

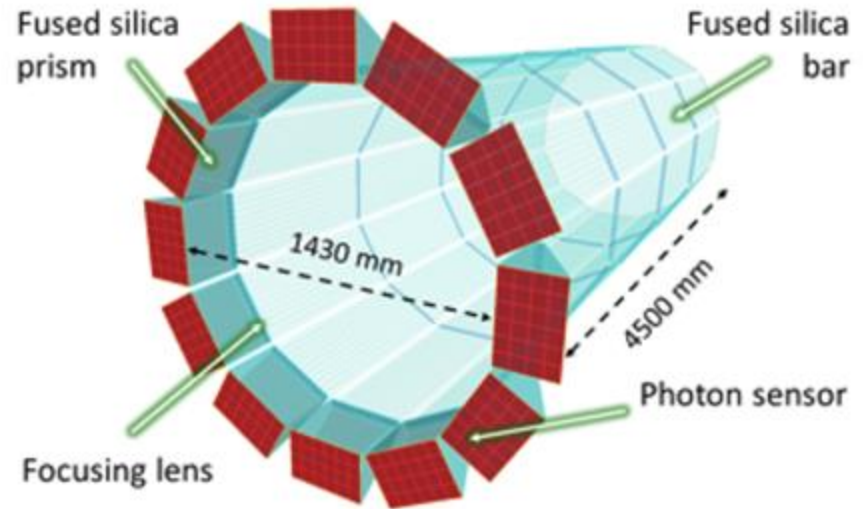
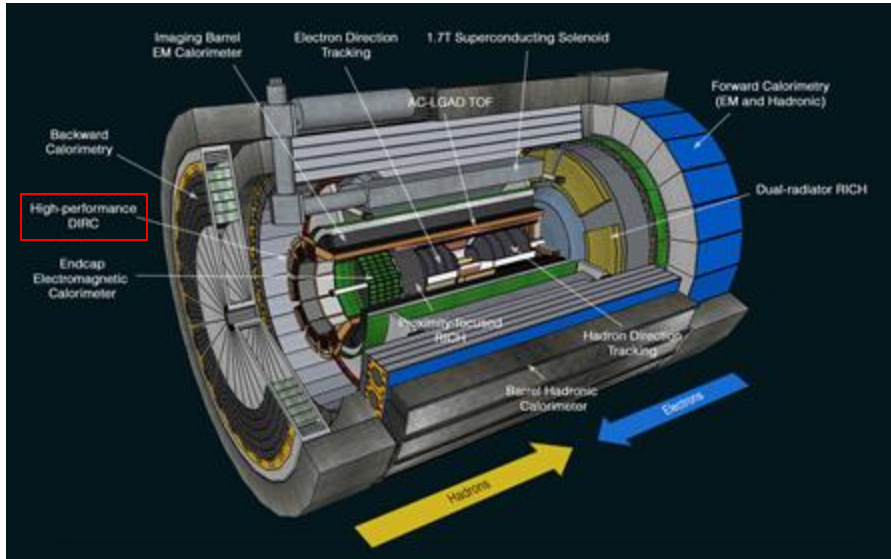
# Construction of a Cosmic Ray Telescope for the hpDIRC Radiators at the Electron Ion Collider

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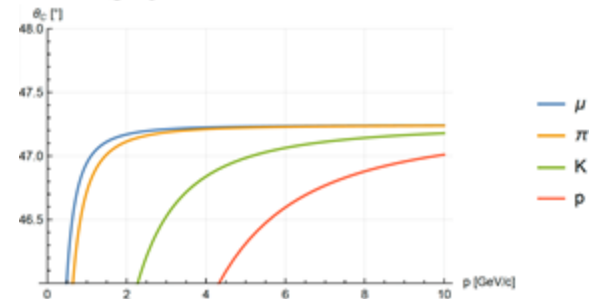
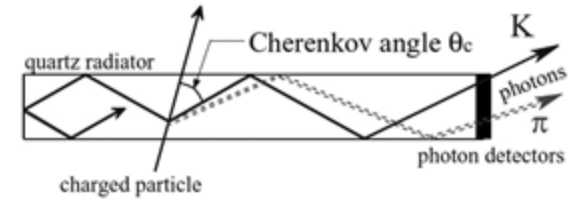
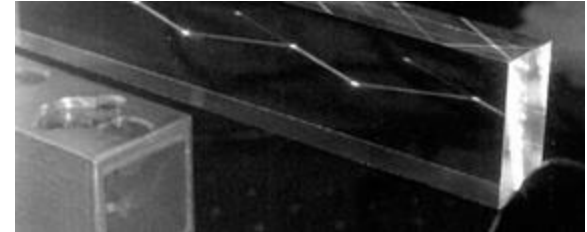
# High Performance DIRC Detector

- DIRC radiator bars will be used in the hpDIRC detector in the ePIC detector at the EIC for hadronic PID



