Howard Astronomical League

February 17, 2022

Astro Humor

Welcome New Members and Guests

HAL Officers/Positions 2022

President	Phil Whitebloom	president@howardastro.org
1st Vice President	Victor Sanchez	1stvp@howardastro.org
2nd Vice President	Jim Tomney	2ndvp@howardastro.org
Treasurer	Joel Goodman	hal_treasurer@howardastro.org
Secretary	Yvonne Chiarelli	secretary@howardastro.org
Event Coordinator	Richard Ren	events@howardastro.org
Publicity Chair +	TBD	publicity@howardastro.org
Social Media +	Hannah Broder	socialmedia@howardastro.org
Observatory Director *	Victor Sanchez	observatory@howardastro.org
Librarian +	Bob Dutilly	librarian@howardastro.org
ALCor +	Steve Jaworiwsky	halcor@howardastro.org
Webmaster *	Ken Sall	Use "Contact Us" Page

* Appointed as voting officers of the board of directors by President with board approval

\+ Appointed non-voting member of the board except when position filled by an elected officer

HAL Public and Members Only Star Parties

2022

March	12	Public
March	26	Members
April	9	Public
April	30	Members
May	7	Public
May	21	Members
June	11	Public
June	25	Members
July	9	Public
July	23	Members
August	6	Public
August	27	Members
September	3	Public
September	24	Members
October	1	Public
October	22	Members
November	5	Public
November	19	Members

Ellicott City is celebrating it's 250th year in 2022. Did you know there are 2 famous "astronomers" widely known from Ellicott Mills early history?

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Benjamin Banneker

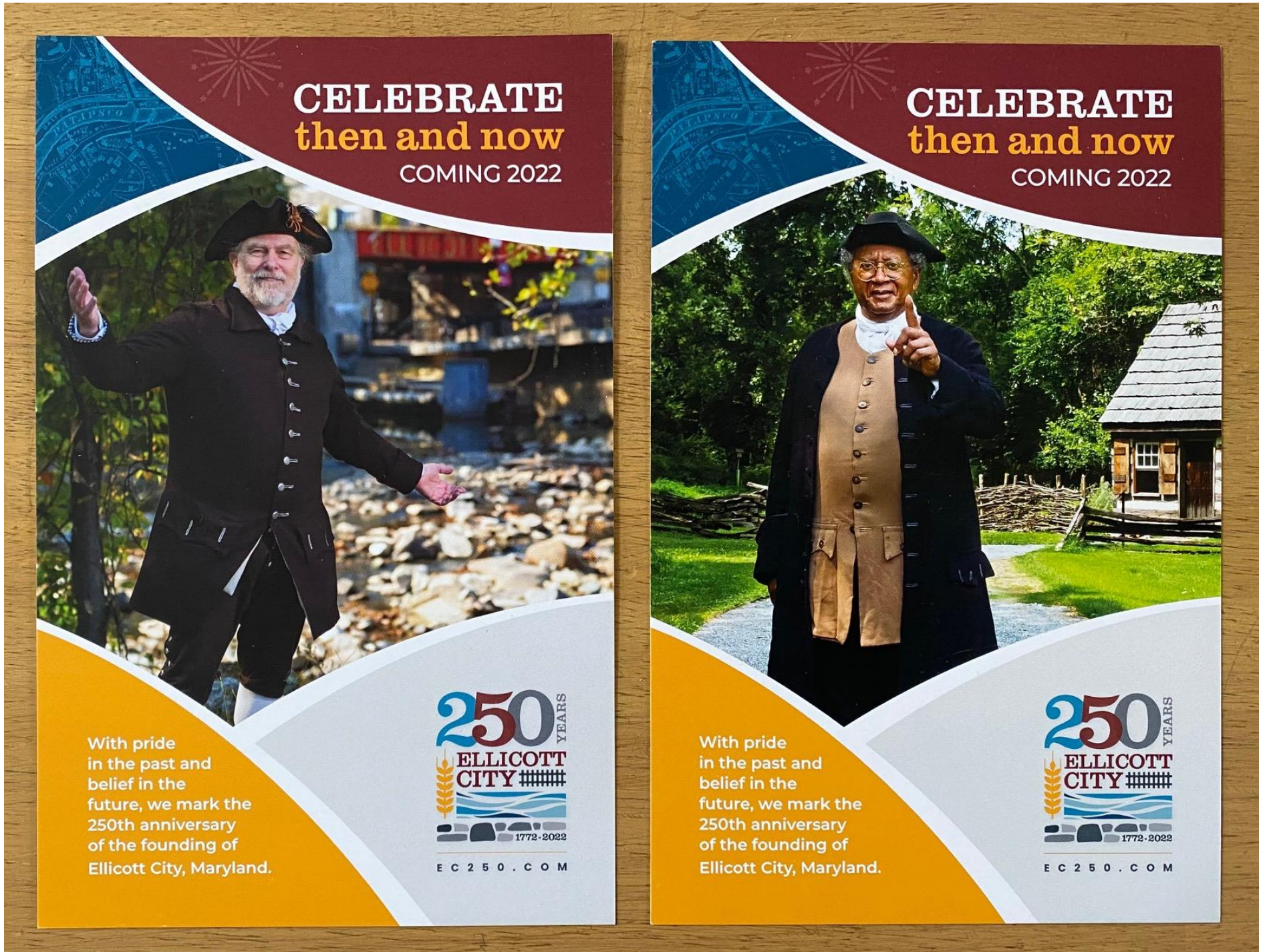
First African American man of science and publisher of almanacs

Major Andrew Ellicott

Surveyor who marked many U.S. boundaries, including D.C.

For Ellicott City 250th events, I re-enact George Ellicott (Major Andrew Ellicott's Cousin) whose 1789 house is still standing in Old Ellicott City.

George (1760 to 1832) was a reported to be an amateur astronomer who would like to give "gratuitous lectures in astronomy" in front of his house. He lent books to Benjamin.



Fans of Benjamin Banneker Astronomy Club

focuses on

- **Naked eye viewing of the sky, constellations, and ecliptic plane, with discussions outdoors**

  and telescopes always welcome as well!
- **Appreciating ancient and classical astronomy**
- **Learning about the history of astronomy**
- **Understanding almanacs of the past and present**
- **Contrasting our modern skies with what people saw “back then”**
- **Discussion of current news in astronomy**
- **Occasional impromptu gatherings**
- **Guest speakers are welcome!**

next gathering
on
Saturday
March 5th
8:00 p.m.

We welcome special guest Dean Howarth, The Natural Philosopher. He'll present how Major Andrew Ellicott used astronomy to lay out Washington D.C. with the assistance of Benjamin Banneker and will bring instruments to help illustrate the technology and science of their day.

We'll point out the winter constellations, as the crescent moon sets early. The classical planets are in the morning sky this month, but we may still view the planet discovered in March 1781 by an amateur observer and known at the time of the D.C. survey as Herschel's Star or Georgium Sidus.

Watch the skies in the place where Benjamin Banneker lived when his first almanac was published 230 years ago and discuss the differences in the skies and in astronomical knowledge in his days and ours. We meet in front the museum. Adults and kids of all ages are welcome. Dress comfortably for the weather, bring a lawn chair and/or blanket to sit or lay back. We might move around for better views in certain directions and may go inside the museum if it rains.

