

# Single-particle tracking efficiency results

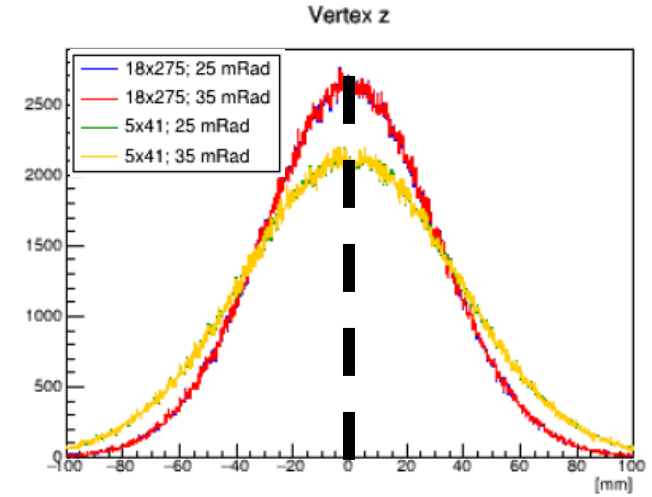
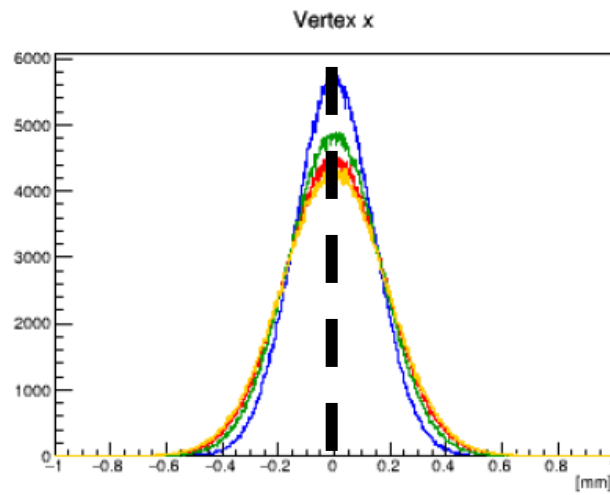
Barak Schmookler

# Motivation / status

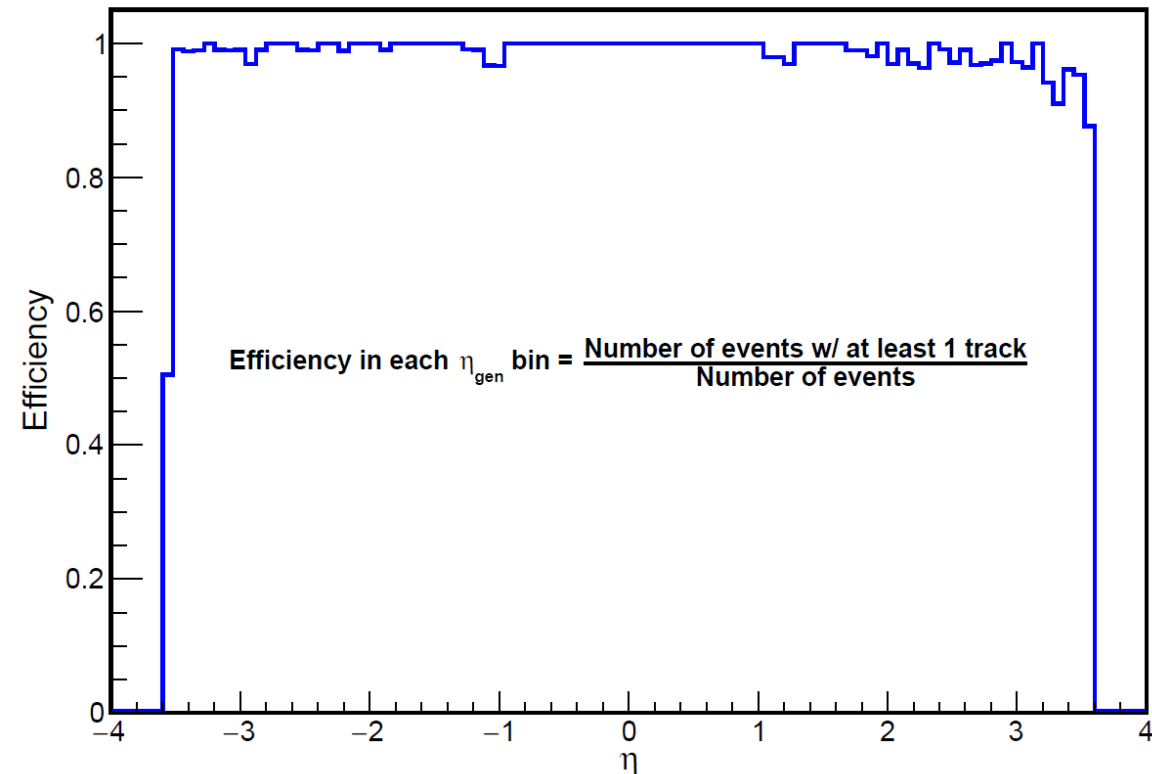
- We had a request from the Technical and Integration Coordinators (TIC) to create some demonstrative plots that show the track reconstruction efficiency with single-particle simulations.
- We made these plots and sent them to the TIC a few weeks ago. The plots used real-seeded tracking – at least 3 points in the SVT are needed to form a seed + 3 good measurement hits to keep the track after the CKF/ambiguity solver. So, these plots also show the geometric acceptance.
- The next step is to have these plots automatically created in the single-particle tracking performance benchmark and in the monthly simulation campaigns.

