Reminder – ANL, live notes from tracking workfest

https://docs.google.com/document/d/1-MhspPGD3Oqf_xR3IO4UBH-6aYRd54Fic7lFlrLiCOo/edit

Feedback received so far:

ePIC Collaboration Meeting (Jan. 2024)
Tracking TDR Preparation Discussion: If you have a figure(s) that should be part of the tracking TDR please specify below:

General Tracking performance plots:
•Reconstructed track efficiency
•Momentum resolution
•Pointing resolution
•Angular resolution of track entering PID detectors

Select some test beam data used for simulation calibration:

For physics-driven needs, it seems natural to use the YR as guidance:

| Tracking requirements from PWGs						
			Momentum res.	**Material budget**	**Minimum pT**	**Transverse pointing res.**
η						
-3.5 to -3.0	Central Detector	Backward Detector	σp/p ~ 0.1%×p ⊕ 0.5%	~5% X0 or less (~MAPS + MPGD trackers)	100-150 MeV/c	
-3.0 to -2.5					100-150 MeV/c	dca(xy) ~ 30/pT μm ⊕ 40 μm
-2.5 to -2.0			σp/p ~ 0.05%×p ⊕ 0.5%		100-150 MeV/c	
-2.0 to -1.5					100-150 MeV/c	dca(xy) ~ 30/pT μm ⊕ 20 μm
-1.5 to -1.0					100-150 MeV/c	
-1.0 to -0.5		Barrel	σp/p ~ 0.05%×p ⊕ 0.5%		100-150 MeV/c	dca(xy) ~ 20/pT μm ⊕ 5 μm
-0.5 to 0						
0 to 0.5						
0.5 to 1.0						
1.0 to 1.5		Forward Detector	σp/p ~ 0.05%×p ⊕ 1%		100-150 MeV/c	dca(xy) ~ 30/pT μm ⊕ 20 μm
1.5 to 2.0					100-150 MeV/c	
2.0 to 2.5					100-150 MeV/c	
2.5 to 3.0			σp/p ~ 0.1%×p ⊕ 2%		100-150 MeV/c	dca(xy) ~ 30/pT μm ⊕ 40 μm
3.0 to 3.5					100-150 MeV/c	dca(xy) ~ 30/pT μm ⊕ 60 μm

Yellow Report, Table 11.2

With current simulations, the performance can be quantified, at least for for single tracks (real-seeded).

Suggest to pair this with track efficiency and purity figures.

The goal over the next months could then be to do this for tracks from DIS events embedded in backgrounds and noise.

