

B'luru scientists predict corona spectacle during total solar eclipse

Event offers rare test of magnetic field models; physicists eye hidden structures



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NEW DELHI, DHNS

Hours before Wednesday's total solar eclipse, Bengaluru physicists predicted a spectacular structure in the Sun's outer atmosphere, the corona, visible only during an eclipse.

They said the purpose of the exercise was to gain insights into solar magnetic fields, the primary drivers of space weather that threaten global satellites, aviation and telecommunication networks from time to time.

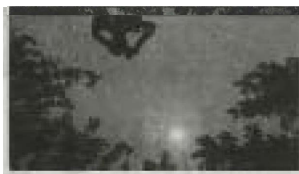
During the eclipse, the Moon's shadow will cover the Sun for two minutes and 18 seconds. While the eclipse won't be visible from India, much of Spain will get to watch the rare celestial spectacle. Western Europe, parts of northwestern Africa and some parts of the US will see a partial solar eclipse.

"Solar winds with speeds of 400 km per second are born

in the corona, which are not normally visible. The total solar eclipse gives us an opportunity to test our models on the magnetic fields associated with the corona," Dibyendu Nandi of Raman Research Institute (RRI), Bengaluru, who led the modelling initiative, told *DH*.

The model developed by Nandi with colleagues from RRI, the Indian Institute of Astrophysics, the Indian Institute of Science Education and Research, Kolkata, the University of Reading (UK), and the US National Solar Observatory indicates the presence of multiple large-scale petal-like struc-

tures and more local, elongated



Much of Spain will get to watch the rare celestial spectacle. The eclipse won't be visible from India. REUTERS

streamers.

"If this turns out to be true, the Sun's corona during the August 12 eclipse would be quite complex and spectacular," said Nandi, a solar physicist.

Testing models of solar

SPACE WEATHER

- 400 km/s solar winds are born in corona
- Global teams use eclipse to study space weather
- Solar storms threaten satellites, aviation, telecommunication networks
- Aditya-L1 to observe total solar eclipse

magnetism and space weather through eclipse observations is an important global exercise pursued by research groups with such modelling capabilities in the US, Europe and India. These models are crucial to understanding the origin of

solar storms— sudden explosions of material and energy blasted by the Sun.

The solar corona is very faint compared to the bright solar surface. It is extremely hard to observe the corona unless an object blocks the bright solar disk. This occulting object can be the Moon, while passing in front of the Sun during an eclipse, or an artificial disk mounted on a satellite — a coronagraph.

India's Aditya-L1 satellite carries such a coronagraph, as does the European Space Agency's Solar and Heliospheric Observatory and the Proba-3 mission. Aditya-L1

would also carry out observations during the total solar eclipse, sources said.

Solar eclipses during occultation by the Moon provide the scientists with excellent opportunities to study the Sun's corona, which can generate key information needed for space-weather forecasts.

Coronal magnetic field dynamics lead to solar flares, solar storms, and coronal mass ejections. The eruption of plasma and charged particles from the Sun during these events can damage satellites and affect GPS or telecommunication networks that rely on Earth's outer atmosphere.