

The Telescope Array experiment for researching Ultra High Energy Cosmic Rays.

Monday, 2 October 2017 15:00 (20 minutes)

We will introduce observation technique, future plan and report current results of the Telescope Array (TA) experiment to research Ultra High Energy Cosmic Rays (UHECRs).

The UHECR, highest energetic phenomena in the Universe, is crucially important to solve mysteries in modern astrophysics. The UHECRs can be observed with an Extensive Air Shower (EAS) which is an interaction of UHECR with the atmosphere as a natural calorimeter.

The TA experiment is an observatory to observe the EASs of the UHECRs using two types of detectors. One type is an array by ~500 of surface detectors (SDs) to catch charged particles on the ground, and the other type is 3 stations of fluorescence detector (FD) to observe fluorescence photons emitting from air molecule excited by EAS. Currently, we are expanding aperture 4 times larger with additional 500 of SD and 2 stations of FD, and the branch experiments of TA using Cherenkov emission from EAS and radio scatter by EAS are operating and developing. To monitor the stability of the detectors, we use various on-site calibration systems and facilities, one of the unique facility to generate artificial EAS using electron linear accelerator named ELS. With detectors and calibration system, we can precisely determine properties of UHECR; the energy spectrum, chemical composition, and the arrival direction. Most exciting achievement is finding the event cluster with an energy greater than 57 EeV so-called "GZK energy limit" which is evidence of a possible source of UHECR.

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