HAL Monthly Meeting - March 12th at 7 p.m.

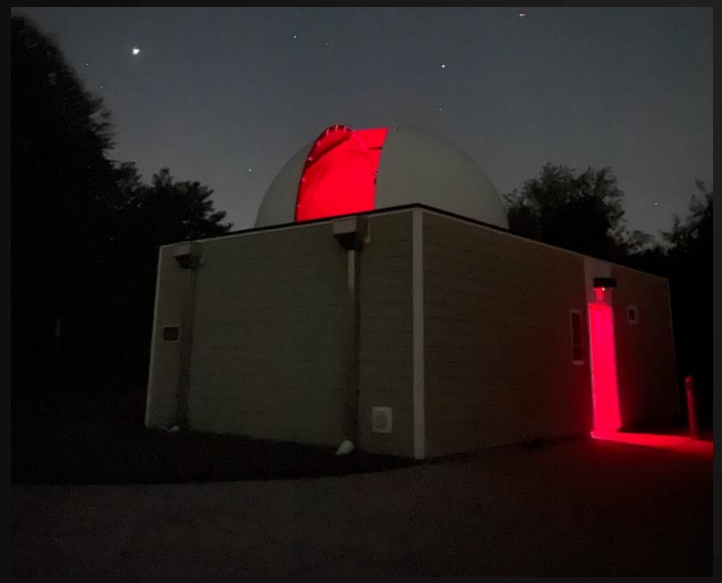
"Observing Exoplanet Host Stars with NASA Exoplanet Watch"

Speaker: *Kalée Tock, AAVSO Member & NASA Citizen Scientist*

Attend in person at the Robinson Nature Center in Columbia or virtually using the Zoom link available on HAL's website at HowardAstro.org

Howard Astronomical League

Member Meeting – March 12, 2026



Agenda

- Welcome & Introductions
- Book of the Month
- Events Calendar
- HAL Kudos
- Presentation:

  Observing Exoplanet Host Stars
  with NASA Exoplanet Watch
  Ms. Kalée Tock

- Shallow Skies
- Member Astrophotos

Welcome to HAL!

Book of the Month

Title:

First Man: The Life of Neil A. Armstrong

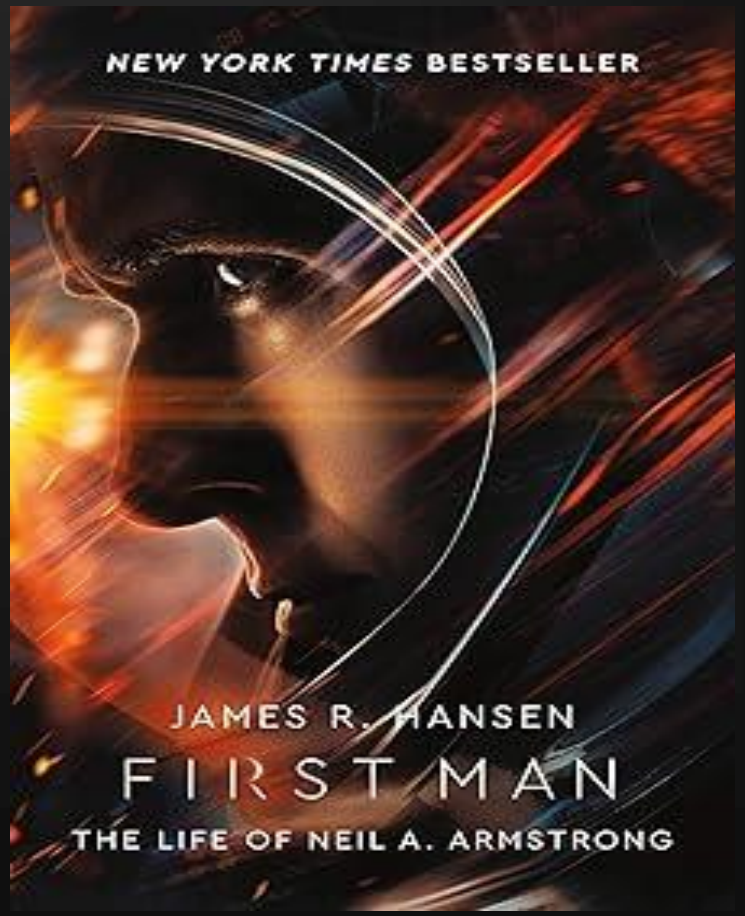
Author:

