author, comet hunter

## FIELD TRIPS

- ★ Irene Pennington Planetarium
  - ★ LIGO (Laser Interferometer Gravitational-Wave Observatory) Livingston\*
  - ★ Louisiana State University Physics & Astronomy
  - ★ Highland Road Park Observatory
- \*Spaces are limited for this trip!

**July 26–29, 2023**

Hilton Baton Rouge  
Capitol Center Hotel  
201 Lafayette Street  
Baton Rouge, LA 70801

**SPEAKERS** ★ Pranvera Hyseni ★ Guy Consolmagno ★ Dan Davis ★ And many more!

Brought to Baton Rouge by the **Baton Rouge Astronomical Society**

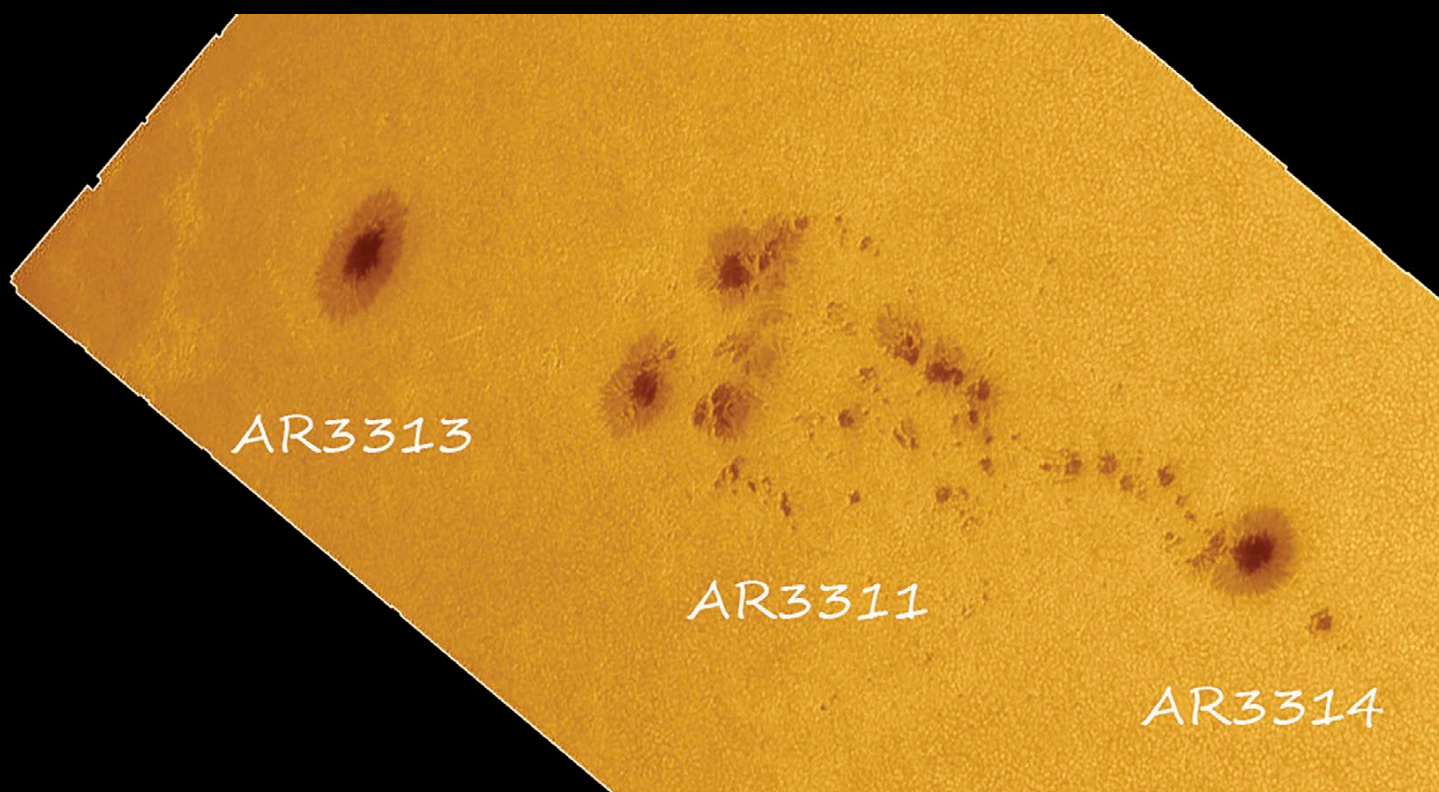
★★ Registration is now open! Check [alcon2023.org](http://alcon2023.org) ★★







**Solar Images on May 21 by Brian Kimball. Little better than average seeing. 8"f12 refractor, Lunt Hershel wedge, ZWO174 camera.**

