

Distributed acquisition logic for extended detector systems

The Pierre Auger Observatory is designed to study cosmic ray showers at the highest energy using a hybrid approach by combining complementary detection techniques to study the same phenomena. One of these detectors is the Surface Detector Array, a regular array of 1660 water Cherenkov detectors distributed in an area of $\sim 3000 \text{ km}^2$.

The surface detector has a centralized, hierarchical event trigger mechanism by which all stations send timing information to a dedicated computer system programmed to search for spatial and temporal coincidences, sending data requests to a relatively broad cluster of stations when one such coincidence is found.

This work proposes an alternative event trigger system in which each station searches for the candidate shower trigger condition, and presents the progress on simulations, using the OMNeT++ network simulator, to verify that i) the proposed event trigger system can detect events using the same criteria currently applied in Auger, and ii) to study the minimum hardware requirements for a possible implementation.

arXiv

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Session Classification: Poster Session