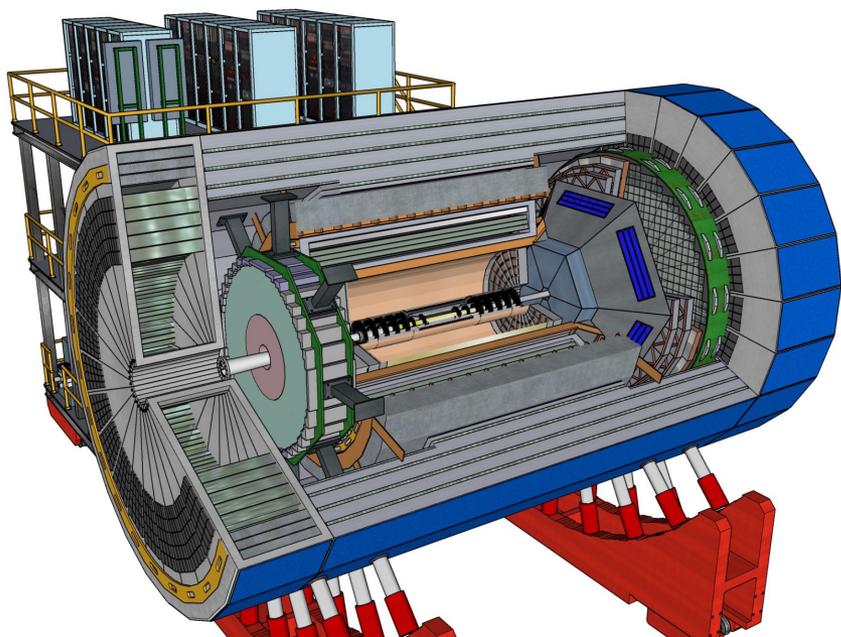


# ECCE 1<sup>st</sup> order integrated tracking detector layout

Xuan Li (LANL), Nilanga Liyanage (UVA)

# ECCE General Detector Technology candidates

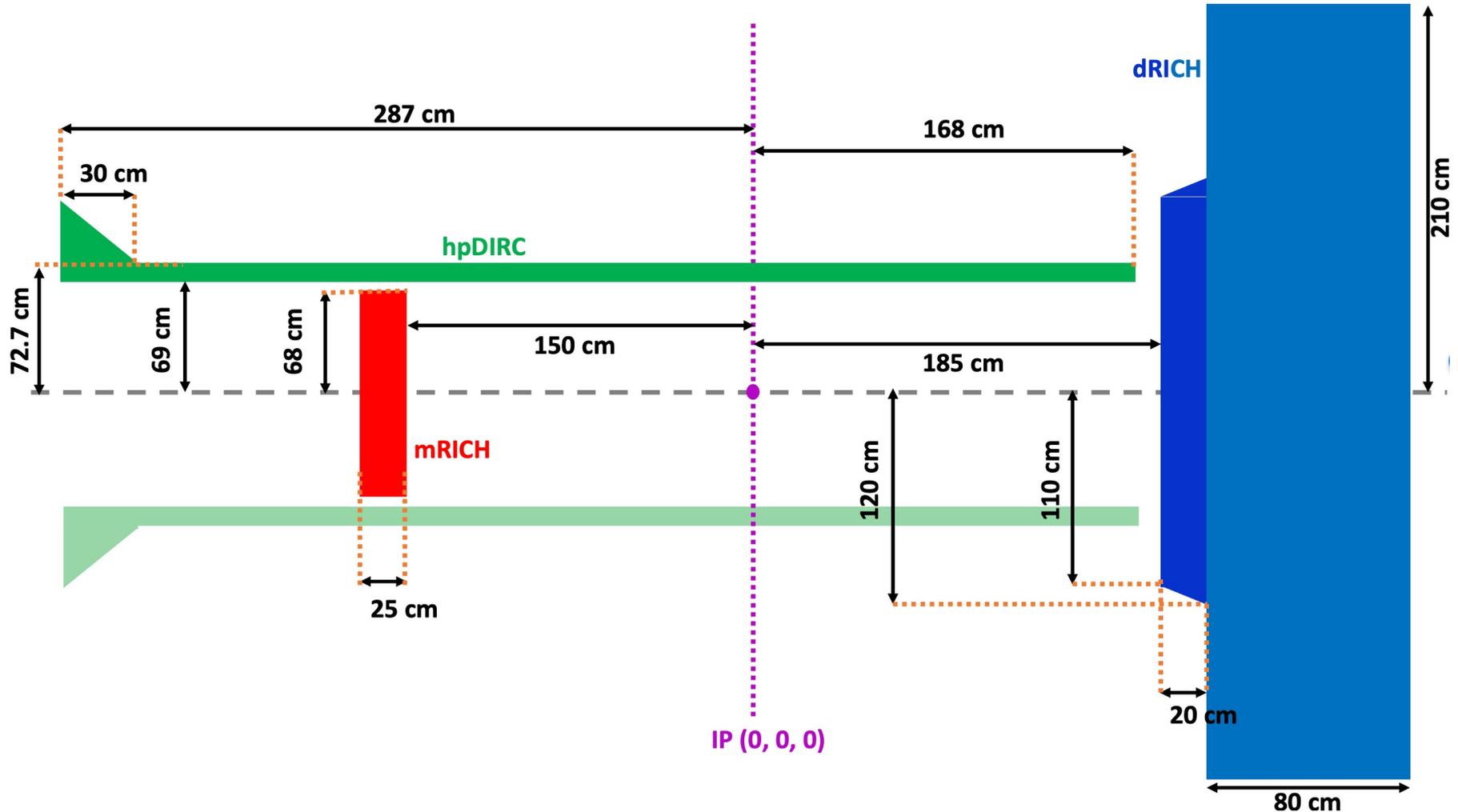
- Initial inputs based on the June 8 ECCE tracking discussions.



