

Integration and qualification of the Mini-EUSO telescope on board the ISS

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Mini-EUSO is a new space-based experiment designed primarily to observe showers that develop in atmosphere due to the interaction between molecular nitrogen and Ultra High Energy Cosmic particles (above 10 ZeV) crossing by. It belongs to the JEM-EUSO program, which includes several past experiments all devoted to develop new larger size satellite detectors like K-EUSO and POEMMA for future UHEC Rays study from space. Mini-EUSO is a multiwavelength telescope launched on August 2019 with the unmanned Soyuz MS-14 rocket to the International Space Station and currently operating on board the Russian Zvezda module, facing a UV-transparent window watching Earth in Nadir direction. The telescope optics comprise a main detection system employing two double-sided Fresnel lenses focusing UV (300–400 nm) light onto an array of 36 Hamamatsu Multi-Anode PhotoMultiplier Tubes, each of 64 channels for a total of 2304 pixels working in single photon counting mode, providing a wide field of view (44°) corresponding to a ground area of 263 km x 263 km with a time resolution up to few microseconds. Mini-EUSO includes also multiple ancillary sensors such as visible (400–780 nm) and NIR (1500–1600 nm) cameras as well as a 64 channels Multi-Pixel Photon Counter Silicon PhotoMultiplier array which will increase the Technology Readiness Level of this ultrafast imaging sensor. Beside the primary objective, the mission aims to study different event such as meteoroids, Transient Luminous Event, search for Strange Quark matter and is capable to provide UV Earth maps over the surface covered during ISS orbits. In this work we will present the detector integration, qualification measurements on ground and some preliminary data.

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other (fill field below)

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Subcategory

Experimental Results

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