

Performance of the ATLAS Liquid Argon Calorimeters in LHC Run-1 and Run-2

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The ATLAS detector was designed and built to study proton-proton collisions produced at the LHC at centre-of-mass energies up to 14 TeV and instantaneous luminosities up to $10^{34} \text{ cm}^{-2} \text{ s}^{-1}$. Liquid argon (LAr) sampling calorimeters are employed for all electromagnetic calorimetry in the pseudorapidity region $|\eta| < 3.2$, and for hadronic calorimetry in the region from $|\eta| = 1.5$ to $|\eta| = 4.9$.

The calibration and performance of the LAr calorimetry system was established during beam tests, cosmic ray muon measurements and in particular the first three years of pp collision data-taking. During this period, referred to as Run-1, approximately 27 fb^{-1} of data have been collected at the center-of-mass energies of 7 and 8 TeV. Following a period of detector consolidation during a long shutdown, Run-2 started in 2015 with approximately 3.9 fb^{-1} of data at a center-of-mass energy of 13 TeV recorded in this year. Results on the LAr calorimeter operation, monitoring and data quality, as well as their performance will be presented, including the calibration and stability of the electromagnetic scale, response uniformity and time resolution. These results demonstrate that the LAr calorimeters perform excellently within their design requirements. The calorimetry system thus played a crucial role in the Run-1 physics programme, and, in particular, in the discovery of a Higgs boson.

Summary

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