- Preferred technologies:
  - **Electron endcap:**  $\mu$ Rwell/MPGD, MAPS based silicon, LGAD based ToF (1 or 2 planes).
  - **Central Barrel:**
    - MAPS based silicon,
    - LGAD based ToF (1 or 2 layers) or **LYSO based ToF (5X5mm<sup>2</sup>, 5cm long bars)?**
    - DIRC
    - **$\mu$ Rwell/MPGD?**
  - **Hadron endcap:** MAPS based silicon,  $\mu$ Rwell/MPGD, LGAD based ToF (1 or 2 planes).
- Any further inputs?

# PID detector geometry reference

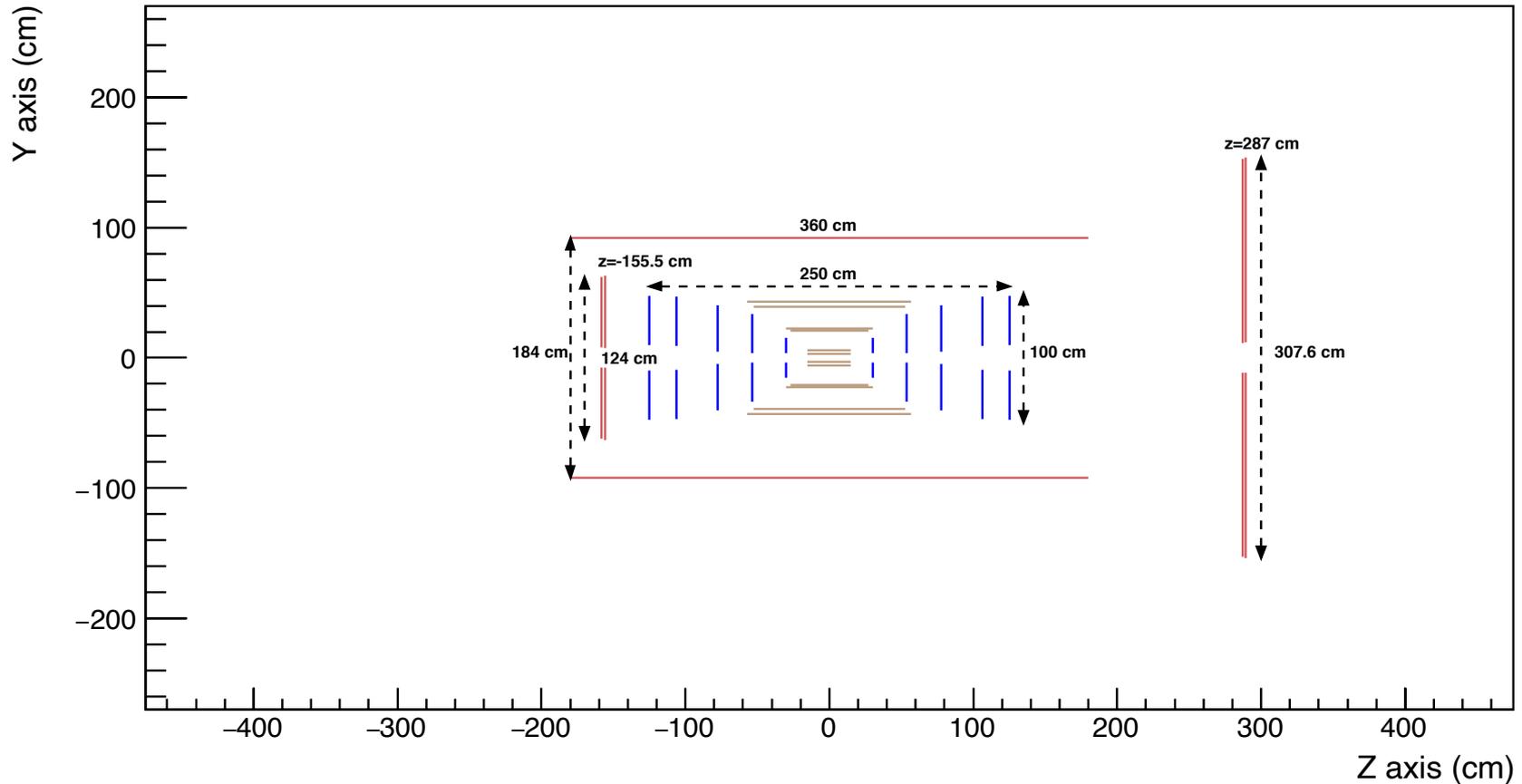
- PID detector dimensions



# Tracking detector geometry reference

- Tracking detector dimensions

ECCE Tracking detector reference geometry



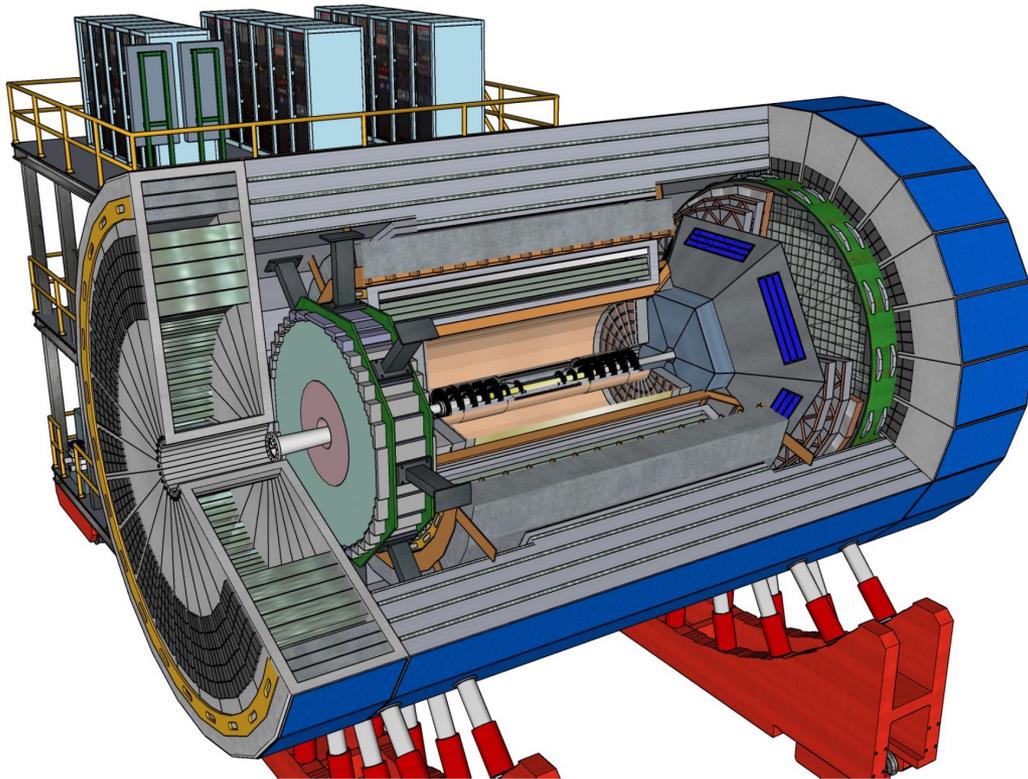
# Conclusions and Outlook

- The first order integrated tracking system is ready for the physics simulation in Fun4All.
- Optimization and tuning is ongoing.
- Further inputs and suggestions are very welcome!

# Backup

# ECCE General Detector Concept

- Presented in the bi-weekly meeting on June 7.



