

Aditya-L1 Generates Doppler Velocity Images of the Solar Corona

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Why in News?

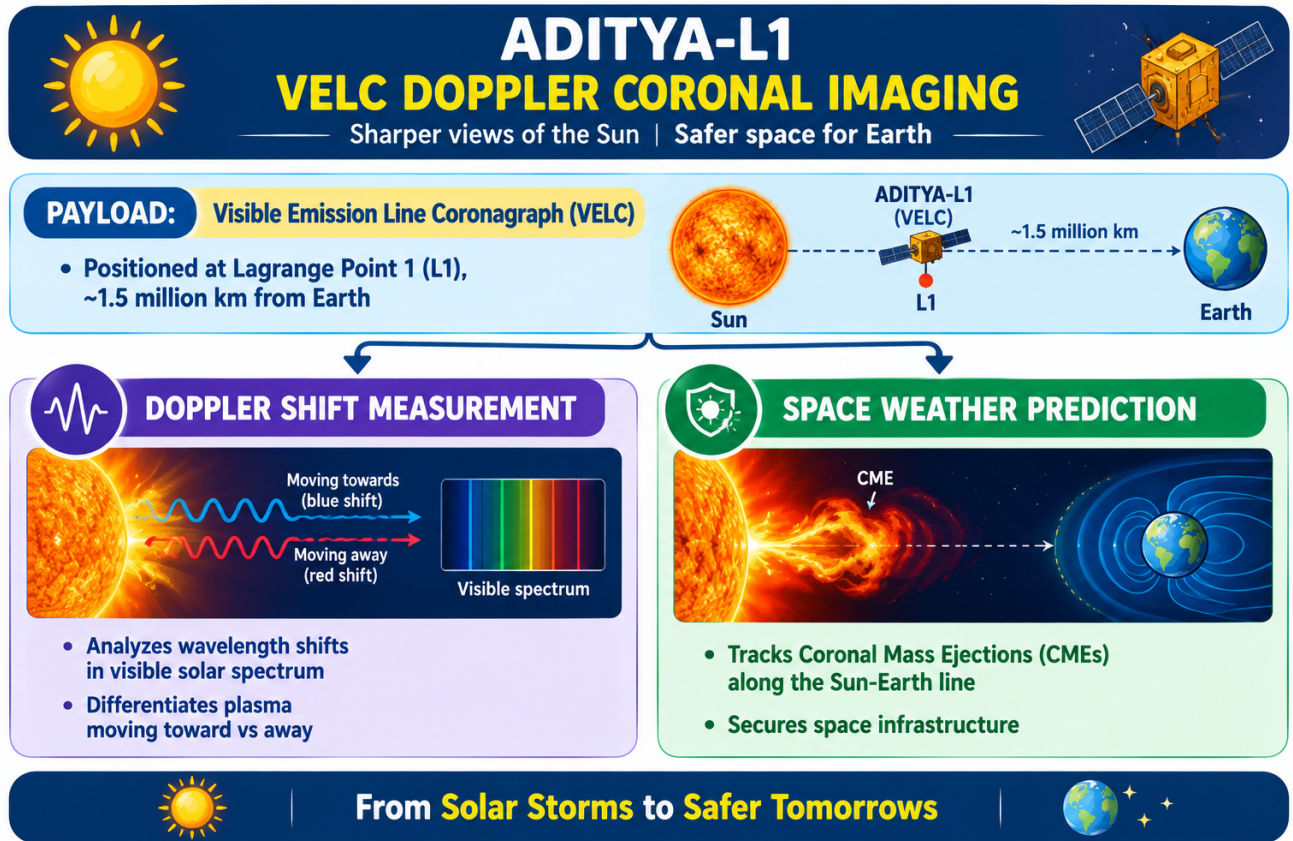
Recently, scientists at the Indian Institute of Astrophysics (IIA) successfully generated groundbreaking Doppler velocity images of the solar corona.

Key Technical Mechanism

- **The Principle of Doppler Velocity Imaging**
 - By examining the spectral line shifts in visible light emitted by the corona, researchers can measure the line-of-sight velocity of coronal plasma.
 - Shifting wavelengths make it possible to distinguish whether erupting plasma is moving **toward or away from the observer** (Earth).
- **Tracking Coronal Mass Ejections (CMEs)**
 - Until now, predicting the exact trajectory and propagation vector of CMEs along the Sun-Earth line possessed critical observational gaps.
 - VELC's new Doppler mapping capability provides vital vector data to determine whether a solar storm is heading directly toward Earth or bypassing it safely.

Strategic Importance

- **Mitigating Interplanetary Risks** - Accurate velocity profiles of CMEs safeguard critical space-based assets, communication satellites, power grids, and navigation systems from catastrophic geomagnetic disruptions.
- **Deep-Space Observational Autonomy** - Demonstrates India's indigenous prowess in processing complex space-borne spectroscopic datasets and validates Lagrange Point 1 (L1) as an optimal vantage point for uninterrupted, real-time solar monitoring.



Reference

[The Hindu | India's first solar mission Aditya-L1](#)