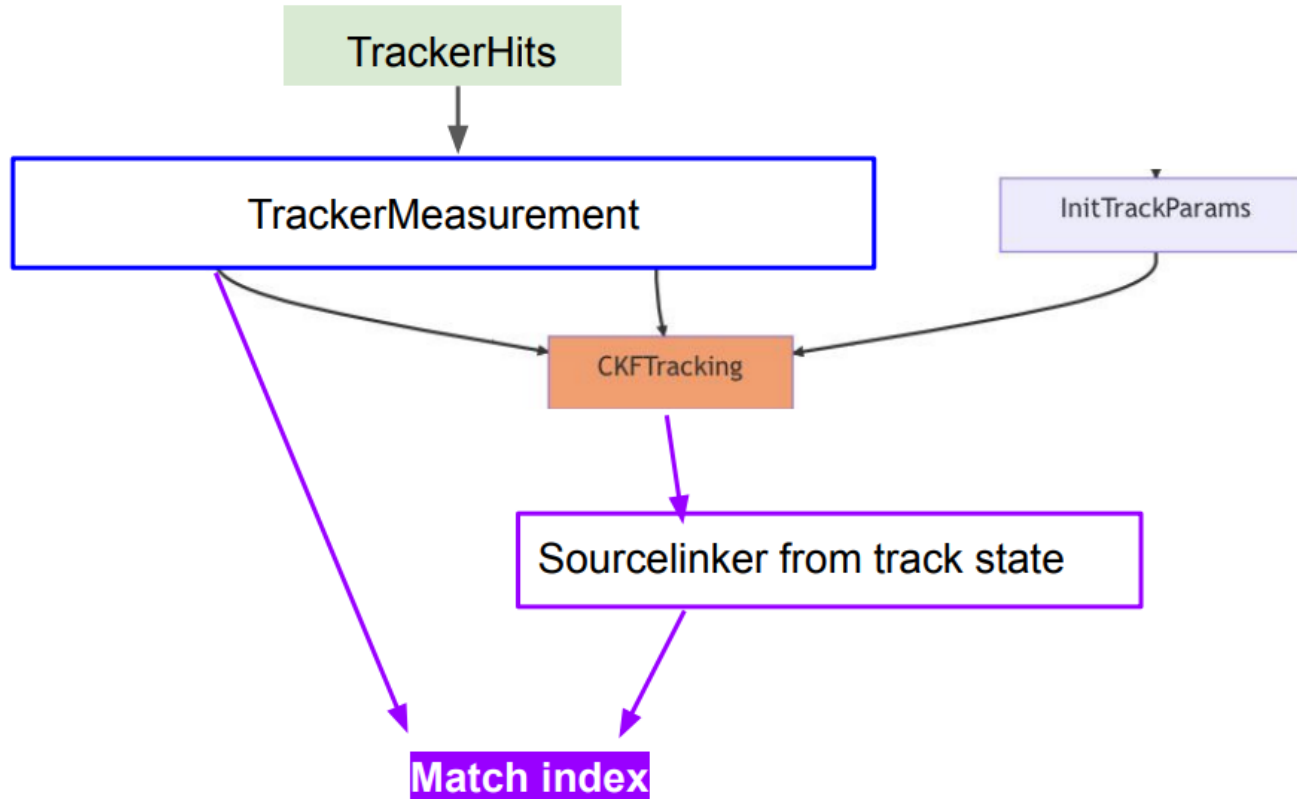


# Tracking updates

Barak Schmookler

# Tracker hits association to tracks



For a given track, this will provide the set of hits in the tracking detectors that were used in the track fit.

Some final tests of this update are ongoing. After that completes, it will be included in the standard reconstruction output.

