TC-office Report

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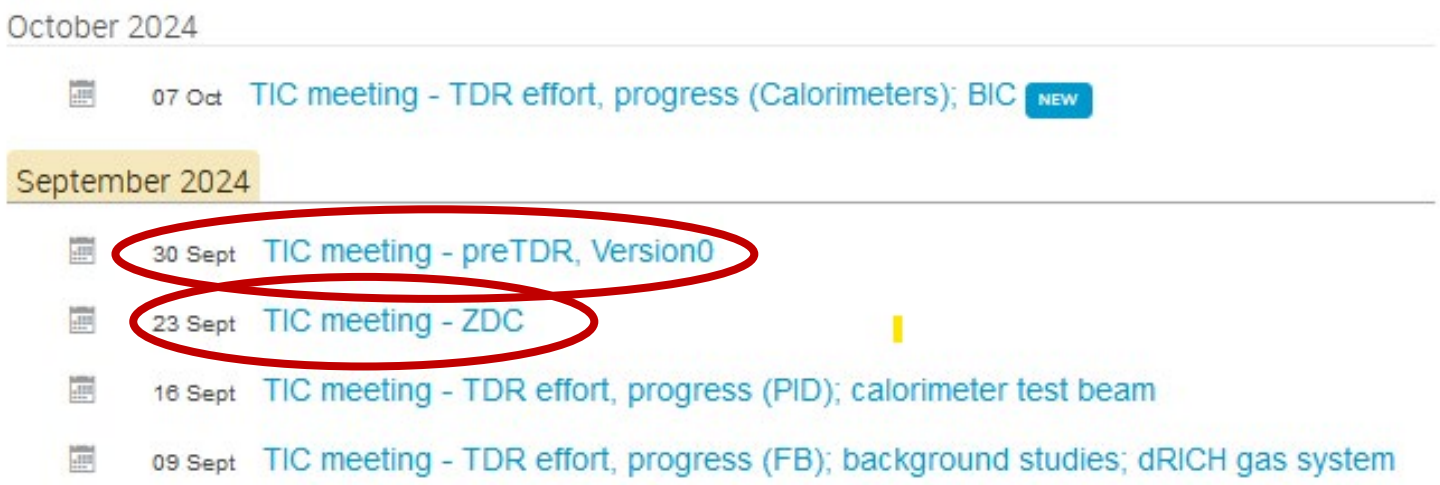
ePIC General Meeting, September 6, 2024

