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Construction and Commissioning of the CALICE Analog Hadron Calorimeter Prototype

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An analog hadron calorimeter (AHCAL) prototype of 5.3 nuclear interaction lengths thickness has been constructed by members of the CALICE Collaboration. The AHCAL prototype consists of a 38-layer sandwich structure of steel plates and highly-segmented scintillator tiles that are read out by wavelength-shifting fibers coupled to SiPMs. The signal is amplified and shaped with a custom-designed ASIC. A calibration/monitoring system based on LED light was developed to monitor the SiPM gain and to measure the full SiPM response curve in order to correct for non-linearity. Ultimately, the physics goals are the study of hadron shower shapes and testing the concept of particle flow. The technical goal consists of measuring the performance and reliability of 7608 SiPMs. The AHCAL was commissioned in test beams at DESY and CERN. The entire prototype was completed in 2007 and recorded hadron showers, electron showers and muons at different energies and incident angles in test beams at CERN and Fermilab.

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