

Common Tracking Selection

Karol Krizka

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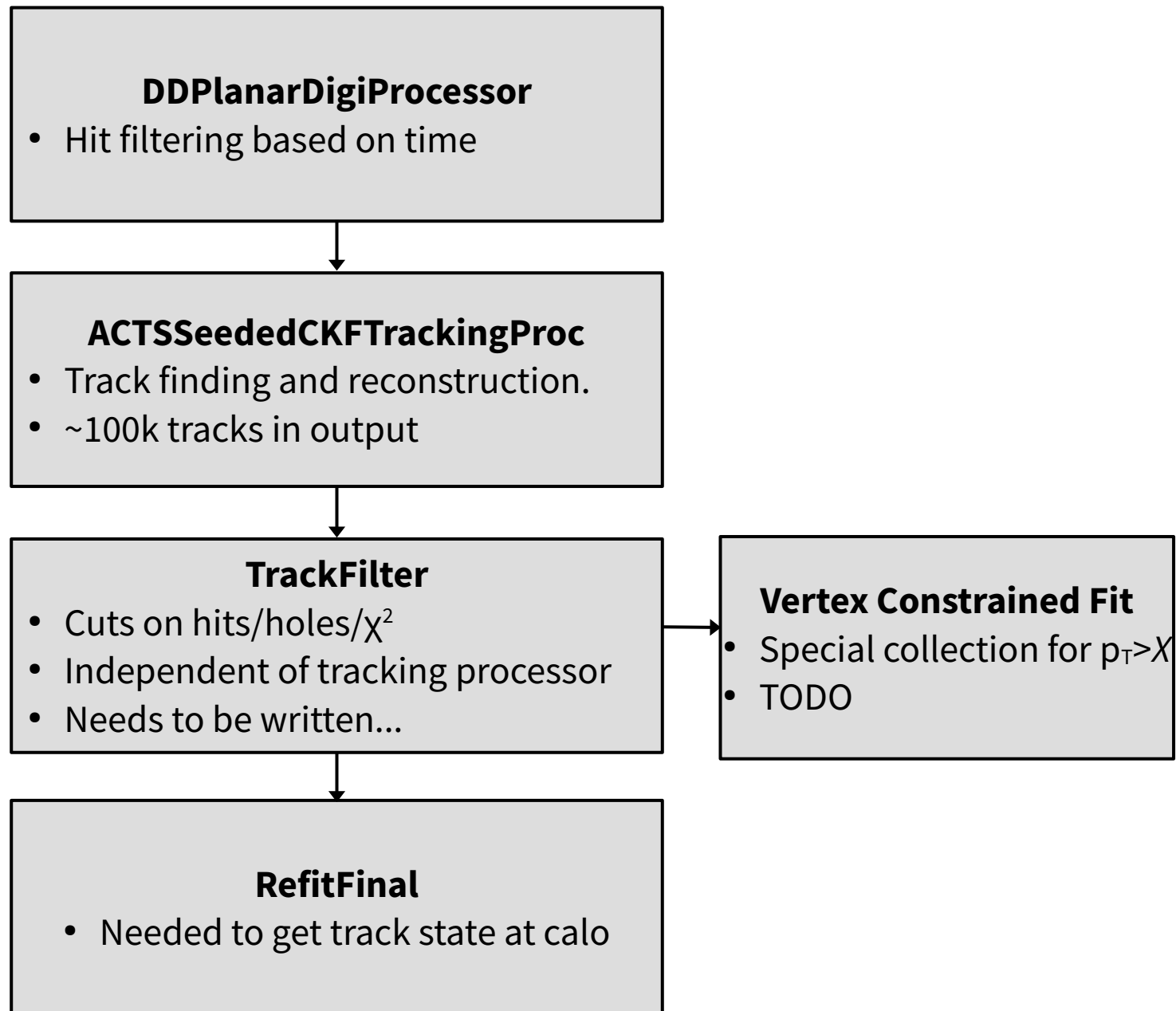
MCD Tracking

ProductionConfig is Important

<https://github.com/MuonColliderSoft/ProductionConfig>

- **Need to ensure that latest configuration is uploaded**
- **Need add CI that gen/sim/reco a few example events**
 - Provides instructions for how to run workflow
 - Ensures that the latest configuration always works
 - [Example](#) (volunteering to port this)