Coming TIC Meetings,

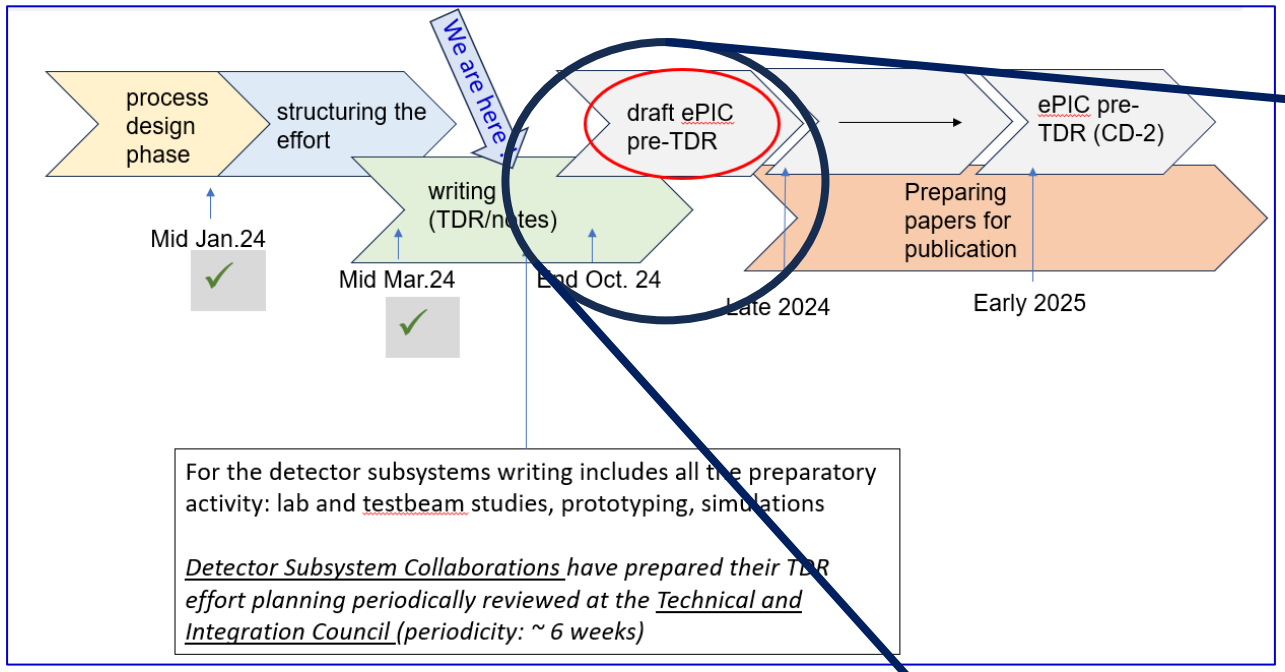
schedule


October 2024
07 Oct
TIC meeting - TDR effort, progress (Calorimeters); BIC
NEW
September 2024
30 Sept
TIC meeting - preTDR, Version0
23 Sept
TIC meeting - ZDC
16 Sept
TIC meeting - TDR effort, progress (PID); calorimeter test beam
09 Sept
TIC meeting - TDR effort, progress (FB); background studies; dRICH gas system

preTDR drafts:

Coming Steps

Schedule



ZOOMING

2 preTDR draft versions in 2024

- **Version0** by **September 29** available in overleaf

- During October 2024, internal review process!
  - Recommendations to be integrated in Version1

NEW

- The process to identify the internal reviewers is ongoing and the reviewers will be invited in September to start the review on October 1st

- **Version1 by December 1**

preTDR – Version0 & Version1

Only 2 preTDR draft versions in 2024 to minimize the load in view of the end-of-year “milestone”

- **Version0** by **September 29**
  - All preTDR text is there, even if it can be in a rough version
  - Additional material: planning required, part already in
  - Plots for Version0 can make use of a scattered set of simulation campaigns

- During October 2024, internal review process!
  - Recommendations to be integrated in Version1

- **Version1** **by December 1**
  - More refined text
  - Recommendations form the internal review have to be integrated
  - The additional material expected, it can still be in a rough text version
  - Plots for Version1 make use of the **October simulation campaign**
  - Version1 is the material that will be used for the Jan. 2025 DOE OPA review

