



KAMARAJ IAS ACADEMY
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ISRO's Aditya L1 mission unlocks solar flare secrets with new image

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Context

India's first dedicated space-based solar mission, Aditya-L1, has made a ground breaking observation as one of its scientific payloads has captured the **first-ever image of a solar flare 'kernel'**.

The **Solar Ultraviolet Imaging Telescope (SUIT) payload** has captured the image in the **lower solar atmosphere** — the **photosphere and chromosphere**.

ISRO said that this observation and associated scientific results mark a major step towards **understanding the Sun's explosive activity and its impact on Earth**.

The space agency added that these observations confirm that the energy released from the flare spread through different layers of the Sun's atmosphere. This provides new insights into the complex physics responsible for these massive solar explosions, according to the space agency.

Aditya-L1 mission

The Aditya-L1 mission was launched on September 2, **2023**. On January 6, 2024, the spacecraft was successfully placed in a large halo orbit around first Earth-Sun Lagrange Point, known as **Lagrange Point L1**.

Our Sun is the nearest star, distancing about 150 million kilometres and the largest object, which is the source of energy for our solar system.

It is a hot glowing ball of **hydrogen and helium gases**.

At the central region of the sun, known as the **'core'**, the temperature can reach as high as 15 million degrees Celsius. At this temperature, a process called **nuclear fusion** takes place in the core, which powers the sun.

The **visible surface of the sun, known as the photosphere**, is relatively cool and has a temperature of about 5,500°C.

The Sun is the powerhouse energising Earth's systems, but **solar storms can disrupt infrastructure**. Mysteries like the corona's extreme heat, the origins of solar wind and eruptions like flares and **Coronal Mass Ejection (CME)** remain unresolved.

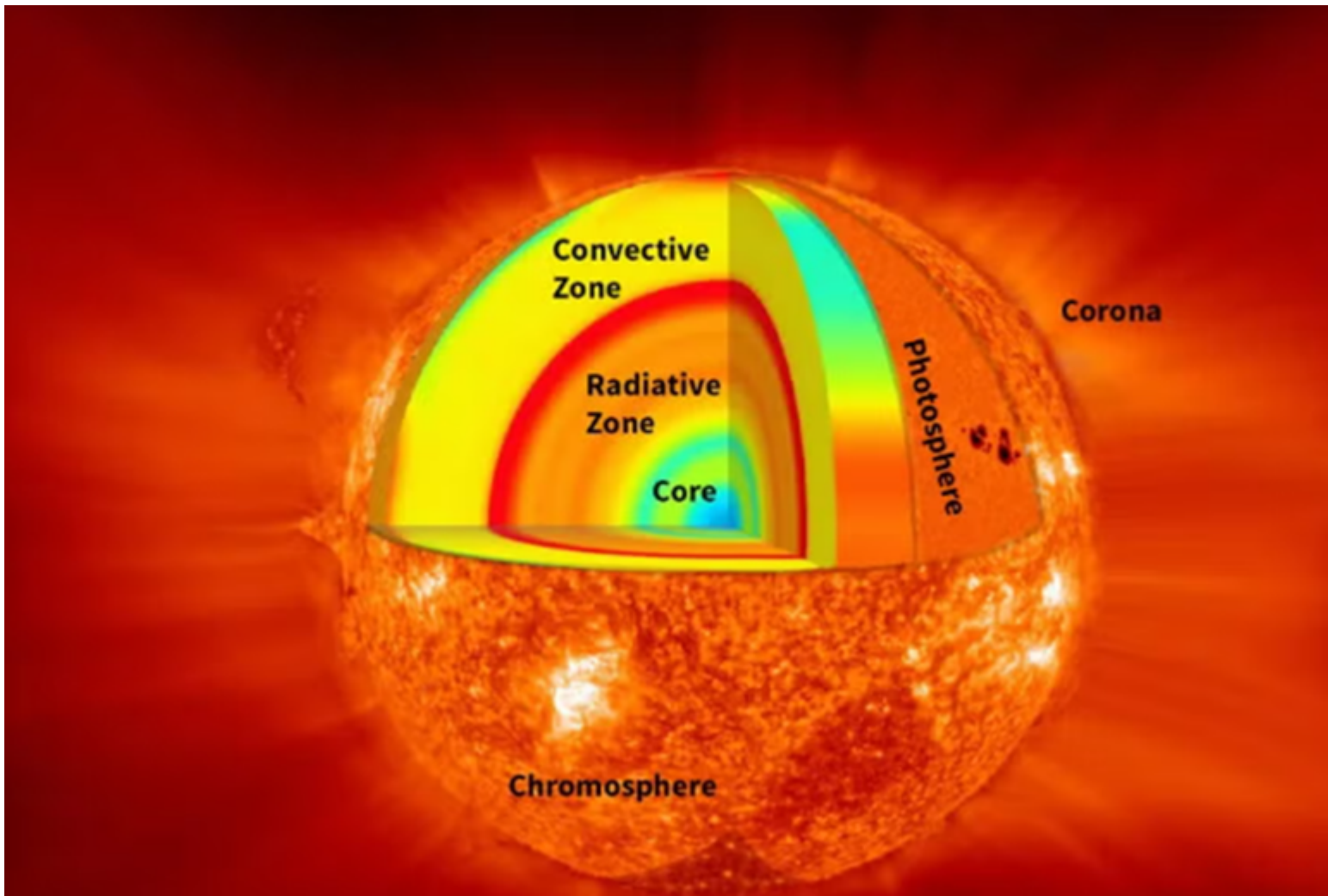
Understanding the Sun's complex magnetic behaviour is thus crucial to advancing space weather prediction, securing technological assets and unravelling stellar evolution. The Aditya-L1 mission signifies India's quest to shed light on these solar uncertainties.