Free and open to the public, with safe social distancing. For questions, or to ask to get an e-mail notice of future activities, send contact information to fansofbenastro@gmail.com

Benjamin Banneker Historical Park and Museum
300 Oella Avenue, Catonsville MD 21228
Baltimore County Department of Recreation & Parks

Our Guest Presenter

Ron Miller

Space Artist, Science Fiction Illustrator and Author

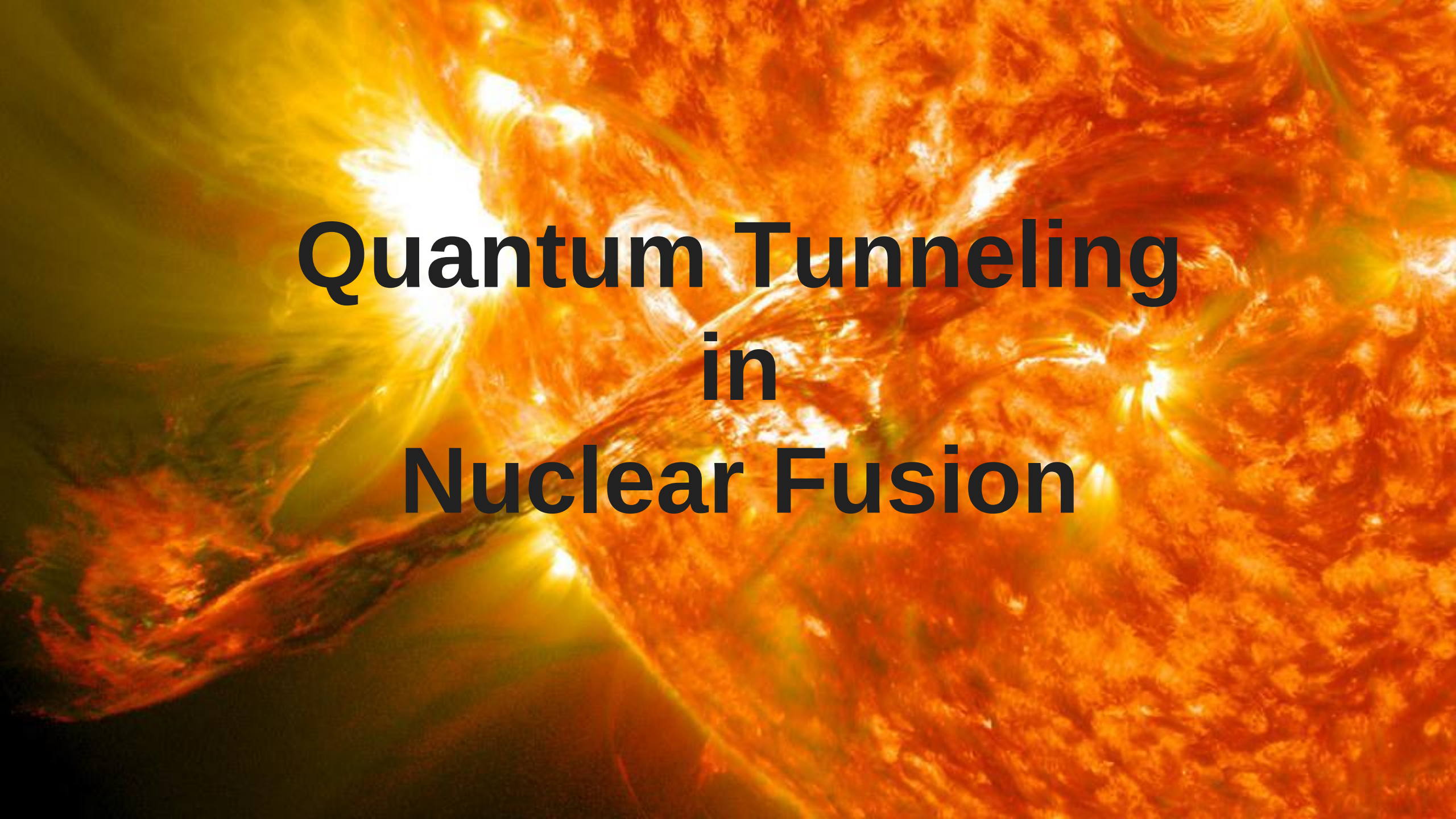
Topic: Personal Experiences of an Artist/Author

Our Guest Presenter

Arjun Meenashi Sundar

HAL Member, Student, Musician, and Artist

Topic – Quantum Tunneling and Nuclear Fusion



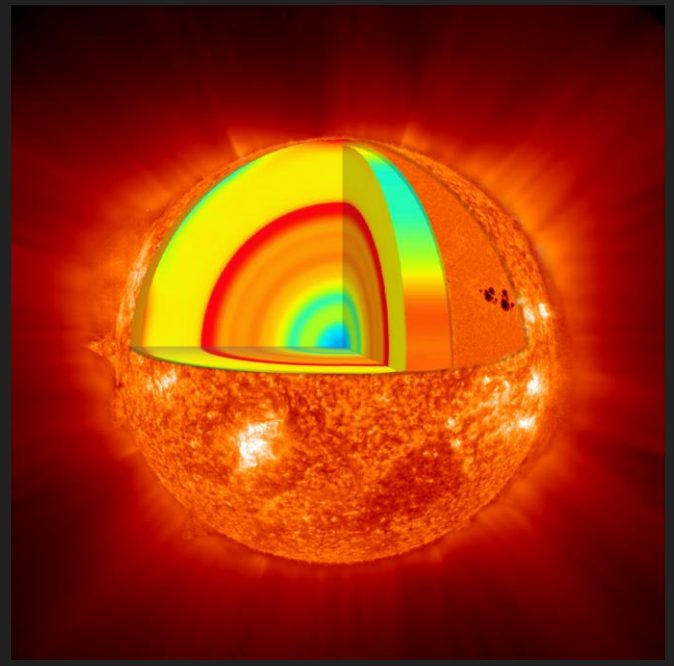
Quantum Tunneling in Nuclear Fusion

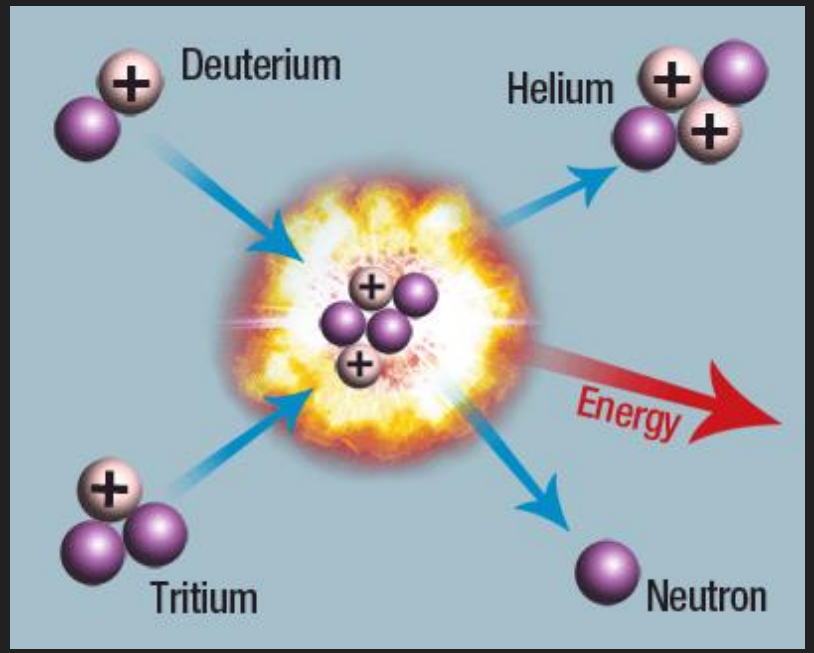
Overview

Everybody sometimes think that Quantum mechanics is absurd - The concepts seemingly defy normal common sense. But, you owe your existence to it. This presentation will cover how Quantum mechanics is so important; And it comes down to our very own Sun - the great ball of gas which is the essence of living organisms on Earth.

The Sun’s implications

Every single day, we run on the Sun's energy. The plants which are the base for all life gets its energy from the Sun - and thus everything runs on it. The Sun is like a nuclear power plant, spewing out tons of energy per second. Nuclear Fusion is what powers the Sun - fusing Hydrogen nuclei into Helium nucleus. This process has kept the Sun running for 4.5 billion years. But that is where the problem arises: the fact that the Sun is not hot enough to sustain Nuclear Fusion.

