

# The Aurora

Dr Das Baskill  
University of Sussex

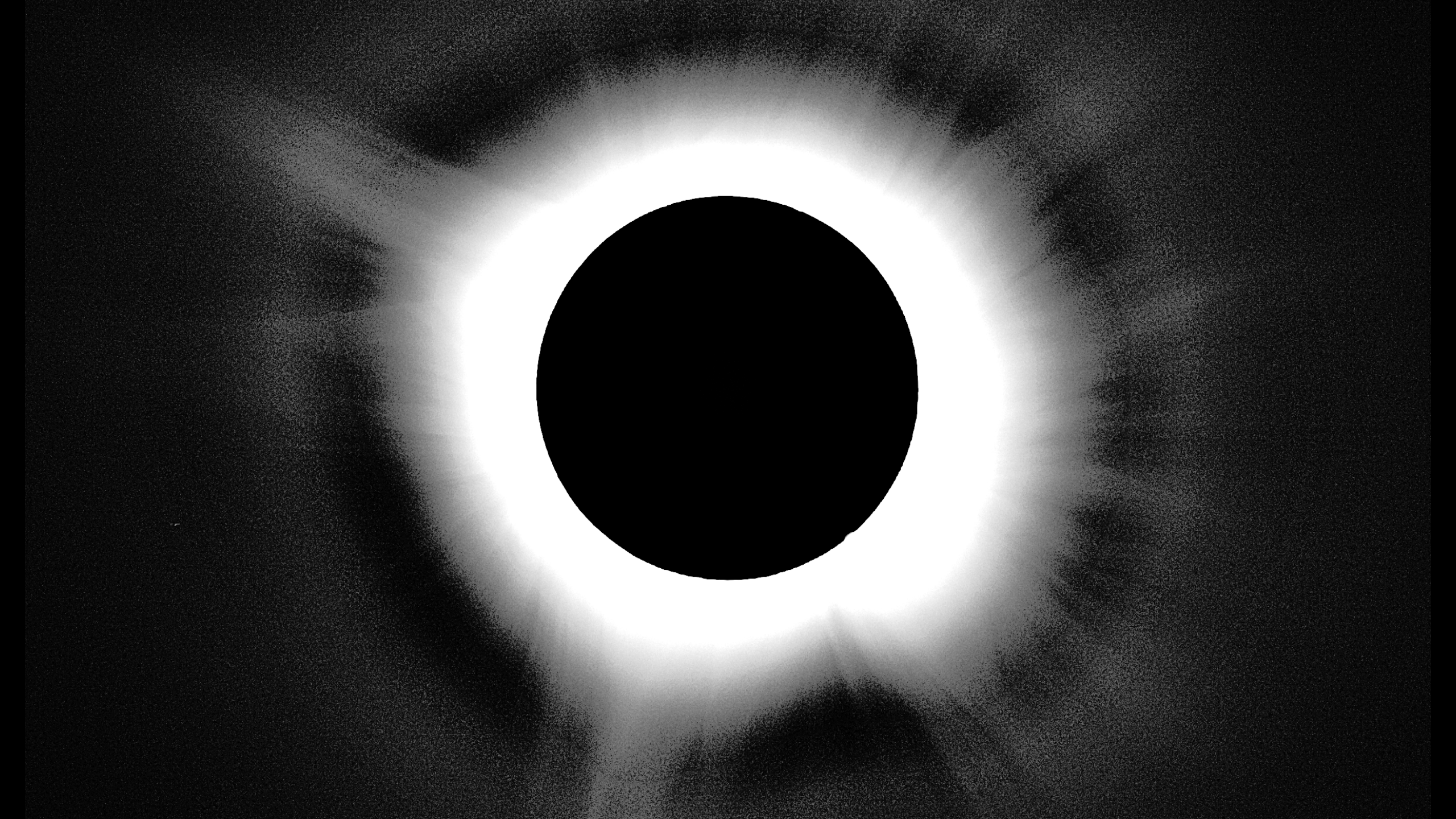


# The Aurora

- The Sun constantly emits gas – the solar wind
- This wind is occasionally enhanced
- When it hits Earth, it distorts our magnetosphere...
- ...Allowing particles to hit the upper atmosphere

