



Update on Global Reconstruction with GENFIT

R. Zarrella

Global Reconstruction

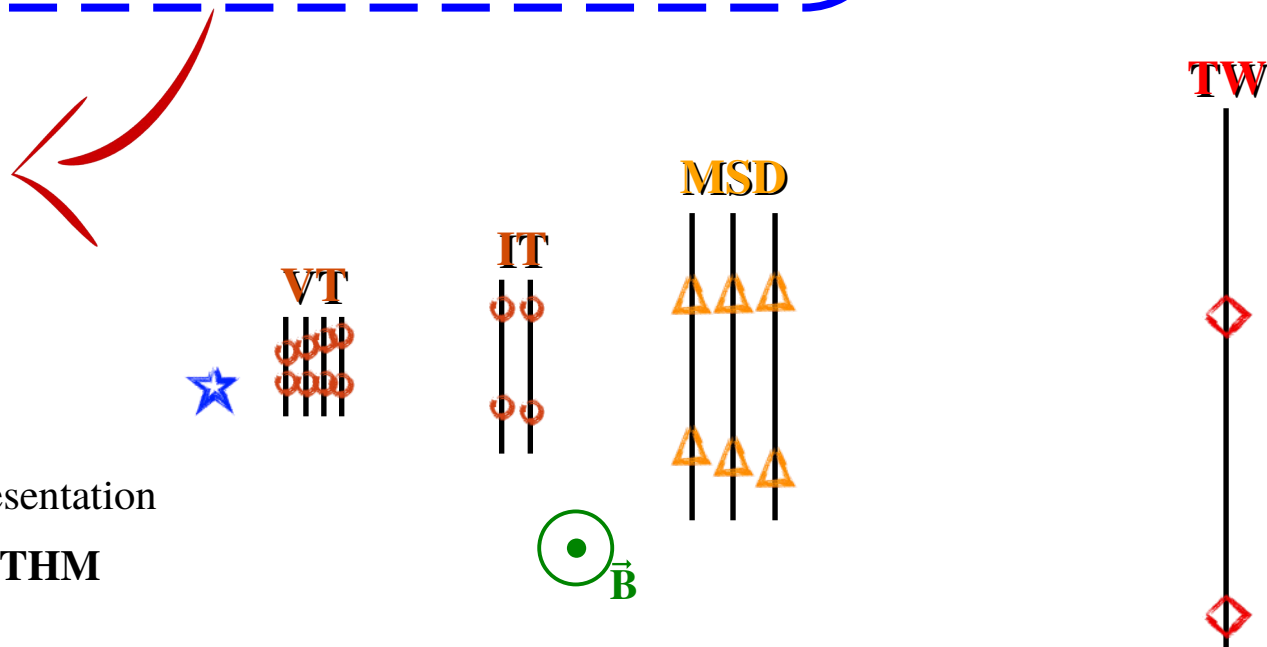


1) MC truth

2) “Standard”:

- Start from VT tracklets
- Linear projection to planes of IT
- RKN extrapolation to MSD
- RKN extrapolation to TW
- Possible Z from TW → track representation

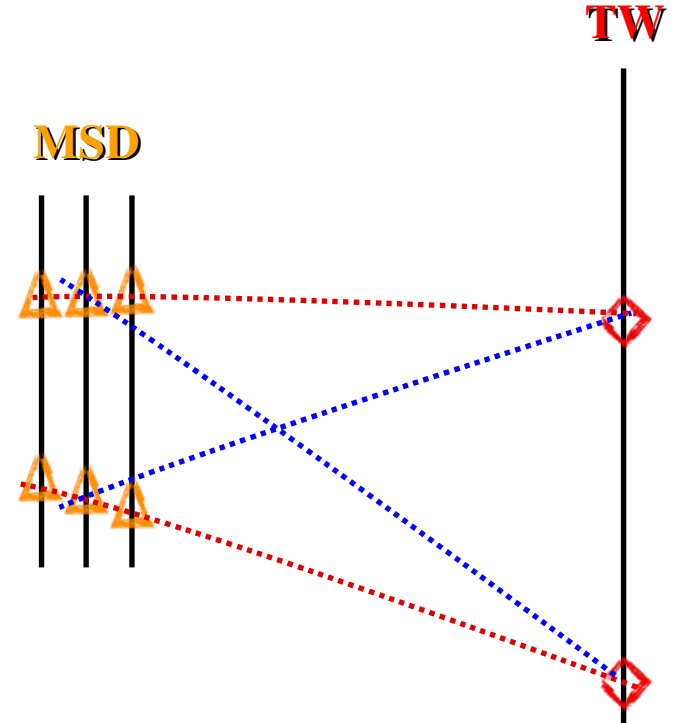
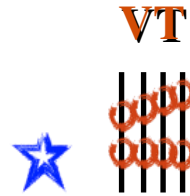
3) “Backtracking” → NEW ALGORITHM