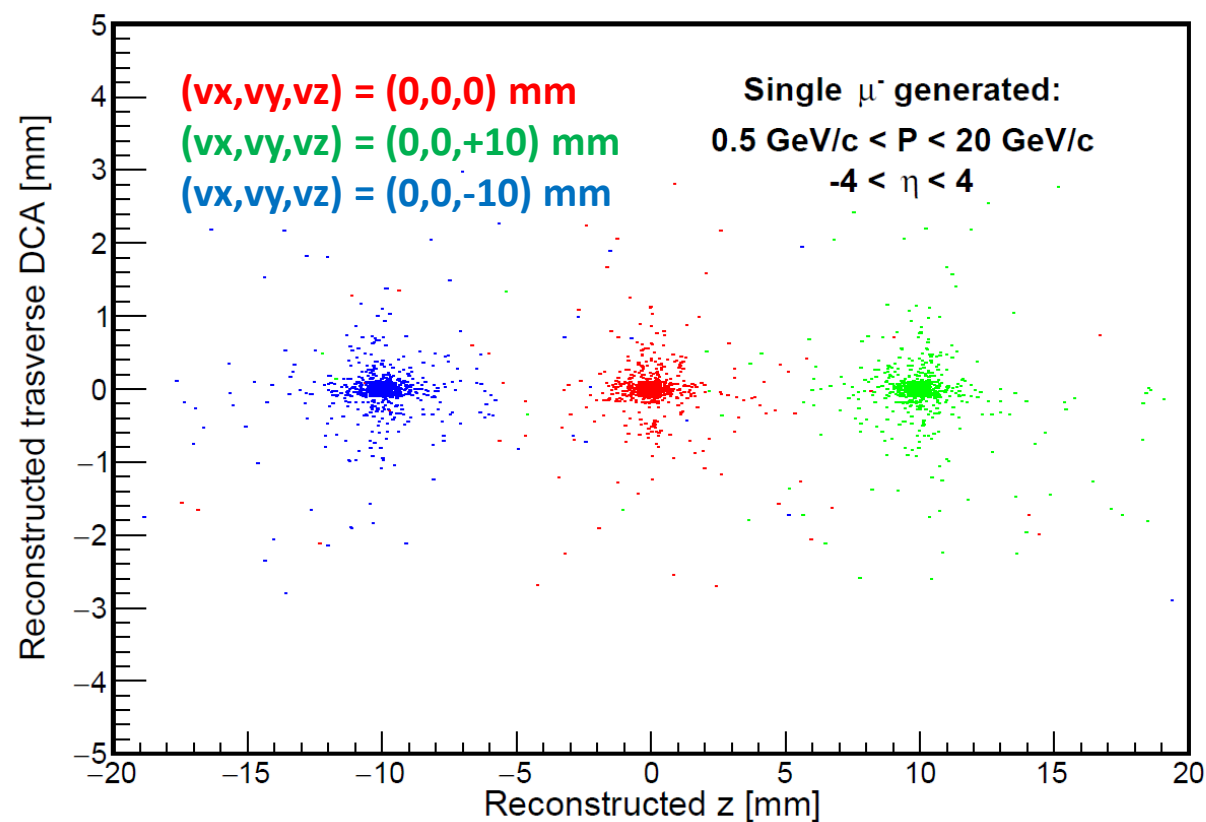
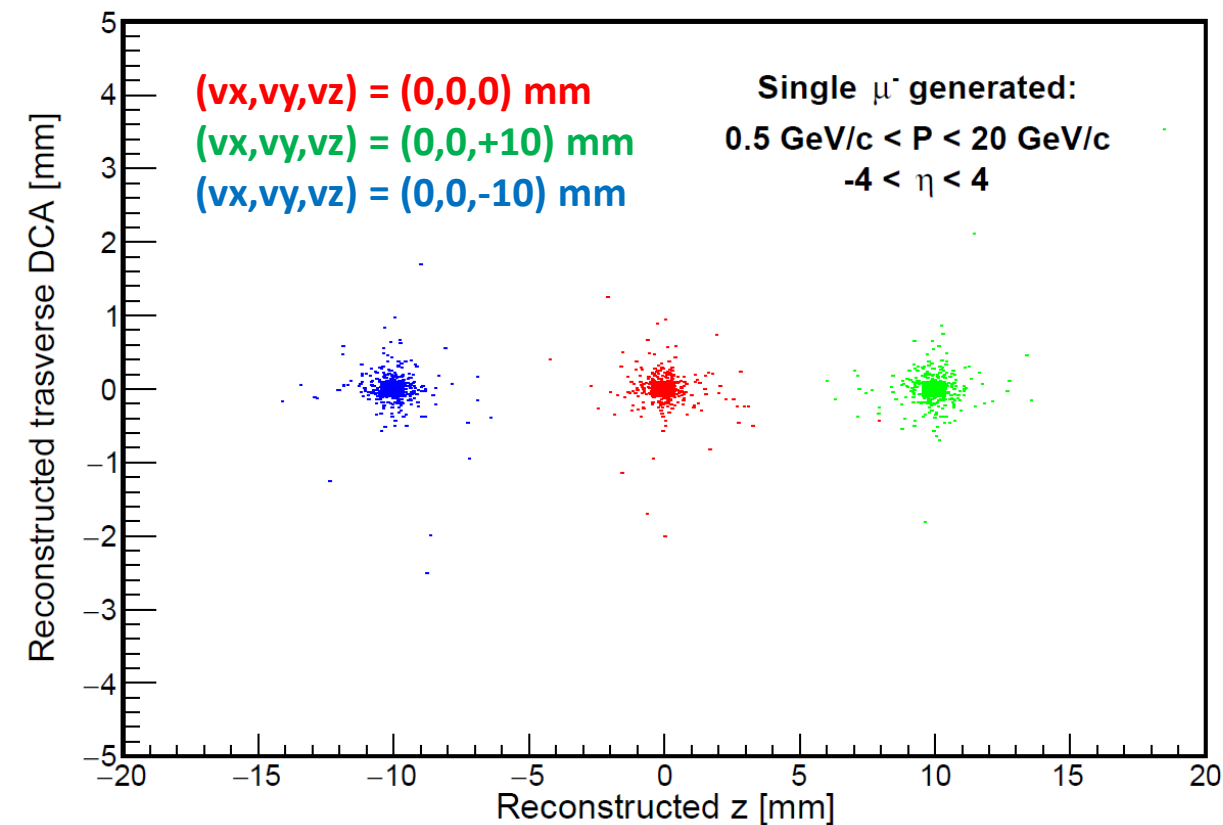
**Work by Shujie, Wouter, Dmitry, Minjung**

