

Carbon-Enhanced Metal-Poor (CEMP) Star

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Key findings:

- The researchers used high-resolution spectroscopic data acquired **using High Dispersion Spectrograph (HDS) attached to SUBARU telescope (Japan)** to analyze the star's surface chemical composition.
- The team found that **the iron content of the star is thousand times less than** that of the sun and it is heavily enriched with neutron-capture elements.
- The star which defies previous classifications and challenges previous understanding of star formation processes shows signs of having been formed through the combination of **two different neutron-capture processes - the slow (s-) and intermediate (i-)** neutron-capture processes.
- It can help understand how different star formation processes influence the elemental composition of stars.
- Elements beyond iron are created due to reactions in nuclear astrophysics called neutron capture processes.
- The slow (s-) process **is believed to occur in low-mass stars during** the asymptotic giant branch (AGB) phase and the rapid (r-) process is believed to occur in Supernovae and Neutron Star mergers.

- One of the proposed sites for intermediate (i-) **process is low-metallicity low-mass AGB stars.**
- Understanding the relative contributions of these processes to the elemental composition of stars is important for understanding the chemical evolution of galaxies and the origins of the elements in the universe.

Key facts Carbon-enhanced metal-poor (CEMP) star

- These stars are characterized **by diverse heavy elements abundance patterns** and are primarily **classified into four groups**, based on which groups of heavy elements are more abundant.
- These are mostly **dwarf stars, sub-giant stars, or giant stars, and stars** that belong to these evolutionary stages cannot produce elements heavier than iron.

Q1) What is a dwarf star?

A dwarf star, also known simply as a “dwarf,” is a type of star that is smaller and cooler than the average main-sequence stars like our Sun. Dwarf stars come in several different classifications based on their characteristics, including their size, mass, temperature, and luminosity.

Source: Unique star discovered that challenges previous understanding of star formation processes

Source: <https://vajiramandravi.com/current-affairs/carbon-enhanced-metal-poor-cemp-star/>

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