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The Cherenkov Telescope Array Observatory

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The field of very high energy (VHE; $>100\text{GeV}$) gamma-ray astronomy is set to enter a new epoch with the arrival of the Cherenkov Telescope Array Observatory (CTAO). Since the birth of the field in 1989, with the discovery of emission above 1 TeV from the Crab nebula, almost 200 sources have been identified by the previous and current generations of experiments. The study of these sources has provided exciting glimpses into the physics of the most extreme known environments. To further our understanding of the very high energy gamma-ray sky, a significant enhancement in sensitivity at TeV energies is required. A wider energy coverage from tens of GeV to hundreds of TeV and improved angular and energy resolution, with respect to the currently running facilities, are also essential. The major topics that CTAO will address cover the broad themes: the role and origin of cosmic rays, studying extreme environments and probing the frontiers of physics. As an open proposal-driven observatory, with access to the full sky, new breakthroughs will be made possible by allowing the entire astronomical community to explore data in a new discovery space. Additionally, CTAO will achieve an unprecedented sensitivity to short-timescale phenomena, making it a key instrument for the future multi-messenger and multi-wavelength time domain astronomy including collaborations with gravitational wave and neutrino observatories.

Summary

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