# Results

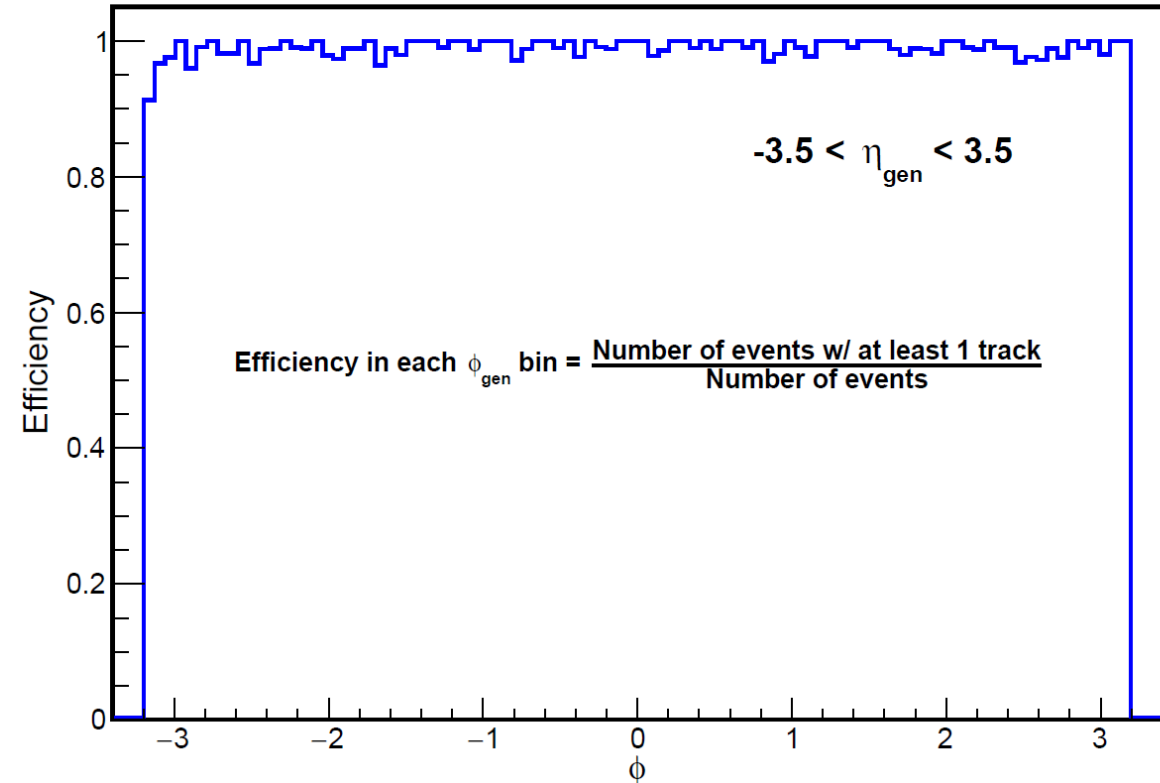
Single muon generated:  
 $0.5 \text{ GeV}/c < P < 20 \text{ GeV}/c$   
 $-4 < \eta < 4$   
Generated vertex: (0,0,0) mm