The resulting glow is the **aurora**





# THE SUN



White light  
photograph  
of the Sun

25<sup>th</sup> September, 2025

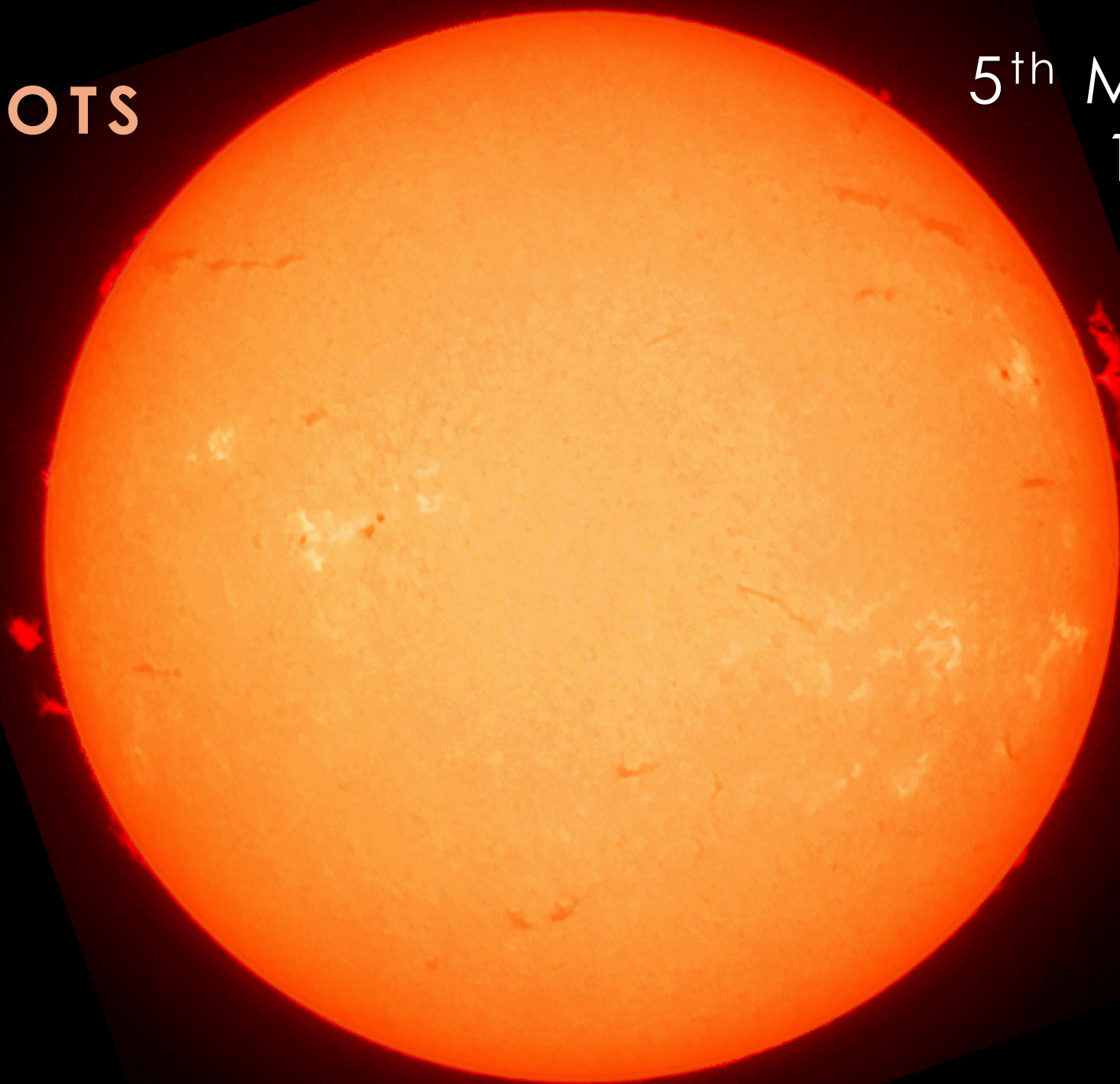
# THE SUN



H-alpha view  
of the Sun  
4<sup>th</sup> August, 2024

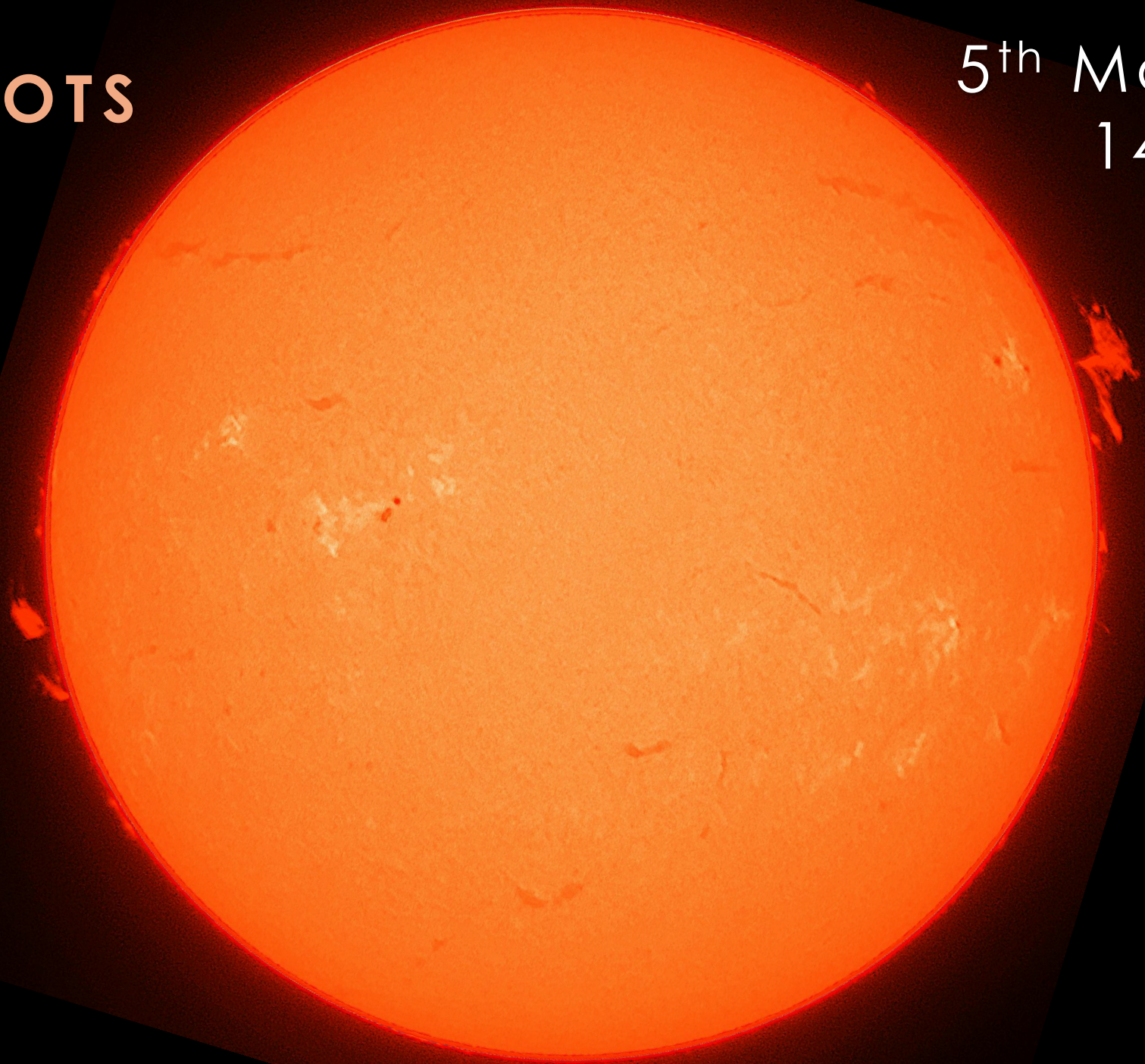
# SUN SPOTS

5<sup>th</sup> March, 2025  
10:32 UT



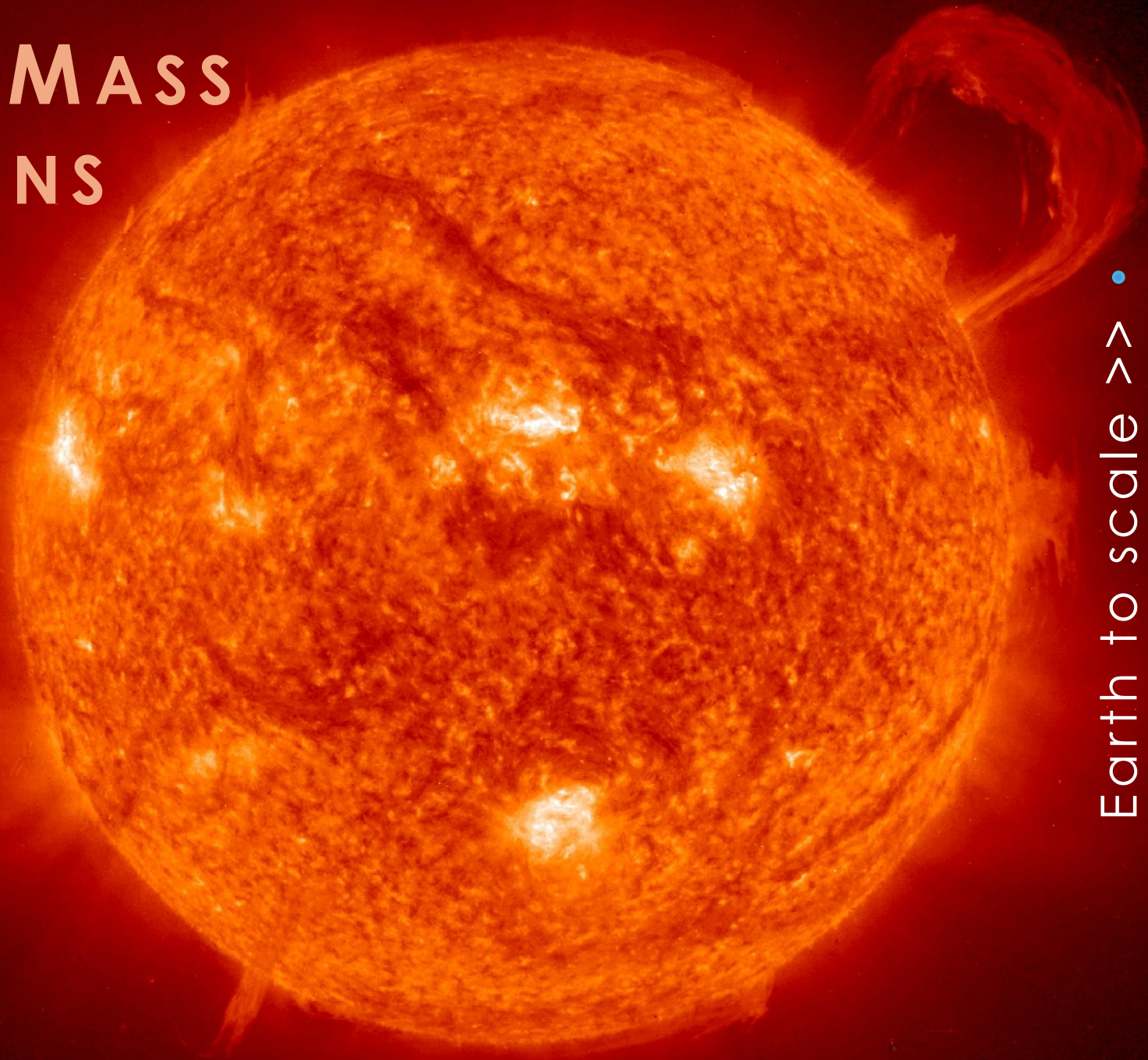
# SUN SPOTS

5<sup>th</sup> March, 2025  
14:57 UT





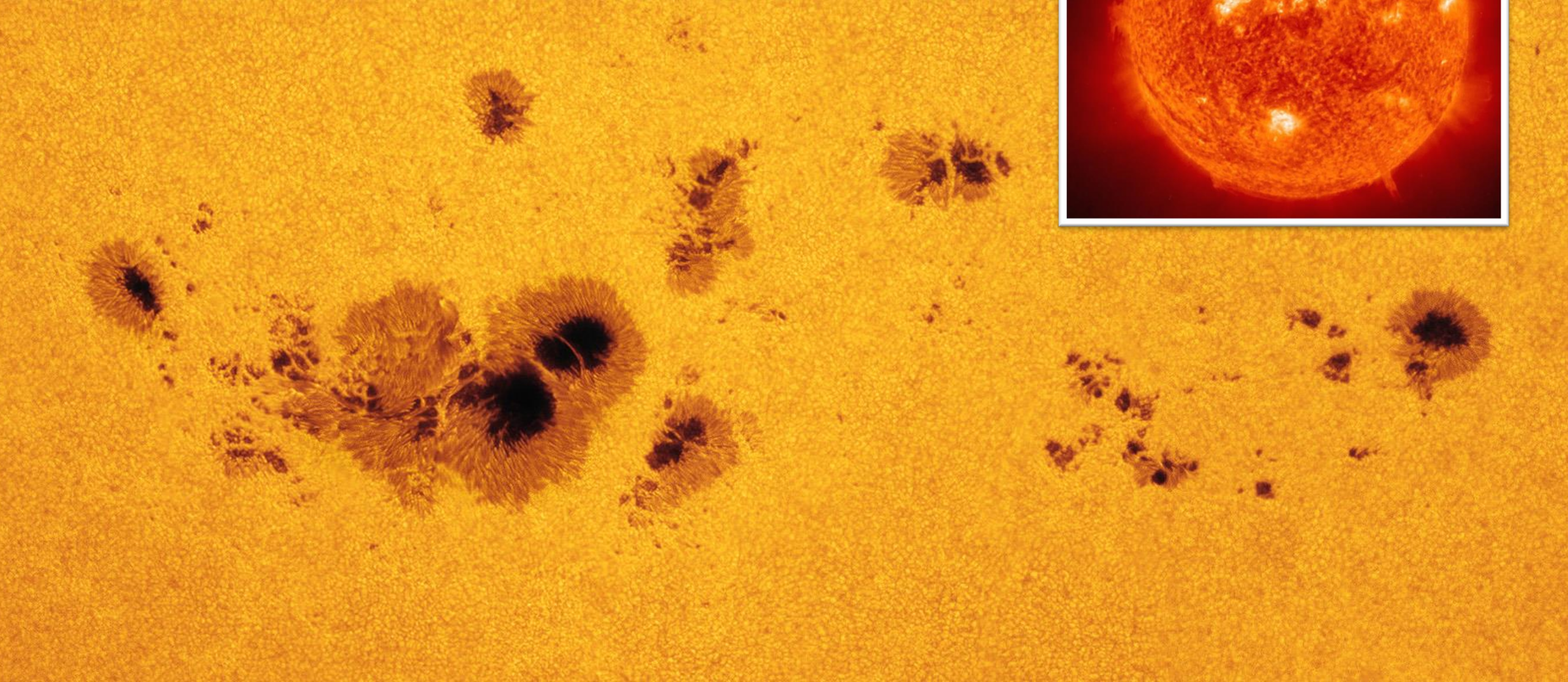
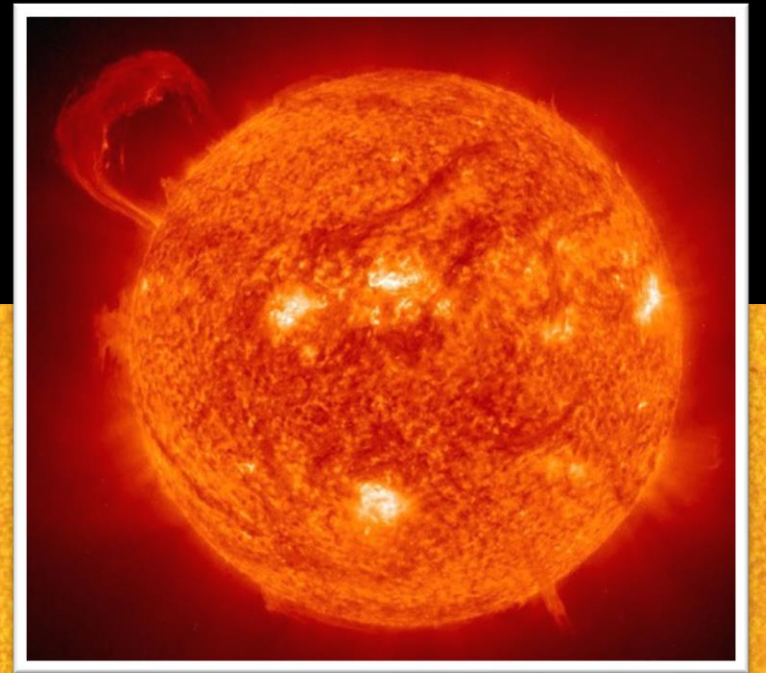
# CORONAL MASS EJECTIONS



Earth to scale >> •

SOHO Solar Observatory (Nasa/Esa)

