

Event Report: Webinar on Life Cycle of Stars

Date: November 29, 2025

Speaker: *Dr. Poojan Agrawal*, Astrophysicist, KU Leuven, Belgium

Organized by: Kalpana Chawla Space Academy (KCSA)

Date: 29/11/2025

Mode: Online Webinar

1. Introduction

Kalpana Chawla Space Academy (KCSA) organized an insightful webinar on the **Life Cycle of Stars**, delivered by eminent astrophysicist **Dr. Poojan Agrawal** from **KU Leuven, Belgium**. The session aimed to enhance students' understanding of stellar evolution, observational astronomy, and astrophysical phenomena governing the birth and death of stars.

2. Overview of the Session

Dr. Agrawal began the session by explaining what stars are, how they form from giant molecular clouds, and the physical principles—such as gravity, nuclear fusion, and thermal pressure—that control their evolution. She highlighted the importance of studying stellar lifecycles to understand galaxy formation, chemical enrichment of the universe, and the origin of elements essential for life.

3. Key Concepts Covered

3.1 Formation of Stars

- Stars originate in **nebulae**, large clouds of gas and dust.
- Through **gravitational collapse**, the cloud condenses into a **protostar**.
- When the core temperature reaches \sim 10 million Kelvin, **nuclear fusion** begins, marking the birth of a main-sequence star.

3.2 Main Sequence and Stellar Evolution

- Dr. Agrawal explained that stars spend most of their life in the **main sequence**, fusing hydrogen into helium.

- The mass of the star determines its temperature, brightness, and lifespan—**massive stars live fast and die young**, while **low-mass stars evolve slowly**.

3.3 Hertzsprung–Russell (H–R) Diagram

A major highlight of the session was the discussion on the **Hertzsprung–Russell (HR) Diagram**, a fundamental tool in astrophysics used to classify and understand stars.

Dr. Agrawal explained:

- The HR Diagram plots **luminosity (brightness)** on the vertical axis and **surface temperature** on the horizontal axis (temperature decreases to the right).
- Most stars, including the Sun, lie on the **Main Sequence**, a diagonal band from hot, bright stars (upper left) to cool, dim stars (lower right).
- Above the main sequence are **Red Giants** and **Supergiants**, which are cool but highly luminous due to their enormous size.
- Below the main sequence lie **White Dwarfs**, which are hot but faint because of their small radius.

She also demonstrated how a star's movement across the HR Diagram represents its evolution:

- **Protostar → Main Sequence → Red Giant/Supergiant → White Dwarf / Neutron Star / Black Hole**
- High-mass stars move rapidly across the diagram, while low-mass stars evolve slowly.

Depending on the mass of the star:

For low-mass stars (like the Sun):

- Red Giant → Planetary Nebula → White Dwarf

For massive stars:

- Red Supergiant → Supernova → Neutron Star or Black Hole

4. Interaction Session

The webinar included an interactive Q&A, where students asked questions about:

- Maximum and minimum life of Stars
- HR diagram axes.
- Colour of star
- Artificial star

Dr. Agrawal provided clear explanations, connecting complex concepts with real astronomical data.

5. Learning Outcomes

Participants gained:

- A comprehensive understanding of stellar birth, evolution, and death.
- Clarity on the role of mass in determining stellar fate.
- Knowledge of the HR Diagram as a tool for studying stars.
- Insights into the cosmic recycling of matter through supernovae.
- Inspiration to explore astrophysics, observational astronomy, and cosmology further.

6. Conclusion

The webinar by **Dr. Poojan Agrawal** provided students with a structured and engaging journey through the life cycle of stars and the use of the HR Diagram. The session successfully deepened students' interest in astrophysics and aligned with KCSA's mission to promote high-quality space education.

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contact@kcsa.org.in



HAVE YOU EVER WONDERED IF STARS IN THE SKY EVER DIE?

Join Dr. Poojan Agrawal for an inspiring session delving into the Lifecycle of Stars. Discover how the stars are born, how they live their life and what happens to them after their death. What will happen to our sun? Perfect for curious minds and space enthusiasts eager to explore the frontiers of space science.

