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THE LARGE MILLIMETER TELESCOPE (LMT)

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RESUMEN

Se presenta el proyecto del Gran Telescopio Milimétrico (GTM) que será construido por el INAOE en una colaboración binacional con la Universidad de Massachusetts, en Amherst. Este es un ambicioso proyecto que consiste en una gran antena de radio que estará optimizada para trabajar en ondas milimétricas rodeada por una cúpula o radomo y será construido en México y operado por ambas instituciones. El costo del proyecto se estima en 46.4 millones de dólares, con un financiamiento binacional.

ABSTRACT

The Instituto Nacional de Astrofísica, Optica y Electrónica and the University of Massachusetts present a binational project, The Large Millimeter Telescope (LMT) which involves the construction of a 50 m radio antenna. This instrument will operate in millimeter wavelengths with a radome or protective enclosure and will be constructed in Mexico and operated by both institutions. The construction and operation of the instrument has an estimated cost of 46.4 million US dollars; the financing is also binational.

Key words: **SITE TESTING — TELESCOPES**

1. THE SCIENTIFIC LMT PRODUCTION

The millimeter radiation is generated in different processes that take place in the Univèrse. In particular, the rotation of molecules emits and absorbs radiation at such wavelengths, and could be an important tool for measuring velocities, chemical abundances, densities, temperatures, etc. in regions where such molecular compounds are present. Moreover, given the temperatures involved, the thermal radiation in the interstellar matter can easily be detected.

With its projected large collecting surface, and its superior sensitivity to other existing telescopes of its kind, the LMT telescope will have a great impact for its capacity to detect both weak spectral lines, and also radiation sources of extremely low intensity. Some examples of its important potential for research are as follows:

1.1. Spiral Galaxy Structure

The LMT will be able to map the spiral structure of the galaxies with excellent spatial resolution, hence enabling a better understanding of the relationship between molecular clouds and dust emission, as well as with neutral hydrogen and Hα emission, thus enabling the study of the role of the spiral density waves on the star formation history at the spiral arm regions. These observations will allow us to derive the temperature, density, mass and kinematic properties of such regions. The knowledge of these parameters will help us in our understanding of the conditions at which proto-stellar collapse occurs.

1.2. Geometry of the Magnetic Field

Using a polarimeter the LMT will turn into an ideal instrument to study the geometry of the magnetic field in the central regions of dense molecular clouds. Current observational evidence from the external part of the clouds, suggest orderly magnetic fields. Throughout gravitational collapse, magnetic field lines can not be frozen and in order to have the contraction that allows stars to be formed, a magnetic flow must occur.

1.3. Formation of Stars and Planetary Systems

Early stages of stellar formation are characterized by accretion and ejection of material. The magnetic flow carried out by ejection of jets has a definite influence in the evolution of the process. Eventually, it is believed,

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