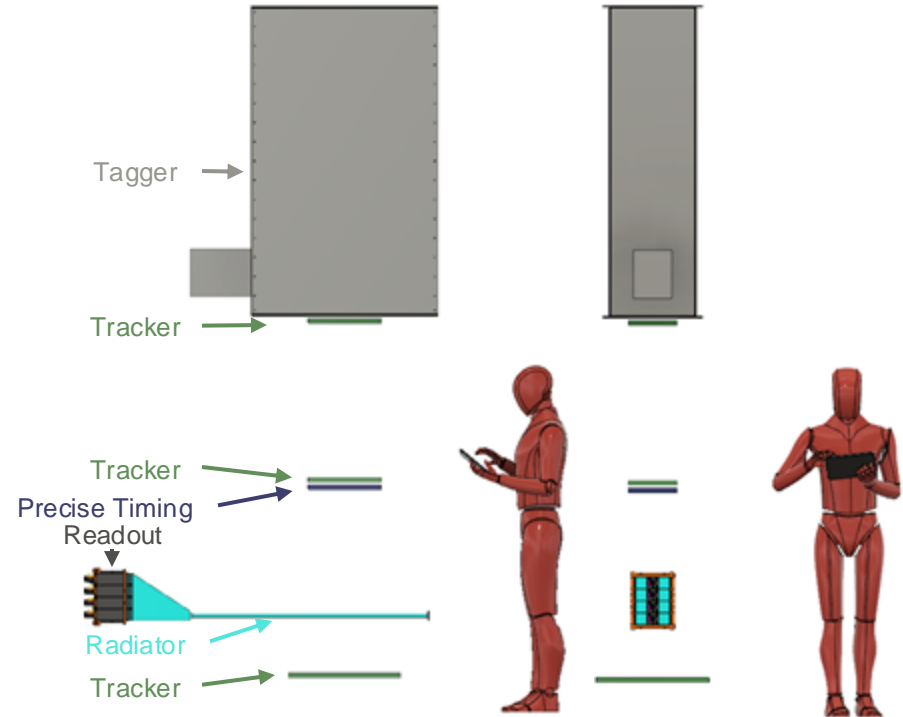
# DIRC

- Detection of Internally Reflected Cherenkov radiation
- Charged particles moving faster than light in a medium  $\rightarrow$  Cherenkov radiation
- DIRC radiators: Synthetic Fused Silica ( $\text{SiO}_2$ )
- $n = 1.473$
- Internal reflection coefficient: 0.9997
- Cherenkov photons produced in the radiators internally reflect to an electronic readout where their trajectories can be reconstructed and analyzed for PID via the Cherenkov angle



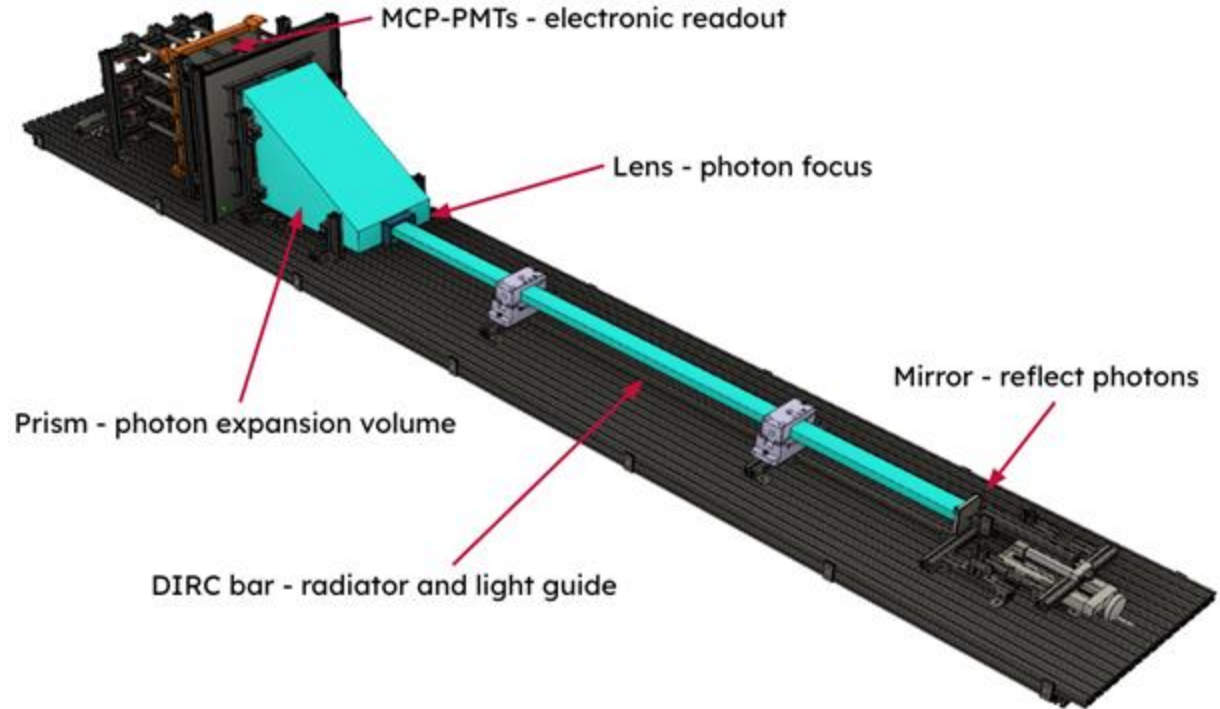
# Cosmic Ray Telescope

- Test and characterize DIRC radiators
- CO<sub>2</sub> Momentum Threshold Tagger (momentum cutoff)
- $\mu$ -RWELL (tracker)
- $\mu$ -RWELL (tracker)
- PICOSEC (timing)
- DIRC bar (radiator and light guide)
- GEM (tracker)



