

India joins multinational telescope project

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NEW DELHI: India has joined the Thirty Metre Telescope (TMT) project, the next generation astronomical observatory that will be located on Mauna Kea, Hawaii.

This was announced by Minister of State for Science and Technology Prithviraj Chauhan in California on Friday.

The observatory is scheduled to begin operations in 2018.

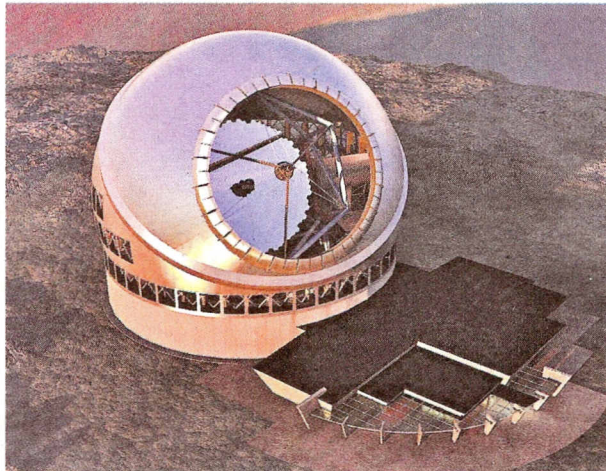
Observer status

India has been granted observer status on the TMT Board. This is the first step to becoming a full partner in TMT, which will mean participating in the development and scientific use of what will be the world's most advanced and capable astronomical observatory, according to the press release by the TMT project team.

"In about a year's time," said Ajit Kembhavi, Director, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, "we expect this observer status to be converted into full partnership in the project."

The proposal to join the TMT project was initiated by three Indian institutes engaged in astronomy: the IUCAA, the Indian Institute of Astrophysics (IIA), Bangalore, and the Aryabhata Research Institute of Observational Sciences (ARIES), Nainital. "The government had regarded our proposal as a reasonable one and hence the decision," Professor Kembhavi added.

"The government and people of India recognise the im-



BIG VISION: An artist's impression of the TMT.

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portance of embarking on world class, international science collaboration," said Science and Technology Secretary T. Ramasami, who had accompanied the Minister to sign the agreement.

Originally, there were three international telescope projects to choose from for Indian participation: the 42-m European Extremely Large Telescope (E-ELT) of the European Southern Observatory (ESO), the 24.5 m Grand Magellan Telescope (GMT) and the TMT of the United States. The E-ELT, in fact, has offered observation time on the existing ESO telescopes before it comes into operation.

Indian scientists will have access to the existing telescopes operated by Caltech, the nodal institution for TMT. The TMT project is an international partnership among Caltech, the University of California and the Association of Canadian

Universities for Research in Astronomy.

The National Astronomical Observatory (NAO) of Japan joined TMT as a collaborating institution in 2008. The National Astronomical Observatories of the Chinese Academy of Sciences joined TMT with the observer status in November 2009.

The TMT was proposed by American scientists after the enormous success of the first new technology telescope, the twin 10 m Keck Telescope, on Mauna Kea. The TMT's primary mirror builds on the technological and operational heritage of Keck.

Spatial resolution

Like existing ground-based observatories, TMT will be capable of observations with a spatial resolution limited by the natural turbulence of the earth's atmosphere. The TMT will be able to observe objects nine times fainter than Keck in an equal amount

of time. However, it will be the first ground-based telescope with Adaptive Optics (AO) as an integral system element. AO denotes systems designed to sense atmosphere turbulence in real time, correct the optical beam of the telescope to remove its effect and enable true diffraction-limiting image on the ground. For any astronomical observations, this is equivalent to observing at a fraction of the cost of a space-based observatory like the Hubble Space Telescope (HST).

According to the arrangement, Indian scientists will get a percentage of the observational time proportional to the percentage of the total project cost that the Indian government would be willing to bear. The next steps in the Indian decision-making process would involve an in-principle decision of the Union Cabinet on the extent of contribution and a decision on the mode of financing the pledged amount. Though the final project cost is not yet clear, it is likely to be in the region of \$1 billion. The project has, as of now, completed its \$77 m design development phase with \$50 m from the Gordon and Betty Moore Foundation and \$22 m from Canada. The project has now entered its early construction phase, thanks to an additional \$200 m pledge from the Foundation. Caltech and University of California have agreed to raise matching funds of \$50 m bringing the current construction investment to \$300 m. Canadian partners propose to supply the enclosure, the telescope structure and the first light adaptive optics.