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The Time Structure of Hadronic Showers in Analog and Digital Calorimeters confronted with Simulations

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The intrinsic time structure of hadronic showers influences the timing capability and the required integration time of highly granular hadronic calorimeters for future collider experiments. To evaluate the influence of different active media and different absorbers, dedicated experiments with tungsten and steel hadron calorimeters of the CALICE collaboration have been carried out. These use plastic scintillator tiles with SiPM readout and RPCs, both arranged as 15 small detector cells read out with fast digitizers and deep buffers. The results of the studies provide detailed information on the time structure of hadronic showers, and are confronted with GEANT4 simulations to evaluate the realism of current hadronic shower models with respect to the time evolution of hadronic cascades.

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