Contribution ID: **1044** Type: **Poster**

Progress on Ultra-Heavy Cosmic-Ray Analysis with CALET on the International Space Station

Monday 19 July 2021 19:18 (12 minutes)

The Calorimetric Electron Telescope (CALET), launched to the International Space Station in August 2015 and continuously operating since, measures cosmic-ray (CR) electrons, nuclei and gamma-rays. CALET utilizes its main calorimeter charge detector to measure CR nuclei from $_{1}$H to $_{40}$Zr. In order to maximize the acceptance of the rare ultra-heavy (UH) CR above $_{30}$Zn, a special high duty cycle (∼90%) UH trigger is used that does not require passage through the 27 radiation length deep Total Absorption Calorimeter (TASC). This provides a 6x increase in geometry factor allowing CALET to collect in 5 years a UHCR data set with statistics comparable to those from the first flight of the balloon-borne SuperTIGER instrument but without the need for atmospheric corrections. Previous CALET UHCR analyses using time and position corrections based on $_{26}$Fe and a geomagnetic vertical cutoff rigidity selection have shown abundances of even nuclei in agreement with SuperTIGER. To further improve resolution and maximize statistics, a trajectory dependent geomagnetic rigidity selection has been employed here with further work being done to implement a Cash-Karp Runge-Kutta ray tracing method for an improved determination of effective cutoff rigidities. Additional work has also been done to analyze events from the smaller dataset of events that pass through the TASC, which provides energy information and a better charge assignment that will provide higher resolution UH measurements, albeit with lower statistics.

Keywords

Collaboration

CALET

other Collaboration

Subcategory

Experimental Results

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Session Classification: Discussion

Track Classification: Scientific Field: CRD | Cosmic Ray Direct