James R. Hansen (2018)

Length: 464 pages

Audience Level:

- Beginner Friendly
- Intermediate
- Experienced



March, 2026

Star Parties

Scheduled

Date	Event
Mar 14	Members-only Star Party
Mar 28	Public Star Party
Apr 18	Members-only Star Party
Apr 25	Public Star Party

Recent Impromptu

Mar 10
- 20 members

Mar 1
- Ernie

Feb 13
- 14 members

Outreach Opportunity - AFNM Sept. 26th

- HAL has attended the Astronomy Festival on the National Mall (AFNM), one of the largest and most visible public astronomy outreach events in the United States.
- Need 2-3 people to commit to staffing a HAL table and setting up for telescope views of Sun and bright evening objects.
- Outreach@howardastro.org

Congratulations to Arjun Meenashi Sundar!

HAL General Meeting February 2026 - I

Wha

- The Pulsar Search Co
  between WVU and G
- Citizen science resear
  students, teachers and
- Uses real radio astron
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- Students analyze diag

Taking the Pulse of Citizen Science: The Pulsar Science Collaboratory Program

By Arjun Meenashi Sundar, Howard Astronomical League

I have had a special interest in astronomy my entire life, so I was happy to take part in a research opportunity starting in the summer of 2024. The Pulsar Science Collaboratory program (PSC) is a citizen science project for high school and undergraduate students and their teachers. Over the next year, I graded pulsar data and even had the opportunity to discover new pulsars.

A pulsar is a unique type of neutron star that emits regular pulses of radiation, typically in the form of radio waves, X-rays, or gamma rays. The pulses are emitted outward in beams from the magnetic poles of the star. As the pulsar spins very fast, its beams sweep through space like a beam sweeps across the sea from a lighthouse. When the beam is pointing in the direction of Earth, we receive a pulse of radiation, and this is why they are referred to as pulsars.

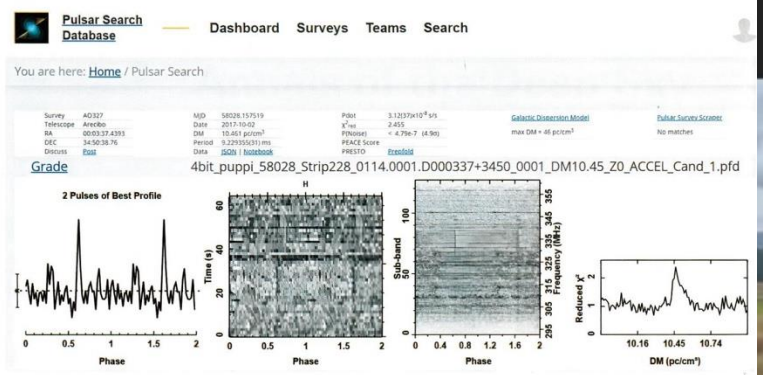
Pulsars are formed when massive stars (at least 8 solar masses) die and explode as a supernova. When the explosion occurs, the remaining core collapses into a neutron star – a dense ball of matter with about twice the mass of the Sun, but concentrated into an incredibly small volume (only about a dozen kilometers in diameter). This collapse causes the star to spin extremely fast, in some cases hundreds of revolutions per second.

The magnetic fields of pulsars are incredibly powerful. It is these magnetic fields that focus the energy into beams, generating the radiation that we detect as periodic pulses when the beam sweeps by our radio telescopes. Their periods are very short, some as short as even a few milliseconds.

Pulsars were first discovered by astronomer Jocelyn Bell Burnell in 1967 while monitoring quasars using a radio telescope. The discovery was made when she picked up a persistent, repeating radio signal with a strange pattern that appeared to repeat at extremely precise intervals. The signal was initially thought to be interference or possibly an alien message, but further examination revealed that the pulses were from a distant rotating neutron star.

