

Tools for the Study and Performance Optimization of the ATLAS High Level Trigger.

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In this presentation we will discuss the design and functioning of a new tool that runs the ATLAS High Level Trigger Software on Event Summary Data (ESD) files, the format for data analysis in the experiment. An example of how to implement a sequence of algorithms based on the electrons selection will be shown.

Summary

The High Level Trigger system of the ATLAS detector has to reduce the LVL1 output rate a factor of one thousand before events are stored in tape. The reduction is done in two steps: LVL2 and EF. Both trigger levels run offline-based software algorithms that analyze portions of the event in a Region of Interest (RoI) given by the previous level. There exists two kinds of algorithms: Feature extraction (that reconstruct objects in the RoI) and Hypothesis algorithms (that perform the selection criteria based on the objects reconstructed before). The execution of the algorithms sequence is guided by the HLT steering package, one of the back-bones of the HLT software architecture.

In this presentation we will describe how to implement a sequence of algorithms based on the electrons selection example and discuss the design and functioning of a new tool that runs the HLT Steering on ATLAS Event Summary Data (ESD) files, the data format that will be used for data analysis. This tool consists of a full prototype of a Trigger chain that, substituting the standard trigger Feature Extraction Algorithms by unpacking algorithms gathering data from ESDs, permits the testing of the full ATLAS trigger menu in a fast mode. The tool will be used for Trigger debugging and efficiency calculation when the data taking starts. An example based on optimization for high transverse momentum electrons selection will be shown.

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