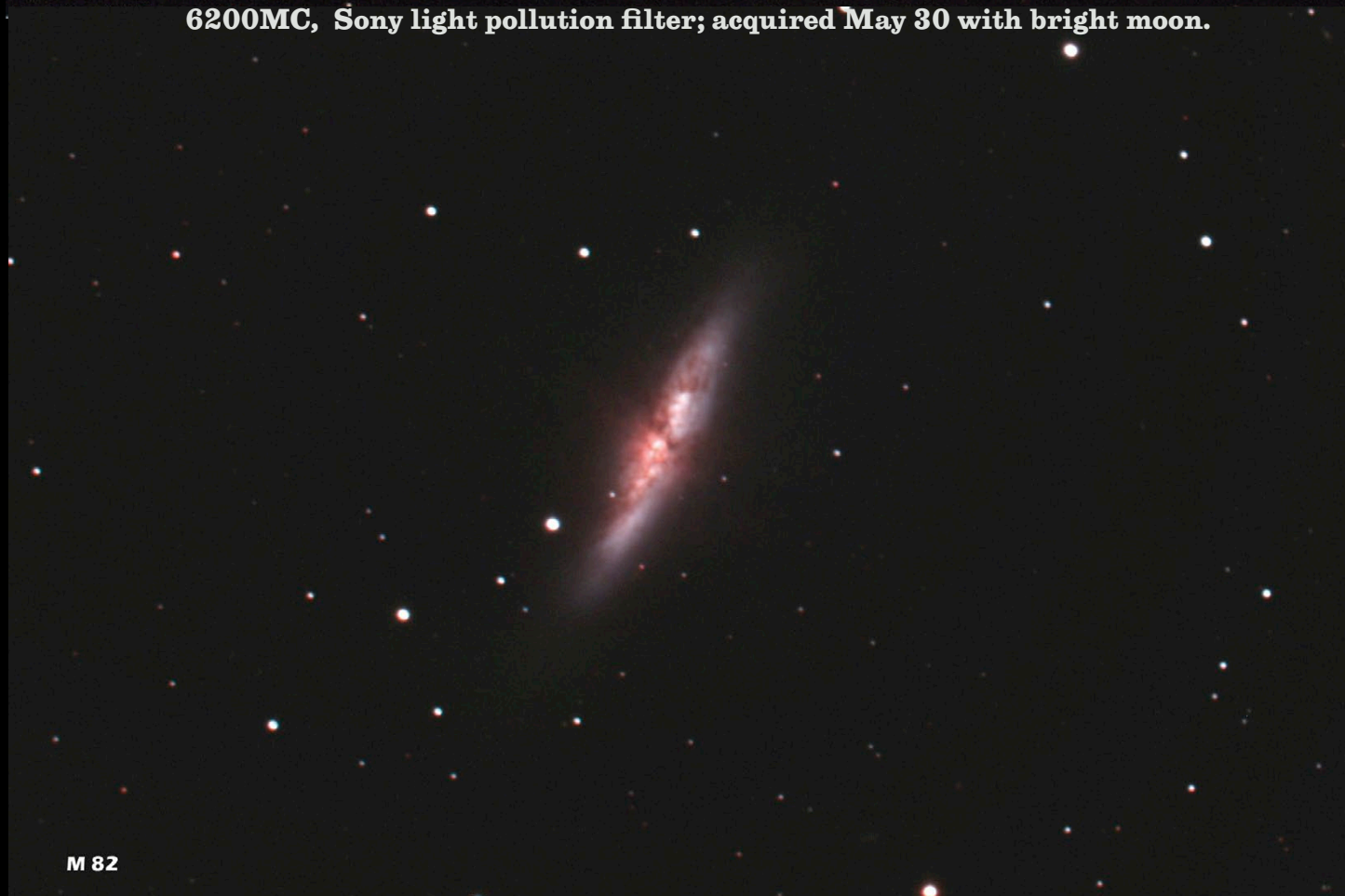






**M 81**

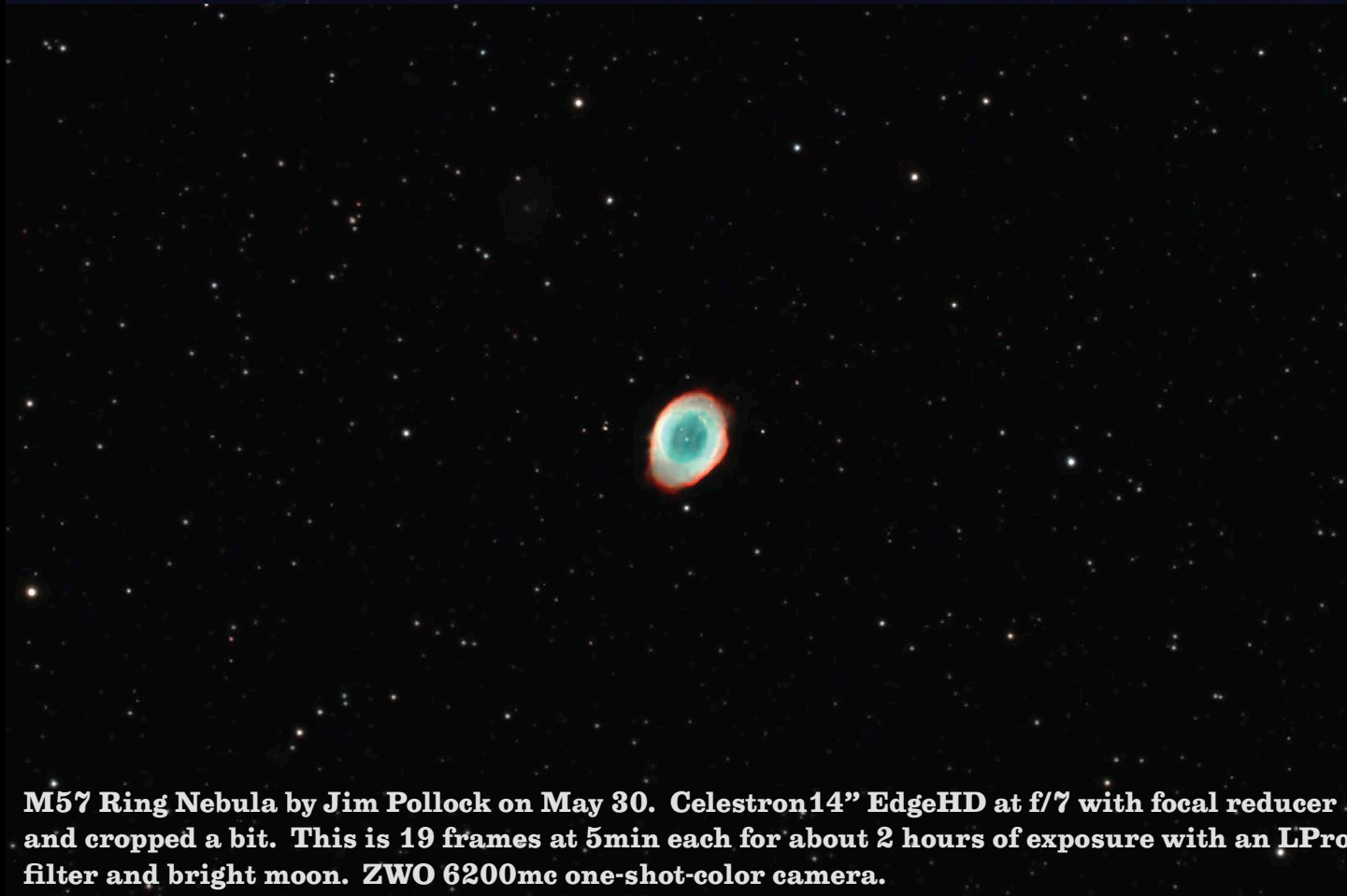
**M81 and M82 by Gary Garzone on May 7. C14 at F 7, ZWO asi 6200MC, Sony light pollution filter; acquired May 30 with bright moon.**



**M 82**



**NGC 4038, Antennae Galaxy by Jim Pollock on May 22.**



**M57 Ring Nebula by Jim Pollock on May 30. Celestron 14" EdgeHD at f/7 with focal reducer and cropped a bit. This is 19 frames at 5min each for about 2 hours of exposure with an LPro filter and bright moon. ZWO 6200mc one-shot-color camera.**





**M82, Bode Galaxy by Jim Pollock on May 30**

**Jim drove from Dallas to Analytic Scientific (Telescopes and Microscopes) in San Antonio Texas on Easter weekend in 1986 to purchase this 8 inch SCT on a “Wedge” tripod for \$1100.**





