

Chasing the Northern Lights

Standing on the NWT Ice Roads in -28°F



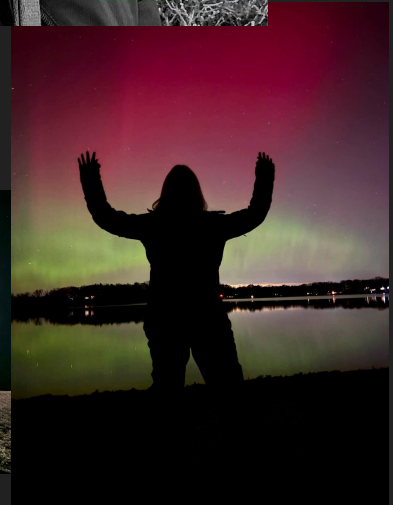
Photo by Cristiano Saturno
YELLOWKNIFE, CA

About the Author

- Chasing the Aurora for 14 years
- Writer at heart
- B.A. in Journalism, Miami University, Ohio
- Author of “Beyond the 45th Parallel: The Beginner’s Guide to Chasing Aurora”
- Amateur Astronomy Magazine
- NASA Social Media Ambassador, Solar Orbiter
- Founder of Michigan Aurora Chasers
- Co-Founder of the Aurora Summit: Celebrating the Art, Culture, Science & Photography of the Aurora



Melissa F. Kaelin
KaelinArt.com



Chasing the Aurora

MINNESOTA | WISCONSIN

MICHIGAN

ALASKA

ICELAND

NWT, CANADA

NORWAY

FINLAND

THE NIGHT AURORA CHASED ME

Driving home from the Inaugural
Upper Peninsula Dark Sky Festival
along Lake Superior's Shore
in Michigan's Upper Peninsula,
April 23-24, 2023.

Photo by Jessica Ellis Rorman

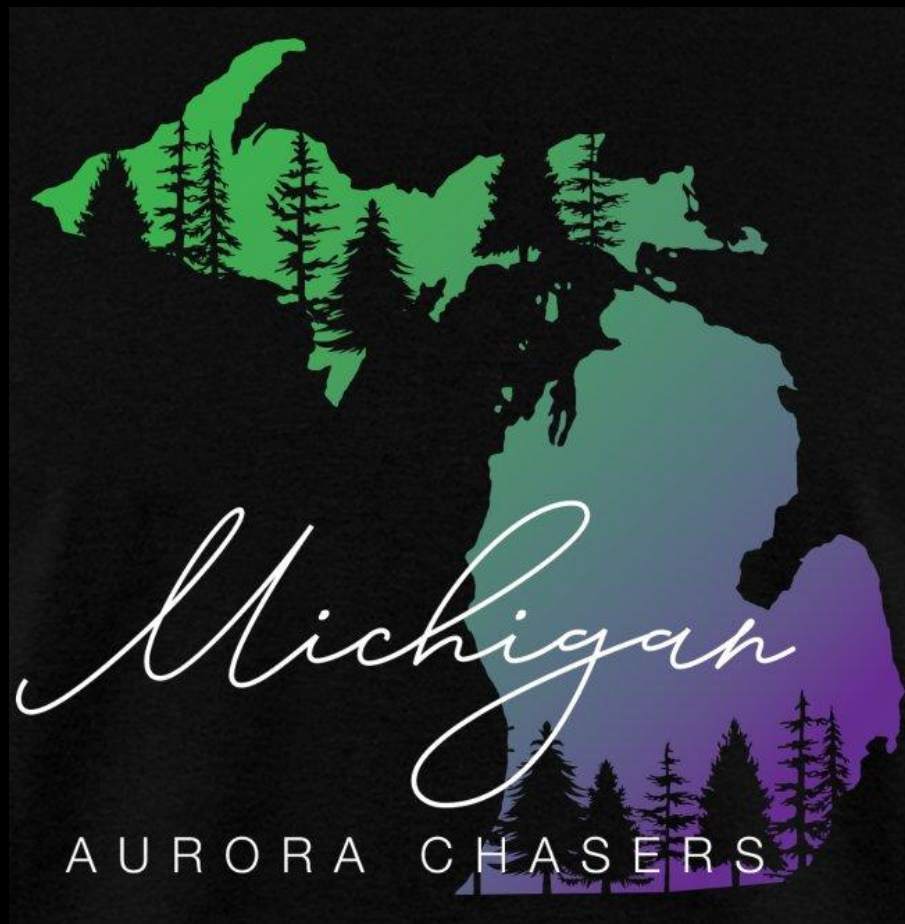
Meet the Michigan Aurora Chasers

Mentors, Aurora Guides, Photographers, Spotters & More

Michigan Aurora Chasers

- Tools & Resources
- Free Aurora Alerts
- Workshops & Events
- Guided Aurora Chases

MichiganAuroraChasers.com



Aurora Alerts Only

- Download the Free Telegram App
- Subscribe to @MichiganAuroraAlerts



"The Jim Cantore Team of Aurora Chasing"

MichiganAuroraChasers.com

Photo by Michele Aucello

Nov. 12, 2025, Pinckney, Michigan, By Jen Boss Mainka

#LiveChase



Jen Mainka

Visible Color in the Northern Lights

- A wildly different experience for each person!
- Our own unique eyesight
- Factors like colorblindness, corrective lenses, cataracts, laser eye surgery
- Demographics like youth, age, gender
- Acclimate to the dark
- Will I see color?
It depends on Aurora strength, location, and space weather variables
- Dark skies are a game-changer!



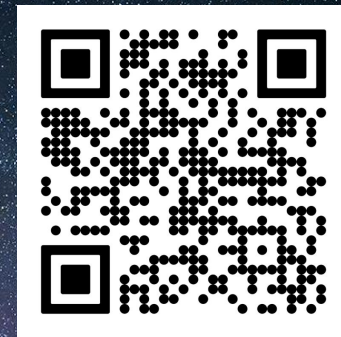
Three Michigan Aurora Chasers Admins chase the Aurora as the sun rises!

Camera Note Card



Leading You to the Dance

Guided Aurora Chases and Dark Sky Experiences

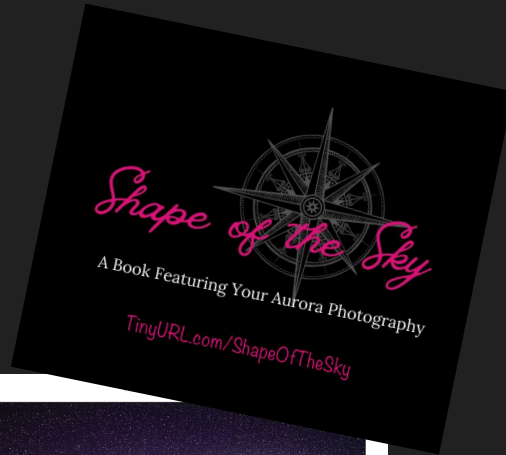


- The Michigan Aurora Experience
- Our #LiveChase
- Annual Michigan Aurora Workshop
- The Aurora Summit
- Festivals, Programs & Talks

Awesome Community Projects

We lead an engaged and active community!

- MI Aurora Experience
- Michigan Aurora Workshop
- Night Sky Festivals



PRESS PREVIEW: SHAPE OF THE SKY BOOK PROJECT | KADUNAART.COM



Colorful pillars of the Northern Lights lift into the night sky in Leelanau State Park, near the 49th Parallel in Michigan, at 12:45 a.m. on September 26, 2024. Photo by Stephanie Bailey.



