ICHEP 2022
BOLOGNA

ICHEP 2022   6
XLI   13 07 2022
International Conference
on High Energy Physics
Bologna (Italy)

Contribution ID: **1365**   Type: **Parallel Talk**

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

Primary author: ZEMKO, Martin (Czech Technical University in Prague)

Co-authors: KVETON, Antonin (Charles University in Prague, Czech Republic); VEIT, Benjamin (CERN / JGU Mainz); Mr STEFFEN, Dominik (Technical University of Munich, Germany); Mr VLADIMIR, Frolov (Joint Institute for Nuclear Research in Dubna, Russia); Mr KONOROV, Igor (Technical University of Munich, Germany); Mr NOVY, Josef (Czech Technical University in Prague, Czech Republic); Mr VIRIUS, Miroslav (Czech Technical University in Prague, Czech Republic); Mr HUBER, Stefan (Technical University of Munich, Germany); Mr JARY, Vladimir (Czech Technical University in Prague, Czech Republic)

Presenter: ZEMKO, Martin (Czech Technical University in Prague)

Session Classification: Computing and Data handling

Track Classification: Computing and Data handling