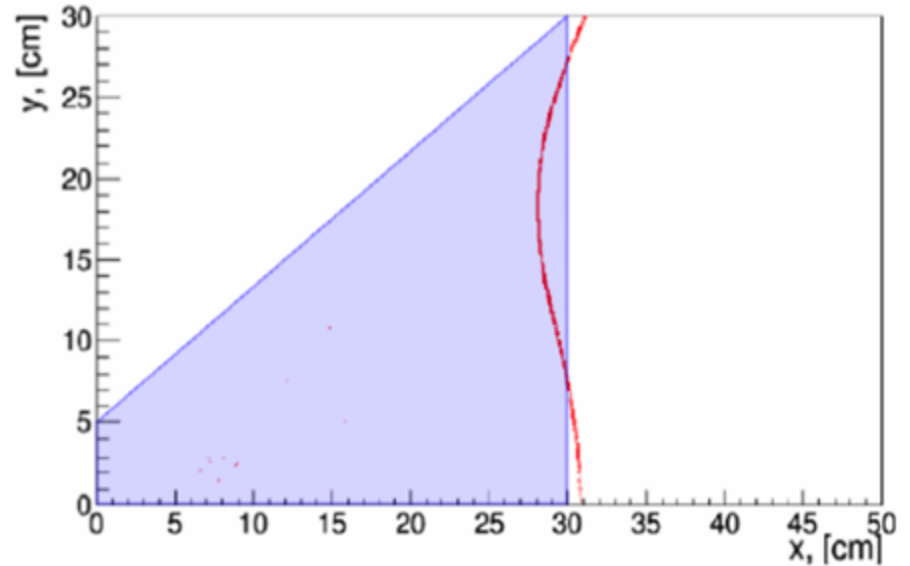
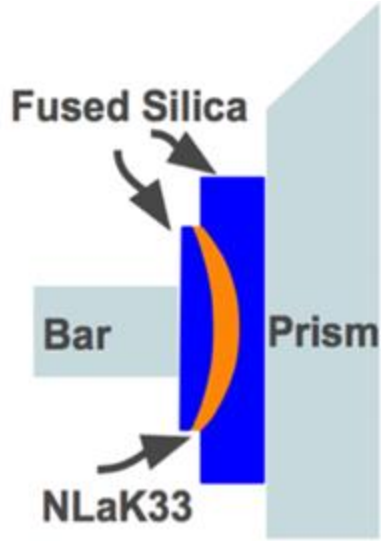
# Dark Box

- Block external light
- User friendly bar mobility
- House DIRC hardware
- Mirror
- Radiator
- Lens
- Prism
- Electronic readout



# Lens and Prism

- Focus and defocus photons onto a flat readout plane
- 3-layer-lens
- Originally lanthanum crown glass, now synthetic sapphire
- Synthetic fused silica



# Motion Platform

- Controlled Pitch and Roll for multiple muon incident angles
- Completed box on motion platform



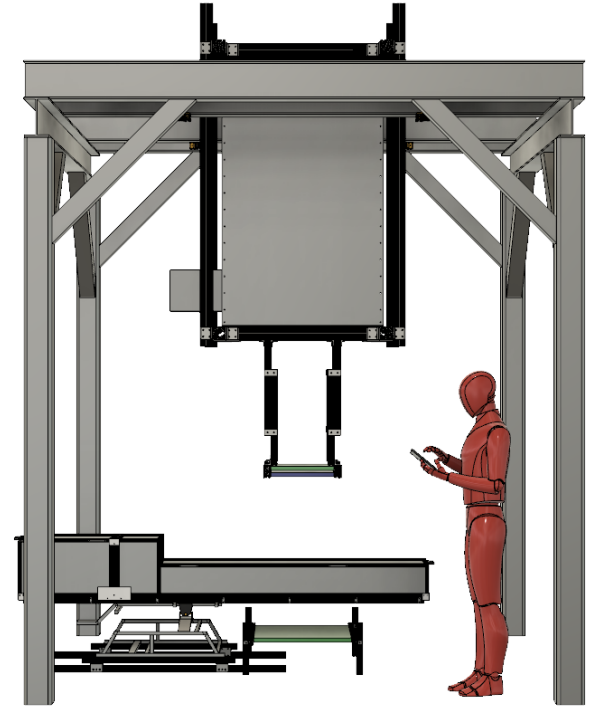
# SBU Clean Tent





# Summary

- Constructing a Cosmic Ray Telescope to characterize the DIRC radiators to be used in the hpDIRC detector in the ePIC detector in the EIC
- The dark box and its parts are completed
- Installation of tracking, timing, and tagging
- We will start taking cosmic ray data before 2025



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