

Making the Dream A Reality

An Adventure in Lights

Melissa F. Kaelin

*Never apologize
for burning too
brightly or
collapsing into
yourself every
night. That is how
galaxies are made.*

Tyler Kent



www.brainybutterfly.com

About Melissa

- Chasing Aurora for 13 years
- Founder of Michigan Aurora Chasers
- Wrote several books, including “Beyond the 45th Parallel,” a beginner’s guide
- Aurora Columnist for Amateur Astronomy Magazine
- Night sky poetry published in “The Wild Word”
- Short Story published in “The Aureorean”
- Books include excerpts of fiction
- Cover story on rare atmospheric phenomena published in “Minnesota Monthly”



... and Science Communicator!

In the office, Melissa works as Manager of Marketing & Communications for the **University of Michigan Department of Climate and Space Sciences**.

- Interviews researchers in fields of space weather & climate change
- Writes breaking news in partnership with NASA, NOAA and other agencies
- Manages websites, social media, marketing and press relations at U-M



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OCTOBER 20, 2023

New Theory Explains How Magnetic Switchbacks Form in the Solar Wind

A new study led by Dr. Gabor Toth develops a theory for how magnetic switchbacks form in the solar wind near the Sun.



University of Michigan @UMich · Sep 7, 2022

Research conducted by scientists at U-M on the northern lights is expected to help @NASA prevent collisions among satellites and other objects in Earth's upper atmosphere. Aaron Ridley, professor at @UMclasp, discusses this research on @MLive. myumi.ch/7eDNG

"The better we understand how the atmosphere reacts to this energy input, the more precisely we can specify the probability of collision between objects."

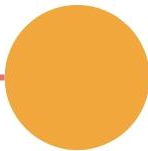
Aaron Ridley
Professor, Michigan Engineering
—toured on mlive.com

ALT

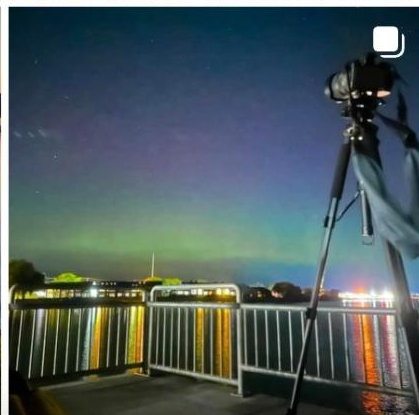
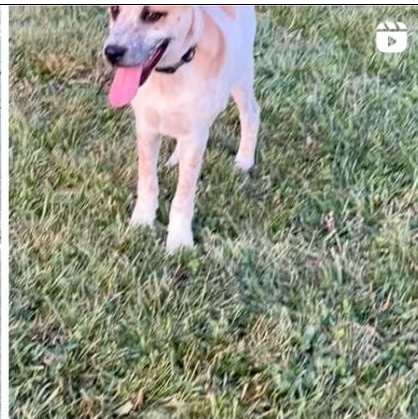
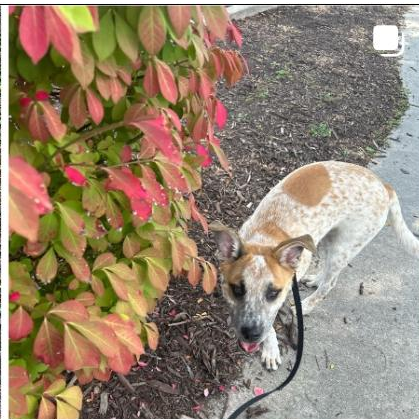
1 1 5

MOST IMPORTANTLY...

JULY 2023



Adopted Elio!



Chasing the Aurora

MINNESOTA

WISCONSIN

MICHIGAN

ALASKA

ICELAND

NWT, CANADA

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

**How does your experience
of the Aurora relate to
your path in life?**

Photo by Jessica Ellis Rorman

WHAT KIND OF AURORA CHASER ARE YOU?

Your level of experience, knowledge, and camera skills may affect what it takes to be successful.

Photo by SY Taylor

11 Types +

BUCKET LISTER

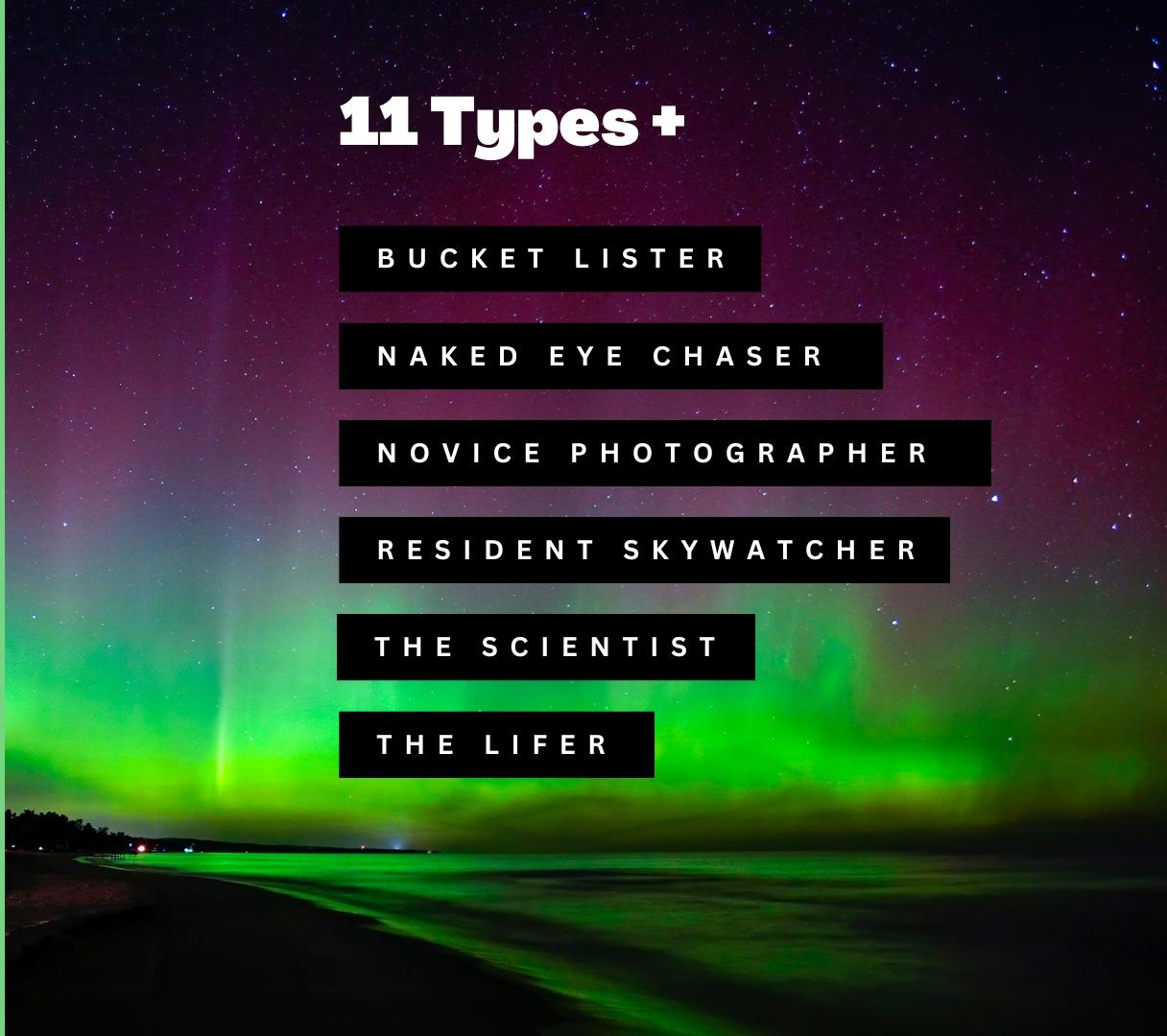
NAKED EYE CHASER

NOVICE PHOTOGRAPHER

RESIDENT SKYWATCHER

THE SCIENTIST

THE LIFER



STYLES

BUCKET LISTER



NAKED EYE CHASER

NOVICE PHOTOGRAPHER

RESIDENT SKYWATCHER

THE SCIENTIST

THE LIFER



ROAD TRIPPER



FIRST TIME VIEWER

SEASONED CHASER

THE ADVANCED ARTIST

HARDCORE CHASER



Lessons Along the Way

Started chasing in April
2012. First display was
October 1-2, 2013 near
Taylors Falls, Minnesota.