Northern Lights rise above the horizon at 3:22 a.m. on March 27, 2025, behind the Pigeon Barn, a part of the 53North Barn Art Project, which can be found in Port Austin, Michigan. Photo by Laurie Olds.



Right Time, Right Place

Catch the Aurora in Your Backyard!

Peak Conditions • International Dark Sky Parks



Peak Times:

2 Hours before/after
magnetic midnight

Peak Season:

September-April

Peak Year:

Solar Maximum 2024

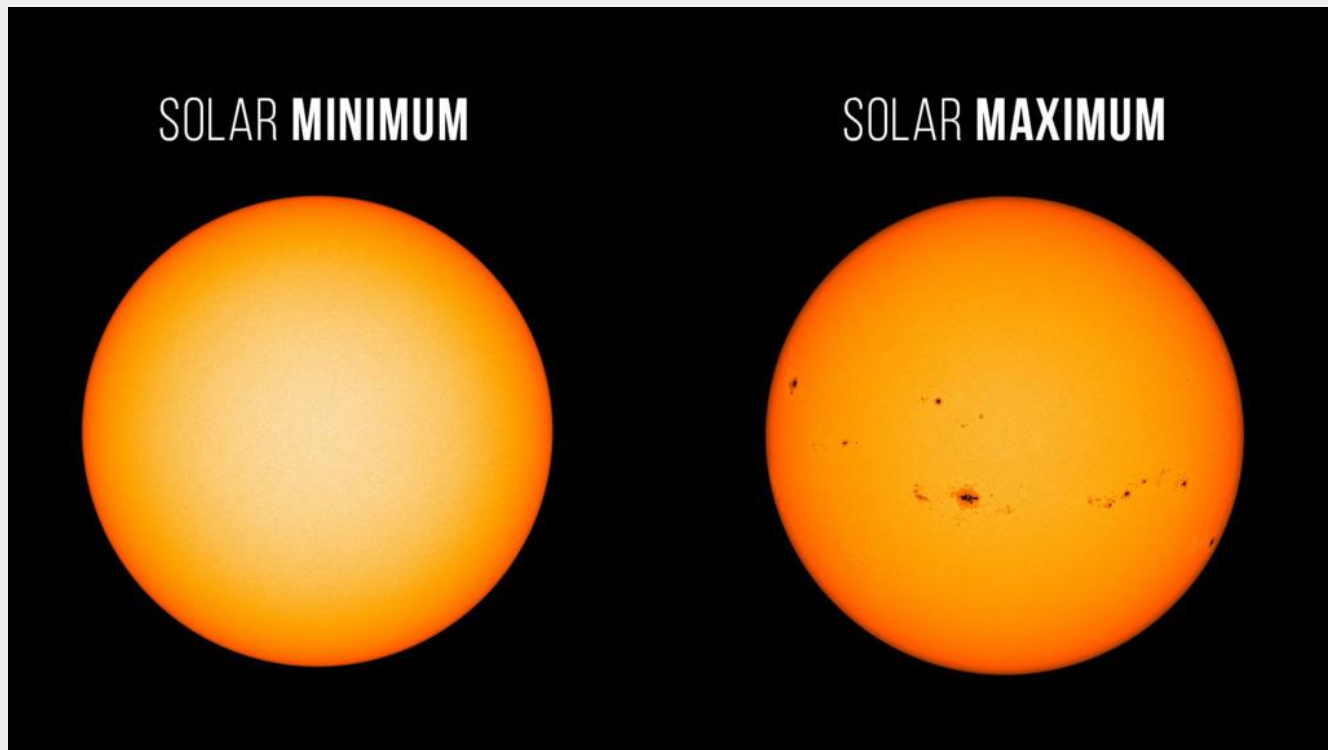
Best Place:

Dark Sky

Photo by Justin Miller

The Solar Cycle

- 11-year cycle
- Magnetic poles on the sun reverse
- 22 years:
Poles flip back
- In between come the quiet times



Visible light images from NASA's Solar Dynamics Observatory highlight the appearance of the Sun at solar minimum (left, Dec. 2019) versus solar maximum (right, May 2024). During solar minimum, the Sun is often spotless. Sunspots are associated with solar activity and are used to track solar cycle progress.

For these images and more relating to solar maximum, visit <https://svs.gsfc.nasa.gov/14683>.

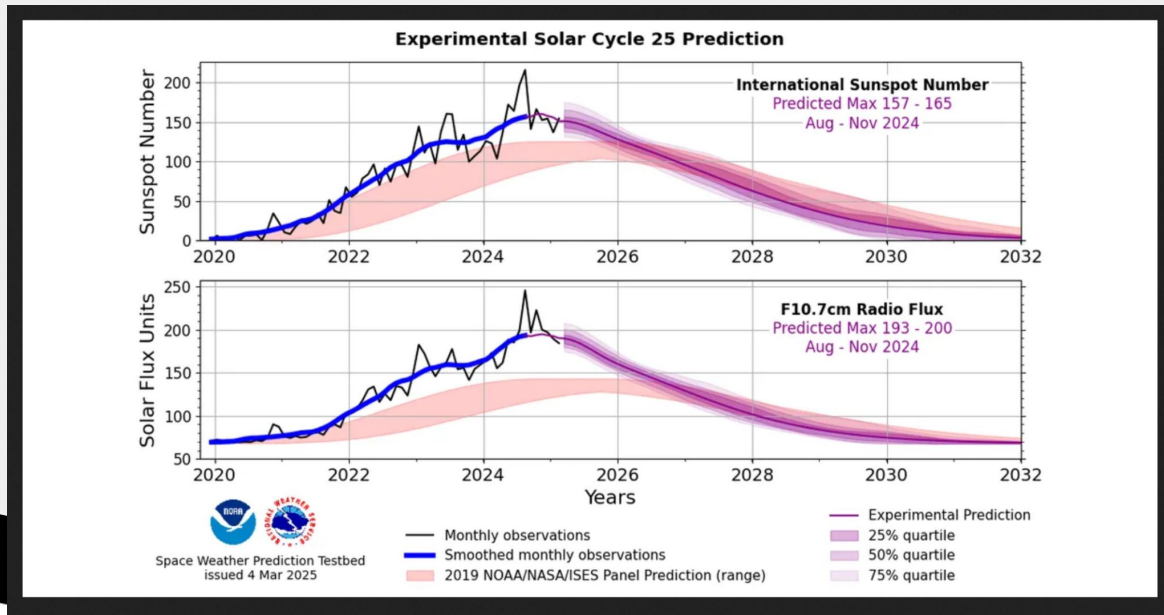
NASA/SDO

Solar Cycle 25: Solar Max & Where We Are Now

Solar Cycle 25

Solar Maximum:
2024

Solar Minimum:
Projected 2030



Solar cycle progression updated prediction (experimental) from the NOAA testbed. The thin, black line shows sunspot data, the blue line represents the 13-month smoothed average, the peach shaded area shows the original 2019 prediction, and the purple line is the current prediction based on the most up-to-date data. (Image credit: NOAA Space Weather Prediction Center)
Source: Space.com

