Optimization of the MPGD layers of EPIC detector

F. Bossù, L. Gonella, K. Gnanvo, L. Xuan

EPIC Detector Tracking WG

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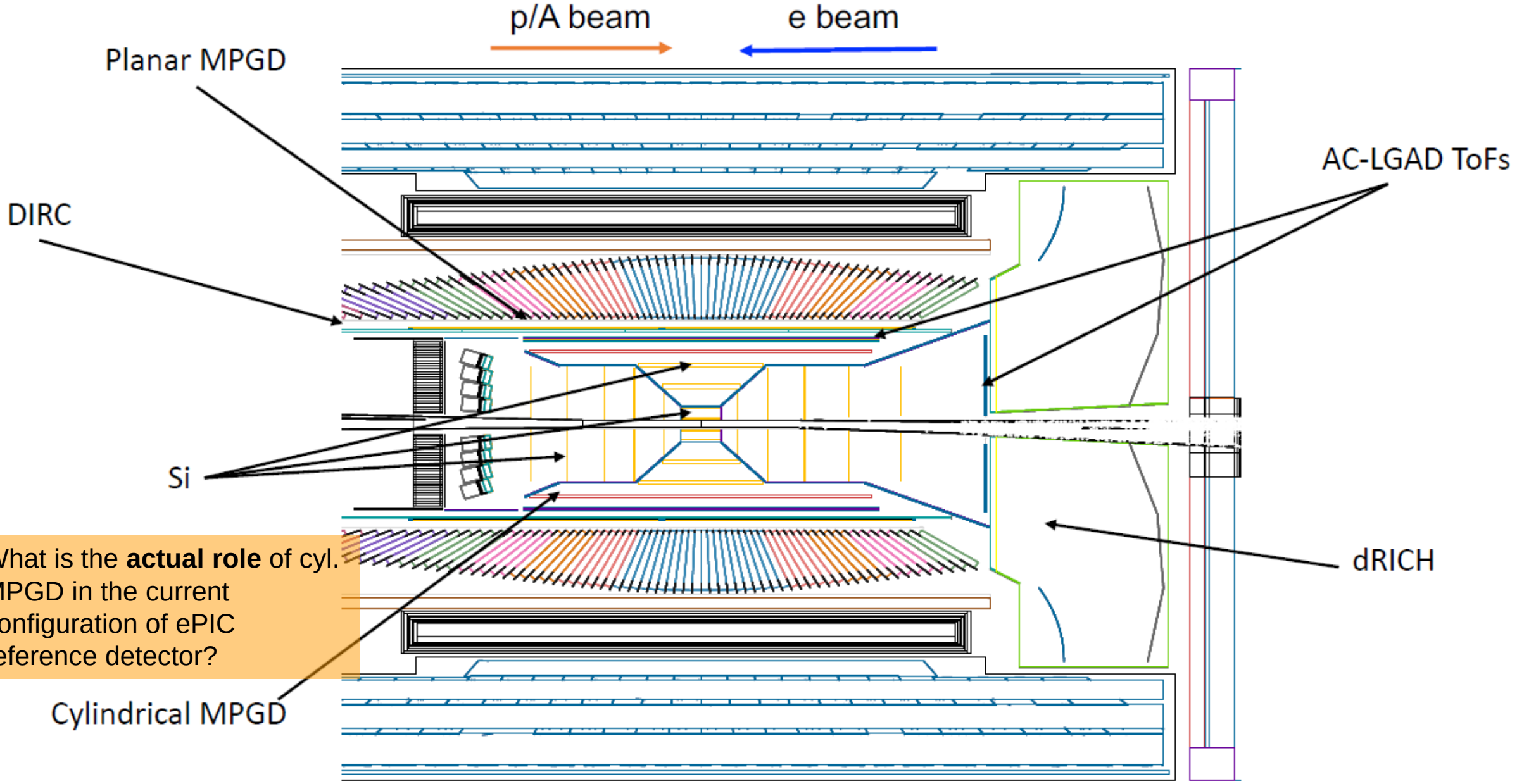
EPIC reference detector : Question 1



What is the **actual role** of cyl. MPGD in the current configuration of ePIC reference detector?

EPIC reference detector : Question 1

What is **the role of the single cyl. MPGD** in the current configuration of ePIC reference detector?