“Naked Eye Chaser”



iPhone Photo by Melissa Kaelin

Meet the Goddess of the Dawn

In Greco-Roman mythology, Aurora is the goddess of the Dawn. She is the sister of Helios, the sun, and Seline, the moon, and she races the sun god's chariot into the sky. In Greek, she is called Eos.



Aurora Summit

- Camera Clinics
- Educational Sessions
- Panel Discussions
- Diverse Speakers
- Aurora Chasing

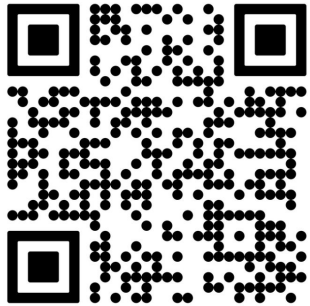
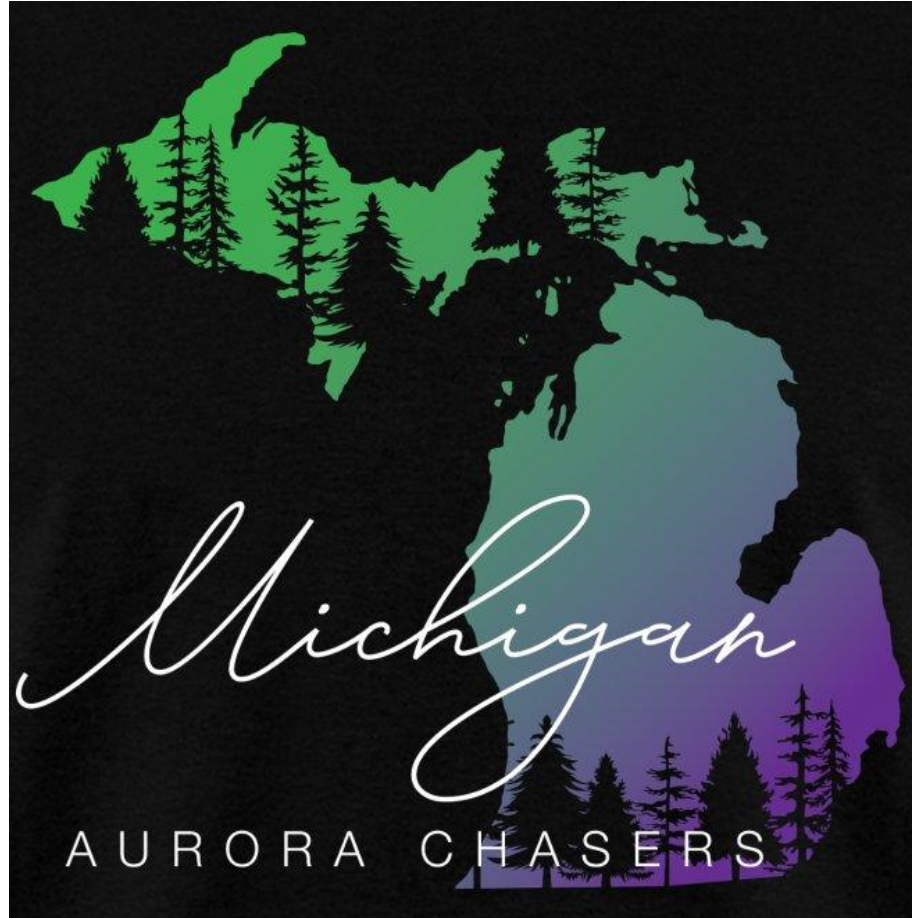
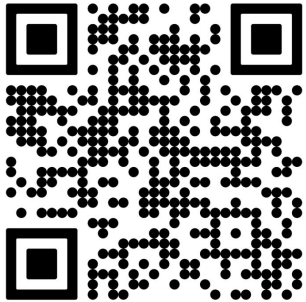


Photo by Greg Ash

Michigan Aurora Chasers

- Guides
- Methods & Resources
- Live Chases & Events
- MI Aurora Workshop



MI Aurora Resources

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

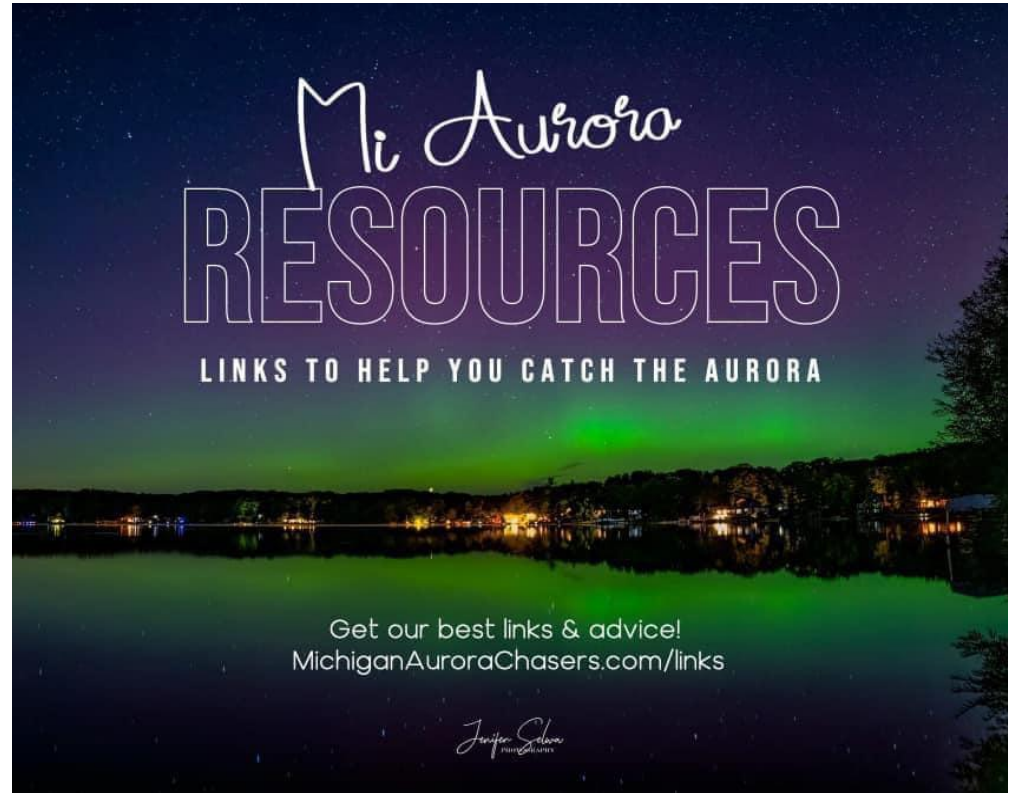


Photo by Jen Selwa

Aurora Alerts Only

- Download the Free Telegram App
- Subscribe to @MichiganAuroraAlerts

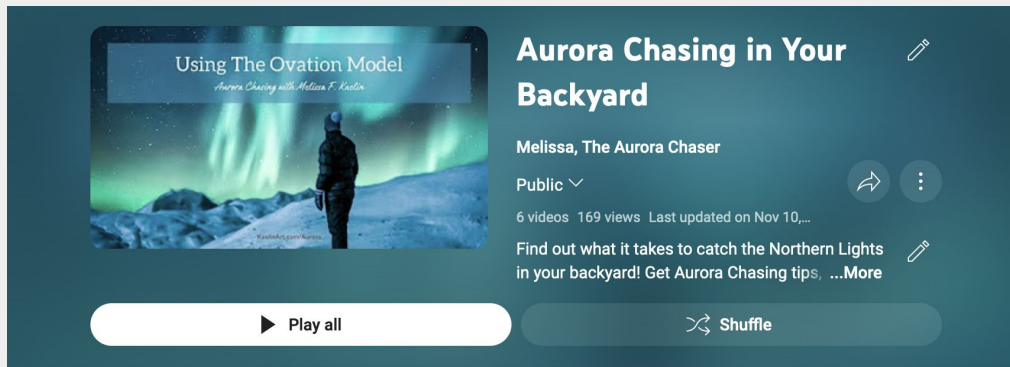


Photo by Michele Duff Aucello

Guides to the Night

- An Empowered Guide to Viewing Locations
- MI Aurora Resource List
- Advice Blog: Aurora Chasing in the U.S.
- YouTube: Aurora Chasing in Your Backyard

