

Project Title:

JEM-EUSO

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Background and work

JEM-EUSO aims to measure for the first time from space with unprecedented accuracy and statistics the cosmic rays spectrum above 6×10^{19} eV, searching in both hemispheres for anisotropies in the arrival direction and identifying possible astrophysical sources and their spectral shape. The experiment is led by RIKEN group, with the participation of various European and American partners. The construction of two telescopes consisting of all JEM-EUSO systems (lenses, electronics data acquisition and storage) is currently under way. The first detector will be installed on Telescope Array site (Utah) and the other to be flown from a 40km balloon in the framework of a CNES (French Space Agency) mission.

Work involved the simulations of Ultra-High-Energy-Cosmic Rays ($10^{19} - 10^{20}$ eV) hitting the atmosphere and being detected from ground (TA-EUSO) and in space (JEM-EUSO). The simulation produce several billion secondary particles which have to be tracked in the atmosphere. Preliminary work has included setting up the simulation environment and working with the montecarlo packages. Currently work is ongoing so no final results on the simulations have yet been obtained.

Conclusions and prospect. Simulation work is progressing and will continue in 2013. It is expected to correlate data from experimental origin with those simulated to calibrate the instrument.

Keywords: Cosmic Rays, Atmospheric showers, Geant 4 Montecarlo simulation, Optics simulation, International Space Station.