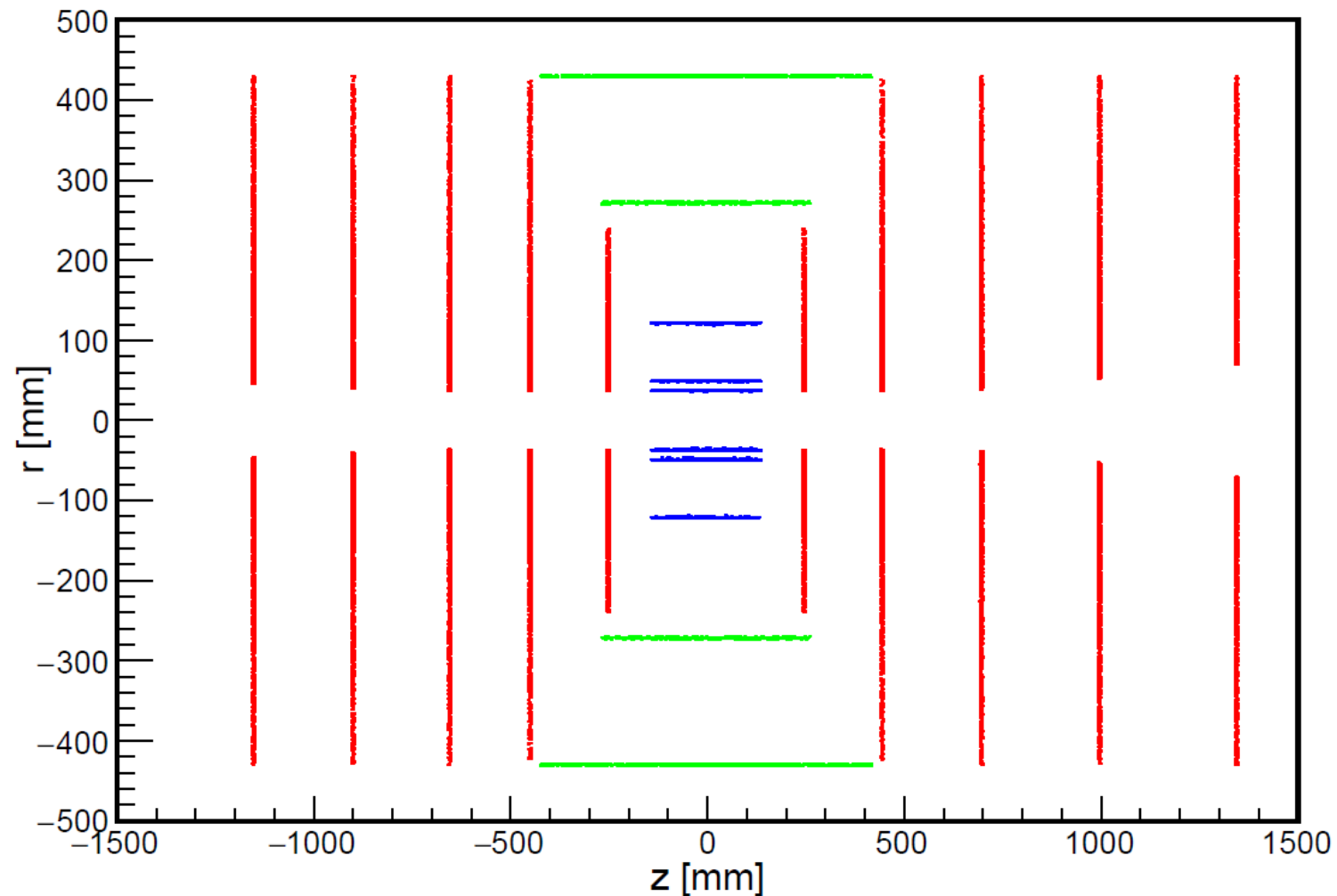


CKF tracking with realistic seeding

Barak Schmookler

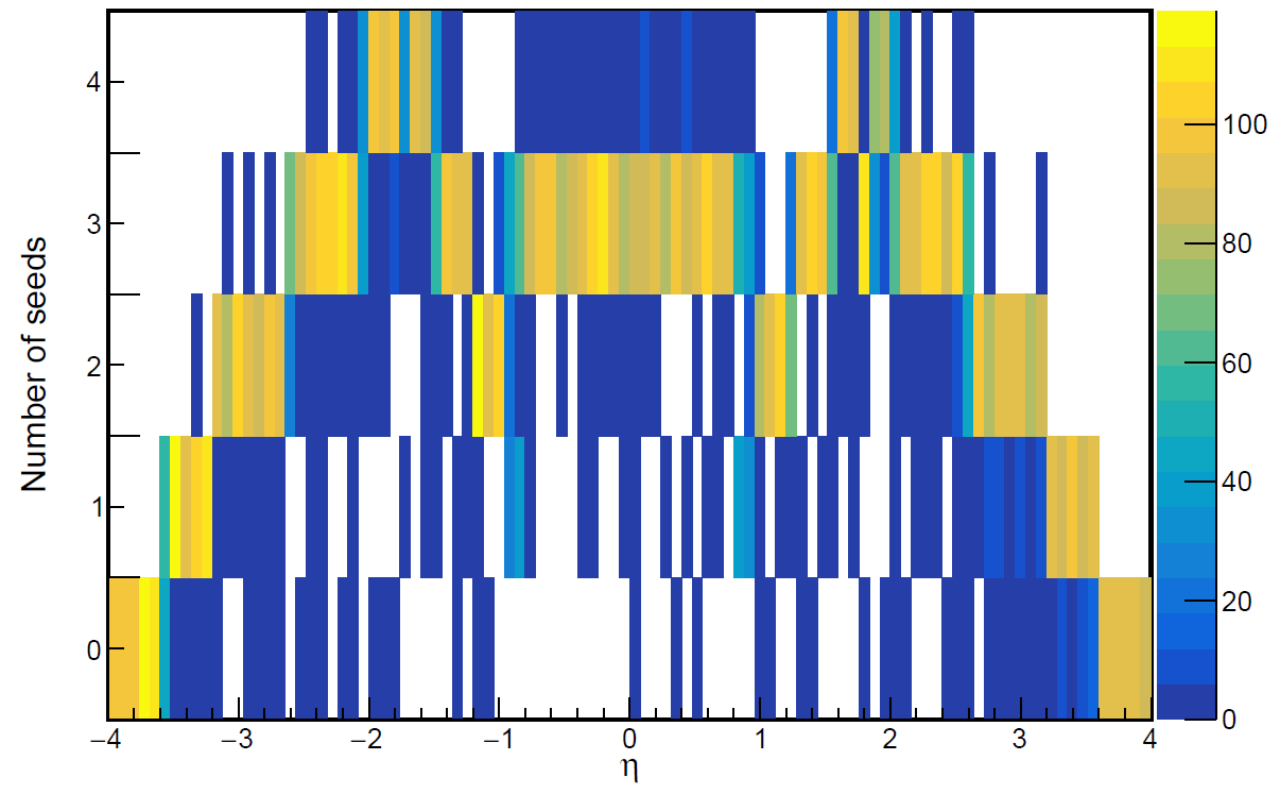
Seeding results summary from last time –