KaelinArt.com



Aurora Chasing in Your Backyard

Melissa, The Aurora Chaser

Public

6 videos 169 views Last updated on Nov 10, 2023

Find out what it takes to catch the Northern Lights in your backyard! Get Aurora Chasing tips, ...More

▶ Play all

↻ Shuffle



Aurora Chasing

Seven Ways to Find an Aurora Viewing Location

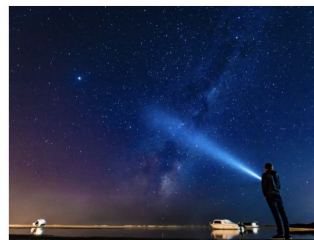
So, you want to see the Aurora! Here are seven ways to find a great Aurora Viewing Location, which are included in my new Empowered Guide.



Aurora Chasing

Five Simple Steps for Tracking Solar Flares

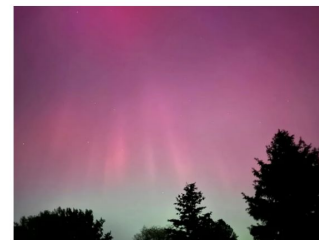
As Aurora Chasers, we love hearing about new solar flares. But many things have to happen for a solar flare to have any visible impact on our night skies.



Aurora Chasing

Make or Break Your Shot: The Beauty of Night Sky Etiquette

Take a few easy steps to ensure everyone around you can enjoy the night sky.



Aurora Chasing

Ask How, Not Where to View Aurora

Often, people who chase the Northern Lights can become too focused on WHERE

Blog > Book > YouTube > Events

Aurora Chasing in the U.S.



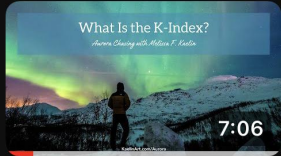
Chase the Northern Lights, and find out what it takes to catch a view in your own backyard.

An avid Aurora Chaser, I'm excited to share my advice on capturing the Northern Lights in the lower 48 states. Get tips for beginners and overcome the many obstacles to catch an amazing display. If you enjoy the content, subscribe below.

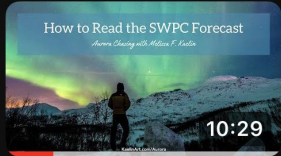


The screenshot shows a YouTube channel page for 'Melissa, The Aurora Chaser'. At the top, there's a navigation bar with a back arrow, the channel name, a search icon, and a menu icon. Below that is a banner image with the text 'Aurora Chasing with Melissa F. Kaelin'. The channel profile picture shows a person in a winter hat. The channel name 'Melissa, The Aurora Chaser' is prominently displayed, followed by the handle '@MelissaTheAuroraChaser', '400 subscribers', and '8 videos'. A bio states: 'Chasing the Northern Lights for more than 10 years, Melissa F. Kaelin is a writer, artist and stargazer. She has successfu...'. Below the bio are links to 'kaelinart.com and 7 more links'. There are buttons for 'Manage videos', 'Home', 'Videos', 'Playlists', 'Community', and 'Channels'. The 'Videos' section is active, showing two video thumbnails: 'RESOURCES AND GUIDES FOR AURORA CHASING' (11:06, 38 views - 1 day ago) and 'What is the K-Index? | Aurora Chasing with Melissa F. Kael...' (7:06, 122 views - 4 days ago). The bottom navigation bar includes icons for Home, Shorts, a plus sign for more options, Subscriptions, and Library.

Videos



What is the K-Index?
| Aurora Chasing
with Melissa F. Kaelin...
37 views · 6 hours ago



How to Read the 3-
Day Forecast from
the SWPC | Aurora...
363 views · 2 days ago



Find a Viewing
Location with Dark
Sky & Light Pollutio...
507 views · 2 days ago



Using the Ovation
Model | Aurora
Chasing with Melis...
264 views · 3 days ago

YouTube Tutorials

Aurora Chasing in Your Backyard



Aurora Chasing in Your Backyard

Melissa, The Aurora Chaser

Public

6 videos · 169 views · Last updated on Nov 10, ...

Find out what it takes to catch the Northern Lights in your backyard! Get Aurora Chasing tips, ...More

▶ Play all

↻ Shuffle

The Michigan Aurora Chasers



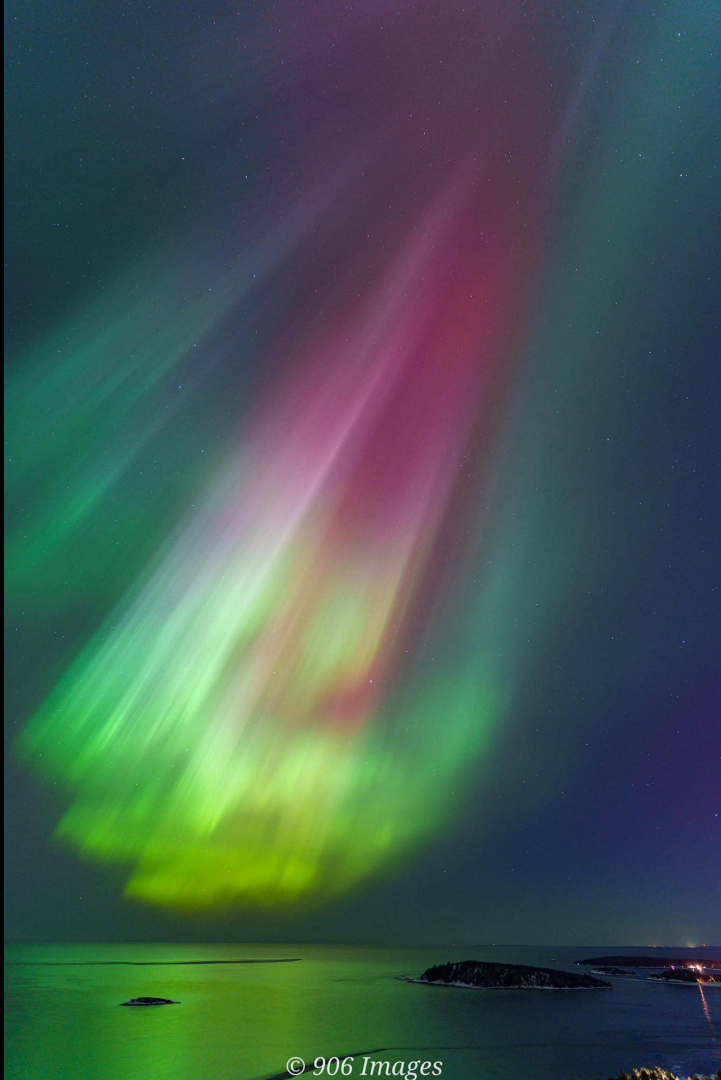
Photo by DJ Studios Photography, Marquette, MI



Photo by Jenn Boss Mainka, Northern, MI

“Beyond the 45th Parallel” Cover Artist

Photo by Shannon Kivi,
906 Images
Marquette, MI



Michigan's International Dark Sky Sanctuary



One of only 23 Dark Sky Sanctuaries in the world: Beaver Island International Dark Sky Sanctuary, Michigan.