<https://indico.bnl.gov/event/20905/contributions/82204/attachments/50513/86389/Hits%20to%20trajectory%20relation.pdf>

# Single-particle 'vertex' (pointing) reconstruction

Truth-seeded tracking

Real-seeded tracking

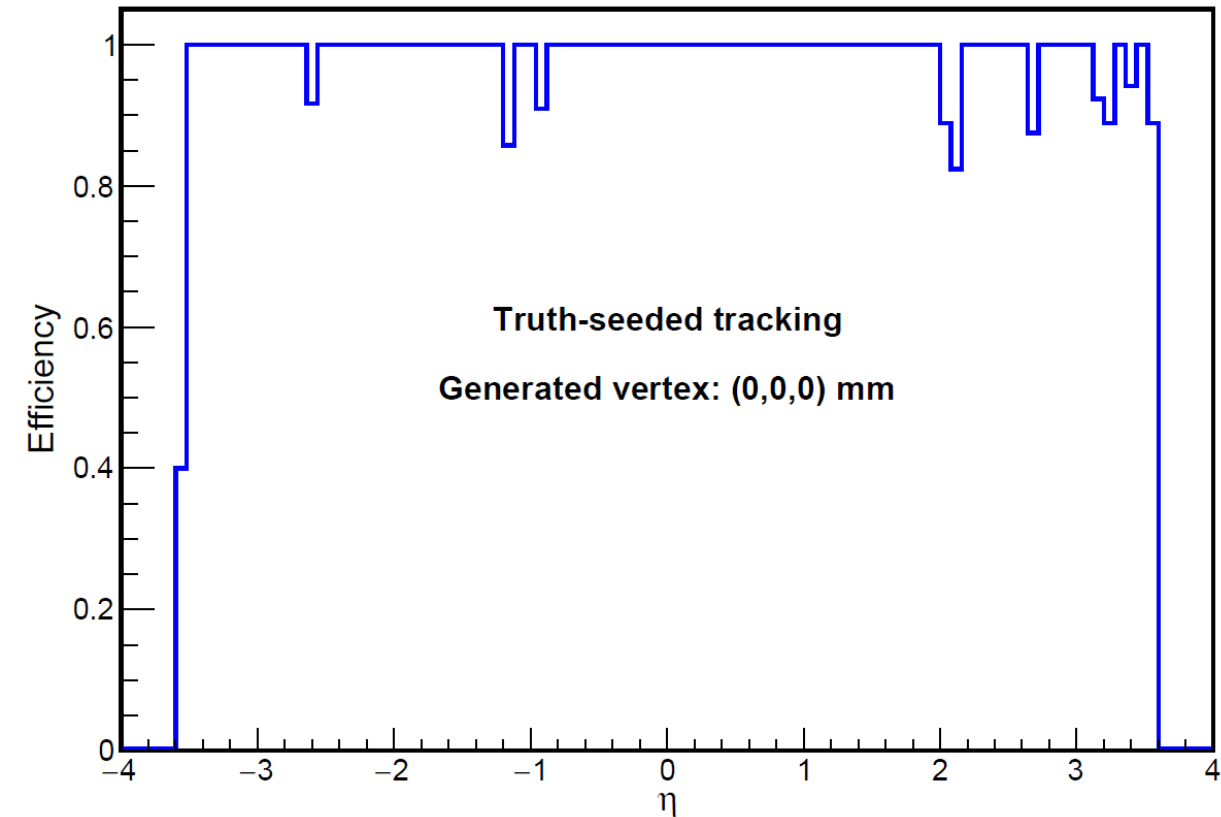


Reconstructed z: longitudinal impact parameter with respect to (0,0,0)

