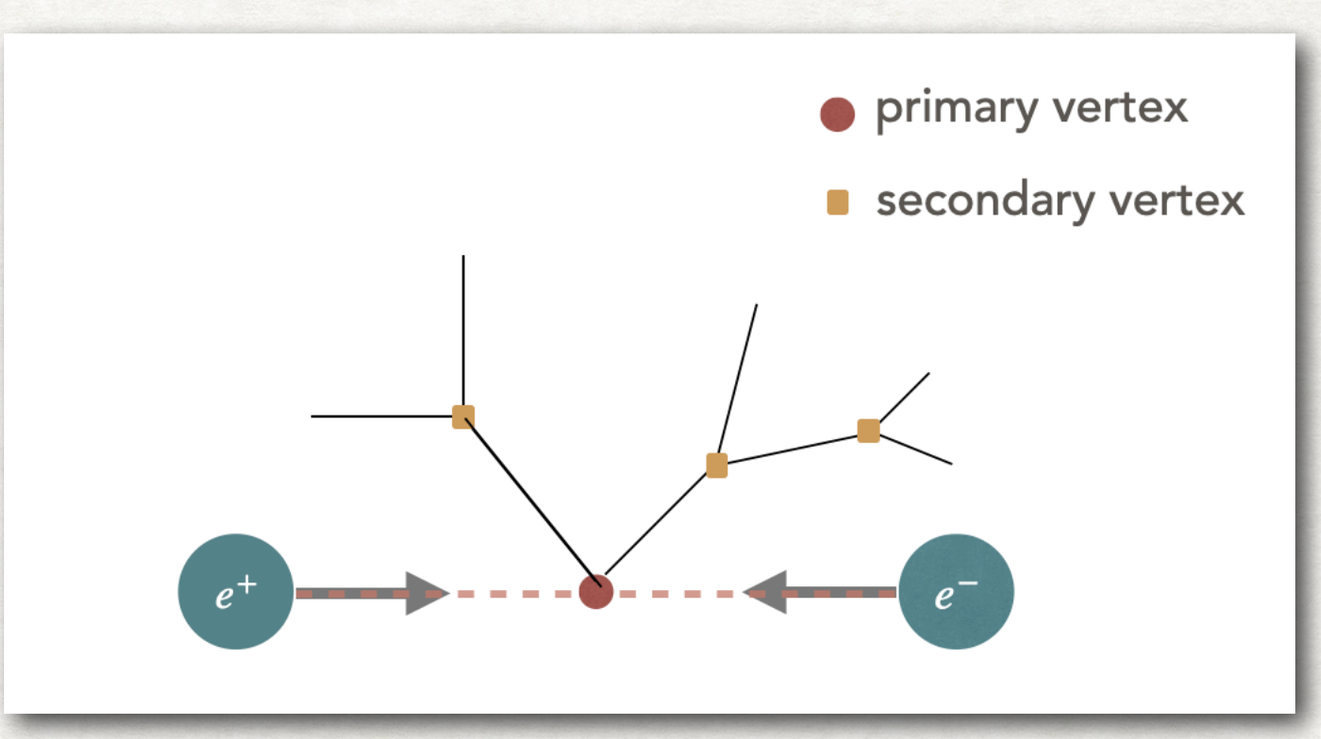
CEPC Vertex Reconstruction Performance

Yongfeng Zhu

Vertex reconstruction is important for flavor physics and jet flavor tagging.