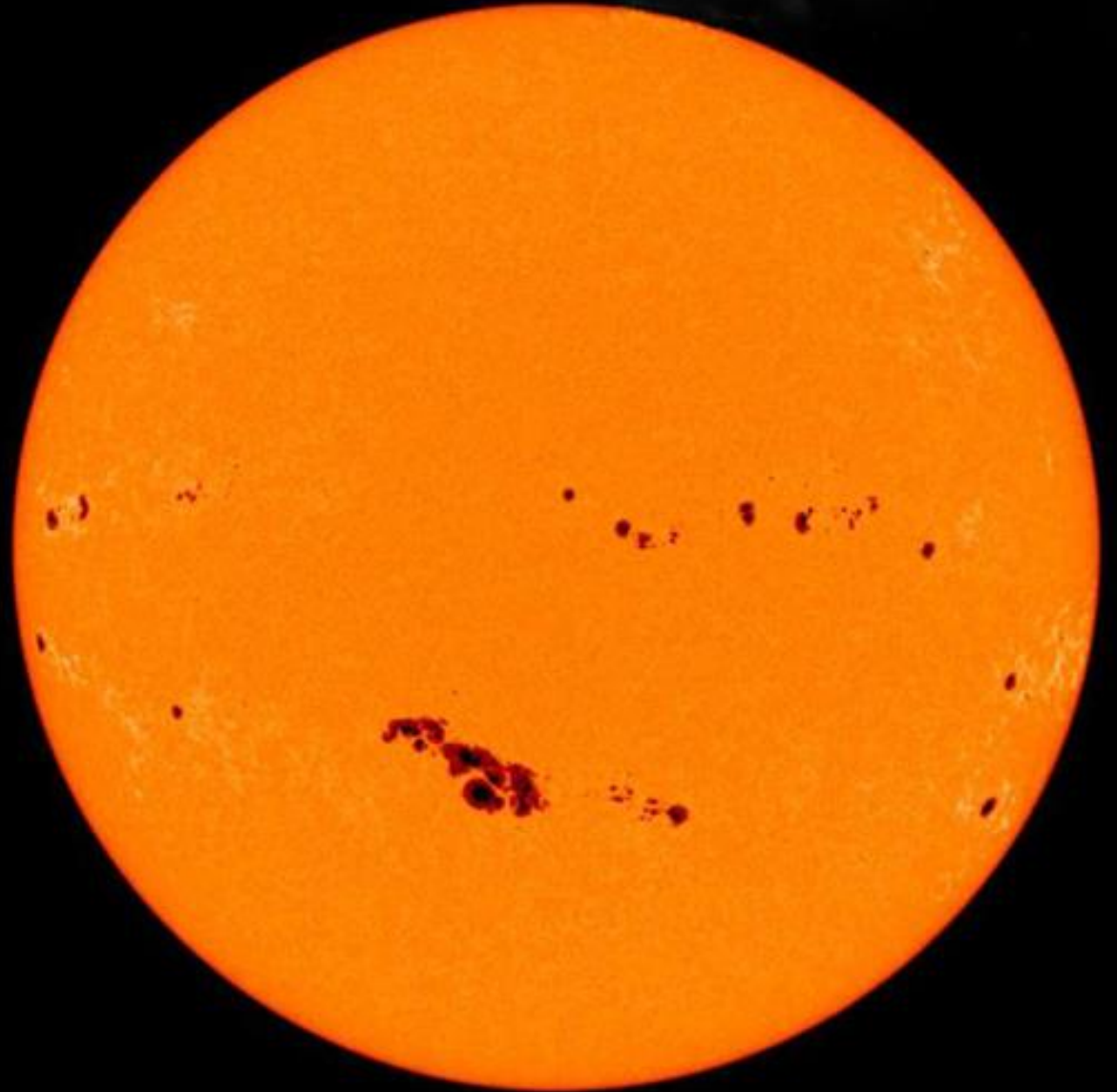
# SUN SPOTS



# THE 11-YEAR SOLAR CYCLE



Solar Minimum



Solar Maximum

# SUN SPOTS

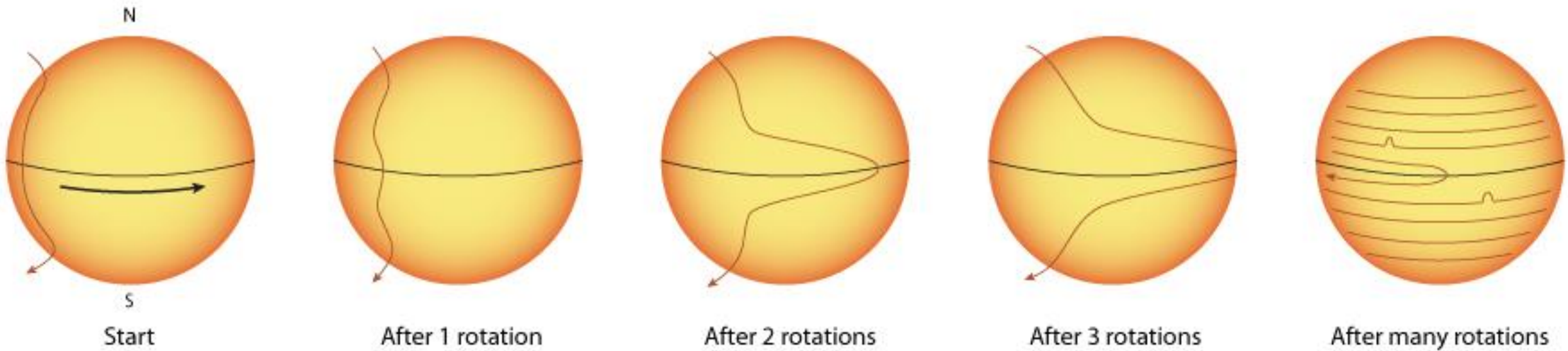
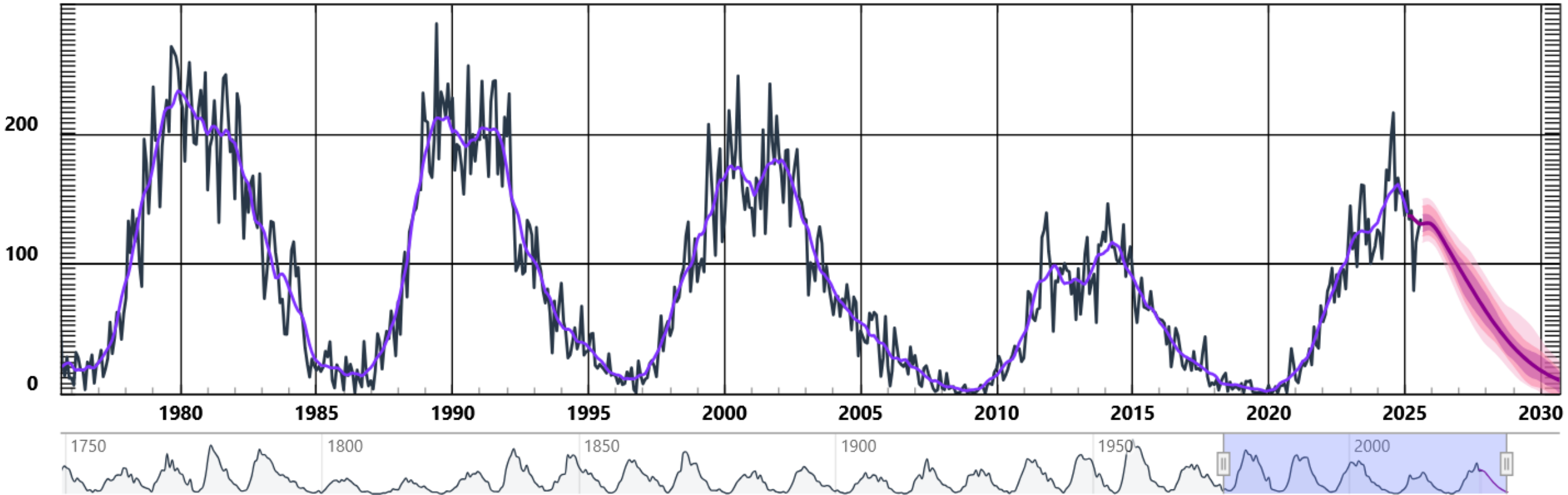
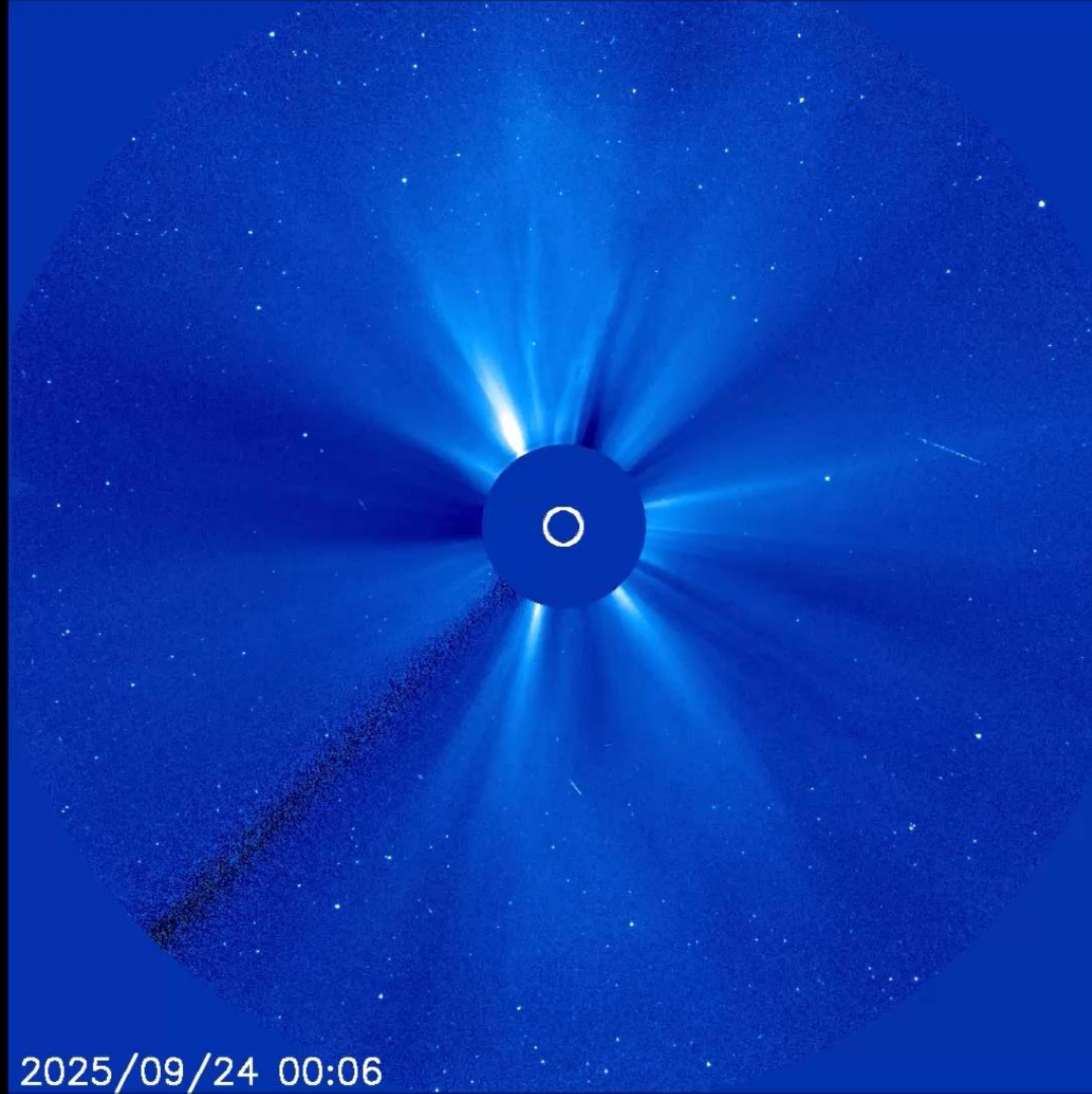


Illustration by José Francisco Salgado, PhD (Adler Planetarium)

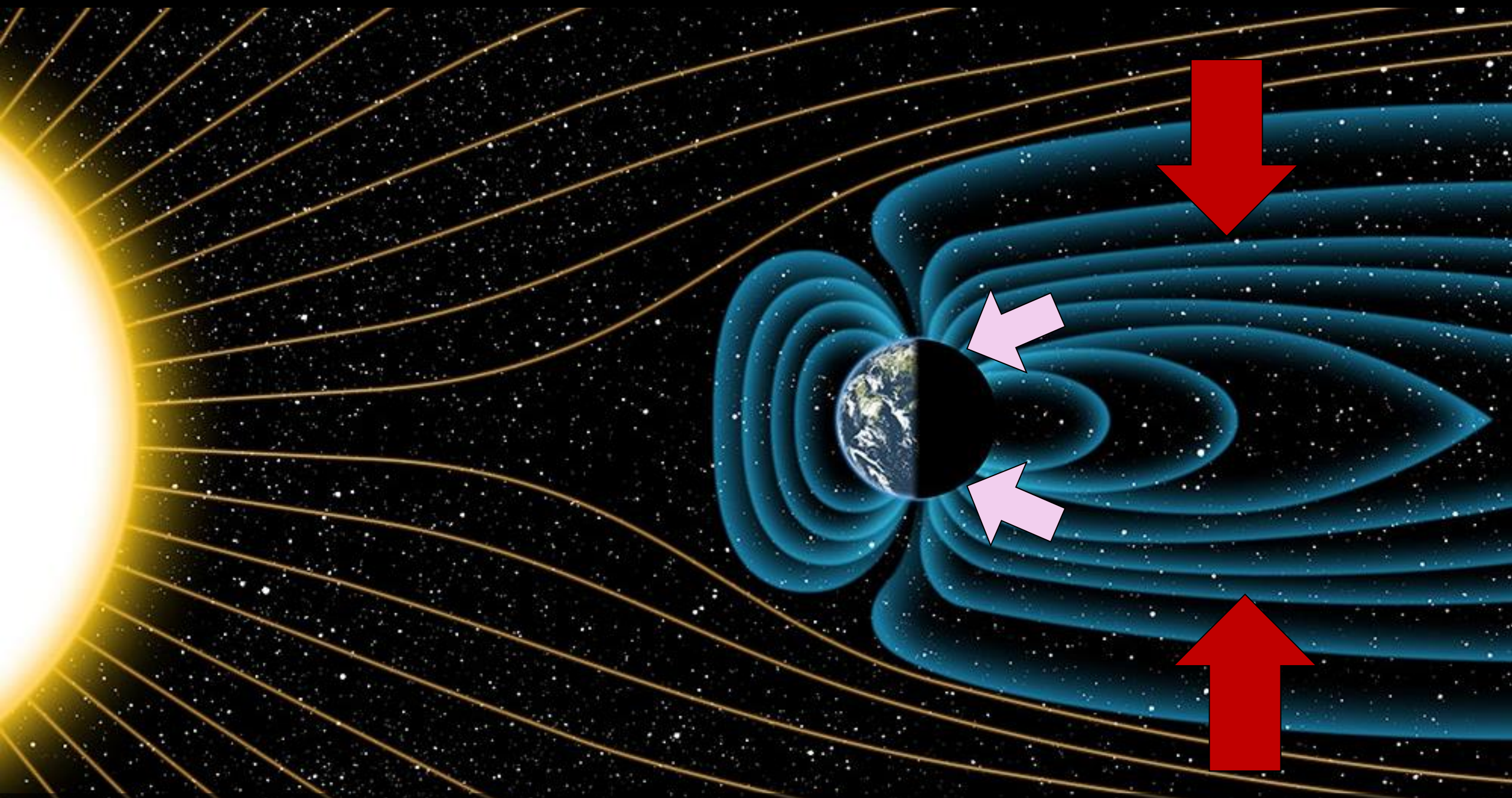
# SOLAR CYCLE

Solar Cycle Sunspot Number Progression





2025/09/24 00:06



The Earth has a magnetic field that extends out into space.

