

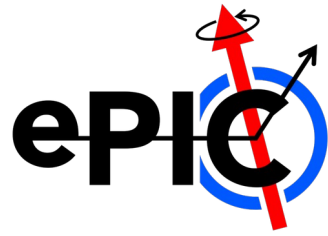
DSC – Gaseous trackers

ePIC Collaboration meeting – Warsaw, July 27th 2023

~~K. Gnanvo, M. Vandennebourcke~~

F. Bossù (CEA Saclay)

Context



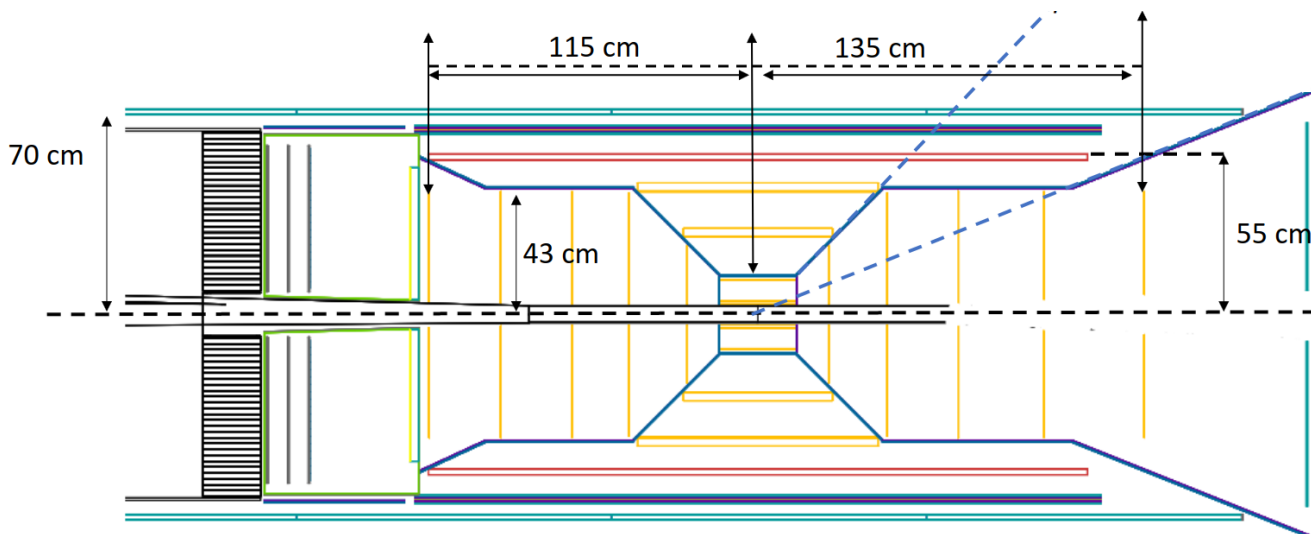
- Nice summary in Ernsrt's slides yesterday ([link](#))
- The evolution of the tracking system from the ECCE's reference design
- The SVT will provide most of the momentum resolution
- Micro-pattern gaseous detectors (MPGDs), together with TOF, will provide fast points for pattern recognition and aid tracking into the PID detectors
- In June 2023, new (final?!) configuration of the MPGD systems

CAVEAT: Last minute preparation of these slides. No time to include many details.