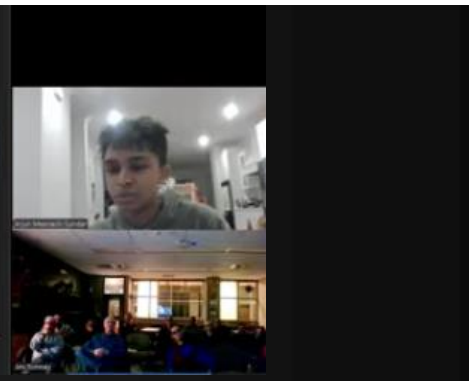
Radio telescopes possess large dishes and sensitive receivers and can capture the weak and regular radio signals sent out by pulsars. Since pulsars emit in such a regular pattern, their periodicity can be used to determine and study many aspects of the dead star, such as its rotational period, magnetic field, and even the effects of relativity. From these observations, scientists can learn quite a bit about the properties of matter in extreme conditions, because pulsars are among the densest objects in the Universe.

The PSC project employs the 20-meter Green Bank Telescope (GBT) in West Virginia to collect data, which it makes available for use by students and faculty who have passed courses of training



Plot of the new pulsar discovered during the PSC camp.

By Arjun Meenashi Sundar, Howard Astronomical League



Observing Exoplanet Host Stars with NASA Exoplanet Watch

Kalée Tock

- AAVSO Member
- Science teacher at Stanford Online High School, bringing NASA projects into student research.
- Contributor to NASA Exoplanet Watch, involved in observing, mentoring, and supporting EXOTIC* training.
- Citizen-science contributor to NASA's Pandora mission, supporting ground-based transit observations.
- Coauthor on peer-reviewed exoplanet research which helped Demonstrate the value of small-telescope follow-up.

**EXOTIC is a free software tool that helps observers turn their raw images of an exoplanet transit into a clean light curve.*

Thank You Kalée!

- Looking ahead to next month…

  “Dark Skies Travelogue”

- Victor Sanchez: Chile near Atacama
- Bill Vanderlinde: Mauna Kea
- And you?
  - WSP?
  - Cherry Springs?
  - WV?

Shallow Skies for Mar-Apr 2026

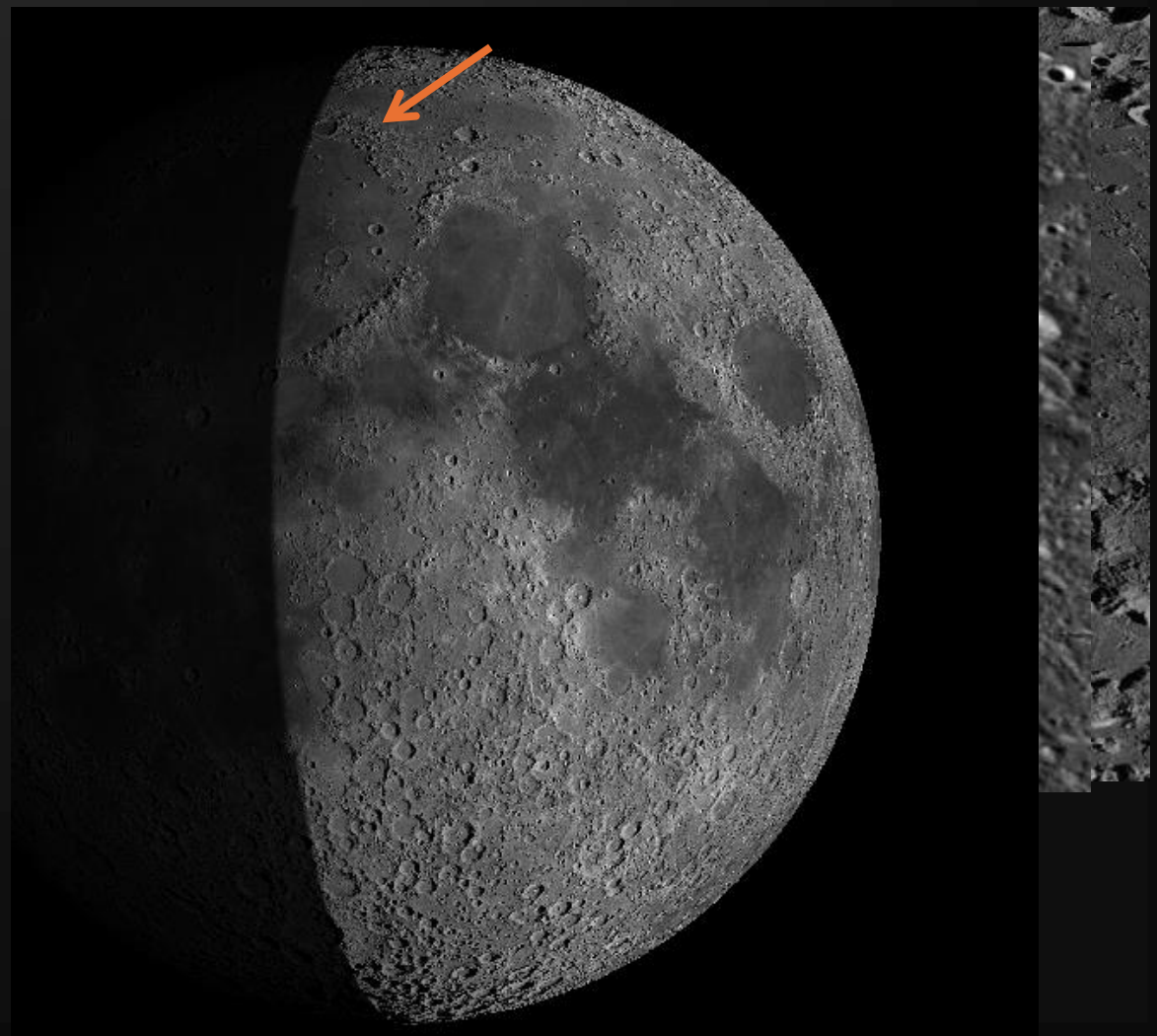
- Spring is in the air – and so are celestial bears! Step outside around 8:30 pm and look N-NE