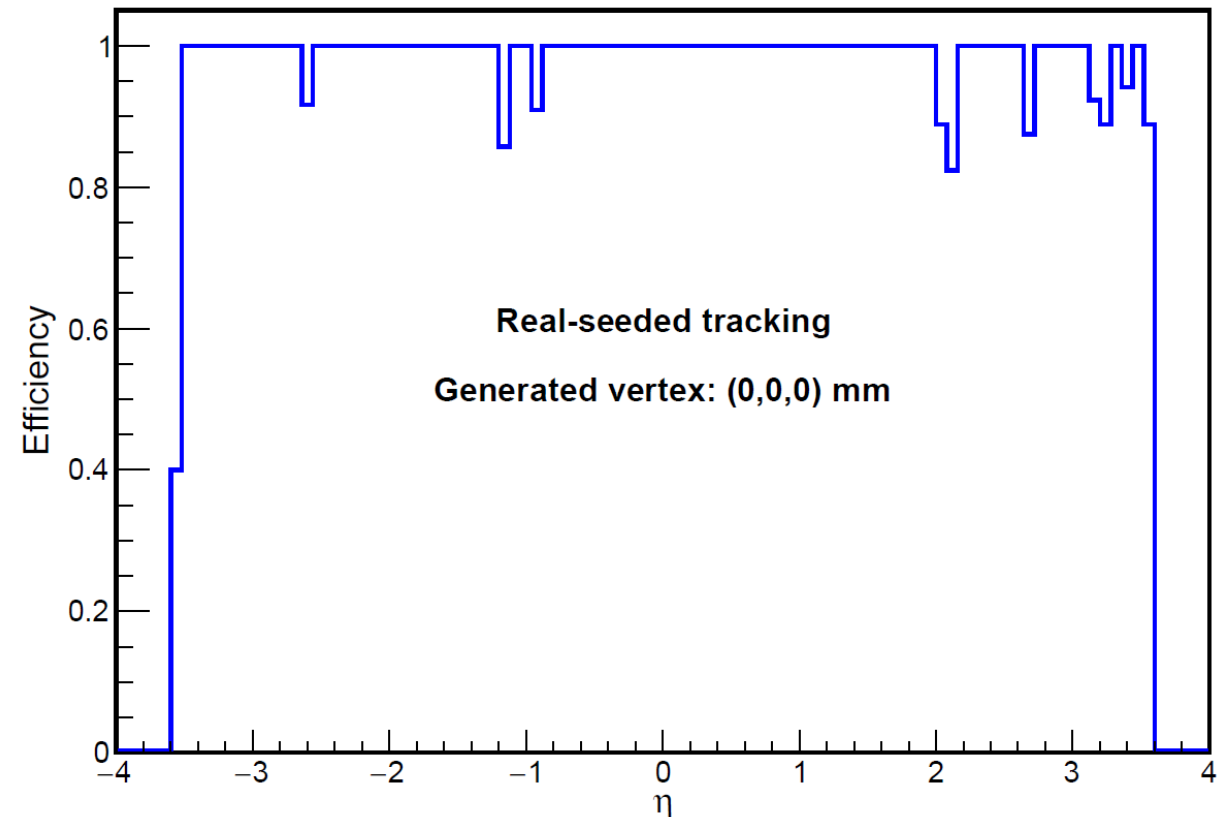
Reconstructed transverse DCA: transverse impact parameter with respect to (0,0,0)