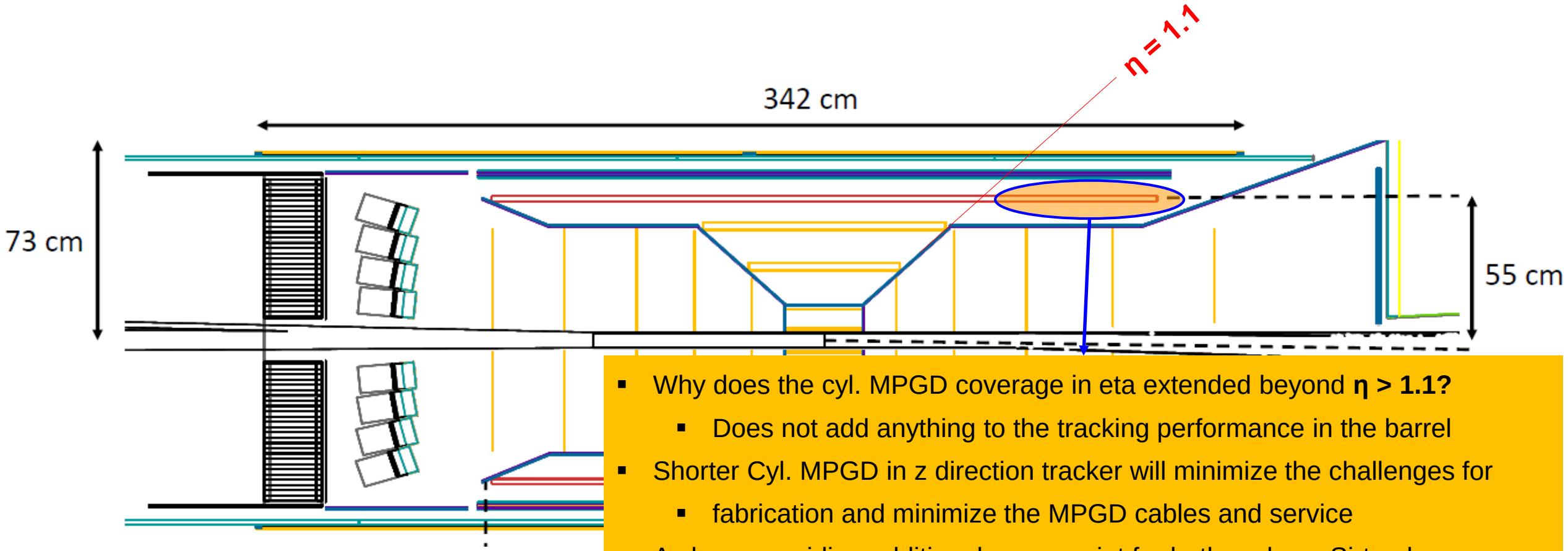
1. What is the contribution to tracking in term momentum and transverse point resolution?
   - **Ongoing simulation effort should evaluate so that we reach a consensus on this question**

2. Are the Cyl MPGD layer (and TOF layers) mainly for pattern recognition in support of the main Si trackers?
   - Minimum number of tracking layers required for pattern recognition
   - **Need simulation with background to make this determination**

3. Is the MPGD layer together with the TOF layers for redundancy
   - to recover for missing hit from the Si trackers (dead pixels …)
   - **Ongoing simulation effort should evaluate the impact on overall tracking performance**

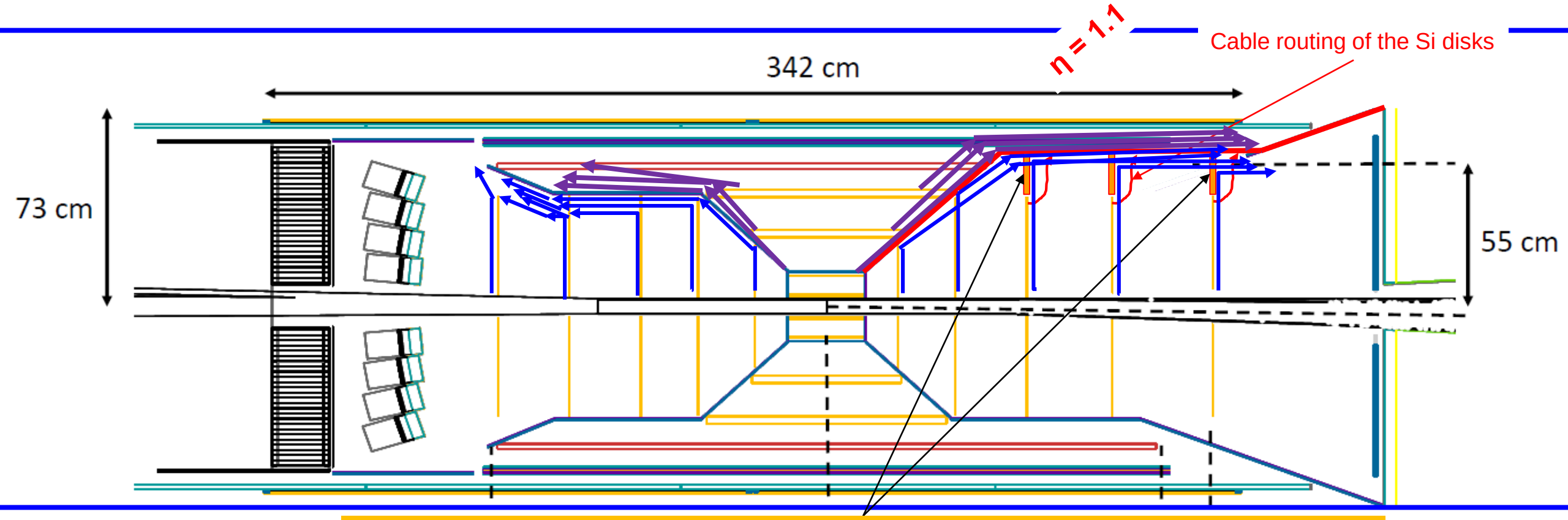
4. Why do the MPGD and TOF cover an |eta | up to 1.5 and not limited to 1.1
   - Impact on the Si support structure and services
   - Impact on tracking performance in the forward nd backward endcap

