

Contribution ID: 199

Type: Parallel

The upgraded LHCb trigger system

Since the beginning of Run 3 of LHC the upgraded LHCb experiment is using a triggerless readout system collecting data at an event rate of 30 MHz and a data rate of 4 TB/s. The trigger system is split into two high-level trigger (HLT) stages. During the first stage (HLT1), implemented on GPGPUs, track reconstruction and vertex fitting for charged particles is performed to reduce the event rate to 1 MHz, where the events are buffered to a disk. In the second stage (HLT2), deployed on a CPU server farm, a full offline-quality reconstruction of charged and neutral particles and their selection is performed, aided by the detector alignment and calibration run in quasi-real time on buffered events. This allows to use the output of the trigger directly for offline analysis. In 2024 for the first time we ran the system at the design lumi and achieve an HLT1 output rate of 1.3 MHz. In this talk we will give a review of the implementation and challenges of the heterogenous LHCb trigger system, discuss the results with 2024 data, together with the prospects for the future.

Secondary track

Author: COLLABORATION, LHCb Session Classification: T12

Track Classification: T12 - Data Handling and Computing