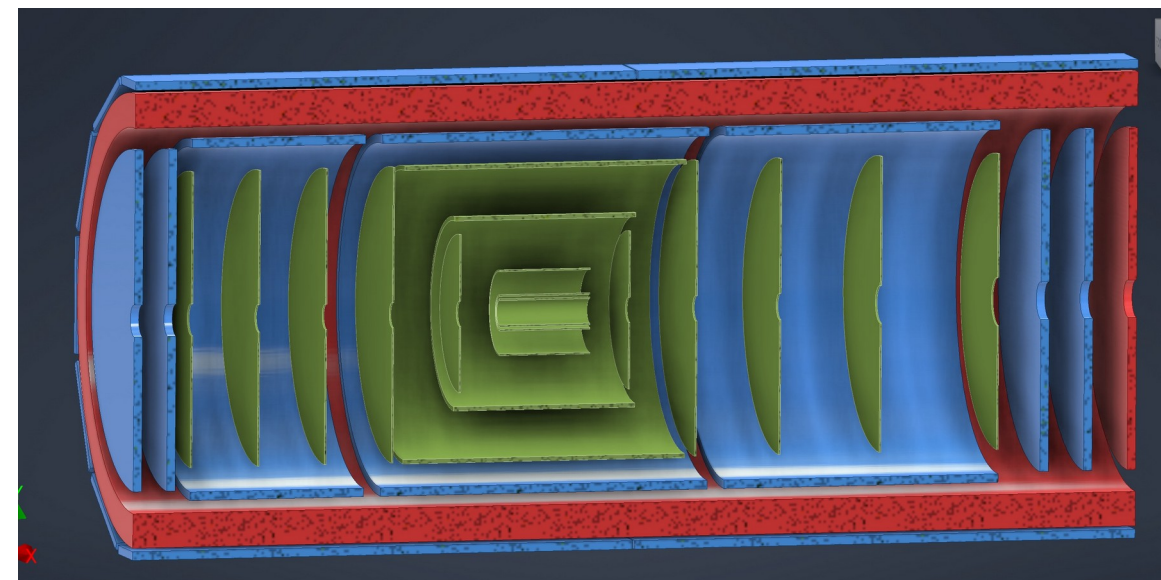
Context



Brycecanyon



New configuration – June 15th



Green: MAPS; Blue: MPGDs; Red: TOF fiducial volume

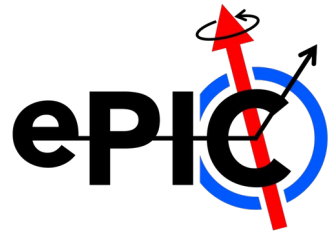
- One cylindrical layer at $r=50\text{cm}$



Three subsystems:

- One 3-cylinders barrel layer at $R=50\text{cm}$
- One layer at the inner surface of the DIRC
- Pairs of disks in the forward and backward endcaps