Photo by Justin Miller

“SAR,” the Stable Aurora Red arc



Photo by Joanne Furton, Colorado, May 10, 2024

“STEVE,” the Sub-Thermal Emission Velocity Enhancement



Photo by Justin Miller, JM Naturescapes, Beaver Island, MI, Sept. 19, 2023, Silver Lake Dunes

STEVE with the “Picket Fence”



Photo by Cherie Wagensomer, Munising, MI



Photo by Kim Masters Acker, Onkama, MI



Corona

Photo by Justin Miller
JM Naturescapes
Lansing Area
May 10, 2024

Corona

May 10, 2024

Photo by Gerry

Beth Buckel,

Fostoria area, MI



“Northern Dawn”



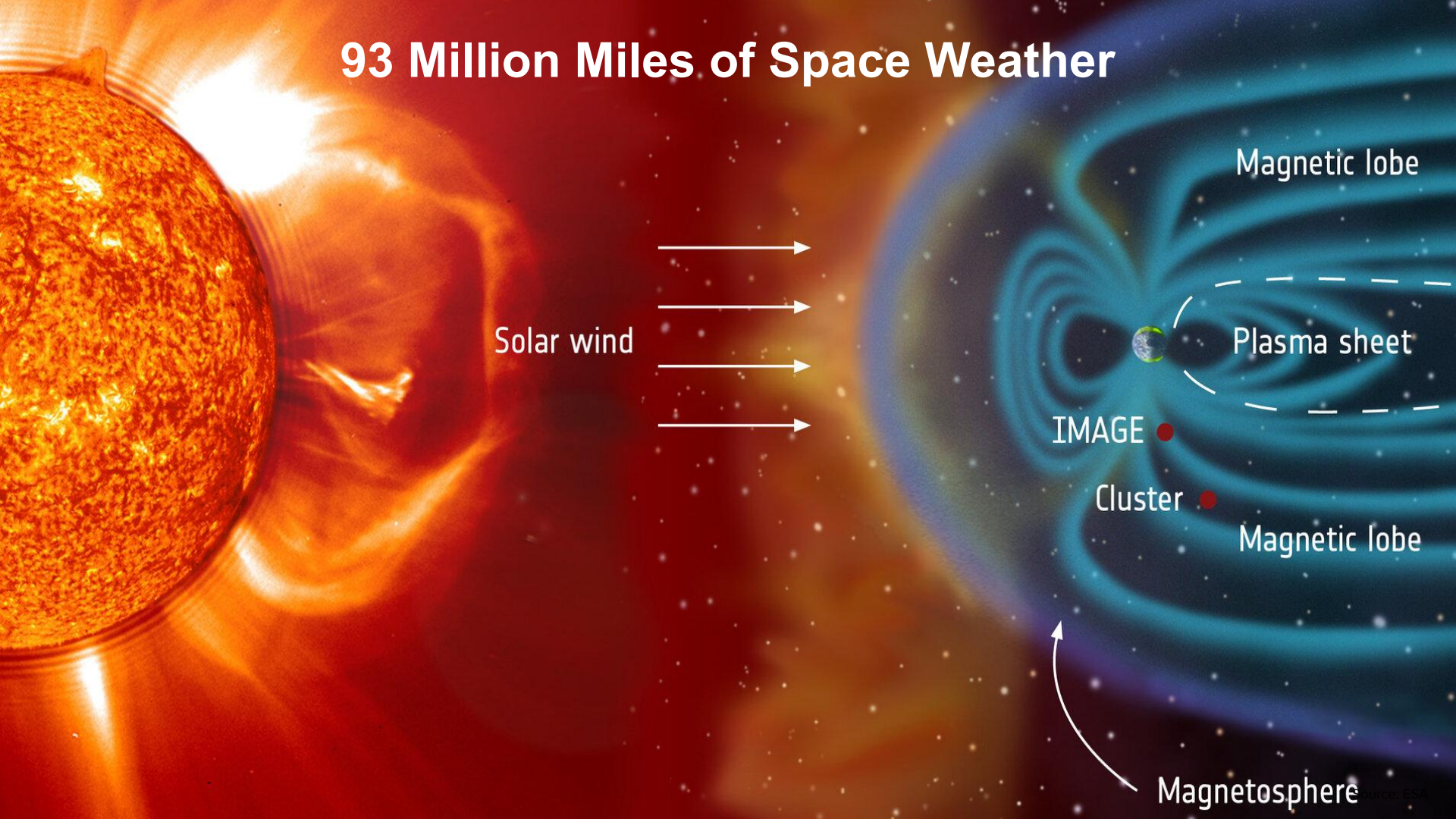
Christina Marie Photography

Sept. 17, 2024 | About 6am | Photo by Christina Cantu Sharp | Mackinaw City, MI

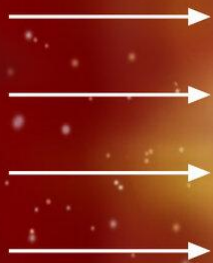


SCIENCE

93 Million Miles of Space Weather



Solar wind



IMAGE

Cluster

Magnetic lobe

Plasma sheet

Magnetic lobe

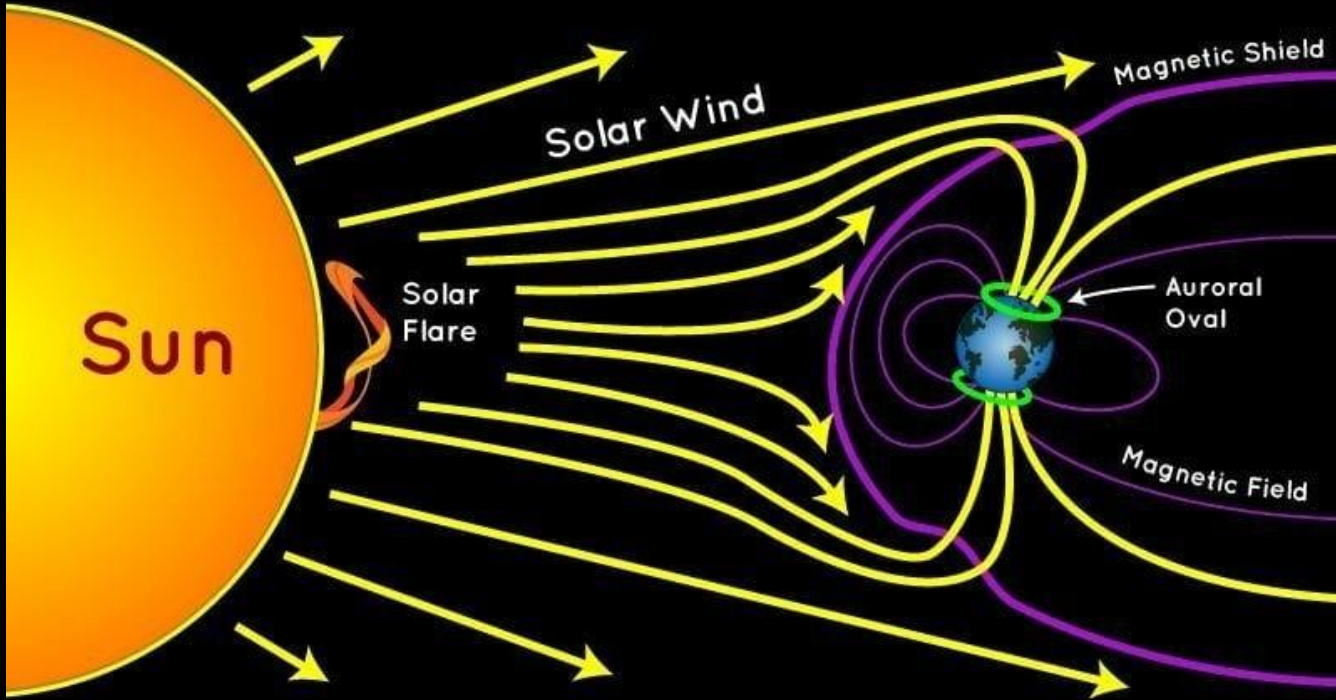
Magnetosphere

When It Hits Headlines

- Solar Maximum
- News coverage
- Urban legends



Monitoring Space Weather & Solar Wind



- Solar Flares
- Eruptions
- CMEs
- CH HSS: Coronal Hole High Speed Stream
- Filaments
- Co-rotating Interactive Regions
- The Ever Present Solar Wind

K-Index & Geomagnetic Storm Scales

The K-Index measures geomagnetic activity on a scale of 0-9.

