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A new design for simulation and reconstruction software for the JEM-EUSO mission

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The Extreme Universe Space Observatory (JEM-EUSO) is designed to detect the highest energy particles in the Universe by observing the fluorescence and (reflected) Cherenkov light produced when these ultrahigh energy cosmic rays (UHECR) traverse the Earth's atmosphere. Unlike existing cosmic ray observatories, JEM-EUSO will view the atmosphere from above, as the instrument will be attached to the International Space Station. Here we describe a new general-purpose software framework to facilitate detailed simulation and reconstruction of UHECR events observed

by JEM-EUSO. This new software is based on open-source codes developed over roughly a decade by a collaborative effort of several particle astrophysics and high energy physics experiments,and is particularly suited to the needs of large collaborations. We explain the machinery used to manage user contributions, organize an abundance of configuration files, facilitate multi-format file handling, and provide access to time-dependent information on detector and atmosp

heric properties. We also discuss the strategies employed to ensure stability and maintainability in the face of a large number of user contributions. Finally, we show analyses of data from the recent JEM-EUSO stratospheric balloon test flight using this new software package.

Collaboration

JEM-EUSO

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