



Contribution ID: 456

Type: Poster

Processing, Calibration and Reprocessing of ATLAS Data from LHC Collisions at 7 TeV

The ATLAS experiment has successfully recorded, reconstructed and analyzed millions of collision events delivered by the LHC at an unprecedented centre-of-mass energy of 7 TeV. The involved large-scale data processing operations worked remarkably well, from an early commissioning period that gradually evolved to a stable operation mode aiming at physics. The early commissioning samples were promptly processed at the CERN “Tier-0” computer farm in all ATLAS data formats: from raw, to reconstructed, to a variety of reduced datasets. From these, the reconstruction software was tuned and state-of-the-art calibration and alignment constants were derived very quickly. These improvements were then used for a series of centralized data reprocessings, using world-wide distributed computing on the Grid. The reprocessing exercises were done coherently for real and simulated data samples, and could provide the high-quality data sets required for the publication of the first ATLAS physics results. By April 2010, the prompt reconstruction was stabilized and pre-calibrated run by run, so that the new data samples produced by the Tier0 are directly usable for physics analysis and can be combined with the earlier reprocessed data, real and simulated.

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Track Classification: 13 - Advances in Instrumentation and Computing for HEP