# Ongoing Development in a Proximity-Focusing RICH Detector for ePIC at the Electron-Ion Collider (EIC)

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**Abstract**

The Electron–Ion Collider (EIC) will provide a unique experimental platform to explore the properties of gluons in nucleons and nuclei, offering new insights into their internal structure and dynamics. The EIC physics program has been comprehensively defined by the community in the White Paper, with corresponding detector requirements detailed in the Yellow Report. The primary general-purpose detector, ePIC, is designed to support a broad range of physics measurements. To fully realize the EIC science program, robust particle identification (PID) capabilities are essential, and ePIC incorporates several dedicated PID subsystems. In the electron-going endcap, a proximity-focusing Ring Imaging Cherenkov detector (pfRICH) is designed to provide charged-particle identification, enabling pion–kaon separation up to momenta of 7 GeV/c.

The pfRICH design consists of a cylindrical vessel, with aerogel tiles mounted on the face closest to the interaction point serving as the Cherenkov radiator. The opposite face houses the photosensors, while conical mirrors line the cylindrical walls to direct Cherenkov photons onto the sensor plane. The mirror system requires high reflectivity and uniformity to minimize photon loss and maintain detection efficiency. The baseline photosensors are High-Rate Picosecond Photon Detectors (HRPPDs) developed by Incom, which provide large-area coverage with fine pixelation, high quantum efficiency, low dark count rates, and excellent spatial and timing resolution.

This talk will present the pfRICH detector design, ongoing mirror evaluation efforts, and preliminary results from HRPPD magnetic-field performance studies conducted at Brookhaven National Laboratory.