Indian astronomers study rare 'stellar fossil' HE 1153−0518

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News

Astronomers from the Indian Institute of Astrophysics (IIA), Bengaluru and Dakshin Kamrup College, Assam have studied HE 1153−0518, a rare carbon-enhanced metal-poor star of the "CEMP-no" type. It has only about one-thousandth of the Sun's iron but is rich in carbon and sodium, and it is identified as a newly found CEMP-no star; the team used high-resolution spectra from Japan's 8.2-metre Subaru Telescope in Hawaii, and the study appears in the Monthly Notices of the Royal Astronomical Society (MNRAS). Its chemistry preserves traces of the first generation of stars (announced 23 Nov 2026; lead author Partha Pratim Goswami).

Key facts for the exam

Point	Details
Star	HE 1153−0518
Type	CEMP-no (carbon-enhanced, metal-poor, no excess of heavy 'neutron-capture' elements)
Iron	About 1/1000 of the Sun's
Rich in	Carbon and sodium
Institutions	IIA Bengaluru; Dakshin Kamrup College, Assam

Point	Details
Telescope	Subaru (8.2 m), Hawaii – high-resolution spectroscopy

Background

- The Big Bang produced almost only hydrogen and helium (with a little lithium). The first stars (Population III) had no metals; their explosions made the first heavier elements. Later stars are Population II (old, metal-poor) and Population I (young, metal-rich, like the Sun). Old metal-poor stars are therefore "fossils" of the early universe.
- Astronomers call every element heavier than helium a "metal".

Tamil Nadu link: IIA traces its roots to the Madras Observatory (1786), later moved to Kodaikanal (1899), where John Evershed discovered the Evershed effect (1909). IIA's Vainu Bappu Observatory is at Kavalur in the Javadi Hills (Tirupattur district).

Frequently asked questions

What is this news about?

Astronomers from the Indian Institute of Astrophysics (IIA), Bengaluru and Dakshin Kamrup College, Assam have studied HE 1153−0518, a rare carbon-enhanced metal-poor star of the "CEMP-no" type.

What are the key facts to remember for the exam?

Star: HE 1153−0518; Type: CEMP-no (carbon-enhanced, metal-poor, no excess of heavy 'neutron-capture' elements); Iron: About 1/1000 of the Sun's; Rich in: Carbon and sodium.

What is the background to this news?

The Big Bang produced almost only hydrogen and helium (with a little lithium). The first stars (Population III) had no metals; their explosions made the first heavier elements.

Practice questions (with answers)

1. Which rare star, carrying clues to the first generation of stars, did IIA astronomers study?

A) Betelgeuse

B) Sirius B

C) HE 1153−0518

D) Proxima Centauri

Answer: C – Explanation: Studied by IIA Bengaluru and Dakshin Kamrup College, Assam (lead author Partha Pratim Goswami); data came from the Subaru Telescope, Hawaii.

2. What does a 'CEMP' star mean?

A) Cool, Expanded, Massive, Pulsating star

B) Companion-Eclipsing Multiple Pair star

C) Compact-core Extreme-Mass neutron star

D) Carbon-Enhanced Metal-Poor star

Answer: D – Explanation: This star has about one-thousandth of the Sun's iron but plenty of carbon and sodium.

3. The Sun belongs to which stellar population?

A) Population II (old, metal-poor)

B) Population I (young, metal-rich)

C) White dwarf

D) Population III (metal-free)

Answer: B – Explanation: The Big Bang made almost only hydrogen and helium; the first stars (Population III) had no metals. Old metal-poor stars are 'fossils' of the early universe.

4. Where is the Vainu Bappu Observatory of the Indian Institute of Astrophysics?

A) Udhagamandalam

B) Kavalur, Javadi Hills

C) Kodaikanal

D) Hanle, Ladakh

Answer: B – Explanation: Kavalur is in Tirupattur district. Kodaikanal has the solar observatory; Ooty has TIFR's radio telescope; Hanle has the Indian Astronomical Observatory.

5. In astronomy, the term 'metal' refers to:

A) Only iron and nickel

B) Elements that conduct electricity

C) Elements heavier than iron

D) Any element heavier than helium

Answer: D – Explanation: All elements other than hydrogen and helium are 'metals' to astronomers; a 'metal-poor' star such as HE 1153−0518 has very little of them.