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The Astri program

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The Cherenkov Telescope Array (CTA) will be the largest ground-based very high-energy gamma-ray detection observatory in the world with more than one hundred telescopes located in the Northern and Southern Hemispheres (La Palma, Canary Islands and currently proposed at Paranal, Chile). The energy coverage, in the southern CTA array, will extend up to 300TeV thanks to a large number (up to 70) of small size telescopes, with their primary mirrors of about 4 meters in diameter and large field of view of the order of 9 degrees.
In the CTA project framework Italy is giving an important contribution in the development of the telescope array through the ASTRI program.
The first aim of the program was to design, realize and deploy a prototype of the CTA small-size telescopes named the ASTRI SST-2M, The prototype telescope is now installed in Italy at the INAF Observatory on Mt. Etna (Sicily) and is entering in its commissioning and science verification phase. During this phase, that includes scientific observations of known sources such as the Crab Nebula and a few blazars, the prototype performance will be crosschecked with the predictions of Monte Carlo simulations.
The next step of the program will be the production of a set at least nine end-to-end ASTRI telescopes named ASTRI mini-array, proposed as one of the first seed of CTA telescopes at the south site. This effort is led by INAF in synergy with the Universidade de Sao Paulo (Brazil) and the North-West University (South Africa).
ASTRI telescopes are characterized by an optical system based on a dual-mirror Schwarzschild-Couder design and by a curved focal plane covered by silicon photomultiplier sensors managed by a fast front-end electronics. The telescope prototype, developed by the Italian National Institute for Astrophysics, INAF, follows an end-to-end approach that includes the internal and external calibration systems, control/acquisition hardware and software, data reduction and analysis software, and the data archiving system.

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