we look for seeds in the silicon tracking volume

Digitized tracker hits

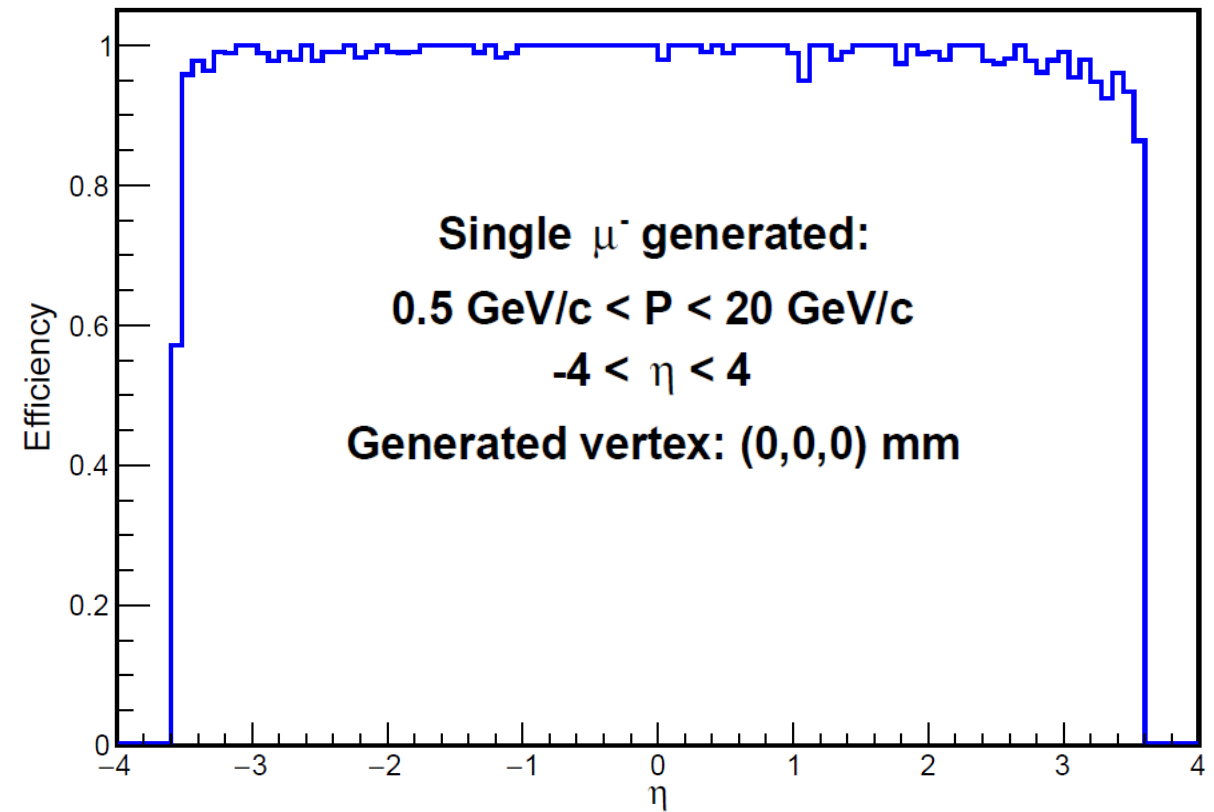


Seeding results summary from last time –
we see good seed efficiency and reconstruction with updated parameters

