

## dRICH @ RICH 2022

Simone: dRICH accepted as Poster

Chandra: EIC PID accepted as Presentation

Roberto: SiPM accepted as Presentation

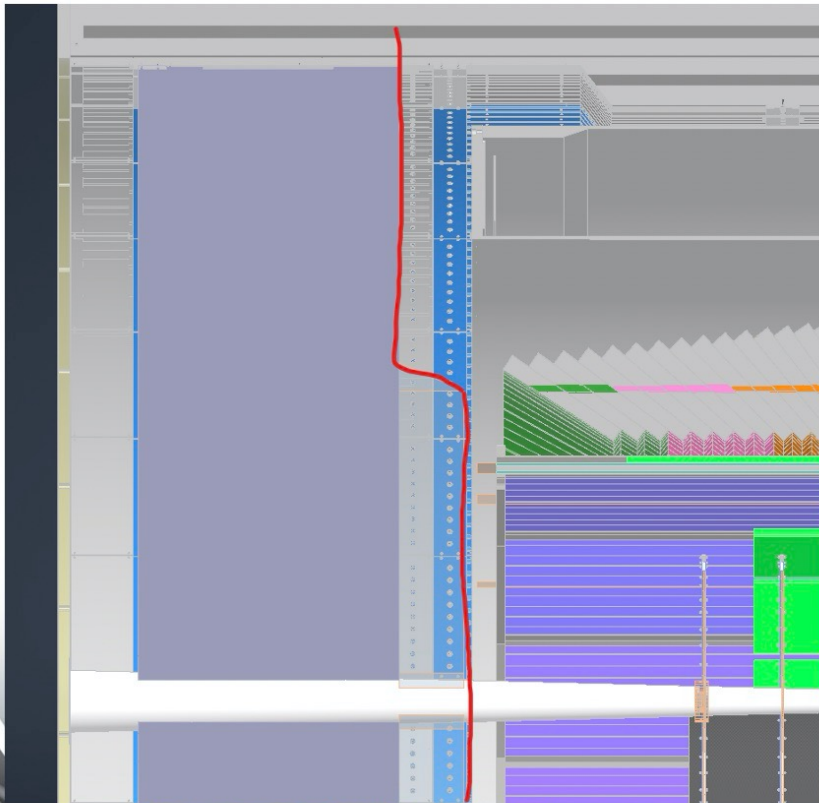
# Integration Progress

To solve dRICH – Barrel ECal conflict that we illustrated at the earlier 06/09/22 meeting:

→ bECal projectivity changed: New model has 50cm "focal length" Sci-Glass variant blocks.

**Details:** The central region of focus is 50 cm long currently with 27.cm on one side of the centerline and 22.5 cm on the other side, respectively to the long and short sides of the detector.

→ Need to implement in simulation to see impact on physics – if any



dRICH implementation equal to recent presentations in WGs

<https://indico.bnl.gov/event/16208/contributions/64912/attachments/41520/69576/%5BEIC%5D%5BDetector1%5D%5BIntegration%5D%20Constrains%20and%20needs%20for%20the%20dRICH%20envelope.pdf>

→ to have space for services dRICH shifted by 15 cm away from IP along z

→ there is now an additional 20 cm for extending the dRICH  
or  
extending the dRICH and adding a tracker behind the dRICH

**Question:** why is the aerogel box so big?

## dRICH Mechanics

contalbrigo

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### 1 Introduction

This document summarizes the mechanical constraints and alternate solutions for the realization of a dual ring imaging Cherenkov detector in the hadron end-cap of the EIC Detector-1.

### 2 Working principles

In ring-imaging Cherenkov detectors, the particle momentum range defines the radiator refractive index and, as consequence, type. To cover the high momentum interval at EIC, a gaseous radiator of  $n \approx 1.0008$  is required. The consequent limited photon yield imposes an extended radiator volume, of the order of 1 m. Because the intrinsic Cherenkov angle resolution scales as  $1/\sqrt{N}$ , a shorter length implies a lower limit in momentum coverage. In case of an extended radiator, a mirror array is required to focalize the light on the sensor surface and suppress the uncertainty on the Cherenkov photon emission point. To cover the low momentum interval at EIC, an aerogel radiator of  $n \approx 1.02$  is anticipated. The dRICH concept seeks for a cost-effective and compact solution using the two radiators with the same focalization and imaging system.

### 3 dRICH Baseline Layout

The exact geometrical dimensions and tolerances need to be defined in conjunction with the global design of EIC Detector-1 and taking into account the interplay with the other EIC sub-detectors. At the moment, the baseline layout assumes:

- a structure made of composite materials (2 skins+core) like CFRP this comprises the skeleton, the support for aerogel and mirrors and, possibly, for the detector boxes;
- a 4 cm layer of aerogel