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A Longitudinally Segmented Hadronic Calorimeter for the Forward Region of the Future ePIC Detector at the Electron-Ion-Collider

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The Electron-Ion Collider (EIC) at Brookhaven National Laboratory will be an experimental facility to explore gluons in nucleons and nuclei, shedding light on their structure and the interactions within. The ePIC detector will be the first experiment at the EIC dedicated to detailed studies of nuclear structure in electron-proton and electron-ion collisions.

The ambitious physics program of the EIC requires a high performance hadronic calorimetry system in the hadron-going “forward” region. Accurate jet measurements are crucial to reconstruct the full 3D nucleon tomography and to study the gluon saturation region. The main goal of the Longitudinally segmented Forward HCal (lf-HCal) is measuring the energies of jets and distinguishing between overlapping jet depositions to high accuracy in the jet energy range up to 120 GeV.

lf-HCal is designed as a plastic scintillator-steel sandwich calorimeter. The plastic scintillator is transversely segmented into $5 \times 5, \text{cm}^2$ tiles. Each tile is directly coupled to a silicon photomultiplier. The electrical signals of all photomultipliers are routed out of the lf-HCal to be digitized by external readout electronics.

This poster will present the current status as well as ongoing and future R&D of the lf-HCal for the ePIC experiment.

Category

Experiment

Collaboration (if applicable)

ePIC

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