6 MIN READ

**NASA, NOAA: Sun Reaches Maximum Phase
in 11-Year Solar Cycle**



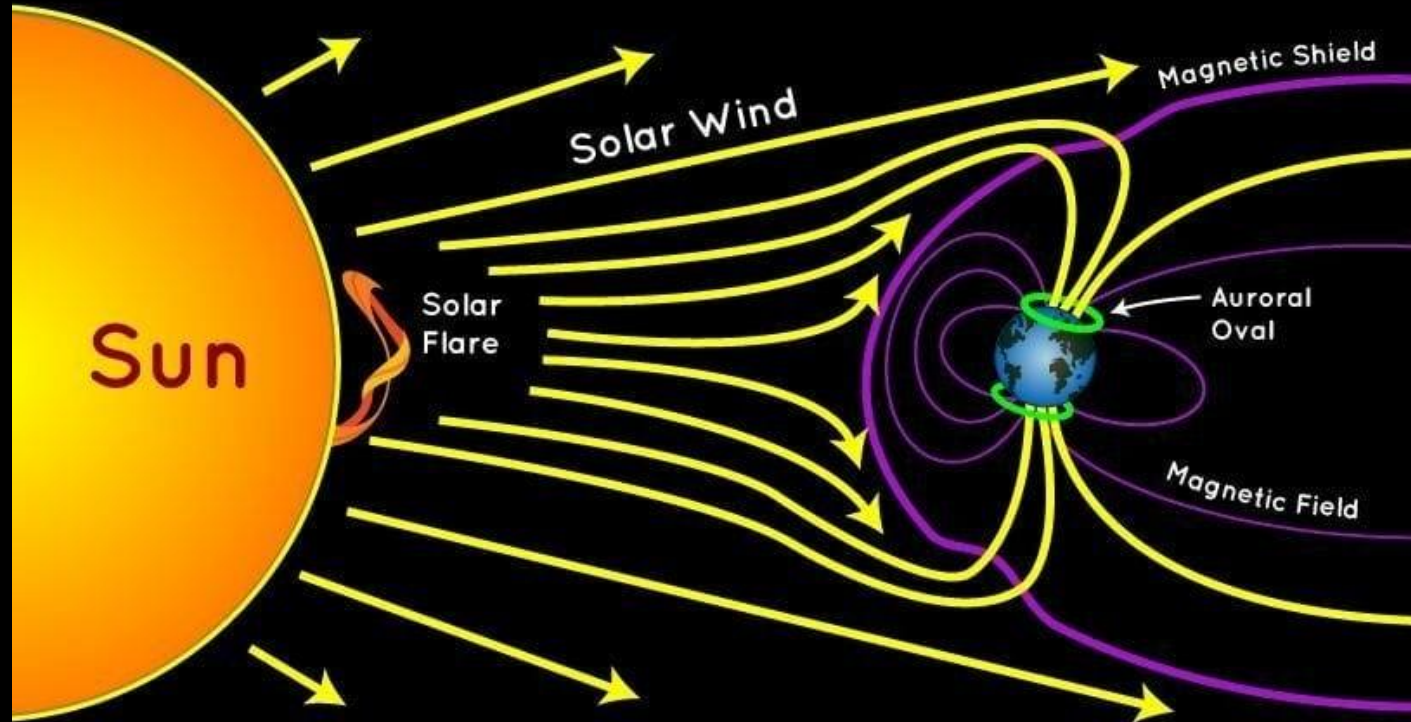
Abbey Interrante

OCT 15, 2024

Understanding What Causes Aurora: The Solar Wind

Solar Activity

- Solar Plasma
- Eruptions
- CMEs
- Coronal Holes
- Filaments
- Glancing Blow
- Co-rotating Interactive Regions
- Ever Present Solar Wind



When Particles Collide & Dance

Colors emerge when excited particles or **electrons** in Earth's atmosphere interact with air molecules like oxygen and nitrogen to emit light.