	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.

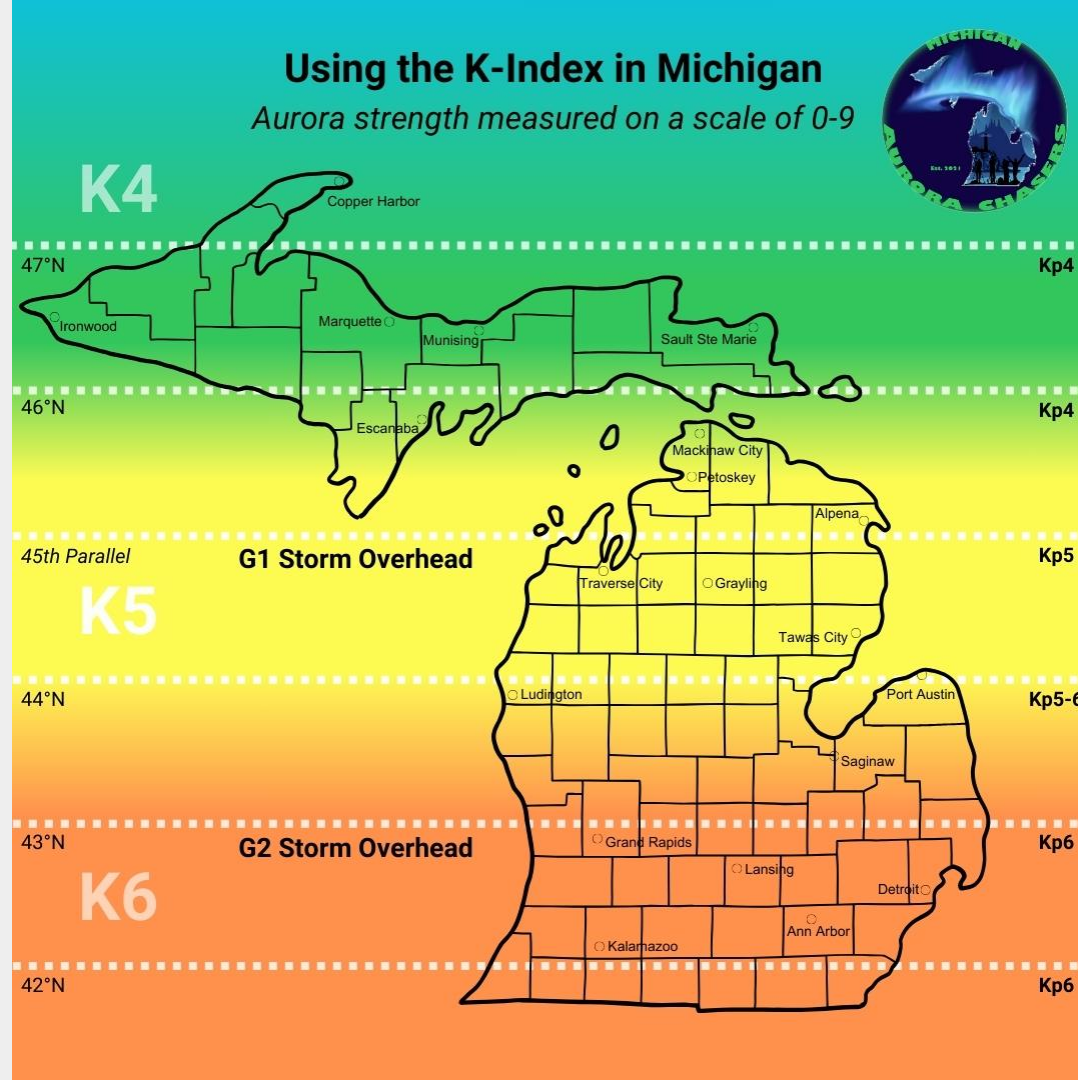
Navigation systems may be out for hours or days.

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

Forecasting by Latitude

The K-Index can be used to understand how far south Aurora may appear based on anticipated conditions. It also works well to compare displays with historic data.

In real time, Kp is not a good indicator of Aurora activity.



The Limitations of the K-Index: Be Weary of Kp

The K-Index actually describes the strength of geomagnetic activity associated with Aurora. When referred to as a “planetary average,” this is called Kp. Kp is not a perfect tool.



Aurora Chasing

The Pros and Cons of Relying on Kp

When you're trying to catch the Northern Lights for the first time, it's natural to wonder when you can see them and where. The answer to these questions, it turns out, is not so easy.

- The national forecasting standard
- A forecasting tool, not a good real-time tool
- Data from magnetometers across the world
- An average over 3 hours
- Often refers to the past
- Available on many apps, which may lag
- Not an exact science
- Other data becomes more important

Many Methods for Predicting Aurora

Beginner

Apps, Telegram Alerts, Webcams

Beginner

K-Index, Predictions, Ovation Model, HPI

Intermediate

Space Weather Live, Real Time Solar Wind

Intermediate

Coronagraphs, Glendale App, SolarHam, Ap-Index

Advanced

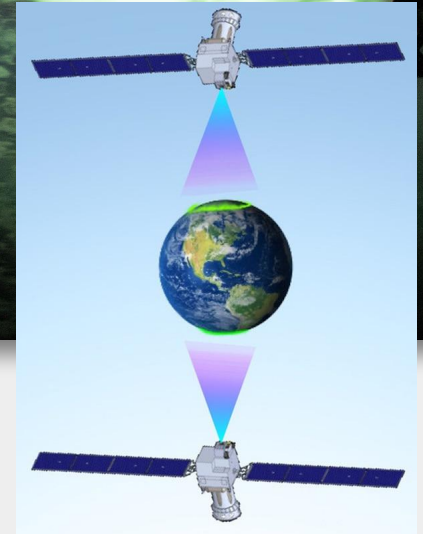
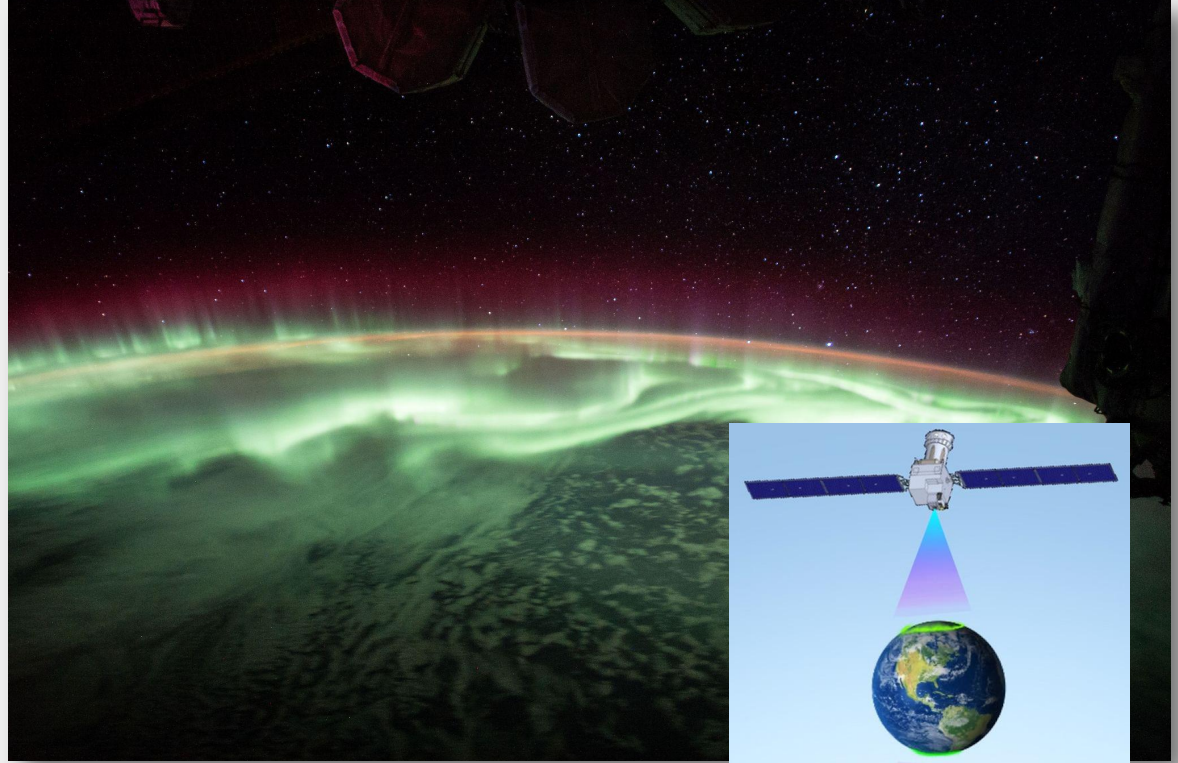
WSA-Enlil, CME Scoreboard, Magnetometer Plots

