

The Telescope Array Experiment: Exploring the Extremely High-Energy Universe

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Cosmic rays are high-energy protons and nuclei originating from outer space, and they are thought to be associated with the most energetic phenomena in the universe. Their energy ranges from GeV to 100 EeV (10^{20} eV, ten-to-the-twentieth electron volts). Among these, those with energies exceeding 1 EeV (10^{18} eV) are referred to as ultra-high-energy cosmic rays (UHECRs).

To study UHECRs, we constructed a large-scale cosmic ray detector, the Telescope Array (TA), in the desert of Utah, USA. Since 2008, the TA experiment has been continuously observing UHECRs. Key measurements include the energy spectrum, mass composition, and anisotropy in the arrival directions of UHECRs.

In this presentation, I will share recent highlights from the TA experiment and discuss the future prospects of UHECR studies. This includes collaboration with observations of other messengers, such as high-energy neutrinos, to further our understanding of these cosmic phenomena.

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