

Measurements of secondary-to-primary cosmic-ray ratios with CALET on the International Space Station

Yosui Akaike, Paolo Maestro for the CALET Collaboration
Waseda University, Siena University and INFN-Pisa

CALorimetric Electron Telescope, CALET, is measuring cosmic-ray nuclei on the International Space Station. CALET has a thick and imaging calorimeter with 30 radiation length for electrons and 1.3 interaction length for protons, which has capabilities of charge identification with a resolution of $0.15e$ for boron and carbon and energy measurement from 1 GeV to a PeV scale. Using data of 1,815 days of operation, we have measured the energy spectrum of boron and the boron-to-carbon ratio from 16 GeV/n to 2.2 TeV/n. A detailed assessment of systematic uncertainties has been performed including trigger efficiency, charge identification, energy scale, and MC model (EPICS vs Geant4).

The preliminary energy spectrum of boron with CALET is consistent with that of PAMELA, but lower than that of AMS-02. The preliminary B/C ratio is well consistent with previous measurements such as CREAM-I, PAMELA and AMS-02. Our present data of B/C ratio can be fit by a single power law function $(B/C)=AE^\delta$, where A is a normalization constant, the spectral index is $\delta = -0.344 \pm 0.012$ ($E > 20$ GeV/n).

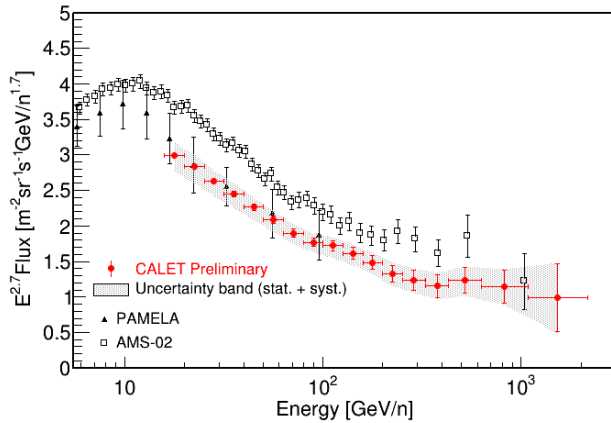


Fig. 1 Preliminary energy spectrum of boron with CALET compared with PAMELA and AMS-02

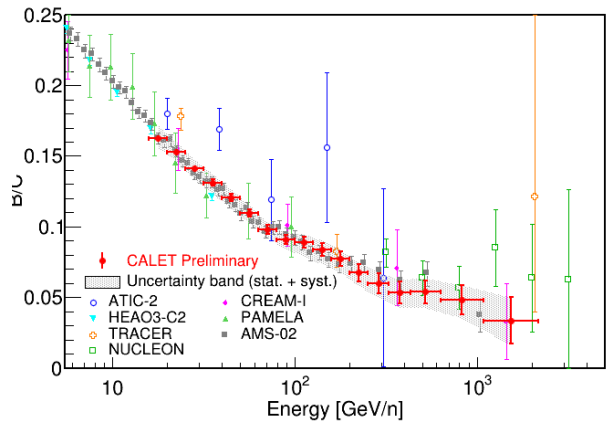


Fig.2 Preliminary result of the boron-to-carbon ratio with CALET compared with ATIC-2, CREAM-I, HEAO3-C2, TRACER, PAMELA, AMS-02 and NUCLEON.