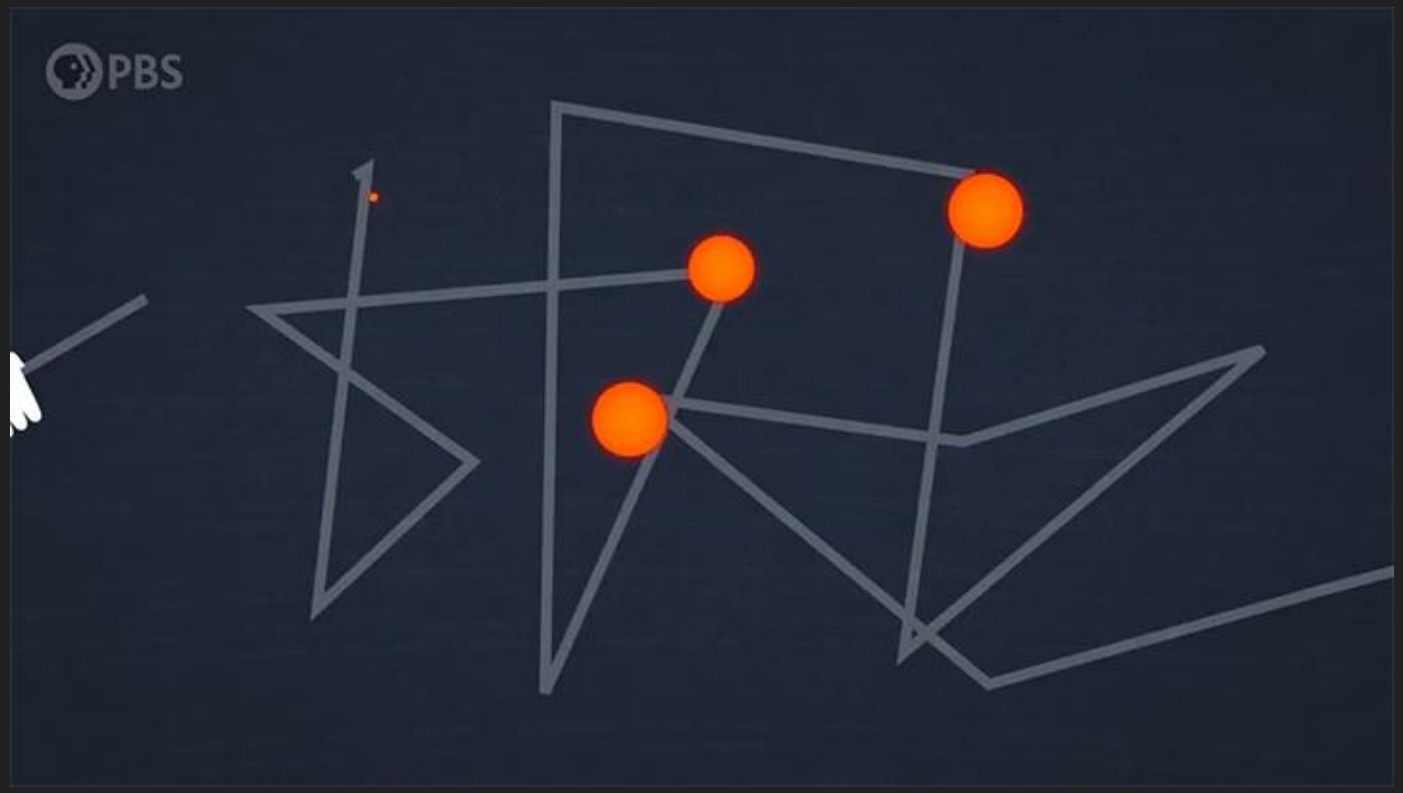




Nuclear Fusion

It all starts in the absurdly hot center of the Sun. The classical theory predicts that since the Sun is very hot and pressurized, the Hydrogen nucleus collide to form Helium nucleus. After that happens, the valuable photons (light particles) go through every layer of the Sun to come here to Earth. Which takes…roughly 150,000 years, give or take.

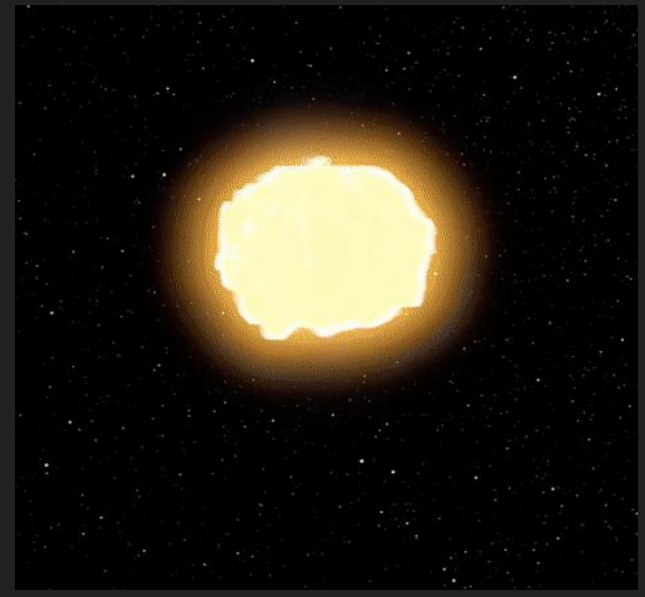
This is an example of how a photon has to make its way out of the Sun - by colliding into particles in what scientists call “the random walk”.



The Problem

- Since two Hydrogen nuclei (protons) are both positively charged, they should repel each other and not be able to fuse.
- For classical Nuclear Fusion to happen in stars, their core needs to be about 100 million kelvin hot - our Sun is barley 15 million kelvin.

With these problems, the fact that the Sun still exists and shines is strange. Something “***Quantum”*** is going on.

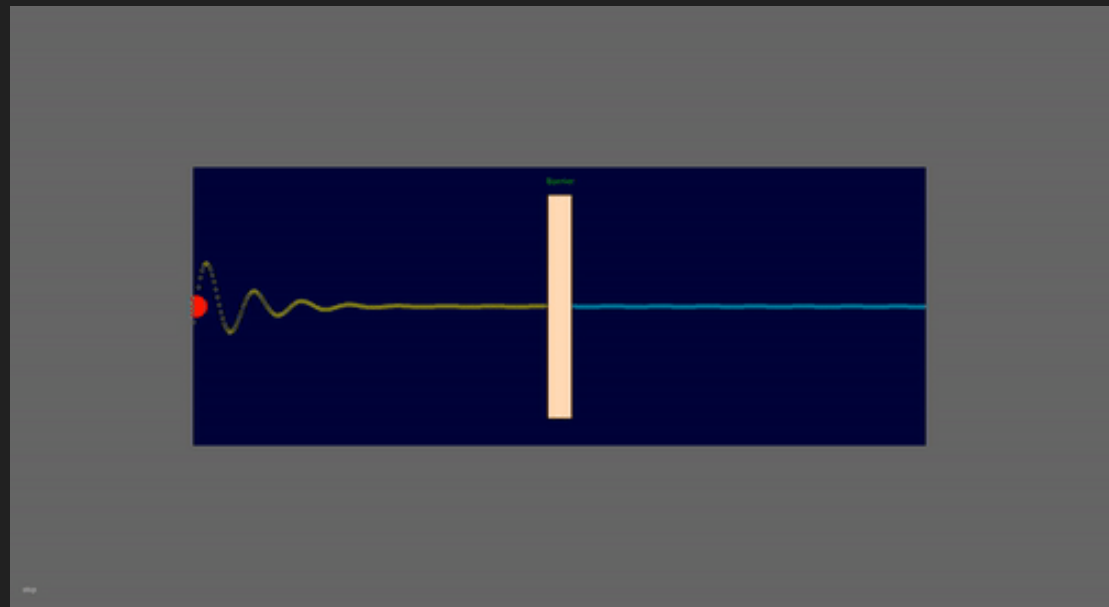


What is Quantum Physics

Quantum mechanics, at its most fundamental level, describes how fundamental particles act and interact. Fundamental particles are particles which cannot be broken down any more - The very building blocks of matter. Down at that bizarre level, the phenomena observed is what published in papers. Everything you hear: From particles being waves at the same time, two things being in different places, and everything else happens at that really small level, and the bizarre phenomena that we are talking about here is called, ***Quantum tunneling.***

Quantum tunneling

Quantum tunneling is a phenomenon where a particle has enough energy to go through a barrier - like a ghost. A barrier in quantum terms is like forces which hold particles from moving to a different energy level, or interacting with other particles. If the particle has more energy than the barrier, it can cross over. But, the particle would lose energy after it crossed the barrier because it used some of its energy to cross the barrier. That's the basic Quantum tunneling theory. Someday, we might be able to use it in real life!