According to Greek mythology, Ursa Major is Callisto—a nymph who served Artemis until she was transformed into a bear by Hera. Years later, her son Arcas nearly killed her while hunting, not knowing the bear was his mother. Zeus intervened at the last moment, lifting them both into the heavens as Ursa Major and Ursa Minor, where they circle the pole forever.

Exploring Ursa Major: Mizar & Alcor

🌙 Vallis Alpes: A Valley on the Moon

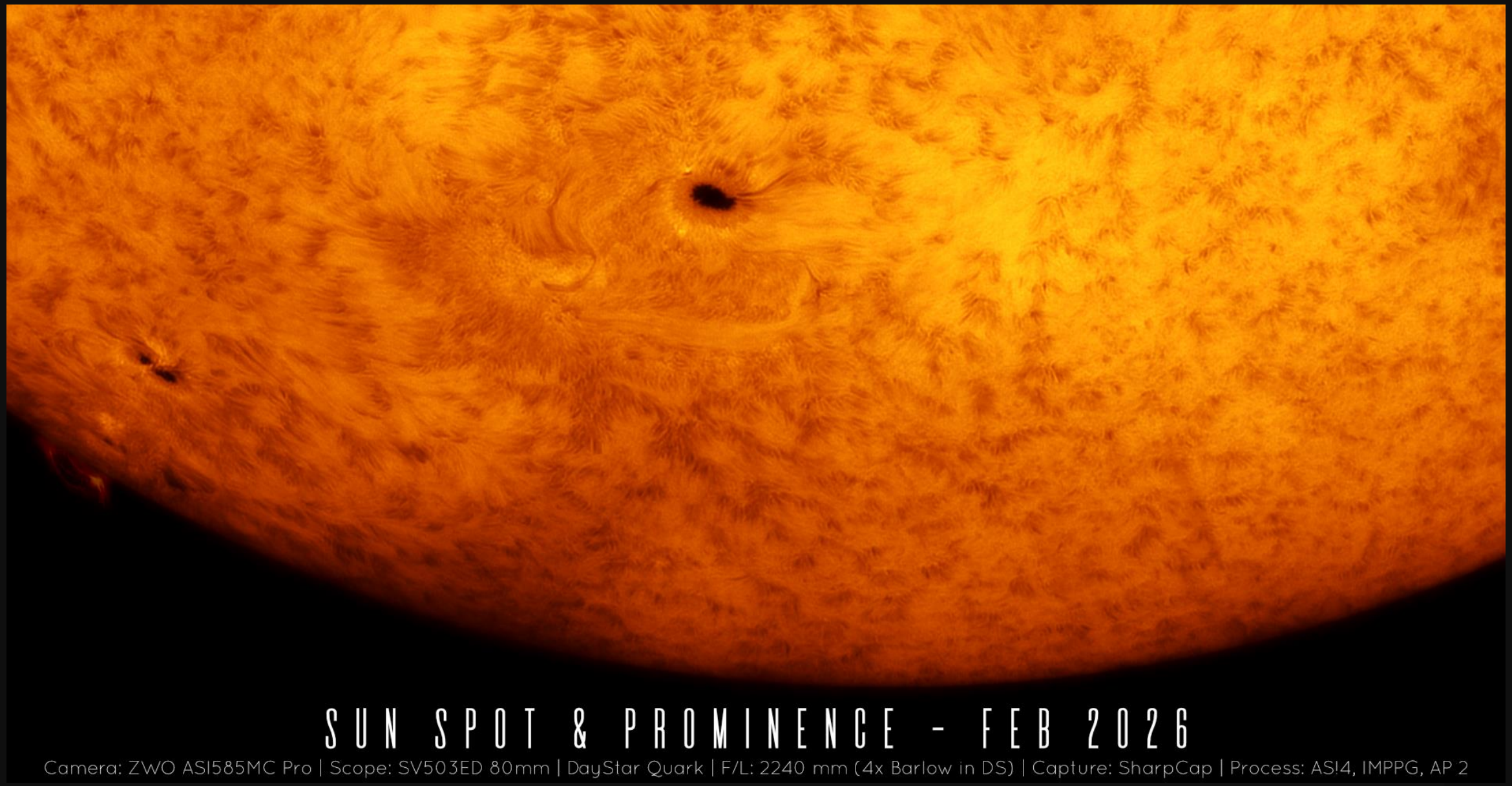
- **What Is Vallis Alpes?**
  - A very straight **100-mile valley** that cuts across the Moon's "Alps"
  - Formed long ago when the Moon's crust **cracked and sank**
  - Later filled with **smooth lava**, giving it a flat floor
- **A Tiny Groove Inside the Valley**
  - Down the middle is a **very thin groove** called a *rille*
  - It's so narrow that even big telescopes struggle to see it
  - Spotting it is a fun **"challenge object"** for even experienced observers
- Optimal Dates
  - March 26th, April 8th (morning), April 24th



