







# The human faces of ePIC@CPAD







## ePIC Institutions at CPAD





12 talks + 1 poster

All explicitly referencing ePIC, the EIC, or EIC-generic R&D efforts

Production of Vessel and Mirrors for the pfRICH Detector at the EIC

Global Mechanics Challenges for Materials and Structures in Future Collider Detectors

Beam Test Results of SiPM-on-Tile Calorimeter Prototypes Toward the ePIC Forward Calorimeter

Development of Thin Gap GEM- $\mu$ RWELL Hybrid Detectors at Jefferson Lab

Design and characterization of the FCFD chip for strip AC-LGAD readout

Innovative Back-Side Illuminated SiPMs (BSI-SiPMs): first results from the IBIS project

AstroPix: Low power high voltage CMOS active pixel sensors for future space and collider experiments

LFHCal for ePIC Detector at EIC

Plans for EIC generic R&D based on MPGD technology

Performance of AC-LGADs for ePIC and beyond

Generic Hardware Platform for future high-bandwidth detector readout

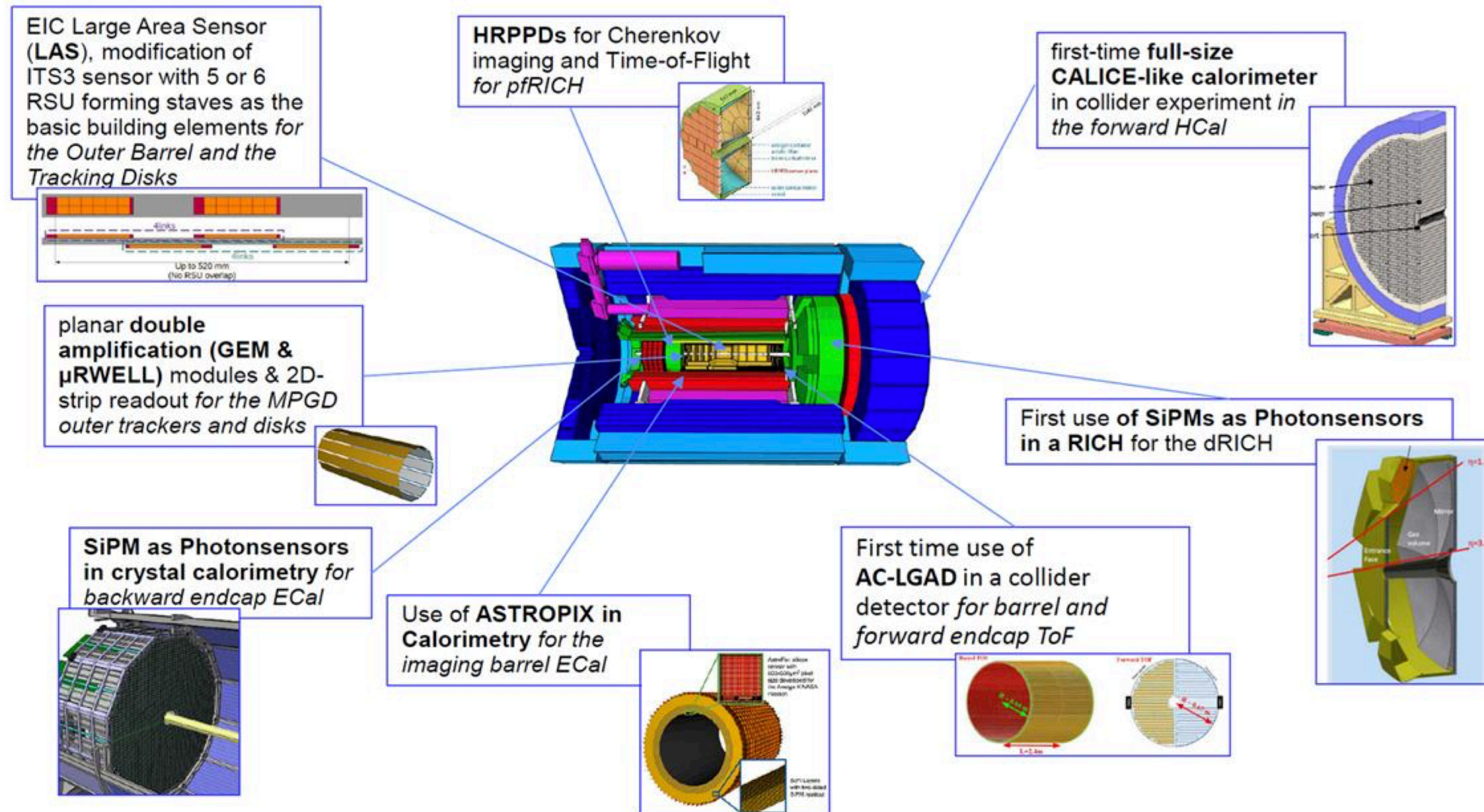
High performance RICH detector concept with HRPPD sensors for EIC Generic R&D

The ePIC Detector HEP Instrumentation Synergies



# ePIC: an innovative, state-of-the-art detector

[O. Hartbrich](#)





