



Contribution ID: 46

Type: **Talk**

Status of the Cherenkov Telescope Array Observatory

Tuesday, September 16, 2025 10:45 AM (20 minutes)

The Cherenkov Telescope Array Observatory (CTAO) is a project whose objective is to advance knowledge of the gamma-ray sky with the largest gamma-ray observatory ever built. The CTAO will consist of two Imaging Atmospheric Cherenkov Telescope (IACT) arrays, with more than 60 telescopes. One of them is under construction in the northern hemisphere, at the Roque de los Muchachos Observatory (ORM) on the Canary Island of La Palma. The other will be installed in the southern hemisphere, in Paranal, Chile.

The CTAO will use IACTs of three different sizes to cover a wide energy range (from 20 GeV to 300 TeV). The construction of the CTAO is progressing, with the commissioning of large-sized telescopes (LSTs) at the ORM. In parallel, infrastructure work and telescope deployment will soon begin at the CTAO's southern site.

The CTAO team is developing the science and technical operations plan that will allow it to meet the scientific requirements. For each CTAO array, the Array Control and Data Acquisition (ACADA) software will allow for the operations of several functional units (subarrays) simultaneously. An automatic scheduler within ACADA will plan and adapt on the fly the desired operations, creating, merging, and splitting subarrays to carry them out. These operations will consist of both observation and calibration activities. A set of calibration and environmental monitoring instruments, such as laser imaging detection and ranging (LIDAR) instruments and weather stations, will operate together with the IACTs under the supervision of ACADA. These instruments will provide detailed atmospheric characterization, which is important for telescope operations and subsequent data analysis, as well as external light sources for the calibration of the IACT cameras. In addition, CTAO will incorporate the capacity for fast science alert processing, together with the rapid movement of CTAO telescopes, which makes CTAO an excellent instrument for studying high-impact astronomical transient phenomena such as gamma-ray bursts or gravitational waves.

This contribution outlines the status of the construction of the CTAO and the planned science and calibration operation schemes.

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Session Classification: Cherenkov light imaging in neutrino and astroparticle physics experiments

Track Classification: Cherenkov light imaging in neutrino and astroparticle physics experiments