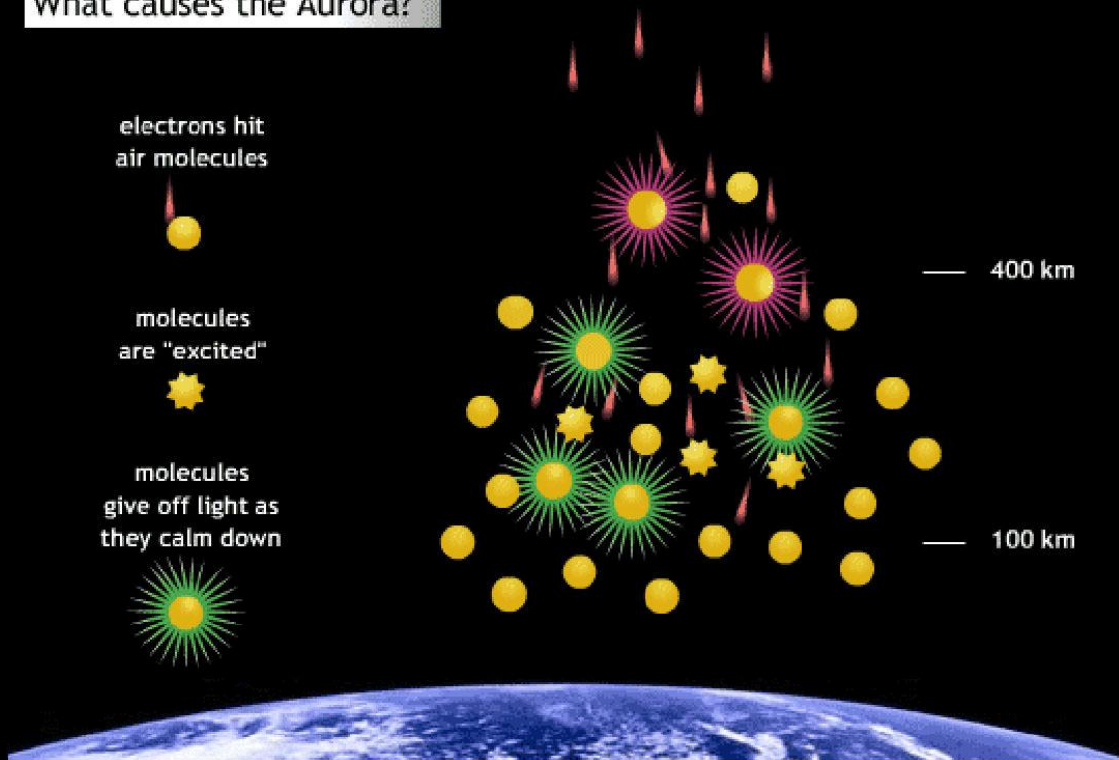
Oxygen - High Altitude: Red

Hydrogen, Helium: Purple, Pink

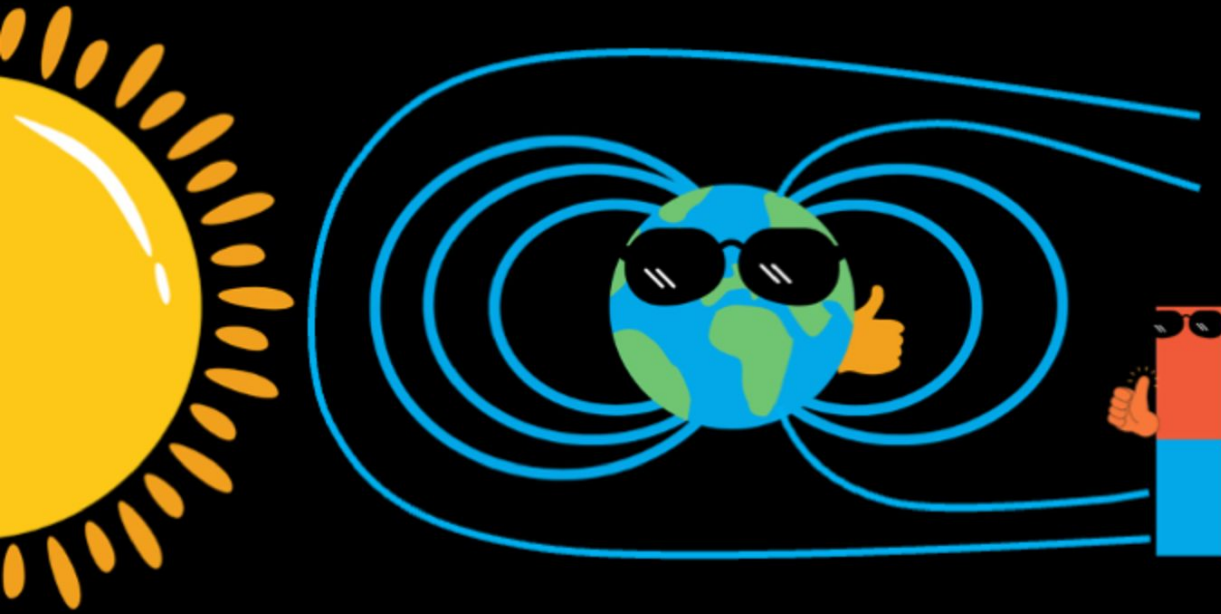
Oxygen - Low Altitude: Green

Nitrogen: Blue

What causes the Aurora?

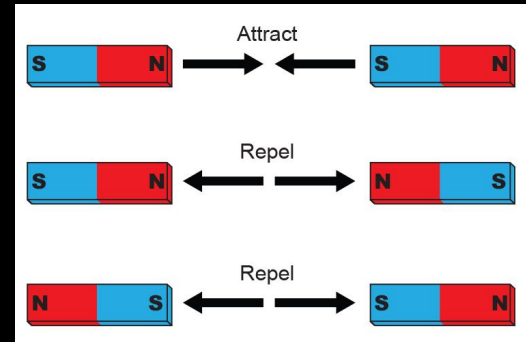


What is the “Bz”? Meet the “Gatekeeper”



- Southward Bz
- More Negative
- Oscillate back and forth:
This is what we want!
- Like an open gate

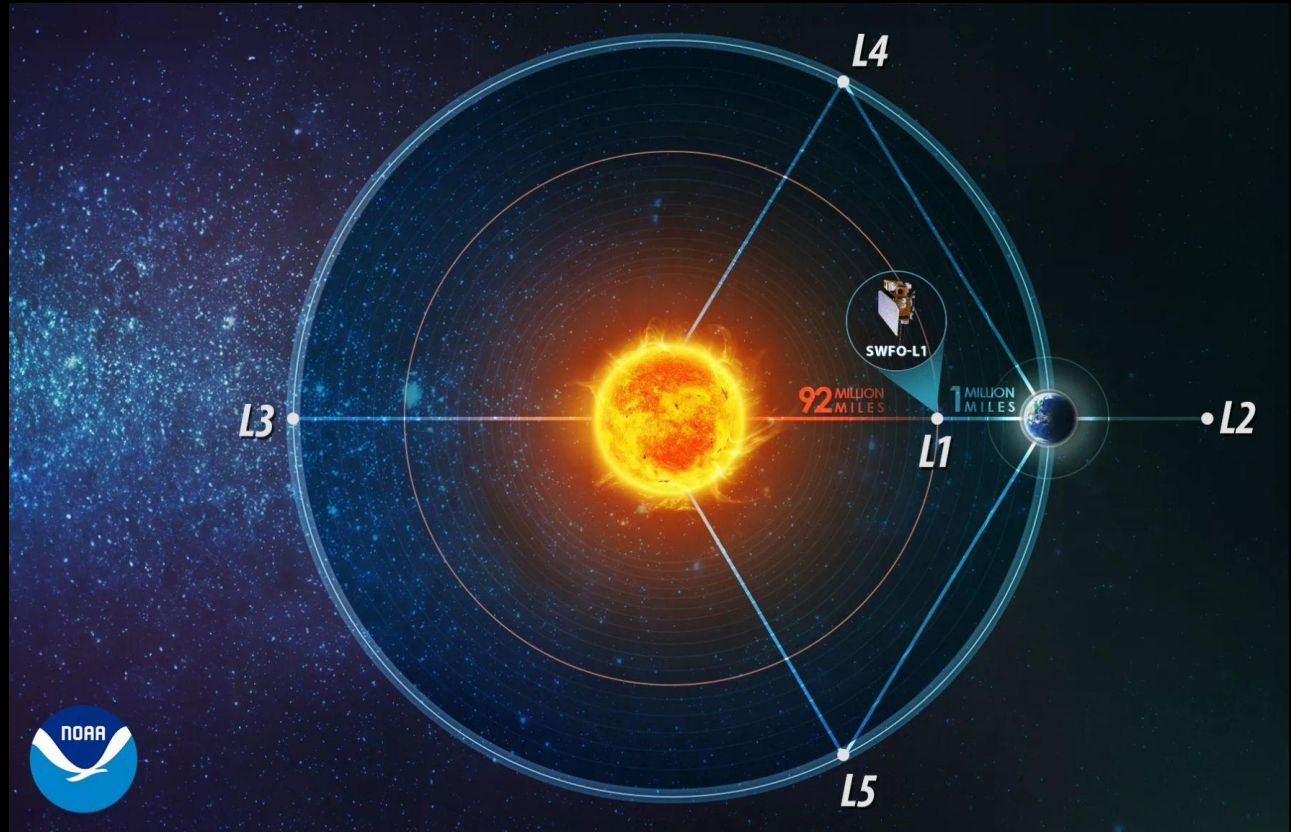
#ThatPeskyBz



Award-winning image courtesy of EGU Blog

L1 LaGrange Point

- DSCOVR changed over to SOLAR-1
- Satellite monitors space weather
- Aurora apps

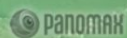


Methods for Predicting Aurora

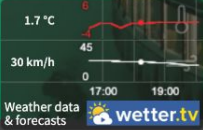
Beginner	Apps, Kp, Webcams, Substorm Alerts
Beginner	K-Index, Predictions, Ovation Model, HPI
Intermediate	Space Weather Live, Real Time Solar Wind
Intermediate	Coronagraphs, SolarHam, Ap-Index
Advanced	WSA-Enlil, CME Scoreboard, Magnetometer Plots
Advanced	Analyzing CMEs, Understanding Flux Ropes



The Globe monument


 **panorama**
Data Protection Statement

Webcams!



The K-Index, G Storms & Planetary Averages

	Kp 9 • G5 Storm	Extreme Geomagnetic Storm
	Kp 8 • G4 Storm	Severe Geomagnetic Storm
	Kp 7 • G3 Storm	Strong Geomagnetic Storm
	Kp 6 • G2 Storm	Moderate Geomagnetic Storm
	Kp 5 • G1 Storm	Minor Geomagnetic Storm
	Kp 4 or Less	Below Storm Levels

Geomagnetic Storm Impact Scale



G1

Minor

Weak power grid fluctuations and minor impacts on satellites are possible.

Migratory animals are affected at this and higher levels.

Aurora is commonly visible at high latitudes.

