

# Measurement of UV light emission of the nighttime Earth by Mini-EUSO for space-based UHECR observations

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The JEM-EUSO Program aims at the realization of the ultra-high energy cosmic ray (UHECR) observation in the satellite orbit by the air fluorescence technique. The Mini-EUSO mission is the first space-based pathfinder mission of the program that has been conducted on the International Space Station since 2019. The Mini-EUSO detector consists of a 25 cm refractive optics that focuses the UV light on the 2304-pixel array of the multi-anode photomultiplier tubes with ultra-fast readout electronics. In the mission, Mini-EUSO is operated by cosmonauts a few days per month. From the nadir-looking window of the Russian Module Zvezda, the detector is capable of continuously monitoring a  $\sim 300 \text{ km} \times 300 \text{ km}$  area at night. The objectives of the mission include to understand the properties of the diffuse UV light emission from the earth and atmosphere. Such light originates from the airglow emission, back-scattered light of astronomical origin as well as the artificial light. The intensity of this light varies over the time, geographic location, atmospheric conditions. It is a key factor that determines the performance for the scientific objectives, i.e., the search for strange quark matter, observation of meteors, study of the transient luminous events etc. The data also allows for the study of the role of such light as the main background for the future UHECR space-based observation missions. In this contribution, we report the result of Mini-EUSO as well as the discussion with those of the past balloon-borne and ground-based pathfinders and perspectives for the future missions.

## Keywords

Mini-EUSO, International Space Station, ultra-high energy cosmic rays, fluorescence technique, airglow

## Collaboration

other (fill field below)

## other Collaboration

JEM-EUSO

## Subcategory

Experimental Results

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