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The Atmospheric Monitoring System of the JEM-EUSO Space Mission

An Atmospheric Monitoring System (AMS) is mandatory and a key element of a space-based mission which aims to detect Ultra-High Energy Cosmic Rays. JEM-EUSO has a dedicated atmospheric monitoring system that plays a fundamental role in our understanding of the atmospheric conditions in the field of view of the telescope. Our AMS consists of an infrared camera and a LIDAR device that are being fully designed with space qualification to fulfil the scientific requirements of this space mission. This Atmospheric Monitoring System will provide information of the cloud cover in the FoV of JEM-EUSO, as well as measurements of the cloud top altitudes with an accuracy of 500 m and the optical depth profile of the atmosphere in the direction of each air shower with an accuracy of 0.15 degree and a resolution of 500 m. This should ensure that the energy of the primary ultra-high energy cosmic ray particle and the depth of maximum development of the extensive air shower are measured with an accuracy better than 30% and 120 g/cm² for extensive air showers occurring either in the clear sky or with the depth of maximum above optically thick cloud layers. Moreover, a novel stereoscopic technique and radiometric retrieval from the data provided by the infrared camera are under development.

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