Tracking Working Group

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Integration Meeting

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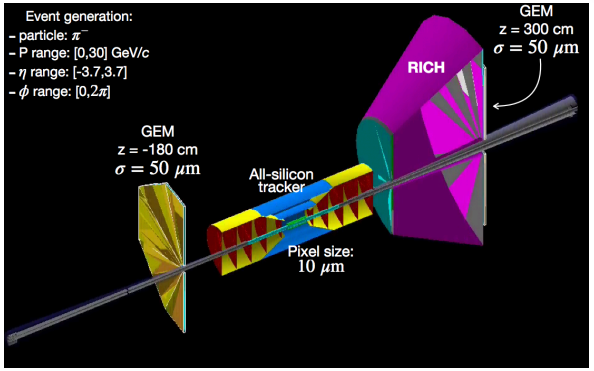
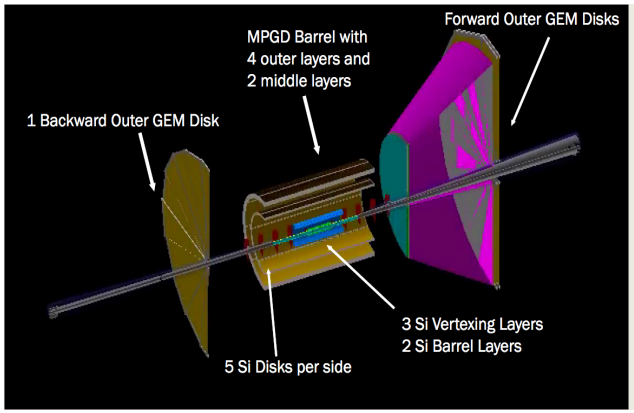
Baseline (0) and Baseline+ (1)

- **Baseline: B-0.0, P-0.0, N-0.0**
  - 2 Si vertex layers (r = 3.3,5.7 cm)
  - 4 Si barrel layers (r = 21, 22.68, 39.3, 43.23)
  - 5 + 5 Si Disks (inner r = 3.18 – 5.91 cm, outer r = 18.5 – 43.23 cm)
  - Outer GEMs on hadron and electron sides



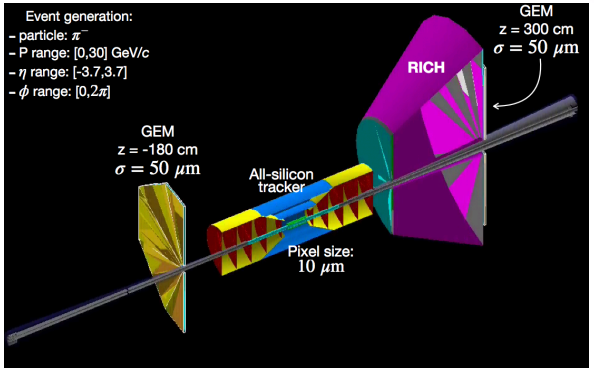
- **Baseline+: B-1.0, P-1.0, N-1.0**
  - 3 Si vertex layers (r = 3.64, 4.45, 5.26)
  - 2 Si barrel layers (r = 13.38, 18 cm)
  - 6 MM barrels (r = 47.7 – 77.47 cm)
  - 5 + 5 Si Disks (inner r = 3.64 – 9.93 cm, outer r = 7.13 – 19 cm)
  - Outer GEMs on hadron and electron sides



Baseline (0) and Baseline+ (1): Pros and Cons

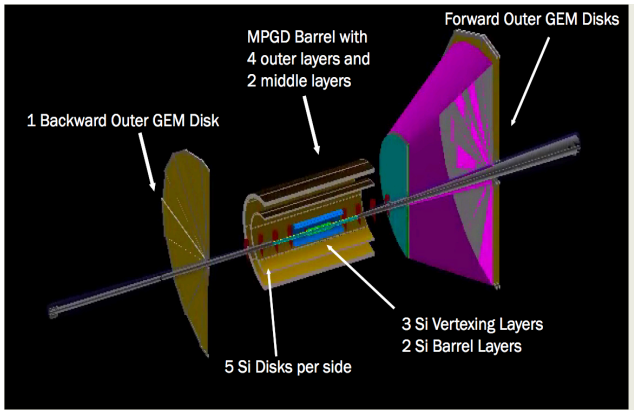
❑ **Baseline: B-0.0, P-0.0, N-0.0**

- Pros:
  - Meets most PWG requirements
  - Has good start for Si support structure
- Cons:
  - Misses momentum resolution in large $|\eta|$ regions
- DD4Hep
  - Detectors and initial Si support/services implemented
  - MPGD 2D readout needs implementation