Backtracking

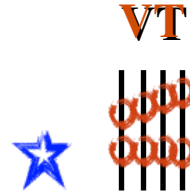
- Start from TW points and MSD clusters (1-D X or Y)
- Create all combinations TW-MSD center
- Extrapolate to other MSD planes and add closest clusters
- Seed state $\rightarrow Z, \beta$ from TW
 $\rightarrow A$ from main isotope



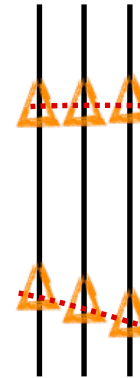


Backtracking

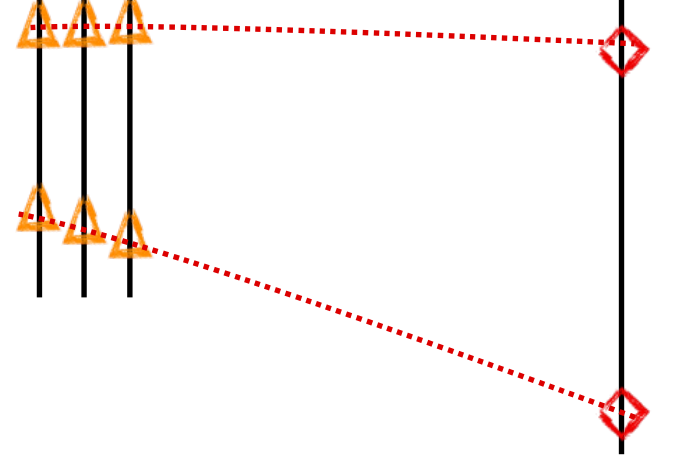
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- Seed state $\rightarrow Z, \beta$ from TW
 $\rightarrow A$ from main isotope
- 1st track prefit



MSD



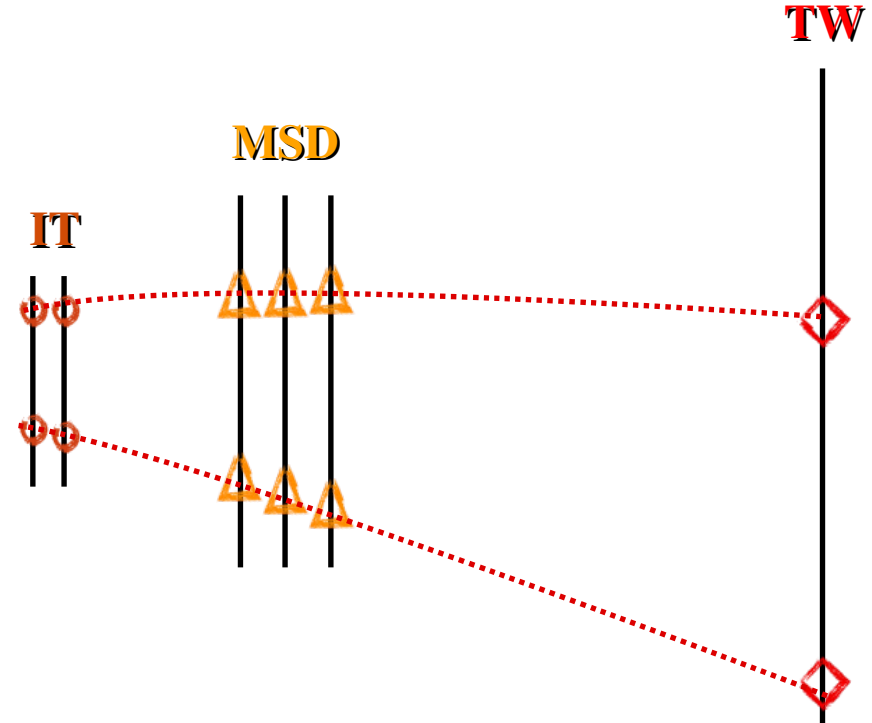
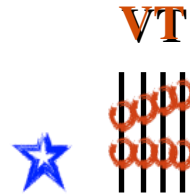
TW