Advanced

Analyzing CMEs, Understanding Flux Ropes

On the Edge of Emerging Science

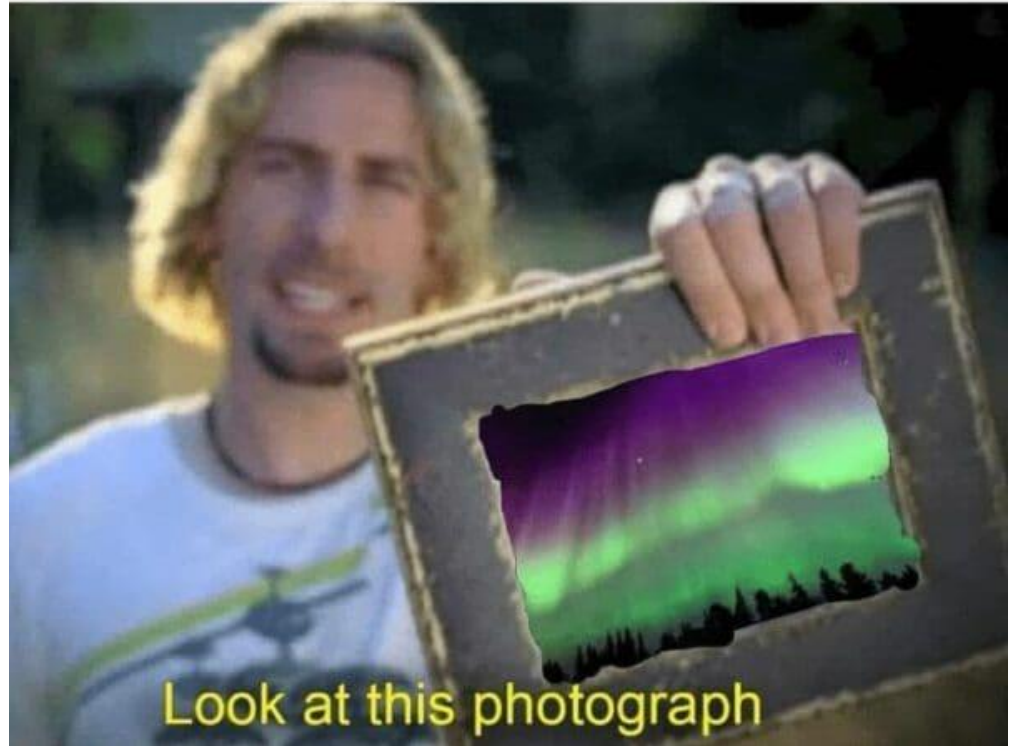
- Solar Orbiter
- Parker Solar Probe
- Space Physics
Research Lab
- U-M Space Institute



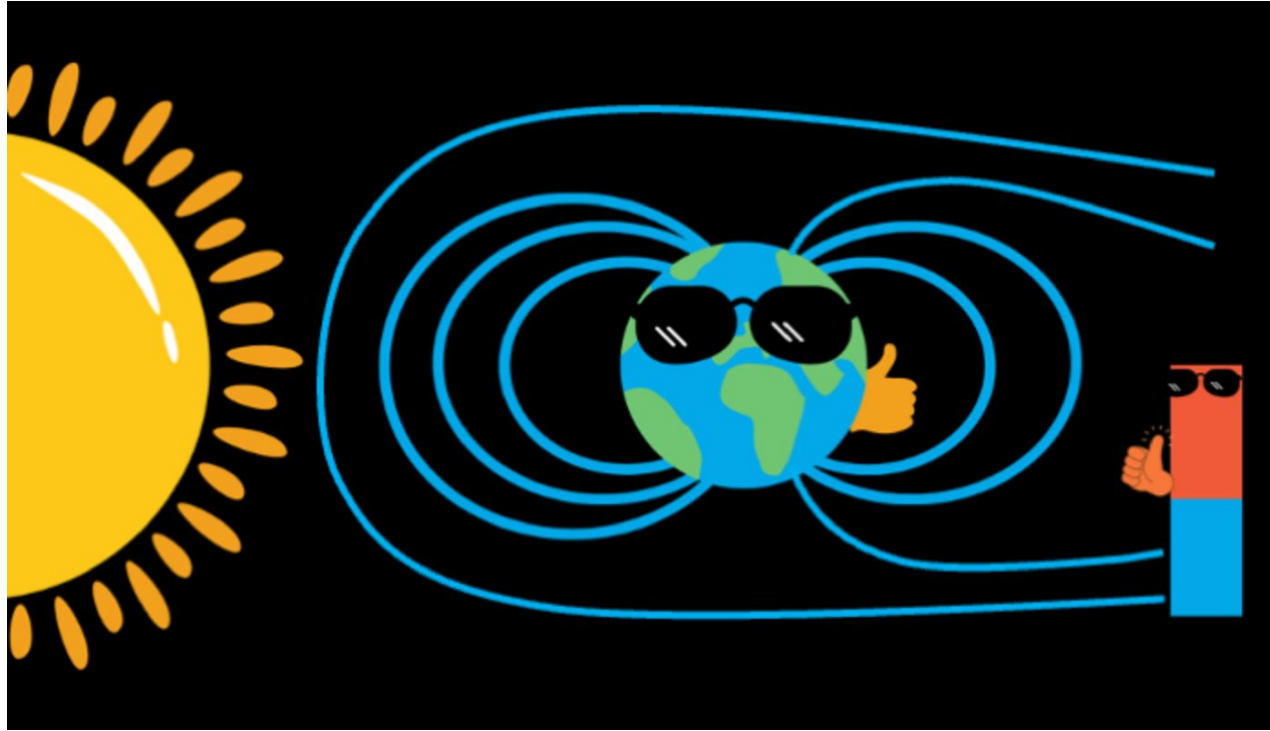
Nocturnal Woes

- Then Aurora “pops” when you least expect it!
- Or when scientists expected it...
- Often based on a **MARGIN OF ERROR** of +/-10 hours

Everyone on Social Media right now..