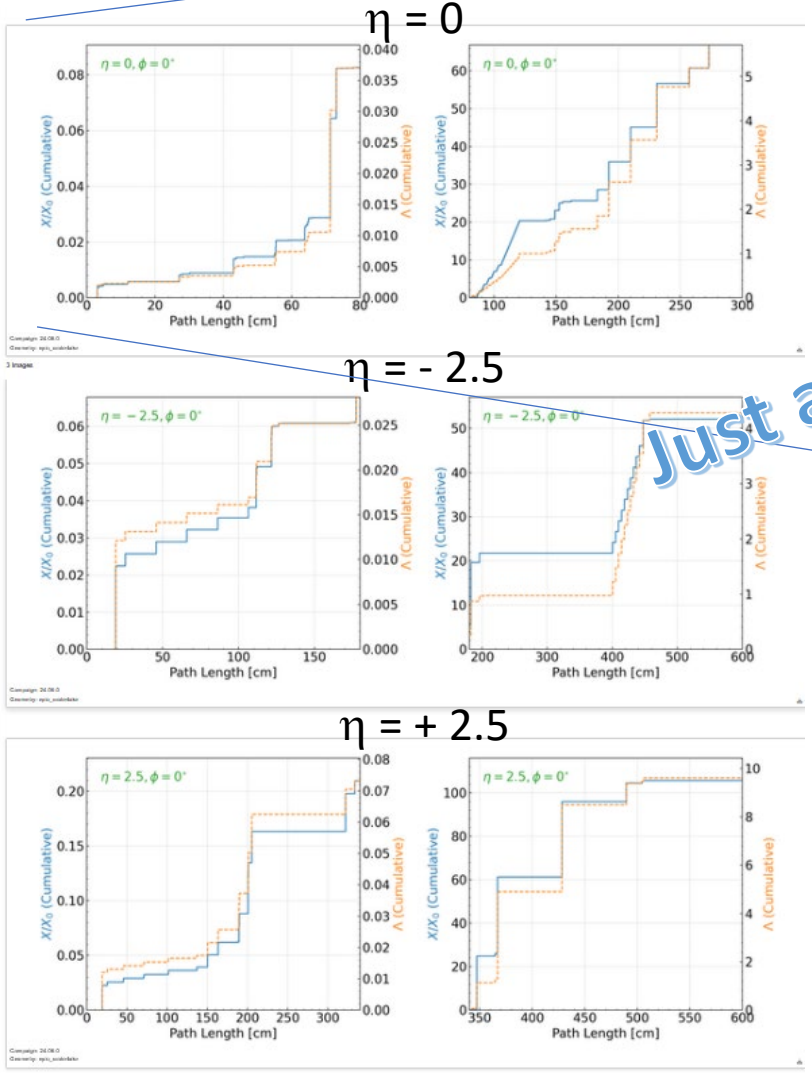
PLOTS to follow the evolution of the ePIC design

Also extremely useful for the preTDR

Integrated material budget (https://eic.jlab.org/epic/image_browser.html)

