

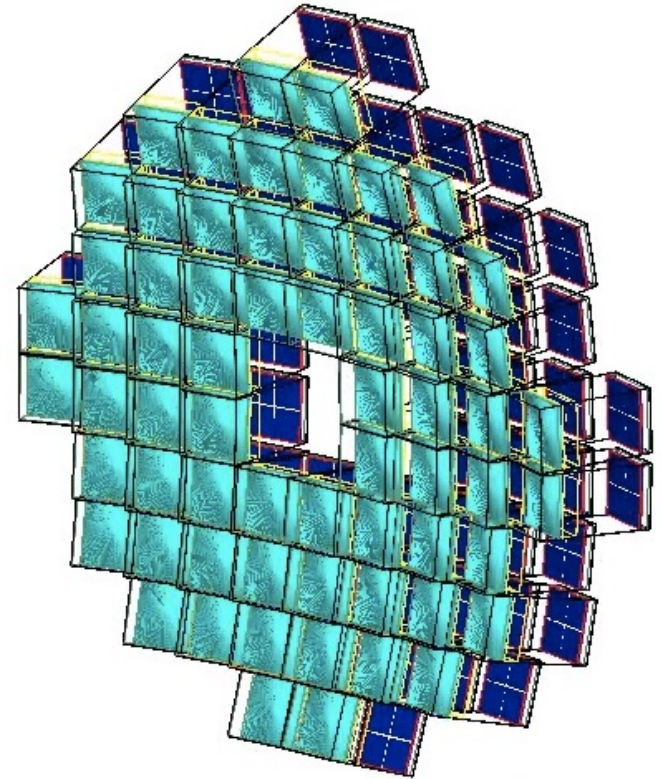
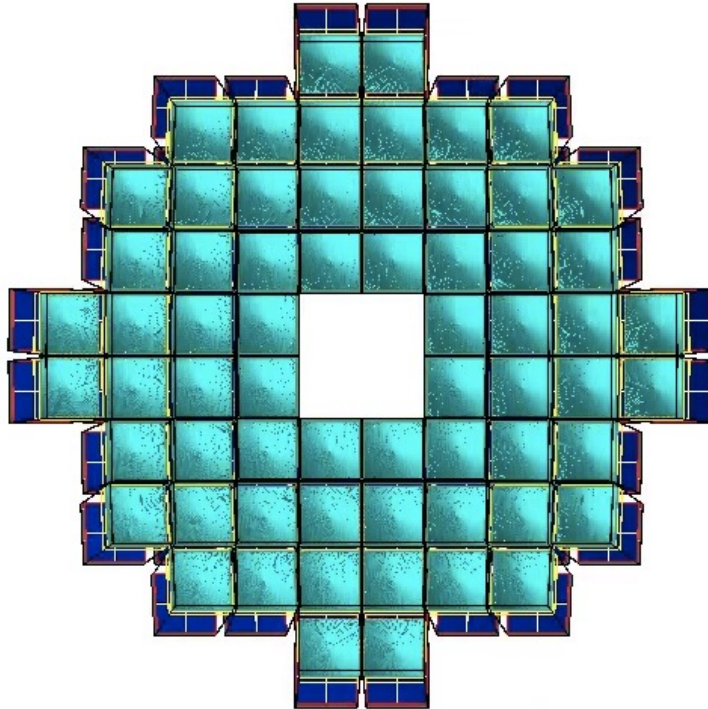
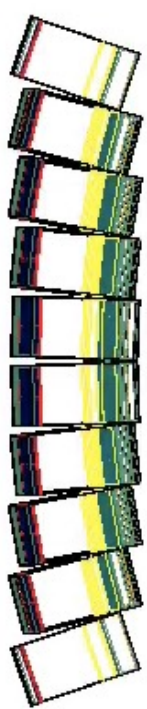
mRICH Status / Update