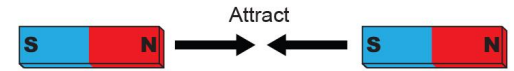


What is the “Bz”? Meet the “Gatekeeper”



- Southward Bz
- More Negative
- Oscillate back and forth
- Like an open door

#ThatPeskyBz



Tips to get started with your camera settings

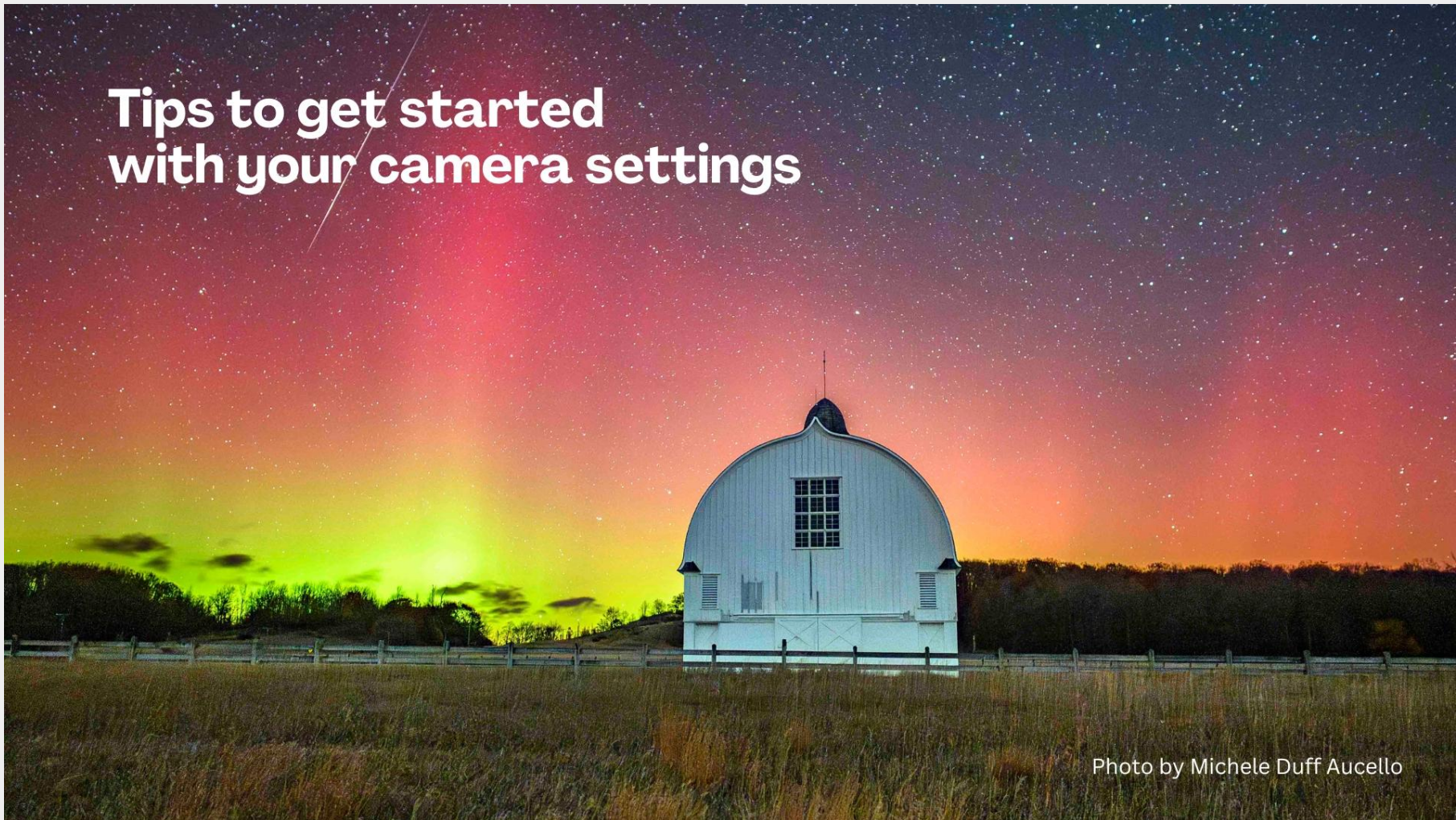


Photo by Michele Duff Aucello



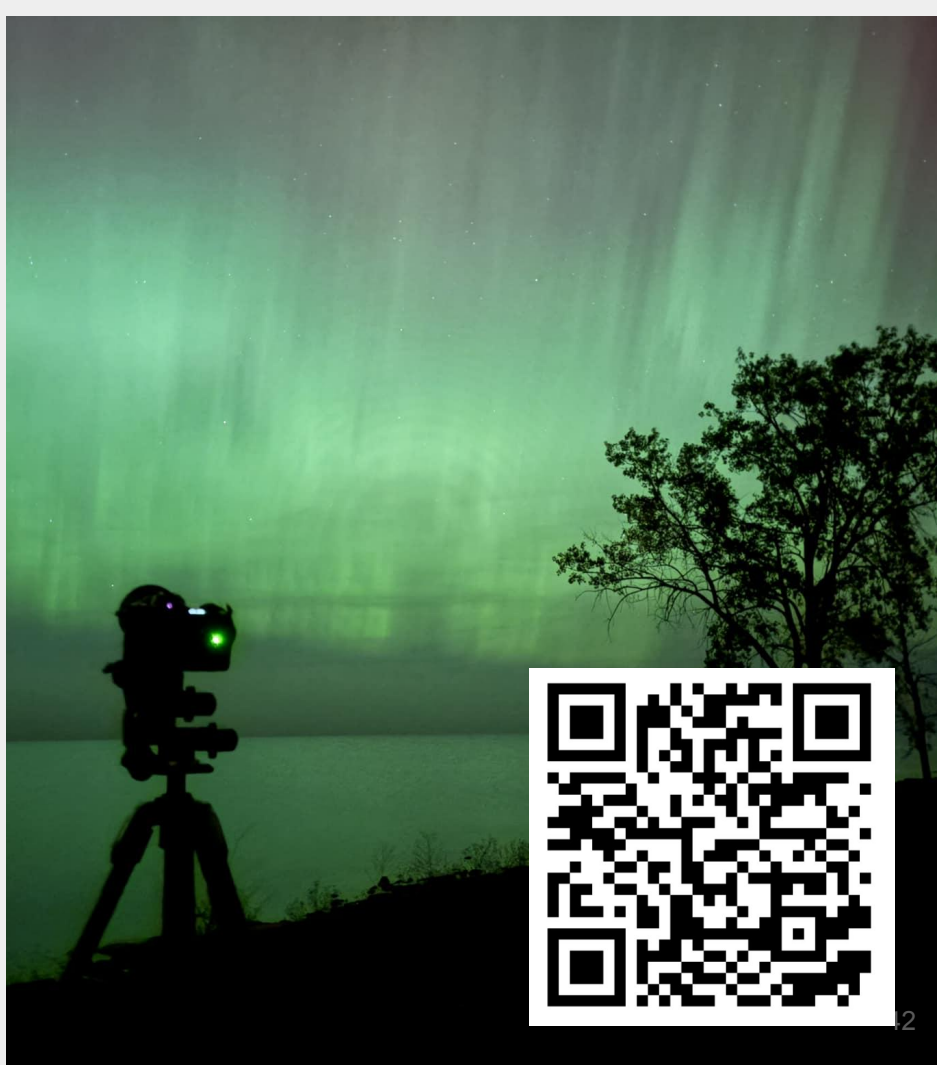
Aurora Photography

A Good Starting Point is:

- Aperture f/2.8 or widest possible
- ISO 3200-5000
- Shutter speed of 3-30 seconds depending on movement and activity
- Modern phone cameras can also capture the Aurora on Night Mode with Long Exposures

Source: Capture the Atlas

Camera Notes



#LiveChase

Led first Live Chase on April 1, 2021. Then I organized a Live Chase on May 10, 2024, during the historic G5 Storm.



Photo by Patricia Parker



Photo by Lauren Kovich



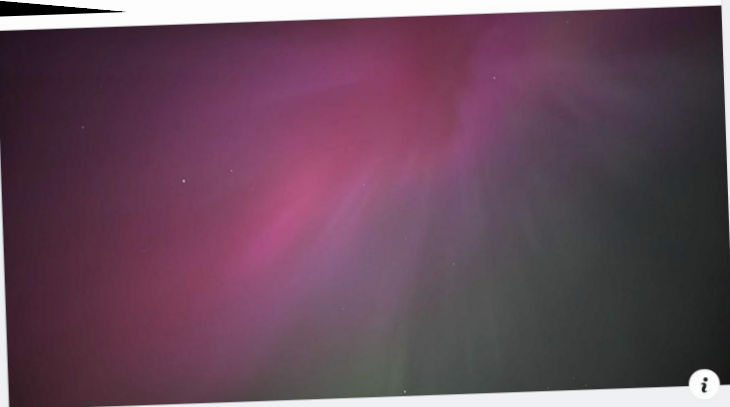
Photo by Karen Serwatowski

Historic G5 Storm

The New York Times

Northern Lights Set to Return During Extreme Solar Storm's 2nd Night

Electrical utilities said they weathered earlier conditions as persistent geomagnetic storms were expected to cause another light show in evening skies.