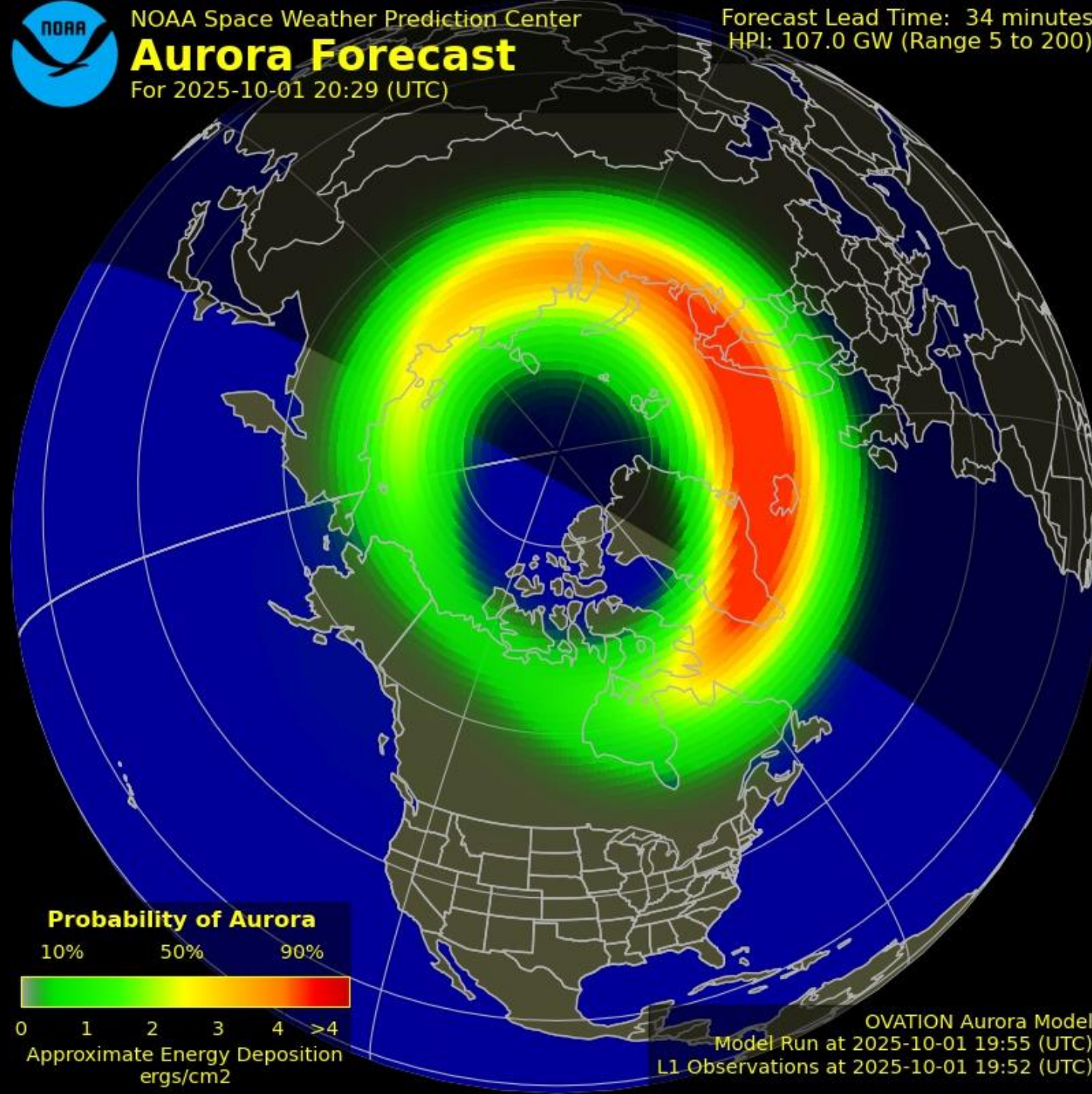


NOAA Space Weather Prediction Center

# Aurora Forecast

For 2025-10-01 20:29 (UTC)

Forecast Lead Time: 34 minutes  
HPI: 107.0 GW (Range 5 to 200)



OVATION Aurora Model  
Model Run at 2025-10-01 19:55 (UTC)  
L1 Observations at 2025-10-01 19:52 (UTC)



August 2014 over Greenland

# The Colours of the aurora

200km

(125 miles)

100km

(60 miles)

10km

(6 miles)



## Red

High-altitude oxygen >200km, visible during strong solar activity.

## Green

Common due to the abundance of Oxygen between 100-200 km.

## Pink, purples & blues

Nitrogen molecules emit red and blue colours when energetic particles reach lower altitude.



# AURORA TYPES

Only really two types...

- Discrete (Arcs, curtains, etc)
- Diffuse (patchy & pulsating

But these can look very different from different angles.

# AURORA TYPES

## **Discrete:**

Arcs, bands, curtains, pillars, rays, etc



# AURORA TYPES

**Diffuse:**

Corona, Patches, etc



# AURORA TYPES



**Diffuse:**

Corona, Pulsating, Patches, etc



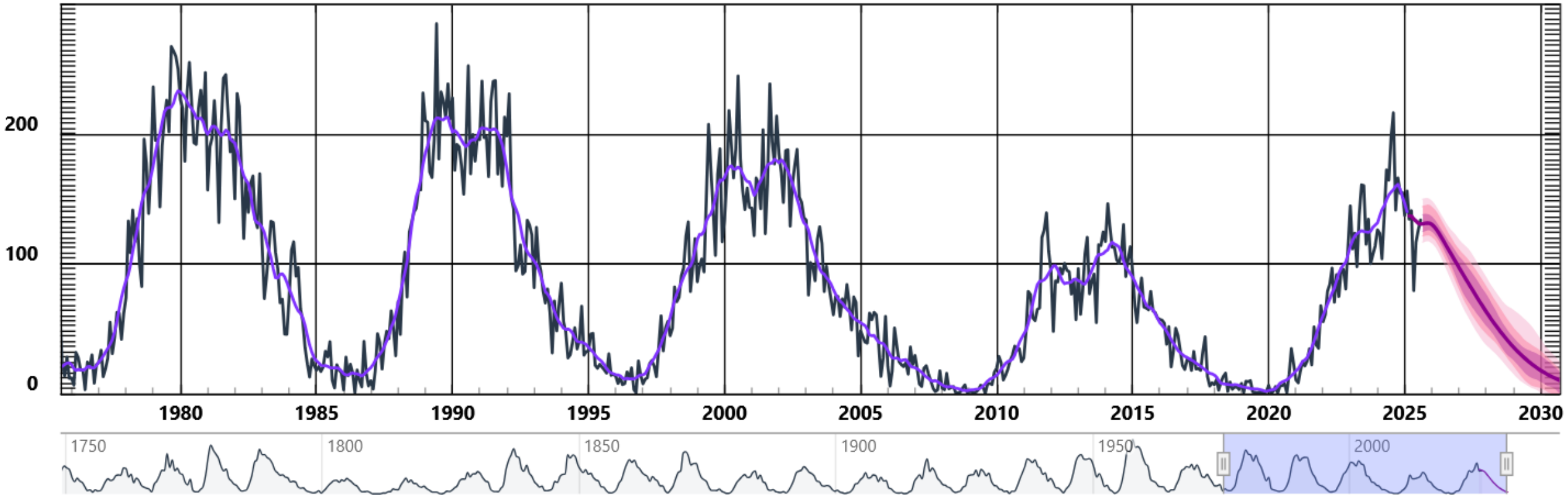
# NOT AURORA TYPES

- **STEVE** – not aurora

Strong Thermal Emission Velocity Enhancement

# LOOKING AHEAD TO 2025/6

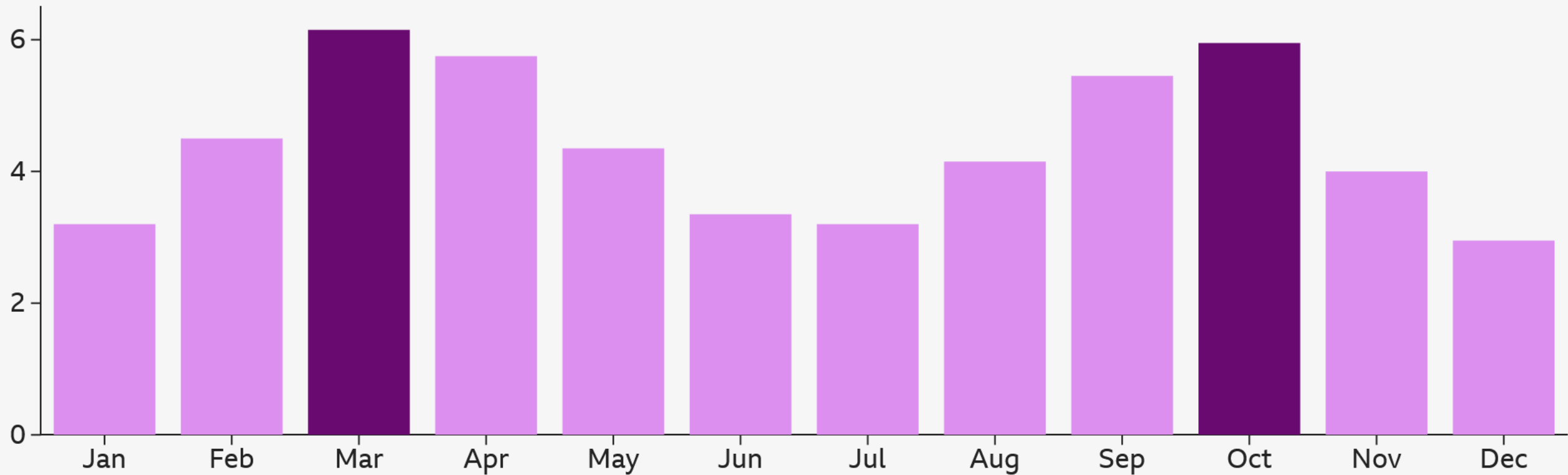
Solar Cycle Sunspot Number Progression



# Stronger aurora more likely in spring and autumn

Effects are caused by 'geometric disturbances' - which increase around **equinox months**

