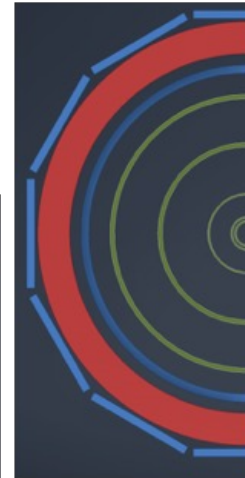
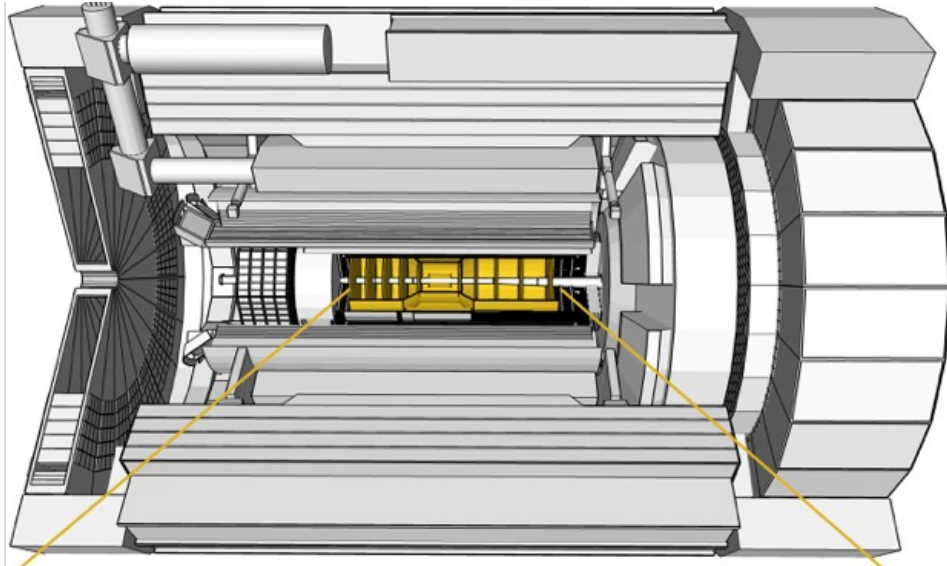