Lagrange points are positions in space where the gravitational forces of two large orbiting bodies, like the Earth and Sun, produce regions of equilibrium where a smaller object can orbit while using minimal fuel

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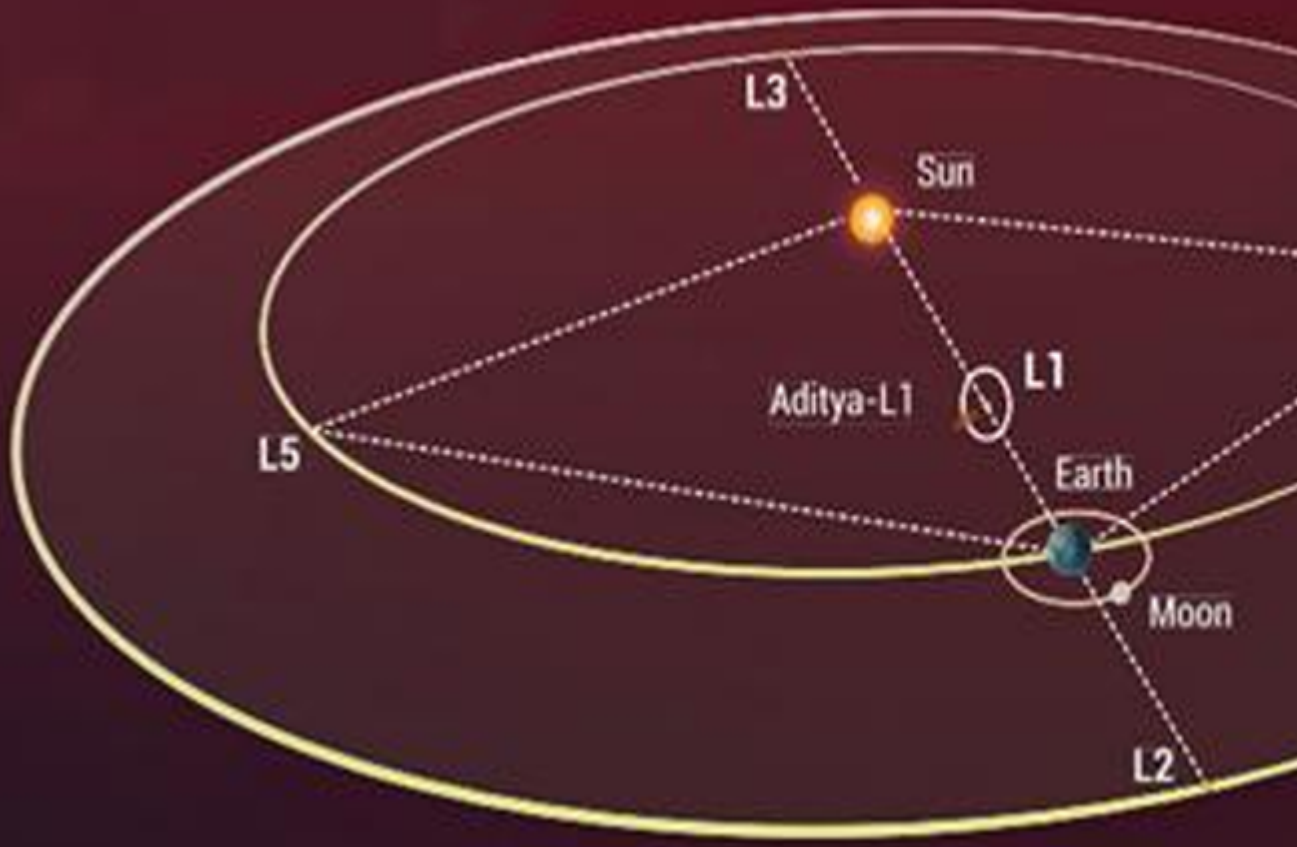


Illustration of all five Lagrange points of Sun-Earth system. The spacecraft will be