Number of seeds vs. generated particle η

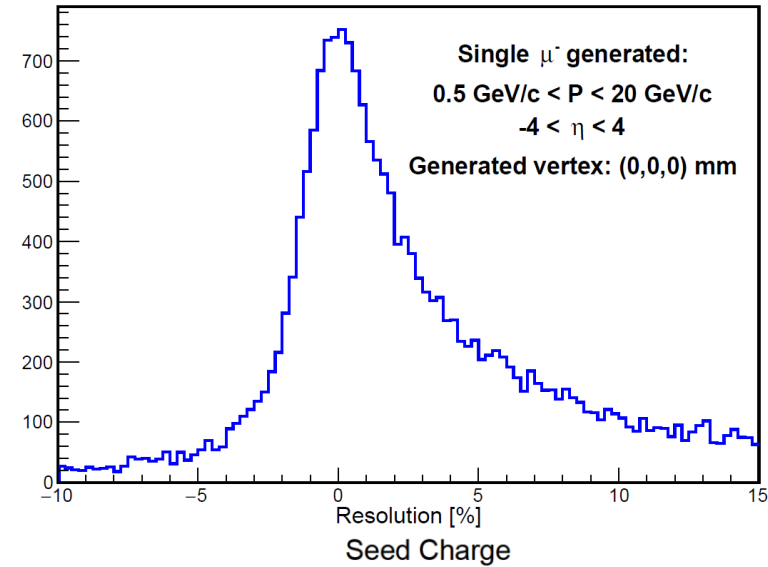


Seeder Efficiency vs. generated particle η

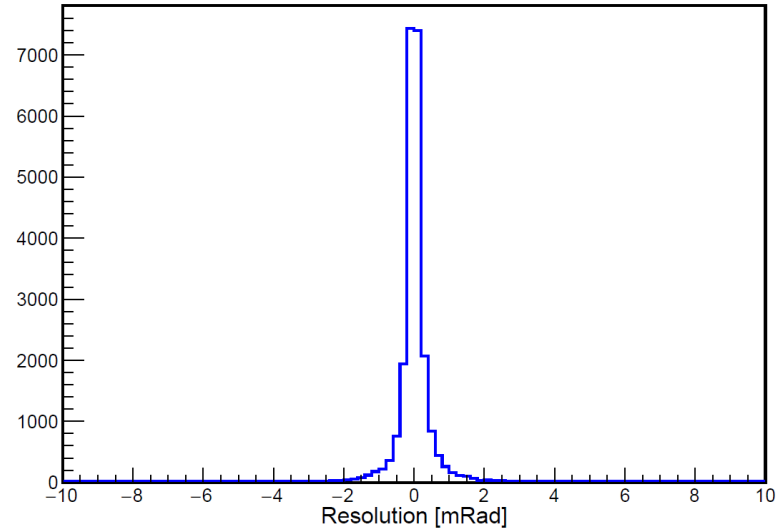


Seeding results summary from last time –
we see good seed efficiency and reconstruction with updated parameters

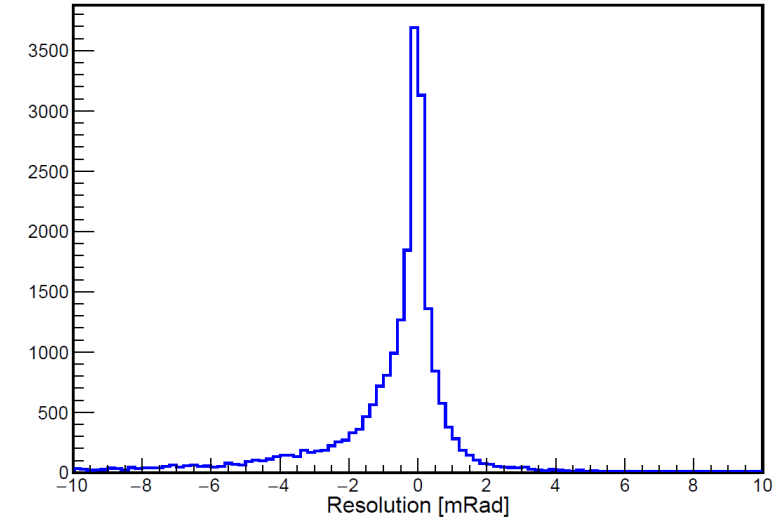
Seed Momentum Resolution: (seed - true)/true



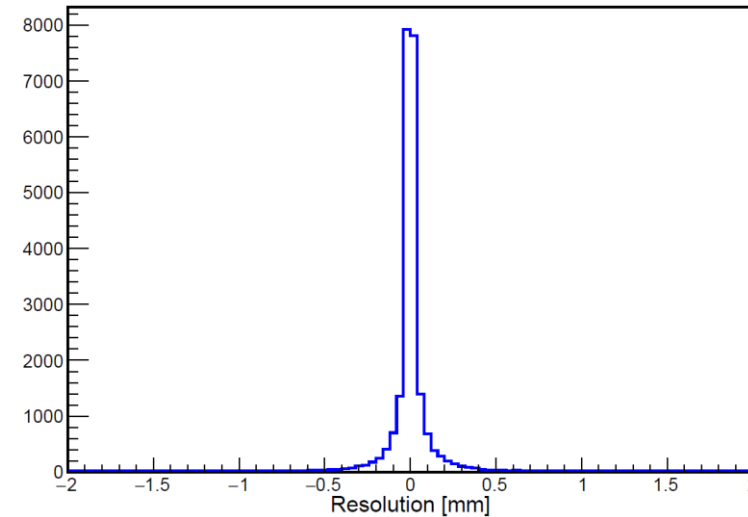
Seed Theta Resolution: (seed - true)