Average number of geometrically disturbed days each month 1932-2007



Source: Nasa physicist David Hathaway

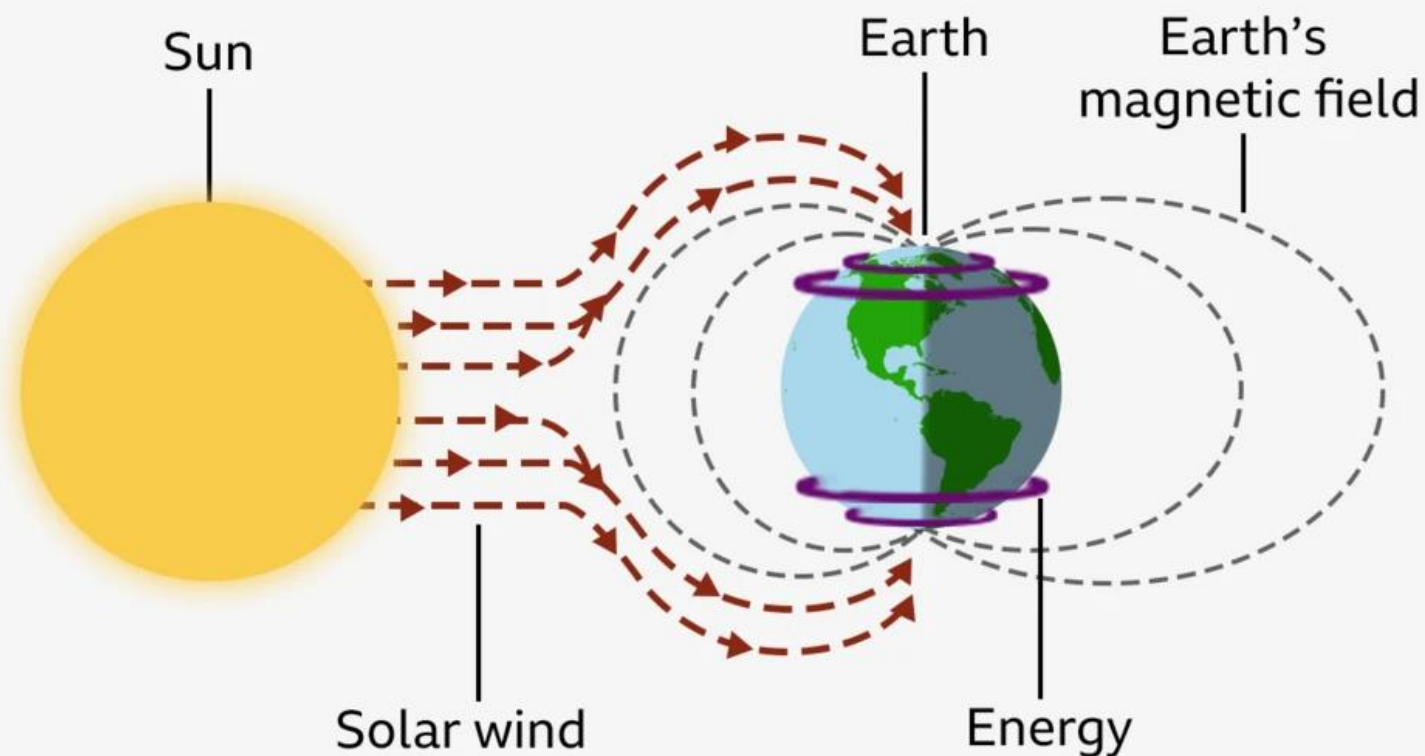
BBC

Russell-McPherron effect, due to the Earth's tilt

# EQUINOXES

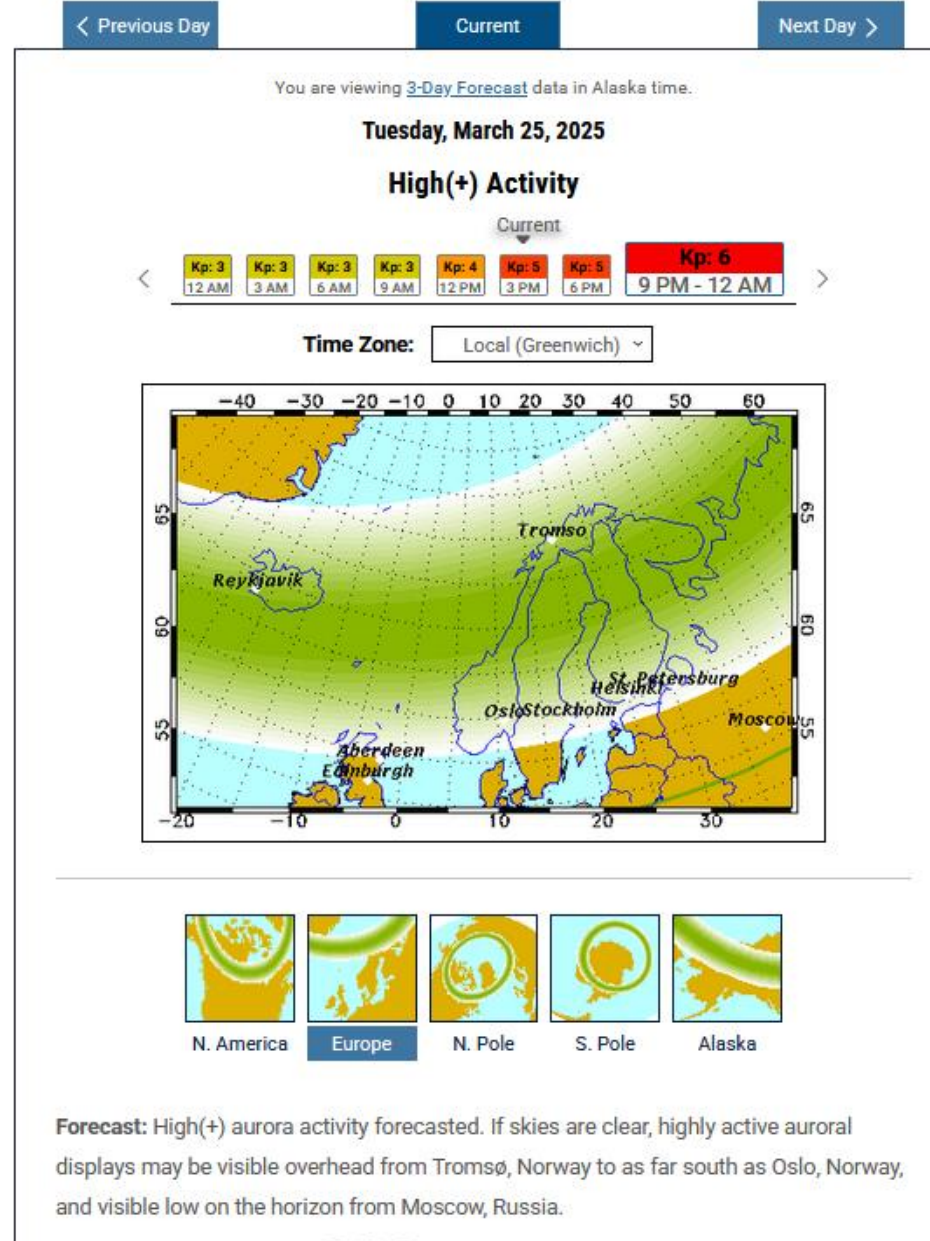
## How the Russell-McPherron effect can make the aurora stronger

When there is no tilt - at **equinox** - the magnetic field of the solar wind is more attracted to the Earth's magnetic field - resulting in more energy entering the atmosphere and **stronger aurora**



# WEBSITES

## AURORA FORECAST



### FAQ

Read our FAQs to learn about these common questions [and more](#):

#### Viewing the Aurora

- [What time of year is best for seeing aurora?](#)
- [Can I see aurora during the summer months?](#)
- [Where is the best place to see aurora?](#)
- [Where should I view the aurora when I'm in Fairbanks, AK?](#)

#### Science of the Aurora

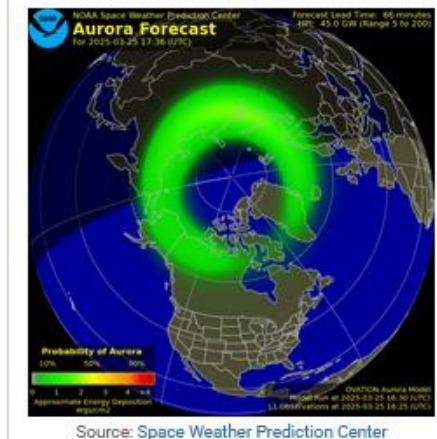
- [What are Kp numbers?](#)
- [What does the 2024-25 solar maximum mean for aurora?](#)
- [Can you predict where there will be aurora?](#)

#### Forecasting the Aurora

- [How accurate is the 3-day forecast?](#)

### Current Activity

Watch the last few seconds of the animation to see what is predicted over your location in the next 30 minutes.





## Current Conditions

### Solar wind

speed: **730.8** km/sec

density: **1.19** protons/cm<sup>3</sup>

more data: [ACE](#), [DSCOVR](#)

Updated: Today at 1051 UT

### X-ray Solar Flares

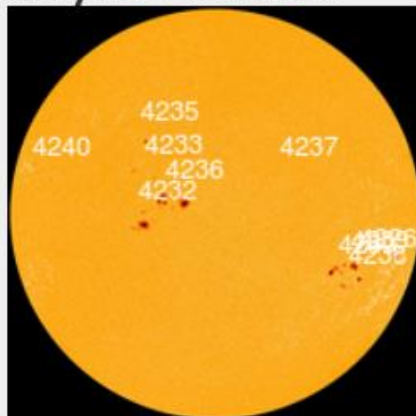
6-hr max: **M1** 1654 UT Oct01

24-hr: **M1** 0226 UT Oct01

[explanation](#) | [more data](#)

Updated: Today at: 2255 UT

### Daily Sun: 01 Oct 25



Expand: [labels](#) | [no labels](#)

Dangerous sunspot alert: Two of these sunspots (4230 and 4236) have 'beta-gamma-delta' magnetic fields that harbor energy for **X-class** solar flares.

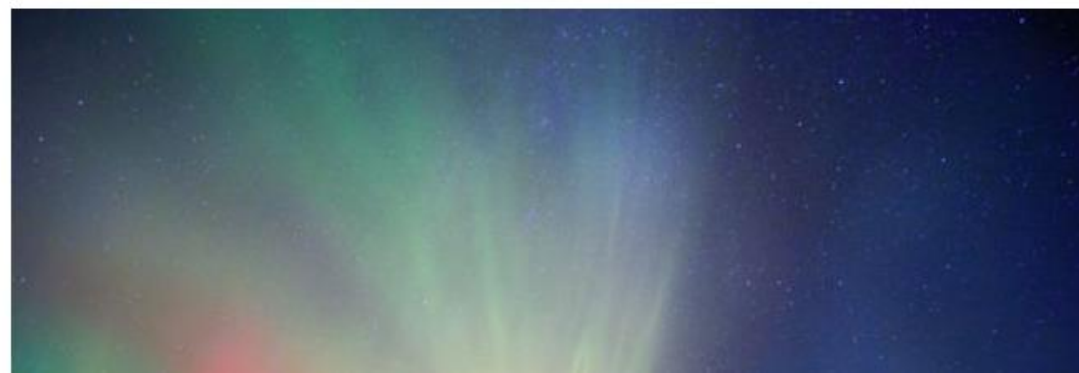
## What's up in space

**This is an AI Free Zone:** Text created by Large Language Models is spreading across the Internet. It's well-written, but frequently inaccurate. If you find a mistake on Spaceweather.com, rest assured it was made by a real human being.



**THE SUN IS BLOWING A GALE:** Earth has entered a stream of solar wind blowing faster than 700 km/s (1.6 million mph). This is extending geomagnetic unrest for [the third day in a row](#). NOAA forecasters say **G2**-class geomagnetic storms are likely on Oct. 1st with continued auroras at high latitudes. **Aurora alerts:** [SMS Text](#).

