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Telescope Array UHECR composition measurement via stereoscopic fluorescence observation THOMAS STROMAN, DOUGLAS BERGMAN, Univ of Utah, TELESCOPE ARRAY COLLABORATION — When entering Earth's atmosphere at ultra-high energies, cosmic rays (UHECRs) produce extensive air showers whose longitudinal development is influenced by the incident primary particle's mass. Each longitudinal shower profile reaches its maximum particle count at an atmospheric slant depth $X_{\rm max}$, and the distributions of observed $X_{\rm max}$ values can be compared to those predicted by detailed simulations of the air-shower physics and the detector; accurately simulated compositions that most closely resemble that found in nature will produce the best agreement between predicted and observed $X_{\rm max}$ distributions. This is the basis of composition measurement at the Telescope Array experiment, the largest and most sensitive UHECR detector in the northern hemisphere. At the perimeter of a large surface-detector array are three fluorescence telescope stations, whose overlapping apertures enable high-precision reconstruction of $X_{\rm max}$ from stereoscopic observation of air-shower longitudinal profiles. We present the distribution of $X_{\rm max}$ observed during eight years of operation, and from comparisons with several simulated combinations of composition and high-energy hadronic physics, we show that a low primary mass is favored at $E > 10^{18.2}$ eV.

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