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The iron and nickel spectra measured with CALET on the International Space Station

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Recent direct measurements of the energy spectra of charged cosmic ray have revealed unexpected spectral features, most notably the onset of a progressive hardening at few hundreds of GeV/n not only of proton and He spectra but also observable for heavier nuclei. Thus, the study of the spectra behavior of heavy elements may shed light on understanding propagation and acceleration phenomena in our Galaxy. In particular, iron and nickel provide favorable conditions for observations thanks to the low background contamination from spallation of higher mass elements they are affected by.
The CALorimetric Electron Telescope, CALET, has been measuring high-energy cosmic rays on the International Space Station since October 2015. The instrument consists of two layers of segmented plastic scintillators, a 3 radiation length thick tungsten-scintillating fiber imaging calorimeter, and a 27 radiation length thick PWO calorimeter. It identifes the charge of individual elements up to nickel and beyond and it measures the energy of cosmic-ray nuclei providing a direct measurement of their spectra.
In this contribution, the iron and nickel spectra resulted after five years of data acquisition, are presented. Specifically, the analysis procedure and the assess of systematic errors are detailed, in addition to the ratio between the two fluxes. The energy range here presented covers the interval between 10 GeV/n and 2 TeV/n for the iron flux and between 8.8 GeV/n and 240 GeV/n for the nickel one. Both spectra are compatible with a single power law, showing similar shape and energy dependence.

Is this abstract from experiment?

Yes

Name of experiment and experimental site

CALET on the International Space Station

Is the speaker for that presentation defined?

No

Details

N/A

Internet talk

Maybe

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