# ePIC@CPAD

## Calorimeters

Hadronic  
Calorimeters

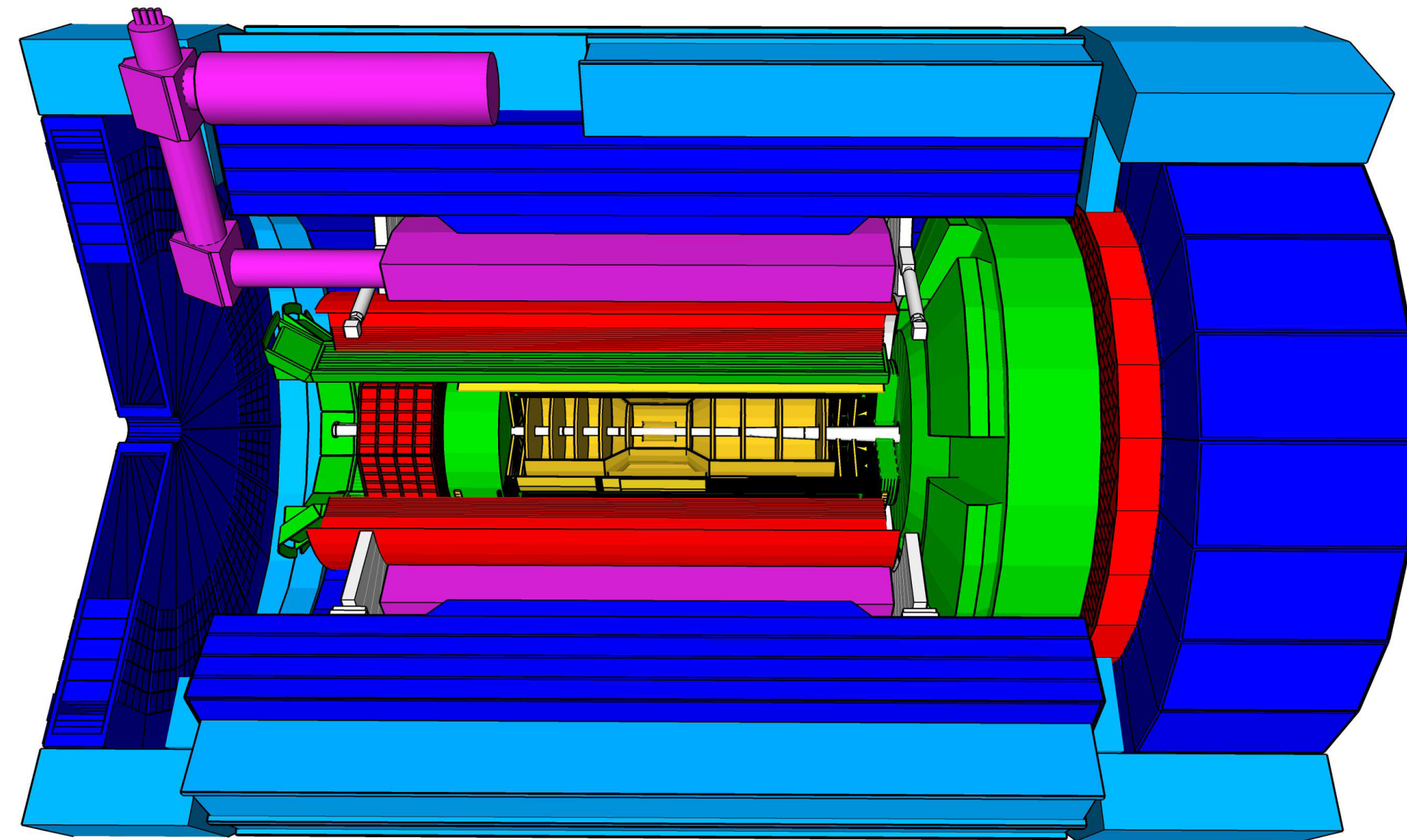
Solenoid Magnet

Electromagnetic  
Calorimeters

Particle  
Identification

Tracking