Special thanks to Torri Jeske and Chao Peng

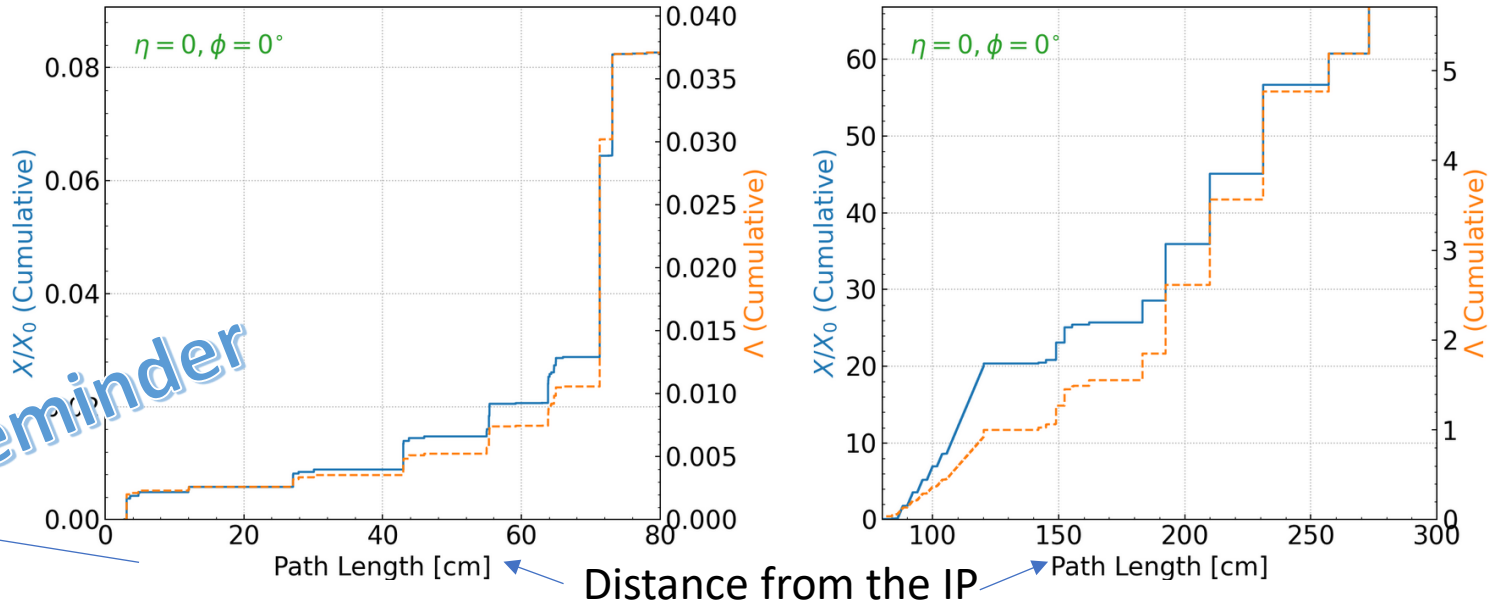
Already implemented



From IP to ECal front-face

η = 0

In the calorimeter region



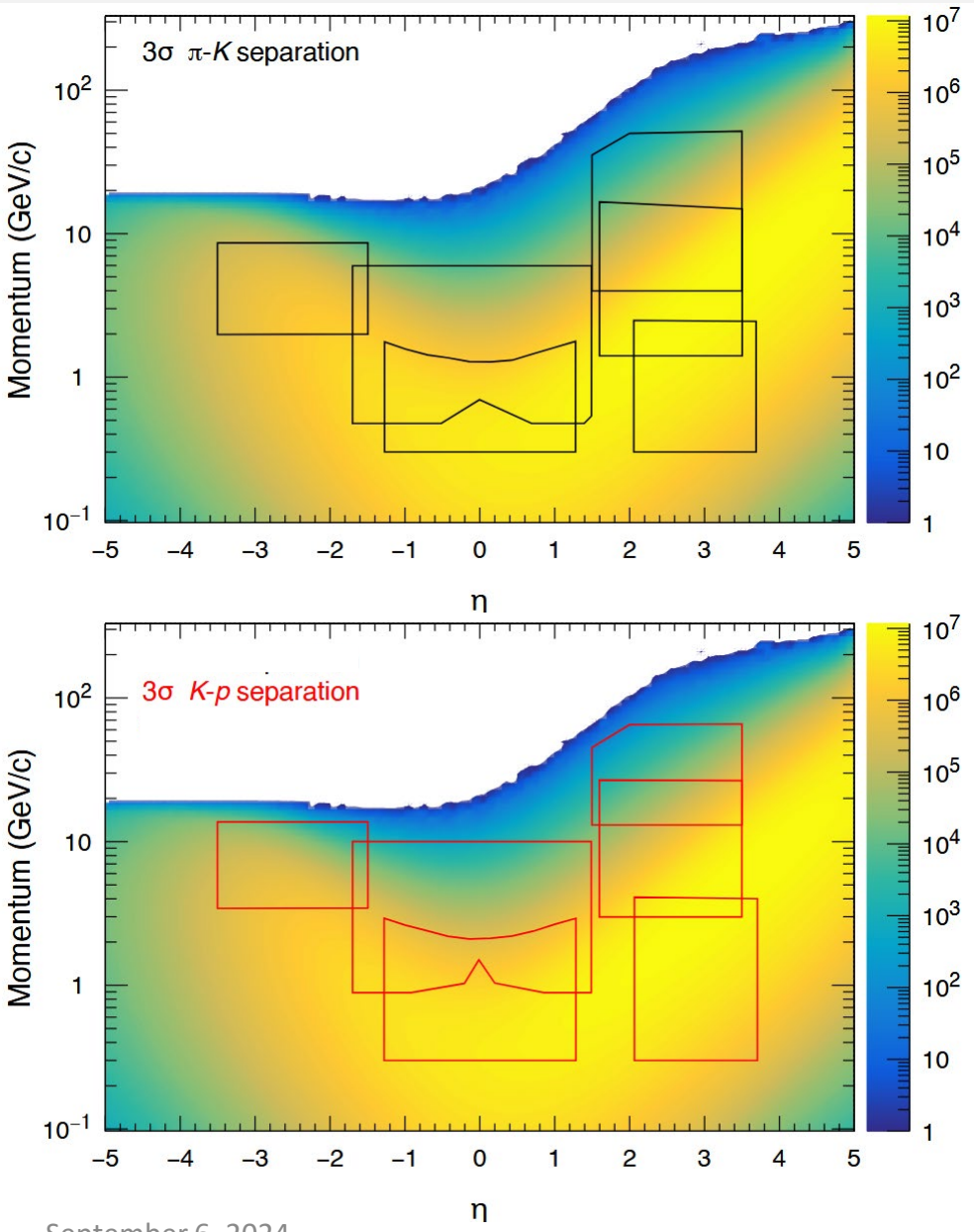
Just a reminder

Coming soon:

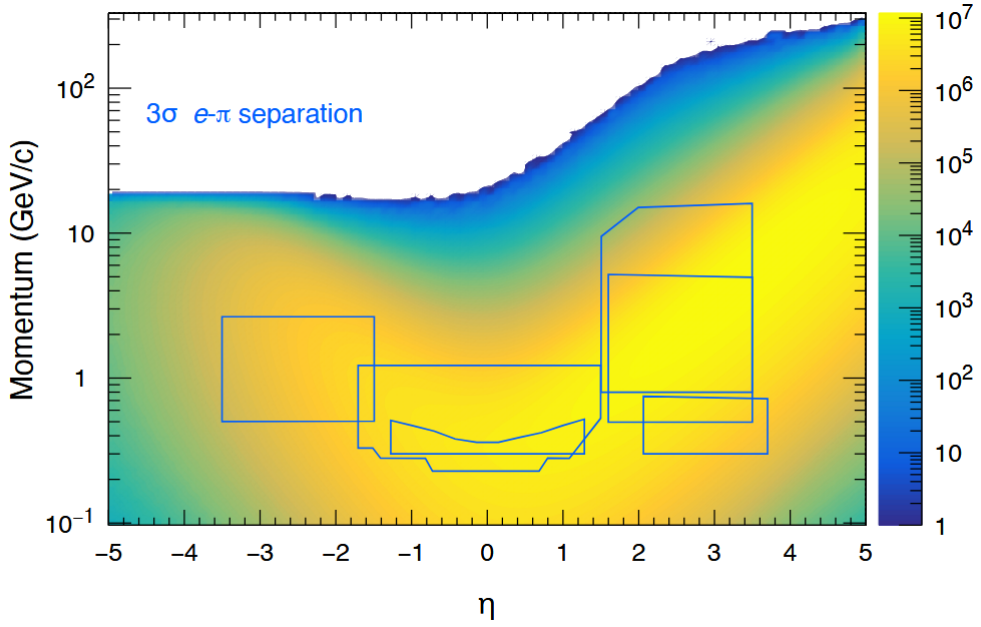
- 2-D plots with material budget integrated along the path length in the plane (path length, η)
- Adding to the 1-D plots (as those you are seen here) the detector location taking it from the geometry parameters as implemented in DD4hep

Detector acceptances: PID *preliminary* already there

Special thanks to Thomas Ullrich and PID DSCs



Just a reminder



Detector acceptances: tracking, initial version

NEW

Thank you, Barak Schmookler

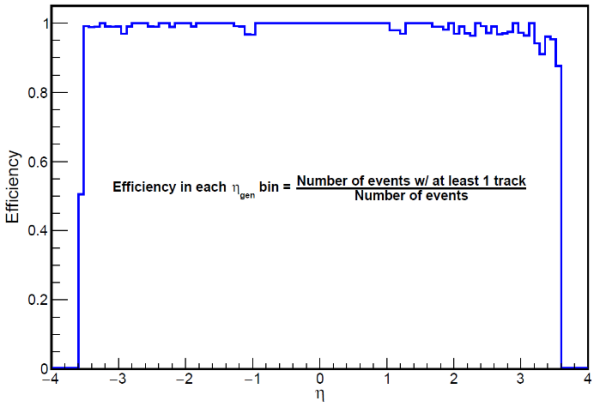
Single muminus generated:

