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Particle Identification with the ePIC detector at the EIC

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The ePIC detector is being designed as a hermetic, general-purpose detector for the Electron-Ion Collider (EIC). One of the key performance drivers for the physics programme at the EIC are the particle identification (PID) system, which enable the separation of pions, kaons, and protons in high multiplicity events over a wide phase space, with significant pion/electron suppression. To address this challenge, ePIC plans to utilize multiple independent particle identification sub-detector systems.

The talk will cover the PID subsystems of the ePIC detector, which comprise a of time-of-flight (TOF) detector for low-momentum PID and several high-momentum particle-identification systems that use DIRC and RICH techniques to exploit Cherenkov light emission from charged particles. R&D activities are underway to develop the AC-LGAD technology selected for the TOF, evaluate the use of SiPMs as photosensors for RICH detectors, explore the capabilities of novel LAPPD detectors and assess the compatibility of commercial MCP-PMT with the experiment's magnetic field conditions. The presentation will also include a discussion of the projected performance of the PID detector system, which has been studied in detail using Geant4 simulations, as well as potential future upgrades.

Category

Experiment

Collaboration (if applicable)

ePIC

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