G2

Moderate

Transformer damage is possible with long duration storms.

Corrective actions to spacecraft orientation may be required; may affect orbit predictions.

Aurora may be seen as low as New York and Idaho.

G3

Strong

Power system voltage corrections may be required.

Satellite and LF radio navigation problems may occur. HF radio may be interrupted.

Aurora may be seen as low as Illinois & Oregon.

G4

Severe

Possible widespread voltage control problems on the power grid.

HF radio sporadic, satellite navigation degraded for hours, LF radio navigation issues.

Aurora may be seen as low as Alabama and northern California.

G5

Extreme

Blackouts or complete collapse of power grids possible.

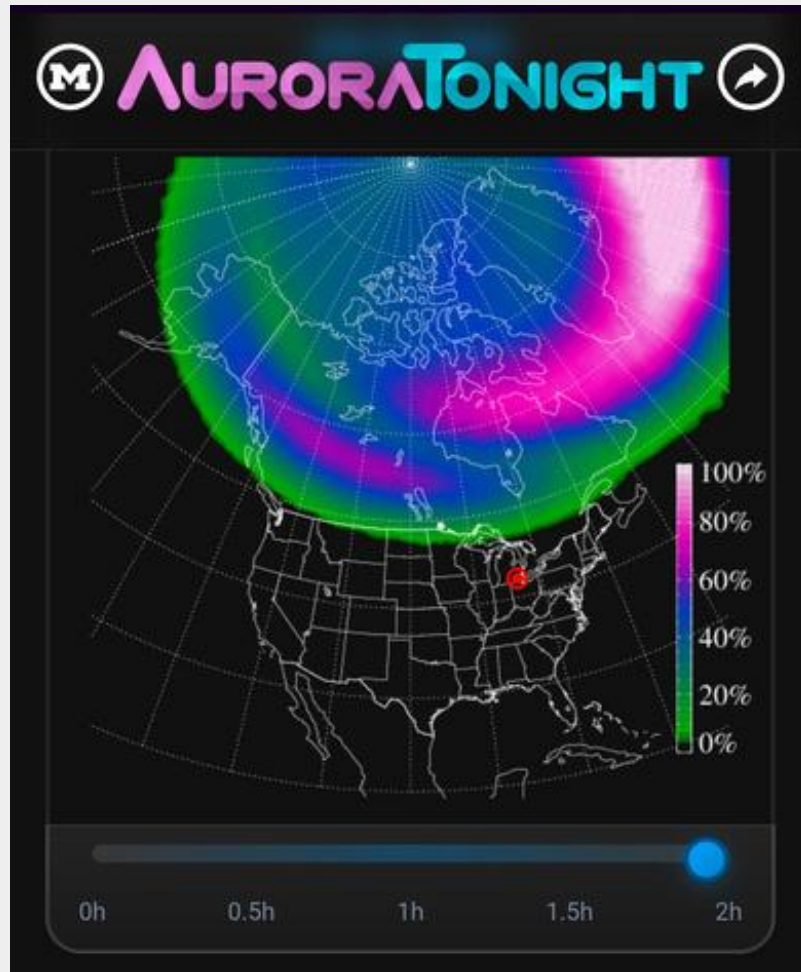
Navigation systems may be out for hours or days.

Aurora may be seen as low as Florida and southern Texas.

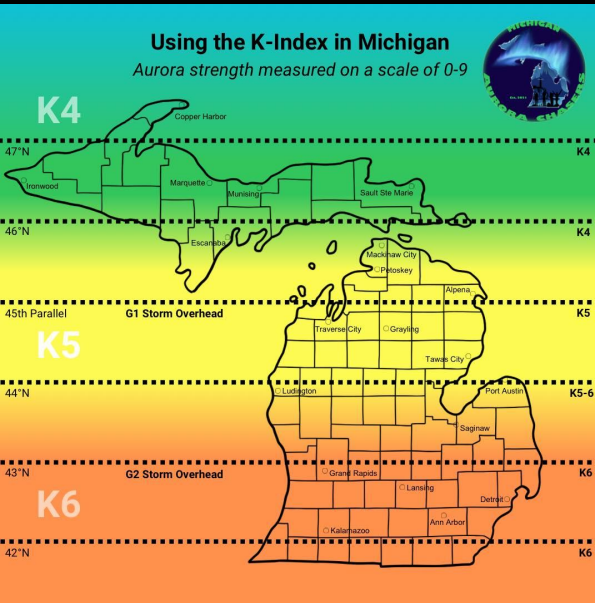
Best Aurora Forecasting Apps

- **Glendale App** - Aurora Alerts UK (web app)
Download it here:
<https://aurora-alerts.uk/>
- **Space Weather Live**
Find it here or in the app store:
<https://www.spaceweatherlive.com/>
- **Aurora Tonight!**
– University of Michigan (web app)
Download it here:
<https://aurora.umich.edu/>

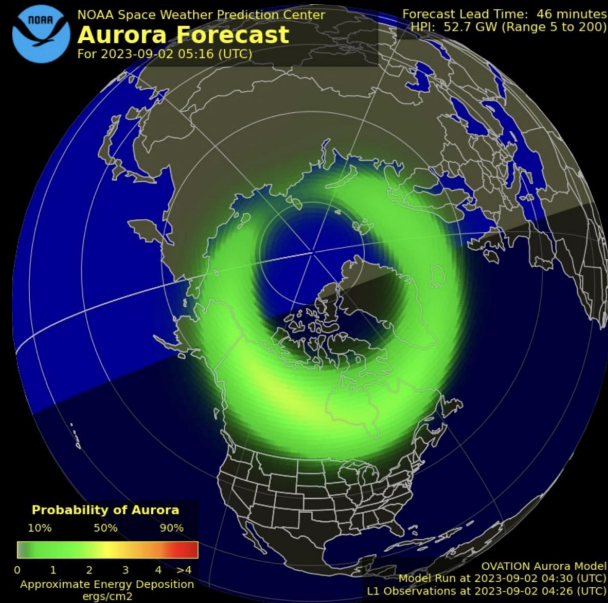
Favorite Aurora Chasing Hacks:
KaelinArt.com/Aurora



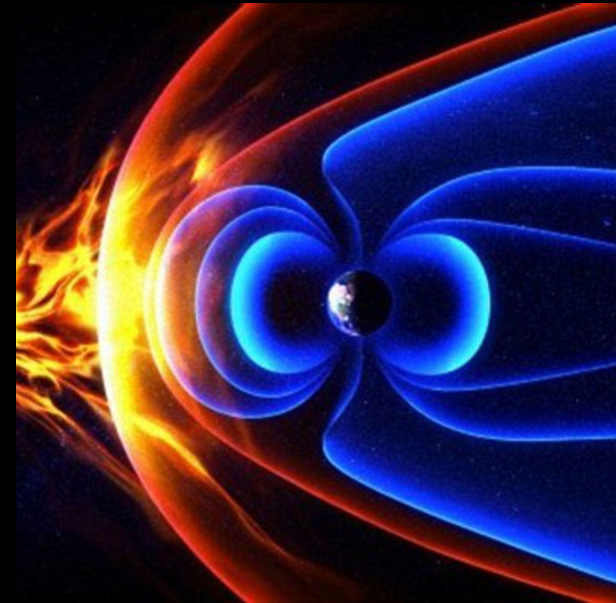
Signs of Aurora Activity Stretching Farther South



K6, K7, K8 Warnings/Watches
(G2 Storm or Higher)



90-100 Gigawatts of
Hemispheric Power
(at least 60gw or so)



Favorable Solar Wind Data:
Speed 500 km/sec
Density 10 /cm³
Bz -10/-15 (at least -5)

Experience the Aurora

Through the Eyes of Michigan Aurora Chasers & Beyond



Auroral Arc

Photo by
Jo Parmer

November 12,
2025

Lake Lansing,
Michigan



45th Parallel

Photo by Michele
Aucello

May 15, 2026,
11:35 pm

Leelanau County,
Michigan

Nikon Z6, 20mm,
f/1.8, ISO 6400, 6
sec.