0.5 GeV/c < P < 20 GeV/c

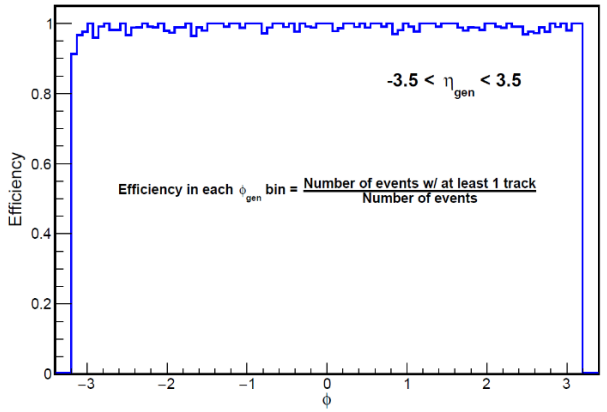
-4 < η < 4

Generated vertex: (0,0,0) mm

Tracker Efficiency vs. generated particle η



Tracker Efficiency vs. generated particle ϕ

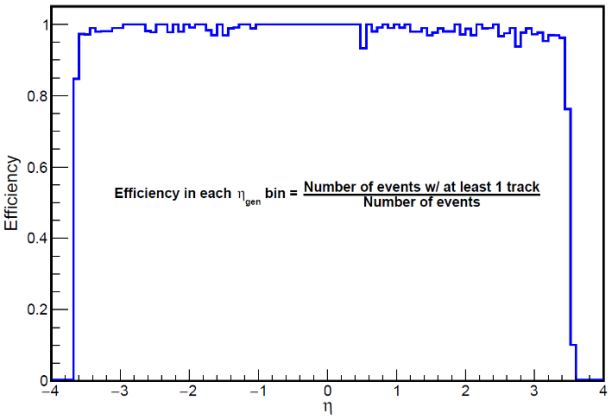


The reconstruction of a track requires a minimum of 3 good measurement hits in different tracking layers. So, these plots show the geometric acceptance edges in the current simulation.

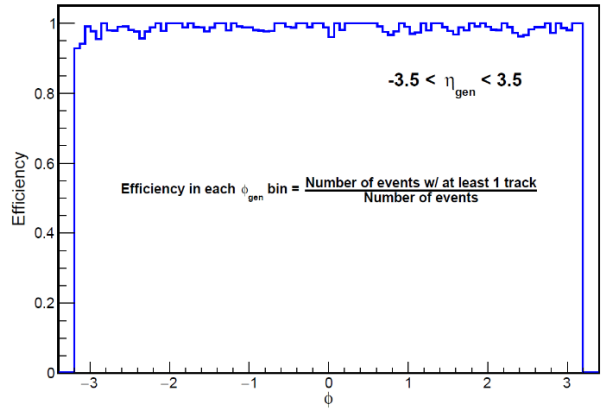
Coming: 2-D acceptance plot in the plane (η,Φ)

