Aditya-L1's findings on Coronal Mass Ejection (CME)

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Why in news?

Aditya-L1, India's first dedicated solar observatory, captured spectroscopic data of a CME very close to its lift-off from the Sun's surface, offering unprecedented insights into solar eruptions.

> ***CME*** *is a large eruption of plasma and magnetic field from the Sun's outer atmosphere, which can travel into space. When it reaches Earth, it can cause geomagnetic storms that disrupt power grids, satellites, and communication systems.*

- **Partnership –** Indian Institute of Astrophysics & NASA scientists.
- **Exclusivity –** These are the ***1st ever spectroscopic observations*** of a CME in the ***visible wavelength range***, globally.
- **Payload –** This was achieved using the ***Visible Emission Line Coronagraph (VELC)*** payload.
  - VELC is a high-resolution coronagraph onboard the Aditya-L1 mission, designed to study the Sun's outer atmosphere (corona), developed by the Indian Institute of Astrophysics (IIA).
  - The VELC allows continuous 24-hour solar observation from the ***Sun-Earth Lagrangian Point L1***, where the Sun never sets.

Key Observations from VELC

- **CME Observation –** It captured the ***closest-ever*** spectroscopic data of a CME in the visible wavelength range using a space coronagraph.
- **Electron Density in CME –** The CME observed had an estimated electron density of ~370 million electrons/cm^3, indicating a highly energized plasma structure.
- **Electron Density in Non-CME Corona –** In contrast, the surrounding

non-CME corona near the Sun is much lower electron density, in the range 10-100 million electrons/cm^3.

- **Scientific Implication –** These measurements help differentiate CME plasma from the ambient solar corona and offer insights into solar eruption dynamics and space weather forecasting.

To know about **Aditya-L1 Mission**, Click here

Reference

The Hindu | Aditya-L1's observation on coronal mass ejection.