TMT Adaptive Optics Facility Status Repor

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Abstract

The TMT first light AO facility consists of the Narrow Field Infra-Red AO System (NFIRAOS), the associated Laser Guide Star Facility (LGSF) and the AO Executive Software (AOESW). NFIRAOS is a 60 x 60 order laser guide star (LGS) multi-conjugate AO (MCAO) system, which provides uniform, diffraction-limited performance in the J, H, and K bands over 17-34 arc sec diameter fields with 50 per cent sky coverage at the galactic pole, as required to support the TMT science cases. NFIRAOS includes two deformable mirrors, six laser guide star wavefront sensors, one high order Pyramid WFS for natural guide star AO, up to three low-order, IR, natural guide star on-instrument wavefront sensors (OIWFS) within each client instrument, and up to four guide windows on the science detectors (ODGW). At first light, NFIRAOS will fed two science instruments: the Infrared Imaging Spectrograph (IRIS) and the Multi-Objective Diffraction-limited High-resolution Infrared Spectrograph (MODHIS). The LGSF system includes the sodium lasers and optics required to generate the NFIRAOS and future AO system laser guide star asterisms. In this paper, we will provide an update on the progress in designing, modeling, and fabricating the TMT first light AO systems, the AO components, and the first light NFIRAOS science instruments. This will include NFIRAOS final design activities, re-baselining the NFIRAOS visible wavefront sensors to commercial detectors, LGSF preliminary design activities, progress in developing the Real Time Controller software and manufacturing the NFIRAOS deformable mirrors, as well as design activities and prototyping for the NFIRAOS science instruments

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