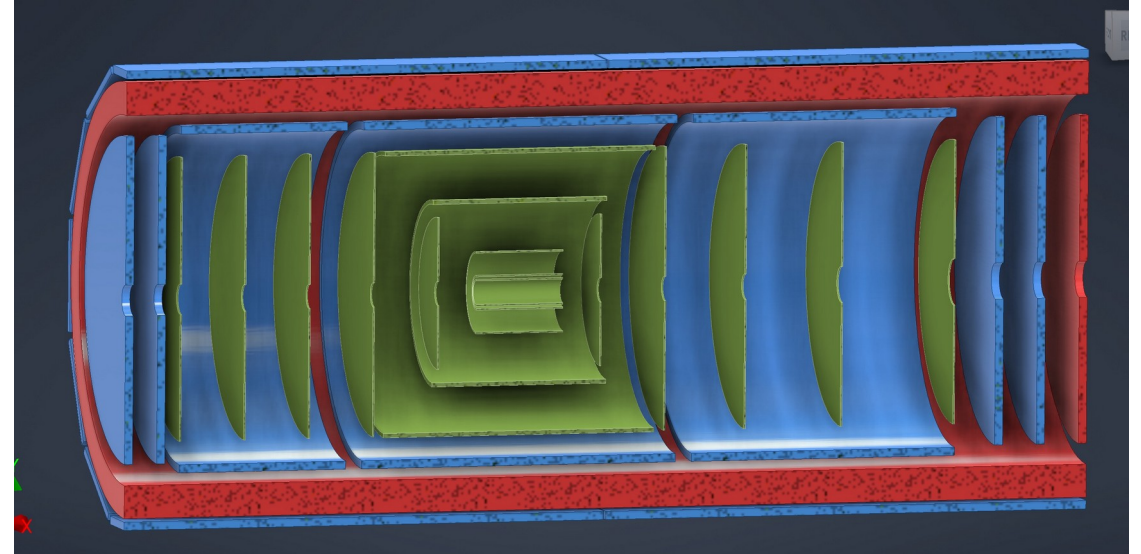
Requirements and challenges



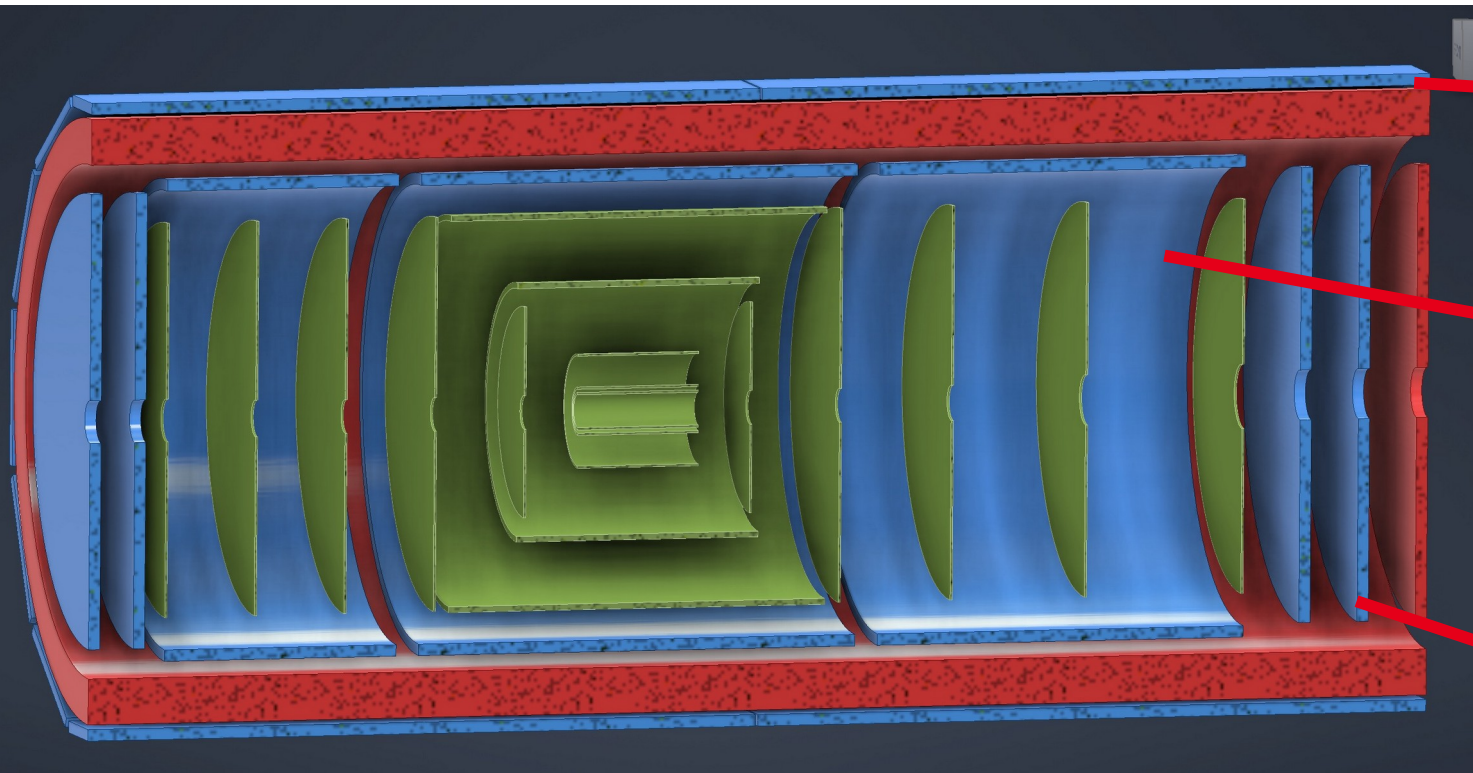
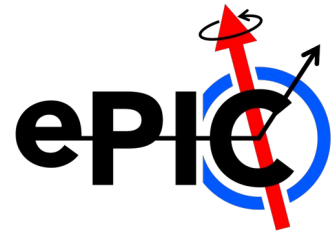
- Time resolution better than 20ns
- Spatial resolutions $\sim 150\mu\text{m}$

Challenges:

- Material budget
- Particles crossings the active areas with large angles
- Space limitations
- Constraints on services (data, HV, LV and cooling) and support structure



Technologies



Layer at the DIRC:

- Flat μ RWELL detectors

Cylindrical layer

- Micromegas

Disks

- μ RWELL or GEM

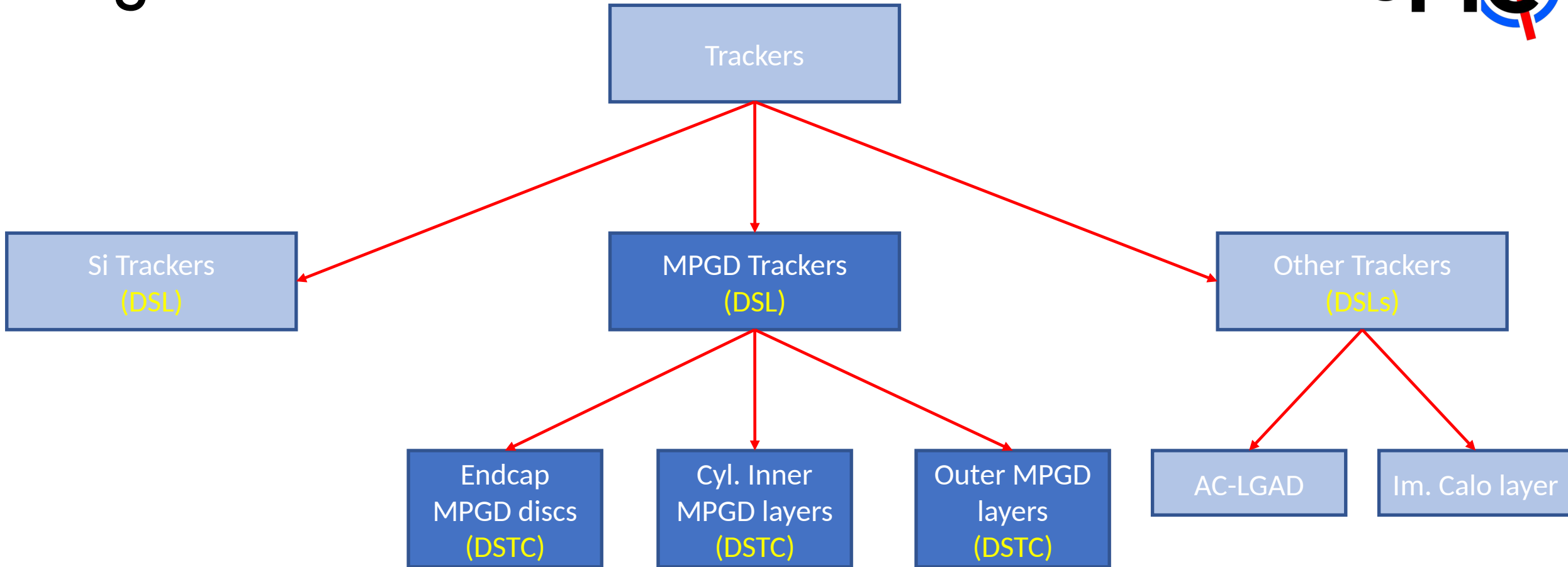
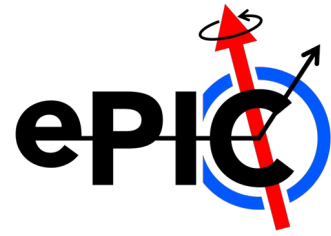
Ongoing R&D within eRD108 and generic R&D

- 2D readout on large detectors
- Thin drift gap (~ 1 mm) to maintain good spatial resolutions for tracks impinging with large angles

Participating institutes: JLab, UVa, FIT, Temple U, BNL, INFN, Vanderbilt U, Yale, CEA-Saclay

FE Electronics based on the future SALSA chip (CEA & Sao Paulo U), under development within eRD109