Track Reconstruction Flow



Recommended ACTSTracking Settings

ACTSTracking examples in tag v1.0.0

- **Seeding Settings**

- SeedingLayers: inner half of VXD double layers
- SeedFinding_RMax = 150
- SeedFinding_DeltaRMin = 5
- SeedFinding_DeltaRMax = 80
- SeedFinding_CollisionRegion = **1** (wrong in v1.0.0 tag)
- SeedFinding_RadLengthPerSeed = 0.1
- SeedFinding_SigmaScattering = 50
- SeedFinding_MinPt = 500

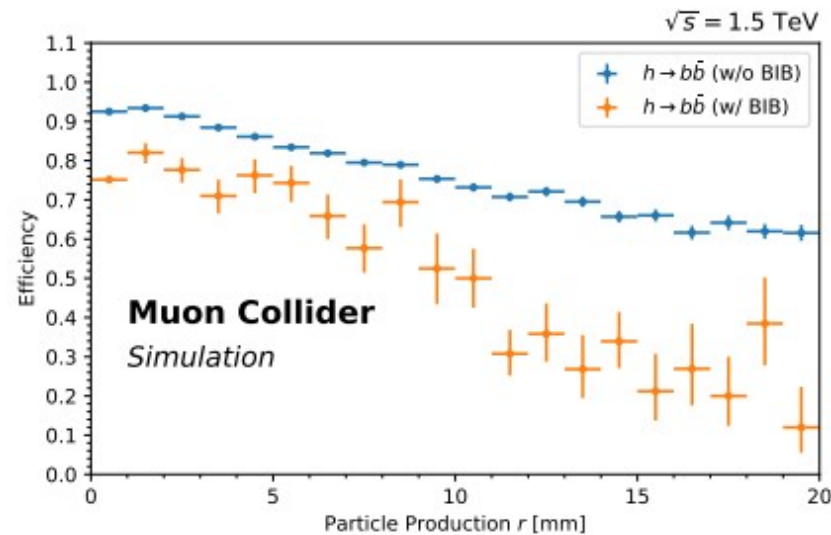
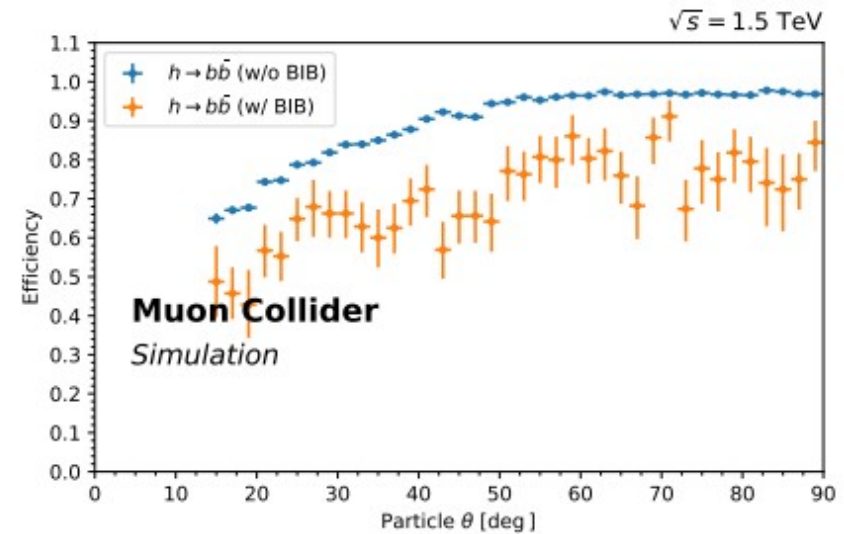
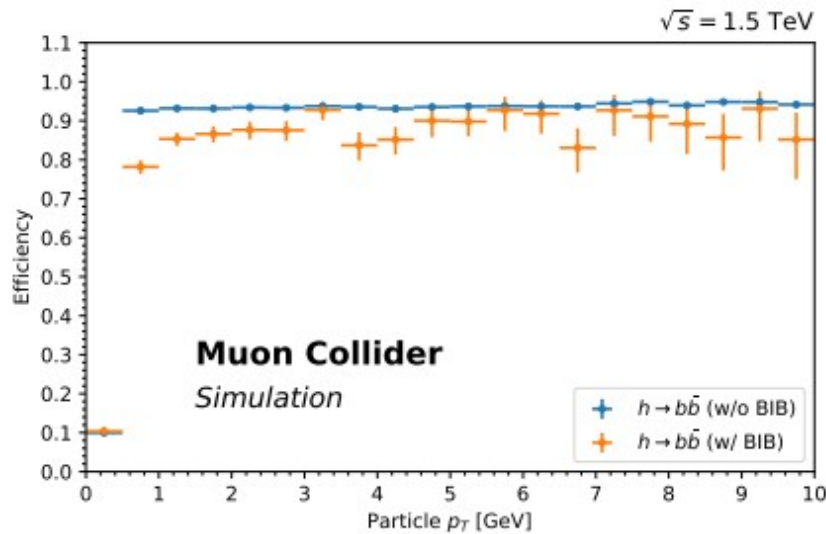
- **CKF Settings**