Murad Sarsour
Georgia State University

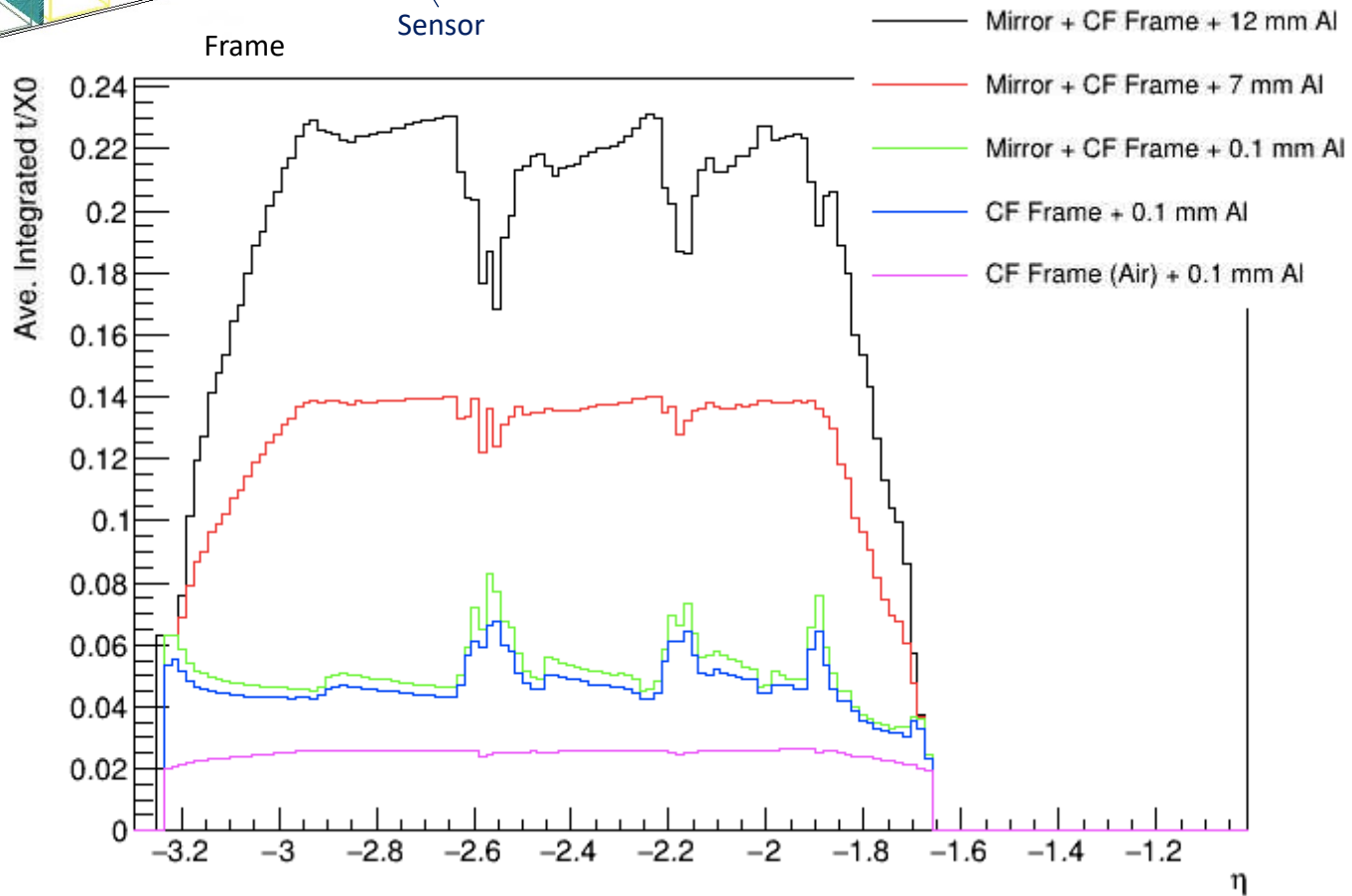
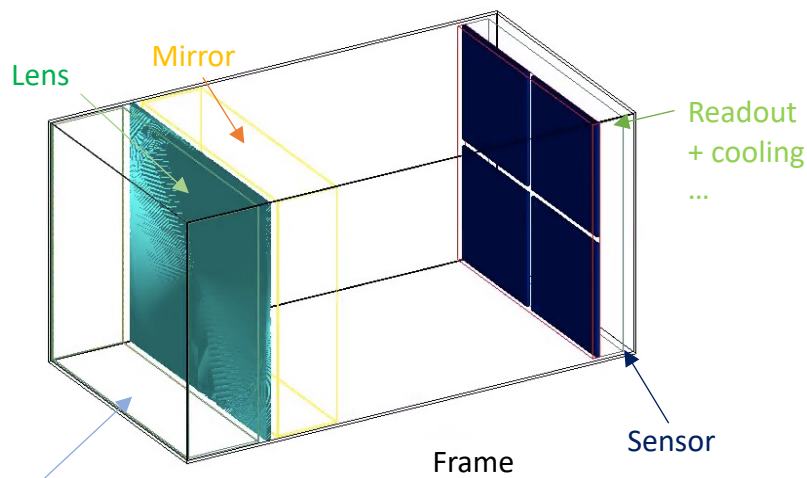
Current Status:

- Full GEANT4+reconstruction implementation in Fun4all framework
 - Current PID performance + other studies
- Implementing mRICH in dd4hep
 - need some parameter adjustments
- Adapt mRICH PID reconstruction code to ePIC framework
 - Performance studies – magnetic field impact & two particles in the same module!
- JLab beam test – Cherenkov angle resolution
- mRICH support structure
- New mRICH prototype design – test important design upgrades
- Submitted eRD101 proposal for FY23.

mRICH Setup in Fun4all



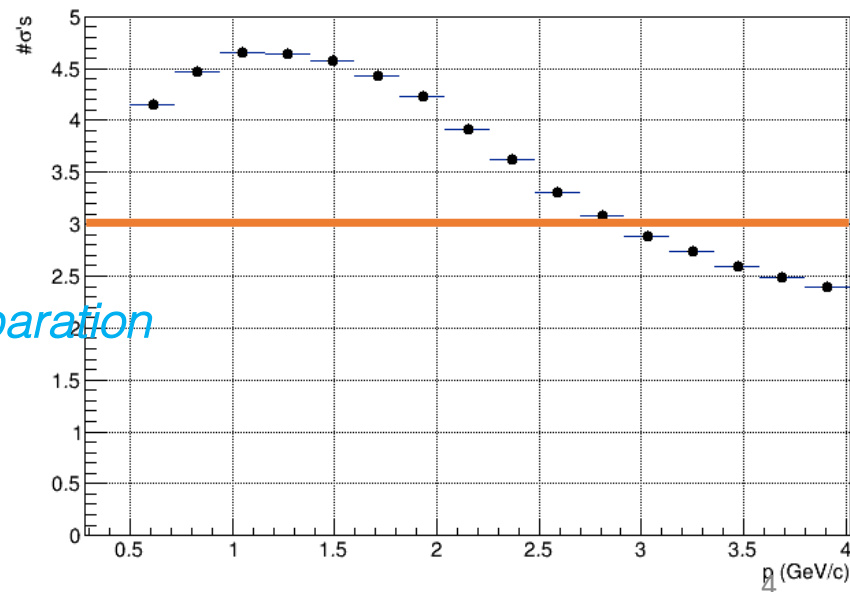
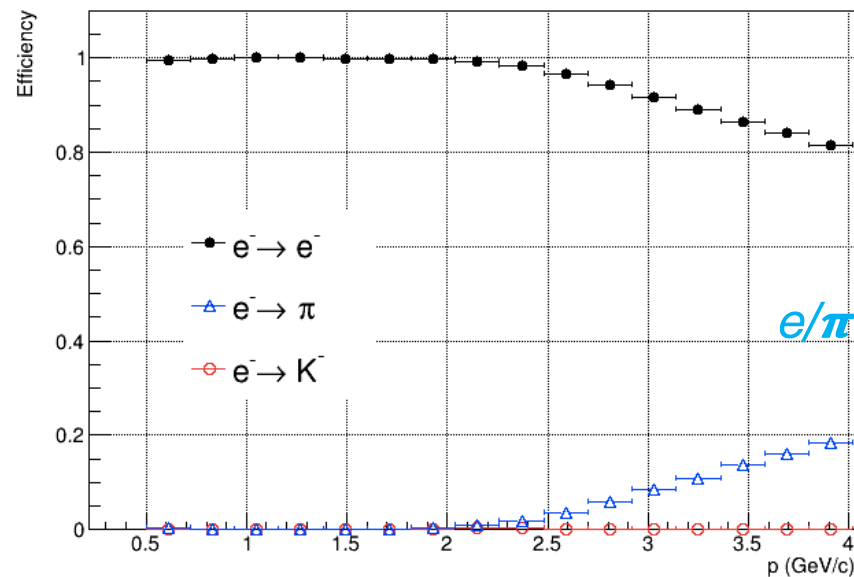
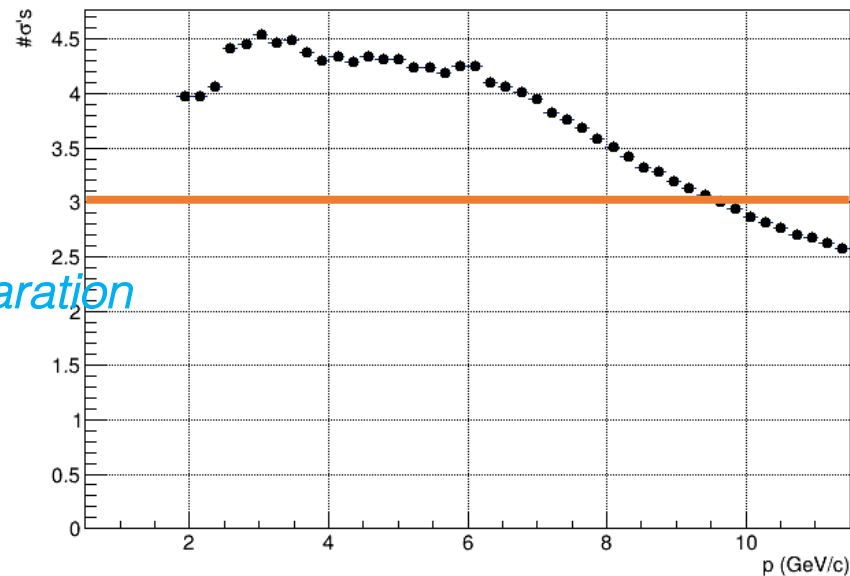
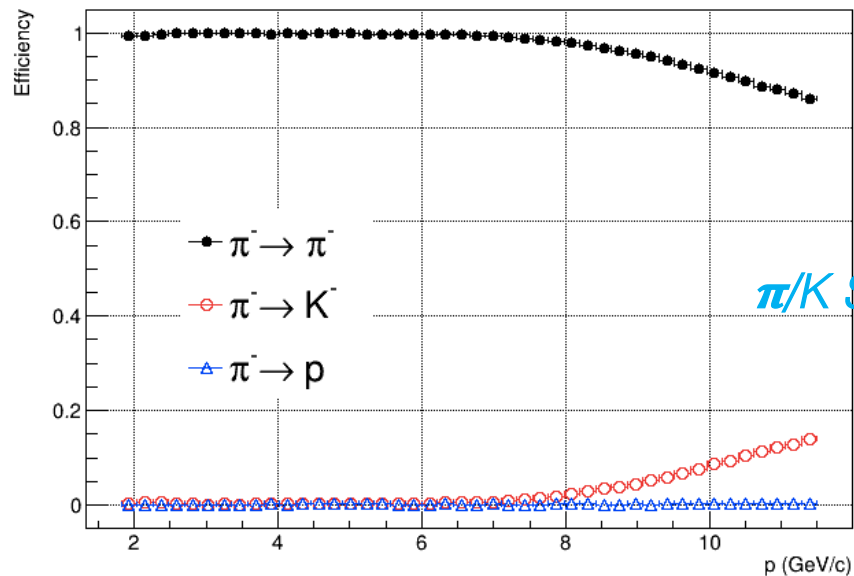
Material Scan



