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The ATLAS Liquid Argon Calorimeter at the LHC

Friday 19 February 2010 11:20 (25 minutes)

The Liquid Argon calorimeter (LAr) is a key detector component in the ATLAS experiment at the LHC. The LAr calorimeter has been installed in the ATLAS cavern and filled with liquid argon since 2006.
We present results assessing the liquid argon calorimeter performance obtained using random triggers, calibration data, cosmic muons, and LHC beam splash events (from fall 2008 LHC running). Preliminary results from the 2009-2010 LHC running period (if available at the time of the Conference) will also be presented.
The properties of each read-out channels such as pedestal, noise and gain have been measured and show the high stability of the LAr electronics over several months of data taking. Calibration data are stored into a database and used at reconstruction level (online and offline). Calibration data together with calculated cable delays are used to time-in the calorimeter front-end electronics. Results are compared to data from muons and splash events. The quality of the energy reconstruction at the first trigger level has also been studied.
We also present the method used to predict the ionization pulse shape and estimate the quality of the prediction using cosmic muons and beam splash events.
Using ionization signals from quasi-projective cosmic muons, the uniformity of the calorimeter response has been measured. Moreover, using radiative cosmic muon events, key calorimeter variables used to identify electrons and photons in ATLAS have been compared to simulations.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

The Liquid Argon calorimeter (LAr) is a key detector component in the ATLAS experiment at the LHC. It provides precision measurements of electrons, photons, jets and missing transverse energy produced in the LHC pp collisions. The LAr calorimeter has been installed in the ATLAS cavern and filled with liquid argon since 2006. Since then the calorimeter has been continuously operated in order to gain experience, commission it and prepare for the LHC collisions.

We present results assessing the liquid argon calorimeter performance obtained using random triggers, calibration data, cosmic muons, and LHC beam splash events (from fall 2008 LHC running). Preliminary results from the 2009-2010 LHC running period (if available at the time of the Conference) will also be presented.

The properties of each read-out channels such as pedestal, noise and gain have been measured and show the high stability of the LAr electronics over several months of data taking. Calibration data are stored into a database and used at reconstruction level (online and offline). Calibration data together with calculated cable delays are used to time-in the calorimeter front-end electronics. Results are compared to data from muons and splash events. The quality of the energy reconstruction at the first trigger level has also been studied.

We also present the method used to predict the ionization pulse shape and estimate the quality of the prediction using cosmic muons and beam splash events. The pulse shape prediction is at the basis of an accurate energy and time reconstruction.

Using ionization signals from quasi-projective cosmic muons, the uniformity of the calorimeter response along eta (averaged along phi) has been measured. Moreover, using radiative cosmic muon events, key calorimeter variables used to identify electrons and photons in ATLAS have been studied. In both cases the results have been compared to the Monte Carlo simulations that will be used at the beginning of LHC data taking.

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