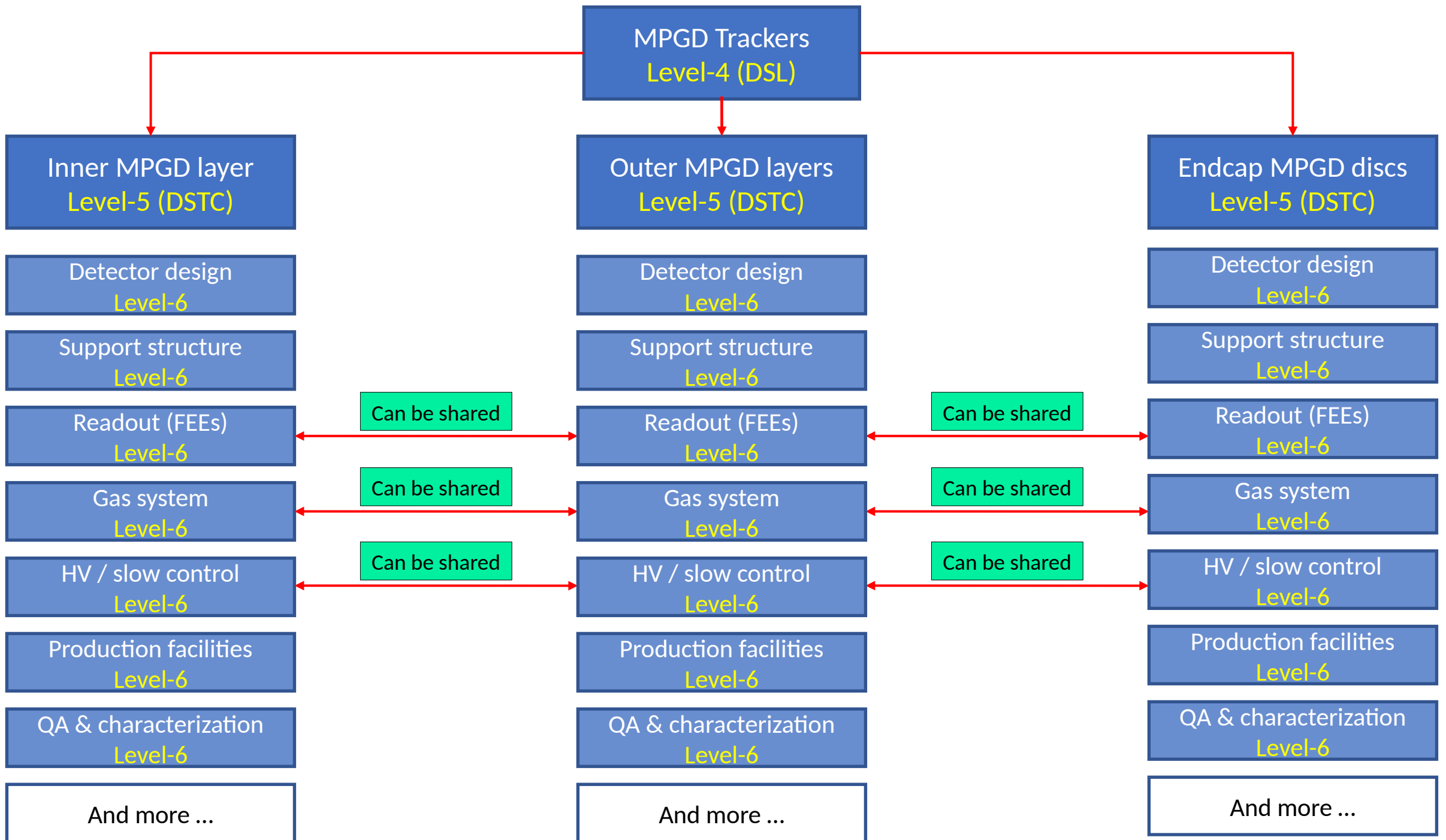
Organization



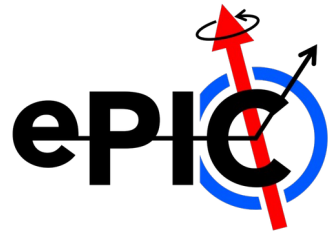
DSL: Kondo Gnanvo (JLab)

DSTC:

- Cyl. Inner layer: Maxence Vandenbroucke (CEA Saclay)
- DSTCs for the endcap and the outer layers to be appointed



Summary



- Recent change of configuration of MPGD layers in ePIC
- Design of the different components at different maturity
- The new configuration brings also new challenges, but with a clearer configuration it is easier to advance on the design
- Close collaboration with the electronic engineers developing the SALSA chip
- Many tanks to the Tracking CC WG conveners and the EIC project for the help and guidance
- Ongoing organization of the teams to speed up the design