mRICH PID Performance

- 3 cm Aerogel @ $n = 1.02$
- SiPM Q.E.

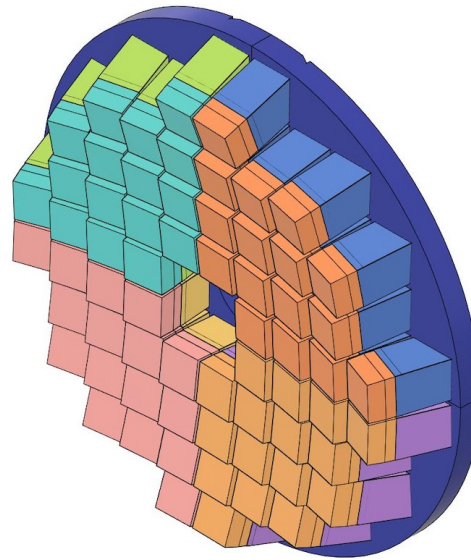
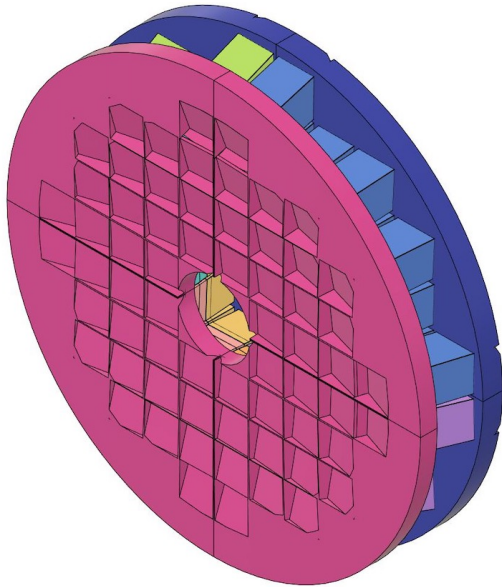
$\Delta\theta = 1.75$ mrad



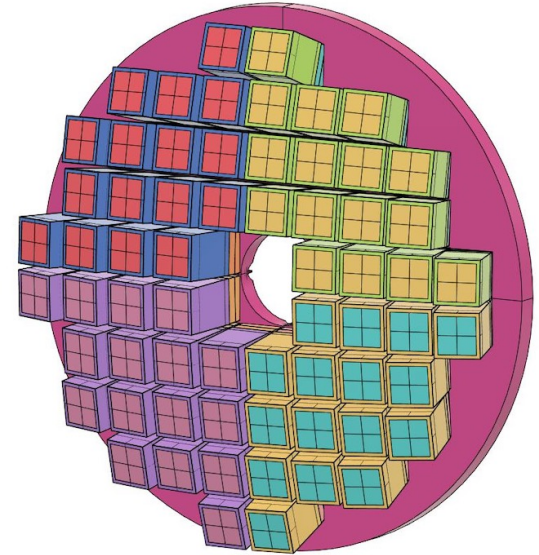
mRICH Support Frame & New Prototype Design