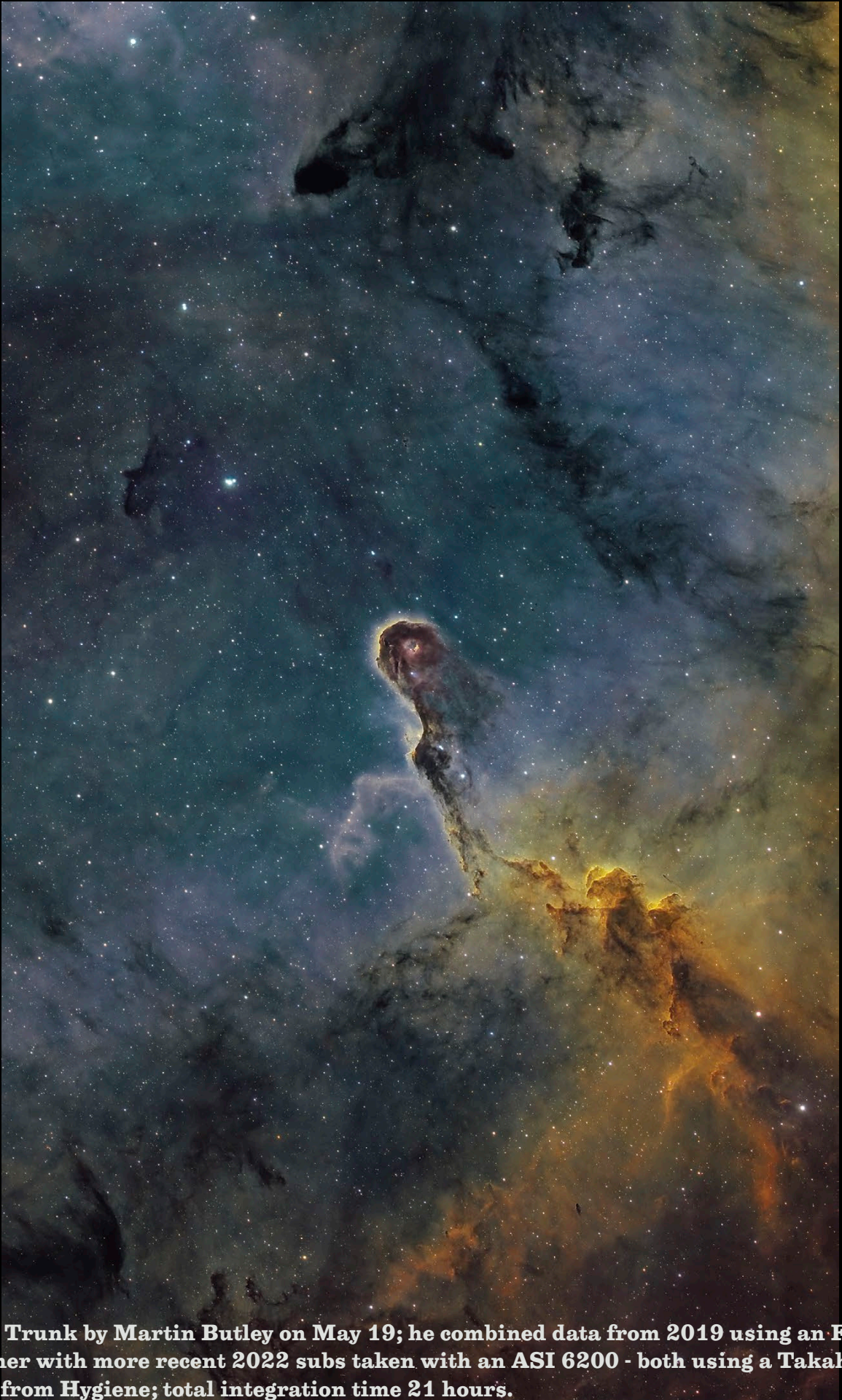


**M101 in April (before supernova) by Ellen Steiner**



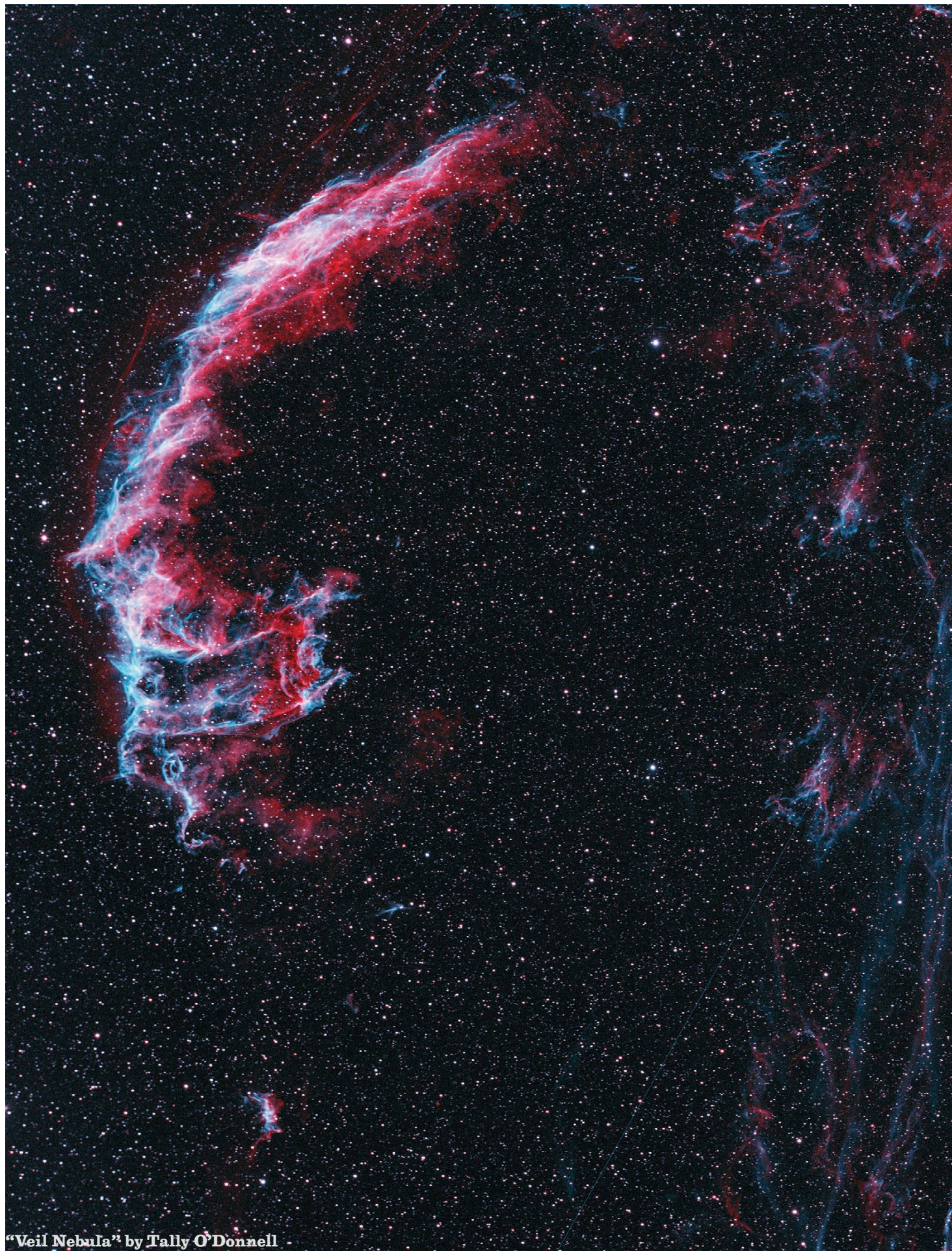
**M101 supernova by Ellen Steiner on May 22**





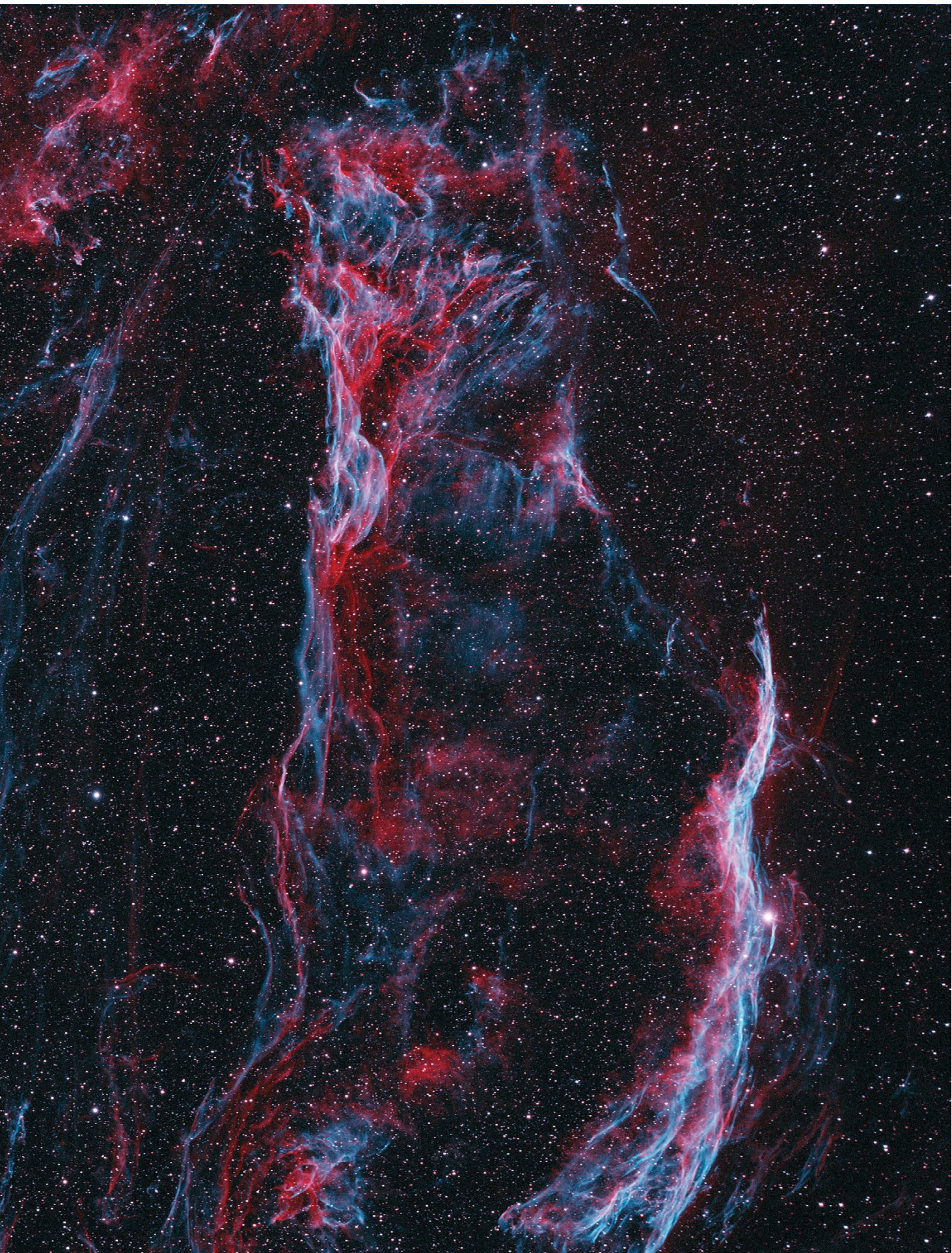
**Elephant Trunk by Martin Butley on May 19; he combined data from 2019 using an FLI camera together with more recent 2022 subs taken with an ASI 6200 - both using a Takahashi FSQ 130 from Hygiene; total integration time 21 hours.**



