Contribution ID: **454** Type: **Oral presentation**

Online track reconstruction on GPUs for the Mu3e and LHCb experiments

Monday 11 June 2018 13:20 (20 minutes)

As the data rate produced by modern particle physics experiments increases, the demands on the computing performance of data selection processes grow. Therefore, Graphics Processing Units (GPUs) are being considered for this task. This talk focuses on their use in the online event selection for the Mu3e experiment and within studies of track reconstruction for the LHCb experiment.

The Mu3e experiment searches for the lepton flavour violating decay $\mu \rightarrow e^+e^-e^+$ by using a silicon tracking detector. During the first phase of the experiment, 10^8 μ/s will be available, resulting in a data rate of ˜10 GB/s, which needs to be reduced by at least a factor 100. Within the signal selection process running on a GPU, the helical tracks are fitted with a 3D fit optimized for multiple scattering dominated resolution, and vertices are defined based on simple geometric criteria. With this algorithm, 98% of signal decays are selected, while reducing the data rate by a factor of 140. On an Nvidia GTX1080Ti GPU, a throughput rate of 2×10^6 events/s has been measured using simulated data, so the selection process can run on the hardware planned for the experiment.

The LHCb experiment is designed to study the decay of B hadrons at the LHC. Beginning in 2020, the first trigger level, implemented in software, will have to reduce the event rate of 30 MHz by at least a factor 30. To meet this demand, possibilities on GPUs are being explored and preliminary results of such studies will be shown.

Minioral

Yes

Description

GPU reconstruction

Speaker

Dorothea Vom Bruch

Institute

CERN

Country

Switzerland

Authors: VOM BRUCH, Dorothea (Centre National de la Recherche Scientifique (FR)); ON BEHALF OF THE MU3E AND LHCB COLLABORATIONS

Presenter: VOM BRUCH, Dorothea (Centre National de la Recherche Scientifique (FR))

Session Classification: Large Experiments 3