The Solution

As said before, there is a property called Quantum tunneling, which allows particles to have a very low chance of fusing into each other - and forming a Helium nucleus. If you think of two protons as waves, then it's like two waves merging together to form a bigger one. In this case, its four proton waves merging together - to form a Helium nucleus wave. As this process goes on, bigger particles will form from Helium. This, is how the Sun runs: On the very low possibility that four of the protons can merge and form a Helium nucleus. Eventually, the sun will run out of particles to fuse, and will then shed off its outer layers and shrink down into a miniature yet active White dwarf.

Conclusion

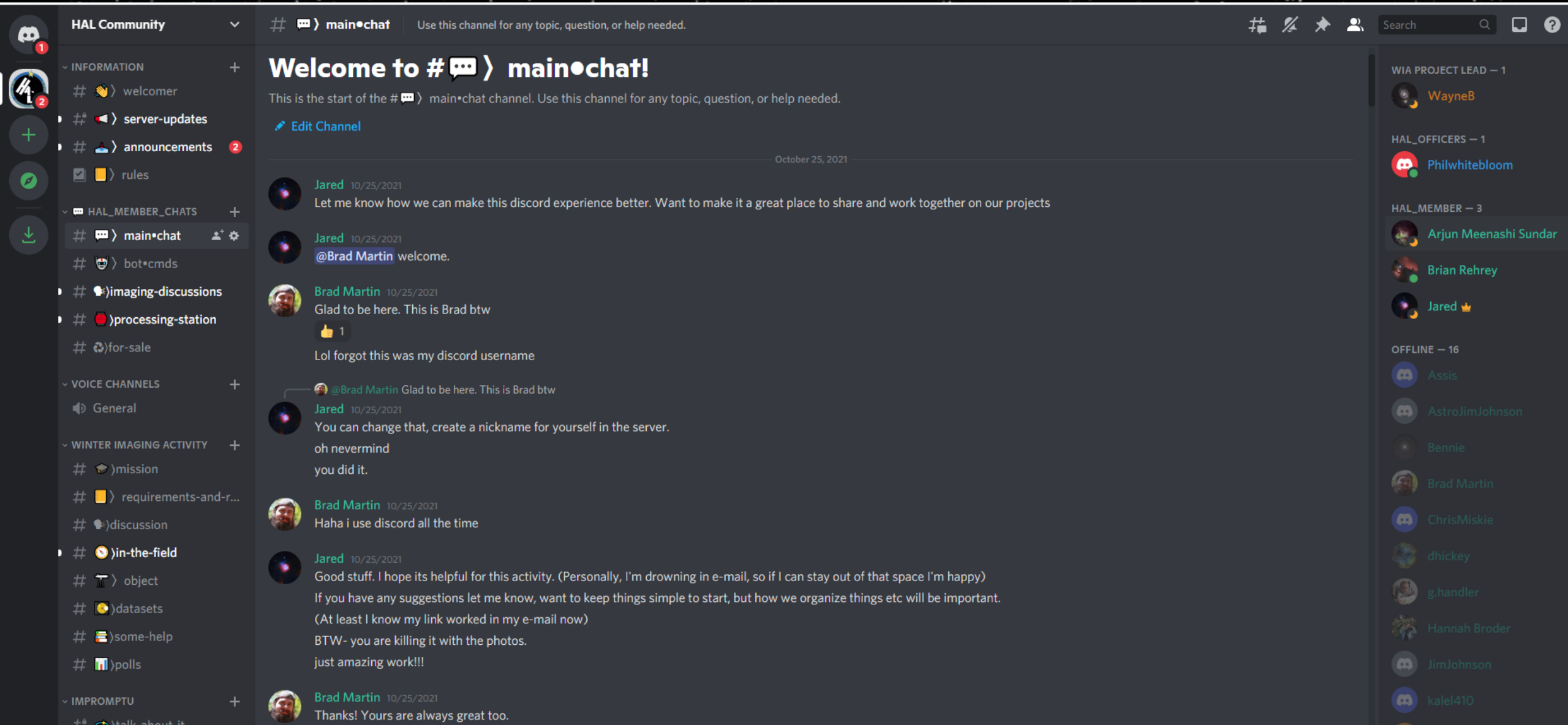
Now, the absurd Quantum Mechanics has come out of the darkness, and explicitly stated how it impacts YOU. Now a brief recap:

- Nuclear fusion is a process where Hydrogen atoms fuse to create energy and form a Helium nucleus.
- Classical theory does not describe Nuclear Fusion properly, so Quantum Mechanics comes to the rescue.
- Quantum tunneling allows Nuclear Fusion in more hostile conditions.
- Quantum tunneling is where particles use their energy to jump over barriers.

Thanks for listening!

Quantum mechanics has came out of the light! I hope the message got to you!

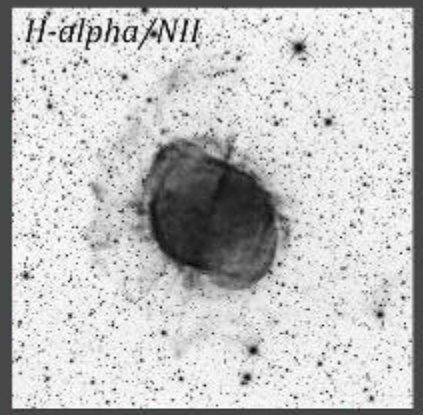
When is Discord a good thing?

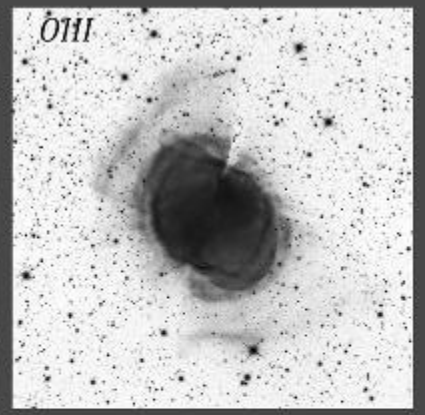


HAL MEMBER ASTRO IMAGES SKETCHES AND MORE


Victor Sanchez

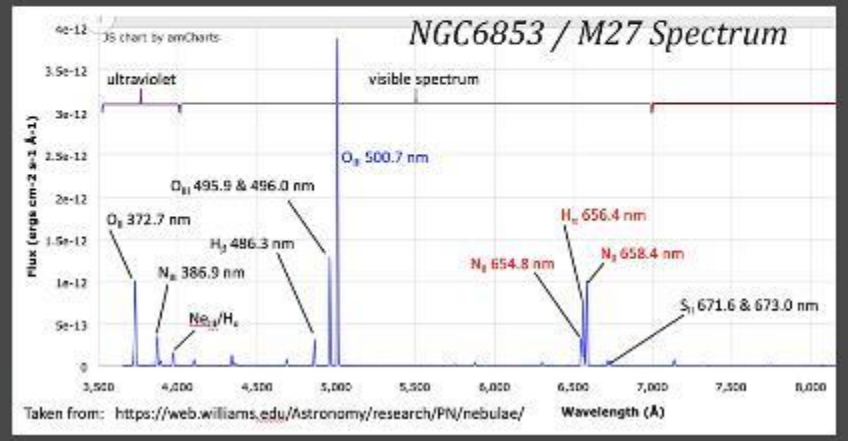

Narrowband + RGB (stars)
The Dumbbell Nebula (M27 / NGC6853)
8" RC telescope & QHY268M camera
Ha(6 nm)/OIII(6 nm)/RGB filters (19 hours total exposure)
September/October 2021; Brad Sheard, Ellicott City, MD