Unravel the Lifecycle of Stars from Dust to Destiny

 Saturday 29th Nov 2025 |  Time 2:30pm to 3:30pm |  Platform **ONLINE**



RESOURCE PERSON 
Dr. Poojan Agrawal
Astrophysicist
Institute of Astronomy-KU Leuven, Belgium

Topics Covered:

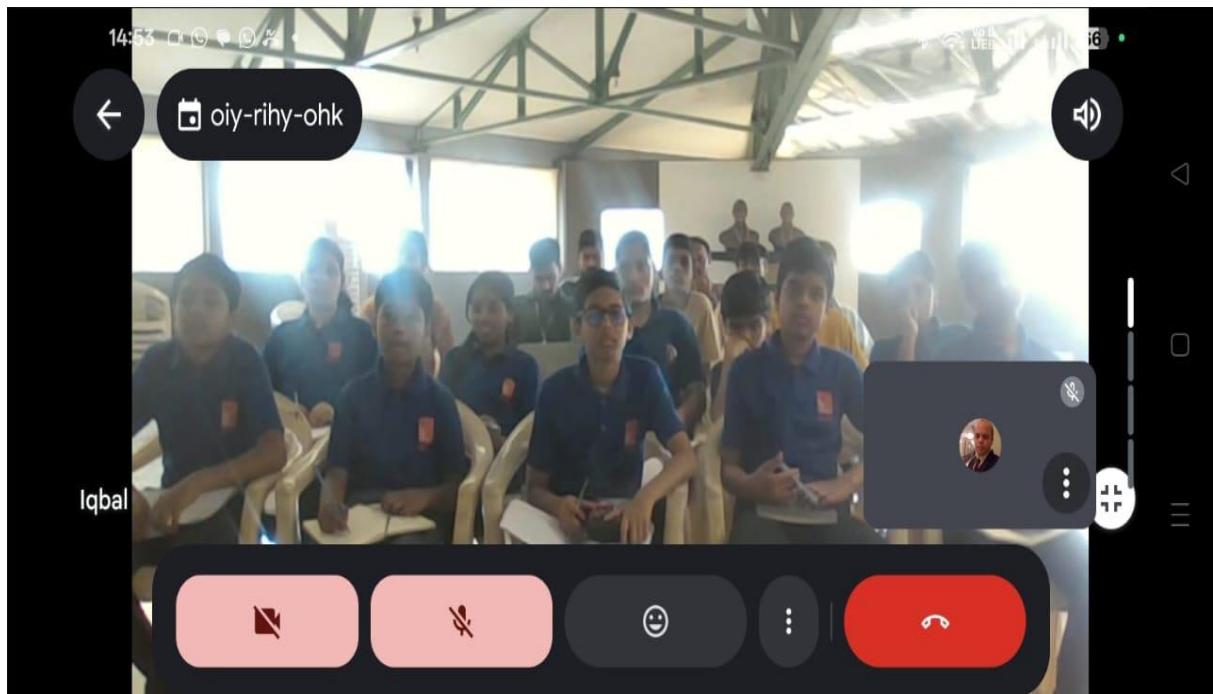
- Lifecycle of Stars
- What are Stellar Remnant's?
- Live Q&A with our expert

Who Should Attend?

- Young enthusiast about Stellar evolution
- Want to understand compact objects (Black Hole, Neutron Star, White Dwarf)
- Join us for a deep dive into the science that shapes our understanding of the cosmos!
- Academician, Researchers and Parents



SCAN QR TO REGISTER 



Webinar on Lifecycle of Stars

ARYAN 3:13PM
what is the age of sun

VIAAN SANTOSH BARWADE 3:23PM
what if a group of astroides crash into the sun

KCSA 3:24PM
Mam , beyond hydrogen fission, what makes a star stable throughout its lifetime ? And how do scientists predict that a dying star will either become a neutron star or black hole ?