Backtracking

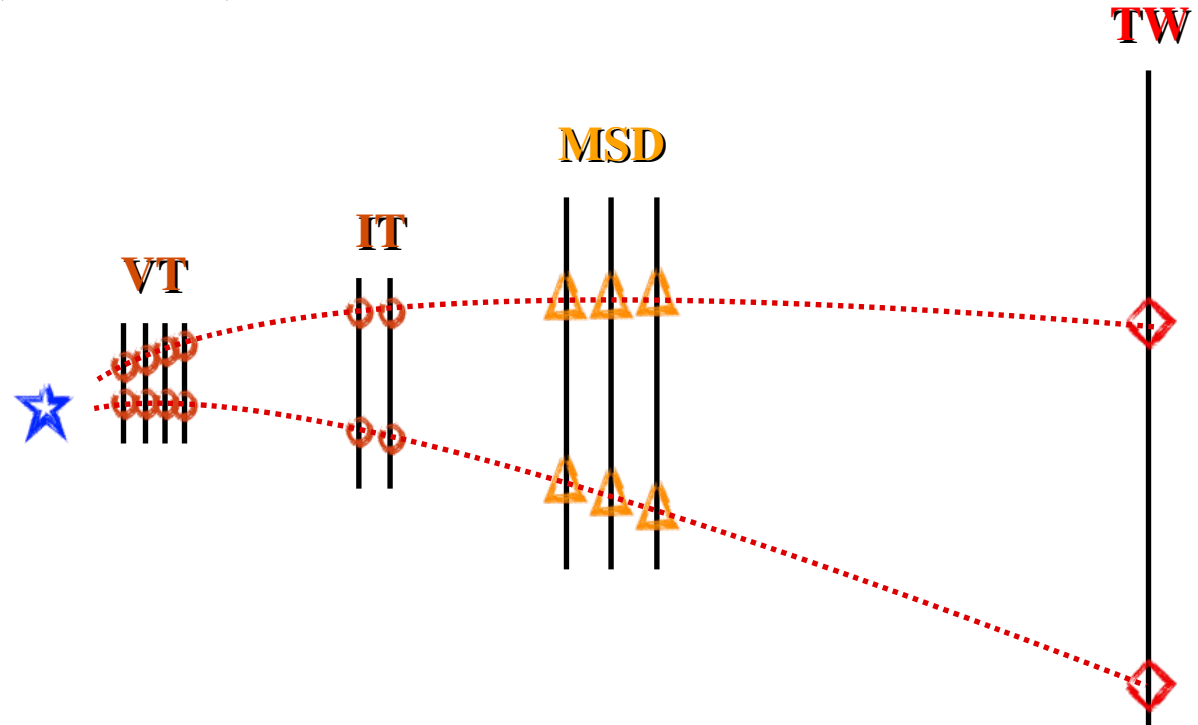
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- Create all combinations TW-MSD center
- Extrapolate to other MSD planes and add closest clusters
- Seed state $\rightarrow Z, \beta$ from TW
 $\rightarrow A$ from main isotope
- 1st track prefit
- RKN extrapolation to IT
- 2nd track prefit





Backtracking

- Start from TW points and MSD clusters (1-D X or Y)
- Create all combinations TW-MSD center
- Extrapolate to other MSD planes and add closest clusters
- Seed state $\rightarrow Z, \beta$ from TW
 $\rightarrow A$ from main isotope
- 1st track prefit
- RKN extrapolation to IT
- 2nd track prefit
- RKN extrapolation to VT
- 3rd track prefit
- Fit remaining track candidates