H-alpha/NII

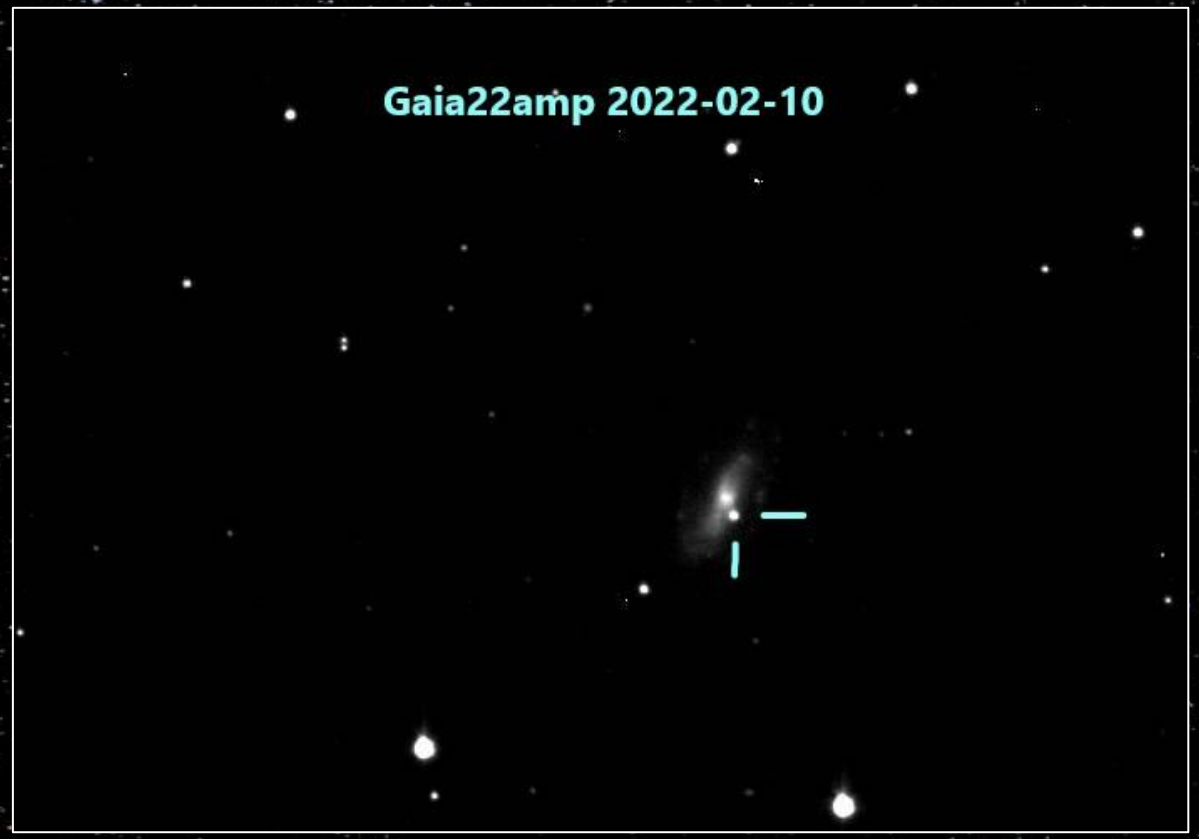

OIII


RGB


SII (not used)


NGC6853 / M27 Spectrum
JS chart by amCharts
ultraviolet
visible spectrum
O3 500.7 nm
O3 495.9 & 496.0 nm
O3 372.7 nm
Hβ 486.3 nm
Ne3/Hε
Hα 656.4 nm
N2 654.8 nm
N2 658.4 nm
S2 671.6 & 673.0 nm
Flux (ergs cm-2 s-1 Å-1)
Wavelength (Å)
Taken from: https://web.williams.edu/Astronomy/research/PN/nebulae/