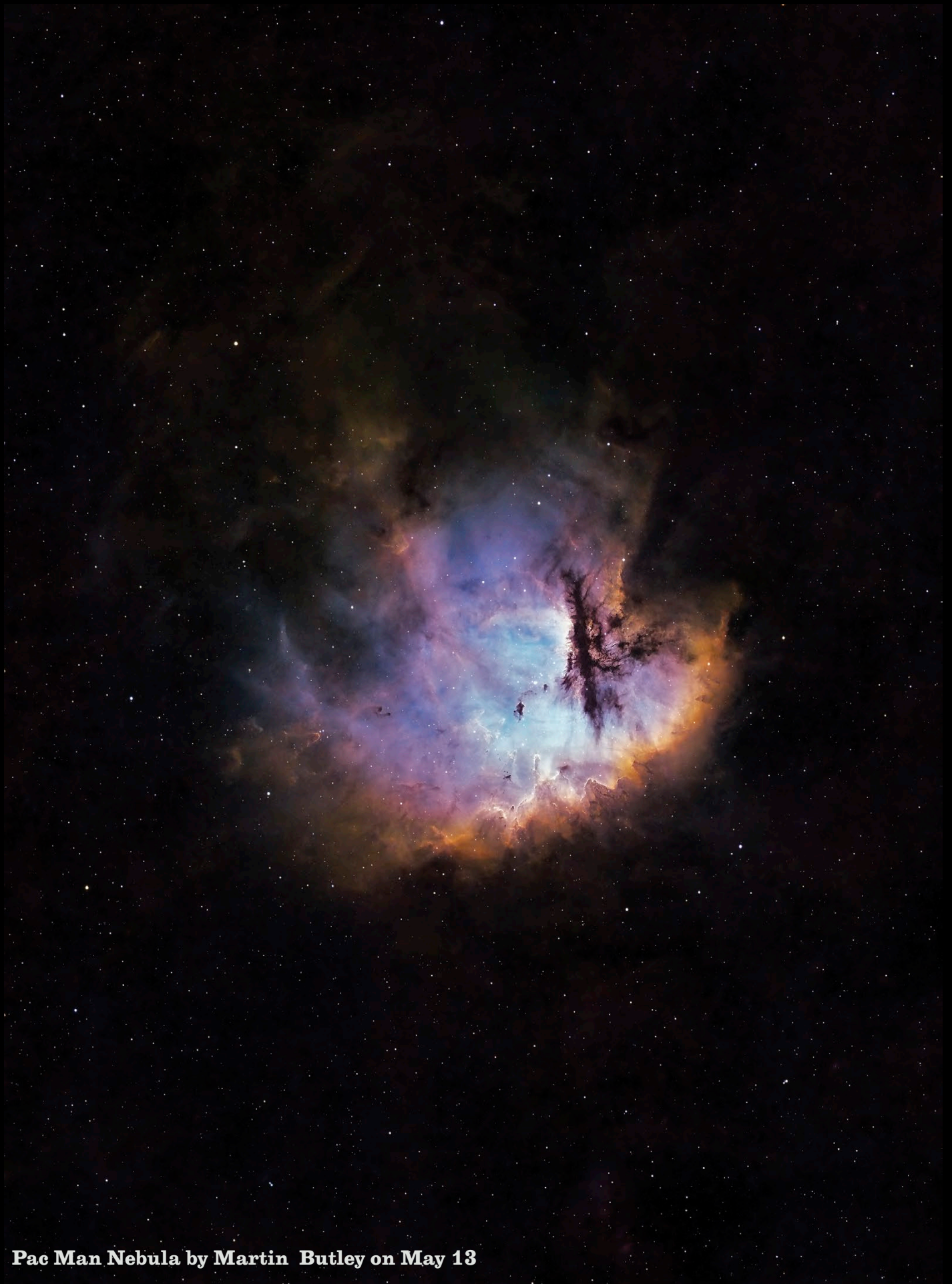


**"Veil Nebula" by Tally O'Donnell**









**Pac Man Nebula by Martin Butley on May 13**



**NGC 1788, Cat's Face Nebula by M. J. Post on May 3**





**NGC 5982 by M. J. Post on May 13**





**M8 Region by Tally O'Donnell on May 25**



## Secretary Notes Thursday, May 18, 2023

by Eileen Hall-McKim

### I. Introduction

The May LAS in-person/hybrid monthly meeting was held on May 18th at the Longmont Lutheran Church. President Vern Raben began the meeting with a self-introduction by all members attending in-person. Fifteen members attended in-person, 8 attended by zoom.

### II. Main Presentation

The main presentation for the May meeting “Living in the Golden Age of Solar Physics” was given by Dr. Maria D. Kazachenko, an assistant professor at Astrophysical & Planetary Science Department (APS) at the University of Colorado, Boulder and the National Solar Observatory (NSO). Before that, she spent seven years at Space Sciences Lab (SSL) at UC Berkeley, first as a postdoctoral fellow and then as a research scientist. Since 2011, she has been part of the Coronal Global Evolutionary Model Team, a collaboration between scientists at UC Berkeley, Stanford, and Lockheed Martin.

#### **Living in the Golden Age of Solar Physics** **Prof. Maria Kazachenko**

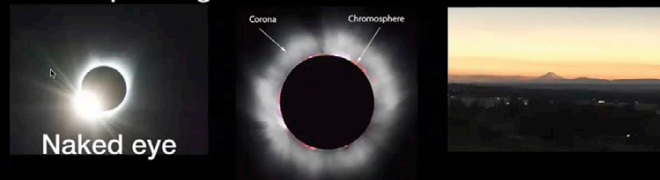
Space weather is largely caused by the activity of our Sun. Invisible yet powerful magnetic fields, created within the Sun, determine when and where the next solar eruption will happen. Large solar storms can put our technological society at risk. In this presentation, Dr. Kazachenko discusses the study of the nature of the Sun, planned missions and instruments to explore the solar corona and heliosphere interactions and how advances in solar telescopes allow scientists to understand the Sun in a lot more detail than ever before.



During a total solar eclipse it gets dark, during the moments of totality is when we see the beautiful solar corona and it is possible to see the fascinating structure of the solar corona.

### Great American Eclipse, 2017

Total eclipse: it gets dark!



Partial eclipse: still lot's of light!



### During Total Solar Eclipse we can see the Solar Corona



Prof. Maria Kazachenko, CU Boulder/NSO

The plasma that emanates from the surface of the Sun has an immense amount of structure and the question is: How is this whole structure created and how do we study it? One way we study it is with the use of light.

#### **The Light from the Sun has many different colors**

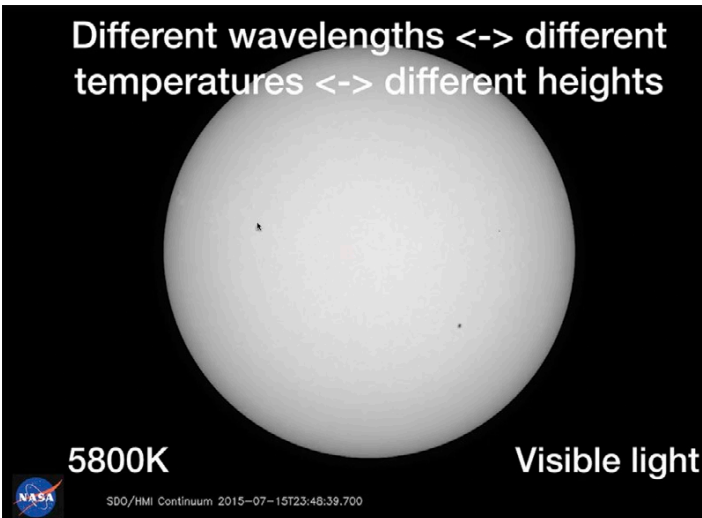
- One way we study the Sun is through examining different wavelengths
- Different colors correspond to different wavelengths, different temperatures and different heights on the Sun
- With these different wavelengths, we can study with different parts of the Sun and different heights of the Sun

## The Light from the Sun Contains many different Colors

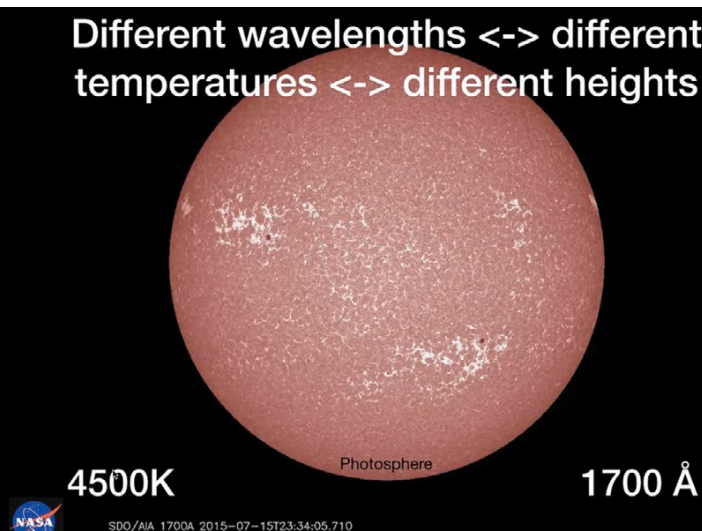


### Different wavelengths $\leftrightarrow$ Different temperatures $\leftrightarrow$ Different heights

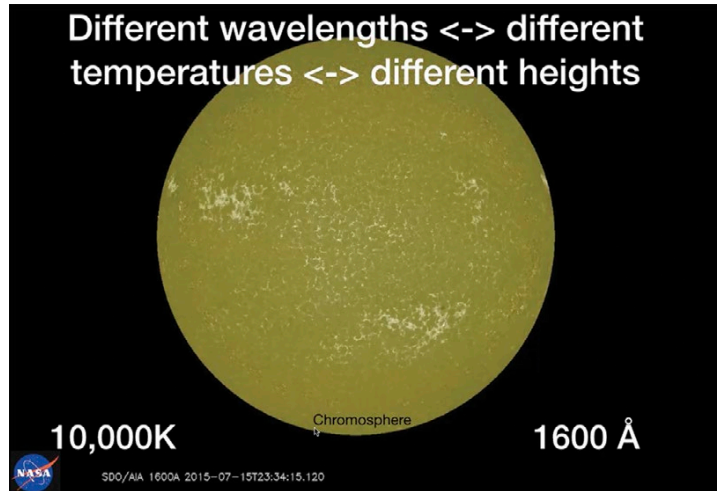
- The farther from the surface of the Sun, the hotter it gets
- Wavelength measures in Angstroms ( $\text{\AA}$ ) unit of length



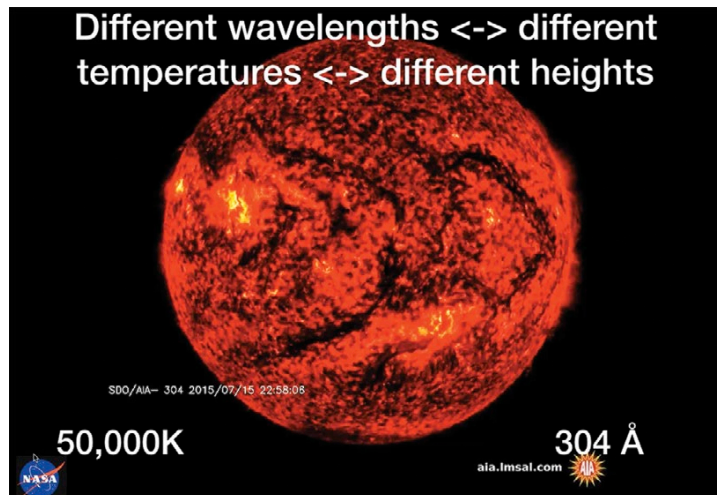
**5800 K Visible light, not much going on, couple black spots are sunspots**