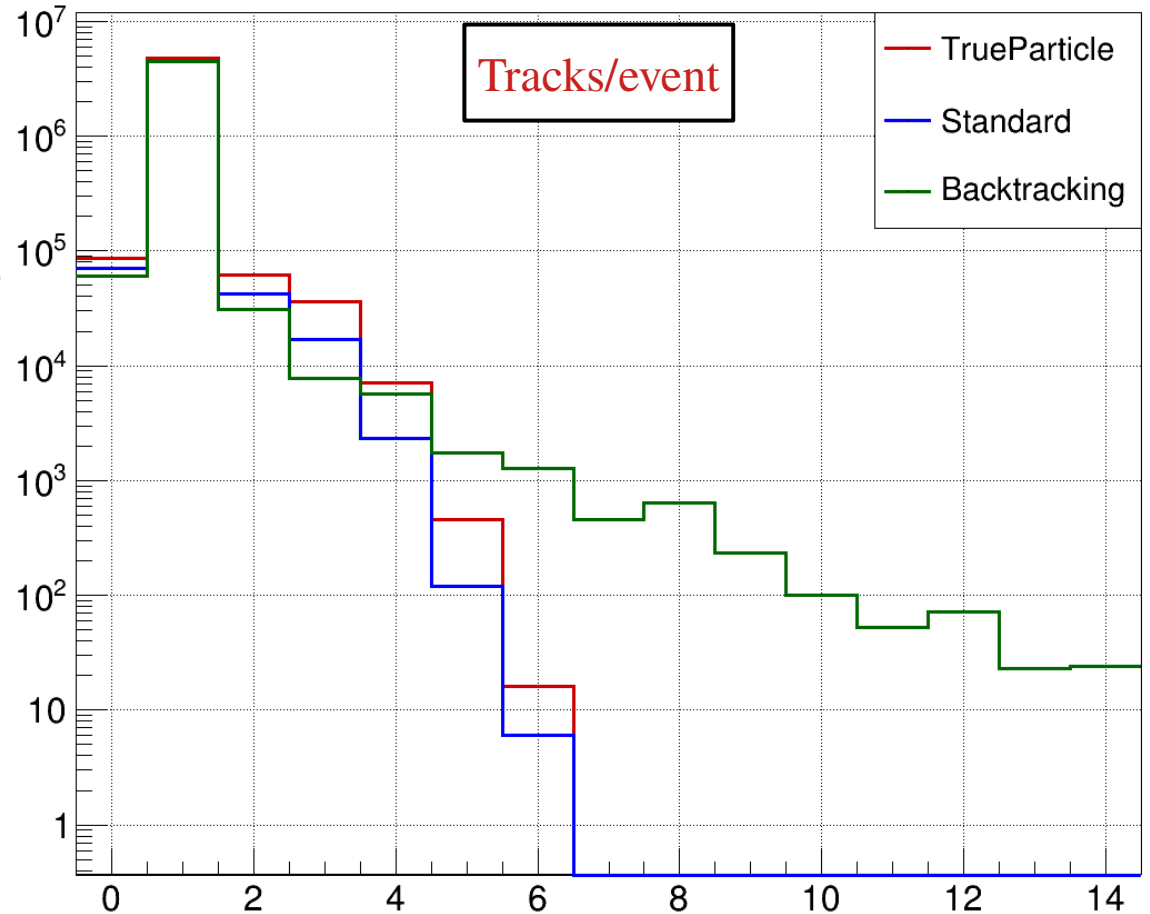
Global Reconstruction

- Test w/ 12C_200_2023v2 campaign
 - Full setup C @ 200 MeV/u + C
 - 5 Mevts
- Fast “comparison” btw selection algorithms