Member Astrophotos, Sketches, & Artwork

Harrini
Meenashi
Sundar

Harrini
Meenashi
Sundar



Wes Ferwerda

Wes Ferwerda

Michael Connelly

Michael Connelly

Great Orion Nebula

“This is a test run image with a new Vespera II set up on my driveway in Columbia on 03/01/26. 75 minutes of 10 second exposures with the light pollution filter. Post processing in Pixinsight.”

William Kautter

Seestar S50

76° W, 39° N / 2025.09.08 22:55

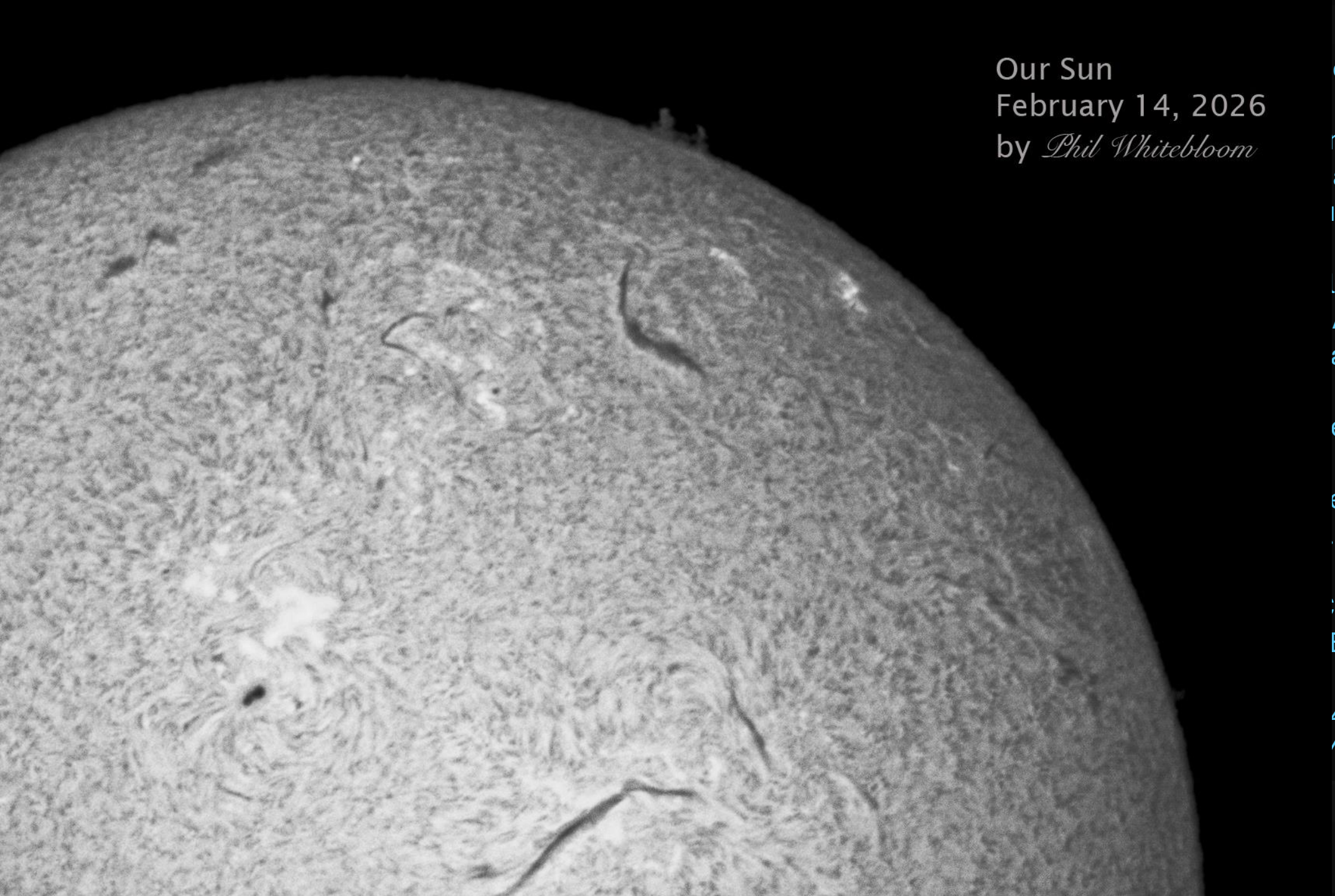
Moon