Sample : $Z \to c\bar{c}$, full simulation with CEPC baseline detector

vertex reconstruction software : LCFIPLUS

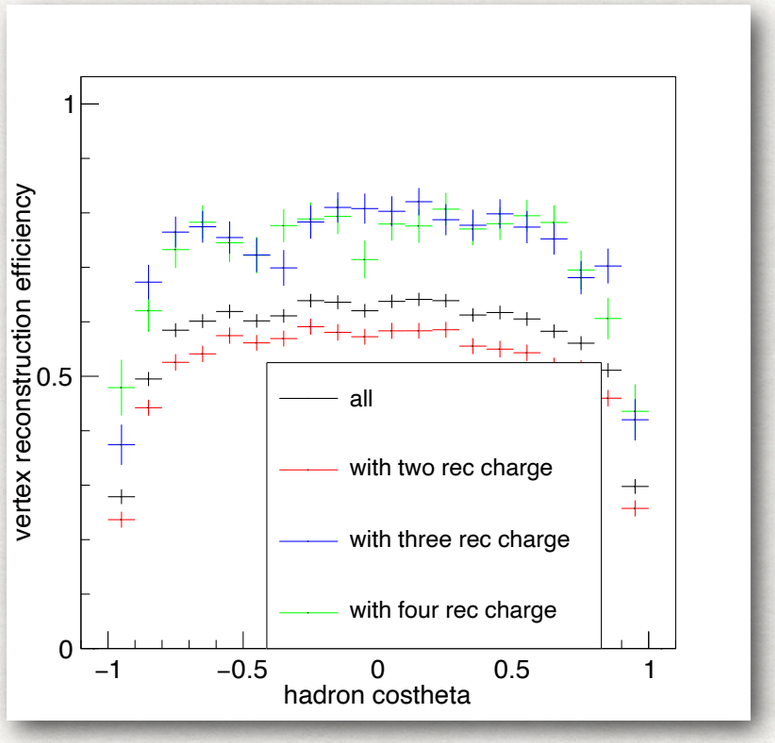


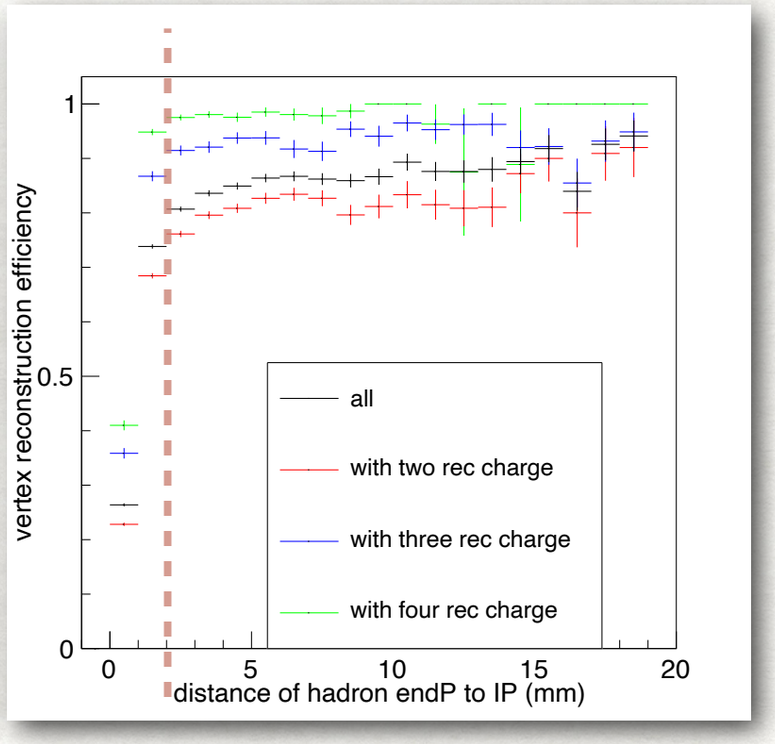
The correlation between secondary vertex reconstruction performance and

