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EUSO-Balloon trigger efficiency in preparation of a long duration flight

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EUSO-Balloon is a pathfinder of the JEM-EUSO experiment that is devoted to the observation of UHECRs from space. It operates under a stratospheric balloon at an altitude of ~ 40 km. A first flight took place in August 2014, and gathered information about the UV background in the nadir direction below the flight altitude. Based on these measurements, we investigate the acceptance of a new version of the instrument in view of a forthcoming long duration flight. To this end, we use the ESAF simulation code, adapted to the EUSO-Balloon design, to determine the trigger efficiency as a function of energy, for different assumptions regarding the photo-detection efficiency, the performance of the optical system and the level of the background light. Finally, we convolve with the cosmic-ray spectrum and derive the number of events to be expected in the range 10^{17} and 10^{19} eV. We conclude that EUSO-Balloon is well-designed to be the first fluorescence telescope to detect cosmic-ray showers from above.

Collaboration

JEM-EUSO

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