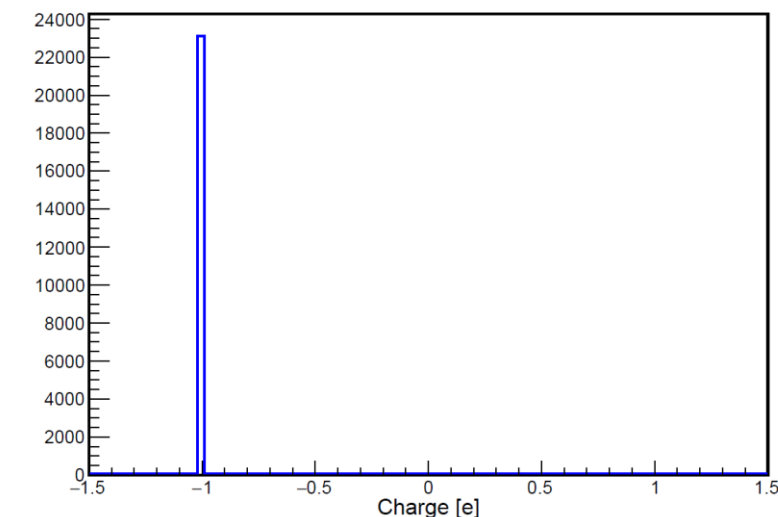
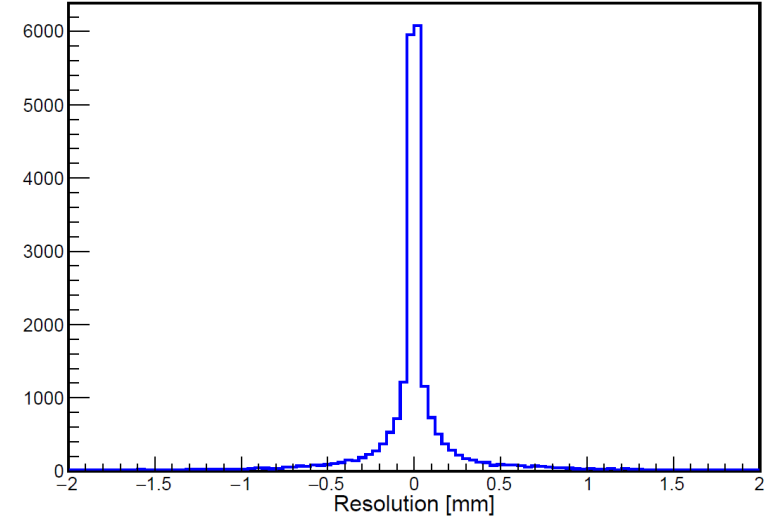
Seed Phi Resolution: (seed - true)



Seed ACTS loc-a Resolution: (seed - true)

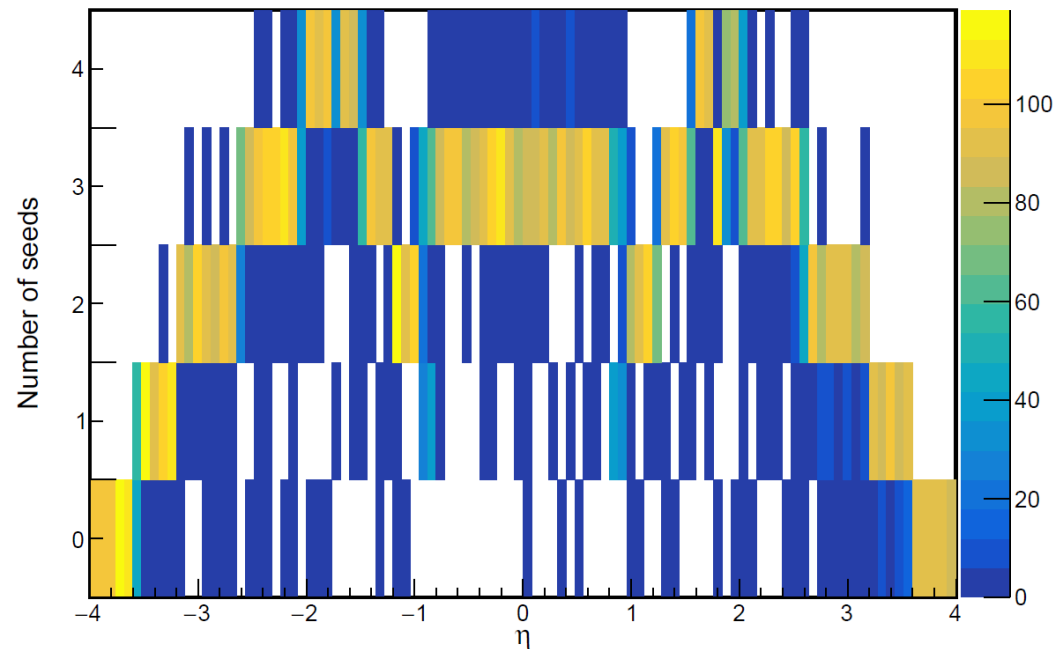


Seed ACTS loc-b Resolution: (seed - true)



We can have multiple seeds reconstructed for a single thrown particle, but many are duplicates.