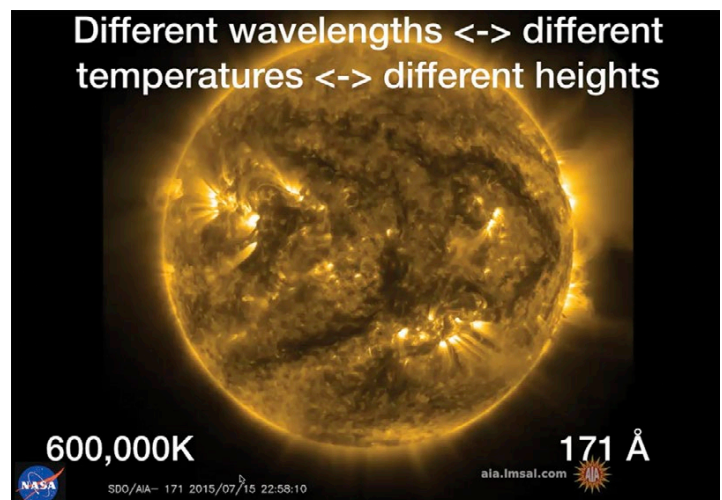
**1700  $\text{\AA}$  4500K Corresponds to surface of the sun,  
now see extra structure**



**1600  $\text{\AA}$  10,000K Higher layer called the chromosphere the red spots that can be seen during totality for a couple of seconds**

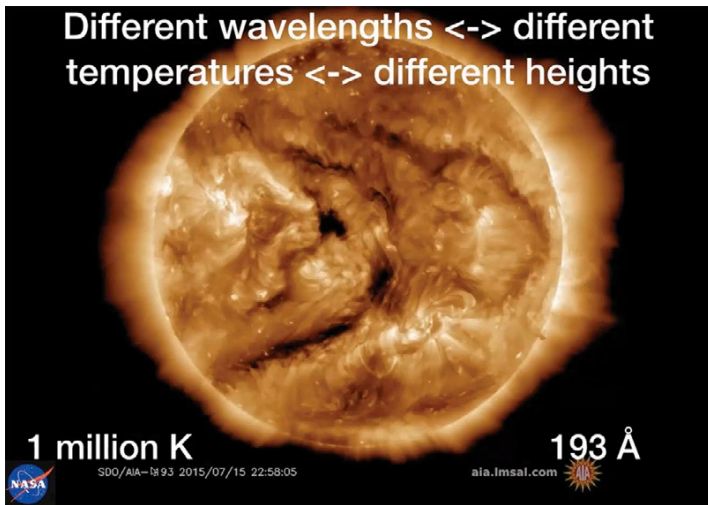


**See much more structure. Higher up in solar atmosphere**



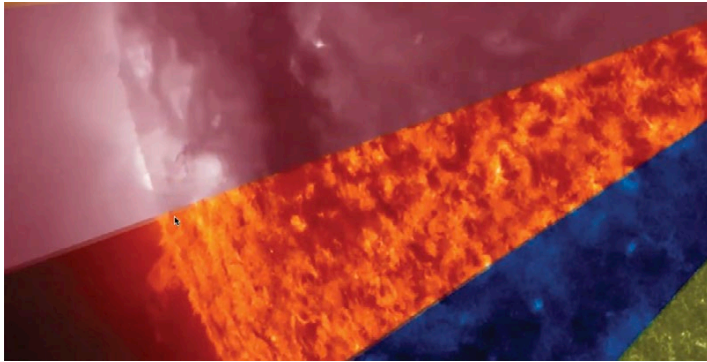
**171  $\text{\AA}$  600,000K**



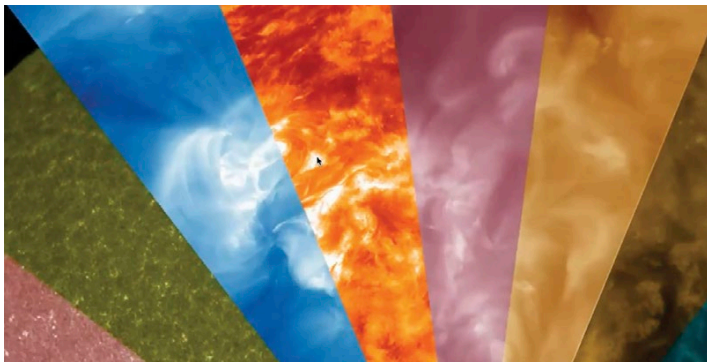


**193 Å 1 million K**

**Our Sun has enormous structure in different wavelengths**

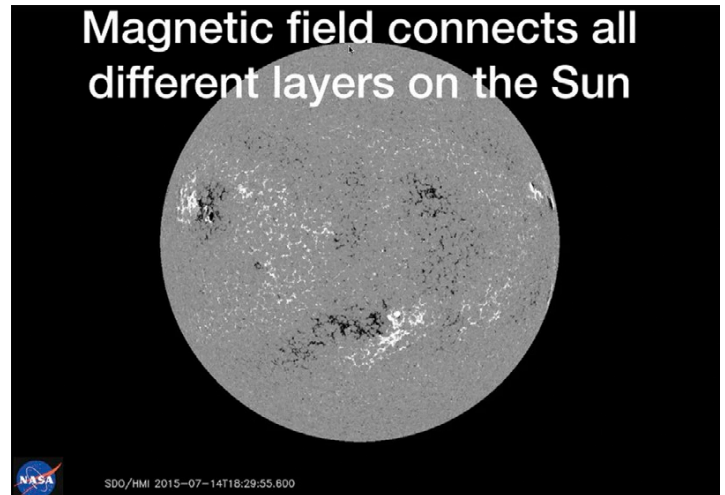


- As you go through these different wavelengths you explore enormous structure that our Sun contains, no longer looks like boring star with a few sunspots
- The photosphere is about 6000K but as you go up the corona is 6 million K
- The Sun's corona is 1000 times hotter than the surface, the big question here, what actually is heating the corona?

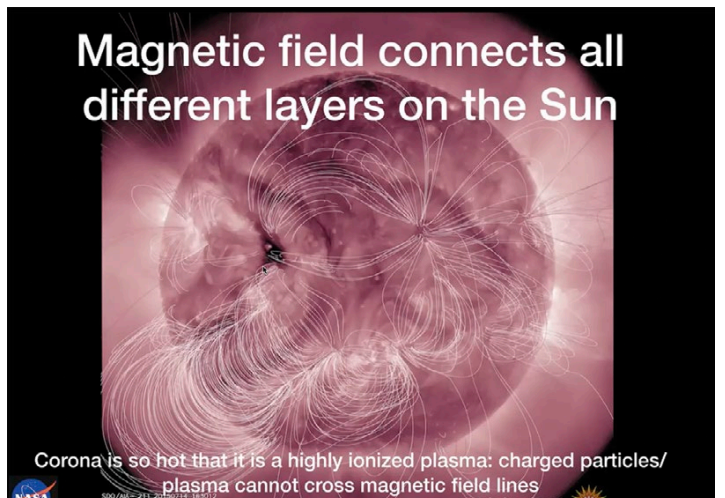


## Magnetic Fields

- Solar surface in visible light, whole structure is created by the magnetic fields, which are very similar to the magnetic fields on Earth.



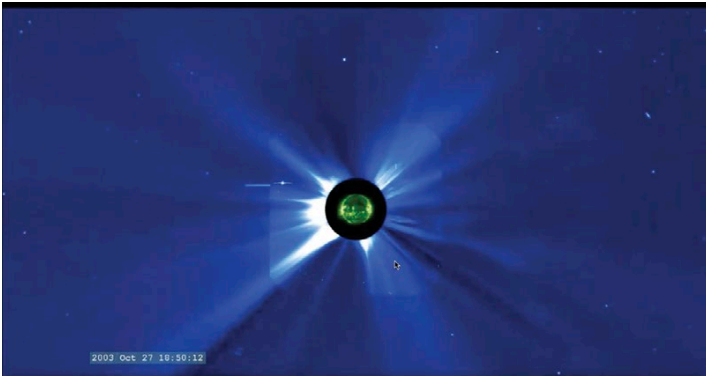
- The difference is on Earth we have gravity
- Dark and light structures show the magnetic fields
- The magnetic field connects all different layers on the Sun



