20th International Conference on Computing in High Energy and Nuclear Physics (CHEP2013)

Contribution ID: **206** Type: **Poster presentation**

Compute Farm Software for ATLAS IBL Calibration

Monday, 14 October 2013 15:00 (45 minutes)

In 2014 the Insertable B-Layer (IBL) will extend the existing Pixel Detector of the ATLAS experiment at CERN by 12 million additional pixels. As with the already existing pixel layers, scanning and tuning procedures need to be employed for the IBL to account for aging effects and guarantee a unified response across the detector. Scanning the threshold or time-over-threshold of a front-end module consists of two main steps: gathering histograms of the detector response for different configurations and then fitting a target function to these histograms. Despite of the currently used method of performing the computationally demanding fits on DSPs located on the read-out hardware, it was decided to abandon this approach for IBL and realize the functionality on an external computing farm for easier development and greater flexibility.

This not only requires the fast transfer of histogram data from the read-out hardware to the computing farm via Ethernet, but also the integration of the fit farm software and hardware into the already existing data-acquisition and calibration framework (TDAQ and PixelDAQ) of the ATLAS experiment and the current Pixel Detector.
It is foreseen to implement the software running on the compute cluster with an emphasis on modularity, allowing for flexible adjustment of the infrastructure and a good scalability with respect to the number of network interfaces, available CPU cores, and deployed machines. By using a modular design we are able to not only employ CPU based fitting algorithms, but also have the possibility to take advantage of the performance offered by a GPU-based approach to fitting.

We present the compute farm software architecture and report on the status of the implementation of the IBL calibration architecture into the ATLAS hardware and software framework. We discuss used test methods and point out obstacles that were encountered along the way.

Primary authors: KUGEL, Andreas (Ruprecht-Karls-Universitaet Heidelberg (DE)); KRETZ, Moritz (Ruprecht-Karls-Universitaet Heidelberg (DE))

Co-authors: GROSSE-KNETTER, Joern (Georg-August-Universitaet Goettingen (DE)); POTAMIANOS, Karolos (Lawrence Berkeley National Lab. (US)); BINDI, Marcello (University of Bologna and INFN (IT)); MORETTINI, Paolo (INFN Genova); HEIM, Timon (Bergische Universitaet Wuppertal (DE)); FLICK, Tobias (Bergische Universitaet Wuppertal (DE)); TAKUBO, Yosuke (High Energy Accelerator Research Organization (JP))

Presenter: KRETZ, Moritz (Ruprecht-Karls-Universitaet Heidelberg (DE))

Session Classification: Poster presentations

Track Classification: Software Engineering, Parallelism & Multi-Core