 - angle and mass reconstruction (p , β)

Caveat → Z id was not working

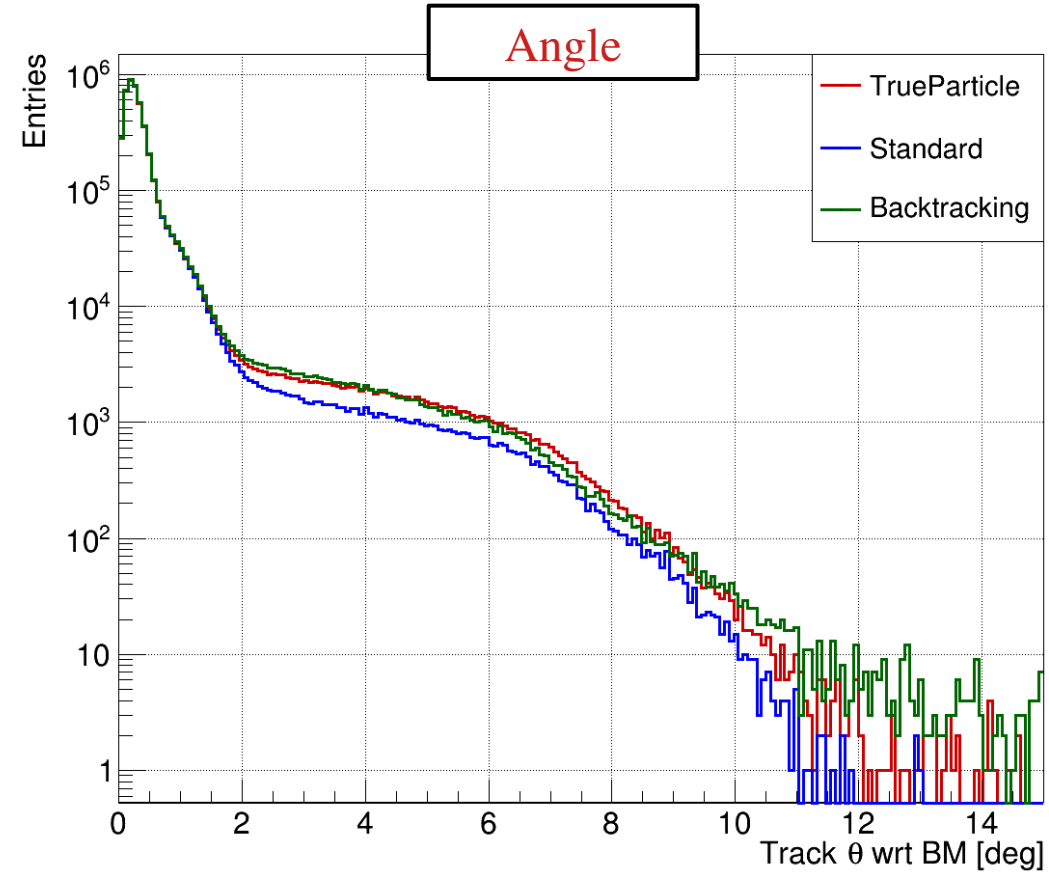
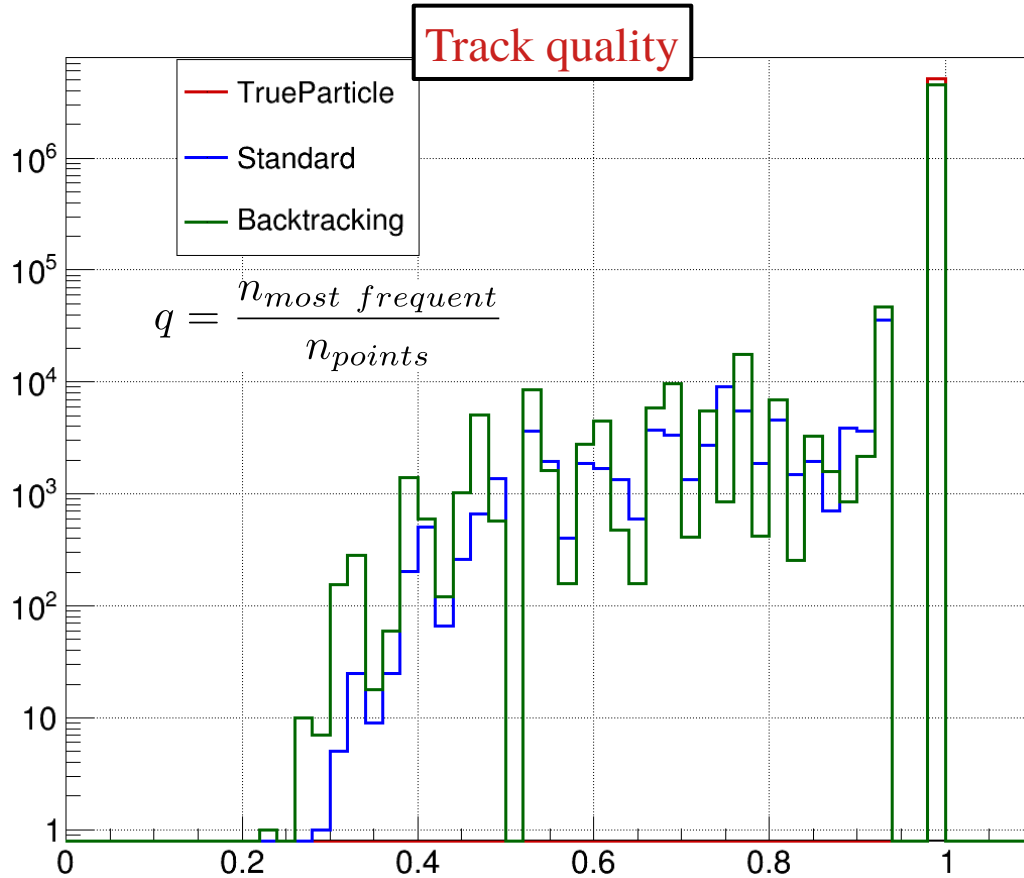
- *Fit w/ value from TW (wrong)*
- *Correct w/ most frequent Z (MC)*