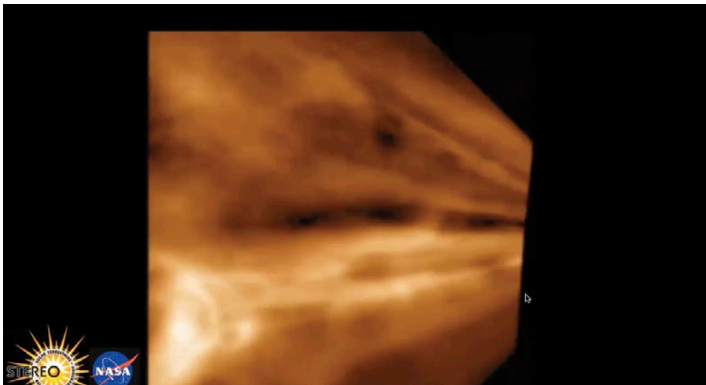
- This creates the connective loops we see coming from the sunspots
- Corona is so hot that it is a highly ionized plasma
- Plasma moves along magnetic field lines
- Plasma cannot cross magnetic field lines

## How do we study the Sun?

- We can create artificial eclipses to observe corona all the time

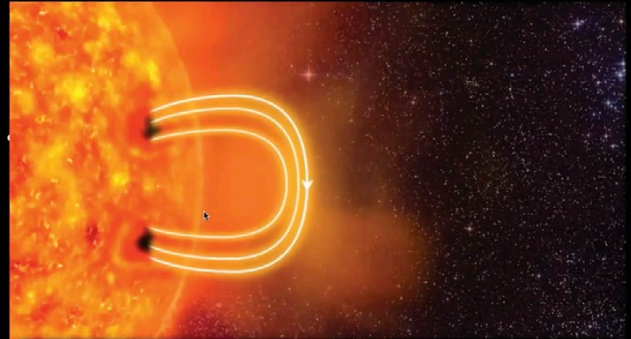


- The bright solar surface disk is blocked allowing us to see the corona so we can see what is going on around the Sun
- Able to observe that the Sun is constantly losing plasma into the interplanetary space
- Observe and study corona mass ejections
- The plasma of hot corona expands outwards becoming Supersonic Solar Wind which is greater than the speed of sound

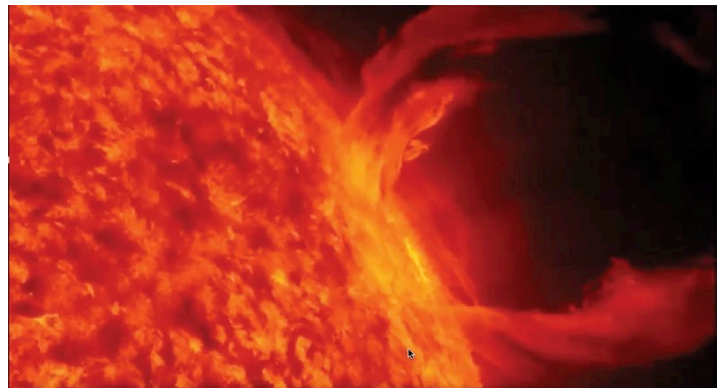


- Heliophysics is the study of the many processes in Solar Physical Sciences
- There is a need to understand the Sun for many reasons
- Fundamental understanding of how stars work
- Protect ourselves from strong solar activities
- Need to know activity for space exploration missions

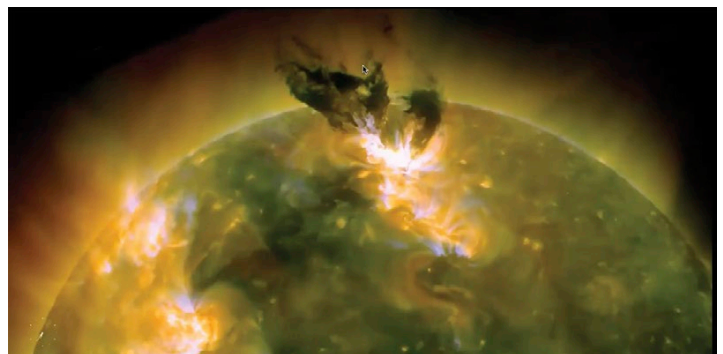
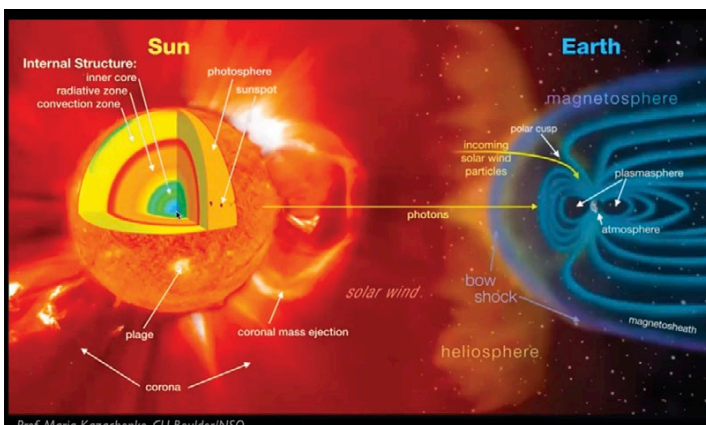
## Solar Explosions Are Caused by Changes in Sunspots' Magnetic Fields



- Actual observations of solar explosion



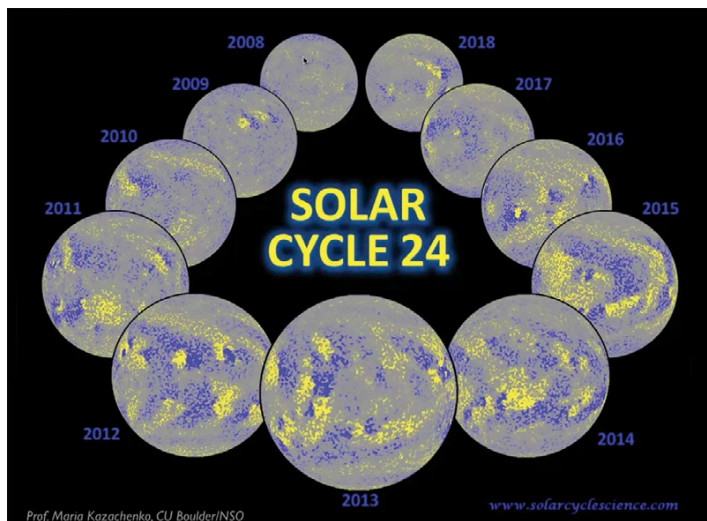
## Heliophysics



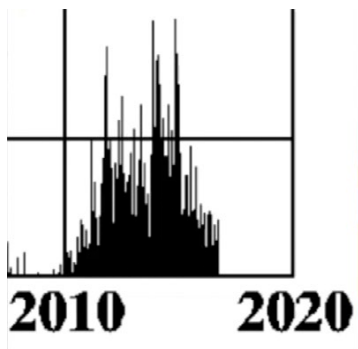


## Where do solar eruptions typically happen?

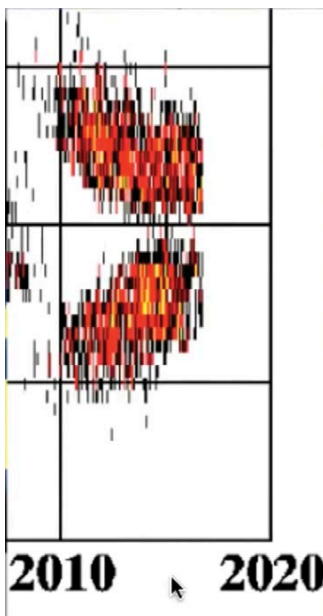
- All the large eruptions happen in the sunspots
- The more sunspots the more eruptions
- Number of eruptions follows very closely to the solar cycle



- Clear curve periods of increase and decrease in sunspots



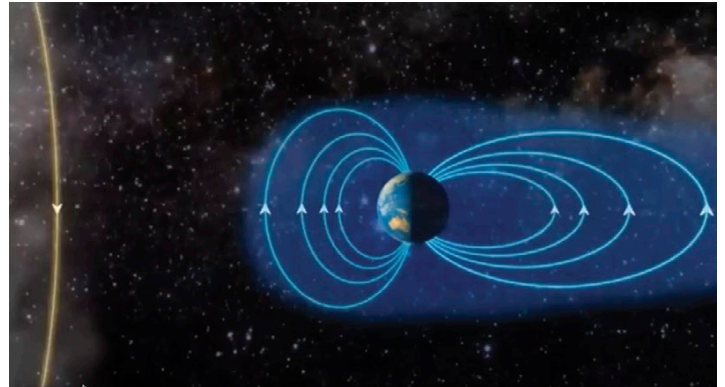
- Most appear far away from equator then later emerge closer to equator
- Follows closely the magnetic fields



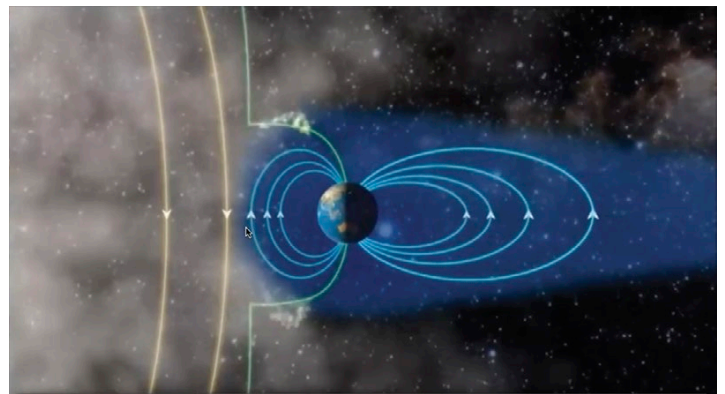
- Largest eruptions typically happen close to the solar maximum