Generated vertex: (0,0,75) mm

Tracker Efficiency vs. generated particle η

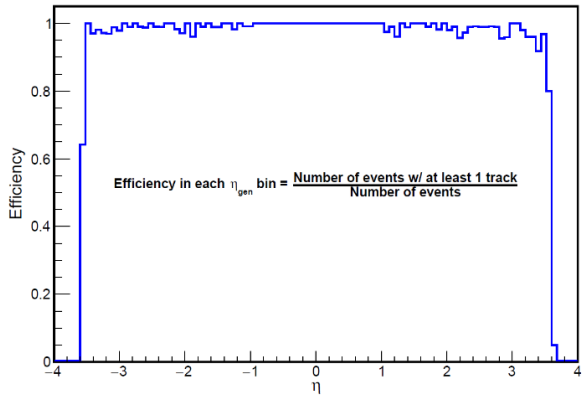


Tracker Efficiency vs. generated particle ϕ

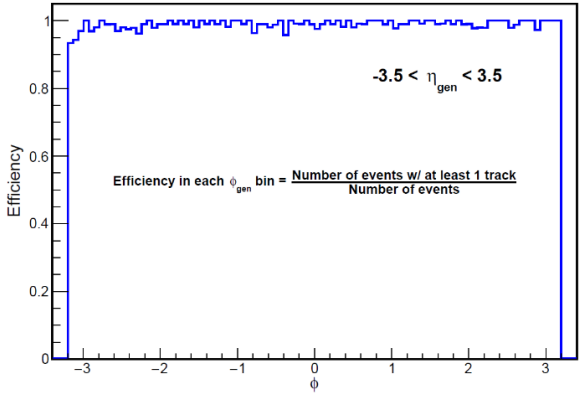


Generated vertex: (1,0,0) mm

Tracker Efficiency vs. generated particle η



Tracker Efficiency vs. generated particle ϕ



Highlights from

Recent TIC meetings

Inter-DSC communication

- The goal: support quasi real-time communication within ePIC and, in particular, within DSCs;

- The tool: make use of “communications” at the beginning of each TIC meeting
  - No longer only communications from TC-office to DSCs
  - Add communications from DSCs to the whole TIC

- For DSC news to be communicated, 2 options:
  - Verbal communication
  - 1-2 slides (a dedicated slot will be present in the TIC mtg agendas starting on Aug 19th)

- When/what for this SHORT form communications?
  - Examples:
    - a new simulation/reconstruction element for the DSC became operative/work has been started;
    - new samples of subsystem components ordered/received;
    - a modification of the detector envelop or layout resulting from integration considerations;
    - a testbeam is starting/ending;
    - ...

- a google document where the DSCs can anticipate their communication has been created:
  - https://docs.google.com/document/d/1TI1D3ie_TK1q0e2Fs7MpqmQf1t8BDGBoBVlP0yHMxeM/edit

19 Aug TIC meeting - TDR effort, progress (tracking); uRWELL-BOT resolution

Tracking update for the pre-TDR effort

- focus is on Tracking/Vertexing software
  - the update to MPGD inner barrel geometry;
  - the implementation of hit-based track to MC particle matching;
  - three benchmark sectors implemented;
  - the update of the primary vertex finder/filter to use real-seeded tracks;
  - the addition of hits from first layer of the Barrel Imaging Calorimeter into the track reconstruction;
  - updates to seed-finder parameters;
  - the implementation of pixel noise and dead area in the SVT detector

Resolution with uRWELL-BOT, 3 reports

1. Summary of tracking requirements for hpDIRC have been summarized
   - For π/K separation at 3-s level at 6 GeV/c, an angular resolution (both in θ, Φ) of 0.5 mrad is requested;
   - Space information is also relevant, but with relaxed resolution (~ 1 cm).
2. uRWELL-BOT - status of the R&D
3. uRWELL-BOT Simulation Update

NEXT steps:

- Study the impact of BIC tracking layer on the angular resolution reversing the track finding direction in EICrecon (for the specific needs of resolution for the DIRC)
- Include space information from BIC first layer

28 Aug TIC meeting - CMS Detector DB and tools; pfRICH prototype

pfRICH prototype

The pfRICH prototype is designed to
- prove the detector principle
- anticipate a number of technical elements required by the final device.

The prototype is expected ready for the Spring 2025 testbeam.

Discussed:
- fabrication items
- Exercises of mirror coating and reflectivity tests,
- HRPPD QE scans,
- aerogel evaluation exercises
- design of a laser monitoring system to monitor HRPPD timing performance, signal amplitude, QE, and mirror reflectivity

An action item has been identified: pfRICH DSC and Electr/r-o/DAQ WG will discuss the integration in the ePIC DAQ model these monitoring data that require a trigger, also a guidance for other monitoring systems with similar requirements.