**NOT ALL THOSE LIGHTS WERE AURORAS:** A strong **G3**-class geomagnetic storm erupted on Sept. 29th, sparking intense auroras around the Arctic Circle. Vacationing from Florida, Bill Williams photographed the spray of color from the Gullfoss Waterfall in Iceland:



Wednesday, Oct. 1, 2025

### archives

October

1

2025

### T CrB NOVA WATCH

today: m=**10.0** (Oct 01.:

yesterday: m=**10.0**

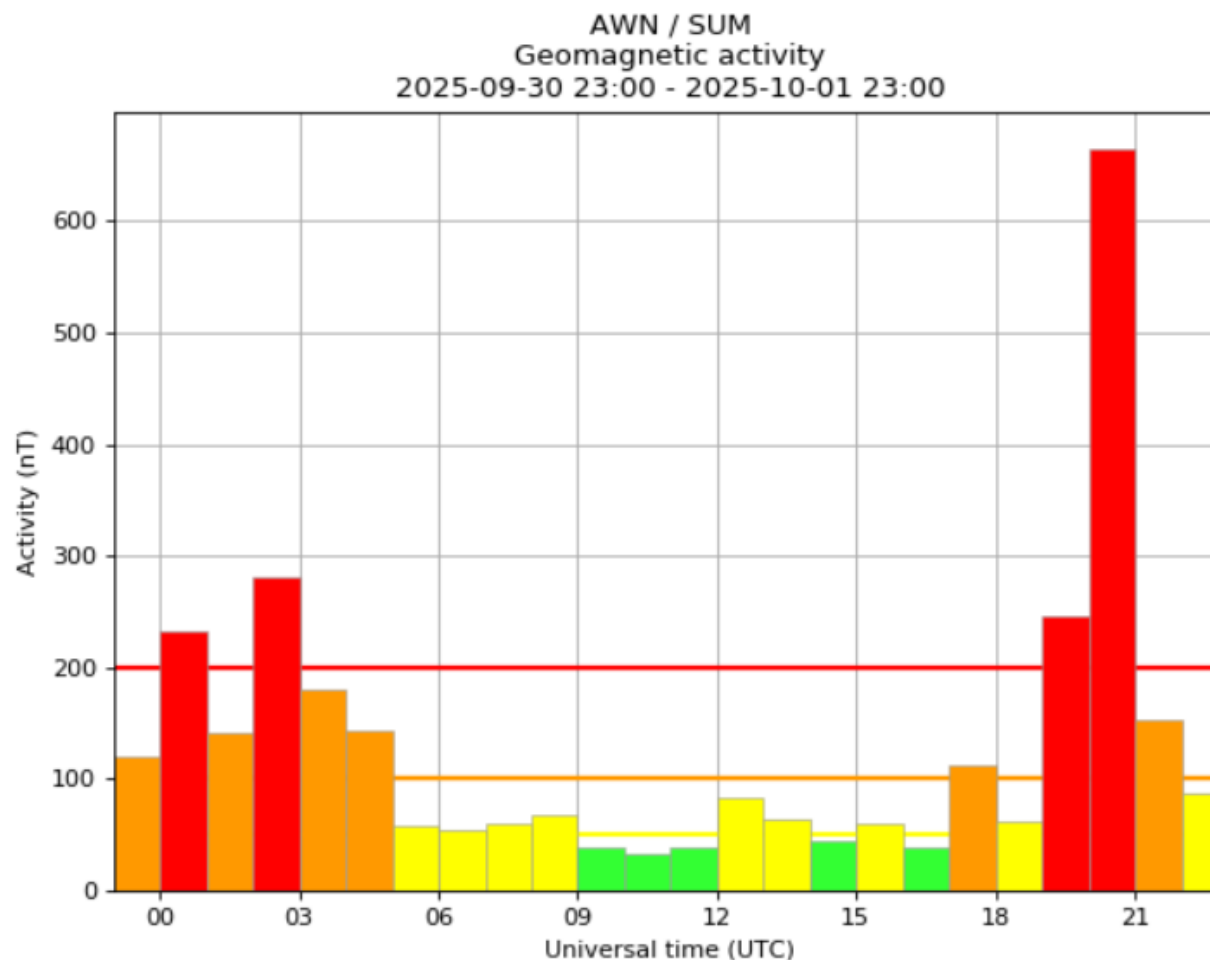
more: [AAVSO data](#)

**Explanation:** When the nova explodes, the visual magnitude of the star (m) will jump from +10 (invisible to the naked eye) to +2 (about as bright as the North Star).

### A New Prediction:

Astronomer Jean Schneider of the Paris observatory predicts the nova will occur around May 10, 2025, or June 25, 2026, based on periodicities observed in previous eruptions. [\[more\]](#)

