The Large Millimeter Telescope: Current Status and Early Science Observations

The Large Millimeter Telescope (LMT) Alfonso Serrano is a bi-national (Mexico & USA) telescope facility operated by the Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE) and the University of Massachusetts. The LMT is designed as a 50-m diameter single-dish millimeter-wavelength telescope that is optimized to conduct scientific observations at frequencies between 70 and 345 GHz. The LMT is constructed on the summit of Sierra Negra at an altitude of 4600m in the Mexican state of Puebla. Following first-light observations in mid-2011, the LMT project conducted a shared-risk Early Science observing program in 2013 and early 2014, including VLBI observations, using the inner 32-m diameter of the primary reflector with an active surface control system. The complete 50-m diameter reflector surface is constructed from 180 individual surface segments, each of which contains 8 high-precision electro-formed nickel panels with a rhodium coating fabricated by Media Lario Technologies. The remaining surface panels, to increase the current primary reflector diameter from 32-m to the full 50-m, are scheduled for delivery to the LMT before the end of 2015. I will briefly describe the current status of the telescope project, the instrumentation program and the development plan to improve the performance of the telescope systems, as well as the on-going transition towards the formation of the LMT Observatory to support the scientific community. The recently commissioned LMT has unique capabilities, compared to existing smaller single-dish (sub- )millimeter-wavelength telescopes, that will enable the study of the formation and evolution of structure at all cosmic epochs. In this context I will summarize the scientific synergies of the LMT derived from observations conducted with a large single-dish millimeter-wavelength telescope, and those from the current and future generations of major new multi-wavelength facilities that will begin scientific operations in the coming decades, including ALMA, JWST, SPICA, large optical telescopes (TMT, GMT, E-ELT) and SKA amongst others.