## Solar explosions cause Aurora Borealis

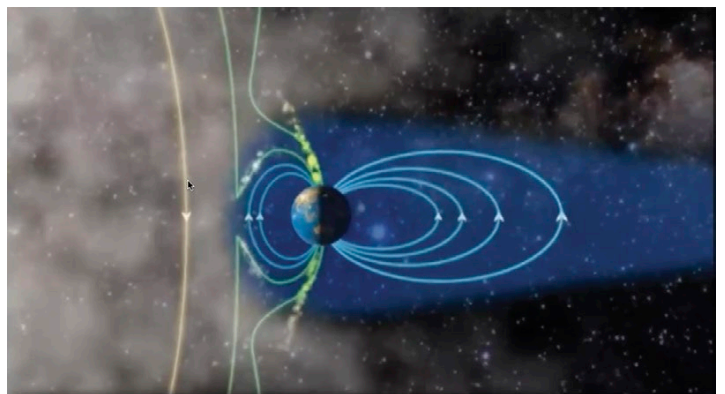
- In 2023 we are close to the solar maximum (2024-25) as we have seen more Aurora Borealis in Colorado lately



- Not all eruptions cause Aurora Borealis, only when eruptions with magnetic fields oriented and parallel to the Earth magnetic fields do the two interact



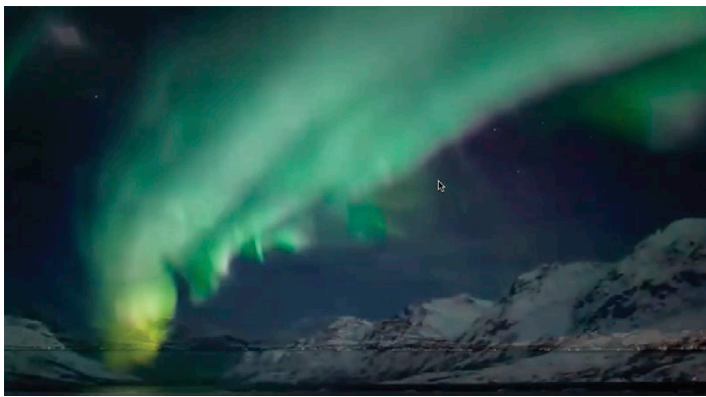
- Solar eruptions interact with Earth's magnetic field



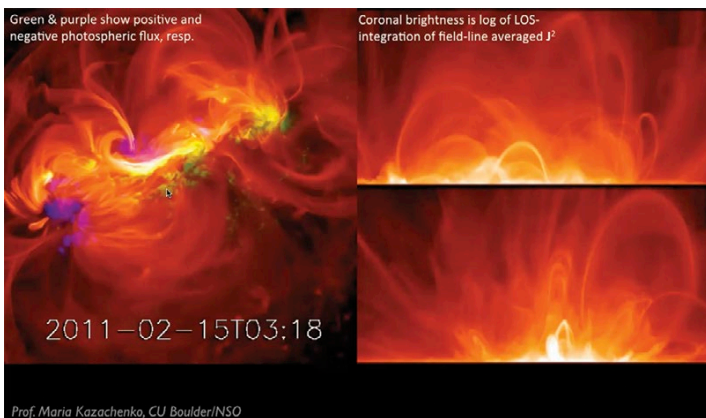
- Field line meet in the pole areas of the Earth



- Beautiful display somewhere close to the magnetic poles



### Using models to Understand (and one day to predict) Solar Eruptions

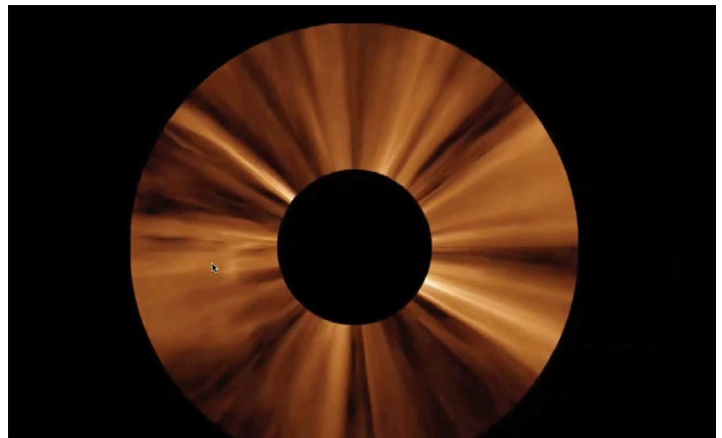


- Research groups trying to figure out how to predict these eruptions
- Use models and magnetic field maps for study without direct observations
- Working toward understanding how sunspots twist, shear, rotate as a result of which the sunspot changes structure and an eruption could occur
- Much research conducted and progress made in Boulder which has the largest number of Solar Physicists per capita in the world

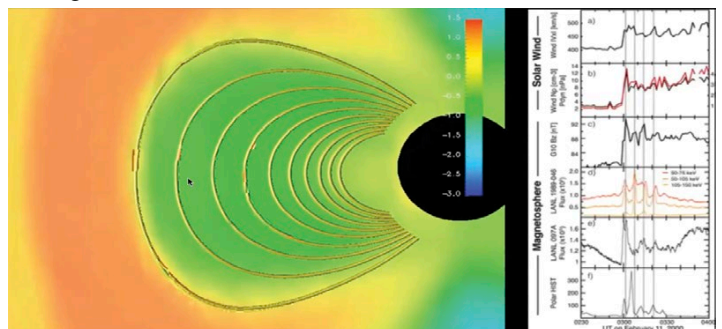
## Even on a Quiet Day the Sun is very active



- Even when no eruptions there is tremendous amount of structure
- The quiet sun creates a lot of structure in the solar wind
- Important to know about effects on Earth and what is going on around us to help avoid incidents such as the fall of Skylab, 1979, in which storms changed course of landing site
- STEREO (Solar TElescope Relations Observatory Telescope observing the Solar Wind



- Solar winds propagates away from the Sun constantly
- Some of these structures cause oscillations in Earth's magnetic fields





- Important to understand what is happening in fields around the Earth

## Understanding Our Sun Requires Many Instruments and Solar Telescopes

- PUNCH- Telescope Mission to understand solar heliosphere (Boulder)
- Parker Solar Probe- Mission that will touch the Sun
- DKIST Largest solar telescope in the world build on Maui by National Solar Observatory (Boulder)



- PUNCH Science Goals
  1. Unify corona and the heliosphere
  2. Understand transition from micro-scale turbulent to evolving global structures
- Planned to be launched in 2025
- PI: Craig DeForest, Southwest Research Institute, Boulder
- Designed in Boulder
- Consists of four small satellites
- Approach: direct, 3D imaging of transition from coronal to the solar wind
- Measurement: polarized photometry of Thomson-scattered visible light
- Synchronized operation
- Unify corona and the heliosphere

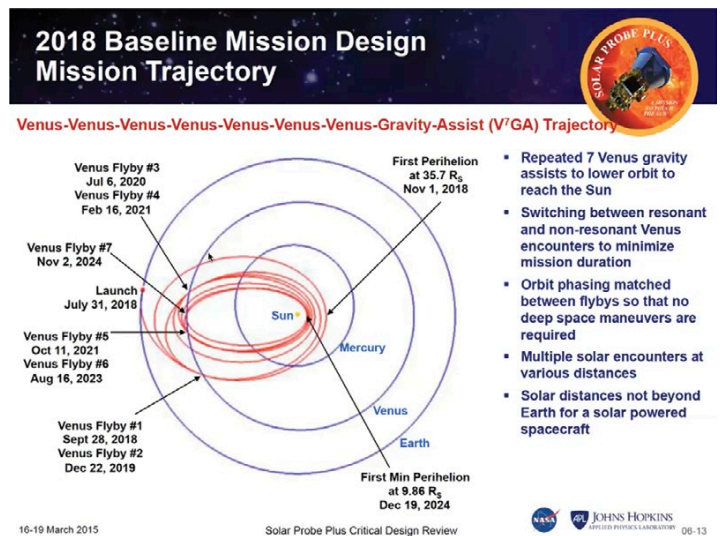
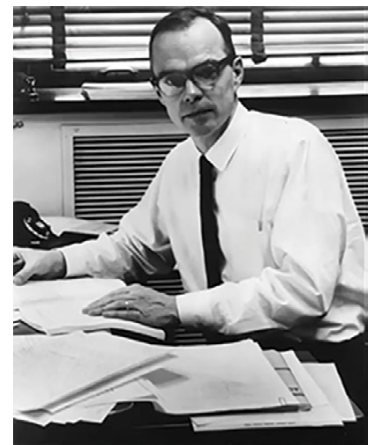