Indiana

Photo by Shawn
Rosinski

October 10,
2024, Potato
Creek State Park
near North
Liberty, Indiana

Afterdarkphoto.com

Shawn Rosinski



Virginia

Photo by Linda
Ruemenapp

Floyd, Virginia in
the Blue Ridge
Mountains

May 10, 2024



Montana

Photo by Steve
Luther

October 11, 2024,
Glacier National
Park, St. Mary,
Montana



Washington Coast

Aurora with SAR Arc

Photo by Kashmir Williams

October 11, 2024

Northern Lights Over Michigan: From Pillars to SAR Arcs & Corona



Christina Marie Photography

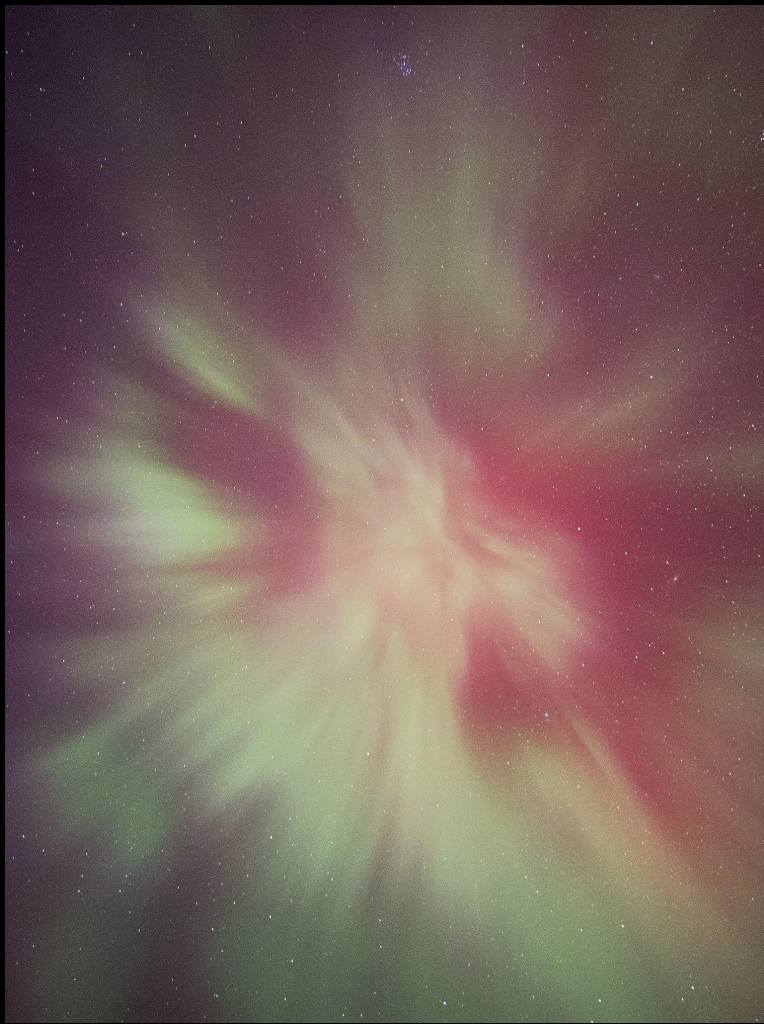
Mackinac Bridge, Michigan | Photo by Christina Cantu Sharp



Aurora with SAR Arc

Photo by Quinn Keon
Northern Gratiot
County near Saint
Louis, Michigan,
10/7/2024
9:21pm

www.quinnkeon.com



LEFT: Photo by Tina M. Cameron, May 10, 2024, 1:23am, Hubbard Lake, Michigan.

BELOW: Photo by Shawn Rosinski. May 10, 2024, Port Austin, Michigan.

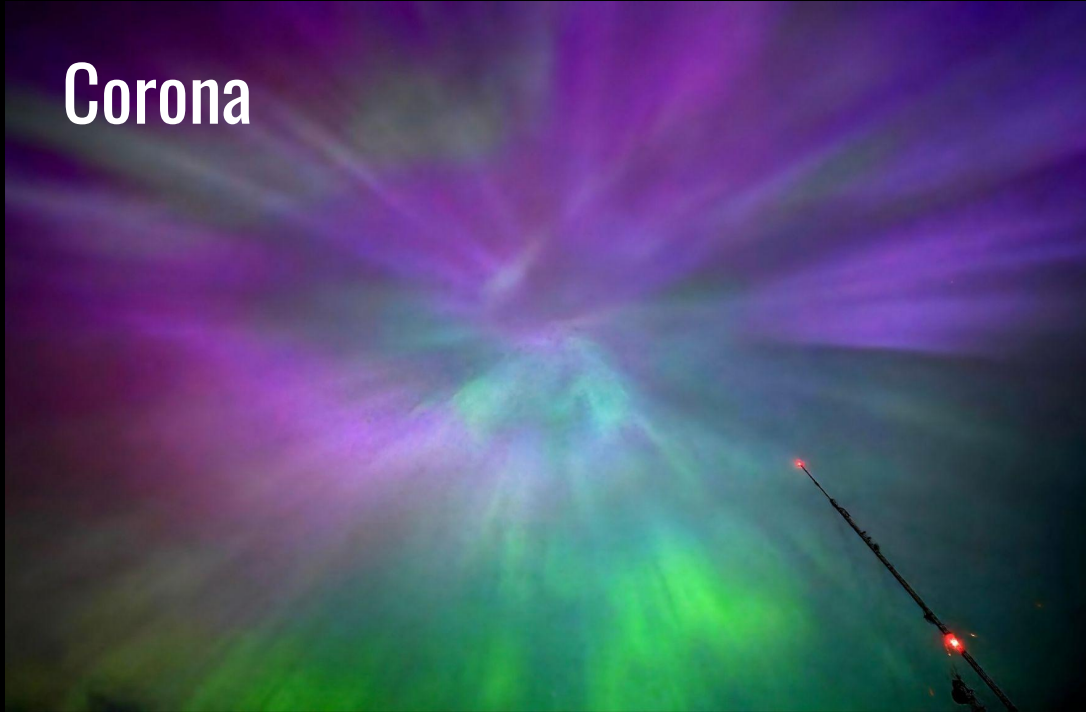




LEFT: Photo by Christina Cantu Sharp, Sleeping Bear Dunes National Lakeshore, Michigan

BELOW: Photo by Patrick Grubba, Mackinaw City, Michigan

Corona





© nate stovall

Alaska

Photo by
“Live Chase” Nate
Stovall

Near Anchorage,
Alaska

North Star
Adventures



Auroral Zone

Photo by Lori
McNaughton

Yellowknife,
Northwest
Territories,
Canada

Sept 7, 2025.
11:22 pm



Northwest Territories, Canada

The Aurora reminds us of the wonder above, while the tipi speaks to the traditions rooted below. Together, they tell a timeless story of the North, where culture, landscape, and sky exist in quiet harmony.
Photos by Raymond McDonald/ Aurora Pursuits.