EPIC reference detector: Question 2



- Why does the cyl. MPGD coverage in eta extended beyond **η > 1.1?**
  - Does not add anything to the tracking performance in the barrel
- Shorter Cyl. MPGD in z direction tracker will minimize the challenges for
  - fabrication and minimize the MPGD cables and service
- As layer providing additional space point for both end cap Si-trackers
  - Poor space point resolution ➔ because of large track angles (> 45^{o})
  - Material of the Si support cone structure in front of the layer …
- **Similar argument can be held for the AC-LGAD disk**
  - **But this is a discussion for another day**

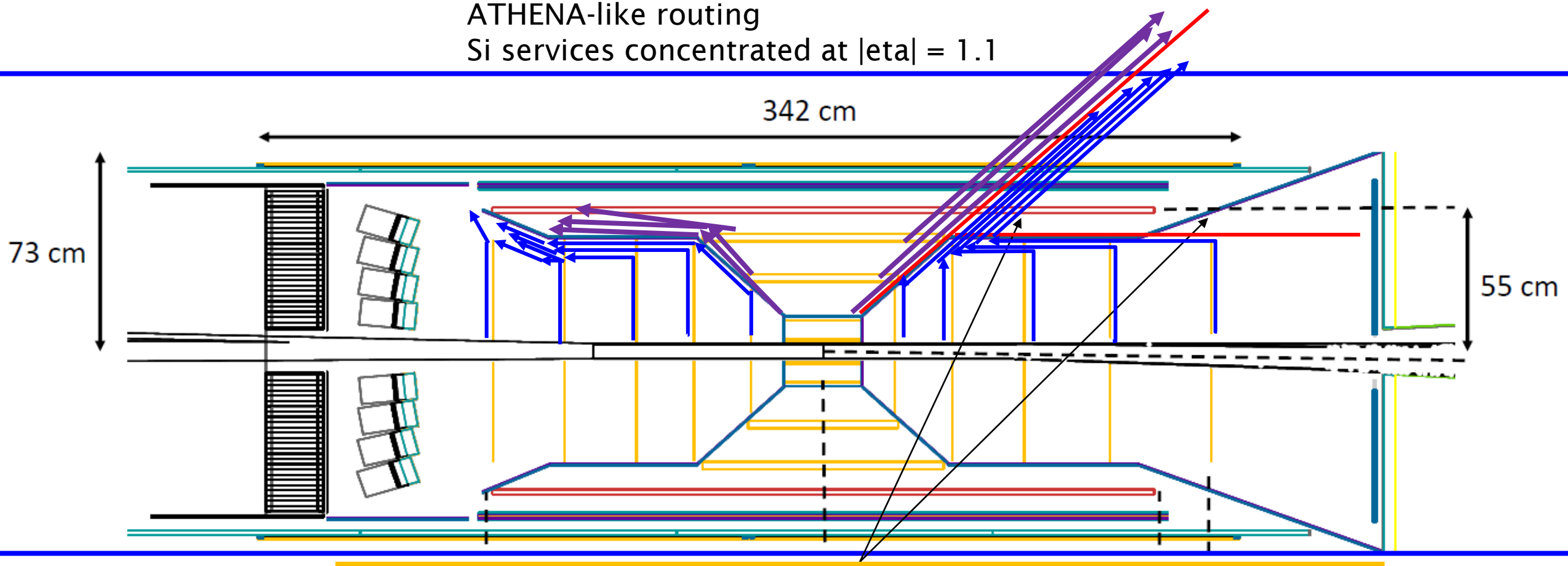
EPIC reference detector: Possible option to question 2