- CKF_Chi2CutOf = **1**
- CKF_NumMeasurementsCutOff = **1**

Possible (long-term) improvements:

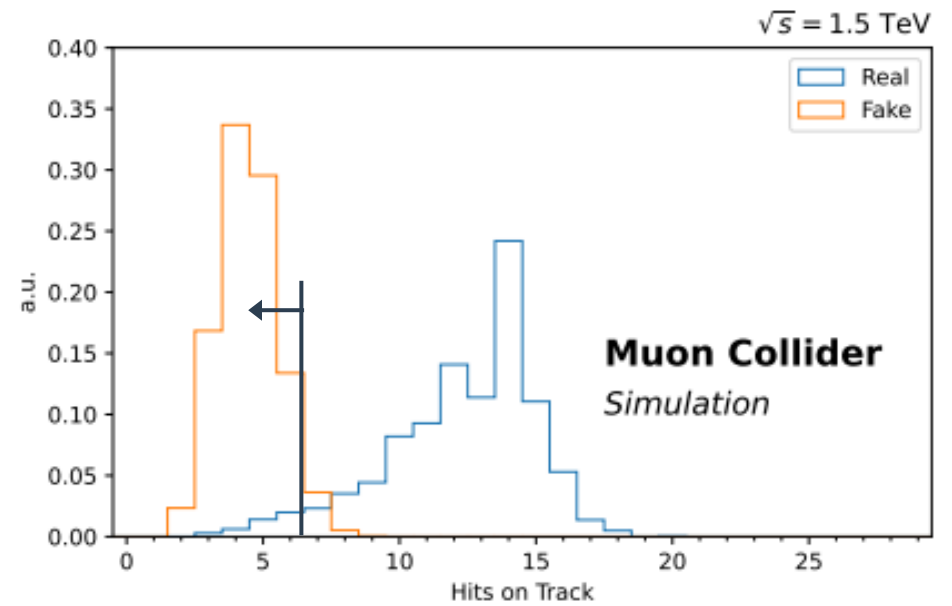
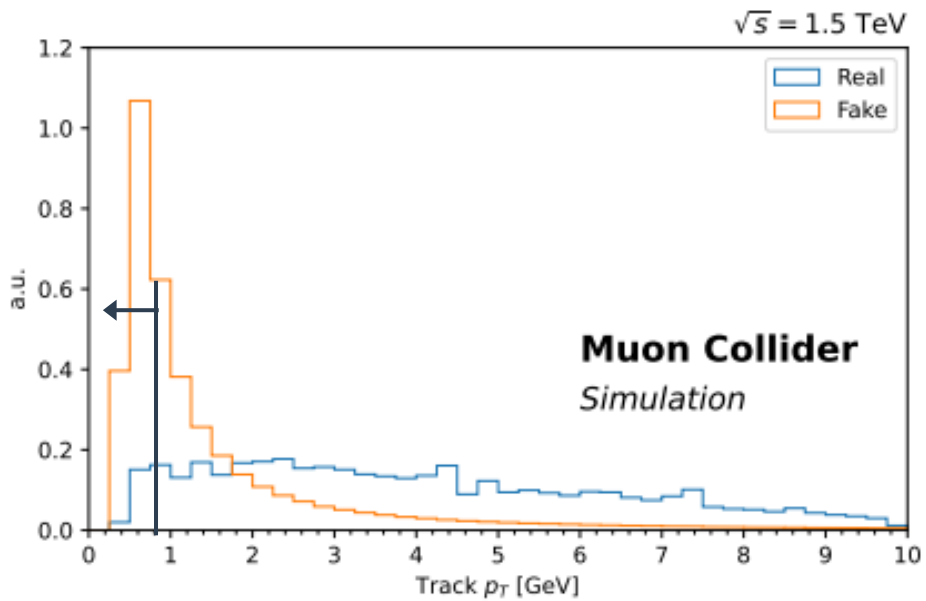
- Outside-in tracking
- Raise SeedFinding_MinPt