Tracker Efficiency vs. generated particle  $\eta$



Tracker Efficiency vs. generated particle  $\phi$



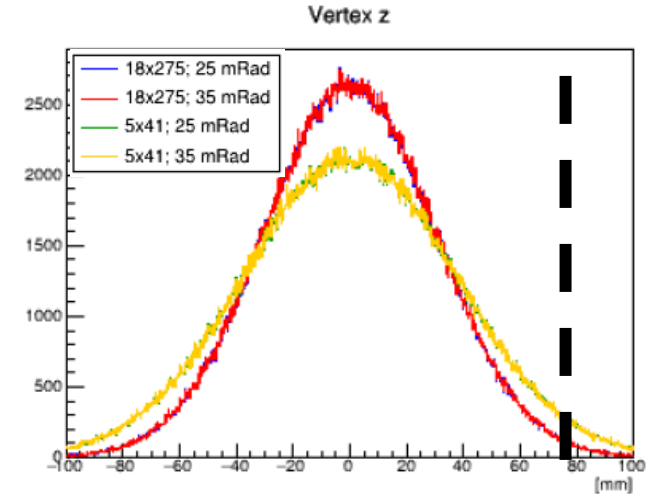
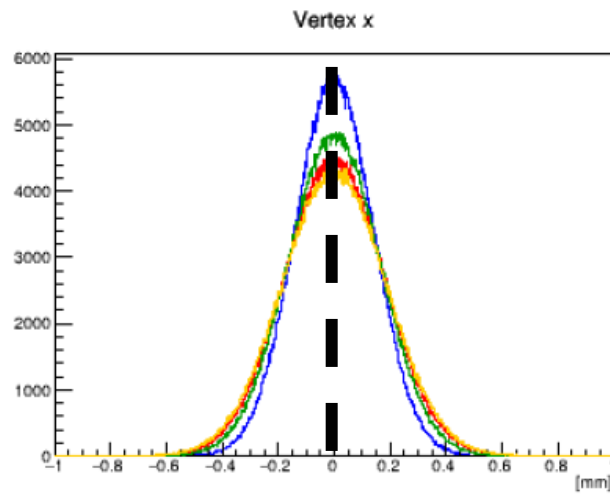
# Results

Single muon generated:

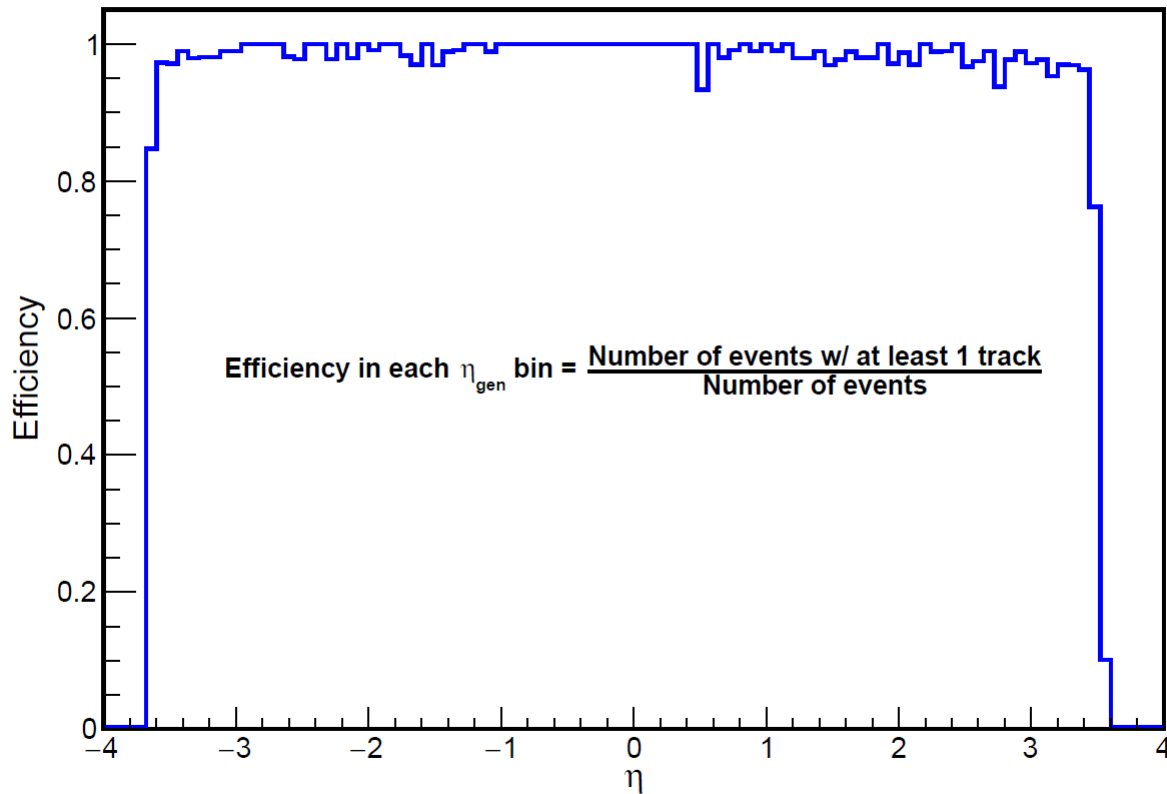
$$0.5 \text{ GeV}/c < P < 20 \text{ GeV}/c$$

