



# Update on reconstruction with Genfit

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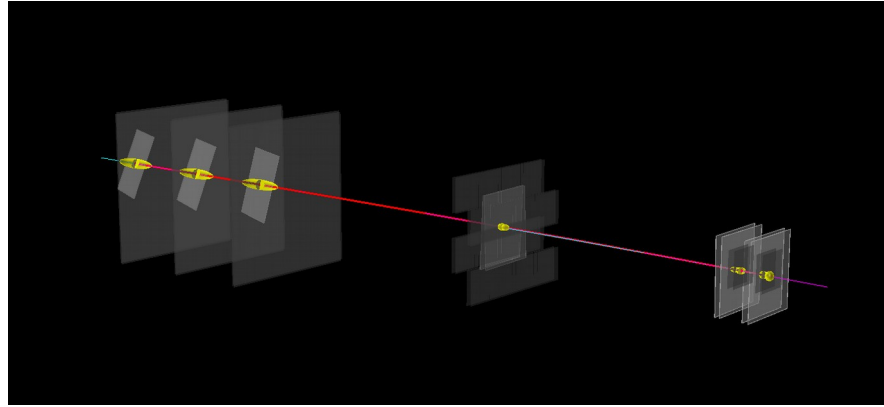
# Genfit package

Genfit is an experiment- independent modular framework for track-fitting and other related tasks

Genfit allows forward/backward Kalman filter, extrapolation and propagation in a magnetic field

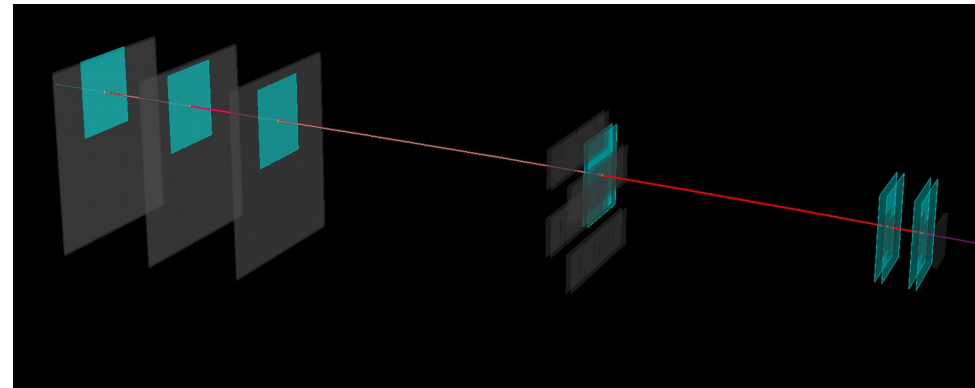
Genfit is included in SHOE

# New measurement handling

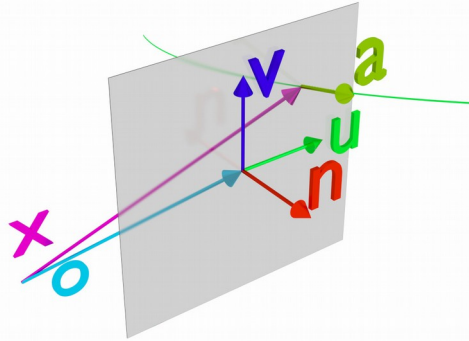


**Spacepoint** measurement,  
good for >2D detectors

**Planar** measurement, good  
for 1D and 2D silicon  
detectors



# Representation of the track



With planar measurements useful to use the distance along the track  $\mathbf{s}$  as free parameter, and then give the values:

$$(q/p, u, v, u', v')$$

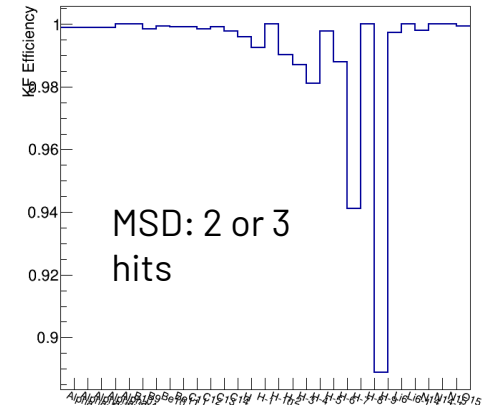
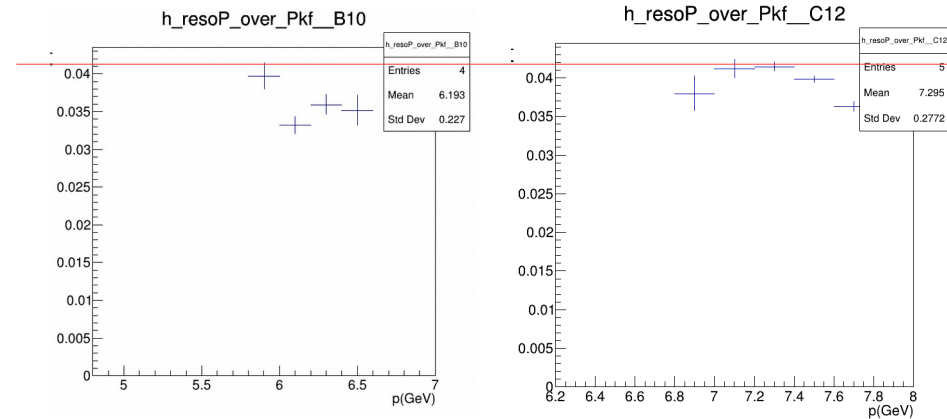
$u, v$  coordinates of the plane

$u', v'$  projections of the direction of momentum on the coordinate axes

# Track fitting and finding

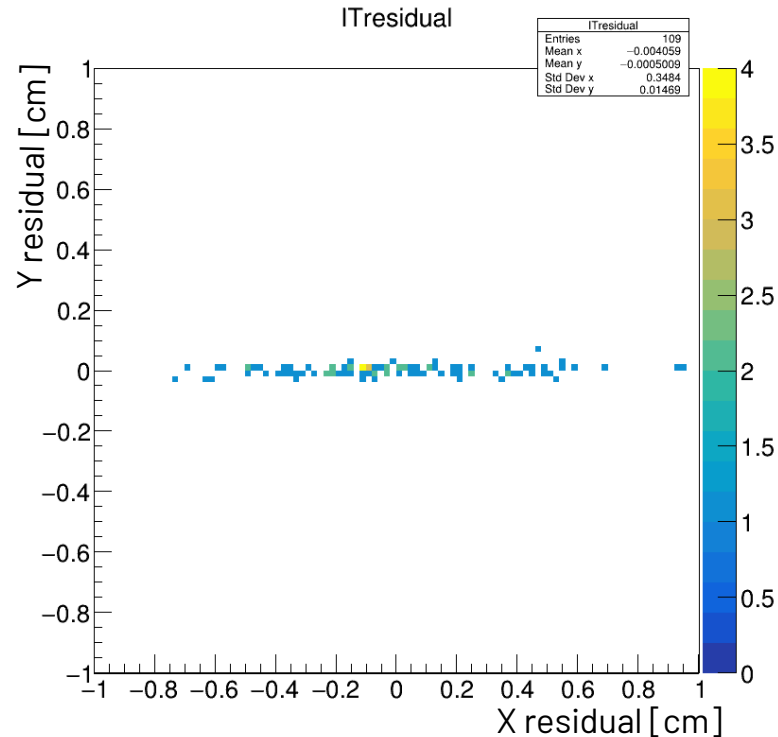
Track fitting with Genfit is well-established,  $p$  resolution  $\sim 4\%$ , fit efficiency with truth matching  $\sim 1$

Track finding is ongoing (next slides)



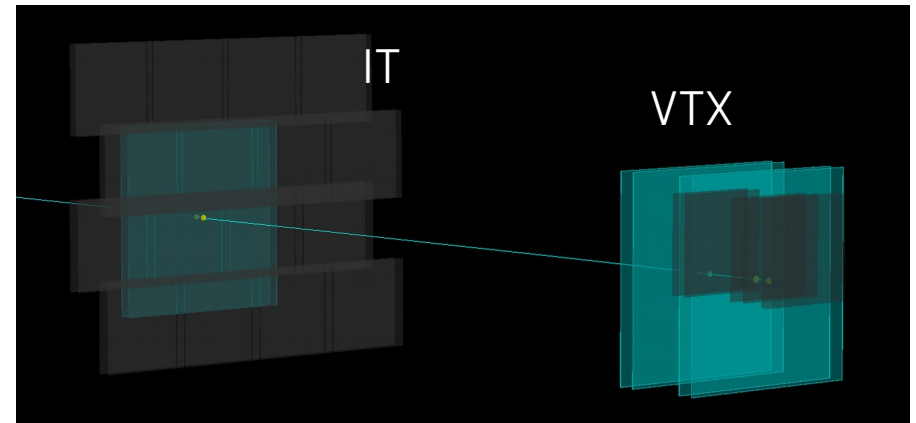
# Track finding strategy

- 1) Take all tracks found in the vertex
- 2) Project them with a line to IT position
- 3) Calculate residual with clusters on IT
- 4) Add IT cluster