Supernova Observations (Feb 2022) – Supra Solem Observatory

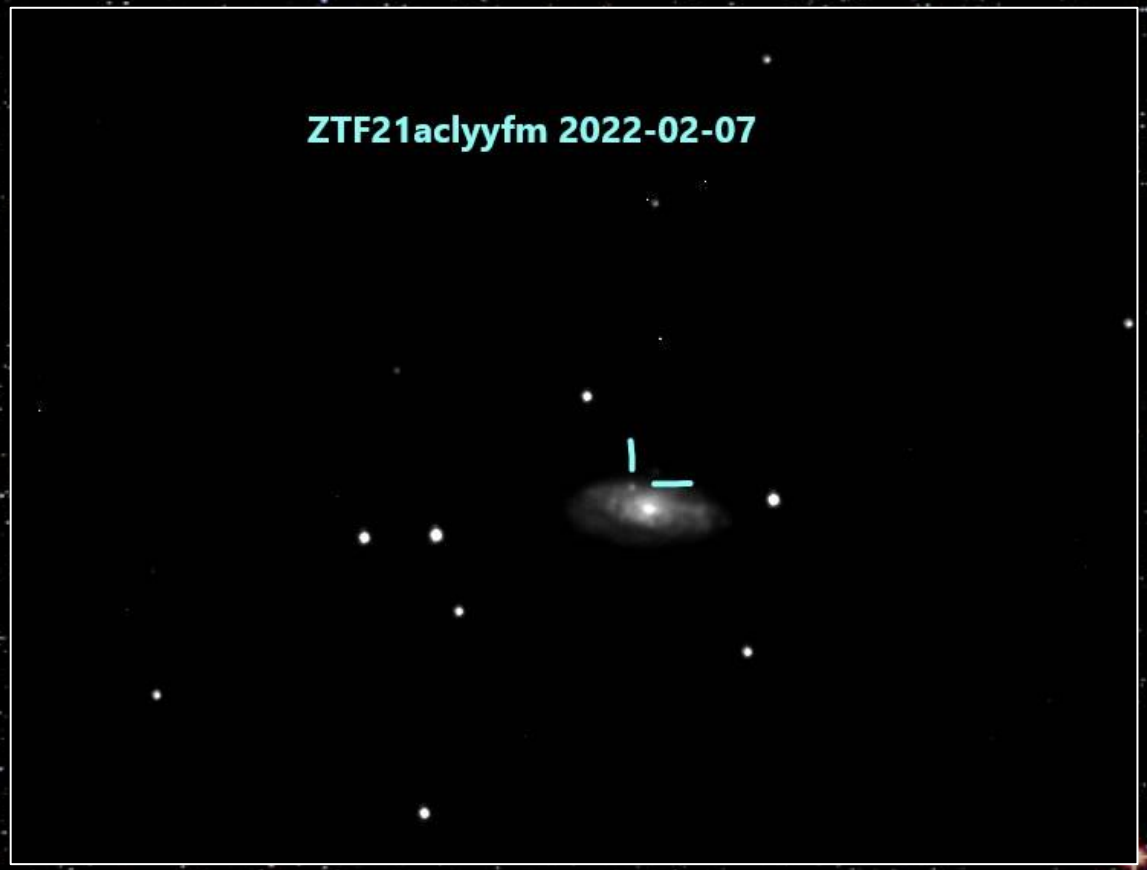


Type II SN in NGC 5117 – 110 Mly

3 stacked 240s, Sloan r filter images

Type II SN in NGC 3813 – 70 Mly

3 stacked 240s, Sloan r images



Chuck Cynamon

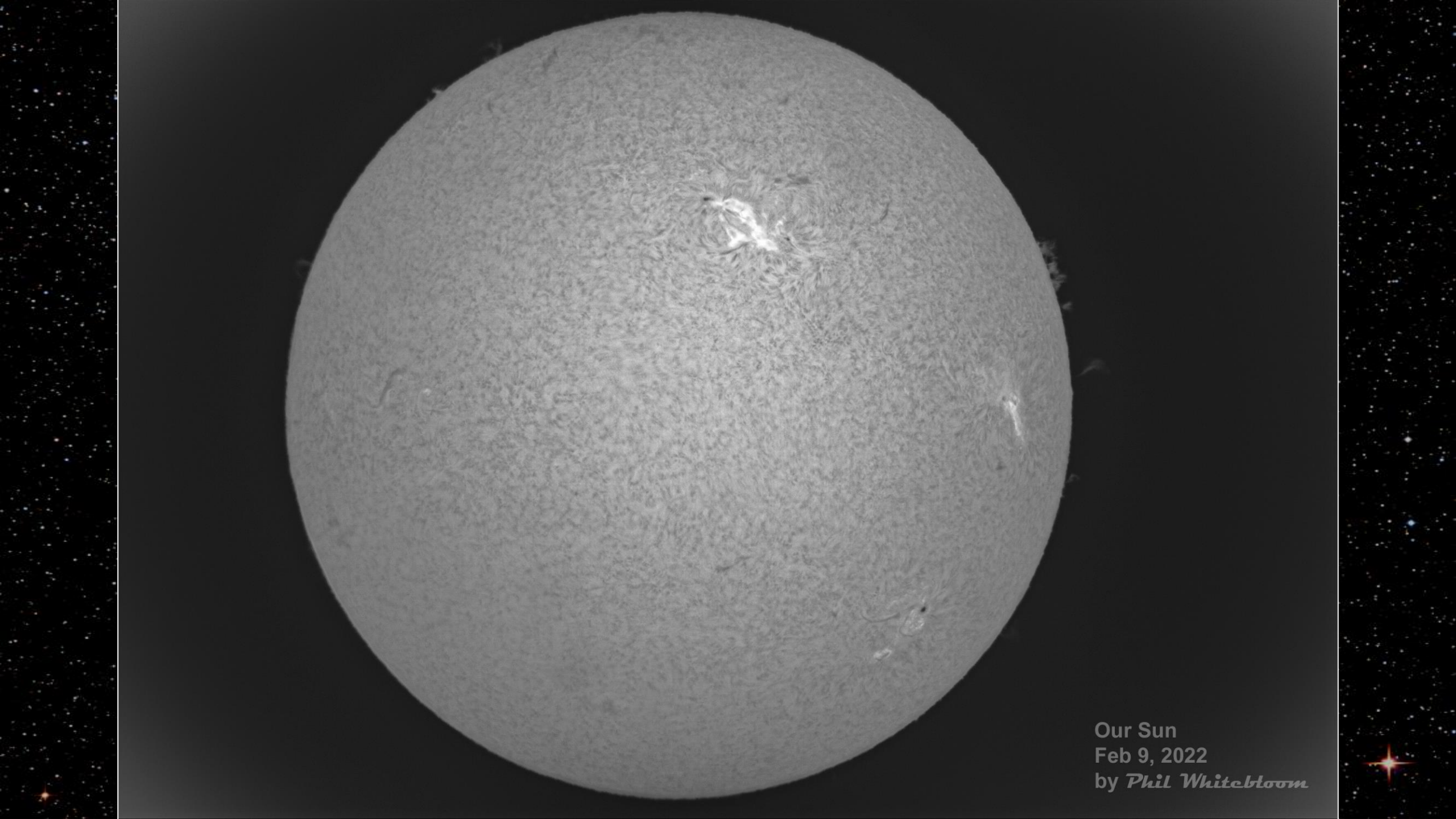
The Moon - 2022-02-15 05:52 UTC