Reconstruction Software

Red: work in progress
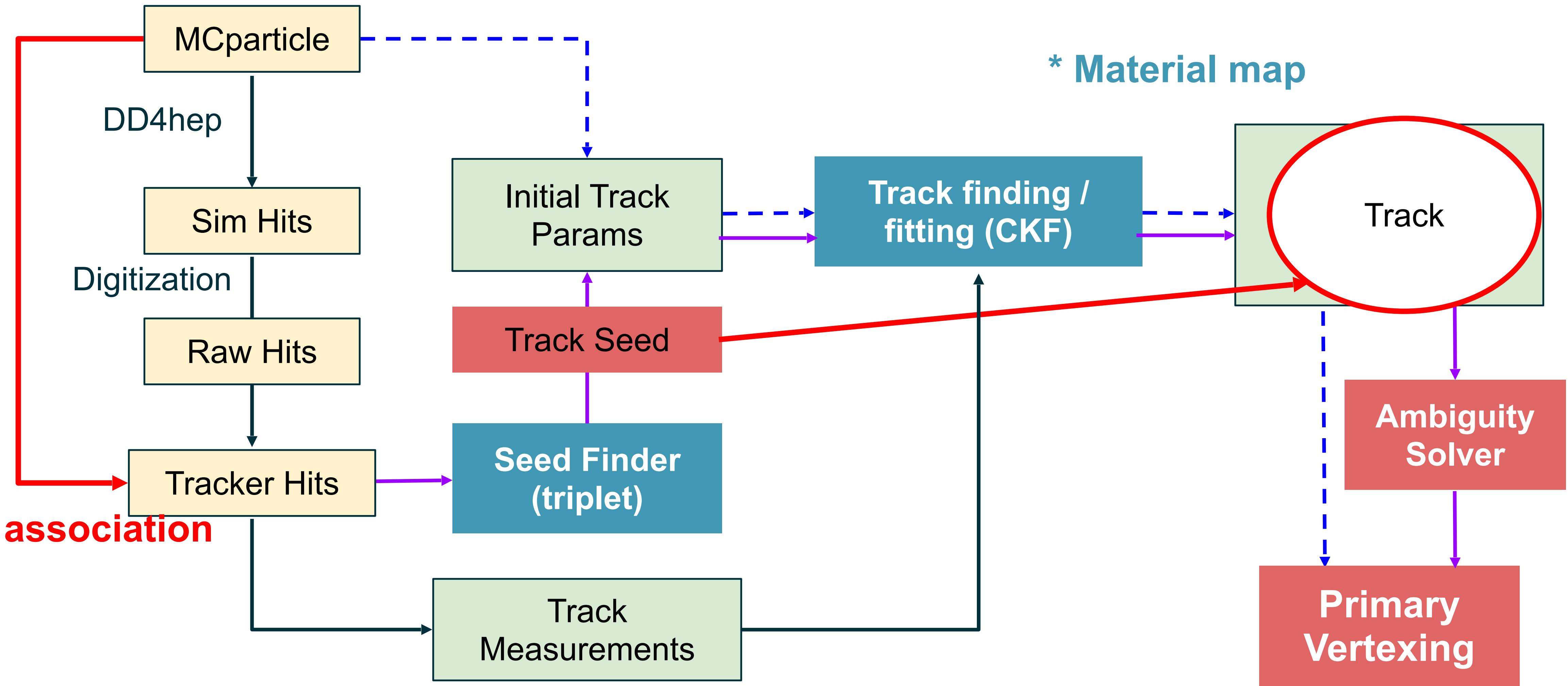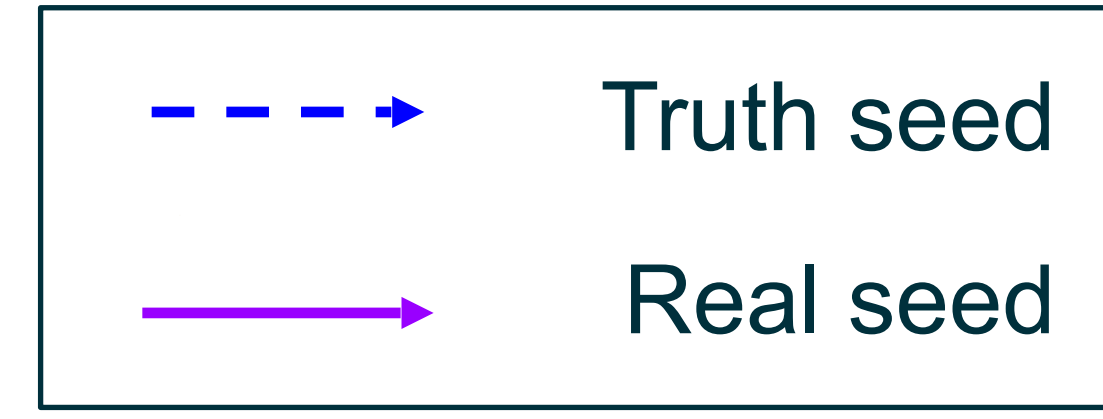
That is, there is quite some work before simulations will be able to demonstrate necessity and sufficiency (!) or inform design trade-offs,
Significant work also remains for the detector descriptions; for acceptance vs. engineering design, as well as for response, supports and services,

Explicit requests:

1. ? — volunteer(s) to make current figures of tracking performance, efficiency, and purity

2. DSCs:

   Please work out: "Select some test beam data used for simulation calibration:" by next WG mtg.

   For example, resolution when tracks traverse a detection plane at an angle. What is available or planned to study this and how should it be(come) implemented in simulations?

3. All:

   Do not hesitate to continue to use the notes started at ANL to refine the figure set for TDR.
   https://docs.google.com/document/d/1-MhspPGD3Oqf_xR3IO4UBH-6aYRd54Fic7IFlrLiCOo/edit