## TOF



## Trackers

## Readout / DAQ

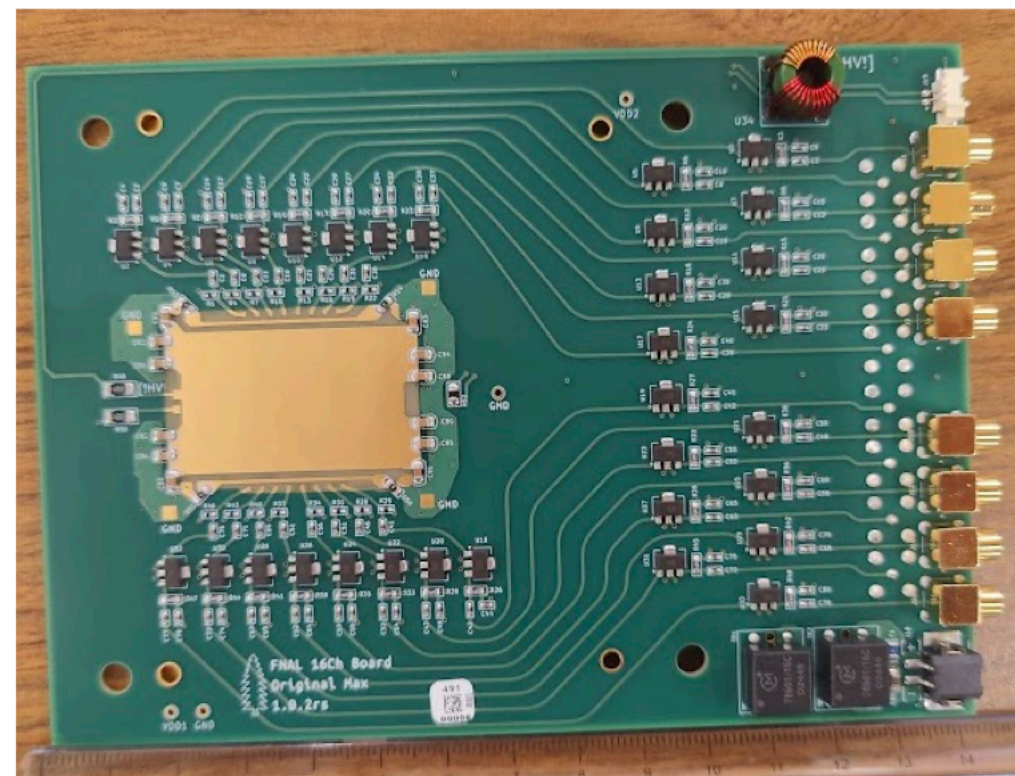
## RICH / PID



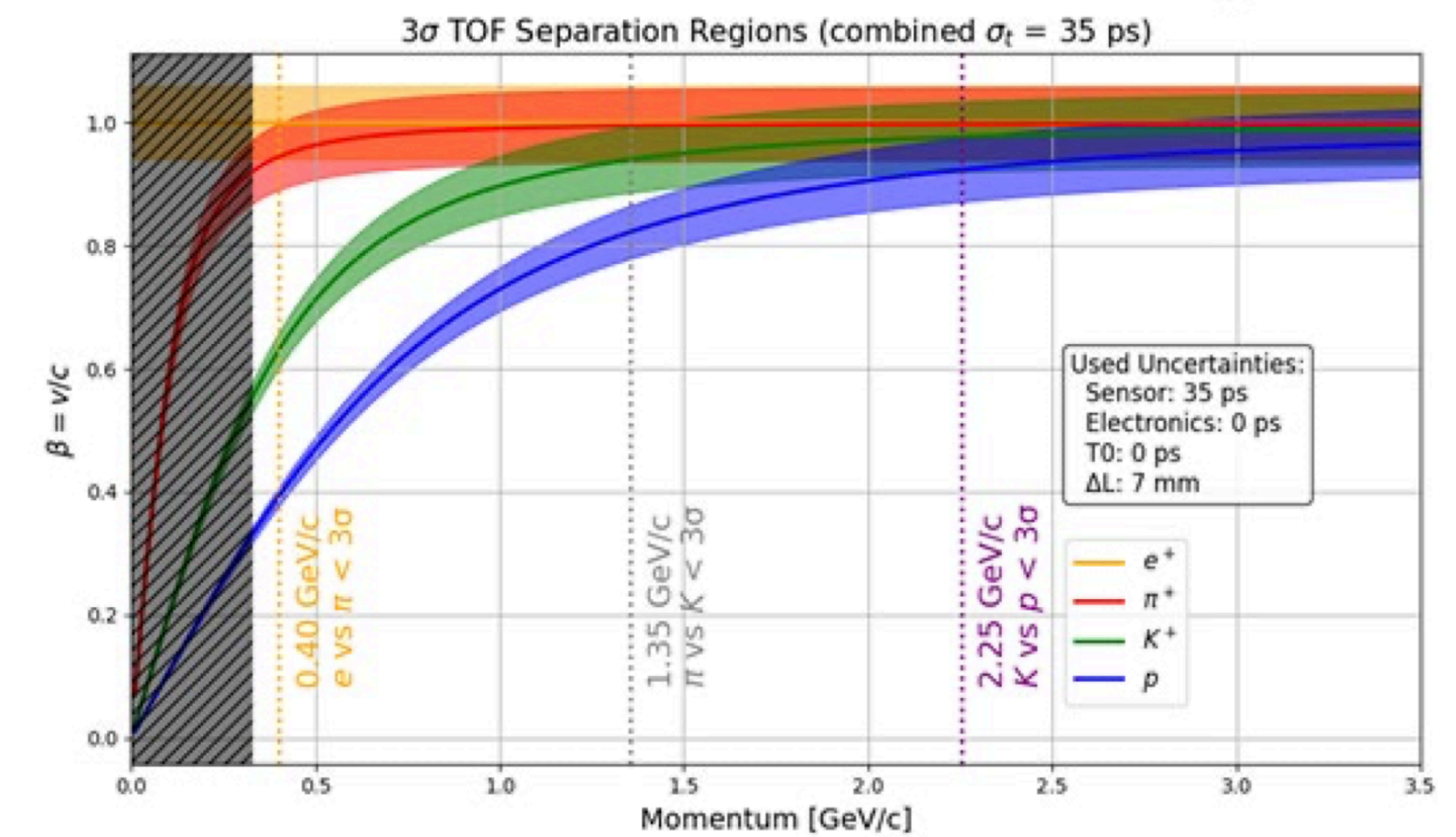
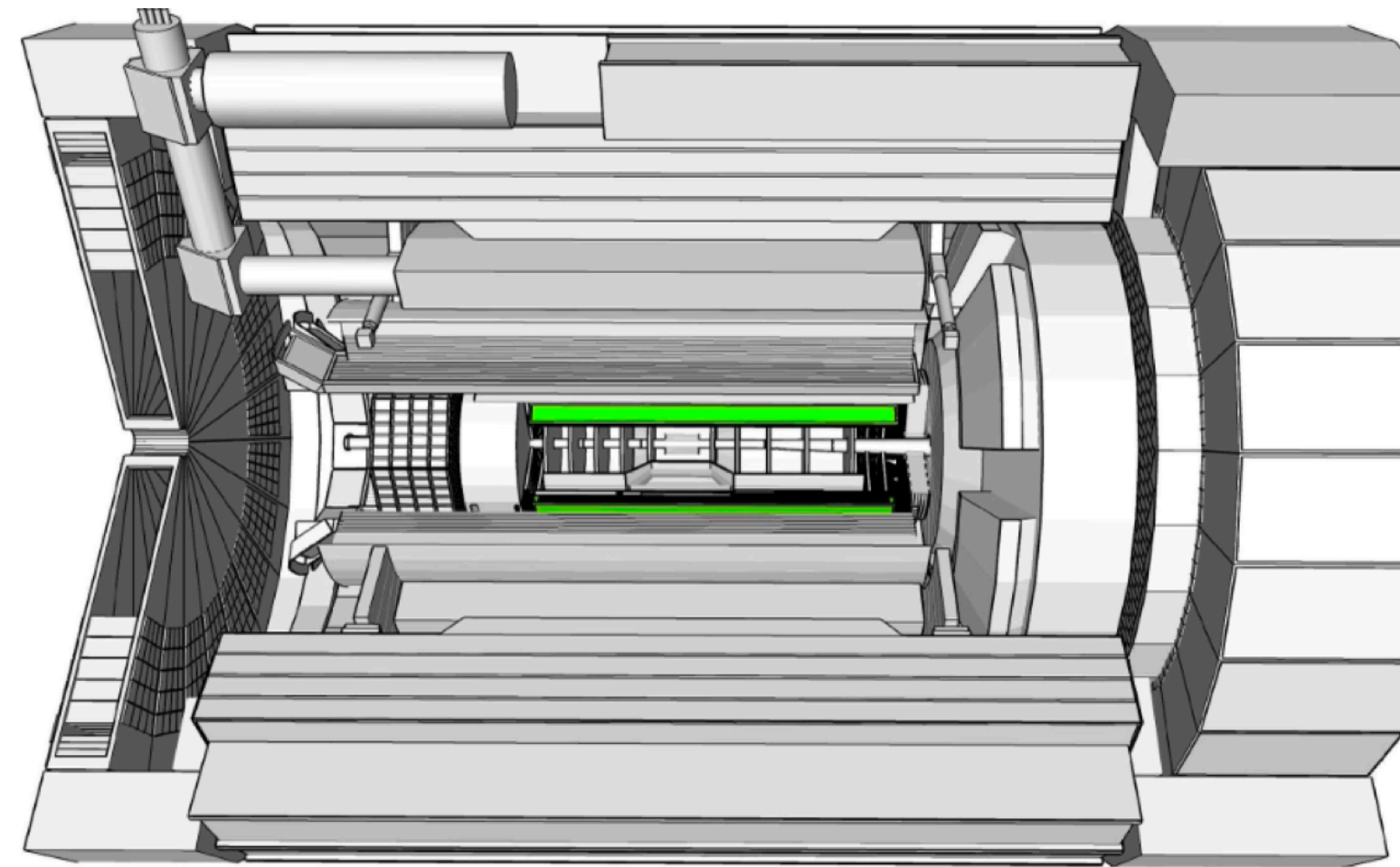
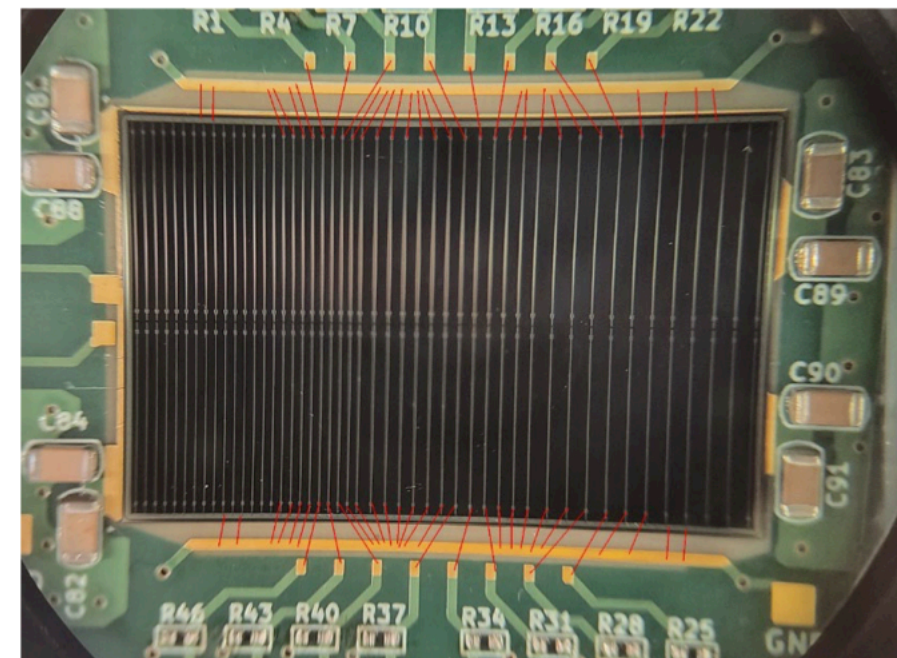
# Time of Flight