Tracking Performance



Does not include filter to reject fakes.

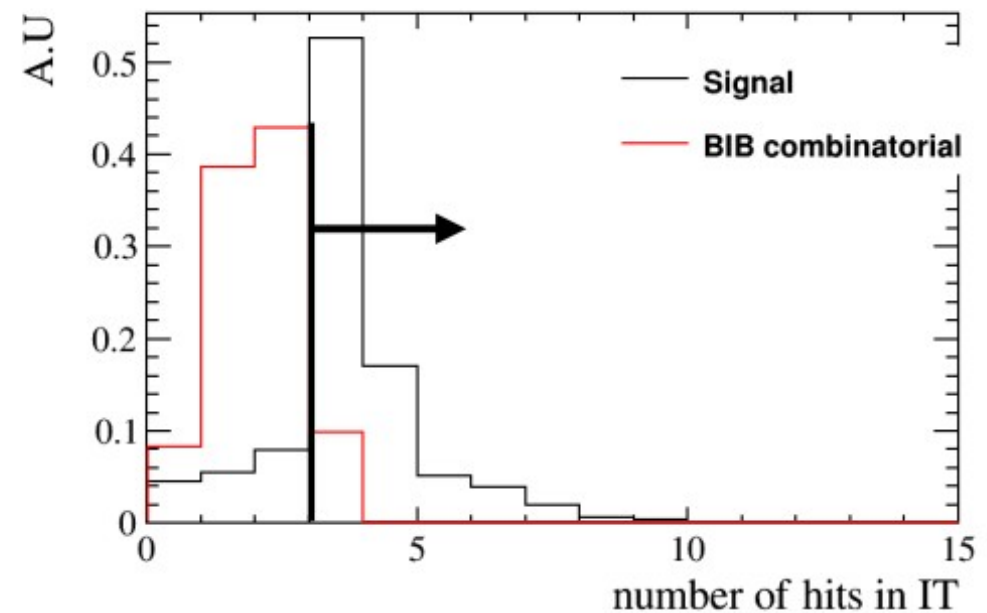
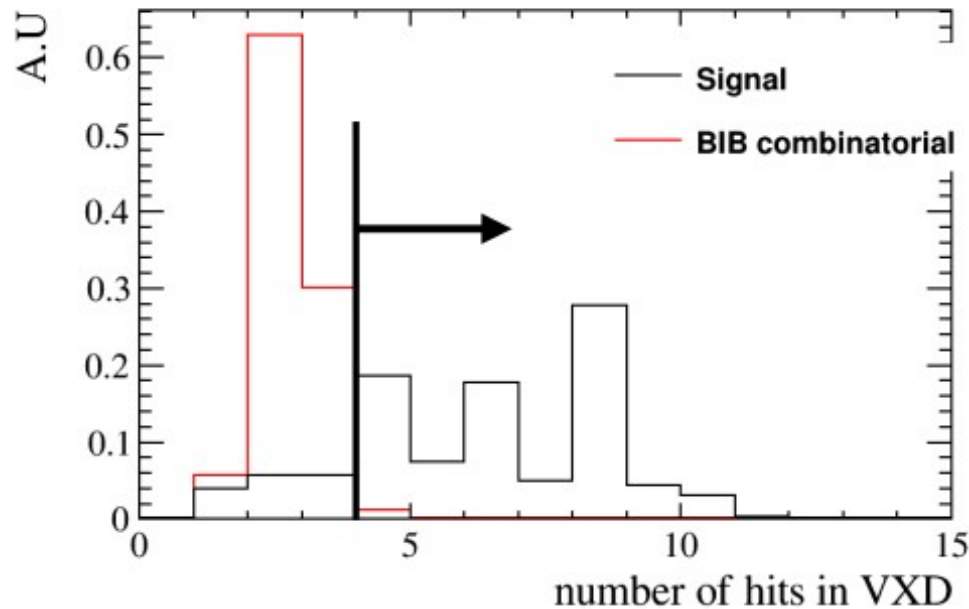
Rejecting Fakes



Track filter

Even better to be sub-detector specific!