AuroraWatch UK status:  
**Minor geomagnetic activity**



Activity plot

Magnetogram

Stackplot

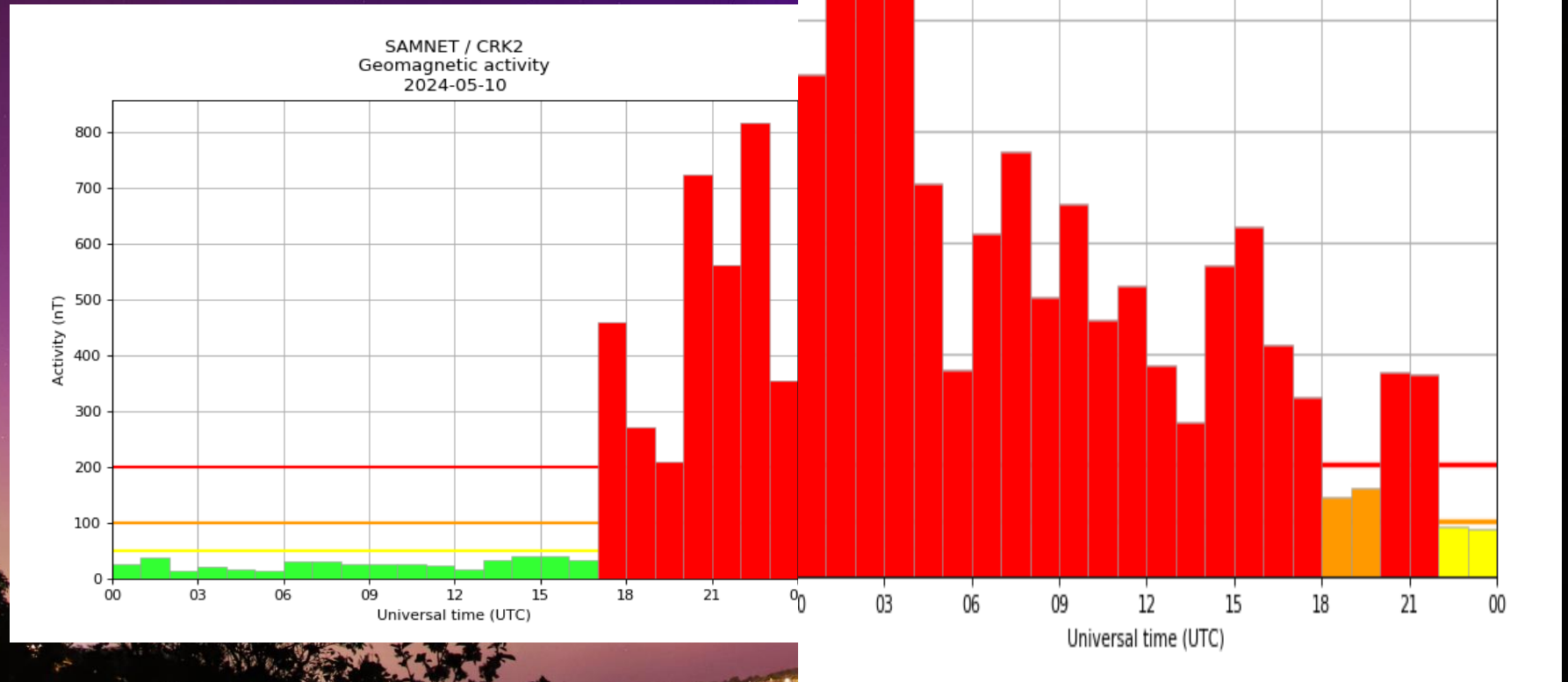
**For Brighton...**

**500nT**  
– visible to  
cameras

**750nT**  
– potentially  
visible by eye

**1000nT**  
– easy to see  
by eye

# BRIGHTON – MAY 2024



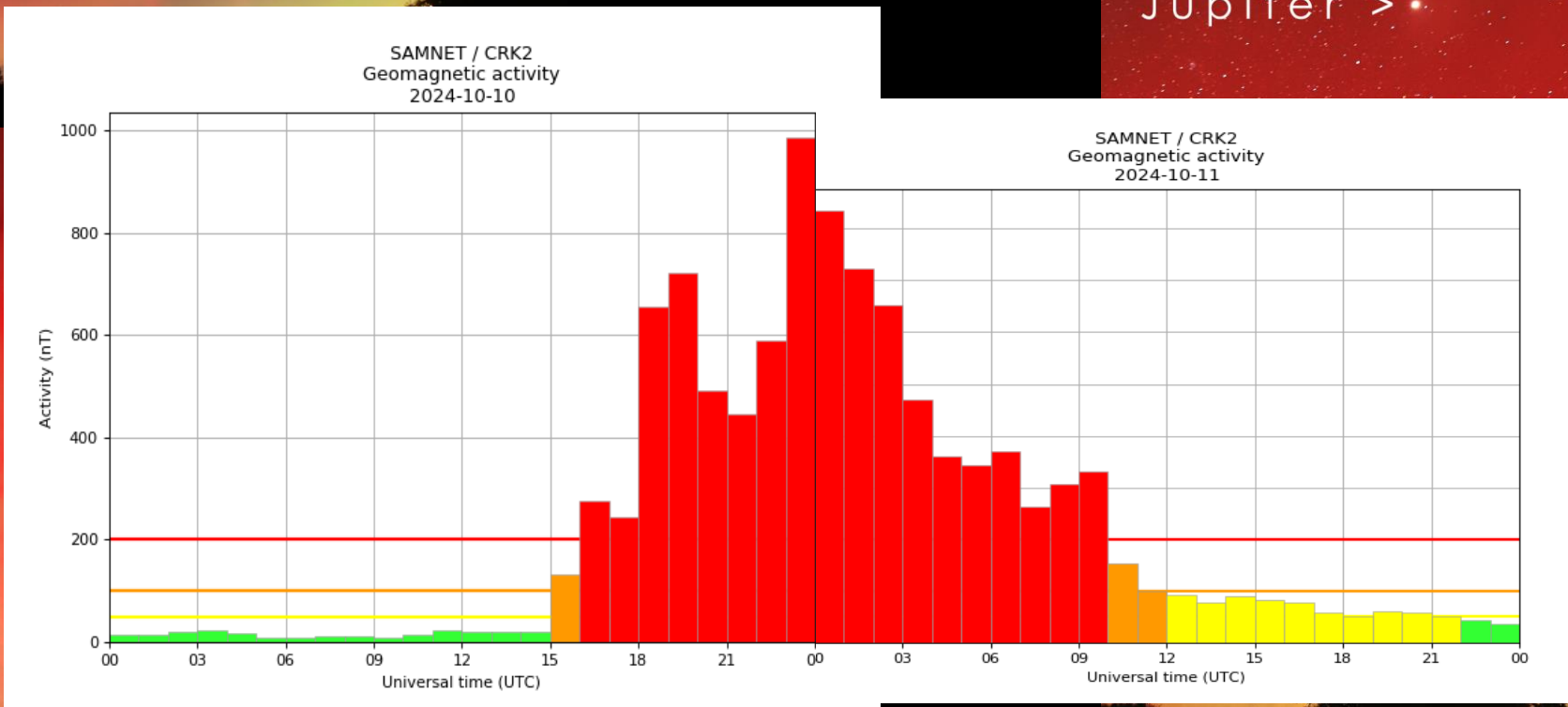
# BRIGHTON – OCTOBER 2024

Pleiades >

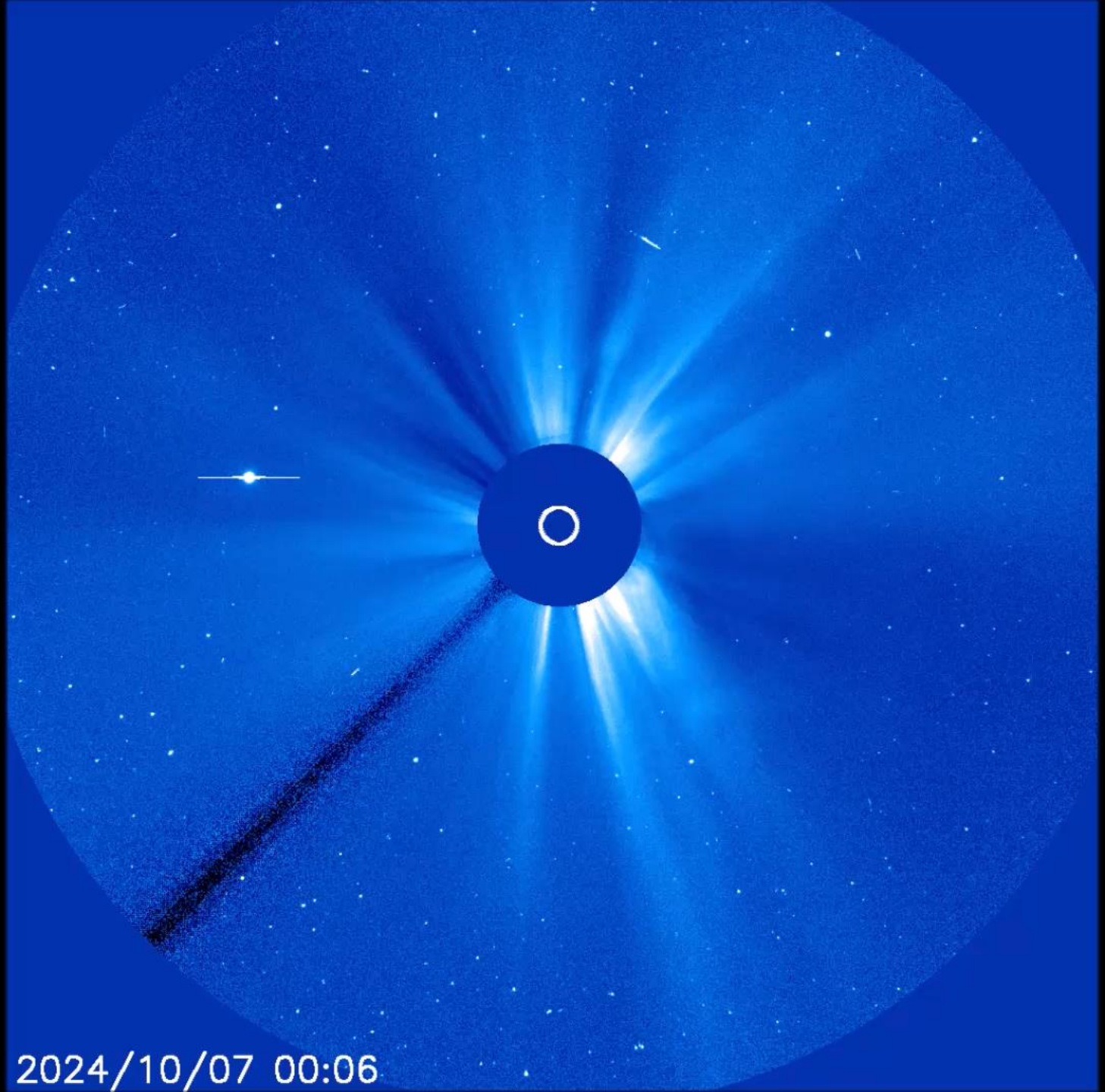
Hyades

Jupiter >

Orion

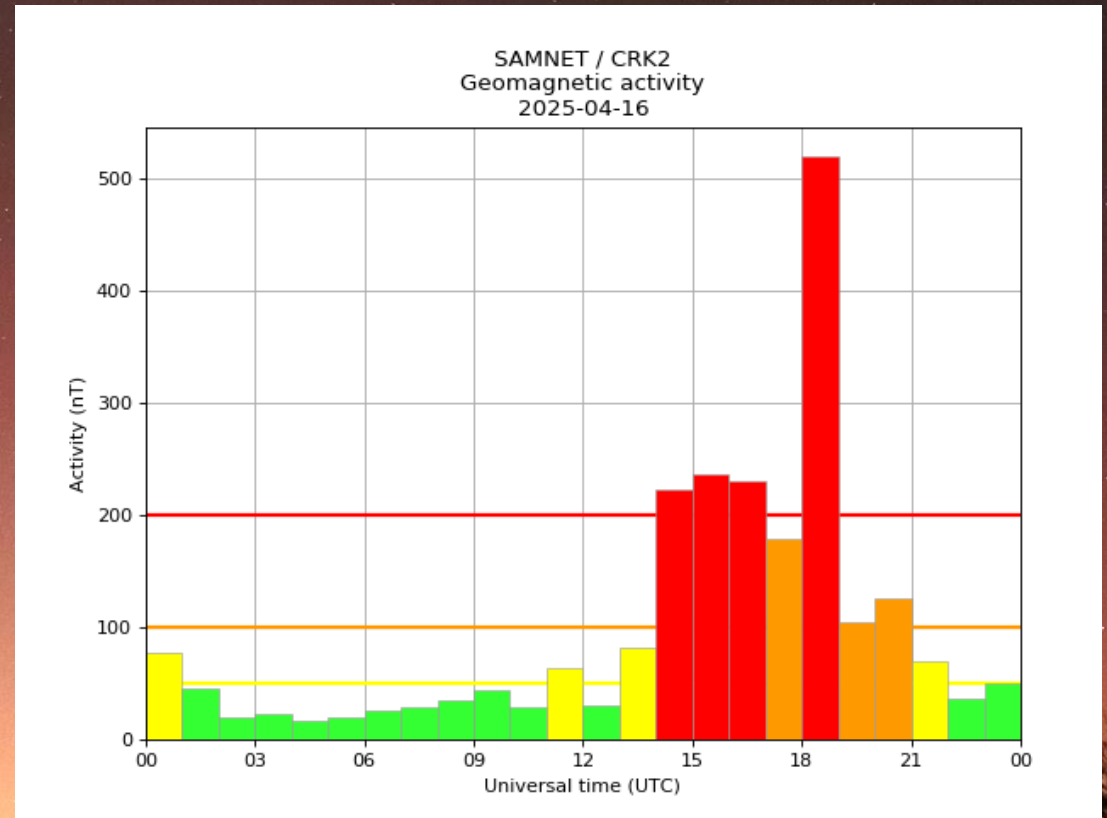


The Solar  
activity that  
sparked aurora  
over southern  
England in  
October 2024