- Find what is really going in this area between corona and heliosphere



Launched 5 years ago

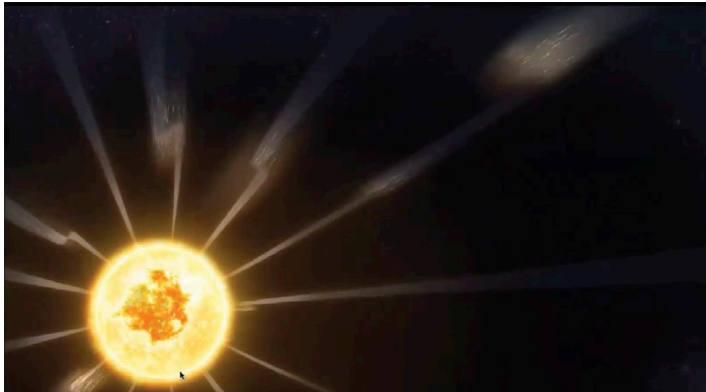
- Mission named after Eugene Parker who figured out existence of solar wind with pen and paper (no instruments) suggested the whole idea of solar wind
- Later confirmed with space observation



- 2018 Baseline Mission Design Mission Trajectory
- Mission to measure directly what is going on close to the Sun
- Had to overcome difficult problems like the instruments exposed to the heat of the Sun
- Parker solar probe uses Venus assistance to do direct measurement of the Sun



- PSP Science Objectives:
  1. Determine the structure and dynamics of the coronal magnetic field
  2. Understand how the solar coronal and wind are heated and accelerated
  3. Determine what mechanisms accelerate and transport energetic particles
- One important discovery of Parker Solar Probe has been the discovery of Switchbacks

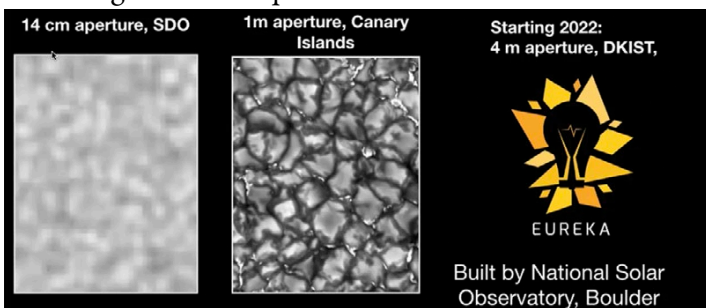


- Plasma has odd structures in solar winds, Switchbacks describe sudden changes in orientation of magnetic fields, lots of competing theories over what is going on

### Daniel K. Inoue Solar Telescope



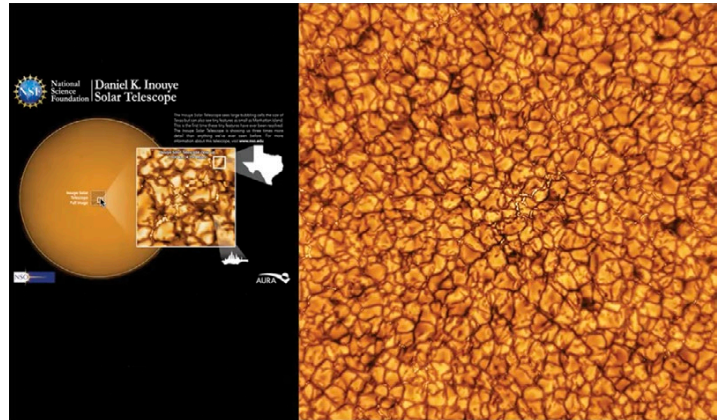
- Starting 2022: 4 m aperture



- Built by National Solar Observatory, Boulder, Colorado DKIST will resolve structures on the Sun as small as 10 km

### DKIST Science Objectives:

- See solar photosphere, chromosphere and corona with highest resolution ( $< 15\text{ km}$ )
- Measure magnetic fields in solar chromosphere and corona
- Understand the generation of magnetic fields, heating of solar corona, turbulence, triggers of eruptions
- Access to the biggest plasma laboratory!
- DKIST looking on the solar disk center



- Whole Sun covered by granules, each one approximately the size of Texas
- Constant motion of plasma on the solar surface

### Living with a Star: Take Home Message

- The Sun is very active and there are no quiet days on the Sun
- Even on the most quiet days the Sun is filled with waves, energy bursts and small explosions that launch plasma into the solar system
- This solar wind bombards all the planets (including Earth) and creates a dynamical space environment that we live in
- The Sun still has many mysteries, but with many new instruments to come we hope to understand at least some of them

Discussion of engaging and interesting questions and comments followed from members on topics of; safety of Astronauts in upcoming Moon mission, magnetic maps of the Sun, complex research of forecasting, filaments and eruption timing, what are most important questions of how the Sun works, sunspots on other stars, what defines solar cycle, magnetic dynamo, coronal heating, how do flares originate, how long before it becomes CME, cor-



relation between 11-yr solar cycle and how fast the Sun is spinning, speeds at solar equator vs poles, differential solar cycle, generation of magnetic fields, periods of magnetic reversals. As we move toward expanding our understanding of the nature of our nearest star, many mysteries remain in solar studies and relationships between the corona, heliosphere and interactions with our planet.

Dr. Kazachenko closes her presentation with reminder of two upcoming events she encourages all to see who have not had the opportunity to experience yet.

Two Solar Eclipse events within the next 10 months:

- Annular Eclipse - October 14th , 2023 over much of West/Southwestern US and Mexico
- Total Solar Eclipse - April 8th, 2024 (see Map)



### III. Business Meeting

#### Old/NewBusiness

Bruce Lamoreaux, gives the monthly Treasurers report:

Upcoming events:

- June 15- LAS Meeting will be In-Person/Zoom meeting at Longmont Lutheran Church
- June 23 – Star Party at Rabbit Mountain

Update on website transfer from WildApricot

- SquareSpace member area software not adequate

Alternative

- Setup WordPress website
- Installed plugin called Simple-Membership
- Transferred member info from WildApricot
- Data transferred from WildApricot, password reset, profile editing, protected area work well
- Execs reviewed
- Consensus was that it should match look of main website- working on that



### Longmont Astronomical Society

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

#### LAS Treasurer's Report - Bruce Lamoreaux

5/18/2023

##### Main Checking Account (xxx-1587)

Begin Balance:	\$ 10,090.00	4/4/2023
Deposits:	\$ 140.00	Membership, Magazine
Expenses:	\$ (860.00)	Bank Charges, Website, Meeting Room, Magazine
<b>Current Balance:</b>	<b>\$ 9,370.00</b>	5/3/2023

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

Past Balance:	\$ 8,135.00	12/30/2023
Interest:	\$ 15.00	
<b>Balance:</b>	<b>\$ 8,150.00</b>	3/31/2023

##### Telescope Fund (xxx-0165)

Past Balance:	\$ 1,100.00	2/27/2023
Deposits:	\$ -	
Expenses:	\$ -	
<b>Balance</b>	<b>\$ 1,100.00</b>	3/30/2023

##### Petty Cash

Past Balance:	\$ 50.00
Deposits:	\$ -
Expenses:	\$ -
<b>Balance</b>	<b>\$ 50.00</b>

##### Total Assets

\$ 18,670.00 \$ (720.00) Down from last report

<b>Active Membership:</b>	<b>115</b>
<b>Student Membership:</b>	<b>3</b>
<b>Total</b>	<b>118</b>



## 10 Years Ago, June 2013

From the President, Bill Tschumy:

The star parties at Rocky Mountain National Park have also started up. Last Friday about 15 amateur astronomers showed up to show the skies to ~100 guests. The observing field in Upper Beaver Meadows has gorgeous views before sunset and can be very dark after sun goes down. Our June meeting will feature Andrew Planck. He will be talking on the history and use of the astrolabe, an ancient instrument used for all manner of calculations. The Constellation of the Month will be by Jim Elkins. He is going to talk about the constellation Libra.



Congrats to LAS member Robert Arn, with the picture of the day for spaceweather.com – his nicely taken “aurora over Pawnee Buttes” on May 18th (2013).

## 20 Years Ago, June 2003

From the President, Bob Spohn:

This month we will visit the heart of our own Milky Way galaxy. All of this month's objects are visible in binoculars and present breathtaking vistas from a low power wide field perspective. Also you may wish to use a more advanced star chart because numerous objects worth visiting are in this region.

## 30 Years Ago, June 1993

From the President, Bob Spohn:

Now that warmer weather is here, more of us are getting out and stargazing. We had our largest turnout of the year for the 1st quarter public observing at Flanders Park at McIntosh Lake on June 7th. Those of you who have been club members the longest can remember when we held our public observing at Dawson Park on the south side of the lake, when we had to get the keys to turn off the streetlights in the park!

With the continuing growth of the area, it is becoming extremely difficult to find close convenient places to observe; I am very happy to report that Flanders will be able to remain on our schedule for the foreseeable future.



**LONGMONT ASTRONOMICAL SOCIETY**  
**PO Box 806, LONGMONT, CO**  
**[HTTPS://WWW.LONGMONTASTRO.ORG](https://www.longmontastro.org)**



**NGC 4559 BY M. J. POST**