- Look into track features for signal (b-jets) vs BIB separation.
- Most discriminating observables are the number of hits in VXD (n_{VXD}) and IT (n_{IT}).



- **$n_{VXD} > 3$ and $n_{IT} > 2$** requirement brings the combinatorial from **300k tracks to less than 100 tracks**.

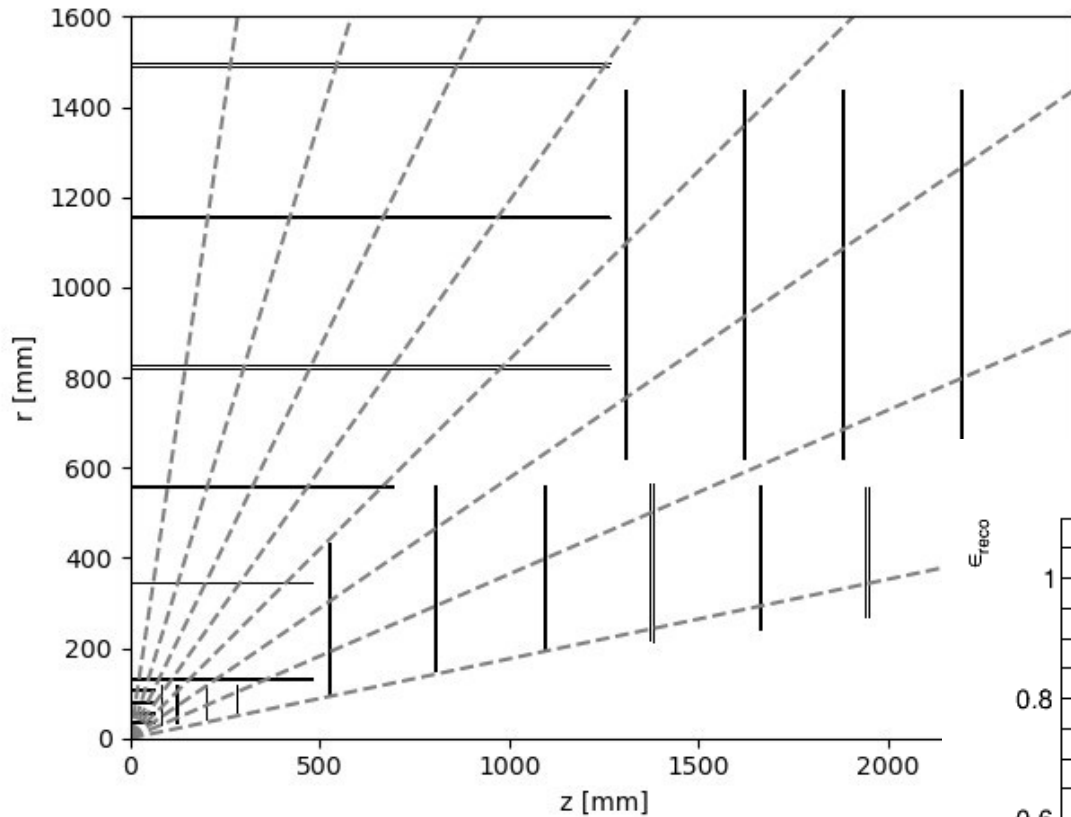
Questions:

- No need for p_T cut?
- Tried cutting on OT? (L: No)

Fake Rejection: Holes

- **Hole: Number of layers without a hit**
- **Commonly used to reject fake tracks**
- **More “uniform” vs Θ than N_{hits}**
 - Always expect it to be zero for a good track
- **Not part of LCIO EDM (LCIO::Track)**
 - (Ideal) Add number of holes to LCIO
 - Can be implemented as part of ACTSTracking
- **Don't include at this stage?**

N_{hits} and Sculpting (Massimo)



Reconstruction efficiency