## ECCE ELECTRON ENDCAP STRAWMAN

**Tracking:** MAPS, Micro Pattern Gaseous Detectors (MPGD)

**Electron Detection:** PWO&SciGlass

- Inner part: PWO crystals (reuse some)
- Outer part: SciGlass (backup PbI)

**h-PID:** mRICH

- From yellow report

**HCAL:** Steel from magnet or Pb/Sc or Fe/Sc

- Not instrumented and only serve as flux return?
- Instrumented \w reduced thickness (lower energies)

## ECCE CENTRAL BARREL STRAWMAN

**Tracking:** Silicon barrel tracker (optional Si/GEM hybrid)

**Electron PID:** SciGlass (backup: W/Sc (Pb/Sc) shashlik)

- SciGlass remains to be demonstrated
- Several backup options – lower resolution though

**h-PID:** hpDIRC & AC-LGAD

- Compact
- AC-LGAD never been shown for barrel configuration
- AC-LGAD backup: dE/dx (needs more space)

**HCAL:** magnet steel (reuse) - Fe/Sc

## ECCE HADRON ENDCAP STRAWMAN

**Tracking:** MAPS, Micro Pattern Gaseous Detectors (MPGD)

**h-PID:** dRICH&TOF

**e/h separation:** TOF & aerogel

- TRD to separate electrons from high momentum hadrons?