ePIC

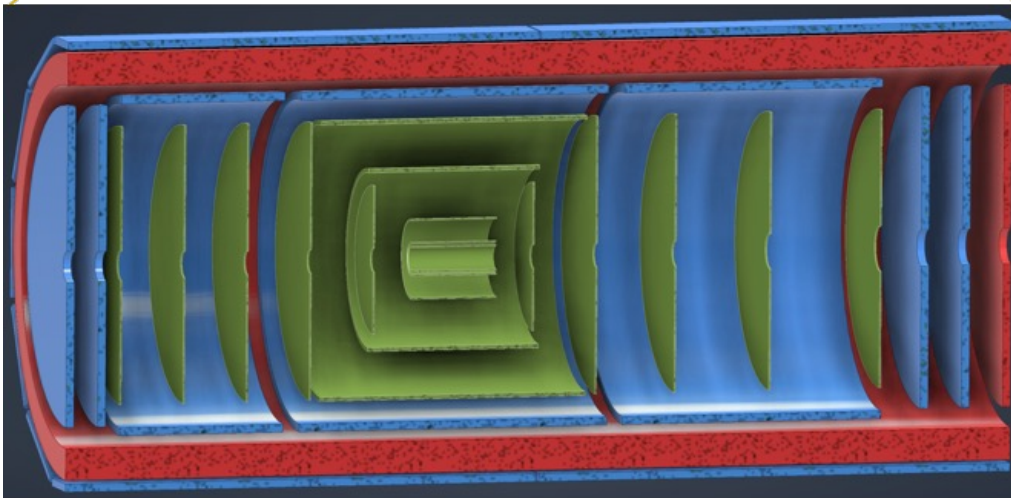
Detector Geometry and Response

Matt Posik and Ernst
Sichtermann

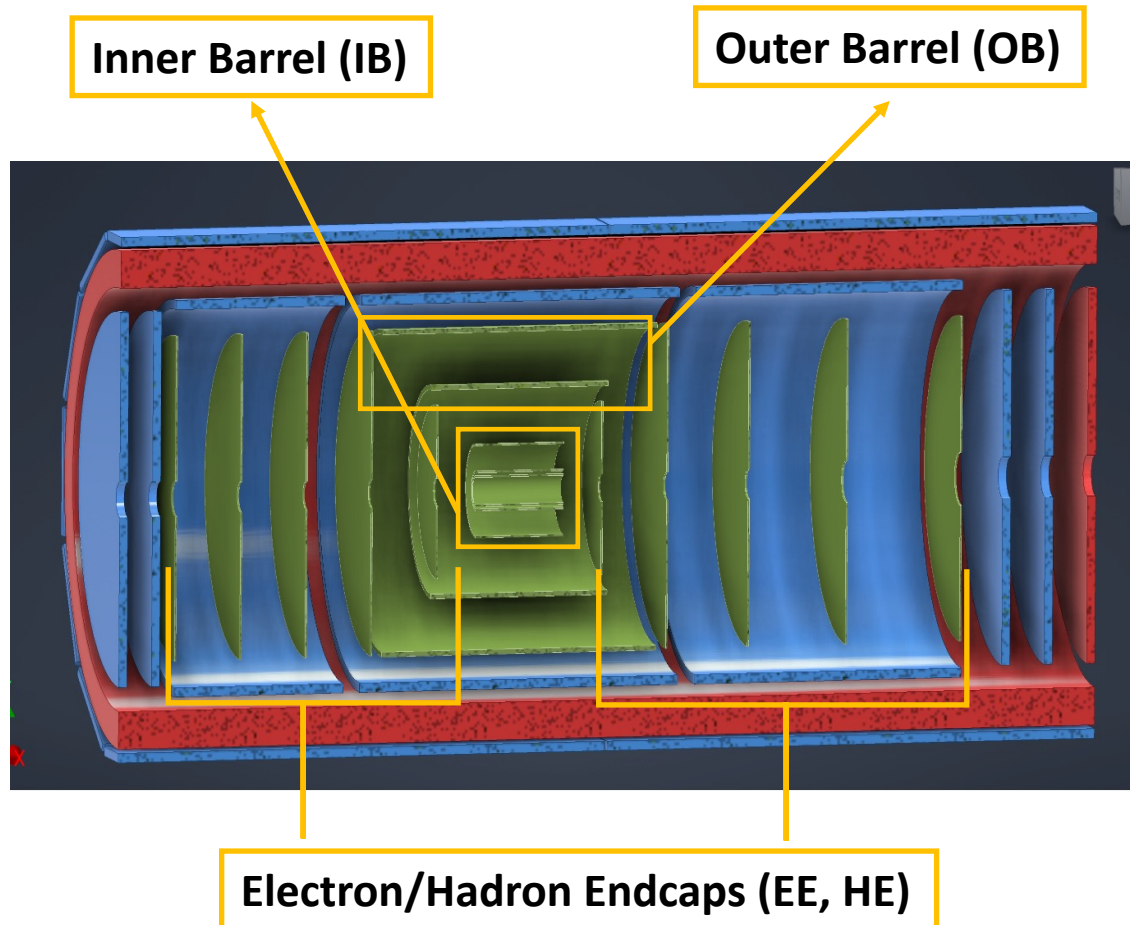
- ❑ Modify simulation detectors to better reflect current detector designs
 - Geometry and segmentation in DD4HEP
 - Define ACTS geometry from DD4HEP geometry (via ACTS DD4HEP plugin)
- ❑ Endcap trackers need to have off centered hole for beam pipe (Si and MPGD)
- ❑ Further develop digitization algorithms
- ❑ Implement tracking cluster algorithm(s)