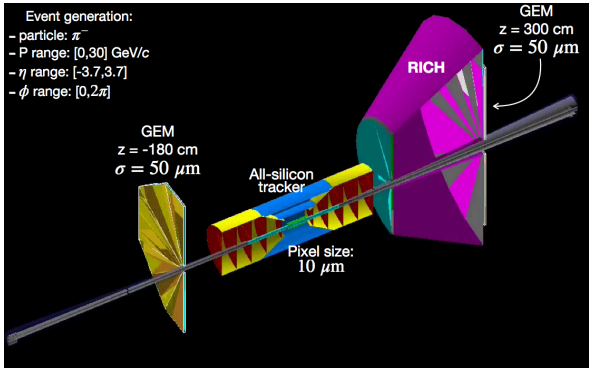
❑ **Baseline+: B-1.0, P-1.0, N-1.0**

- Pros:
  - Meets most PWG requirements
- Cons:
  - Misses momentum resolution in large $|\eta|$ regions
  - Gaps in acceptance
  - No initial Si support implementation
- DD4Hep
  - Detectors implemented
  - MPGD 2D readout needs implementation
  - Support/services need implementation

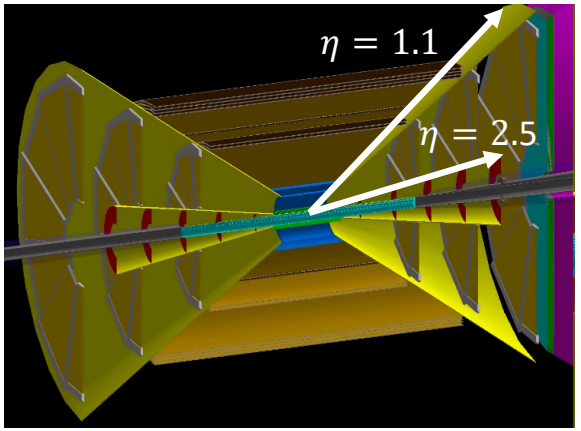


Baseline (0) and Projective Baseline+

- **Baseline: B-0.0, P-0.0, N-0.0**
  - 2 Si vertex layers (r = 3.3,5.7 cm)
  - 4 Si barrel (r = 21, 22.68, 39.3, 43.23)
  - 5 + 5 Si Disks (inner r = 3.18 – 5.91 cm, outer r = 18.5 – 43.23 cm)
  - Outer GEMs on hadron and electron sides



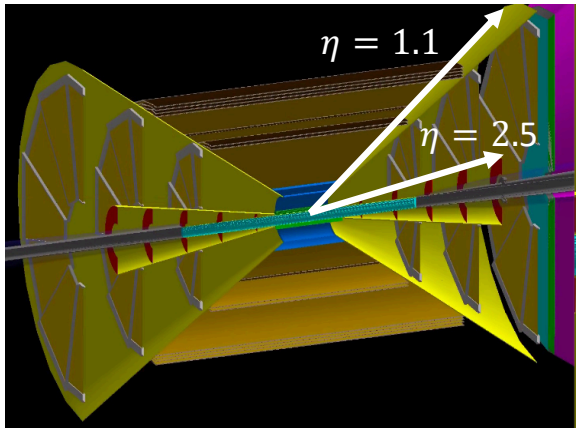
- **Baseline+ → Projective Baseline+**
  - 3 Si vertex (r = 3.64, 4.45, 5.26)
  - 2 Si barrel (r = 13.38, 18 cm)
  - 6 MM barrels (r = 47.7 – 77.47 cm)
  - 5 + 5 Si Disks (inner r = 3.64 – 9.93 cm, outer r = 5.4 – 20 cm)
  - Outer GEMs on hadron and electron sides
  - Inner GEMs (inner r= 13.4 – 25.6 cm, outer r = 43.07 – 89.27 cm)



Projective (Hybrid) Baseline+: Pros and Cons

❑ **Projective → Baseline+**

- Pros:
  - Meets most PWG requirements
    - Preliminary performance results shown
      - ➢ Tracking Working Group Meeting
      - ➢ Integration Meeting
  - Better or comparable performance as baseline+
  - No acceptance gaps
  - Has some initial support/service
  - Minimizes material over η range
- Cons:
  - Misses momentum resolution in large $|\eta|$ regions
  - Need full MC study for
    - Displaced vertex → PWGs
    - Localized material effect on EMCal → not a clear show stopper
      - Material localized and not in transvers plane (wrt z)
- DD4Hep
  - Detectors implemented
  - MPGD 2D readout needs implementation
  - Support/services need implementation



Baseline 2 and Beyond

- Common Improvements:
  - Extend lever arm of Si disks
  - Add potential Si disk behind mRICH → help with p resolution in the electron direction
  - Iterate on support/services to make implementation in simulation more realistic

- Baseline improvements:
  - Add barrel MPGD layers near DIRC radial position

- Baseline+ (hybrid)
  - Add MPGD trackers to cover acceptance gaps

- Baseline+ (Projective hybrid)
  - Optimize MPGD barrel and GEM position for barrel PID covering 95—105 cm radial volume

- No strong consensus for baseline 2
  - Full simulation results for the two baselines can guide this decision
  - More can be learned from running Projective Baseline+ than Non-projective Baseline+
    - Propose to make Projective Baseline+ our Baseline+ to be simulated in ATHENA