

# The next generation of Cherenkov telescopes: innovations, challenges, and perspectives of ASTRI and CTAO

*Tuesday 4 June 2024 14:55 (20 minutes)*

Within the next five years, the next generation of Cherenkov Imaging Atmospheric Cherenkov telescopes (IACT) arrays will be completed or very close to completion. The first of these facilities is the ASTRI Mini-Array, a project, led by INAF, to build and operate nine IACT telescopes at the Teide Astronomical Observatory in Tenerife (Spain). The second one is the Cherenkov Telescope Array Observatory (CTAO) which will be the world's largest and most sensitive instrument to study high-energy phenomena. INAF contributes to the project in the construction of all three kinds of telescopes and the software development. INAF leads the international consortium to build 37 Small-Sized Telescopes (SSTs) and the program to build 2 Large-Sized Telescopes to be installed at the CTAO southern site. Finally, the Large Array of imaging atmospheric Cherenkov Telescopes, an array of 32 of telescopes of 6 meters diameter, will be installed by the Chinese Academy of Sciences at the site of the Large High-Altitude Air Shower Observatory on Mt. Haizi (China). The implementation of such arrays comes with various technical, logistic, and management challenges. In this regard, innovative technologies have been utilized to develop the ASTRI-Horn prototype, and similar solutions have been adopted to tackle these challenges in the case of the ASTRI Mini-Array. The ASTRI Mini-Array project serves as a precursor to produce the SST Telescopes, as optics and electro-mechanical structures are similar. Therefore, the ASTRI Mini-Array project provides a critical training ground for optimizing methods and approaches for SST telescopes production and quality assurance processes.

## **sessioni congresso**

Tecnologie avanzate e strumentazione

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**Session Classification:** Tecnologie Avanzate e Strumentazione