*JLab engineer:
Alex Eslinger*

- mRICH Support Structure



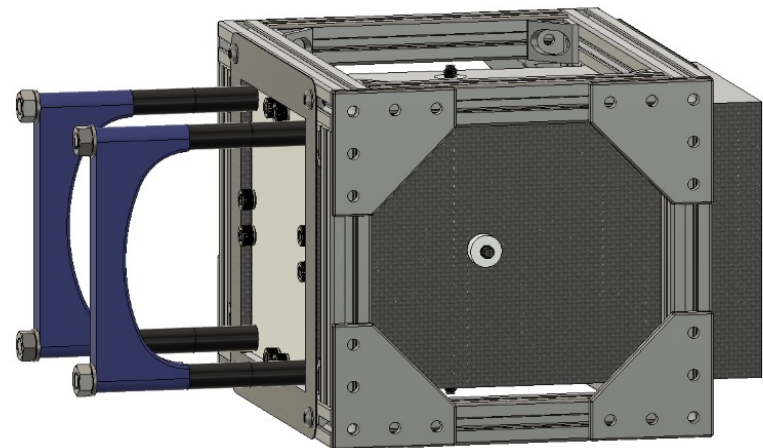
Front



Back

- New mRICH Prototype Design

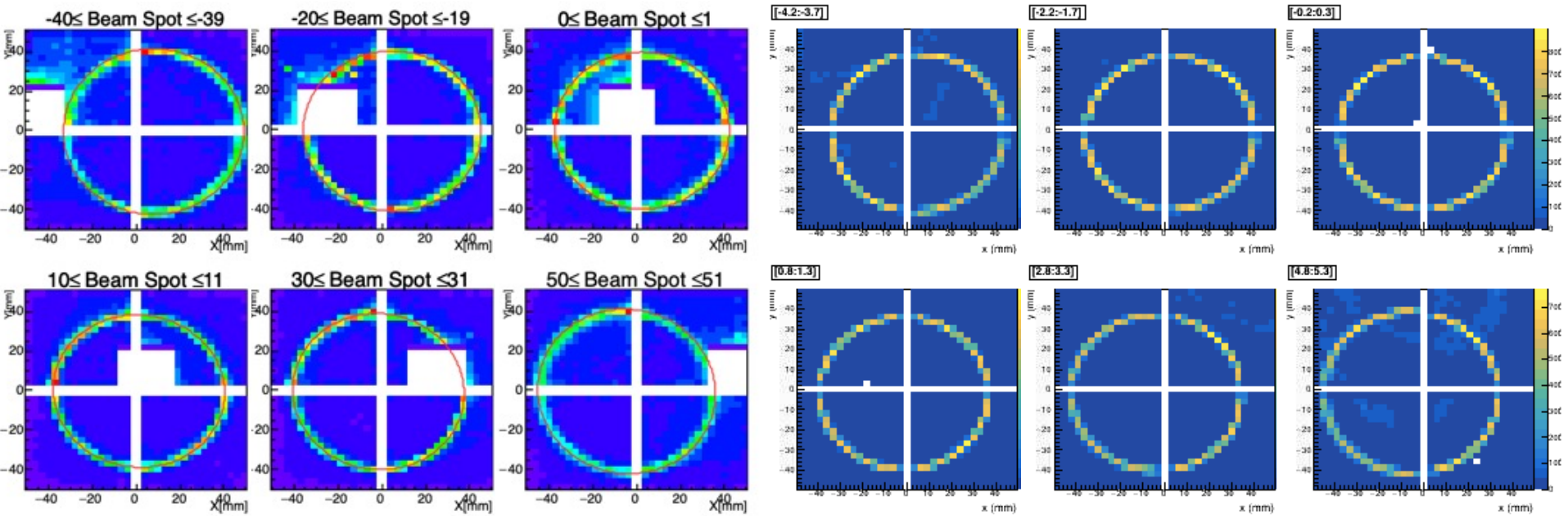
Optimizing the sensor location
and Aerogel thickness



