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The dual radiator RICH detector for particle identification in the forward region of the future Electron Ion Collider spectrometer EVARISTO CISBANI, Italian National Institute of Nuclear Physics - Rome Section and Italian National Institute of Health, LUCA BARION, MARCO CONTALBRIGO, Italian National Institute of Nuclear Physics - Ferrara Section, ALESSIO DEL DOTTO, Italian National Institute of Nuclear Physics - Frascati National Laboratory, CRISTIANO FANELLI, Thomas Jefferson National Accelerator Facility and Laboratory for Nuclear Science, Massachusetts Institute of Technology, PAWEL NADEL-TURONSKI, Stony Brook University, ROBERTO PREGHENELLA, Italian National Institute of Nuclear Physics - Bologna Section, ZHIWEN ZHAO, Duke University, EIC-ERD14 COLLABORATION — Excellent particle identification (PID), especially of hadrons over a large kinematic phase space, is a critical requirement to realize the rich experimental physics program at the future Electron-Ion Collider (EIC). We present the status of the development of a dual-radiator ring-imaging Cherenkov (dRICH) detector designed for PID in the forward hadronic endcap of the EIC spectrometer over an extended momentum range. The current dRICH design consists of 6 identical azimuthal sectors covering the full solid angle for pseudorapidities 1.5 <?g<3.4 (polar angles: 5 <?g<25 deg). Each sector includes a 4-cm-thick aerogel radiator (n˜1.02) followed by 1–1.5-m-long CFgas filled volume (n˜1.0008). Cherenkov photons from both radiators are focused by a spherical mirror onto the photo-detector surface which sits outside the detector acceptance. Studies based on detailed Monte Carlo simulations, Bayesian-driven detector optimization strategies and event-based PID reconstruction algorithm, show that the dRICH can provide continuous K/?separation from ˜3 to ˜50 GeV/c, and electron identification from few hundred MeV/c to ˜15 GeV/c. A small-scale, full features, prototype is being designed to validate the predicted performance and to study critical features of the proposed detector.

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