Here comes India’s sun watcher Aditya-L1

With this advantage, the instrument has the capacity to observe the loop-like magnetic structures that form in the corona, the outer layer of the sun. “This will be the first experiment to measure the coronal magnetic field from a space platform. This was not even done by SOHO,” says Dipankar Banerjee, the principal investigator of the VLEC.

Between them, the three payloads — VLEC, the Solar Ultraviolet Imaging Telescope (SUIT) and the X-ray spectrometers — can image the sun in all wavelengths.

Like seasonal changes on the earth, the sun experiences approximately eleven-year-long cycles during which sunspots, caused by the sun’s magnetic field, start forming, increase in the ascending phase and decrease in the descending phase towards the end of the cycle.

“Studying coronal mass ejections [a phenomenon that would correlate with high sunspot activity] is not the only objective. This study can also help us understand the coronal heating problem,” says Prof. Banerjee. The ‘coronal heating problem’ refers to the fact that the photosphere, a deeper layer of the sun, is at a much lower temperature than the outer layer, the corona. Since it is believed that the heating process happens from within, what causes this heating of the outer layer, the corona, remains a mystery.

First proposed in 2008 as a 400 kg-class satellite with one scientific instrument, a coronagraph, the project has since changed and grown in size and scope. Aditya-L1 will carry seven payloads. Each of these will either image the sun or sample the space around it for traces of charged particles spewed out by the sun during coronal mass ejections.

The payloads alone will weigh close to 250 kg. The biggest of these is the VLEC, about 170 kg. The next is SUIT, weighing around 35 kg; others are much lighter. Orbiting about the L1 point, due to a play of gravitational forces acting on it, Aditya-L1 will require little energy to keep it in place.

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