$$-4 < \eta < 4$$

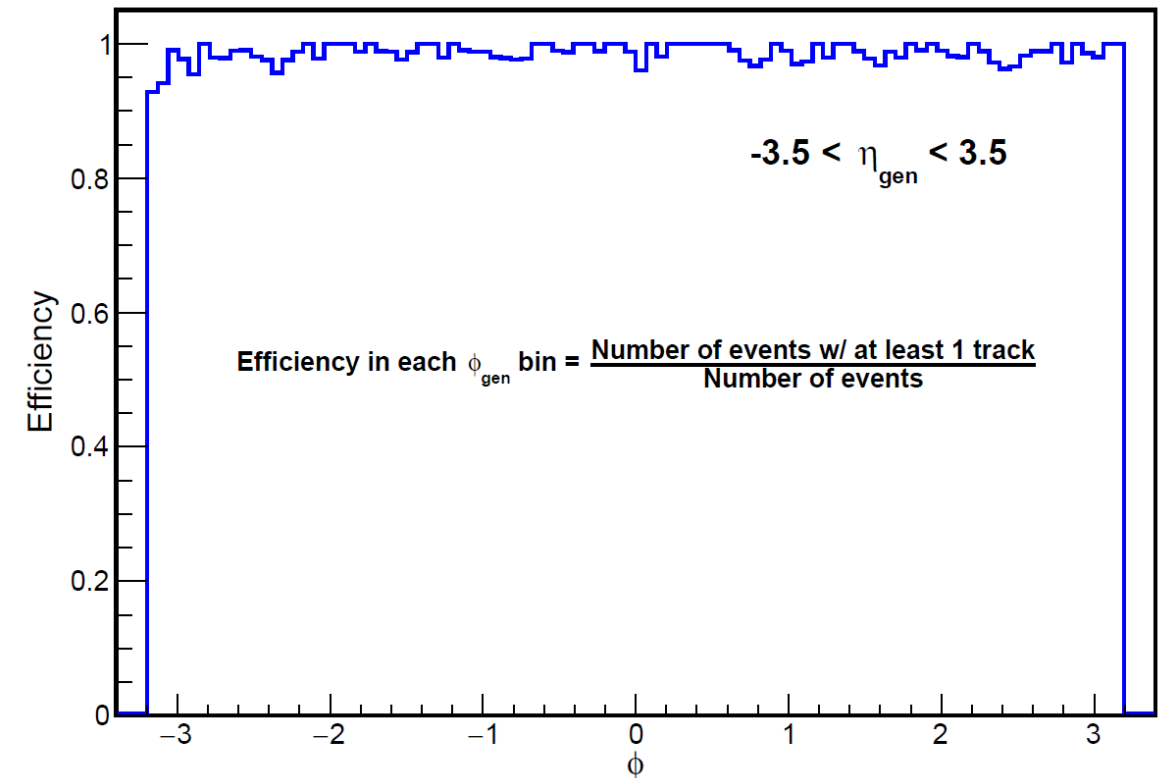
Generated vertex: (0,0,75) mm



Tracker Efficiency vs. generated particle  $\eta$



Tracker Efficiency vs. generated particle  $\phi$



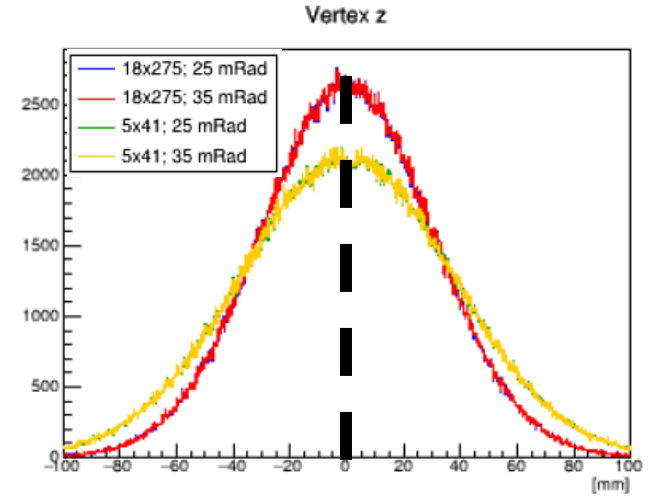
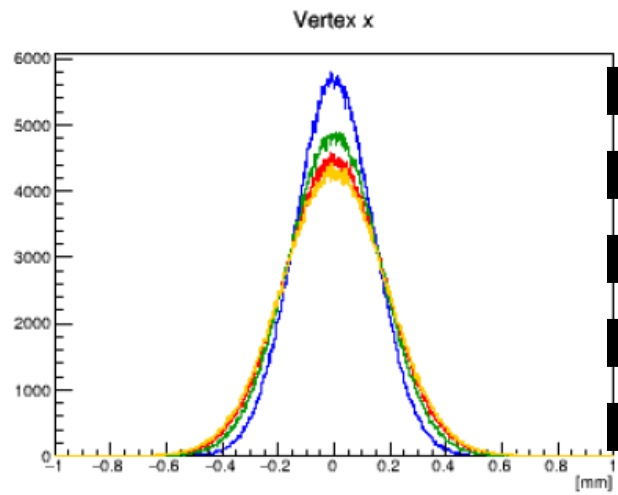
# Results

Single muon generated:

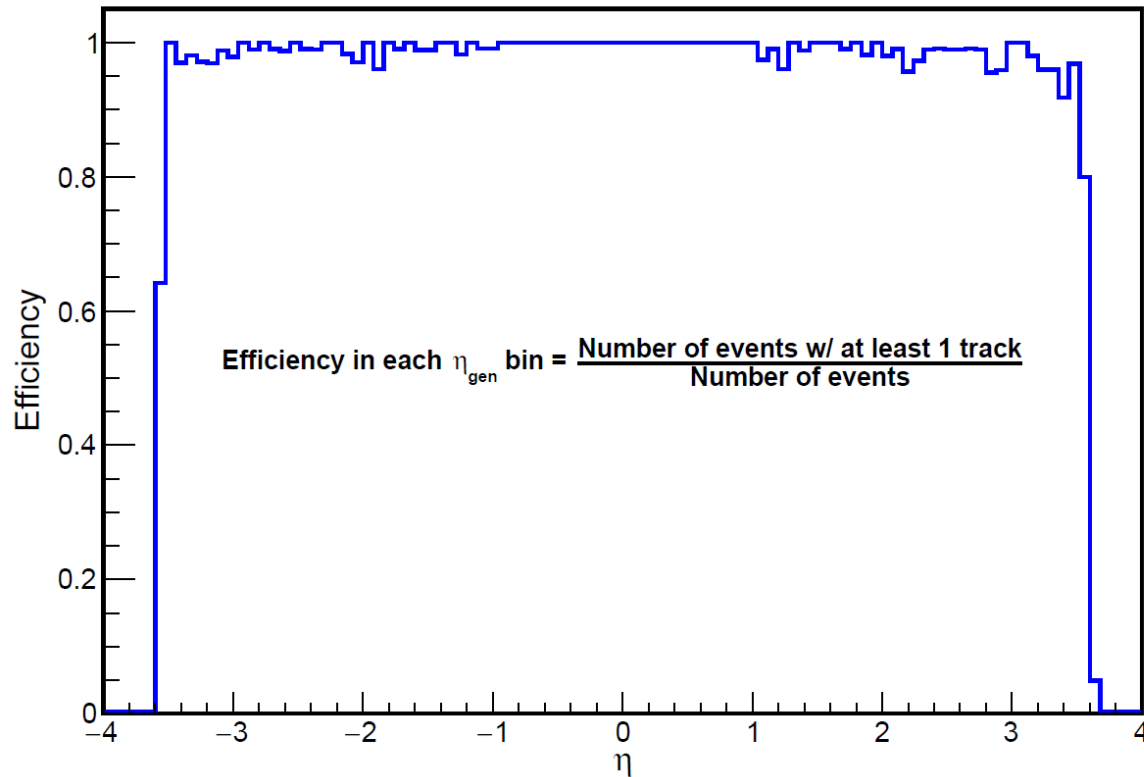
$$0.5 \text{ GeV}/c < P < 20 \text{ GeV}/c$$

