

The Energy Spectrum of Telescope Array's Middle Drum Detector and the Direct Comparison to the High Resolution Fly's Eye Experiment

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The Telescope Array's Middle Drum fluorescence detector was instrumented with telescopes refurbished from the High Resolution Fly's Eye's HiRes-1 site. The data observed by Middle Drum in monocular mode was analyzed via the HiRes-1 profile-constrained geometry reconstruction technique and utilized the same calibration techniques enabling a direct comparison of the energy spectra and energy scales between the two experiments. The spectrum measured using the Middle Drum telescopes is based on a three-year exposure collected between December 16, 2007 and December 16, 2010. The calculated difference between the spectrum of the Middle Drum observations and the published spectrum obtained by the data collected by the HiRes-1 site allows the HiRes-1 energy scale to be transferred to Middle Drum. The HiRes energy scale is applied to the entire Telescope Array by making a comparison between Middle Drum monocular events and hybrid events that triggered both Middle Drum and the Telescope Array's scintillator Ground Array.

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