Lunar Photos by
Tommie O. Battle, Jr.

Seestar S50

Columbia / 2025.05.02 22:31

Moon



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Phil Whitebloom

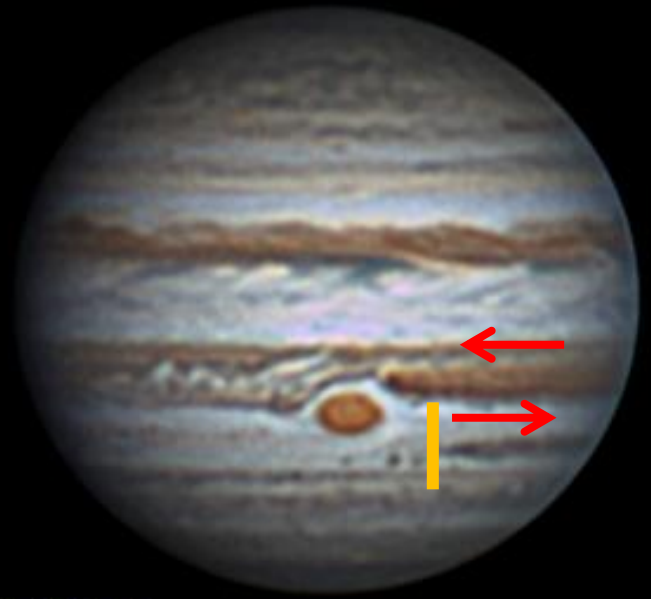

© CFHT/ Helix Collaboration Team

The Gum 16 supernova remnant, in the HOO color palette. ~7.5 hours of light collected January 21 thru 23 in the Chilean Andes using a Nikon 200mm lens & ZWO ASI 294mc pro (mostly H & O data, but a little bit of RGB was collected for the stars).

