

## Commissioning of the ATLAS Liquid Argon Calorimeter

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The Liquid Argon calorimeter (LAr) is one of the main sub-detectors 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. The electronic calibration of the readout system, a critical system for precision measurements, has been continuously exercised in the commissioning phase, resulting in a fully commissioned calorimeter with its readout and a small number of problematic channels. A total of only 0.02% of the read out channels are dead beyond repair and 0.4% need special treatment for calibration.

Throughout the last two years a large amount of calibration data has been collected. Cosmic muon data, first triggered via specially developed trigger boards on the LVL1 output of the Tile calorimeter and later with the standard ATLAS LVL1 calorimeter trigger, have been recorded at various stages of commissioning. In Sept 2008, with the first single beams circulating in the LHC ring and a near full readout of the calorimeter, events resulting from beam-gas interactions and beam-collimator splashes were recorded.

We present here the LAr electronic calibration scheme, the measured stability of the pedestal, the pulse shape and the gain, and the expected calibration procedure for LHC running. We also present the calorimeter performance study based on the cosmic muon and LHC beam events. With the reconstructed muon minimum ionizing signal in the calorimeter, the uniformity of the barrel electromagnetic calorimeter can be checked. The timing alignment as measured from the data can be compared to the expectation. The high energy depositions in the calorimeter readout cells, either from catastrophic energy loss of the cosmic muons or from beam interactions, are used to validate the signal shape of calorimeter response derived from the calibration pulse.

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