

## **IIA trains young researchers from various developing countries, to analyse the solar data**

Around 25 young researchers from various developing countries, including India, were trained to analyse the solar data obtained using space and ground-based instruments at a workshop organised by the Indian Institute of Astrophysics (IIA) along with COSPAR (Committee on Space Research, France), NASA (National Aeronautics and Space Administration, USA), SCOSTEP (Scientific Committee on Solar-Terrestrial Physics, USA), and ISWI (International Space Weather Initiative, USA).

International experts who work in the related fields were invited to give lectures on the Sun and hands-on training at the Capacity-Building Workshop titled “Coronal and Interplanetary shocks: Analysis of data from Space and Ground-based Instruments,” at the Kodaikanal Solar Observatory of IIA. IIA is an autonomous institute of the Department of Science & Technology autonomous institute.

Scientists associated with the workshop said that it would help young researchers study and understand Coronal Mass Ejections (CMEs) study and their associated properties from their initiation on the Sun to their arrival at the Earth with the help of a suit of scientific instruments.

Explaining the science behind it, scientists said that the Sun is the prime source of energy for the existence and subsistence of all living beings on the Earth. “Scientific research of the last century revealed that the Sun emits X-rays (high energy), Ultra-Violet rays, Visible light, Infra-Red rays, and radio radiation (low energy). The activities of almost all living beings on the Earth are dependent on the visible light. So, by and large, the effects of visible light on life are constructive. On the other hand, the impacts of high energy radiation could be destructive and lethal, on severe exposure”, said the scientists.



“Besides radiation, it was discovered recently, by space-borne observatories, that the Sun continuously injects energetic particles into the interplanetary medium. Particle detectors

deployed in the Earth's outer atmosphere continuously count such particle influx into our atmosphere. The counts are usually moderate (2 million tonnes per second) but may go up to very high values when huge masses of solar plasma enter into Earth's atmosphere. The latter is due to sudden expulsion of a huge mass of plasma (trillion tonnes per second) confined by the strong magnetic fields present in the outer solar atmosphere, called Coronal Mass Ejections (CMEs)", the scientists explained.

The entry of CMEs into Earth's atmosphere generate shock waves, magnetic storms, high electric currents in the outer atmosphere, and so on that can destroy the communication satellites, remote sensing, and navigation systems deployed in space, and induced ground currents that can lead to long-duration power outages, and so on. "Therefore, in order to safeguard our technological systems, it becomes inevitable to monitor and collect scientific data continuously, which is expected to improve our current understanding of various processes that are associated with each other in our solar system. The eruption of CMEs on the solar atmosphere and their propagation properties in the interplanetary medium are continuously observed by white-light cameras onboard space missions and radio telescopes on the ground. Their entry into the Earth's atmosphere are monitored by particle counters, magnetometers, radio telescopes, etc. So, one can study CMEs and their associated properties from their initiation on the Sun to arrival at the Earth with the help of a suit of scientific instruments", the scientist further added.