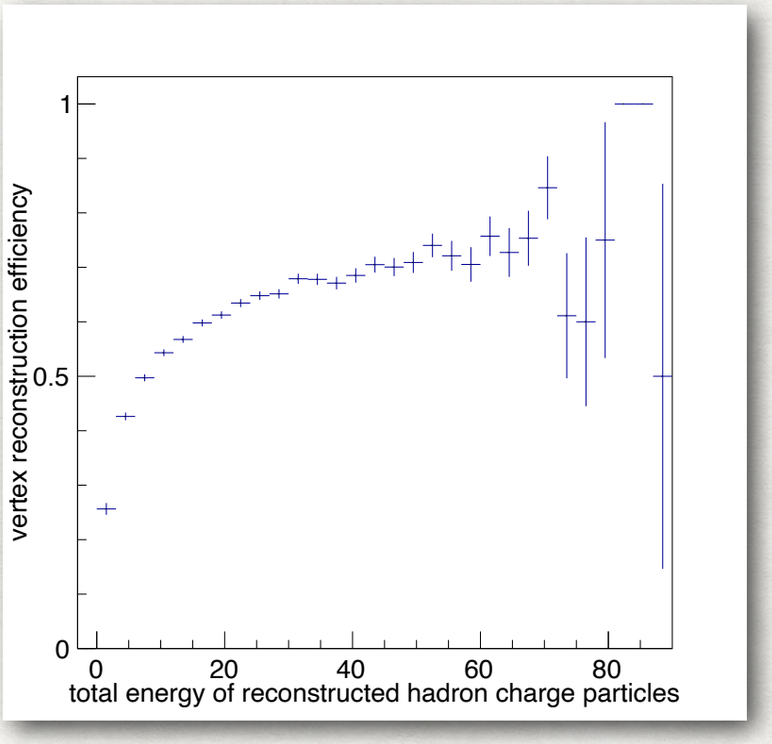
the direction of hadron flight

the energy of hadron

the distance of hadron endpoint to IP





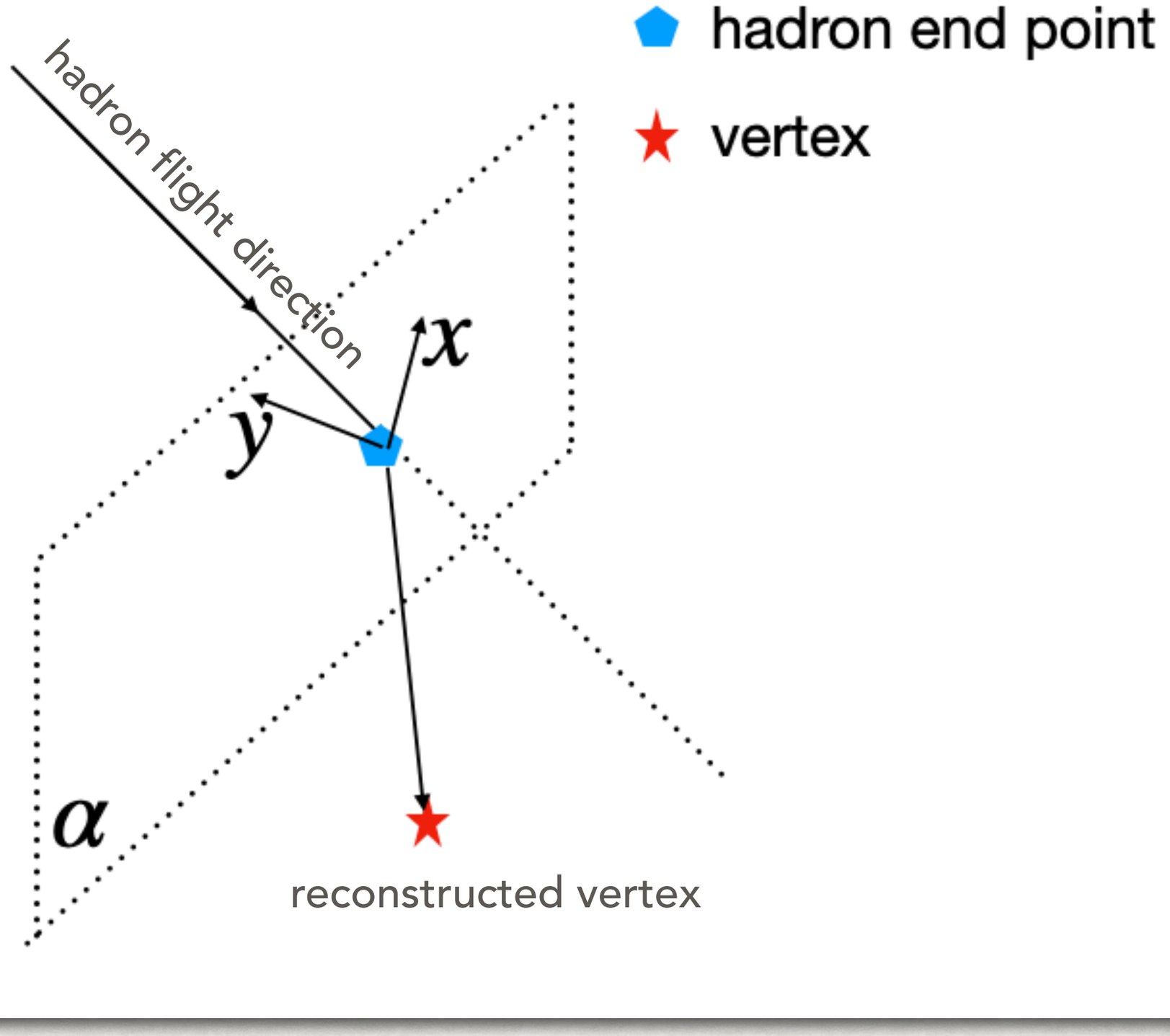


red : two charged particles