At this step no information about particle type (only TW can be checked)

YZ “no-(less) bending” plane  
XZ bending plane



# Track finding strategy

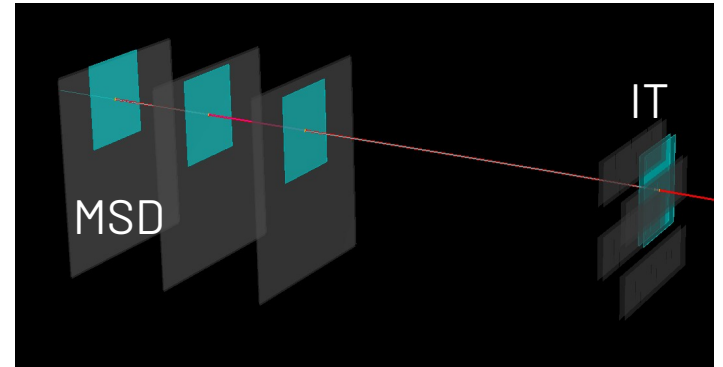
Now extrapolation to MSD has to be done

After the IT clusters insertion we have more “information” also about the bending, i.e.  $q/p$

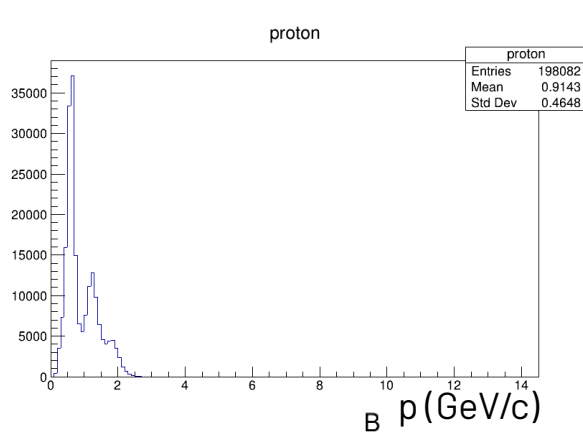
1) Runge-Kutta extrapolation

2) Calculate residual with points on MSD

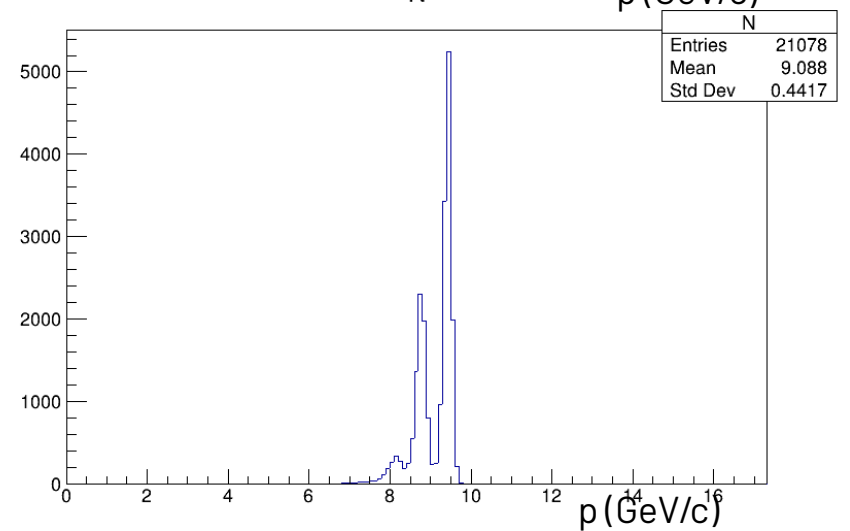
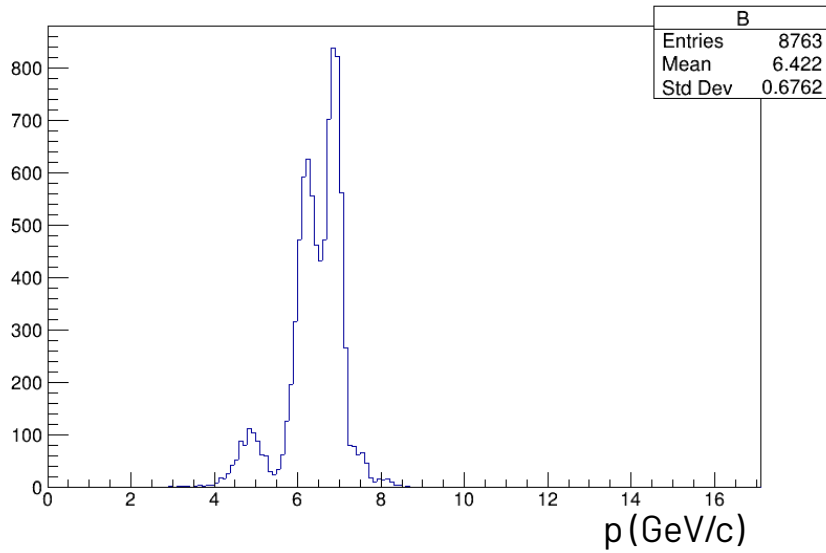
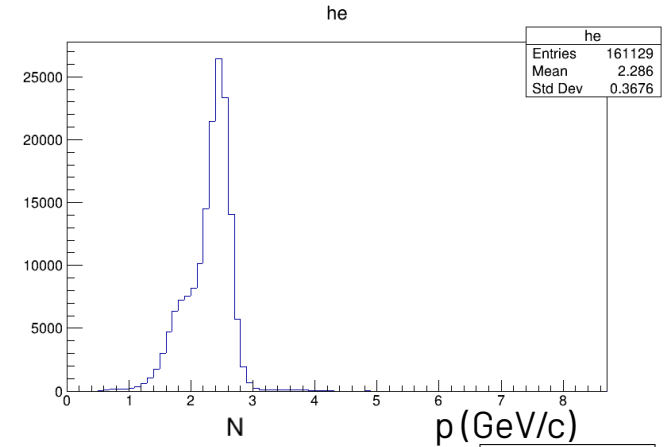
Main issues: starting value for momentum and particle type



