

Solar Coronal Holes

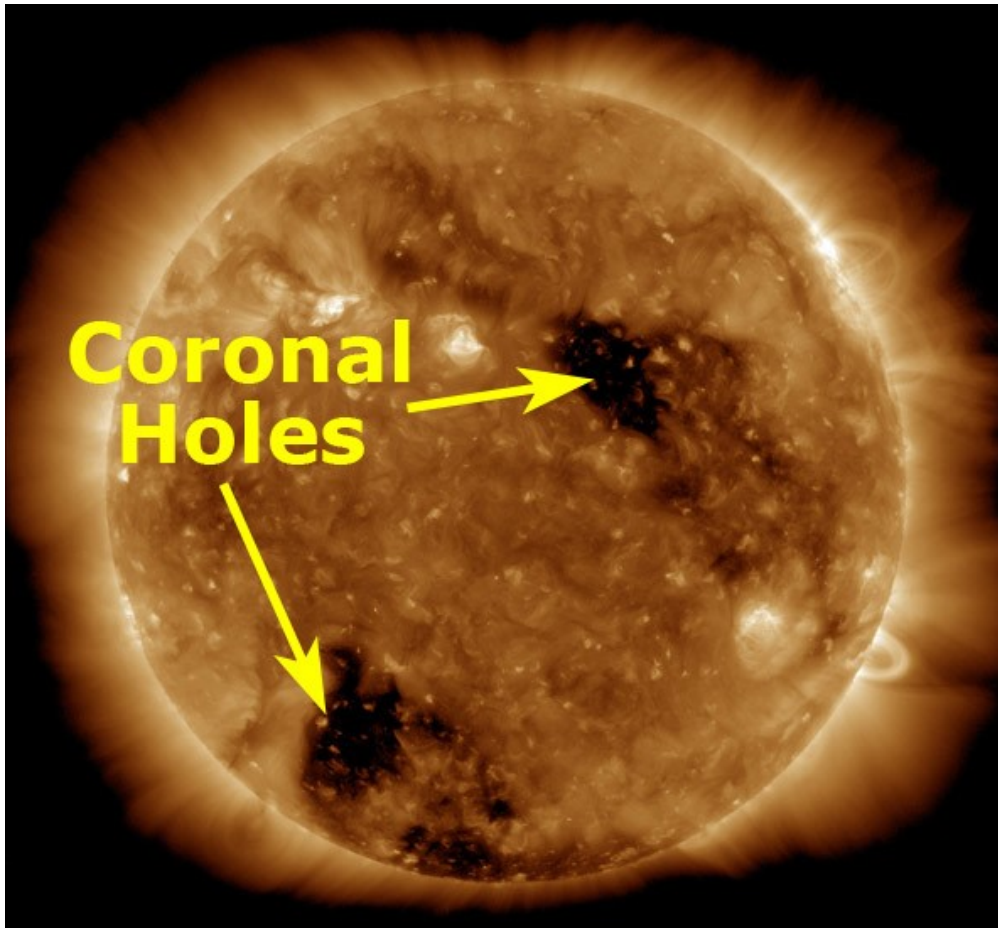
Why in News?

Astronomers from the Indian Institute of Astrophysics (IIA) recently accurately characterised the latitude dependence of temperature and magnetic field strengths within the coronal holes.

Coronal holes

- Coronal holes are large, dark areas on the sun that are cooler and less dense than the surrounding plasma.
- They are regions of open magnetic fields that allow solar wind to escape into space.
- These phenomena are intense sources of fast solar wind, streams of charged particles escaping the sun at high speeds.
- **First discovered in** - 1970s by X-ray satellites.
- These holes may appear at any time of the solar cycle but they are most common during the declining phase of the cycle.

Solar and Heliosphere Observatory (SOHO), a joint project between NASA and the European Space Agency (ESA) is a spacecraft that orbits the Sun, studying the Sun's interior, atmosphere, and solar wind.



Key findings of the study

- **Uniform Temperature** - There is no significant variation in the temperature structure of coronal holes across different latitudes.
- **Magnetic field structure** - The strength of the magnetic field structure within coronal holes *varies with latitude*, increasing from the solar equator to the poles.
- These results suggest that coronal holes likely ***originate from the deep solar interior*** and may form from the superposition of *Alfven wave perturbations*, respectively.
- Understanding the thermal structure, estimate the depths of origin of coronal holes, while radiative flux and energy estimations help quantify the thermal energy input into interplanetary space.
- **Significance of the Findings** - Improved monsoon predictions which benefit agriculture and disaster management.
- Deepen the knowledge of how solar phenomena influence Earth's weather systems.

Reference

[India Today |New Findings of Coronal Holes](#)