blue : three charged particles

green : four charged particles

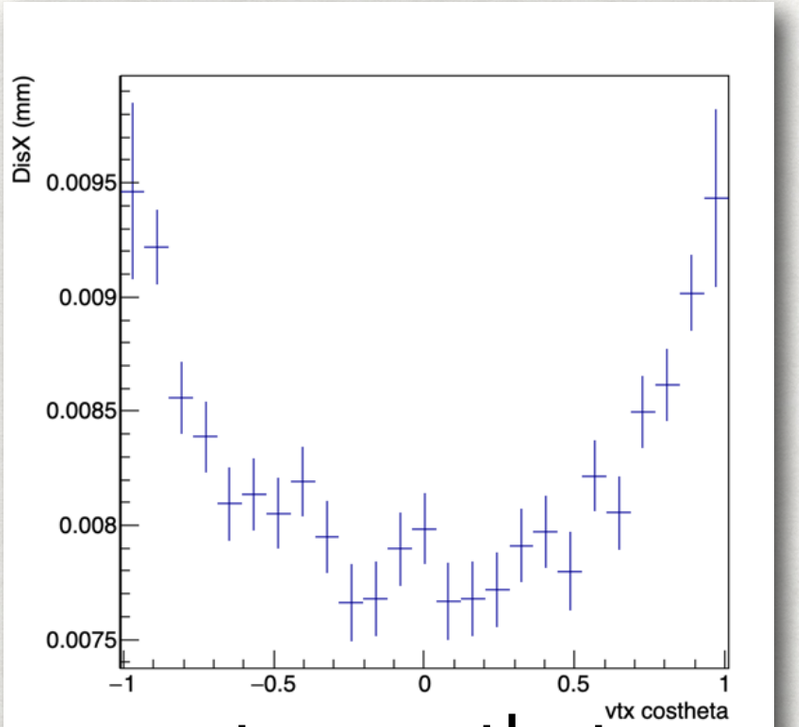
black : all conditions


hadron end point
vertex
hadron flight direction
x
y
α
reconstructed vertex