- ❑ ePIC tracking system is a hybrid of silicon and gaseous technologies
- ❑ **MAPS Layers**
 - Make up inner tracking volume
 - Highly granular and low mass layers to provide excellent momentum resolution and precision pointing resolution
- ❑ **MPGD Layers**
 - Large area detectors are instrumented in the outer tracking volume
 - Provide timing and pattern recognition
 - Planar detectors can provide impact point and direction for PID seeding
- ❑ **AC-LGAD**
 - Fast detector to provide low momentum PID.
 - Can provide an additional space point for pattern recognition/redundancy
- ❑ **Barrel Imaging Calorimeter (BIC)**
 - Provide additional hit point
 - Potential to help with PID seeding and pattern recognition



- MAPS Barrel + Disks
- MPGD Barrels + Disks
- AC-LGAD based ToF

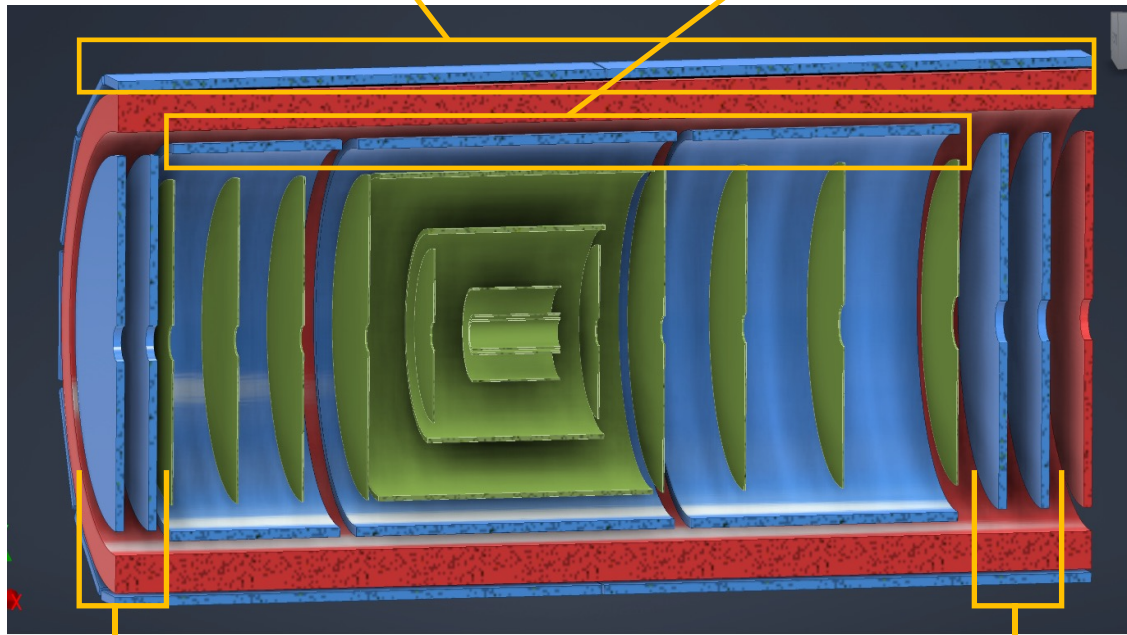


□ SVT based on MAPS 65 nm CMOS imaging technology

- Total (active) area $\sim 8.5 \text{ m}^2$
- Small pixels ($20 \mu\text{m}$) provide excellent resolution
- Low power consumption ($< 40 \text{ mW}/\text{cm}^2$)
- Low material budget (0.05% to 0.55% X/X_0) per layer
- Frame rate $\approx 2 \mu\text{s}$

$\mu RWELL$ Barrel Outer Tracker ($\mu RWELL$ -BOT)

Cylindrical Micromegas Barrel Layer (CyMBaL)



$\mu RWELL$ Endcap Trackers ($\mu RWELL$ -ECT)

□ MPGD detectors based on two technologies:

- $\mu Megas$ (curved layers) and
- $\mu RWELL$ (planar layers)

- Total (active) area $\sim 26 \text{ m}^2$
- Provide $\sim 10 - 30 \text{ ns}$ timing resolution
- Average spatial resolution $\sim 150 \text{ }\mu\text{m}$
- Streaming readout capable SALSA FEE being developed by CEA Saclay IRFU and Sao Paulo Universities for ePIC MPGDs

