

Study of the performance of a compact sandwich calorimeter for the instrumentation of the very forward region of a future linear collider detector

The FCAL collaboration is preparing large scale prototypes of special calorimeters to be used in the very forward region at a future linear electron positron collider for a precise and fast luminosity measurement and beam-tuning. These calorimeters are designed as sensor-tungsten calorimeters with very thin sensor planes to keep the Moliere radius small and dedicated FE electronics to match the timing and dynamic range requirements.

A partially instrumented prototype was investigated in the CERN PS T9 beam in 2014. It has been operated in a mixed particle beam (electrons, muons and pions) of 5 GeV/c. The results demonstrated a very good performance of full readout chain. The high statistics data were used to study the response to different particles, perform sensor alignment and measure the longitudinal shower development in the sandwich. In addition, Geant4 MC simulations were done, and compared to the data.

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