# Momentum distribution in MC



particles  
surviving at  
MSD



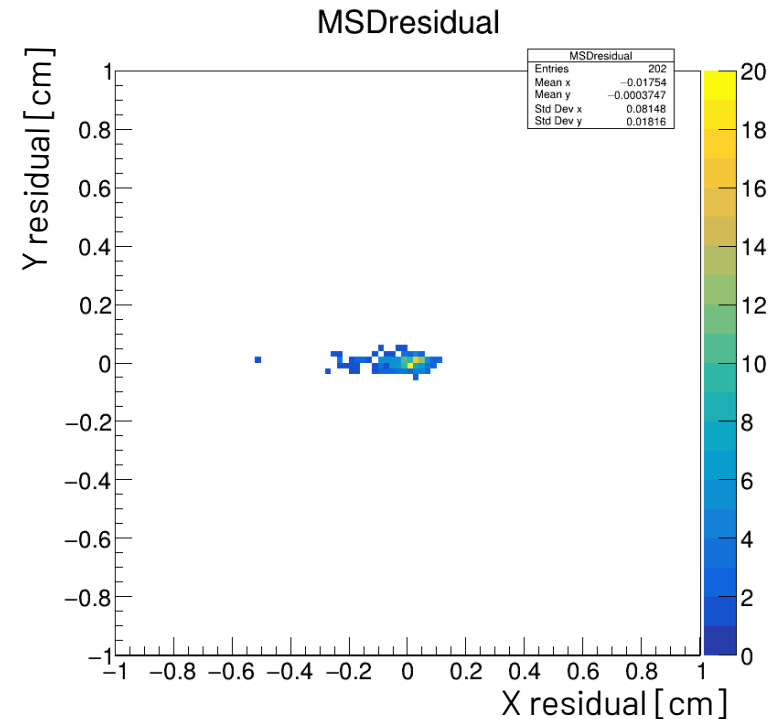


# MSD extrapolation

Choose a “mean” particle (such as a 6 GeV/c Boron) and extrapolate to MSD

Energy loss is not well taken into account, no problem for multiple scattering

Get charge information from TW (to be done, also with new Z id methods)



# Conclusions

Algorithms, geometry, correct measurements handling are set in place

implementing TW information from the beginning

studies on reconstruction efficiency, ghosts, clones ongoing

test MSD considering two 1D measurements instead of one 2D measurement per station