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Triggerless data acquisition system for the AMBER experiment

Friday, 8 July 2022 16:00 (15 minutes)

We developed a novel free-running data acquisition system for the AMBER experiment. The system is based on a hybrid architecture containing scalable FPGA cards for data collection and conventional distributed computing. The current implementation is capable to collect up to 10 GB/s sustained data rate. The data reduction is performed by the filtration farm that decreases the incoming data rate by factor 50 to 100-200 MB/s. The filtration framework implements various optimized filter algorithms for different physics programmes. These algorithms perform a partial data decoding, time and spatial analysis of the data in order to take a valid filter decision in a semi-online manner. Our system also exploits the mechanism of continuous and iterative time calibration of detectors, which is required by the continuously running acquisition system. Additionally, this contribution describes a simulation tool able to calculate detector responses to passing particles and convert them into raw data formatted in the free-running protocol. These artificial data are used for testing and validation of the readout chain and the filtration framework. The entire system will be tested with a limited number of detectors this year.

In-person participation

Yes

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