Jim Johnson, Ashton MD
ZWO ASI178MC
TeleVue NP101is/2.5x PowerMate
Losmandy G11

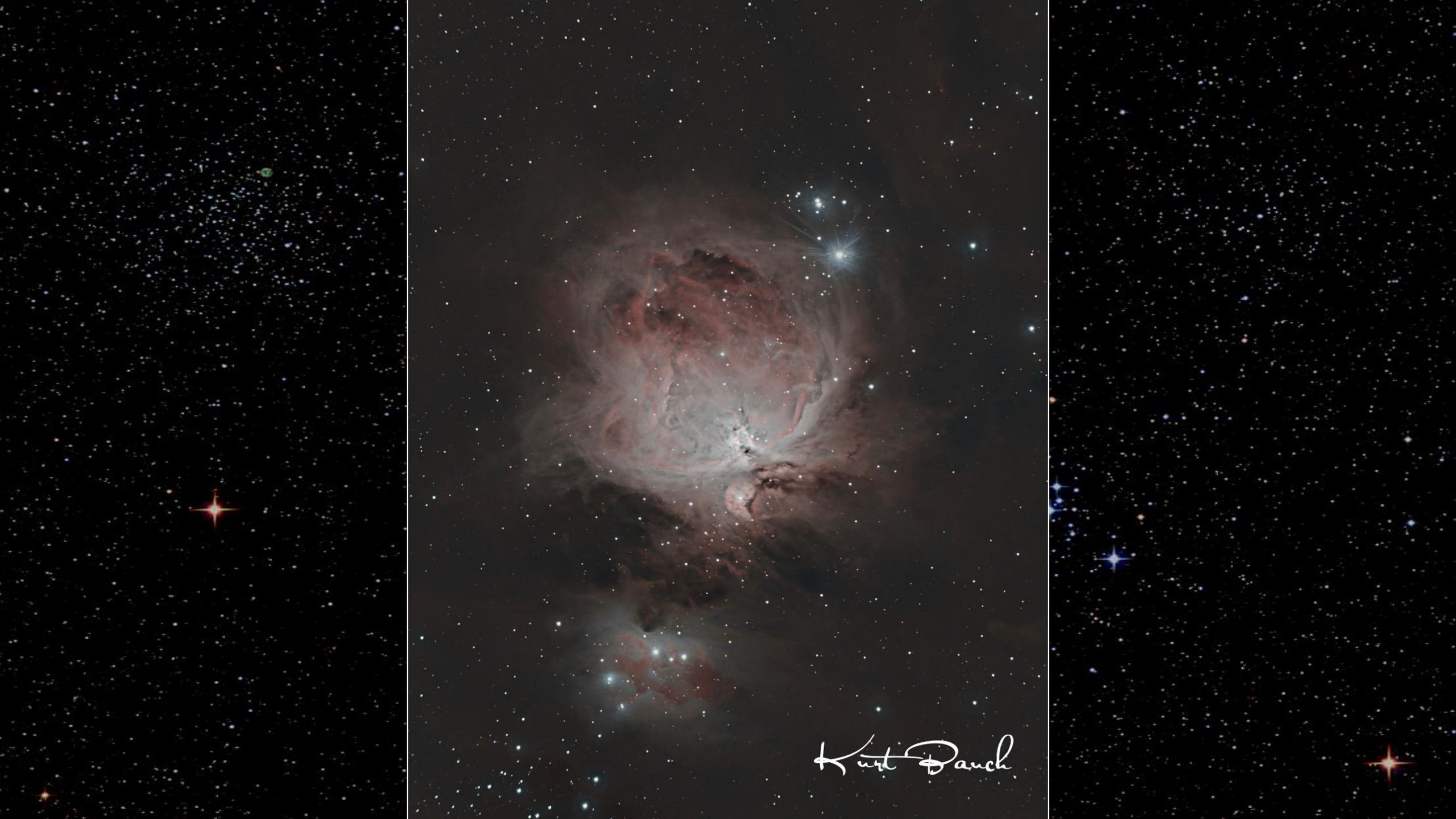

Greg Duncan


February 16th 2022
@JamesWillinghan


Phil Whitebloom

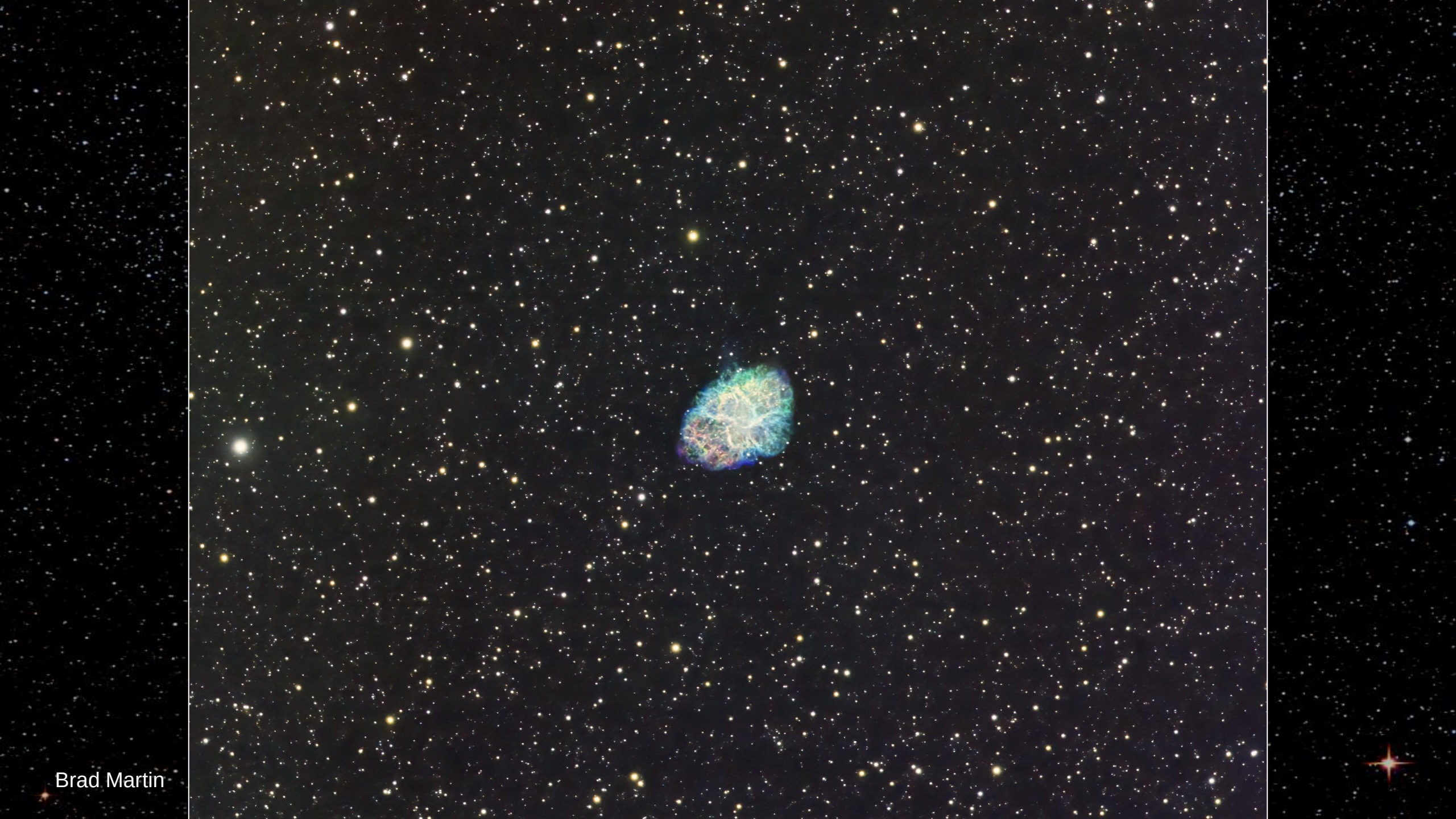

Our Sun
Feb 9, 2022
by Phil Whitebloom

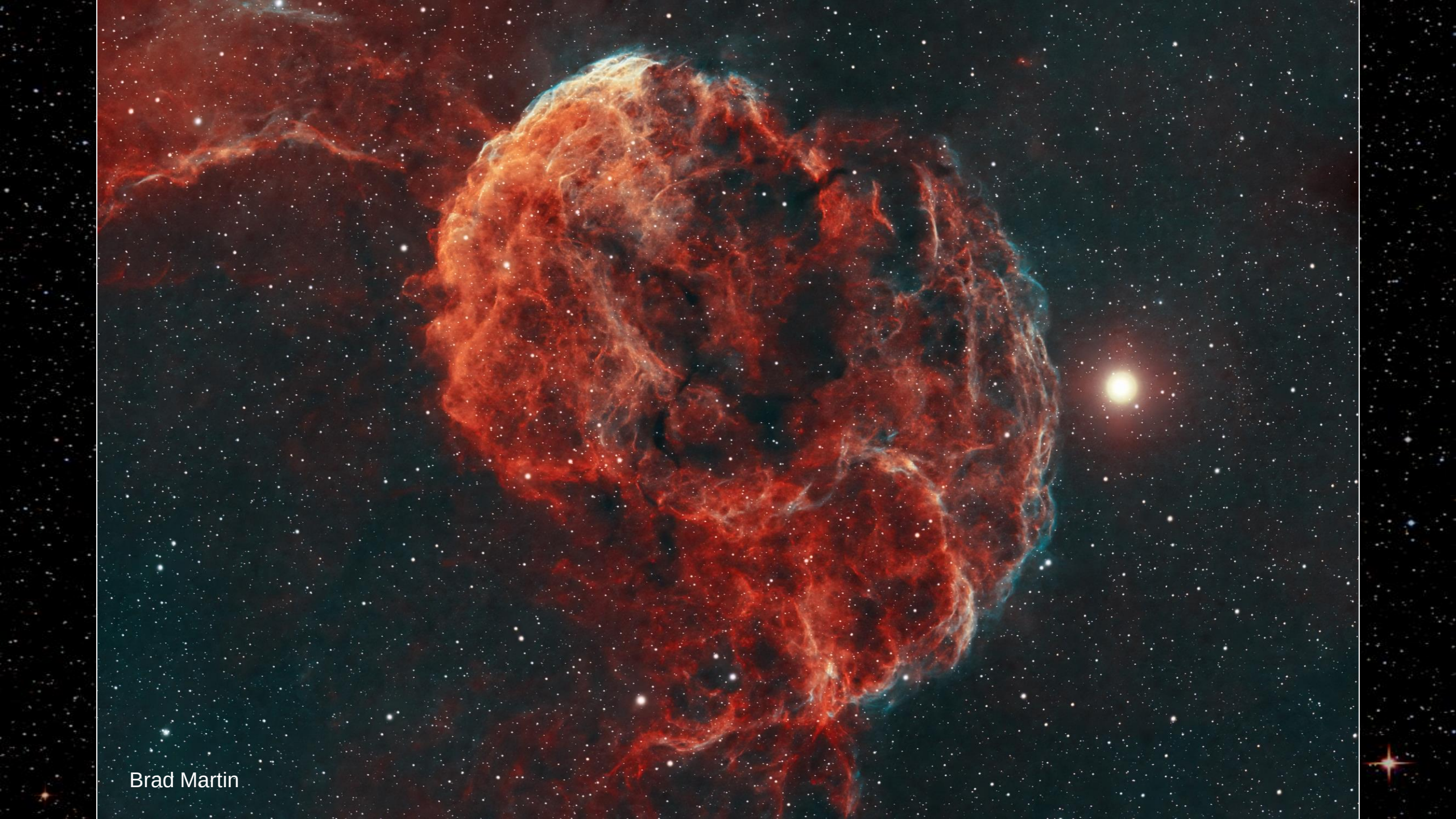

