

India to join project to build largest telescope

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NEW DELHI: In a giant leap for astronomy, India will help build the world's largest and most advanced telescope. About 20 institutions like the Indian Institute of Astrophysics, Aryabhata Research Institute of Observational Sciences, Inter-University Centre for Astronomy and Astrophysics and the Tata Institute of Fundamental Research will join construction of the Thirty Metre Telescope (TMT) – a telescope that will have nine times the collecting area of the current largest optical/infrared telescopes and will provide unparalleled high-sensitivity spatial resolution more than 12 times sharper than what is achieved by the Hubble Space Telescope.

The Department of Atomic Energy has proposed a budget of Rs 700 crore for the project over the next five years.

The 30-meter aperture will permit the telescope to focus more sharply than smaller telescopes by using the power of diffraction of light. The large aperture also collects more light than smaller scopes, allowing images of fainter objects.

Two of the most exciting challenges to astrophysics are to understand the physical processes that lead to star and planet formation and to characterize the properties of extra-solar planets.

TMT will have a very important role to play in many aspects of this endeavour. The TMT project, being spearheaded by the California Institute of Technology and having international partners like Canada, Japan and China, has entered the early construction phase and is expected to be completed by 2019.

The Planning Commission's working group for the DAE says this large aperture (in the range 25-40 metre) optical telescope will mark the next giant leap in the field of astronomy.

The report of the working group said, "India was invited to participate in these endeavours. After careful assessment by its astronomy community, India decided to join the TMT project in 2010 in Hawaii as an observer. Observer status is the first step in becoming a full partner in TMT and participating in engineering development and scientific use of the world's most advanced and capable astronomical observatory."

It added, "As an observer, we can begin exploring the specific areas where India can contribute to the project and look forward to becoming a full partner with a formal agreement and commitment for funding."

According to the group, TMT is expected to be operational in roughly eight years at which time it will be the first of the next generation of ground-based optical observatories.

"This revolutionary telescope will integrate the latest innovations in precision control, segmented mirror design, and adaptive optics to correct for the blurring effect of earth's atmosphere. The 30-metre segmented primary mirror will help TMT get sharper images," the group said.

Experts say TMT will be a fundamental tool for investigating exploration of the "dark ages" when the first sources of light and the first heavy elements in the universe formed.

The nature of "first-light" objects and their effects on the young universe are among the outstanding open questions in astrophysics. TMT will allow detailed spectroscopic analysis of galaxies. Observations with TMT will enable astronomers to study objects in our own solar system and stars throughout our Milky Way, its neighbouring galaxies and forming galaxies at the very edge of the observable universe, near the beginning of time.