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The Cosmic-Ray Energy Spectrum between 2 PeV and 2 EeV Observed with the TALE detector in monocular mode

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We present a measurement of the cosmic ray energy spectrum by the Telescope Array Low-Energy Extension (TALE) air fluorescence detector (FD). The TALE FD is also sensitive to the Cherenkov light produced by shower particles. Low energy cosmic rays, in the PeV energy range, are detectable by TALE as "Cherenkov Events". Using these events, we measure the energy spectrum from a low energy of ~2 PeV to an energy greater than 100 PeV. Above 100 PeV TALE uses the air fluorescence technique to reach energies of a few EeV. In this talk, we will describe the detector, explain the technique, and present results from a measurement of the spectrum using ~1080 hours of observation. The observed spectrum shows a clear steepening near 10^{17.1} eV, along with an ankle-like structure at 10^{16.2} eV. These features present important constraints on galactic cosmic rays origin and propagation models. The feature at 10^{17.1} eV may also mark the end of the galactic cosmic rays flux and the start of the transition to extra-galactic sources.

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