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The LFHCAL forward hadronic calorimeter for the EPIC detector at the EIC

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The Electron Ion Collider (EIC) is the next Nuclear Physics flagship experiment to be constructed at Brookhaven National Lab over the next decade. 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 (LFHCAL) is measuring the energies of jets and distinguishing between overlapping jet depositions to high accuracy in the jet energy range up to 120 GeV.

LFHCAL is designed as a plastic scintillator-steel sandwich calorimeter. The plastic scintillator is transversely segmented into 5x5 cm² tiles. Each tile is directly coupled to a silicon photomultiplier. The electrical signals of all photomultipliers are routed out of the LFHCAL to be digitized by external readout electronics based on the H2GCROC3 developed for the CMS HGCal project.

This talk will present the current status of the LFHCAL for the EPIC experiment including results from SiPM characterization measurements and scintillator light yield comparisons from lab measurements as well as initial results from a first small-scale testbeam prototype operated at CERN PS and SPS in the fall 2023.

Early Career

No

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