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Processing of First AA and pp Collisions in the ALICE High Level Trigger

ALICE (A Large Ion Collider Experiment) is a dedicated heavy ion experiment at the Large Hadron Collider (LHC) of CERN. In order to reduce the amount of data written to mass storage a High Level Trigger (HLT) completely analyses every event triggered by the preceding trigger stages to be able to select only the most promising events for storage. In addition to this event selection the HLT is also used to provide reconstructed events for a live online display in the main ALICE control room as well as online data compression. The HLT is a Linux cluster consisting of more than 200 nodes with 8-24 CPU cores and 16 to 48 GB RAM each. In addition to these processing capabilities the HLT can also make use of FPGA co-processing in its front-end receiver cards, even before the data from the detector enters a computer's memory and 35 nVidia graphics cards which can perform online tracking. These capabilities are in particular important for the large amounts of data encountered during the heavy ion collisions, e.g. like in the first heavy ion period at the end of 2010. All HLT software reconstruction is embedded into ALICE's offline data analysis framework for testing and verification. Some parts of the HLT processing software even directly use offline software for online analysis. Other parts are highly optimized for most efficient online running like the TPC tracking which shows speed improvements compared to its offline equivalent of a factor of more than 3 (pp) and 8 (heavy ion) respectively. We will present experiences from the previous running since the first LHC collisions, in particular of the first heavy ion collisions, as well as the current configuration and setup of the HLT for the 2011 running period.

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Track Classification: Trigger and Data Acquisition Systems