The Thirty Meter Telescope (TMT) is a planned observatory that will be located on Mauna Kea, Hawaii. Its primary mirror will consist of 288 hexagonal segments, each 1.48 m in diameter, and will be 30 m in diameter when fully deployed. The TMT will be equipped with advanced instruments capable of performing a wide range of astronomical observations, including high-resolution imaging, spectroscopy, and astrophysical research.

**Examples of Solar System Science Cases**

- **Observation of long-period orbit comets**, study of their composition and interaction with planet formation Models.
- **Characterization of Trans-Neptunian Objects (TNOs)**: Out of over 1,500 TNOs known only 100 have been characterized – because they get too faint for 9-10 m class telescopes. Getting visible plus NIR spectra, particularly NIR to look for ice signatures, will allow these data set better constraints for solar system formation models. 
- **Diffraction limited observation of Solar System objects (Neptune)**: TMT's AO-assisted, diffraction-limited resolution will approach spacecraft-quality imaging; these will be more distant, Voyager data, blurred to match the resolution of TMT at K'.
- **IRIS**: High signal-to-noise ratio imaging and spectroscopy for greater than 50% of sky. This can be done with a mere 2 observing nights in a facility like TMT combining observations of WFOS and IRIS for observation of 100 targets down to magnitude 24.

**Abstract**

The TMT will consist of a 30-m filled-aperture segmented primary mirror and will include non-sideral rate tracking capabilities for observing Solar System objects. Its sensitivity will be 14 times larger than that of 9-m class telescopes for seeing-limited observations up to 200 times larger for background limited adaptive optics (AO) observations - and will allow high angular/spatial resolution with diffraction-limited capability in the near infrared. AO guiding will accommodate faint, small angular size solar system objects to serve as natural guide stars for non-sideral observations. For Kupfer belt objects (KBos), on-piston wavefront sensors can crawl the field-of-view to look for background natural stars that can be used for tip/tilt correction. Here, we describe the main characteristics of the Thirty Meter Telescope, its first light natural stars that can be used for tip/tilt correction. Here, we describe high angular/spatial resolution with diffraction-limited capability in the assisted by 6 laser guide stars and 2 deformable mirrors. Multiconjugate Adaptive Optics System (MAOS) dubbed the main characteristics of the Thirty Meter Telescope, its first light natural stars that can be used for tip/tilt correction. Here, we describe high angular/spatial resolution with diffraction-limited capability in the assisted by 6 laser guide stars and 2 deformable mirrors.