$$p_{corr} = p_{fit} \cdot Z_{MC} / Z_{fit}$$



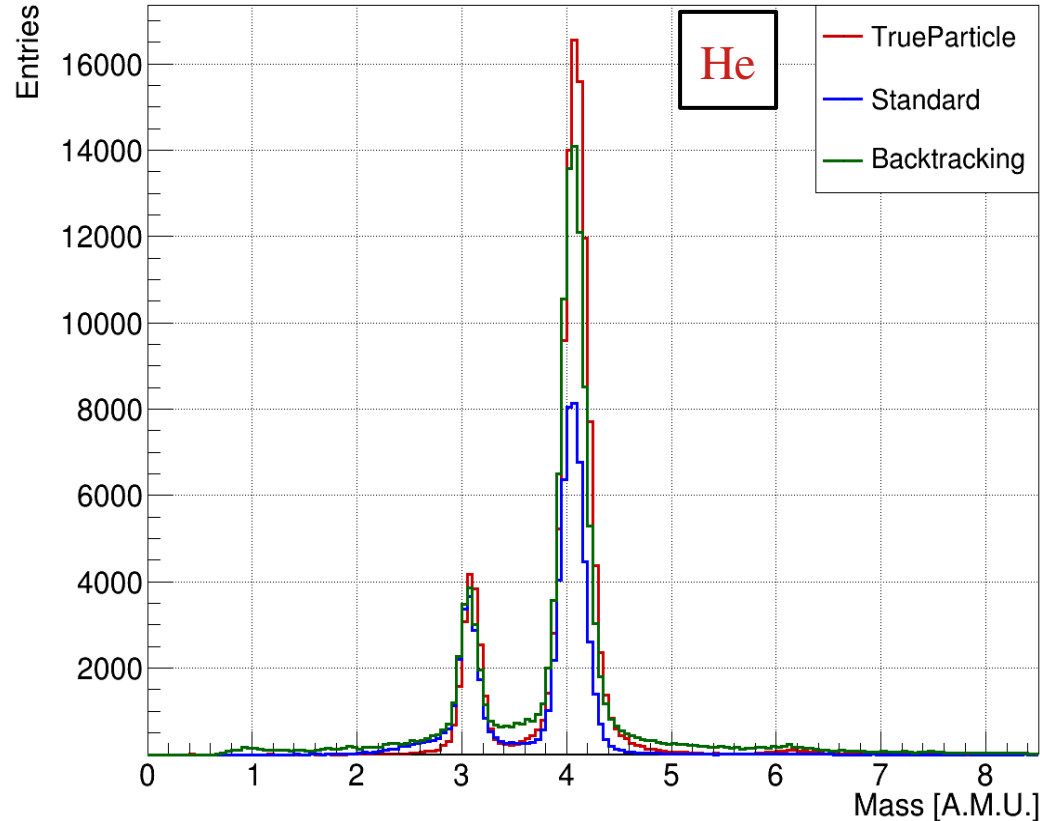
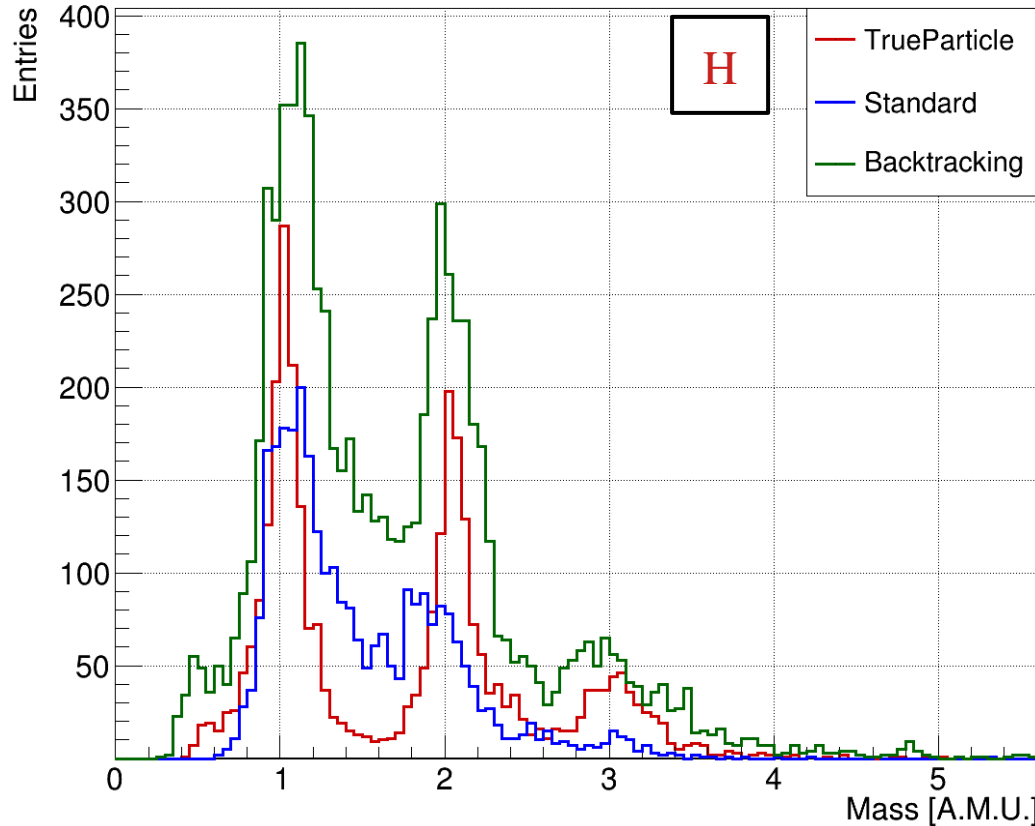


