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Design and Commissioning Results of the New HCAL-J Hadron Calorimeter for Upcoming Nucleon Form Factor Experiments at JLab[1]
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The new hadron calorimeter, HCAL-J, will be used in the upcoming Super-BigBite Spectrometer (SBS) experiments measuring the nucleon form factors G_M^n, G_E^n, and G_E^p/G_M^p. These experiments will provide stringent tests of theoretical predictions, allow for the extraction of flavor form factors, and greatly increase our understanding of the fundamental building blocks of matter. The HCAL-J is a sampling calorimeter designed to measure the energy of several GeV protons and neutrons. The detector consists of forty layers of iron alternating with forty layers of plastic scintillator. The iron causes the hadrons to shower while the plastic scintillator samples the energy. HCAL-J contains 288 modules with attached PMTs and weighs approximately forty tons. Each module contains a wavelength shifter to increase light collection efficiency attached to a light guide which directs the photons to the PMT. In addition to the design of HCAL-J, commissioning results will be presented including timing resolution (<1 ns rms) and efficiency studies.

[1]DOE

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