Rare Forms & Sub-Auroral Phenomena

From S.T.E.V.E. to the Corona

Stable Aurora Red (SAR) Arc



Photo by Patrick Grubba



“STEVE,” the Sub-Thermal Emission Velocity Enhancement



Photo by Justin Miller, Sept. 19, 2023, Silver Lake Dunes, Michigan

STEVE & “The Picket Fence”



Photo by Clayton Adams, Upper Peninsula, MI

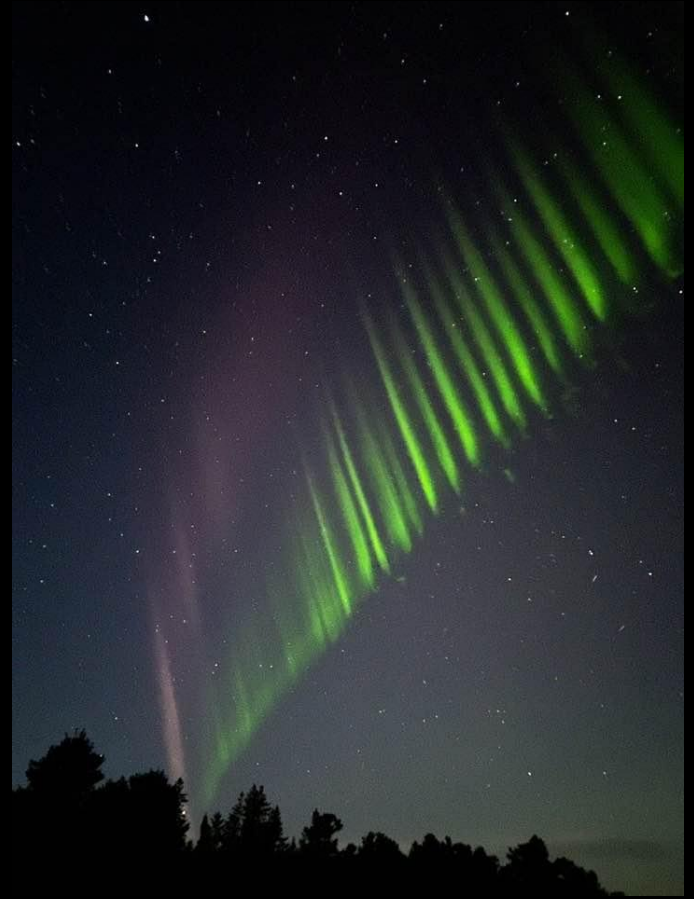


Photo by Pamela Hofacker Teachout, MI

Continuum Emission



Photo by Patrick Grubba, Mackinaw City Area, Michigan



“Holy Grail” The Corona

Photo by
Stephanie Bailey
April 24, 2023,
Upper Peninsula,
Michigan

AURORAL FORMATIONS

Clockwise from top left:
S.T.E.V.E. (Strong
Thermal Emission
Velocity Enhancement),
The Picket Fence,
Stable Aurora Red
(SAR) Arc,
Streaks,
Continuum Emission

Michigan Aurora Chasers
Photography by:
Nate Stovall
Pamela Teachout
Joanne Furton
Michele Aucello
Christina Cantu Sharp



Advancing the Science

Become a Citizen Science: Shape the Future of Aurora Research

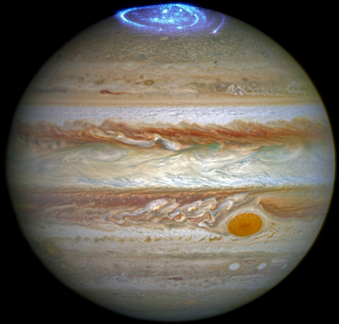
“Hello, World” — Astronauts on Artemis II

- Aurora Borealis, “Northern Lights”
- Aurora Australis, “Southern Lights”
- Moonlit Earth
- Zodiacal Light
- Venus
- This image was taken by Commander Reid Wiseman after the trans-lunar injection burn on April 2, 2026
- Photograph courtesy of NASA



The View from Space

- Views from ISS
- Other planets
- Photos from NASA



SolarMaX Mission

- April 1-4, 2025, Ground Support Team
- First human spaceflight over the poles
- Worked with Fram2 Astronaut: Vehicle Commander Jannicke Mikkelsen



Citizen Science

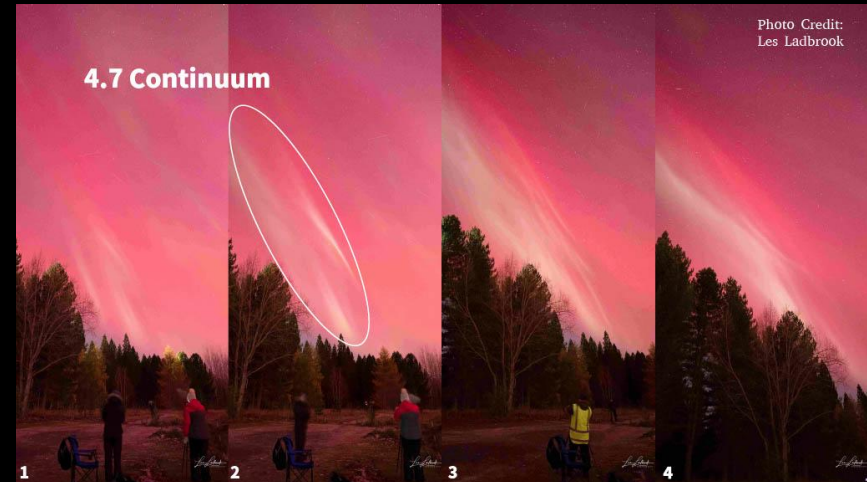
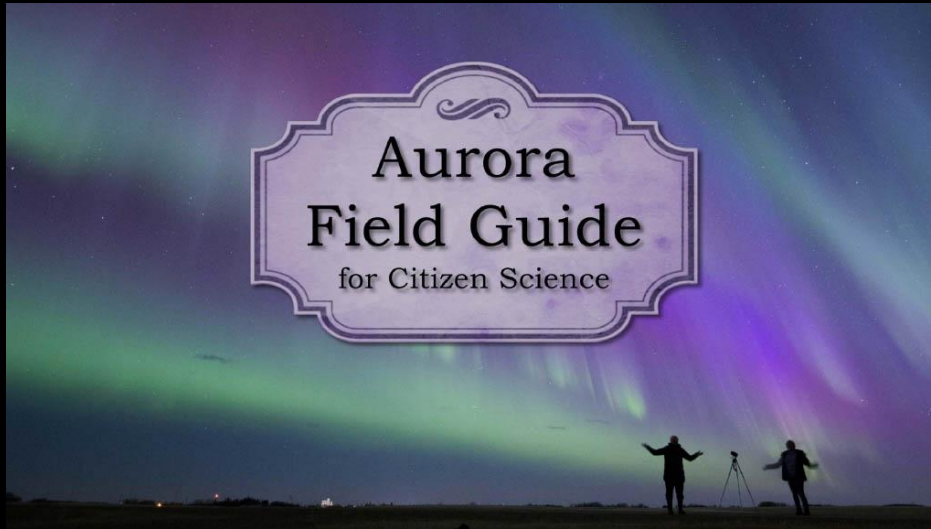
- *Catch rare sightings*
- *Submit your findings!*
- *SkyWarden*
- *Aurorasaurus.org*