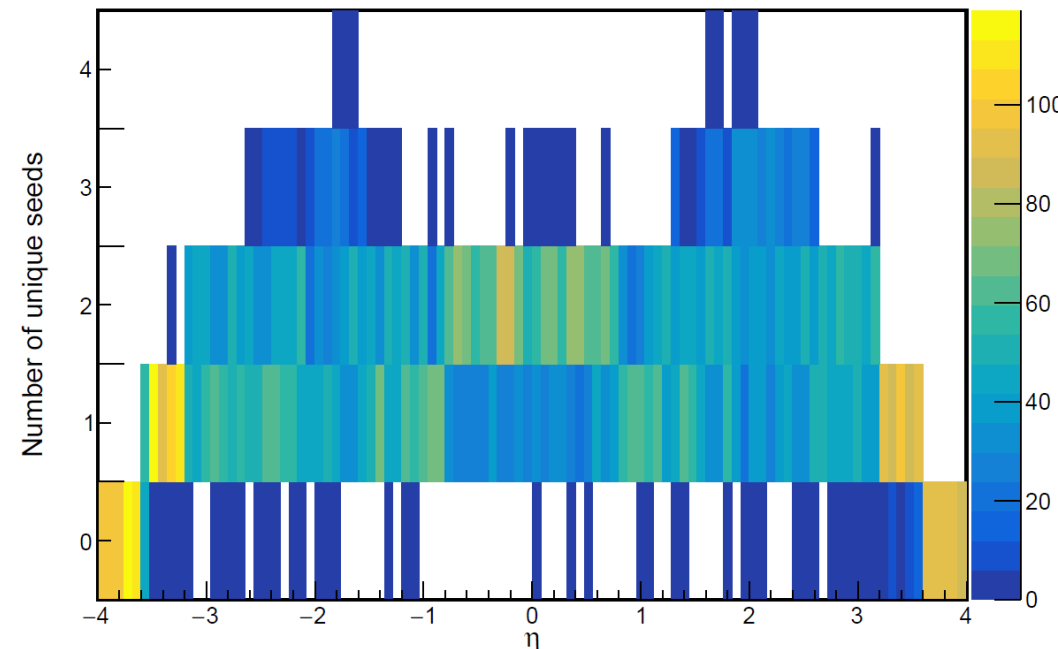
Number of seeds vs. generated particle η



Combining all the seeds where q/p , θ , and ϕ differ by less than 5%.



Number of unique seeds vs. generated particle η



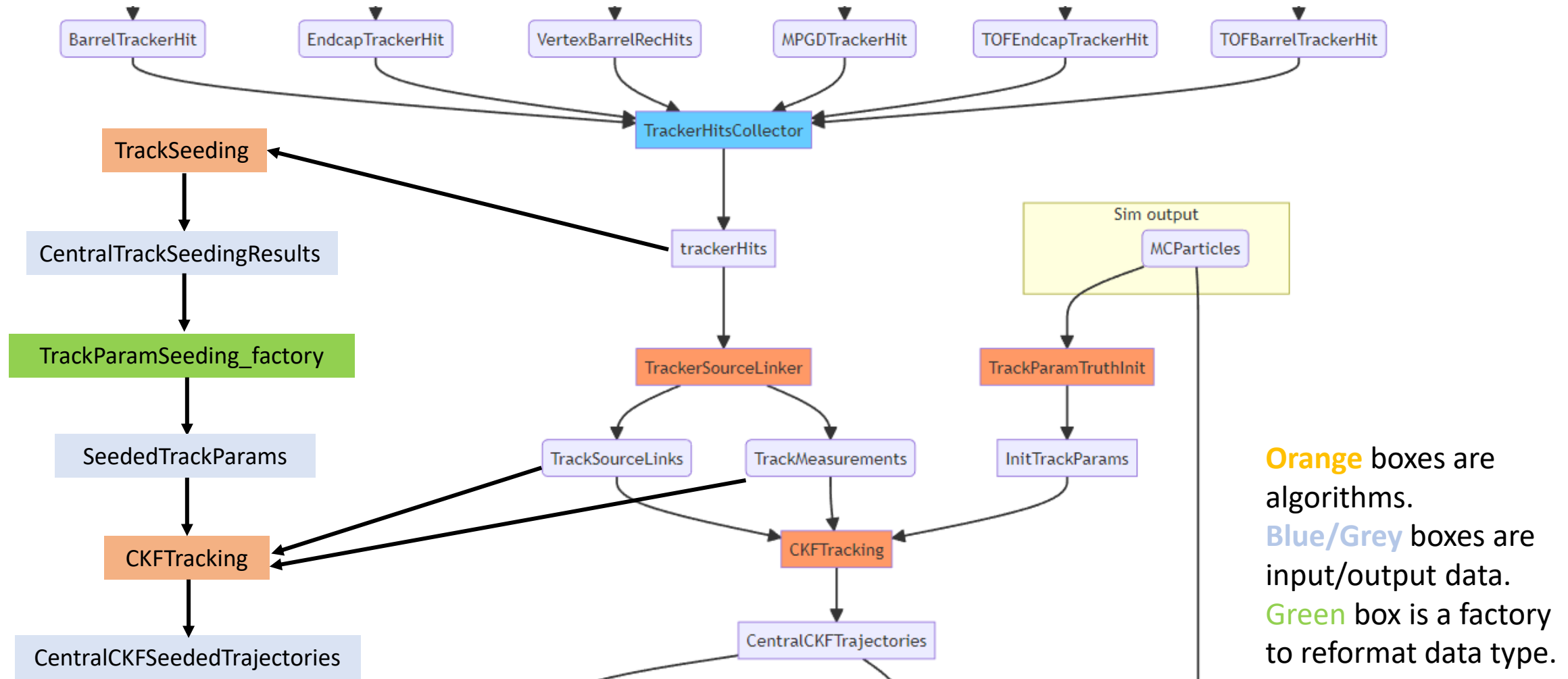
Single μ^- generated:

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

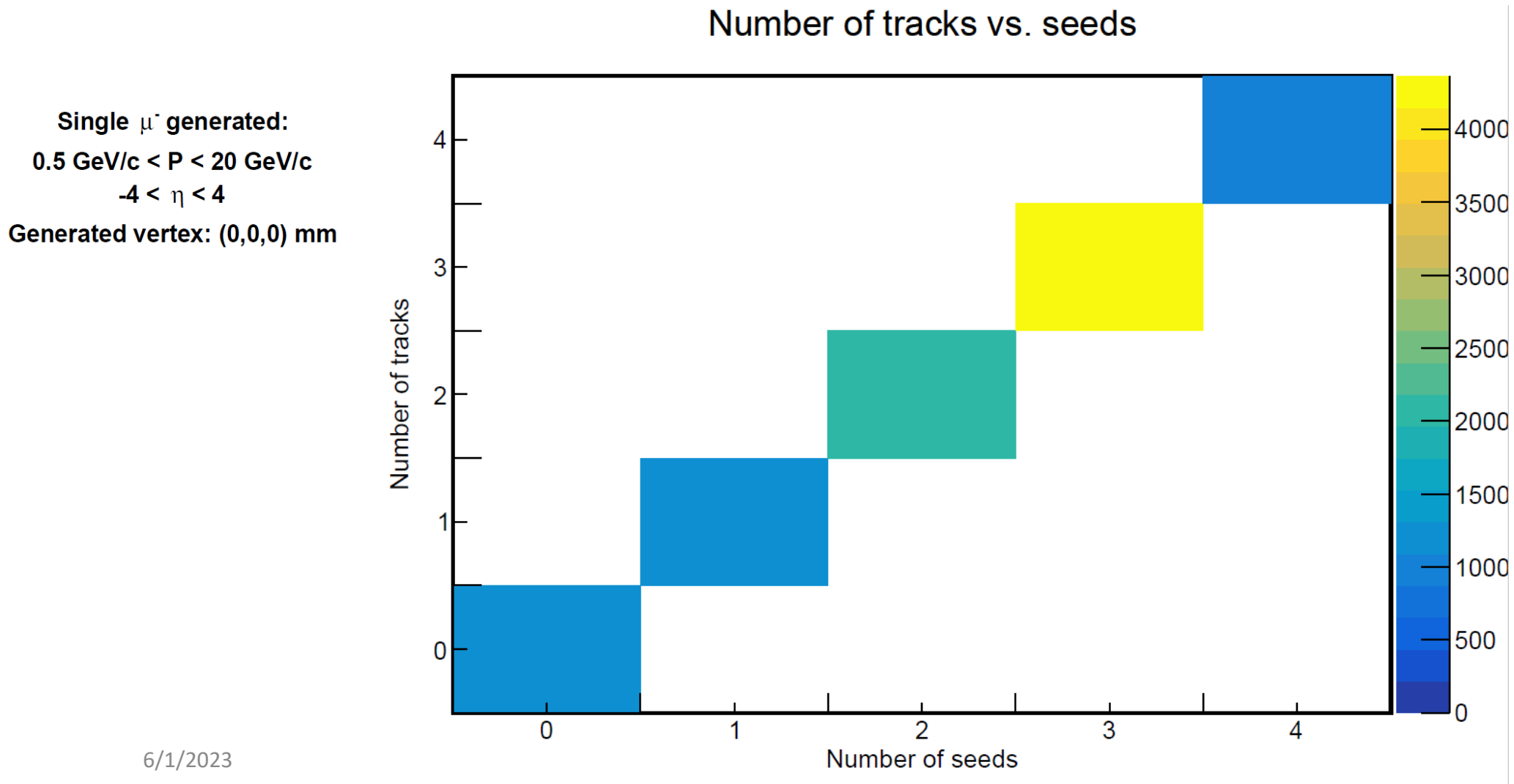
$-4 < \eta < 4$

Generated vertex: (0,0,0) mm

We can use real seeds for tracking in our track-qa branch