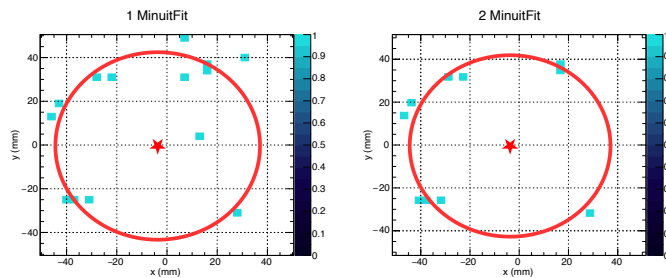
JLab Beam Test

(Cherenkov Angle Resolution)

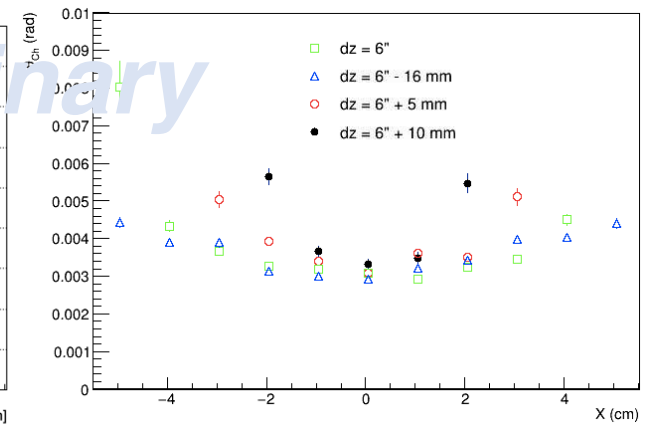
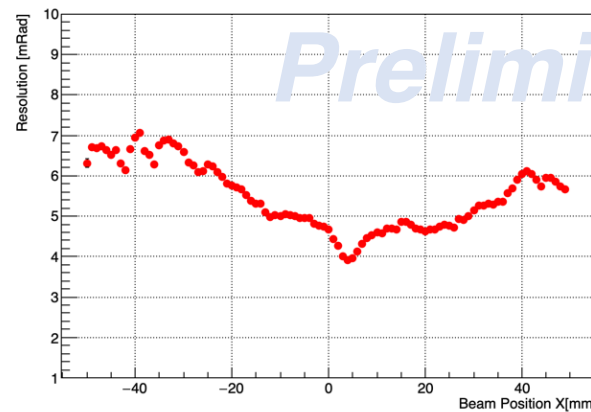
GSU postdoc:
Deepali Sharma



Fitting Ring Image Pattern on Event-by-Event Basis



Single Photon resolution vs X (Beam Spot) for $15 \leq Y \leq 16$ [mm]



Current Status:

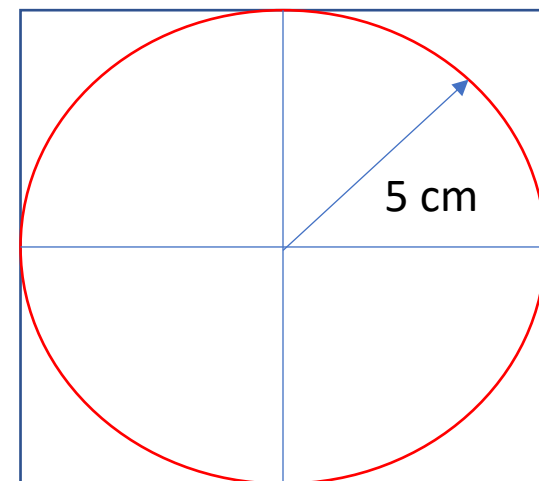
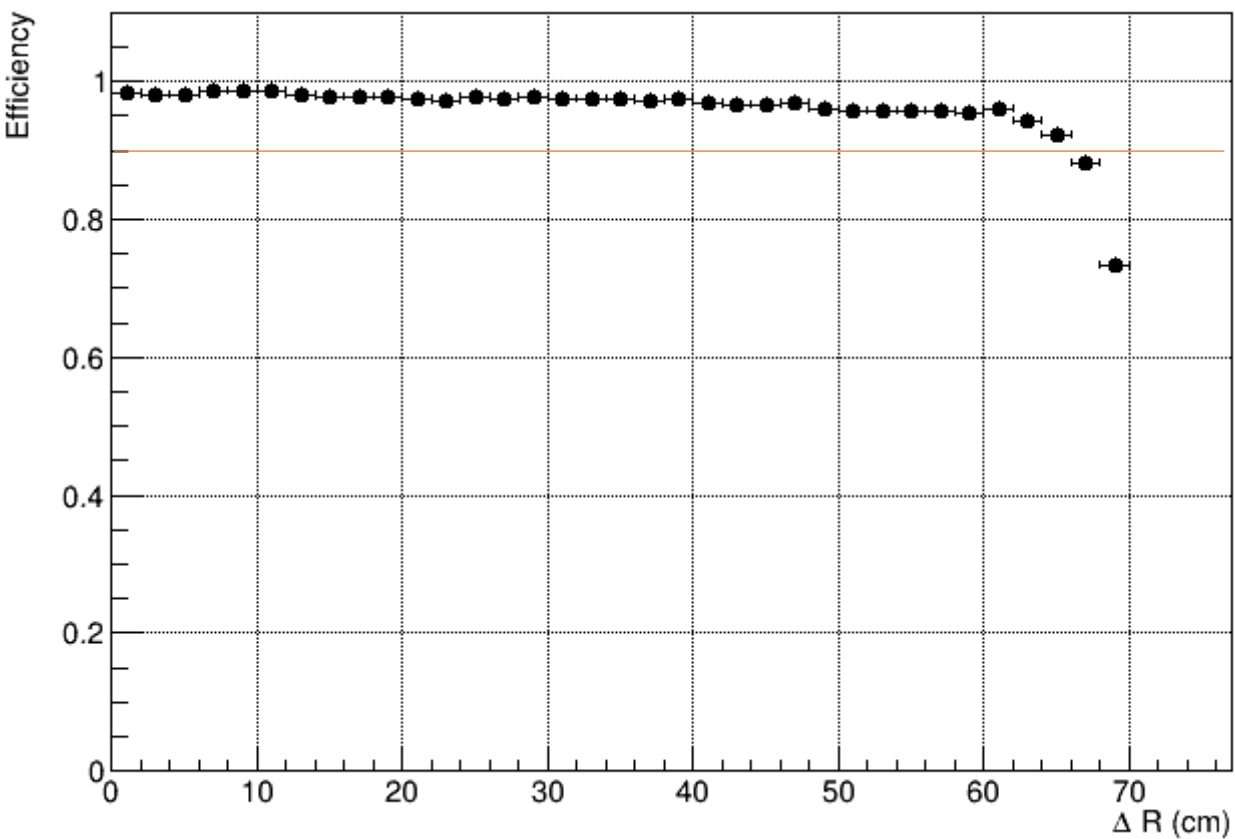
- JLab Beam test – Cherenkov angle resolution – near completion
- mRICH Support Structure – near completion
- New mRICH Prototype Design – work ongoing
- Implementing mRICH in dd4hep – near completion
 - Some parameter adjustments
- Adapt mRICH PID reconstruction code into ePIC framework - to be done
 - Performance studies – magnetic field impact & two particles in the same module! - to be done
- Submitted eRD101 proposal for FY23.
 - Key milestones: support frame, new prototype, and implementation in ePIC simulation framework

Backup

mRICH PID Performance - π/K Separation

$n = 1.02$

Q.E.



mRICH PID Performance

