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The CMS Barrel Calorimeter Response to Particle Beams from 2 to 350 GeV/c

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Summary

We report on the response of the CMS barrel calorimeter to hadrons and muons over a wide momentum range from 2 to 350 GeV/c. To our knowledge, this is the widest range of momenta in which any calorimeter system has been studied. These tests, carried out at the H2 beam line at CERN, provide a wealth of information, especially at low energies. We present the analysis on the calorimeter response to charge pions, kaons, protons and antiprotons and discuss the underlying phenomena. We also present techniques that deal with the corrections to the signals from the considerably different electromagnetic (EB) and hadronic (HB) barrel calorimeters in reconstructing the energies of hadrons. The corrected data set corrected for the combined system is linear over to $\pm 4\%$ for beam momenta over 4 GeV/c.

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