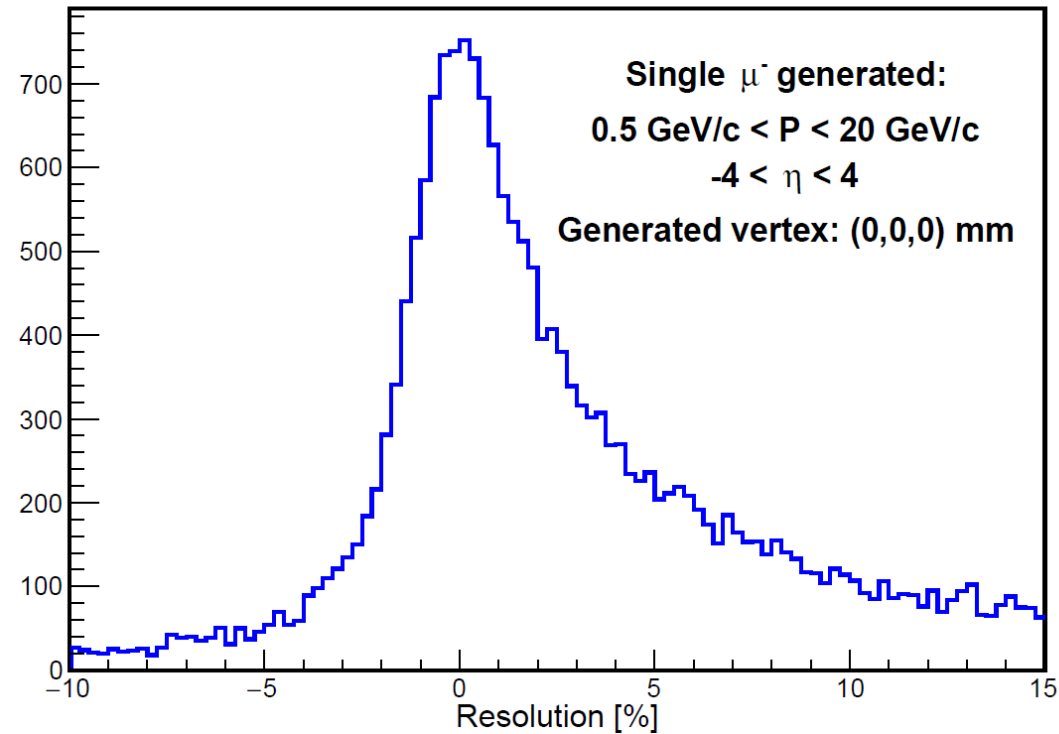


For single-particle simulation, we seem to always reconstruct one track for each seed



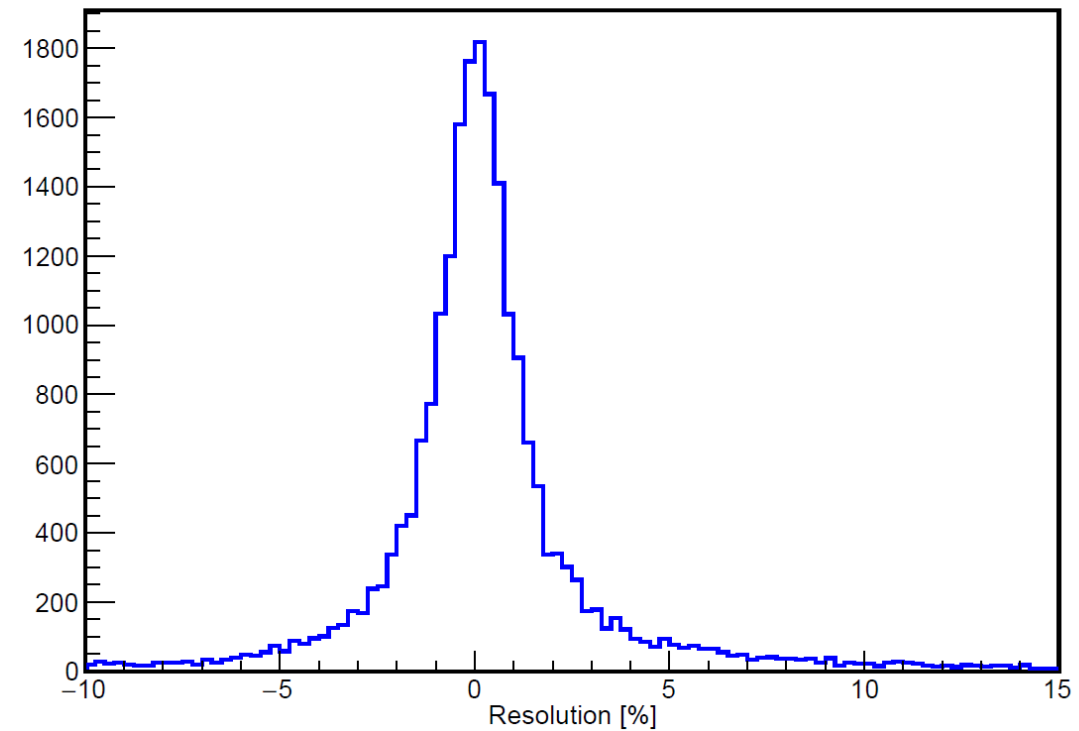
The CKF improves the momentum resolution of the seeds

