

TA Monocular Spectrum Measurement

Wednesday, July 14, 2021 1:12 PM (12 minutes)

The Telescope Array (TA) Cosmic Ray Observatory is the largest cosmic ray detector in the northern hemisphere. TA was built to study ultra-high-energy cosmic rays (UHECRs), cosmic rays with energies above 1 EeV. TA is a hybrid detector, employing both a surface detector array and fluorescence telescopes. We present a measurement of the cosmic ray energy spectrum for energies above $10^{17.5}$ eV using only the fluorescence telescopes. A new, machine-learning based, weather classification scheme was used to select data parts with good weather and ensure the quality of the fluorescence data. The data from the Black Rock Mesa (BR) and Long Ridge (LR) fluorescence telescope stations were analyzed separately in monocular mode, with the calculated fluxes combined into a single spectrum. We present fits of the combined spectrum to a series of broken power law models. A three-times-broken power law gives the best fit. The three breaks suggest an additional feature of the spectrum between the previously observed Ankle and the GZK suppression.

Keywords

CR Spectrum, Monocular

Collaboration

Telescope Array

other Collaboration

Subcategory

Experimental Results

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Session Classification: Discussion

Track Classification: Scientific Field: CRI | Cosmic Ray Indirect