

Project Title:

Software Simulations for the JEM-EUSO Mission

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1. **JEM-EUSO** (Extreme Universe Space Observatory onboard the Japanese Experiment Module) is a space borne ultra high energy cosmic ray (UHECR) detector. It will be launched in 2017 and attached to the Japanese module of the international space station (ISS). ESAF (EUSO Simulation and Analysis Framework) is a software designed to simulate the JEM-EUSO instrument. With ESAF we simulate the entire chain of events during the measurement of UHECR with the JEM-EUSO detector. This is important to estimate the expected performance of the instrument and to check its design and technological components.
2. The ESAF software is a object oriented c++ code which is based on ROOT (root.cern.ch). The physics and hardware simulations include several analytical and numerical techniques.
3. The software is still under development. During the fiscal year 2011, the granted computation time could not appropriately been used.
4. ESAF is an important tool to estimate the expected performance of the JEM-EUSO mission. It is still under development, however we believe that in 2012 we are ready to extensively use the computation time granted to perform large-scale simulations.
5. During the year 2012 we will carry out massive simulations for the JEM-EUSO mission.
6. Due to problems with the code, so far the provided computation time was not used. After resolving the issues we can now start with a large number of simulations. In the next usage

term simulation will cover especially the angular reconstruction capability of the JEM-EUSO instrument.

RICC Usage Report for Fiscal Year 2011

Fiscal Year 2011 List of Publications Resulting from the Use of RICC

[Publication]

[Proceedings, etc.]

Mernik et al.: "The ESAF-Reconstruction Framework of UHECR Events for the JEM-EUSO Mission",
Proceedings of the 32nd ICRC, Beijing, China

[Oral presentation at an international symposium]

[Others]