



Union Minister Inaugurates Asia's Largest 4-metre International Liquid Mirror Telescope at Devasthal | Uttarakhand | 22 Mar 2023

Why in News?

On March 21, 2023, Union Minister of State for Science & Technology and Earth Sciences (Independent Charge), Personnel, Public Grievances, Pensions, Atomic Energy and Space Dr. Jitendra Singh inaugurated Asia's largest 4-metre International Liquid Mirror telescope.

Key Points

- Speaking on the occasion, Dr Jitendra Singh said that this historic event of the inauguration of Asia's largest 4-metre International Liquid Mirror Telescope will provide India with a host of capabilities to study the mysteries of space and astronomy and share the same with the rest of the world. Keep it on a different and higher level.
- Aryabhata Research Institute of Observational Sciences (AREES) announced that the world-class 4-metre International Liquid Mirror Telescope (IMLT) is now ready to explore distant and deep celestial space. It received its first light in the second week of May 2022.
- This telescope is located at an altitude of 2450 metres in the observatory complex at Deosthal in Nainital district of Uttarakhand (India) at AREES, an autonomous institute under the Department of Science and Technology (DST), Government of India.
- Union Minister for Science and Technology Dr. Jitendra Singh informed that IMLT is supported by Aryabhata Research Institute of Observational Sciences (AREES), University of Liège, Belgium and Royal Observatory of Belgium, Poznań Observatory, Poland, Ulugh Beg Astronomical Institute of Uzbek Academy of Sciences and Researchers from the National University of Uzbekistan and the University of British Columbia, Laval University, the University of Montreal, the University of Toronto, York University and the University of Victoria in Canada.
- The telescope was designed and built by Advanced Mechanical and Optical Systems (AMOS) Corporation and the Center Spatial de Liège in Belgium.
- He said, this ILMT uses a 4-metre diameter rotating mirror made of a thin layer of liquid mercury to collect and condense and focus the light. Metallic mercury is liquid at room temperature and is also highly reflective and therefore, ideally suited to make such a mirror.
- ILMT is the first liquid mirror telescope specially designed for astronomical observation and is the largest aperture telescope currently available in the country as well as the first optical survey telescope in India.
- The ILMT is designed to survey the strip of sky it passes over every night, helping to detect transient or variable celestial objects such as supernovae, gravitational lenses, space debris and asteroids.
- This telescope will generate about 10-15 gigabytes of data while scanning a strip of sky every night and the data generated by ILMT will be processed with the facility of application of Big Data and Artificial Intelligence/Machine Learning (AI/ML) algorithms. The same will be used to classify objects observed with IMLT.
- The minister informed that the data will be rapidly analysed to find and identify variable and transient stellar sources. A DOT of 3.6 m, together with the availability of sophisticated back-end equipment, will allow rapid follow-up observations of the latest discovered transient sources with adjacent ILMTs.
- In addition, the data collected from ILMT would be ideally suited to conduct an intensive photometric and astrometric variability survey over the next 5 years of operational time.
- It is known that a liquid mirror telescope consists mainly of three components – first, a Bowl-like

container containing a reflective liquid metal (essentially mercury) and second, an air bearing (or motor) on which the liquid mirror is mounted and third, a drive system. Liquid mirror telescopes take advantage of the fact that the surface of a rotating liquid naturally takes on a parabolic shape that is ideal for focusing light.

- A scientific grade thin transparent film of Mylar protects the mercury from the air flow. Reflected light passes through a sophisticated multi-lens optical corrector that produces excellent images over a wide field of view. Also, a 4K×4K CCD camera, located above the mirror at the focus, records 22 arc-minute wide strips of the sky.