# Single-particle 'vertex' (pointing) reconstruction

Tracker Efficiency vs. generated particle  $\eta$

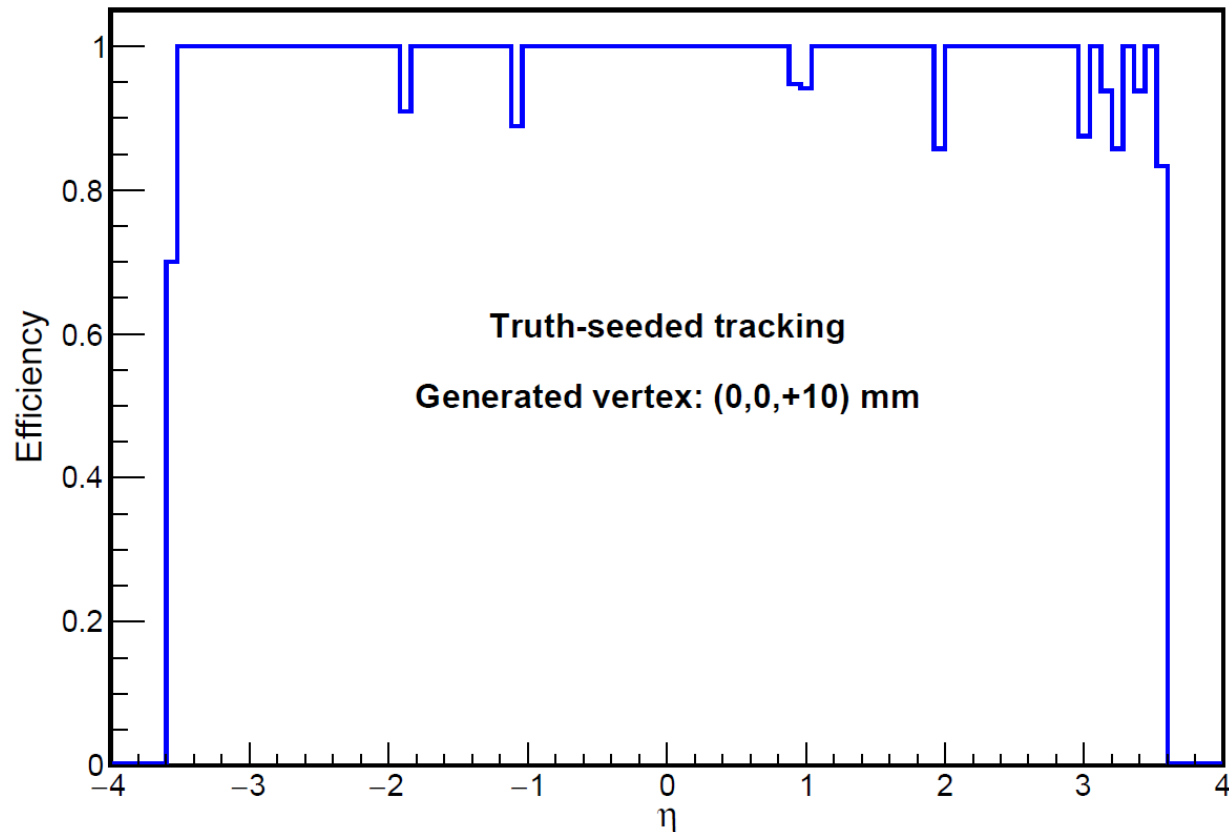


Tracker Efficiency vs. generated particle  $\eta$

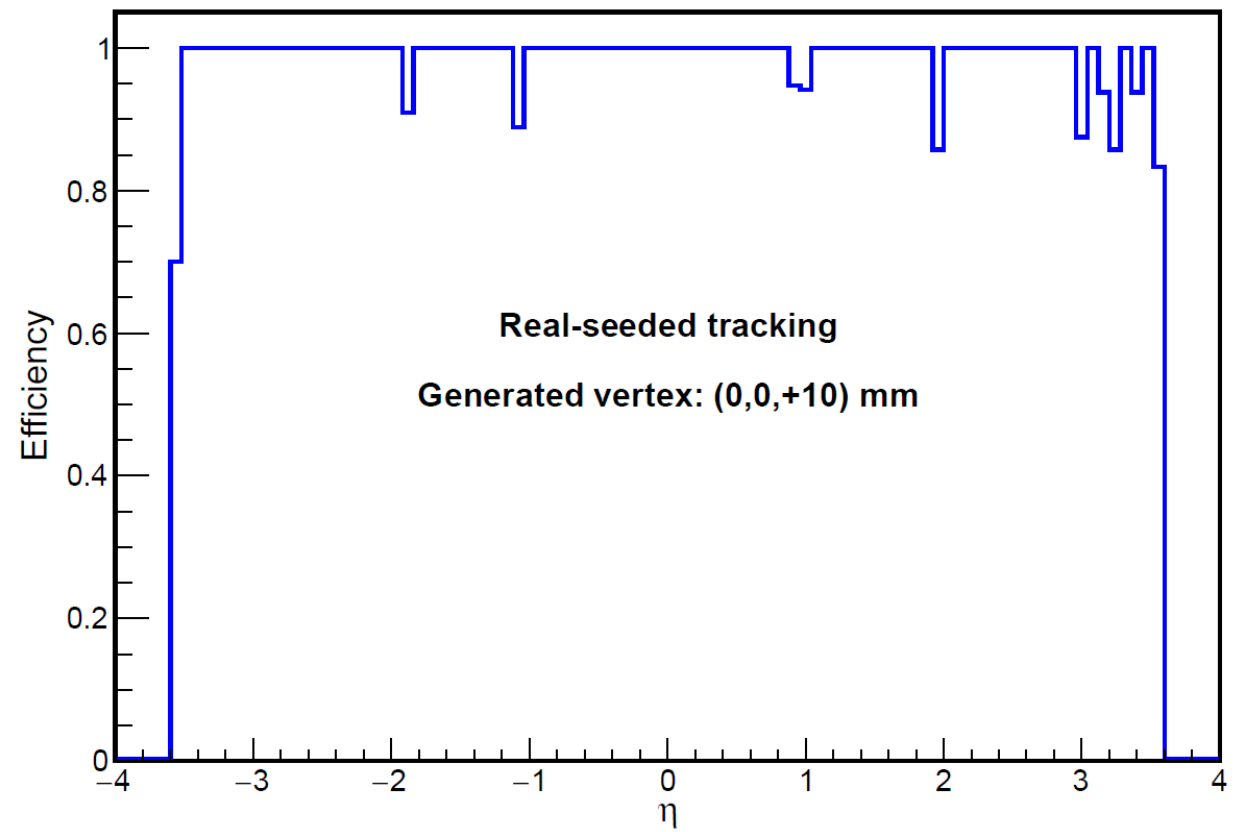


# Single-particle 'vertex' (pointing) reconstruction

Tracker Efficiency vs. generated particle  $\eta$

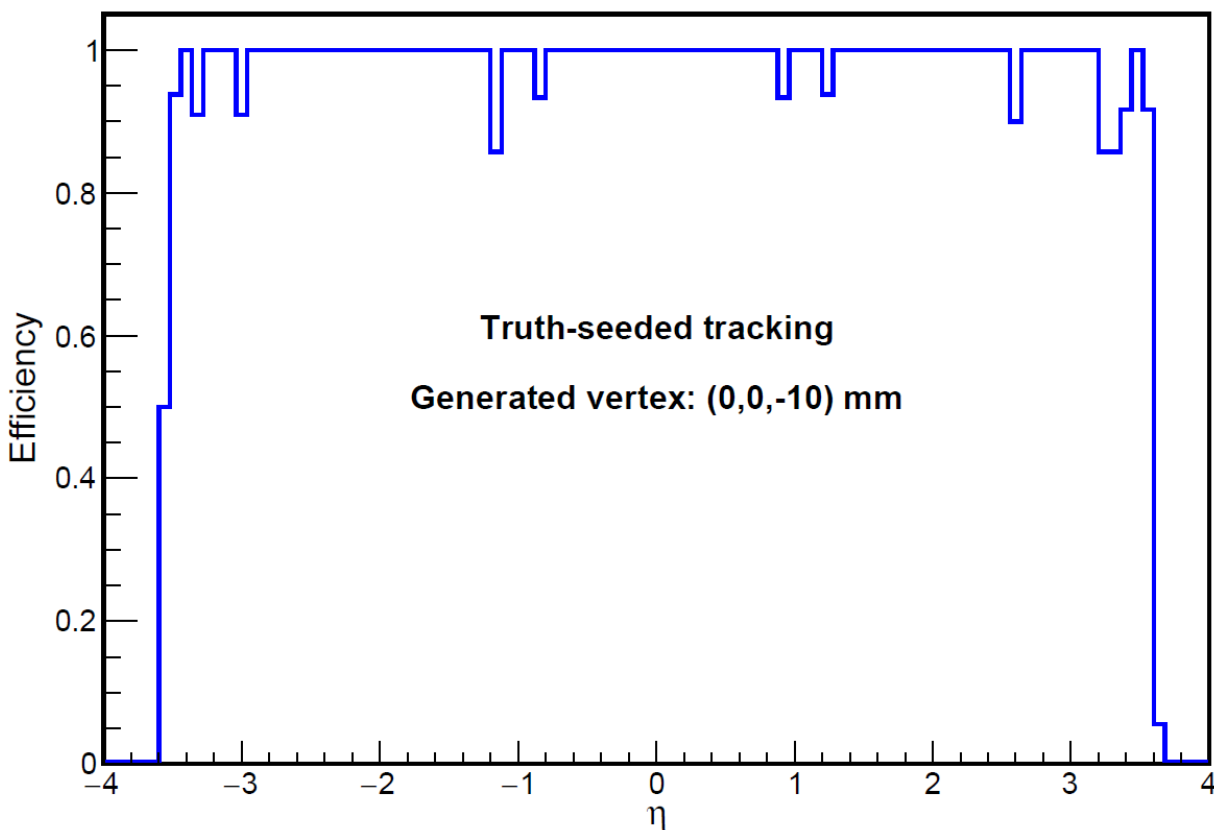


Tracker Efficiency vs. generated particle  $\eta$

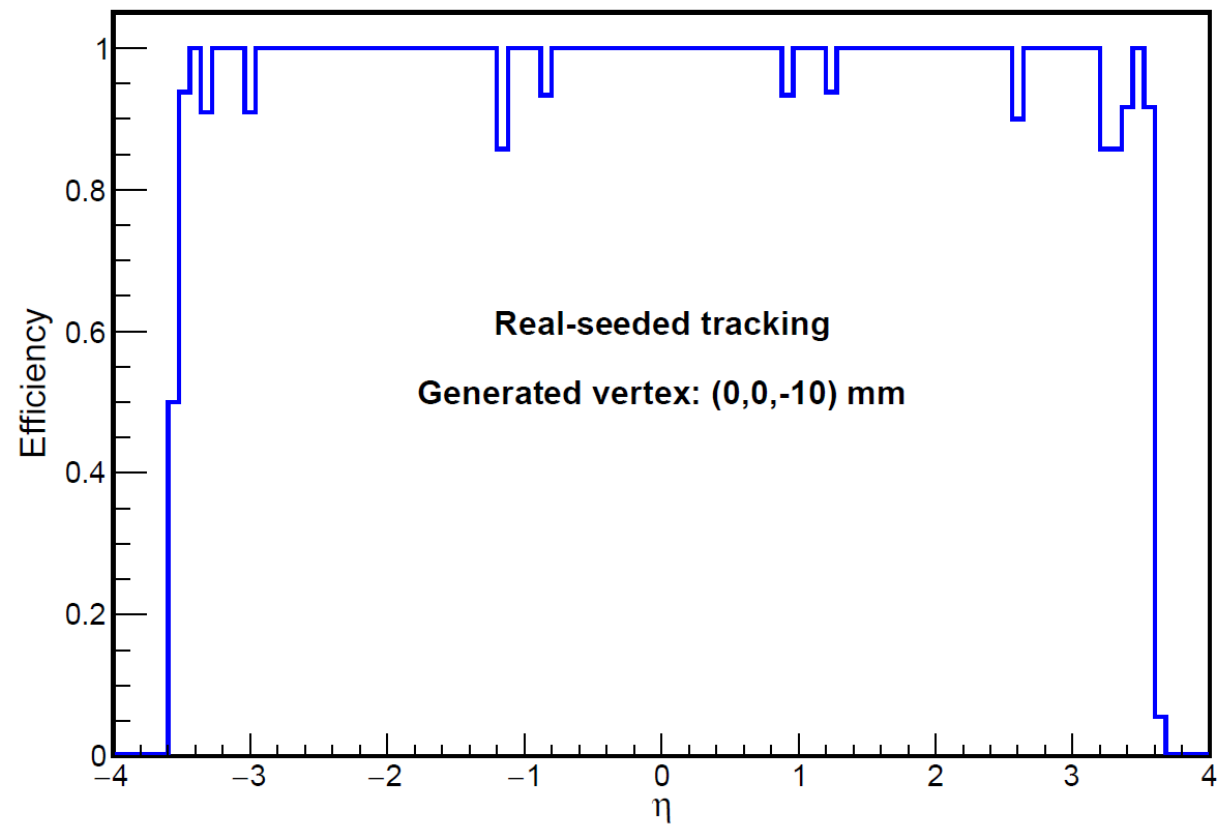