Global Reconstruction



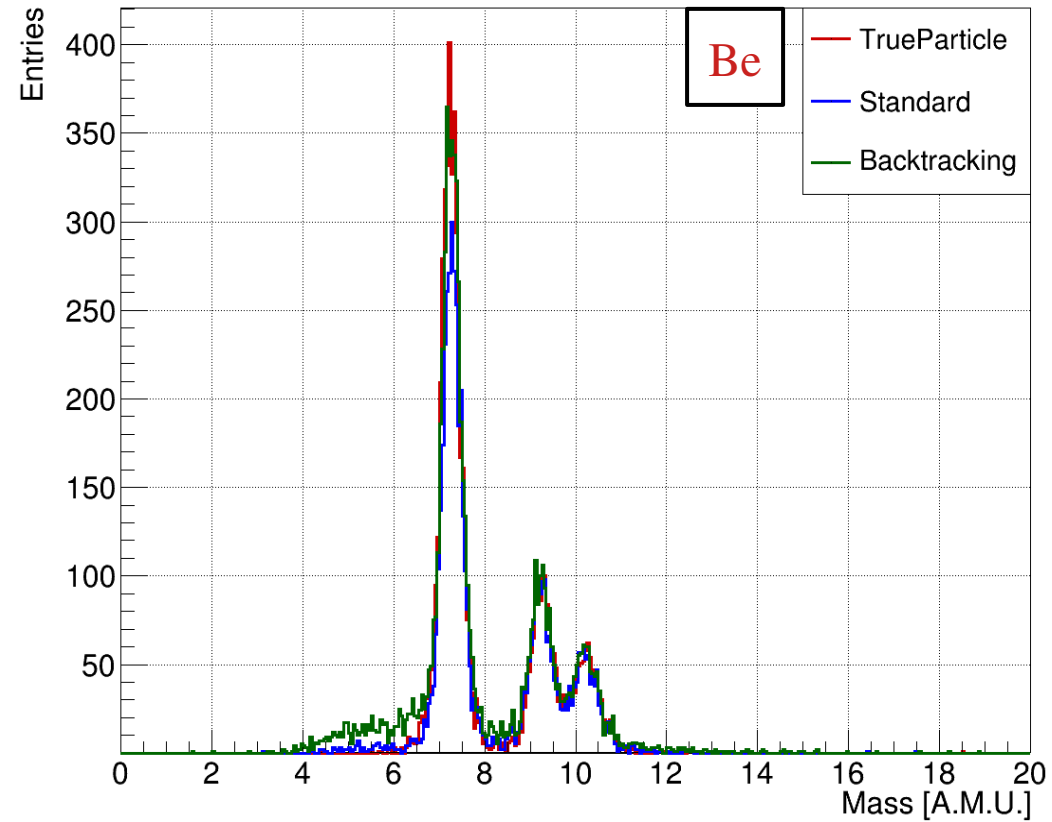
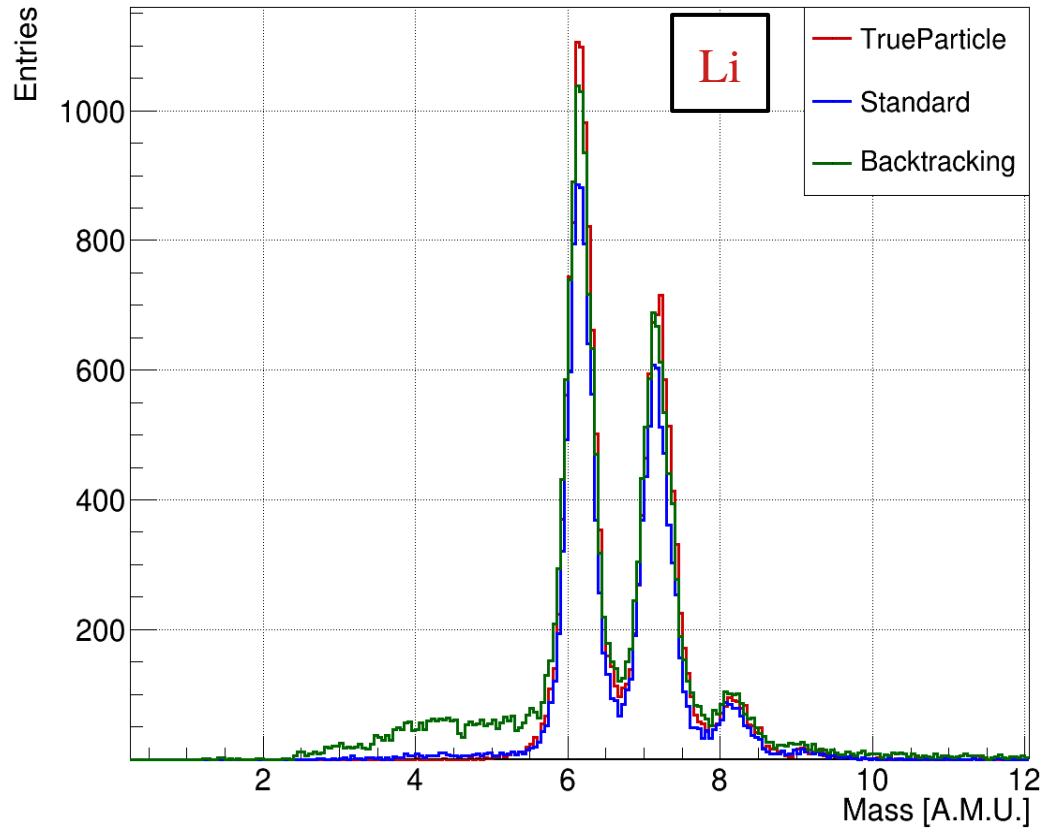


