

Mysterious Magnetic Threads in the Solar Corona

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Why in News?

Recently, solar physicists and astronomers announced the discovery of a mysterious magnetic "web" or fine thread-like structure weaving through the Sun's outer atmosphere (the corona).

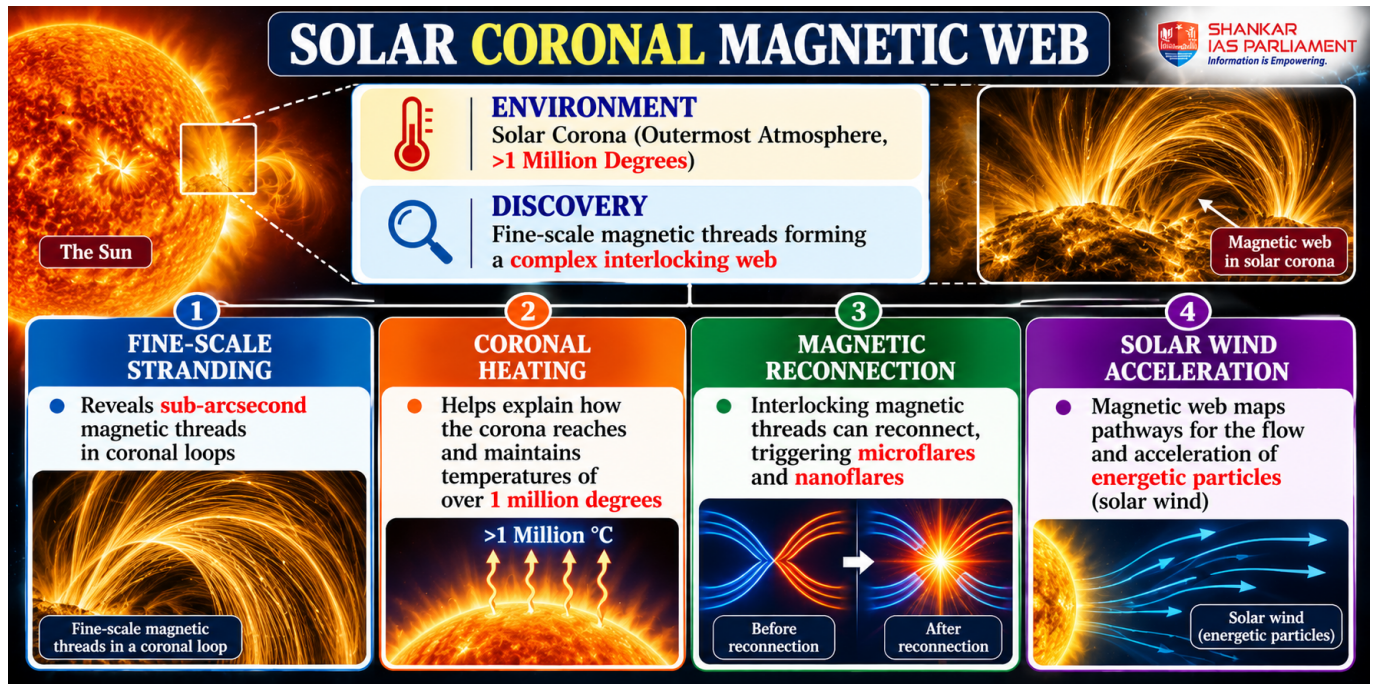
- This intricate network sheds new light on how coronal plasma is heated and how solar wind is accelerated.
- It is captured through advanced ultraviolet imaging and high-resolution solar observatories.

Key Highlights

- **Resolution of Fine-Scale Threads**
 - Previous observations showed broad coronal loops arching between magnetic poles.
 - The latest high-resolution imagery reveals that these loops are actually bundled assemblies of **thousands of ultra-thin, distinct magnetic threads**.
 - Each thread acts as an independent magnetic conduit containing superheated plasma ($>1,000,000^{\circ}\text{C}$).
- **Solving the Coronal Heating Paradox**
 - For decades, scientists puzzled over why the Sun's corona is hundreds of times hotter than its underlying surface (photosphere).
 - The newly discovered magnetic web supports advanced models of **nanoflare heating**, widespread, micro-scale magnetic reconnections.
 - Occur continuously along fine threads that release immense magnetic energy into the surrounding plasma.

Strategic Significance

- Understanding the fine structure of coronal magnetic fields improves our ability to forecast solar flares, coronal mass ejections (CMEs), and geomagnetic disturbances that impact satellite communications, power grids, and GPS navigation on Earth.
- Complements ongoing data streams from space missions (such as NASA's Solar Dynamics Observatory, Parker Solar Probe, and India's **Aditya-L1** spacecraft), which monitor coronal dynamics and solar wind origins from multiple vantage points.



Reference

[Science Daily | Mysterious magnetic web above the Sun](#)