Measurement of the energy spectrum of cosmic-ray helium with CALET on the International Space Station

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The CALorimetric Electron Telescope (CALET) is a space instrument designed to carry out precision measurements of high energy cosmic-rays.
It was installed onboard the International Space Station in August 2015 and since mid-October 2015 it is collecting data with excellent performance and no significant interruptions.
The instrument consists of two layers of segmented plastic scintillators to identify the charge of individual elements from proton to iron, followed by a thick (30 X_0 and ~1.3 λ_I) calorimeter. It comprises a finely segmented imaging calorimeter (3 X_0), providing accurate particle tracking and complementary charge measurement, and a total absorption (27 X_0) homogeneous calorimeter.
The energy spectrum of helium nuclei in cosmic rays is measured using the data collected in about 4 years of observation (1815 days), over a wide energy interval from ~50 GeV up to ~50 TeV of kinetic particle energy.
The preliminary observation from CALET is consistent with the recent DAMPE results and with others previous experiments like AMS-02 and CREAM.
The CALET preliminary result confirm that the helium differential spectrum does not follow a simple power-law, but clearly show a progressive hardening up to the multi-TeV region.
A very preliminary fit of CALET data (with only statistical errors included) with a “smoothly broken power-law” function returns a power law index, $\Delta\gamma$ and break energy consistent with DAMPE measurements.

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