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An overview of CALET observations after three years 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 on the JEM-EF external platform of the ISS where it has been collecting science data continuously since mid October 2015.
Equipped with a thick (30 X0 , 1.3 λI) calorimeter with an imaging pre-shower and with two independent subsystems to identify the charge of the incident particle, CALET has the depth, tracking capability, electron/proton discrimination and energy resolution to study hadrons, electrons and gamma rays.
An overview of CALET observations is presented, based on the data taken during the first three years.
It includes a direct measurement of the electron+positron energy spectrum from 11 GeV to 4.8 TeV in good agreement with AMS-02 data in the region below 1˜TeV and suggesting a flux suppression above 1 TeV. In the energy region below ~300˜GeV, CALET's spectral index is consistent with AMS-02, Fermi-LAT and DAMPE, while from 300˜GeV to 600˜GeV the spectrum is significantly softer than the spectra from the latter two experiments.
The proton spectrum has been measured from 50 GeV to 10 TeV covering, for the first time with a single space-borne instrument, the whole energy interval previously investigated in separate sub-ranges by magnetic spectrometers and calorimetric instruments. The observed spectrum is consistent with AMS-02 but it extends by nearly one order of magnitude higher in energy, showing a smooth transition of the power-law spectral index from -2.81 +- 0.03 (50–500 GeV) to -2.56 +- 0.04 (1–10 TeV), thereby providing evidence of a deviation from a single power law by more than 3 sigma.
In addition to its primary goal of identifying nearby sources of high-energy electrons and possible signatures of dark matter in the electron spectrum, CALET is carrying out extensive measurements of the energy spectra, relative abundances and secondary-to-primary ratios of elements from proton to iron and above (up to Z=40) studying the details of galactic particle propagation and acceleration.
Preliminary spectra of cosmic-ray nuclei are presented, together with gamma-ray observations and searches of an e.m. counterpart of LIGO/Virgo GW events.

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