reconstructed vertex position precision

perpendicular to hadron flight direction

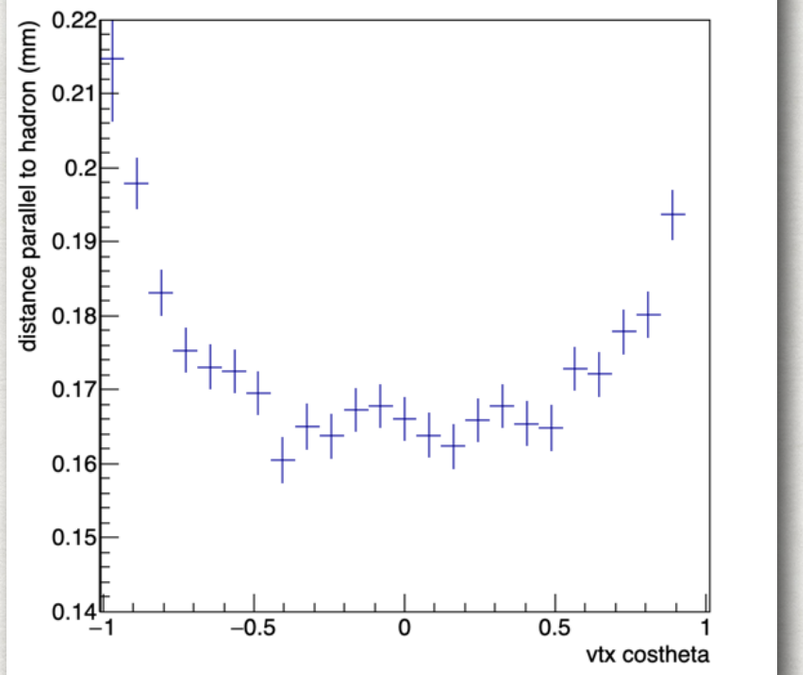
~ 0.008 mm

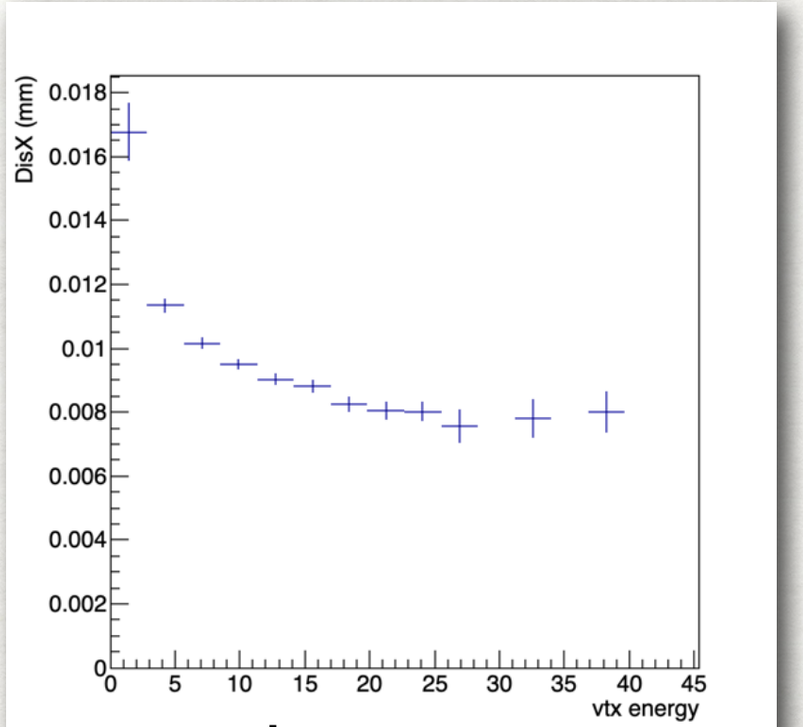


vertex costheta

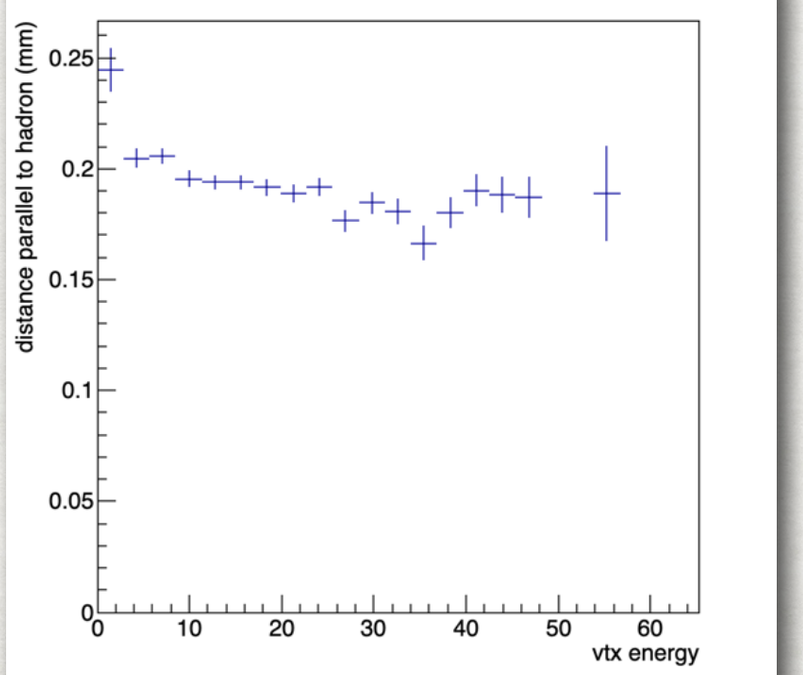