- Complement the Si disks with thin gap MPGD rings (or extending Si disks radius)
- Optimizing the Si-layer cable and services “cone” support ➔ (red lines)
- Could the cables of the Si-disks be routed vertically up to the cone structure?
  - This will be optimal for performances

EPIC reference detector: Possible option to question 2

ATHENA-like routing
Si services concentrated at |eta| = 1.1



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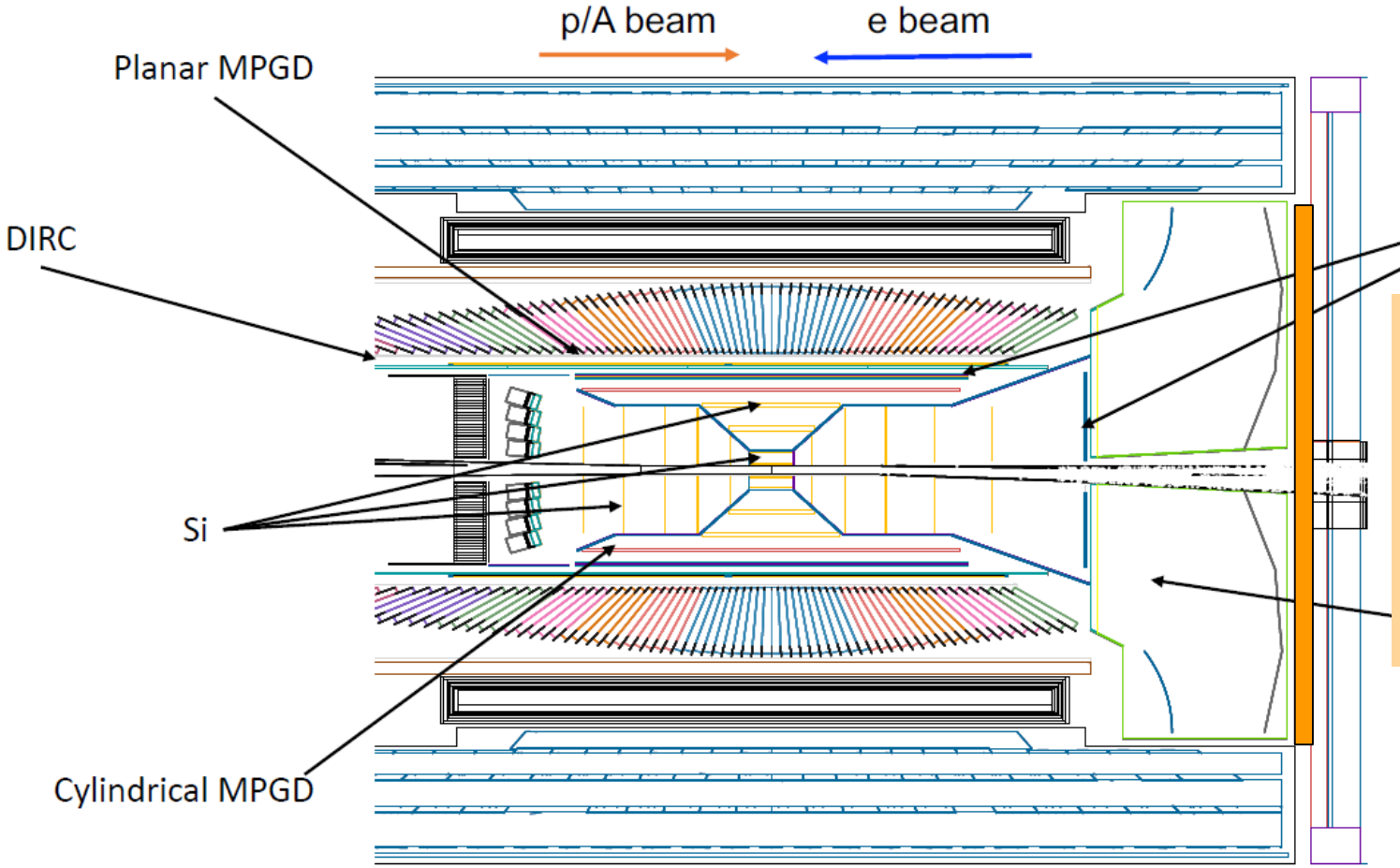
EPIC reference detector : Question 3 – MPGD layer behind dRICH



- Once we will have the background and the software becomes more mature, we will re-assess the track quality extrapolated inside the dRICH
- Having a MPGD layer after dRICH is still probably a smart choice