Sensors for the ePIC TOF  
layers are reaching  
maturity

S. M. Mazza et al.



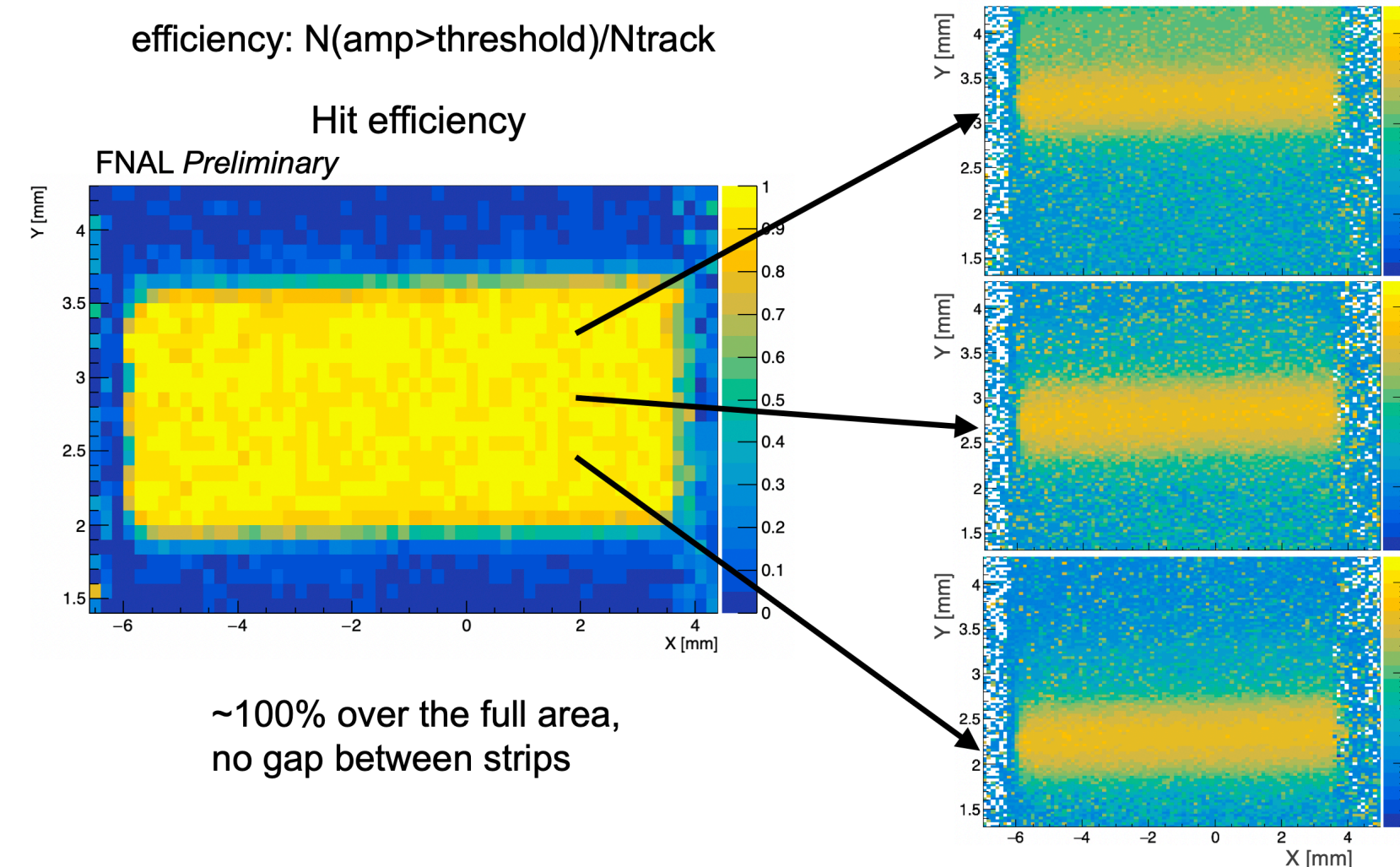
Strip AC-LGAD



## Barrel TOF – Test Beam at FNAL

FCFD chip for strip AC-LGAD

S. Wu et al.



## Resolutions

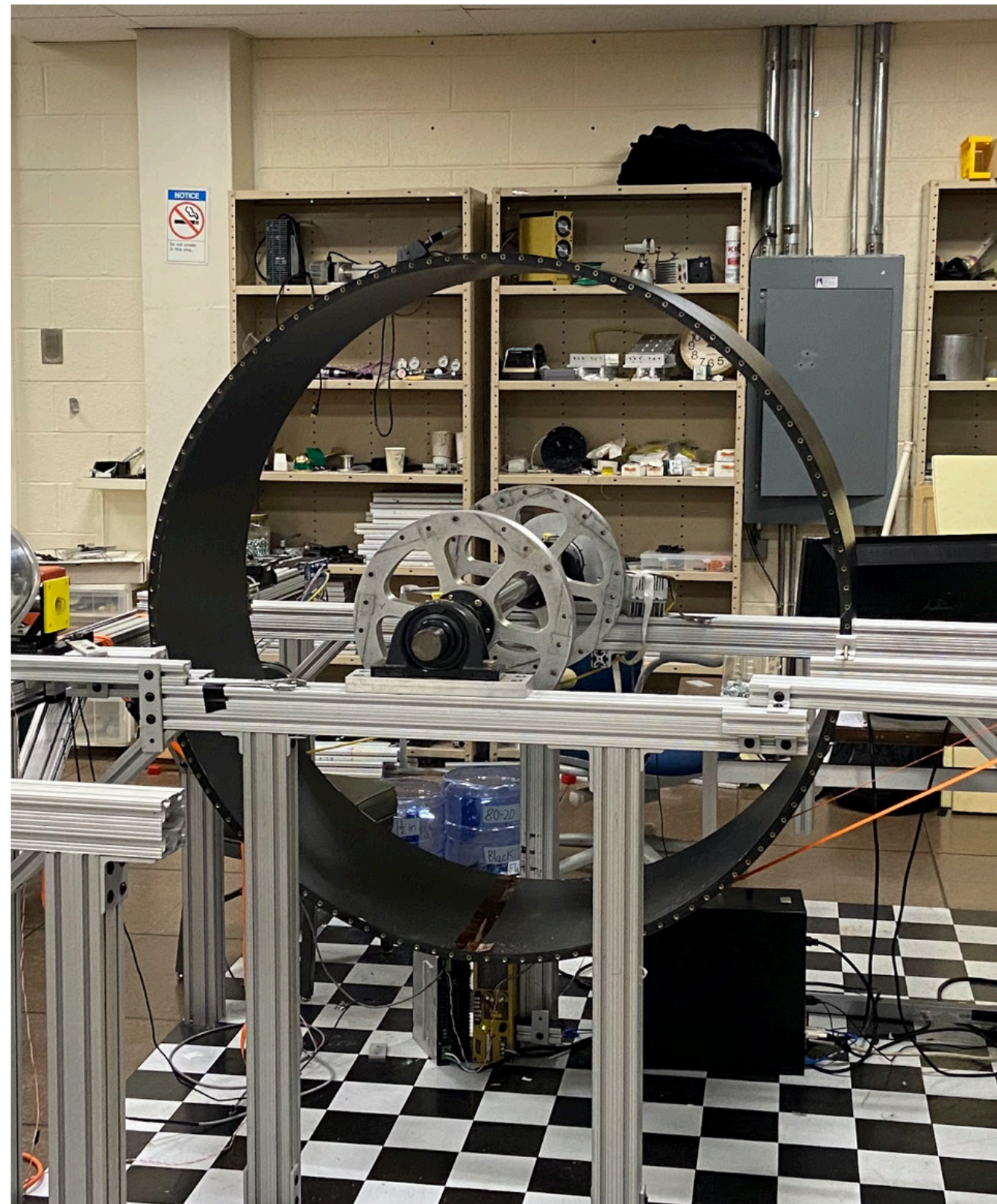
$$\sigma_t = 39 \text{ ps}$$

$$\sigma_s = 14 \text{ um}$$

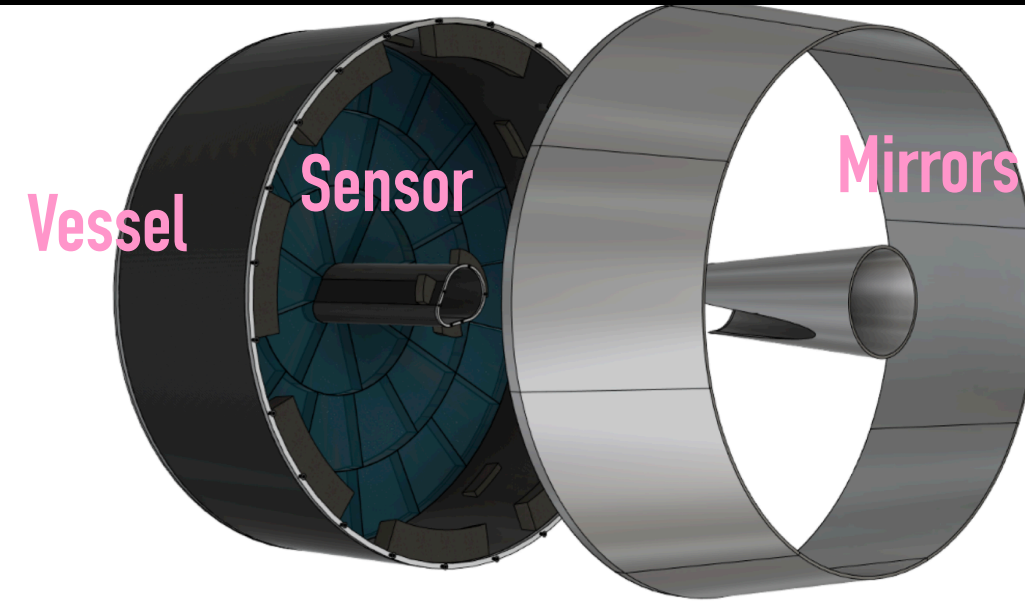


# pfRICH PID

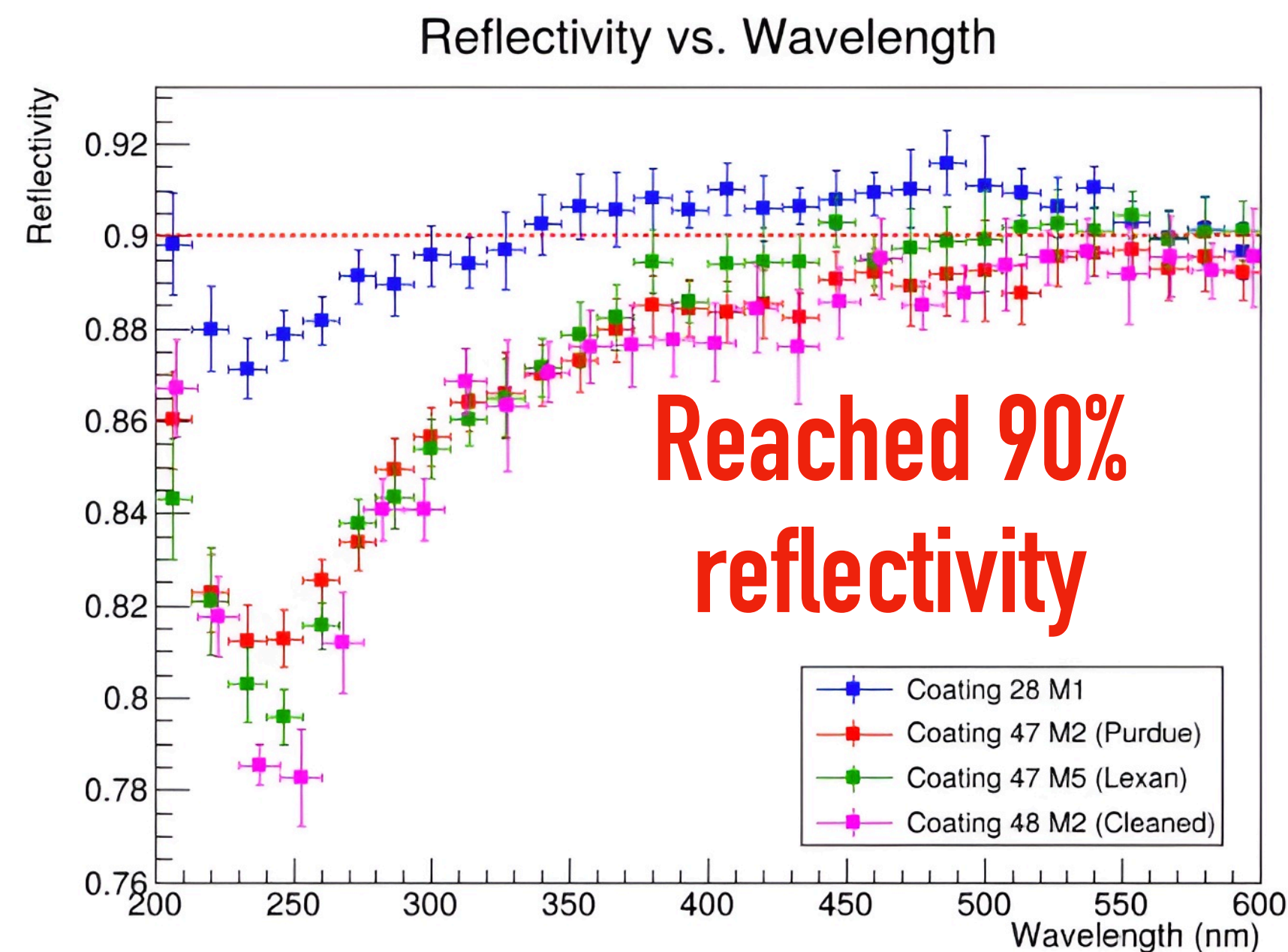
pfRICH vessel achieved



C-J Naïm



## pfRICH mirrors

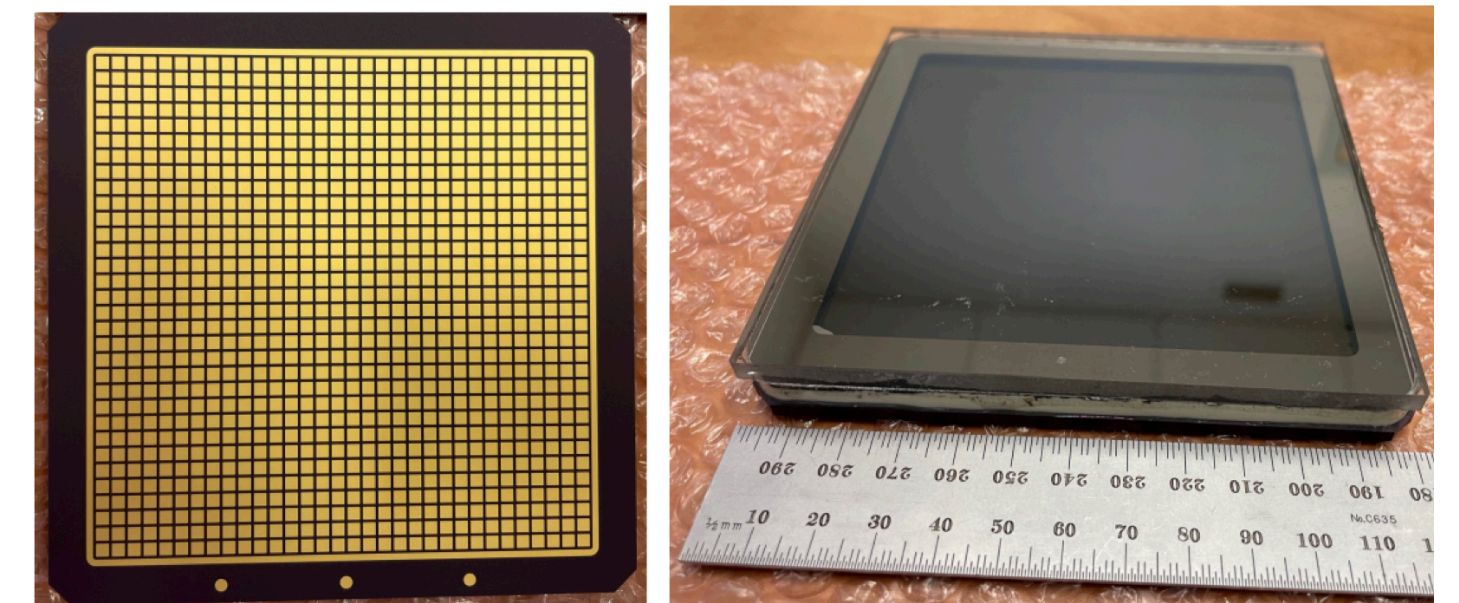


