



Contribution ID: 314

Type: Talk

Offline data processing software for the High Energy cosmic-Radiation Detection facility

Monday 21 October 2024 14:24 (18 minutes)

The High Energy cosmic-Radiation Detection facility (HERD) is a scientific instrument planned for deployment on the Chinese Space Station, aimed at indirectly detecting dark matter and conducting gamma-ray astronomical research. HERD Offline Software (HERDOS) is developed for the HERD offline data processing, including Monte Carlo simulation, calibration, reconstruction and physics analysis tasks. HERDOS is developed based on SNIPEr, a lightweight framework designed for HEP experiments, as well as a few state-of-the-art software in the HEP community, such as Detector Description Toolkit (DD4hep), the plain-old-data I/O (podio) and Intel Thread Building Blocks (TBB), etc.

This contribution will provide an overview of the design and implementation details of HERDOS, and in particular, the following details will be addressed:

1. The design of the Event Data Model (EDM) based on Podio, and the implementation of data management system (DMS) through the integration of Podio and SNIPEr.
2. The parallelized DMS based on SNIPEr and TBB, specifically the development of GlobalStore based on the Podio to enable concurrent data access and data I/O.
3. The parallelized detector simulation based on MT-SNIPEr, including both event-level and track-level parallelism.
4. The geometry management system based on DD4hep that provides consistent detector description, an easy-to-use interface to retrieve detector description information.

At present, HERDOS is operating effectively to support the design of the detector, as well as the exploration of its physics potential.

Primary author: SHI, qianqian

Co-authors: HUANG, Xingtao; Dr LI, Teng (Shandong University, CN)

Presenter: SHI, qianqian

Session Classification: Parallel (Track 3)

Track Classification: Track 3 - Offline Computing