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Expectation of measuement of Iron Spectrum at Knee region

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For over decades, the structure of the cosmic ray all-particle spectrum has been progressively refined through different observations. The fine structure of the spectrum carries important information about the acceleration and propagation of cosmic rays, yet the causes of these fine structures have not been fully elucidated.
For the cause of the most prominent "knee" region, there are two different point of view. In the context of astrophysics, both scenarios acceleration and propagation hypotheses entail that the cut–off energy for each individual element depends on its charge Z. From a particle-physics perspective, the observed knee in the spectrum of extensive air showers is connected with the changes of inelastic collisions of the primary protons near the upper boundary of atmosphere. Such effects lead to a nuclear mass-dependent cut–off. By conducting a comprehensive and precise measurement of the knee region with iron nuclei, and comparing the knee region position in the proton spectrum, can we provide decisive evidence in the choice between the two interpretations.
This report utilizes simulation data to investigate the capability of LHAASO to measure the iron nucleus energy spectrum.

Collaboration you are representing

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