Curved mirror development (ongoing)

L. B. Havener

68 HRPPDs in pfRICH

Very good time resolution for single photon detection ( $\sim 50$ ps)



HRPPDs with  
75 % geometric efficiency, 1.625 mm  
pad pitch, QE<sub>peak</sub> = 40 % @ 450 nm



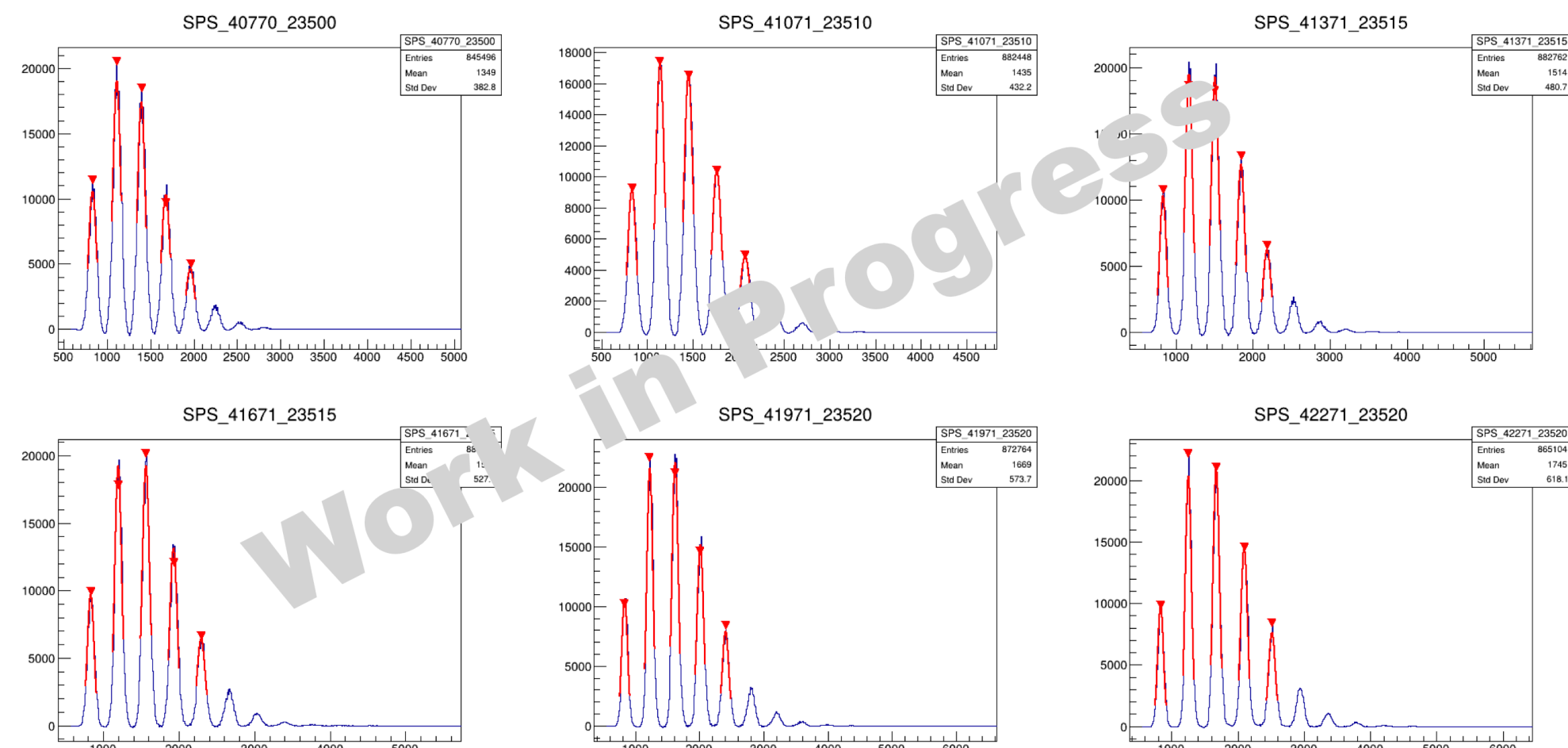
# Calorimeter

ePIC LFHCal

P. Garg

Scintillator tiles with silicon photomultipliers (SiPMs) coupled to them

First Batch of Hamamatsu SiPMs

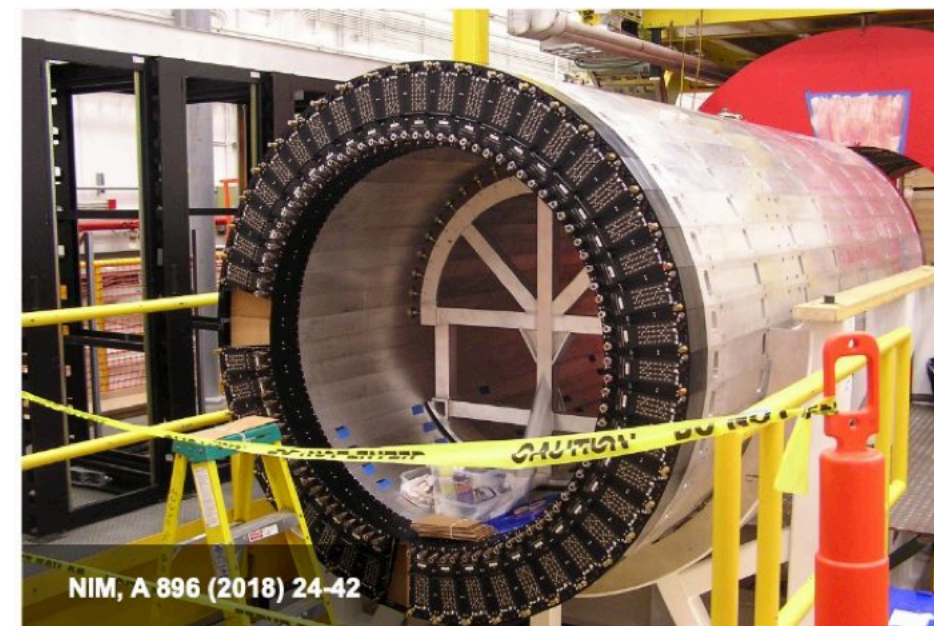


Test-beam 2025@CERN (19th Nov. 2025)