Photo by Michele Aucello



Aurora Field Guide

- Identify & Classify
- “Gotta Catch ‘Em All!”
- Written by the ARCTICS Team



MI Aurora Resources

- Recommended Apps
- Live Aurora Webcams
- General Resources Used Everywhere
- Resources Developed by the Group & the Founder
- Fun Stuff

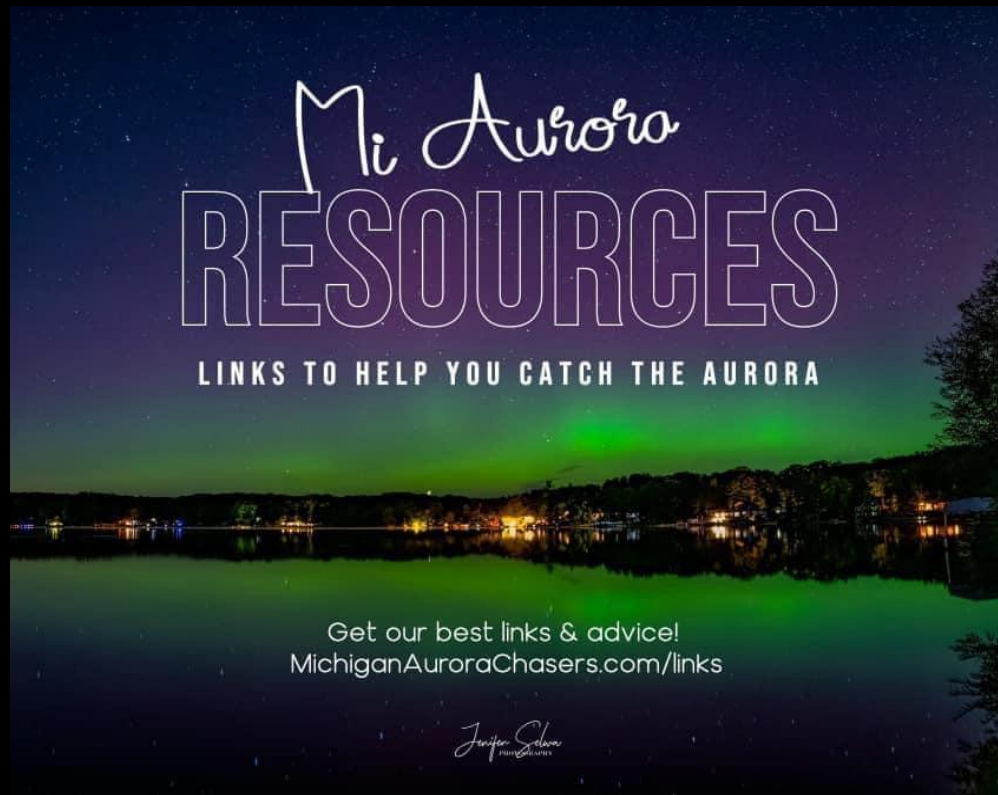


Photo by Jen Selwa

What Matters Most

The greatest Aurora Chase &
Why we are fortunate here in Michigan

My Own Backyard - Dark Skies

42.45° North, Michigan



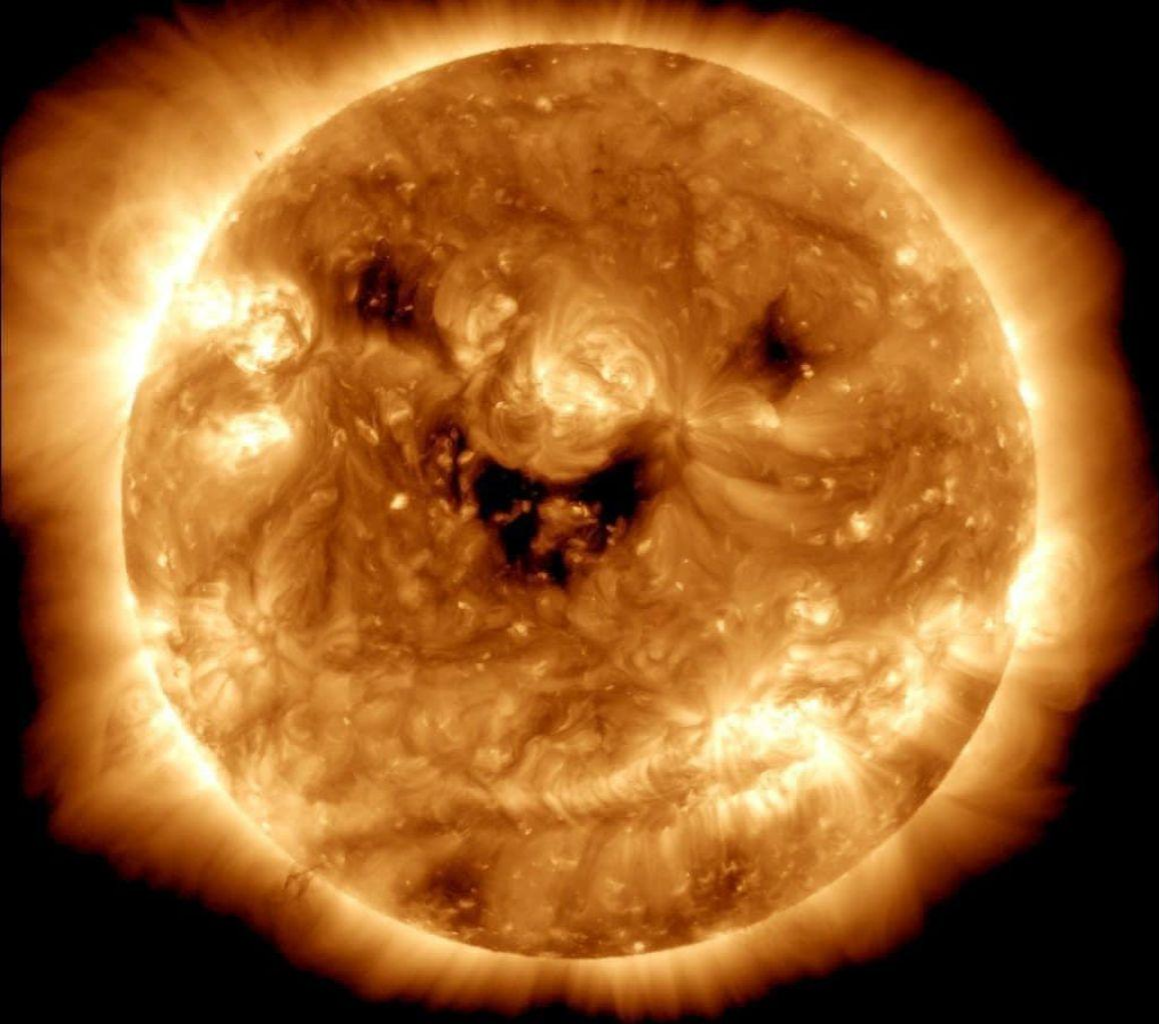
Photo by Jen Boss Mainka

Beyond the 45th Parallel: Aurora Chaser & Author

- Aurora Advice Blog
- Events & Guides
- 45th Parallel Series

KaelinArt.com





Happy Chasing!

 @MiAuroraChasers