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Pyrate: a novel system for data transformations, reconstruction and analysis for the SABRE experiment

Wednesday, 26 October 2022 11:00 (30 minutes)

The pyrate framework provides a dynamic, versatile, and memory-efficient approach to data format transformations, object reconstruction and data analysis in particle physics. Developed within the context of the SABRE experiment for dark matter direct detection, pyrate relies on a blackboard design pattern where algorithms are dynamically evaluated throughout a run and scheduled by a central control unit. The system intends to improve the user experience, portability and scalability of offline software systems currently available in the particle physics community, with particular attention to medium to small-scale experiments. Pyrate is implemented with the python programming language, allowing easy access to the scientific python ecosystem and commodity big data technologies. This presentation addresses the pyrate design and implementation.

Significance

The presentation will introduce a new tool designed for data format transformations, object reconstruction and data analysis which improves upon the versatility of similar systems used for offline data processing and analysis at particle physics experiments, with particular advantage to medium to small-scale experiments.

References

https://indico.cern.ch/event/855454/contributions/4605006/

Experiment context, if any

The system has been developed in the context of the SABRE experiment for dark matter direct detection in construction at the SUPL laboratory in Victoria Australia and at the LNGS in Italy. The system aims to be an efficient tool for experiments of the same scale.

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