Energy resolution for electrons should be fully contained

M. Jadhav

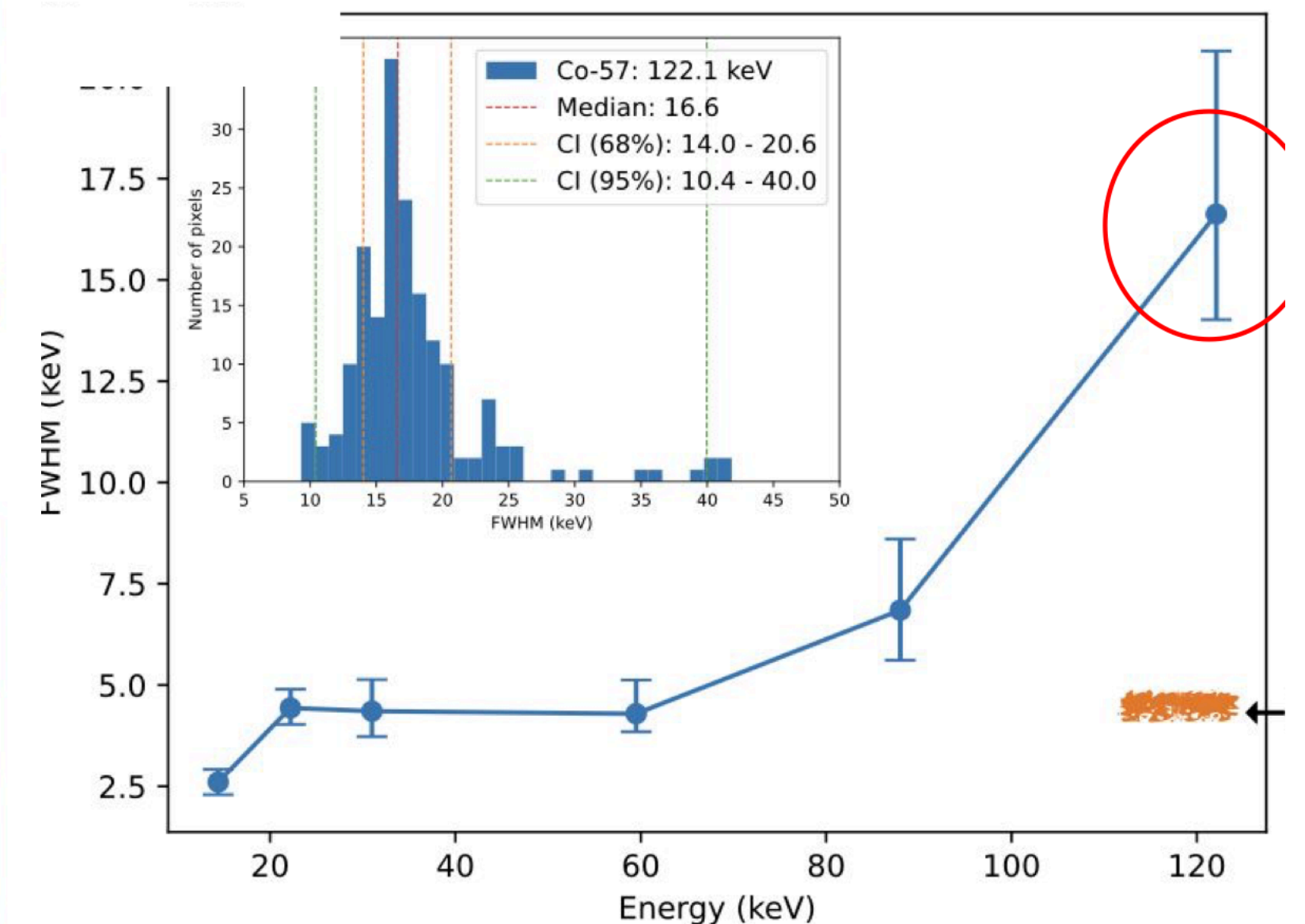
Layered Pb/ScFi technology



AstroPix: silicon sensor with 500x500  $\mu\text{m}^2$  pixel size

ePIC Barrel Imaging Calorimeter  
for electron-pion separation

AstroPix v4 (2024)