Victor Sanchez

Nov 5, 2025

Mar 11, 2026



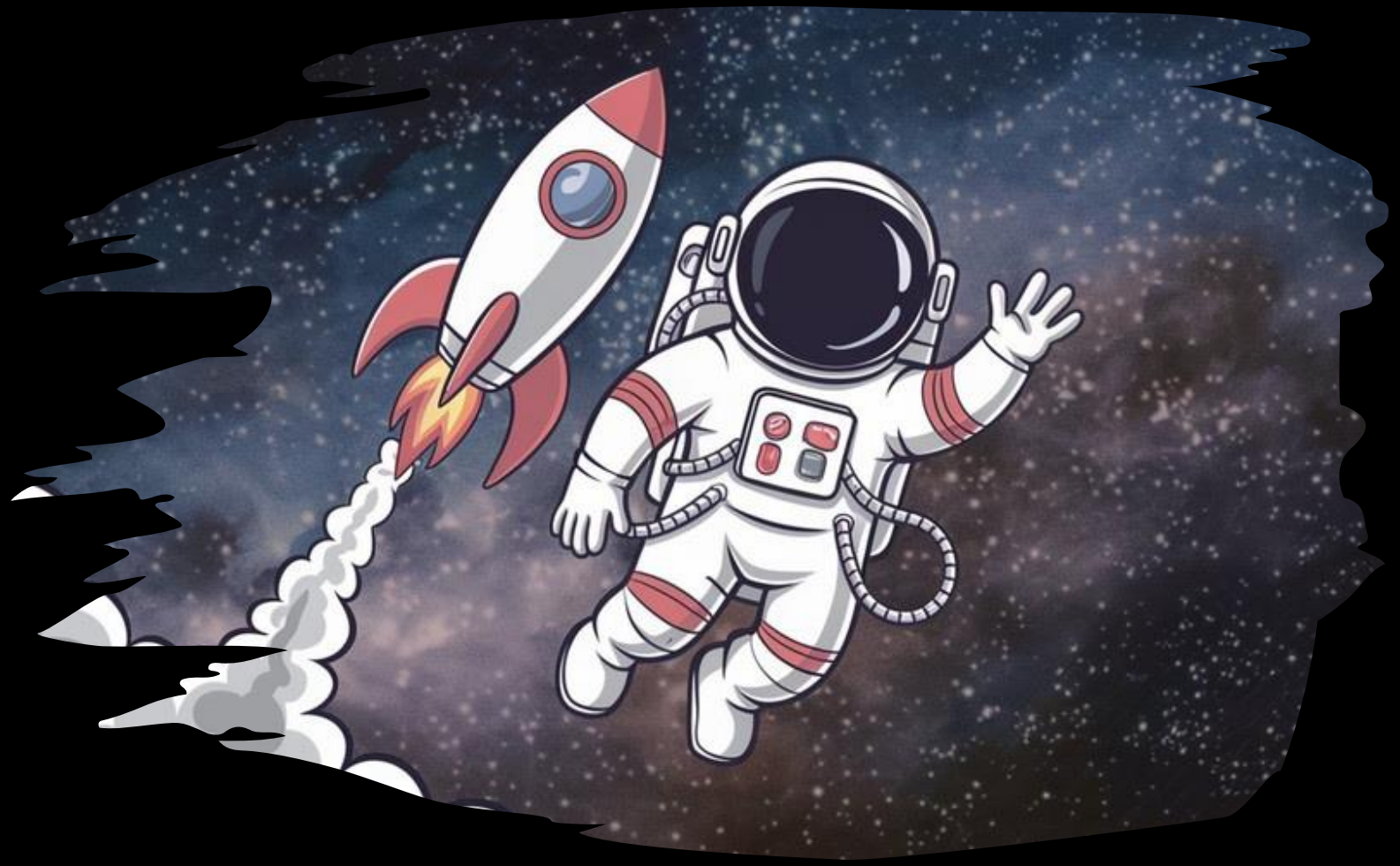
Jim Tomney

How Jupiter's Atmosphere Moves: A Story Told by Two Images

- Jupiter's atmosphere rotates at *different speeds* depending on latitude.
- The **GRS** drifts slowly eastward (left) in the SEB shear zone.

- Over this 4-month period, the GRS moved +10° East
- But – compared to the end of the STB segment – we have a shift of maybe 90° eastward – which means
- The STB is in a retrograde (traveling west) and much faster than the GRS pace

Thanks for Joining Us!



Be safe heading home – see you next month

👉 HAL Planning Meeting: April 6, 2026
HAL Members Meeting: April 9, 2026