Send a message

18

The image is a screenshot of a video conferencing interface. At the top left, there is a profile picture of a person and the name "Poojan Agrawal (Presenting)". The main content area on the left features a presentation slide with the title "Connection of color with temperature" and a photograph of a glowing blue flame. At the bottom of this slide, there is a small image of a person and the text "Image: Nirmala-Laxmi University, KZN". The right side of the interface shows a video feed of a person with glasses and the name "Poojan Agrawal" displayed below it. To the right of the video feed is a sidebar with a list of messages. The messages are as follows:

- VIAAN SANTOSH BARWADE 3:07PM
- 150 billion
- Rendezvous with Dr. Pushpendu Rakshit 3:08PM
- What determines a star's color?
- ARYAN 3:09PM
- MY QUESTION IS which is the most common type of star in the universe

At the bottom of the interface, there is a "Send a message" input field and a red send button. Below the input field, there are several small icons for audio, video, screen sharing, and other communication features. The bottom left corner shows the time "3:09 PM" and the title "Webinar on Lifecycle of Stars".

Poojan Agrawal (Presenting)

Evolution of a Sun like star on the HR diagram

White Dwarf, Time: 11429.4 Myrs

Luminosity (in solar units)

10⁵

10⁴

10³

10²

10¹

10⁻¹

10³

10⁴

10⁵

White Dwarf, Time: 11429.4 Myrs

10³

10⁴

10⁵

10⁶

10⁷

10⁸

10⁹

10¹⁰

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VIAAN SANTOS...

i

White Dwarf, Time: 11429.4 Myrs

KCSA

Iqbal Dhalait

Riya Tapkeer

Janani Ramanan

P

9 others

Aditya Patil (adi_phot...)

3:02 PM | Webinar on Lifecycle of Stars

18

Poojan Agrawal (Presenting)

2:56 PM | Webinar on Lifecycle of Stars

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VIDYA NIKETAN EDUCATION TRUST

KCSA

VIAAN SANTOSH BARWADE

iqbali

Poojan Agrawal

KCSA

Iqbal Dhalait

Riya Tapkeer

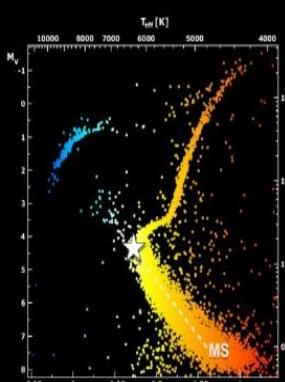
Janani Ramanan

8 others

Aditya Patil (a...)

Poojan Agrawal (Presenting)

There's more..



VIAAN SANTOS... iqbal

KCSA Iqbal Dhalait Riya Tapkeer

Janani Ramanan 8 others

Aditya Patil (adi_phot...)

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2:53 PM | Webinar on Lifecycle of Stars

K CSPA (Presenting)

Dr. Poojan Agrawal
Institute of Astronomy - KU Leuven, Belgium
Date: 29th November 2025
Subject: Thanking Note for your Extended Presence as a Guest Lecturer for webinar on life cycle of stars.

Dear Mam,

On behalf of Kishan Chawla Space Academy (KCSA) we extend our heartfelt congratulations and sincere appreciation for your insightful and engaging guest lecture delivered on "Travelling the Life Cycle of Stars from Dust to Destiny" dated 29th November 2025 for our budding scientists in the field of Astrophysics.

We are grateful for the time and effort you invested, and we hope to collaborate again in the future. Your contribution has left a lasting impression and added immense value to our academic environment.

Once again, we thank you for your commendable presentation and for grace us with your valuable perspectives with us.

Dr. Poojan Agrawal
Institute of Astronomy - KU Leuven, Belgium
Date: 29th November 2025
Subject: Thanking Note for your Extended Presence as a Guest Lecturer for webinar on life cycle of stars.

Rendezvous with Dr. Pus...

Dr. Puspender Rabhi
Program Director KCSA,
Uttarakhand, India

Rendezvous with Dr. Pus...

3:27 PM | Webinar on Lifecycle of Stars

Webinar on Lifecycle of Stars

What is the age of sun

VIAAN SANTOSH BARWADE 3:23PM

what if a group of astroides crash into the sun

KCSA 3:24PM

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Poojan Agrawal (Presenting)

HR Diagram of Solar Neighbourhood

2:57 PM | Webinar on Lifecycle of Stars

VIAAN SANTOSH BARWADE

iqbal

Poojan Agrawal

KCSA

Iqbal Dhalait

Riya Tapkeer

Janani Ramanan

8 others

Aditya Patil (a...)

17