Photopeaks detected  
from 22–122 keV in  $\sim 90\%$  of pixels

Capture a 3D image of the shower

AstroPix v5 will provide a few ns time resolution

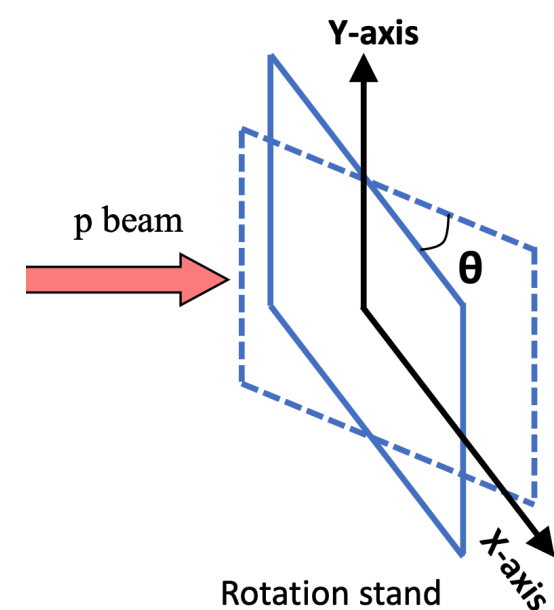


# Trackers

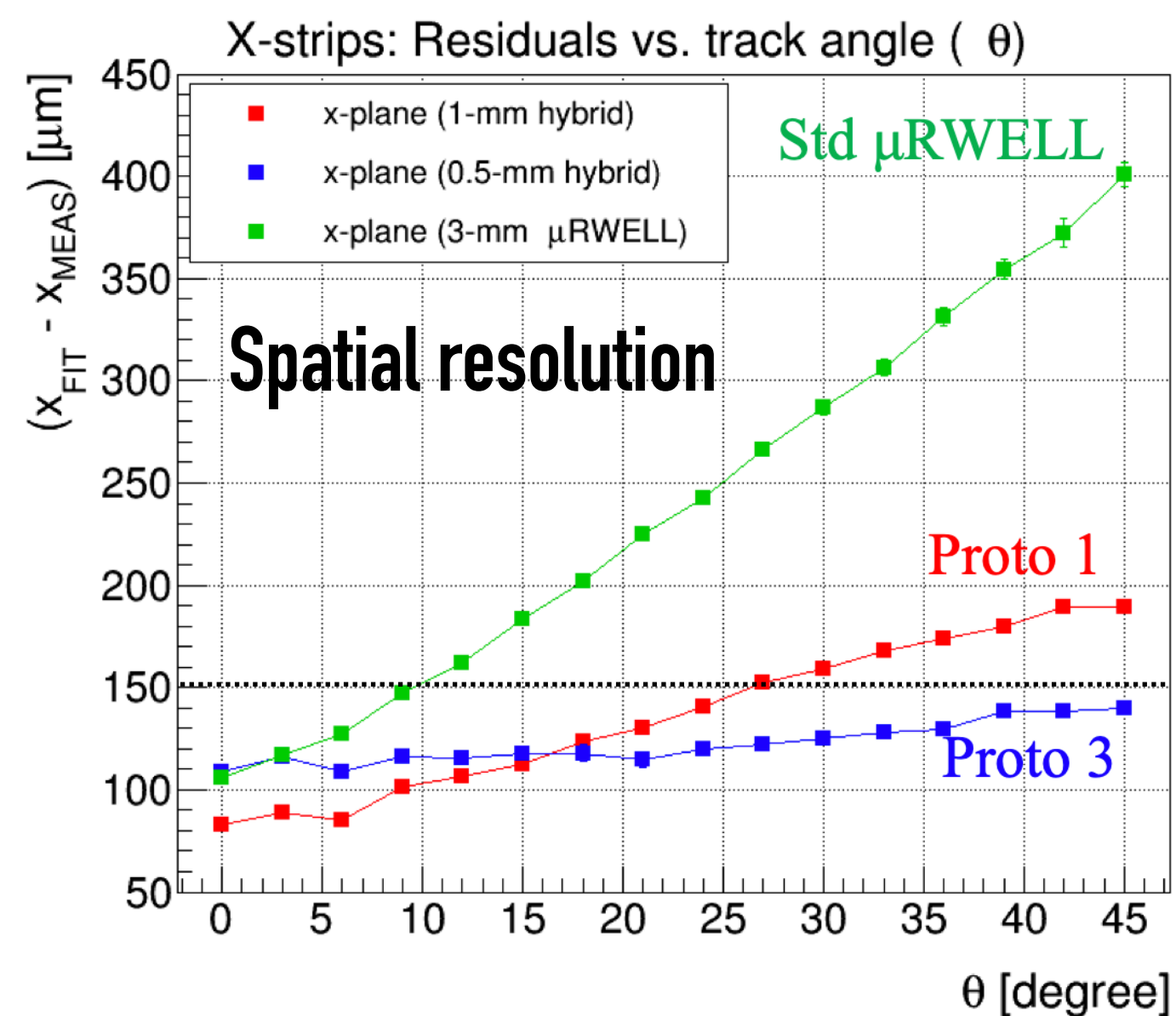
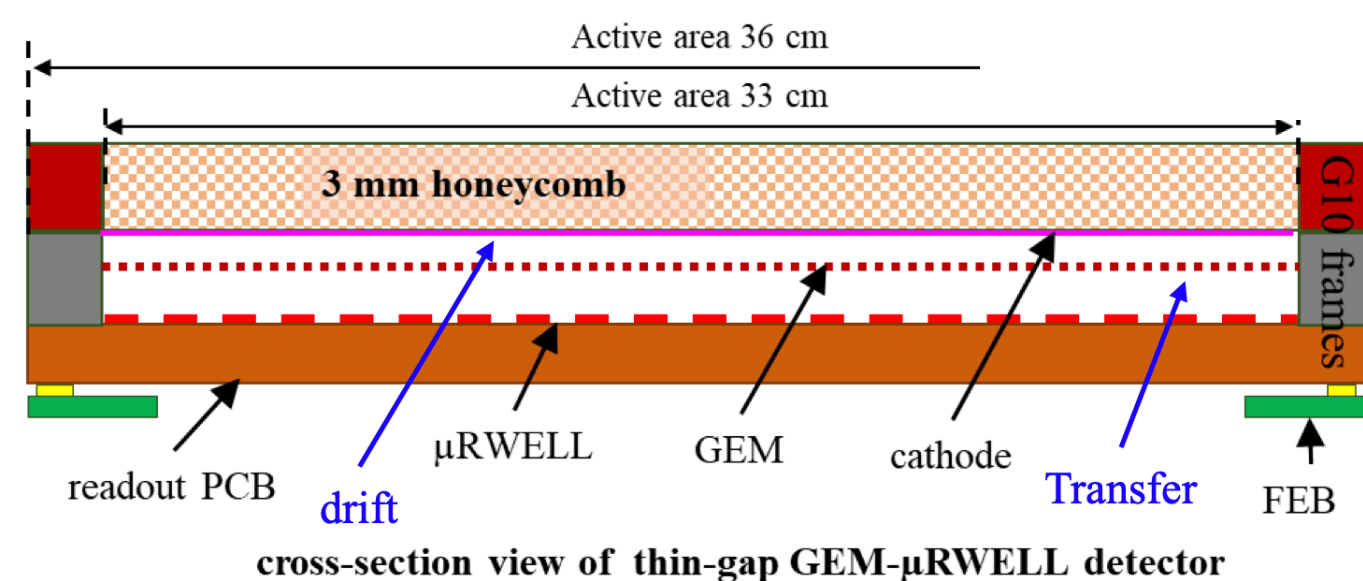
K. Gnanvo

## Thin-gap GEM- $\mu$ RWELL

Test beam campaigns @ FNAL (2023) and @ JLab (2025)

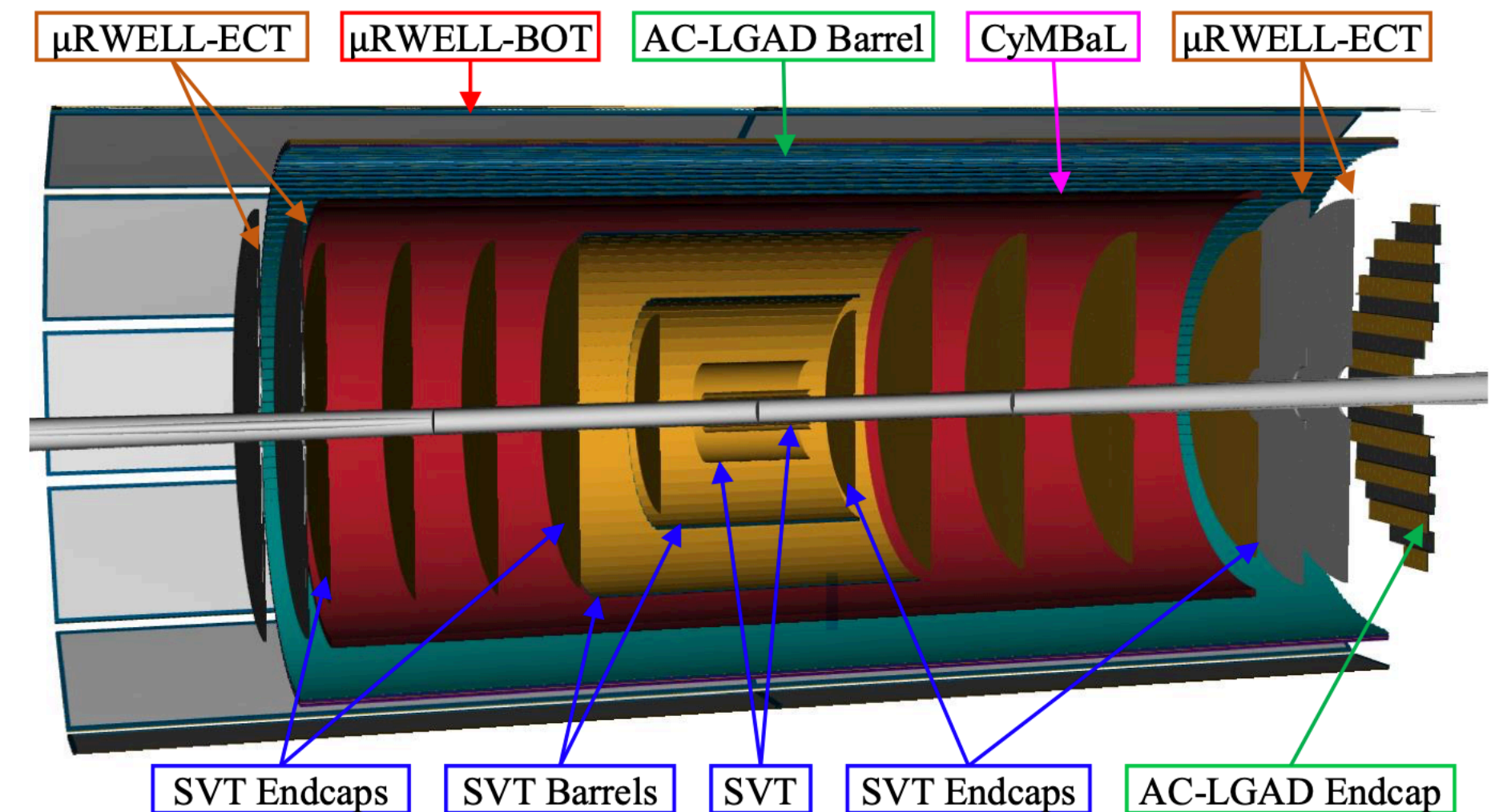


$\sigma_s$  better than 150  $\mu\text{m}$  in a wide range of the impact angle of the incoming particle



Efficiencies of **96%** and **98%** are achievable with 1.0 mm and 1.5 mm gaps, respectively  
Ar:C02:iC4H10 (90:7:5=3)

