

Energy spectrum measured by the Telescope Array experiment in $10^{15.6}$ eV to $10^{20.3}$ eV range

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The Telescope Array (TA) experiment is the largest cosmic ray detector in the Northern Hemisphere. The TA surface detector (SD) array is deployed on a square grid of 1.2 km spacing, covering an effective area of 700 km². The TA SD is overlooked by three fluorescence detector (FD) stations: Black Rock Mesa (BRM), Long Ridge (LR), and Middle Drum (MD). The TA BRM and LR stations cover 3 to 33 degrees in elevation, while the TA MD, together with the TA low energy extension (TALE) FD, cover 3 to 57 degrees. In addition, there is a TALE infill array, which consists of 400 and 600 m spaced counters placed in front of the TA MD site at distances ranging from 1.5 to 3 km.

The TA SD observes cosmic rays above $10^{18.2}$ eV with the most statistics. The TA FD stand alone measurement, on the other hand, is sensitive to cosmic rays above $10^{17.2}$ eV. Because of a 10% duty cycle, it provides the best statistics in $10^{17.2}$ eV to $10^{18.5}$ eV range. Together with the TALE, the TA FD observes cosmic rays down to $10^{15.6}$ eV. We report the energy spectrum of cosmic rays obtained by a combination of TA SD, TA FD and TALE measurements.

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