Global Reconstruction – mass reconstruction

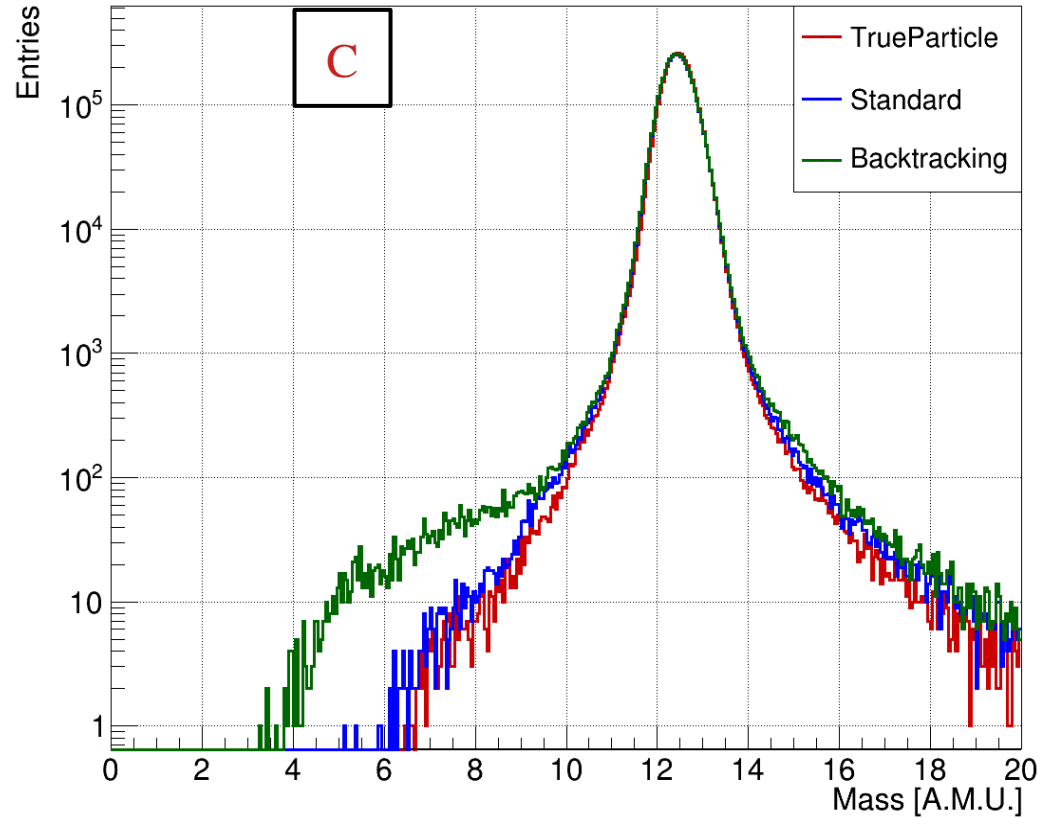
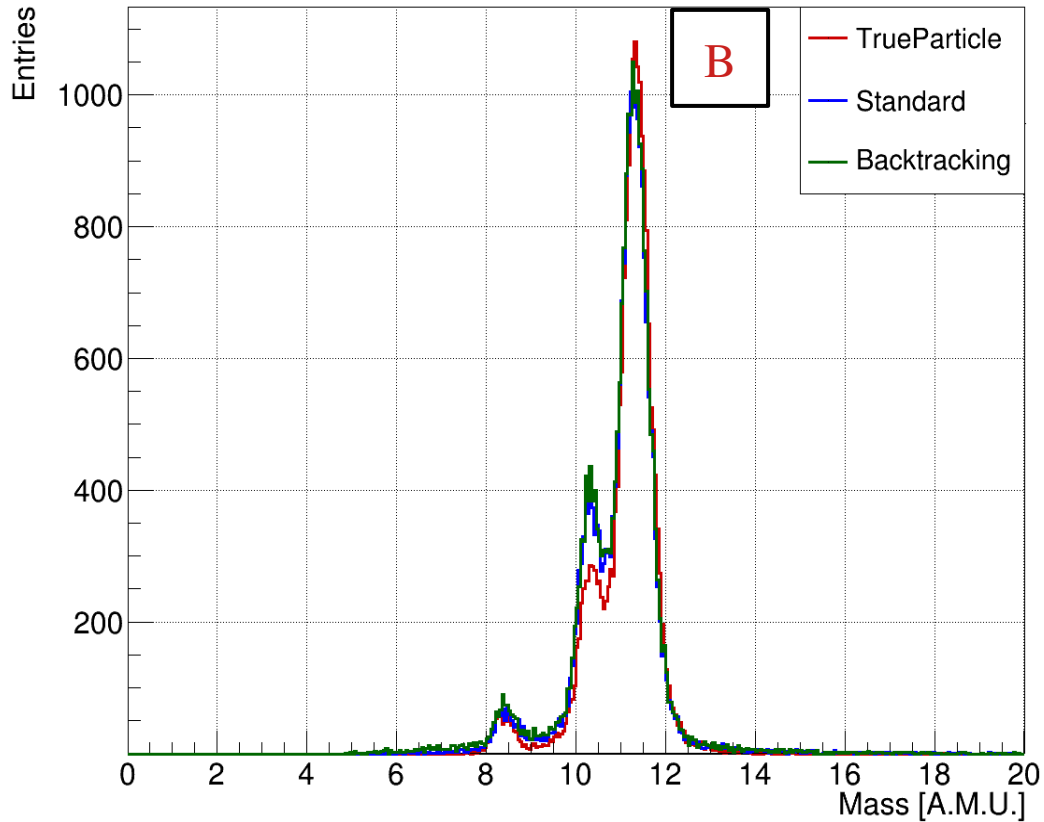




Global Reconstruction – mass reconstruction



Global Reconstruction – mass reconstruction



Conclusions



New tracking algorithm!

- Start from TW (lowest multiplicity)
- Better hypothesis for extrapolation seed $\rightarrow Z, \beta$ available
- Works on any dataset w/ MSD and TW (VT and IT not *strictly* needed)
- Implemented in newgeom
- High multiplicity at low $Z \rightarrow$ to be checked
- Comparison w/ other algorithms ongoing



Real output of track fitting is $p(Z_{\text{fit}})$ not $p!! \rightarrow$ Correct if needed!

Good news is... fit results do not strongly depend on a correct Z hypothesis

*Maybe add rigidity (p/Z)
to SHOE output?*