## $\mu$ RWELL Barrel Outer Tracker

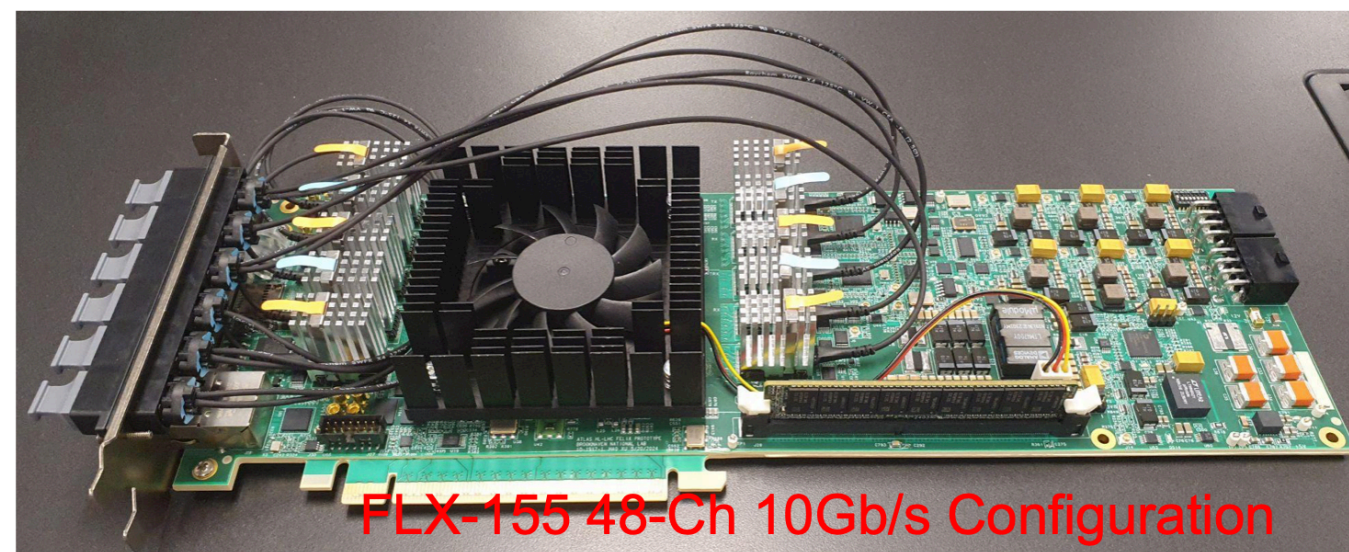


Assembly start week of Oct.13th → **Completed by December 15th**  
Plan to **test** performance in beam in **Spring-Summer 2026**



# DAQ / Readout

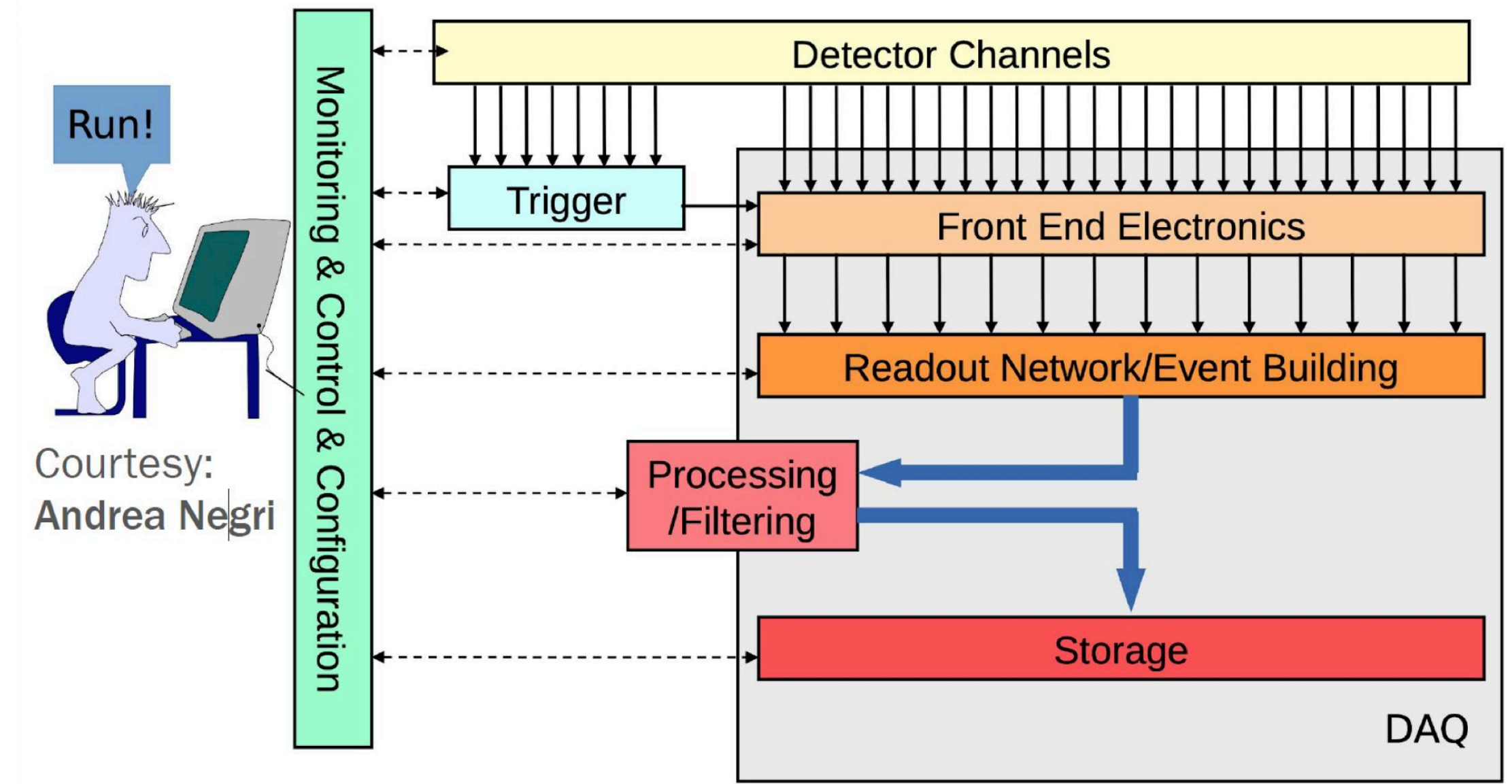
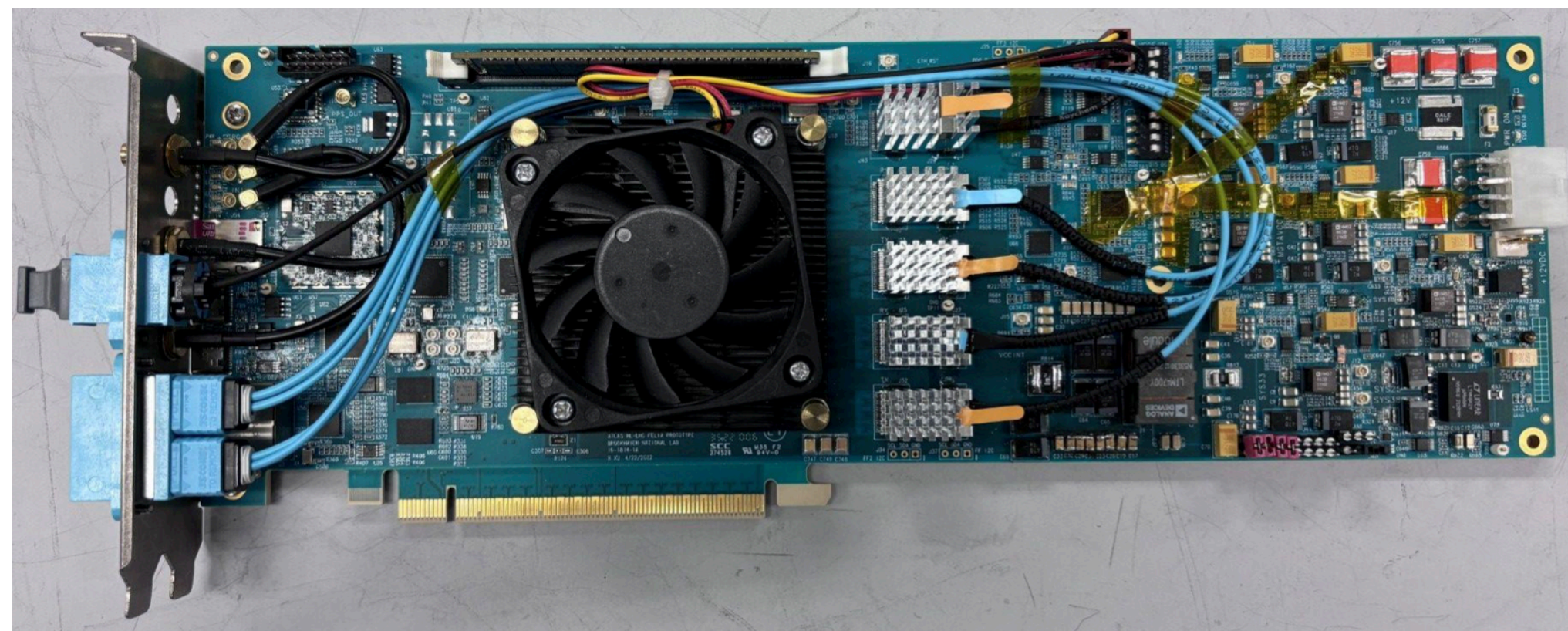
## FLX-155



FELIX PCIe readout card enabling streaming DAQ for EIC

**Performance: All 56 optical links have been verified at 25.78125 Gb/s**

## FLX-182B



S. Tang et al.

**Performance: 28 (24+4) links @ 25 Gb/s**