Seed Momentum Resolution: $(\text{seed} - \text{true})/\text{true}$

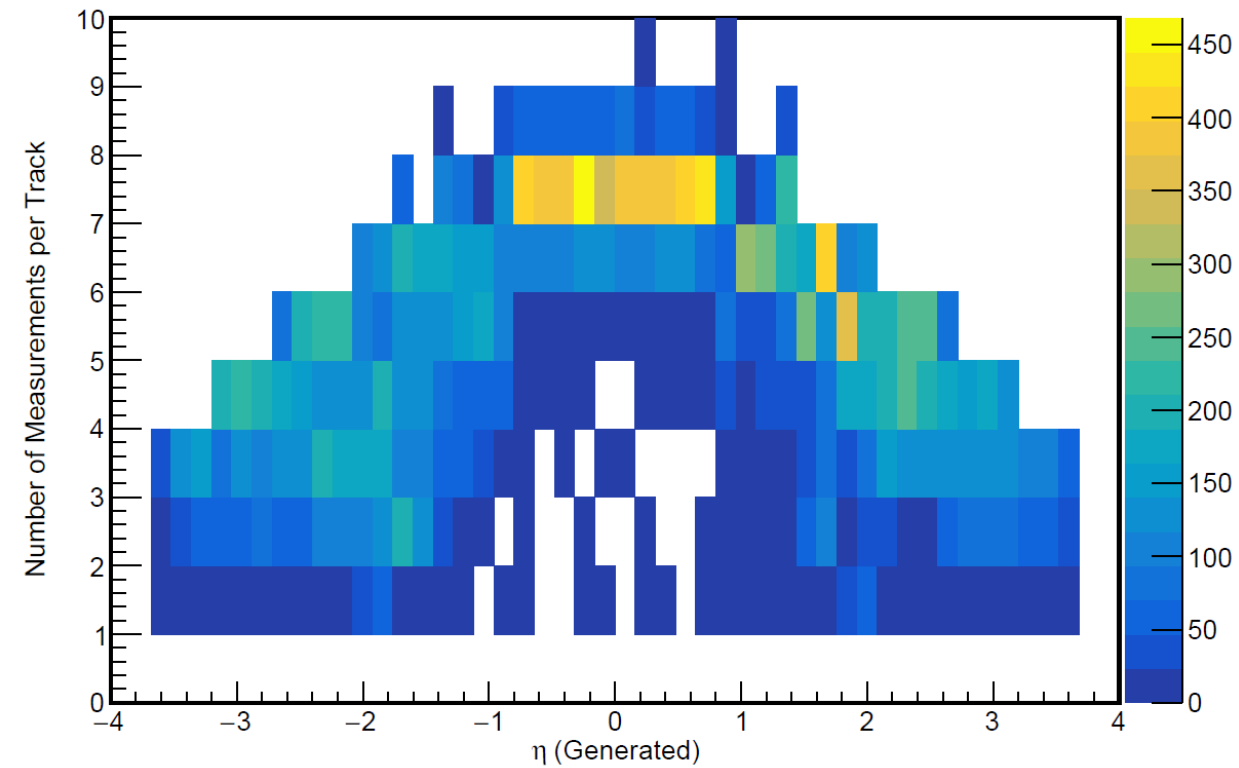
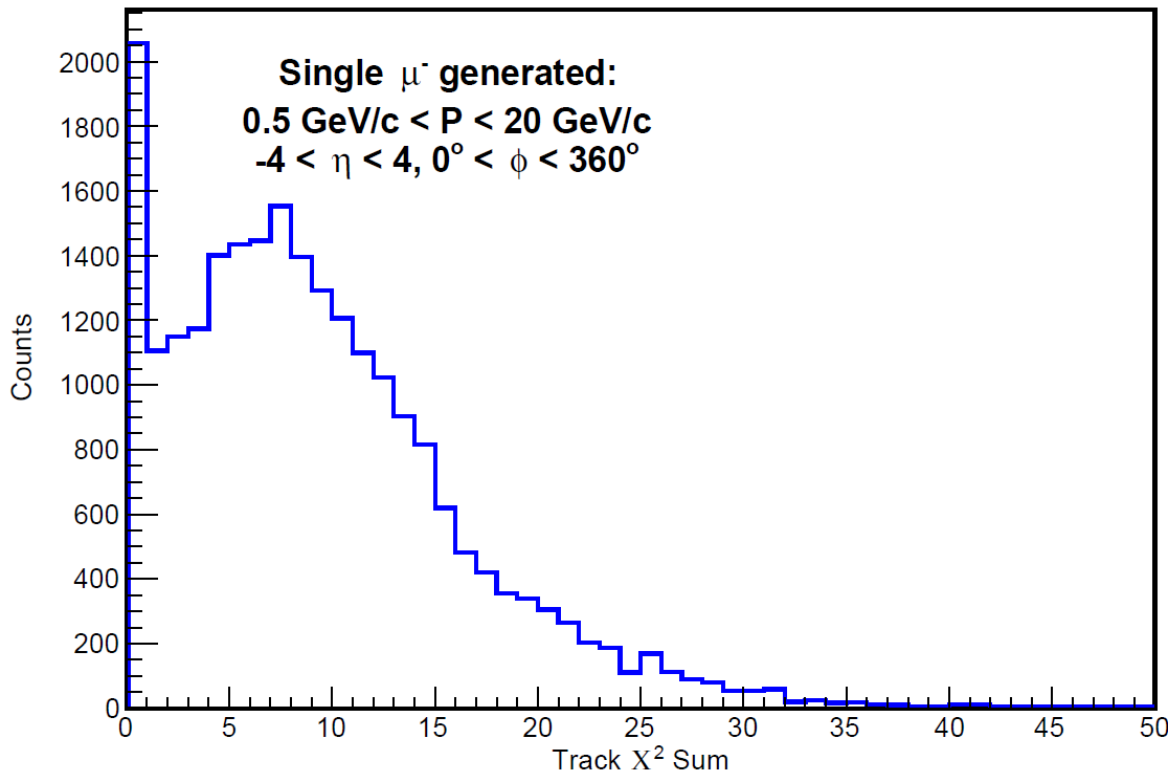


CKF

Track Momentum Resolution: $(\text{track} - \text{true})/\text{true}$



We have access to track quality information for future studies



Action items

1. More systematic studies of track efficiency/resolution with real seeds and CKF
2. Merging the track-qa branch into the main EICRecon branch. I can do this now, but I first want to create a user-controllable flag which allows the standard EICRecon TTree output to switch between truth and realistic seeding. If someone can help with this, that would be useful.
3. More studies on duplicated seeds/tracks. And of course with embedded background.