

Simulations studies for the Mini-EUSO detector

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Mini-EUSO is a mission of the JEM-EUSO program flying onboard the International Space Station since August 2019. Since the first data acquisition in October 2019, more than 35 sessions have been performed for a total of 52 hours of observations. The detector has been observing Earth at night-time in the UV range and detected a wide variety of transient sources all of which have been modeled through Monte Carlo simulations. Mini-EUSO is also capable of detecting space debris and meteors and we performed simulations for such events to estimate their impact on future missions for cosmic ray science from space.

We show here examples of the simulation work done in this framework to analyze the Mini-EUSO data. The expected response of Mini-EUSO with respect to ultra high energy cosmic ray showers has been studied. The efficiency curve of Mini-EUSO as a function of primary energy has been estimated and the energy threshold for Cosmic Rays has been confirmed to be above 10^{21} eV. We compared the morphology of several transient events detected during the mission with cosmic ray simulations and excluded that they can be due to cosmic ray showers. To validate the energy threshold of the detector, a system of ground based flashers is being used for end-to-end calibration purposes. We therefore implemented a parameterization of such flashers into the JEM-EUSO simulation framework and studied the response of the detector with respect to such sources.

Keywords

Mini-EUSO, simulations, data analysis, JEM-EUSO

Collaboration

other (fill field below)

other Collaboration

JEM-EUSO

Subcategory

Experimental Results

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