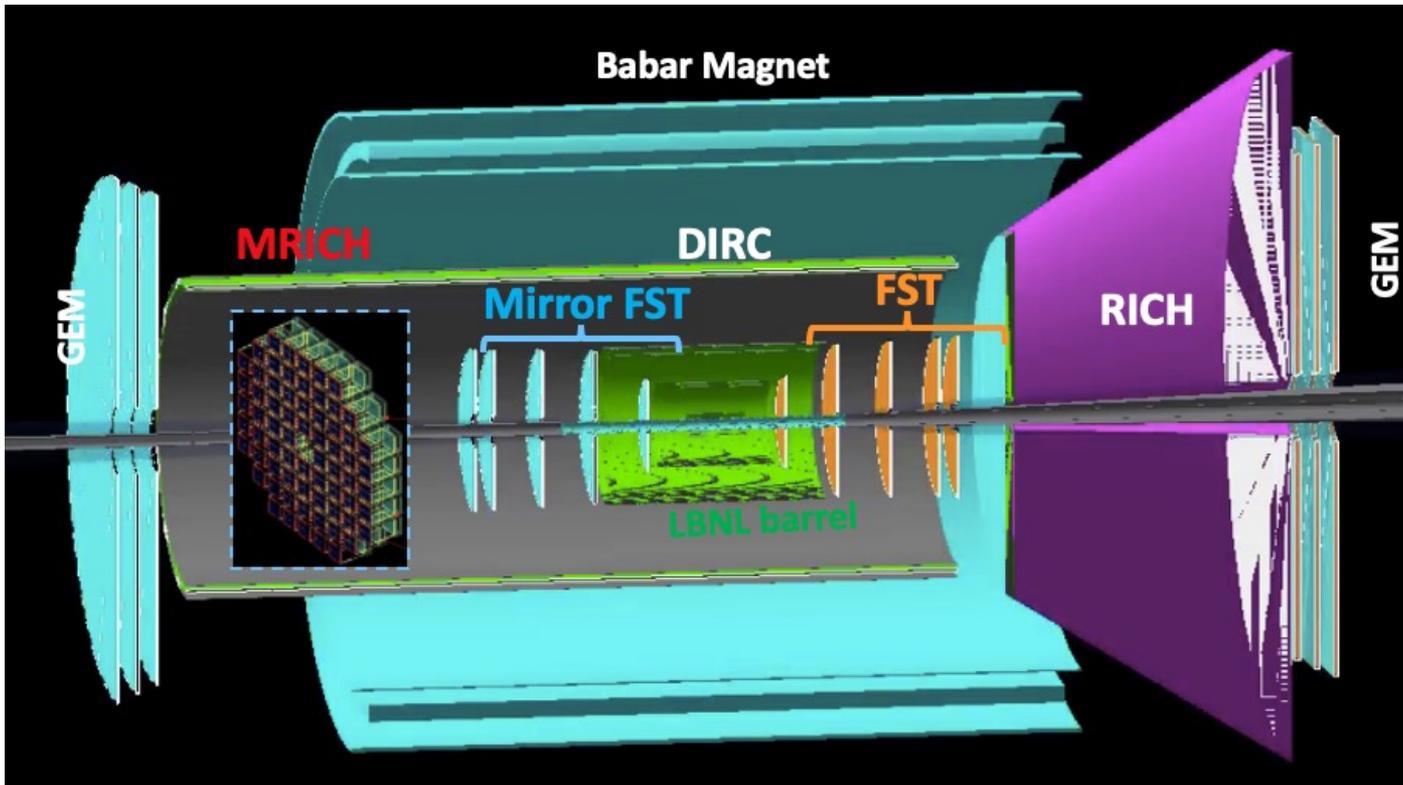
**Electron PID:** W/ScFi, Pb/Sc or W/Sc shashlik

**HCAL:** Pb/Sc or Fe/Sc

- Alternative for improved resolution: dual readout, high-granularity

# Electron endcap vertex/tracking

- Candidates:
  - LBNL All-silicon Tracker.
  - Mirror of the LANL Forward Silicon Tracker design.
  - Hybrid design between silicon and MPGD/ $\mu$ Rwell tracker.



Strawmen  
reference