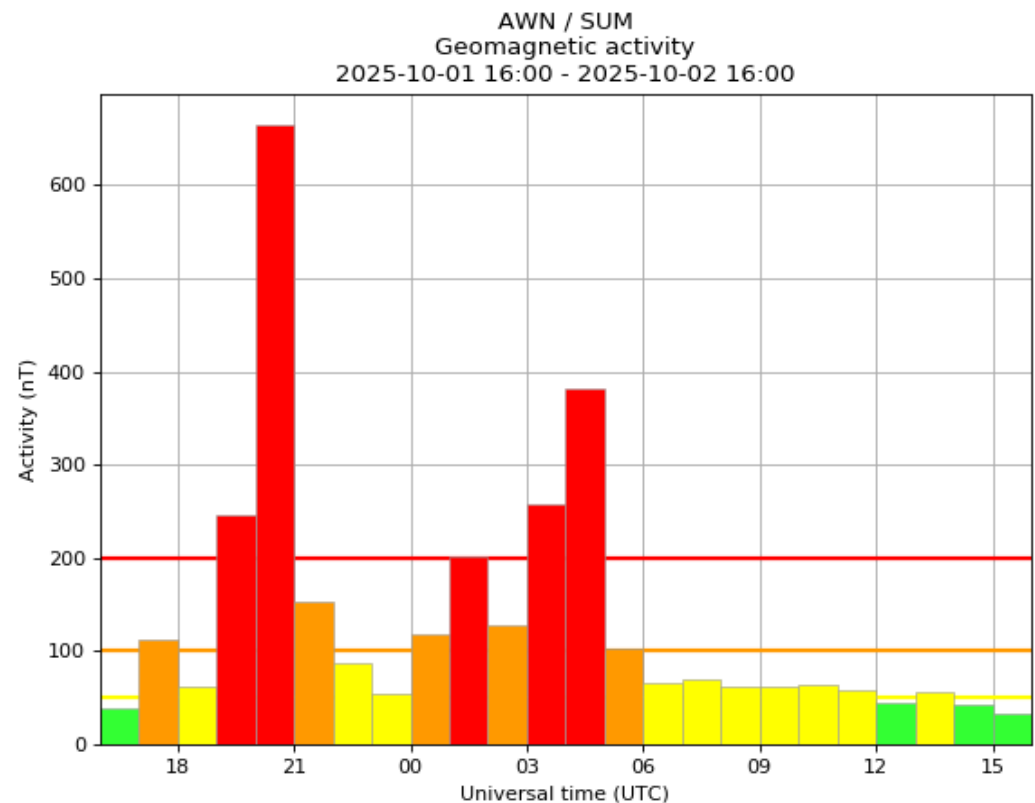


2024/10/07 00:06

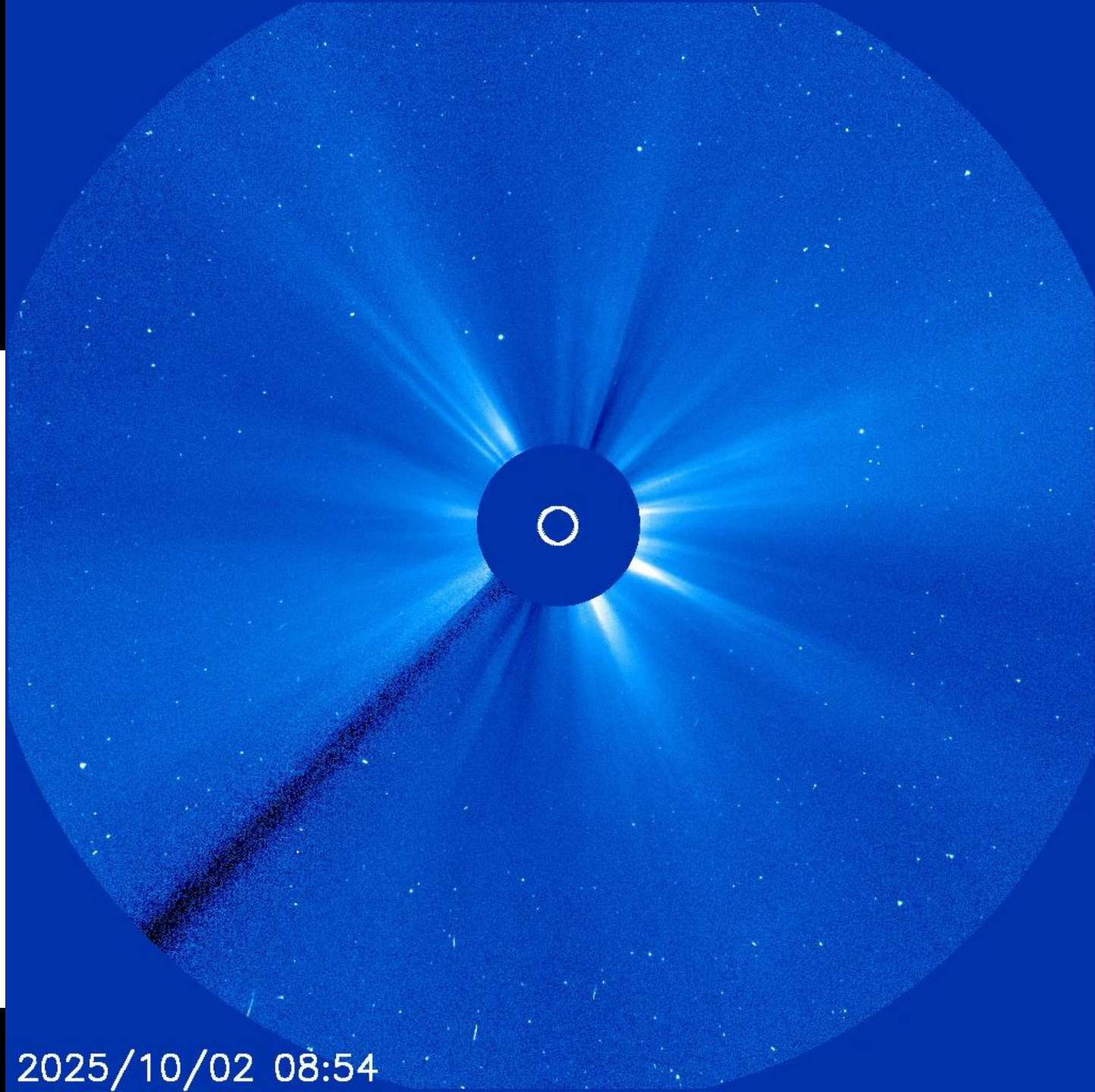
# BRIGHTON – APRIL 2025



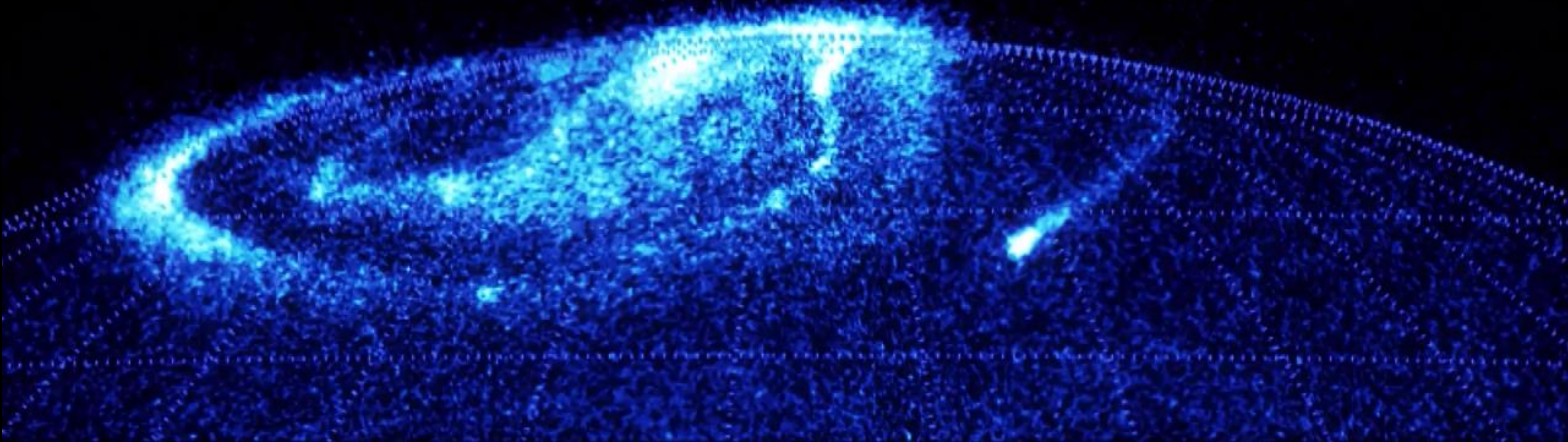
# BRIGHTON – OCTOBER 2025



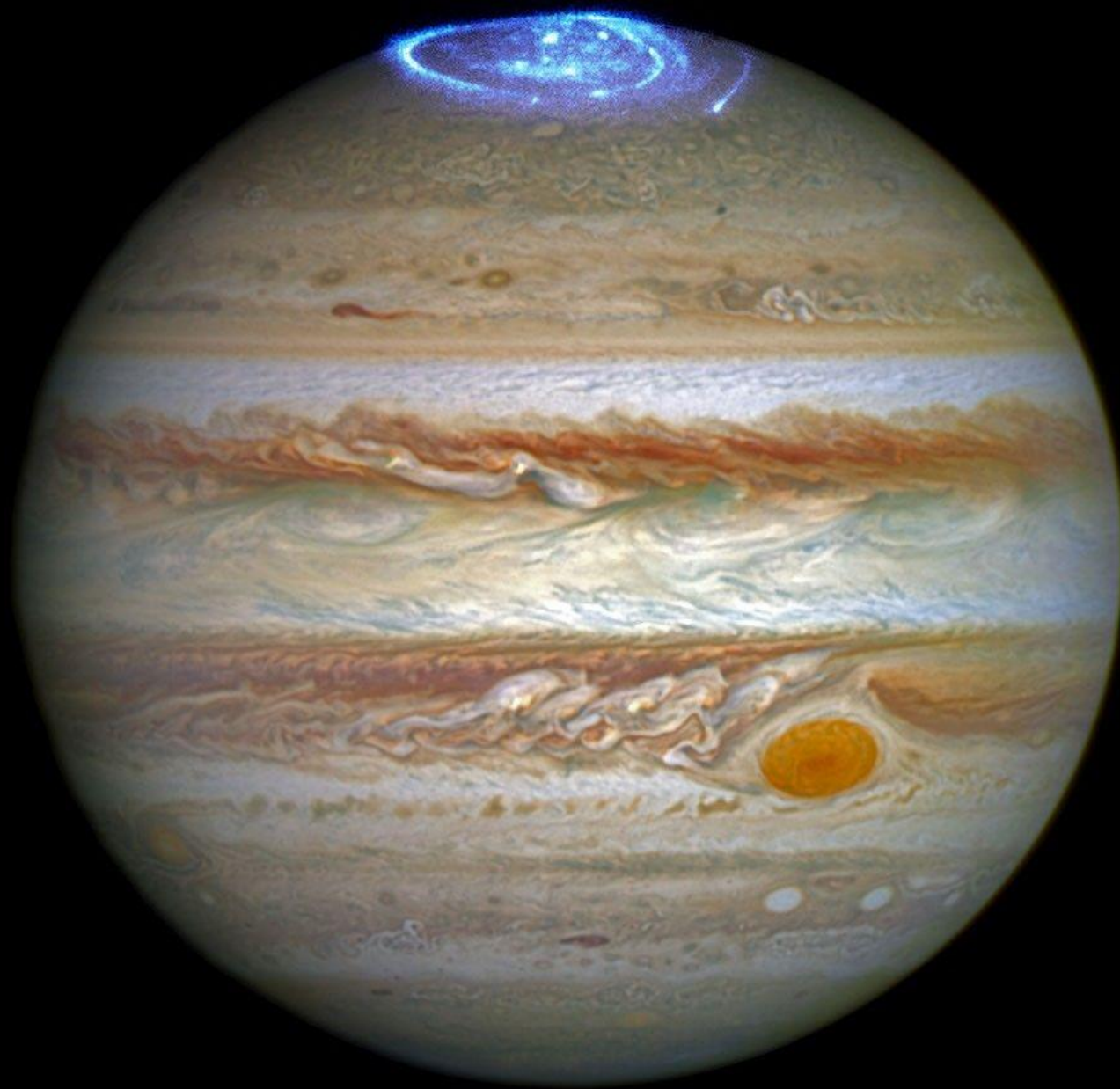
2025/10/02 08:54



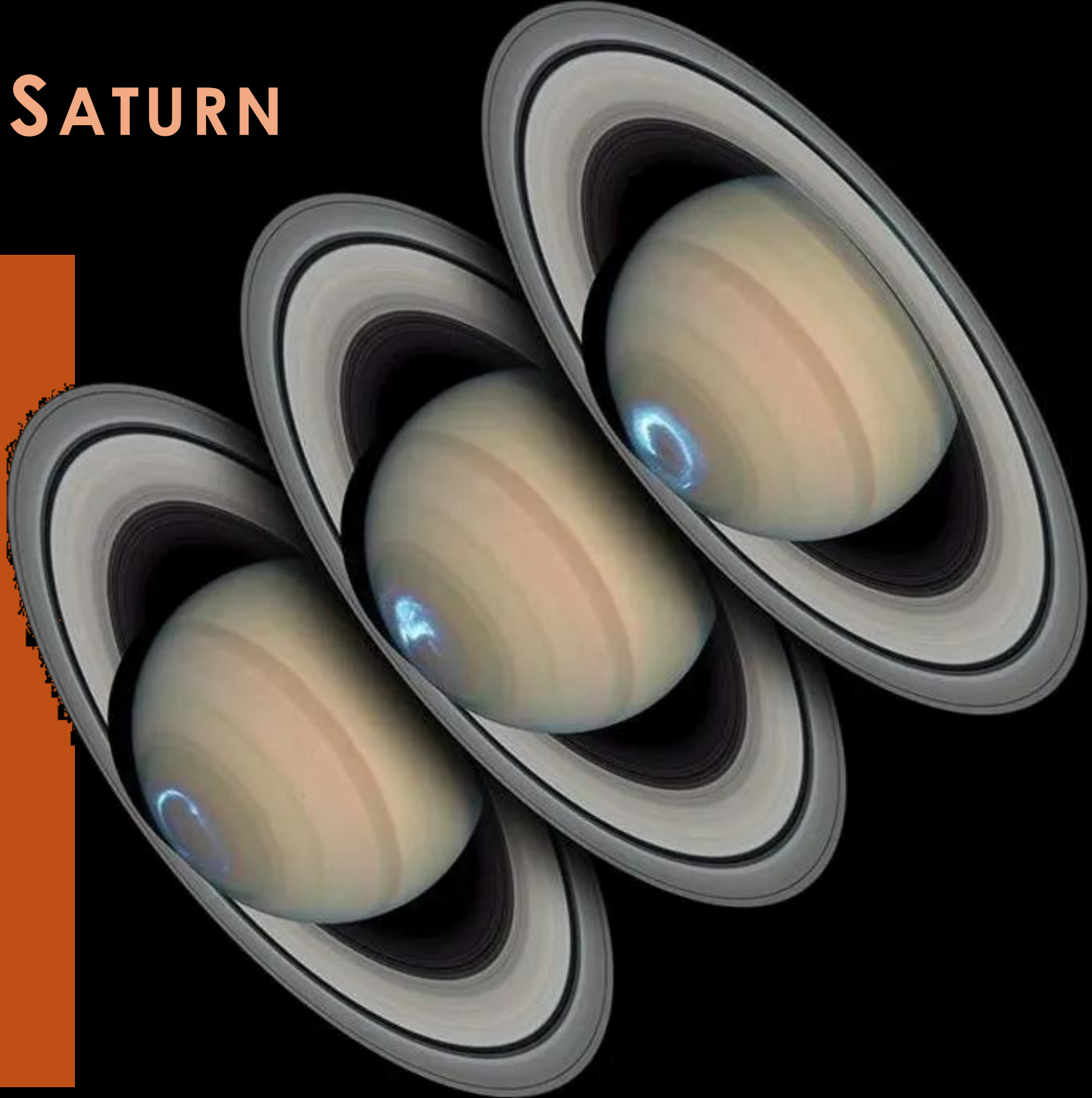
# BEYOND EARTH



# JUPITER



# SATURN



**Exoplanets** *have been discovered through the low-frequency radio-waves ( $\lesssim 150$  MHz) emitted by their aurora.*

YZ Ceti

$<12\text{ly}$ ,  $0.7 M_{\oplus}$ ,  $0.9 R_{\oplus}$ ,  $0.02\text{AU}$  [2017]

SIMP J0136+0933

$20\text{ly}$ ,  $13 M_{\oplus}$ ,  $14 R_{\oplus}$  [2003]

GJ 1151

$26\text{ly}$ ,  $\leq 5 M_{\oplus}$ ,  $0.91 R_{\oplus}$  [2023]

# HURTIGRUTEN



Guest Favourite

Bergen – Kirkenes – Bergen (Roundtrip)

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