Kurt Rauch

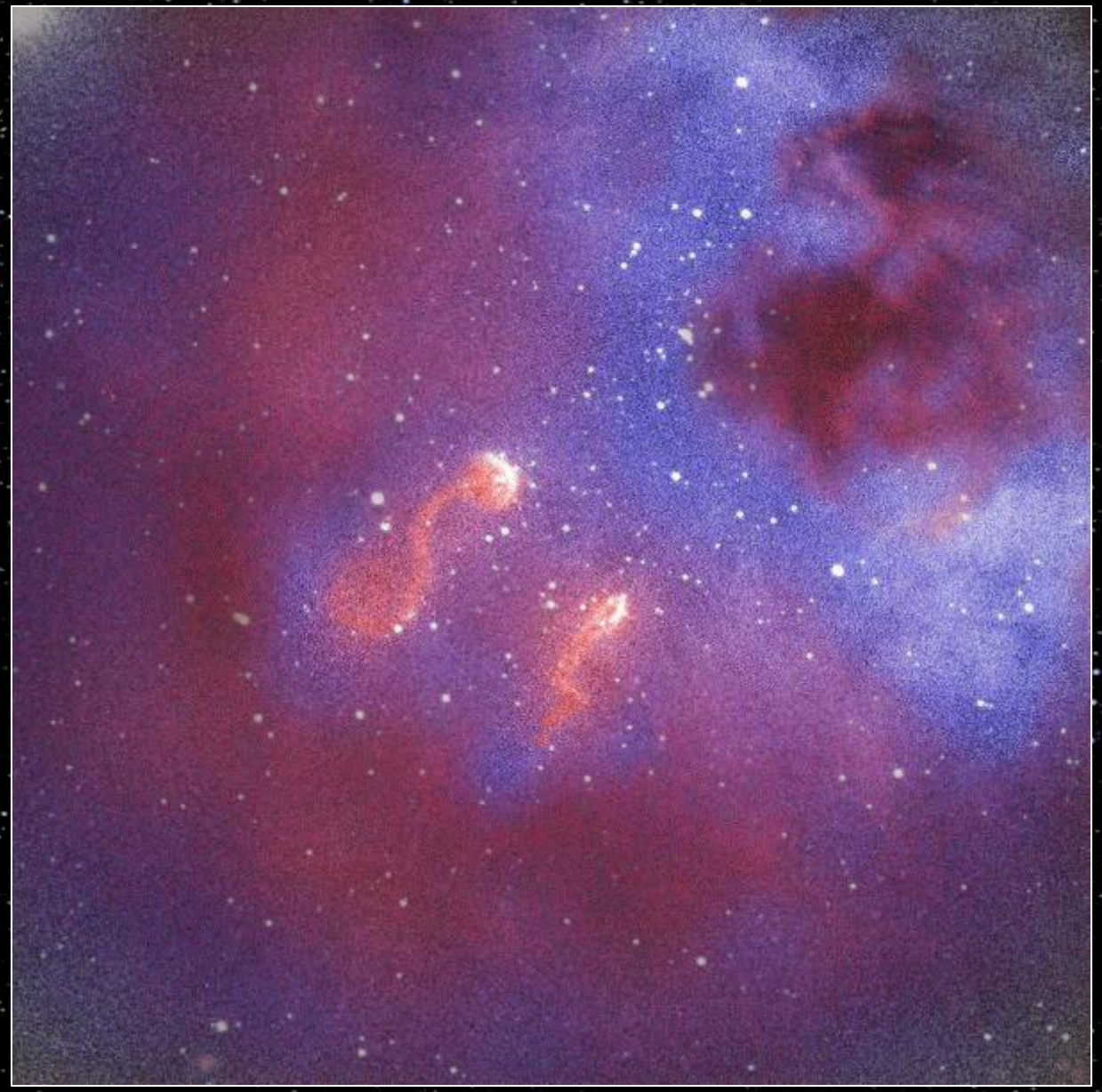

Kurt Rauch


Kurt Pauch

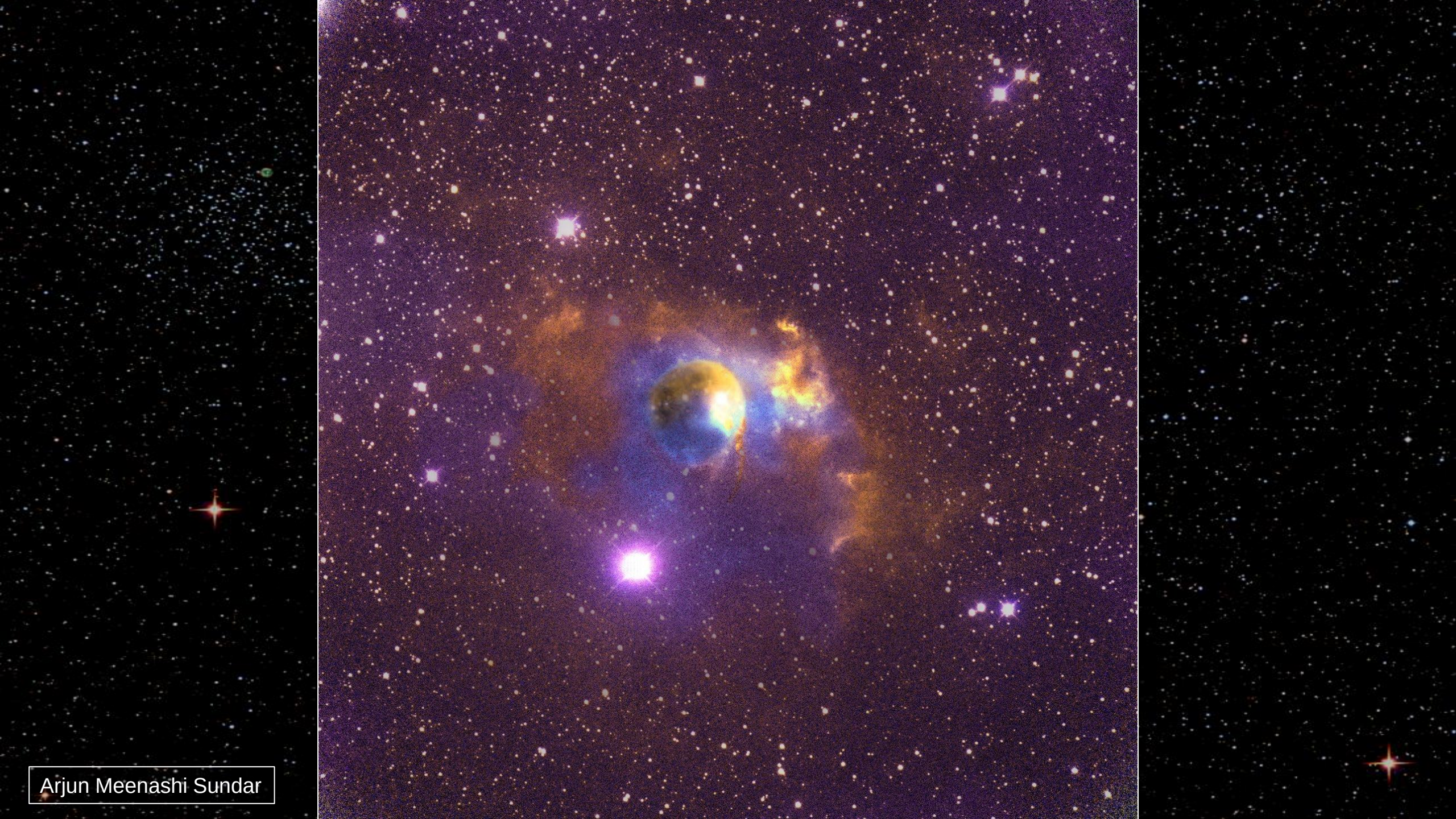

Brad Martin


Brad Martin


Brad Martin



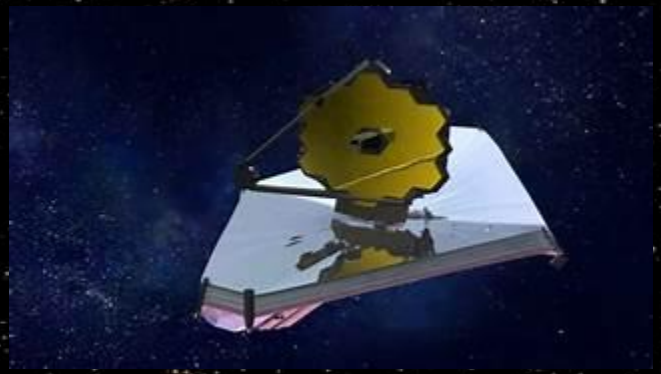
Arjun Meenashi Sundar



Arjun Meenashi Sundar

Arjun Meenashi Sundar

Thank You



CLEAR SKIES!