CLASP.ENGIN.UMICH.EDU

Space Weather Scientist Explains Rare Intensity of Northern Lights - Climate and Space Sciences and Engineering

1 comment 1 share
Dixie J. Burbank, Samuel Warfel and 9 others



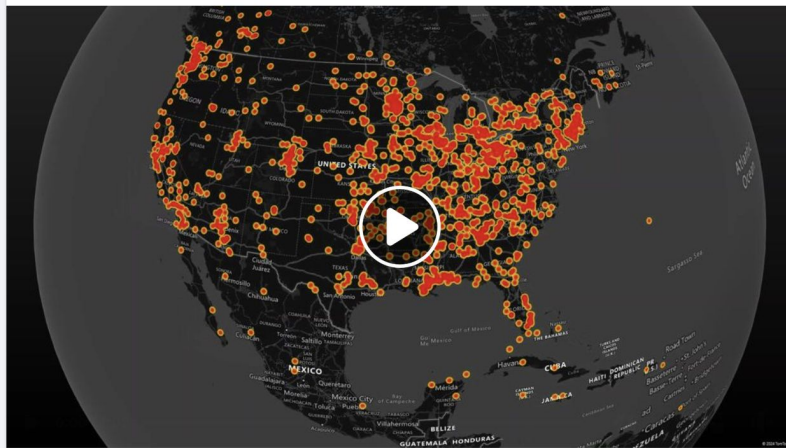
Chris Wicklund

July 31 at 2:52 PM · 🌐

Thanks to my friend [Vincent Ledvina](#) I have discovered a new way to plot the historic G5 aurora event seen across the globe. Look at all those points! I have even submitted my preliminary dataset to a scientific research site where it has obtained a DOI and can be open sourced and used in scientific research. I have been working on this with a small team since the magnificent event in may and have supplied a couple agencies with it. Feel free to share this across platforms.

Fun times! [#aurora](#)

The live map to view is also here: <https://www.google.com/maps/d/edit...>



16

14 comments 13 shares

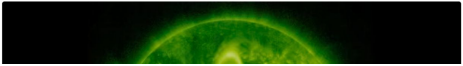
What did the Ovation Model Show on May 10, 2024?

CLICKON DETROIT Join Insider Sign In

SPORTS FEATURES LIVE IN THE D ANN ARBOR CONTACT US NEWSLETTERS

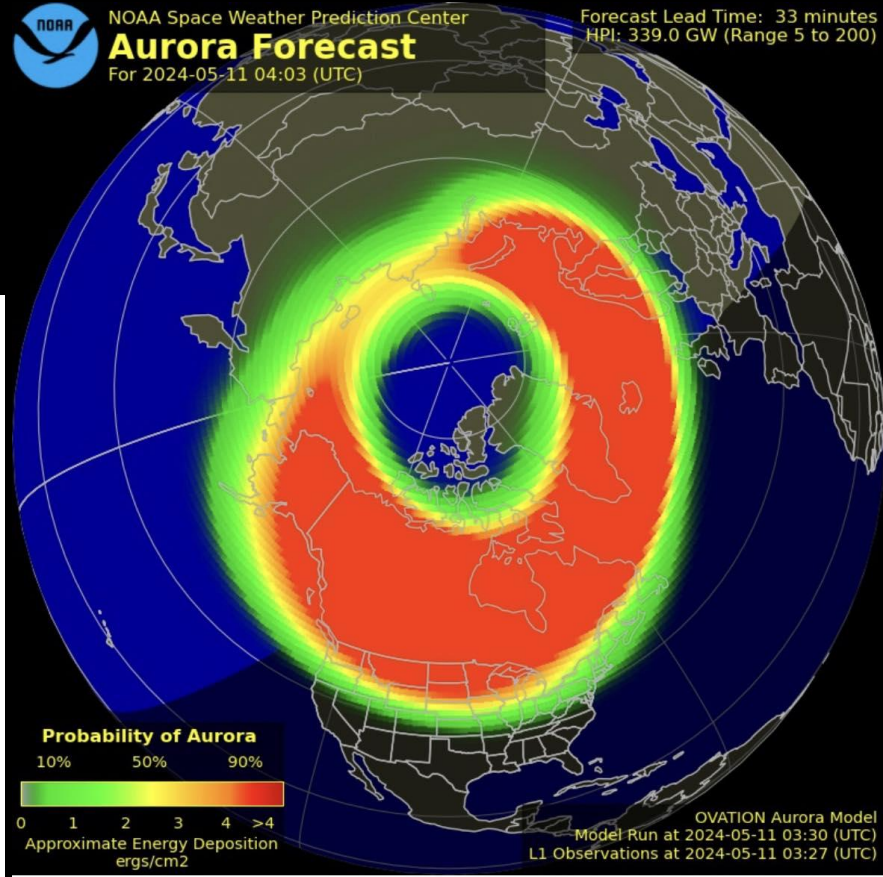
Severe geomagnetic storm watch issued for first time in nearly 20 years: What to know

CMEs expected to arrive midday Friday, May 10



USATODAY.COM

One week ago, the northern lights stunned America. When will it happen again?



On the Ice Road



Photo by Cristiano Saturno
YELLOWKNIFE, CA

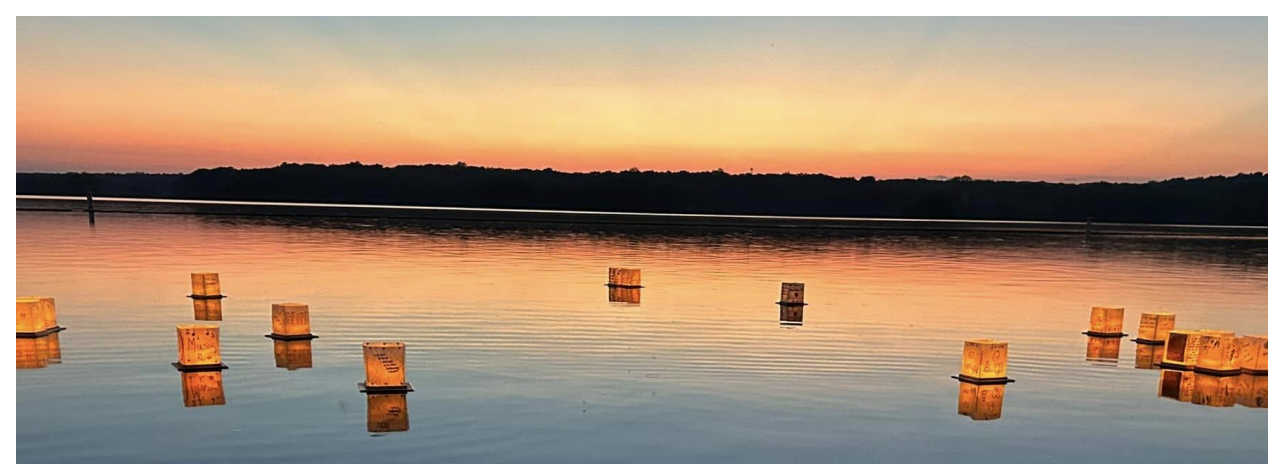
Upcoming Events

Catch the Northern Lights!

MichiganAuroraChasers.com/events



Photo by "Live Chase Nate" Stovall



Beyond the Aurora

Subscribe for free email blog writing, email notices about upcoming events.

Exclusive paid option coming soon!



Beyond the 45th Parallel: Aurora Chaser & Author

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



Thank you!!

