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Joint analysis of the energy spectrum of ultra-high-energy cosmic rays as measured at the Pierre Auger Observatory and the Telescope Array

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The measurement of the energy spectrum of ultra-high-energy cosmic rays (UHECRs) is of crucial importance to clarify their origin and acceleration mechanisms. The Pierre Auger Observatory in Argentina and the Telescope Array (TA) in the US reported their measurements of UHECR energy spectra observed in the southern and northern hemisphere, respectively. The region of the sky accessible to both Observatories ([-15,+24] degrees in declination) can be used to cross-calibrate the two spectra.
The Auger-TA energy spectrum working group was organized in 2012 and has been working to understand the uncertainties in energy scale in both experiments, their systematic differences, and differences in the shape of the spectra. In previous works, we reported that there was an overall agreement of the energy spectra measured by the two observatories below 10 EeV while at higher energies, a remaining significant difference was observed in the common declination band. We revisit this issue to understand its origin by examining the systematic uncertainties, statistical effects, and other possibilities. We will also discuss the differences in the spectra in different declination bands and a new feature in the spectrum recently reported by the Auger Collaboration.

Keywords

ultra-high energy cosmic rays, energy spectrum

Collaboration

other (fill field below)

other Collaboration

Pierre Auger Observatory, Telescope Array

Subcategory

Experimental Results

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