$$-4 < \eta < 4$$

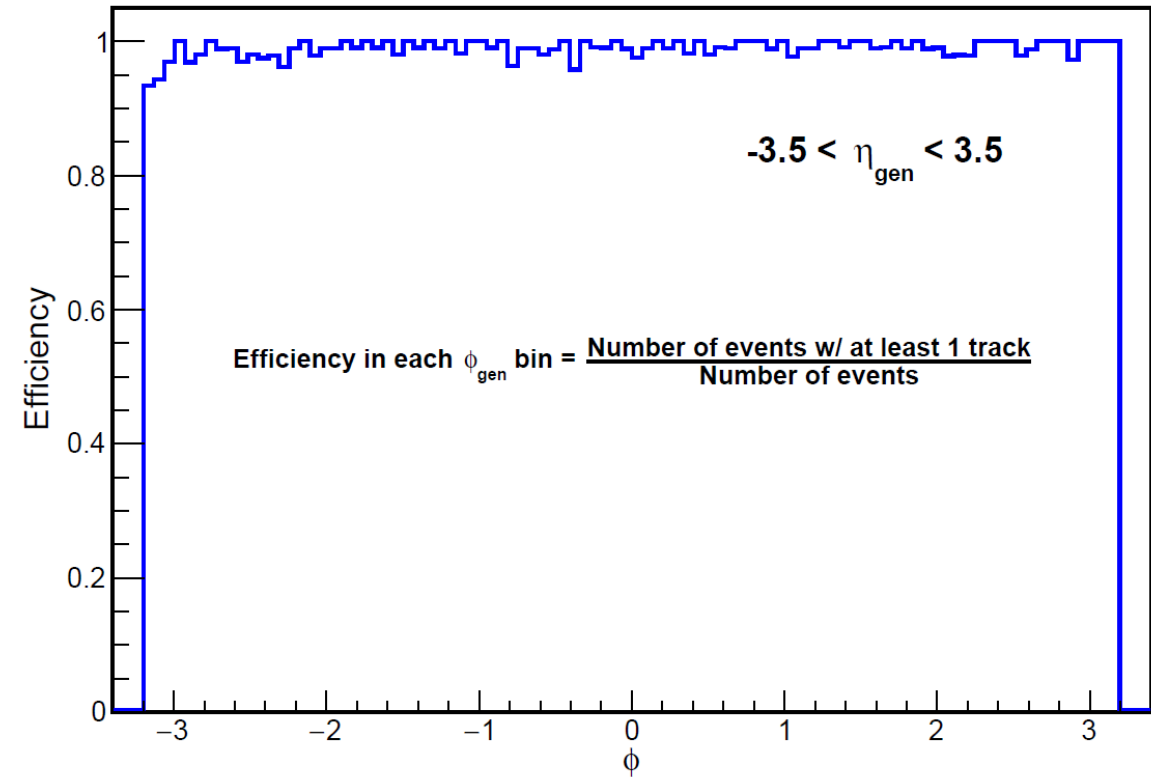
Generated vertex: (1,0,0) mm



Tracker Efficiency vs. generated particle  $\eta$

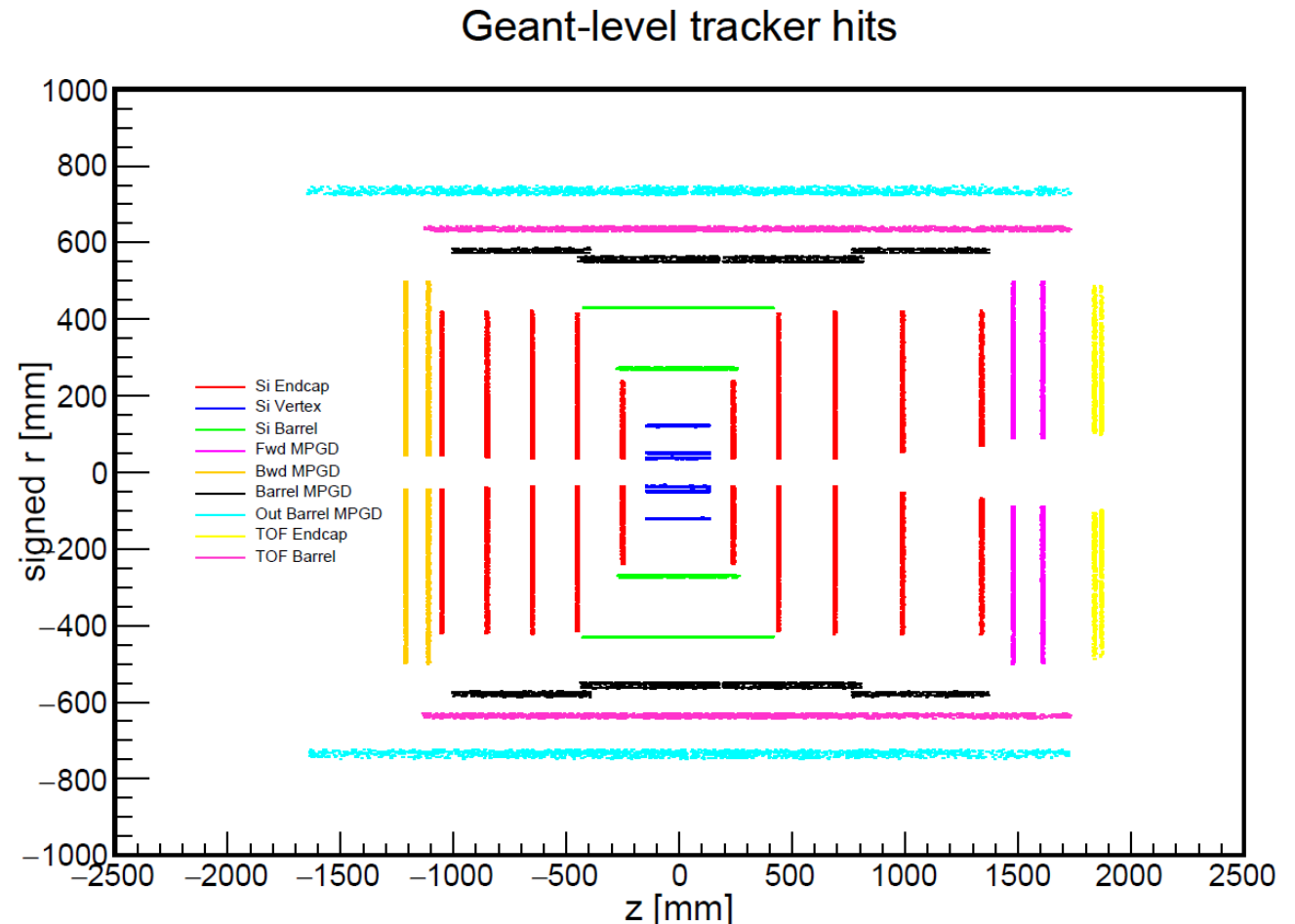


Tracker Efficiency vs. generated particle  $\phi$



# Acceptance effect of services and supports

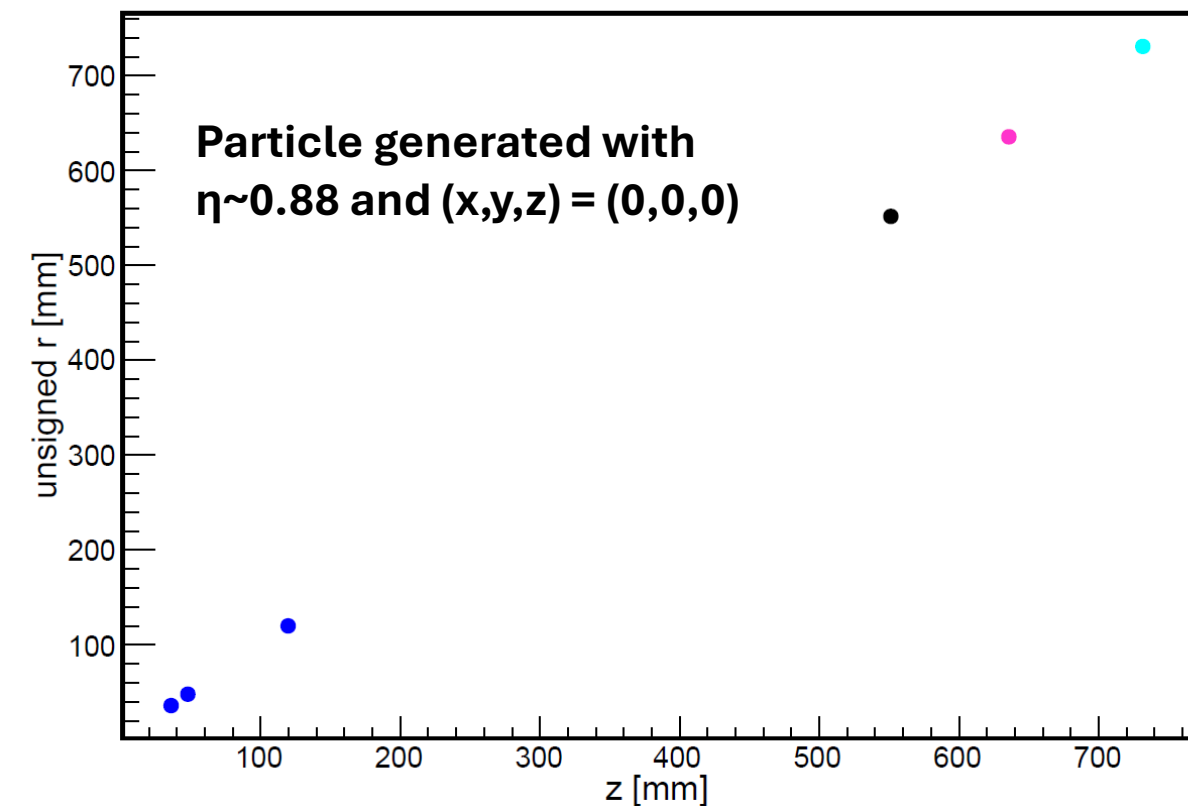
- Services and supports are implemented in this file:  
[https://github.com/eic/epic/blob/main/compact/tracking/support\\_service\\_craterlake.xml](https://github.com/eic/epic/blob/main/compact/tracking/support_service_craterlake.xml).
- They are used in the Crater Lake geometry:  
<https://github.com/eic/epic/blob/main/configurations/craterlake.yml#L10>.
- Particles near  $|\eta| \sim 0.88$  from  $(x,y,z) = (0,0,0)$  will go through the service cone, but still have 3 hits in SVT layers.



# Acceptance effect of services and supports

- Si Endcap
- Si Vertex
- Si Barrel
- Fwd MPGD
- Bwd MPGD
- Barrel MPGD
- Out Barrel MPGD
- TOF Endcap
- TOF Barrel

Tracker hits from primary particle for event 6205



9/12/2024

Tracker hits from primary particle for event 1692