# Single-particle 'vertex' (pointing) reconstruction

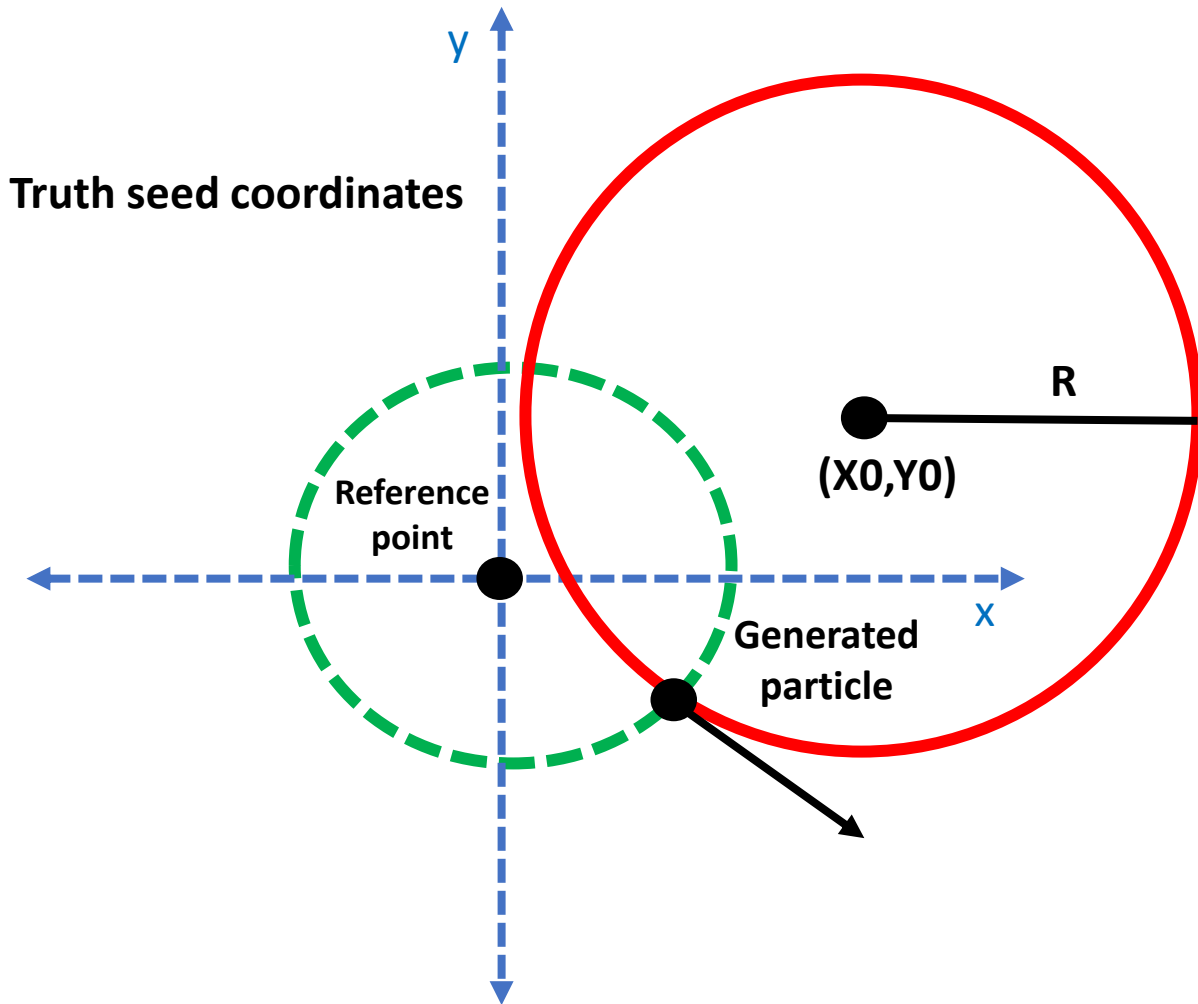
Tracker Efficiency vs. generated particle  $\eta$



Tracker Efficiency vs. generated particle  $\eta$



# What about particles generated off the beamline (i.e. secondary particles)?



## Real-seeded seed finder parameters

```
float m_sigmaScattering = 5; // How many standard devs of scattering angles to consider
float m_radLengthPerSeed = 0.1; // Average radiation lengths of material on the length of a seed
float m_minPt = (100. * Acts::UnitConstants::MeV) / m_cotThetaMax; // MeV (in Acts units of GeV) - min:
float m_bFieldInZ = 1.7 * Acts::UnitConstants::T; // T (in Acts units of GeV/[e*mm]) - Magnetic field :
float m_beamPosX = 0; // x offset for beam position
float m_beamPosY = 0; // y offset for beam position
float m_impactMax = 3. * Acts::UnitConstants::mm; // Maximum transverse PCA allowed
float m_bFieldMin = 0.1 * Acts::UnitConstants::T; // T (in Acts units of GeV/[e*mm]) - Minimum Magneti
float m_rMinMiddle = 20. * Acts::UnitConstants::mm; // Middle spacepoint must fall between these two r
float m_rMaxMiddle = 400. * Acts::UnitConstants::mm;
```

# Plan going forward

- Repeat single-particle studies discussed above with particle generated off z axis.
- If necessary, modify algorithm/parameters for truth- and real-seeded seed single-particle position ('vertex').
- Jeetendra and Barak are working on this.