

Implementation of a Data Transfer Method for GPU-based Online Tracking for the PANDA Experiment

Thursday, 11 September 2014 12:15 (45 minutes)

PANDA (AntiProton Annihilation at Darmstadt) is a new hadron physics experiment currently under construction at FAIR, Darmstadt. PANDA will analyze reactions of antiprotons at 1.5 to 15 GeV/c momentum with protons and other heavier nuclei.

In this energy region, signal and background events have similar signatures, rendering a conventional hardware-level trigger unfeasible. PANDA will instead employ a software-based data acquisition paradigm, reconstructing the whole event stream in realtime to perform background rejection.

Our research focuses on the use of Graphics Processing Units (GPUs) for online tracking, an essential part of PANDA's online event reconstruction and filtering process.

At an average collision rate of 20 million events per second, PANDA will require a massive amount of computational power to reduce the incoming raw data rate from 200 GB/s to the 3 PB/year of storage available for offline analysis. In order to reach this goal, it is vital to ensure optimal performance of the whole data manipulation chain, including data transfer to and from the GPU devices.

This poster outlines PANDA's progress in GPU-based online tracking, and introduces our work on GPU data transfer with FairMQ, a flexible abstraction layer using message queues to communicate with different consumers.

Primary authors: Mr HERTEN, Andreas (Forschungszentrum Jülich); Dr ADINETZ, Andrew (JSC, Forschungszentrum Jülich); Mr BIANCHI, Ludovico (Forschungszentrum Jülich)

Co-authors: Prof. PLEITER, Dirk (JSC, Forschungszentrum Jülich); Prof. RITMAN, James (Research Center Juelich and Ruhr-University-Bochum); Mr KRAUS, Jiri (NVIDIA GmbH, Germany); Dr TOBIAS, Stockmanns (Forschungszentrum Jülich, Institut für Kernphysik I)

Presenter: Mr BIANCHI, Ludovico (Forschungszentrum Jülich)

Session Classification: Poster Session