parallel to hadron flight direction

~ 0.18 mm





vertex energy



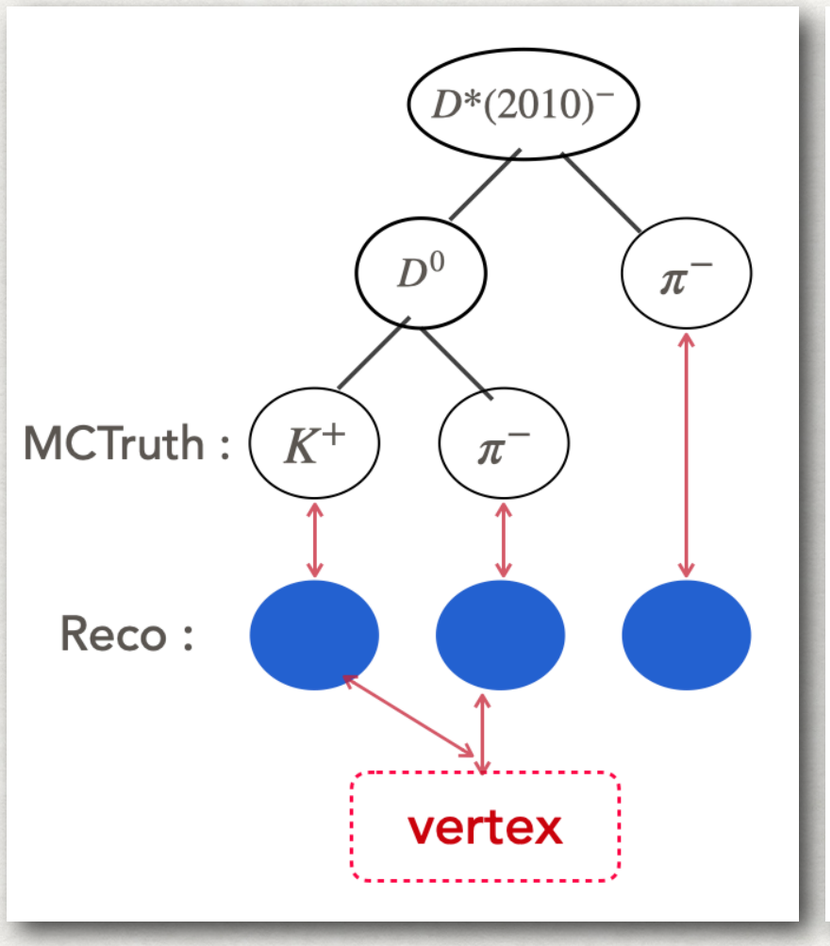
The results need to be verified in a further step.

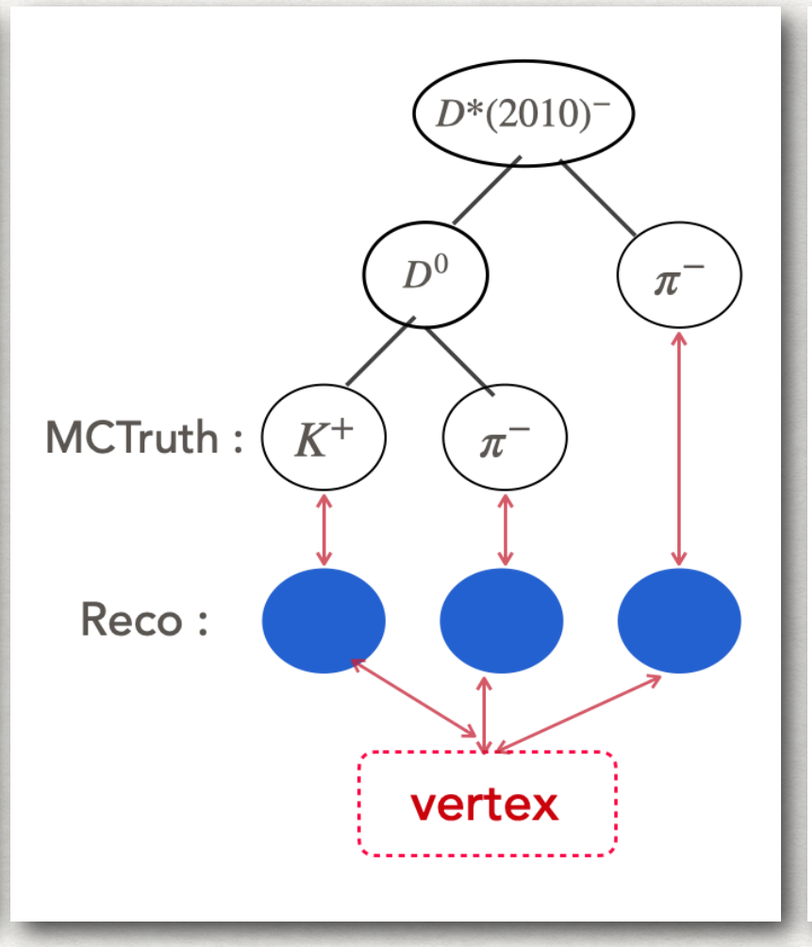
Conclusion :

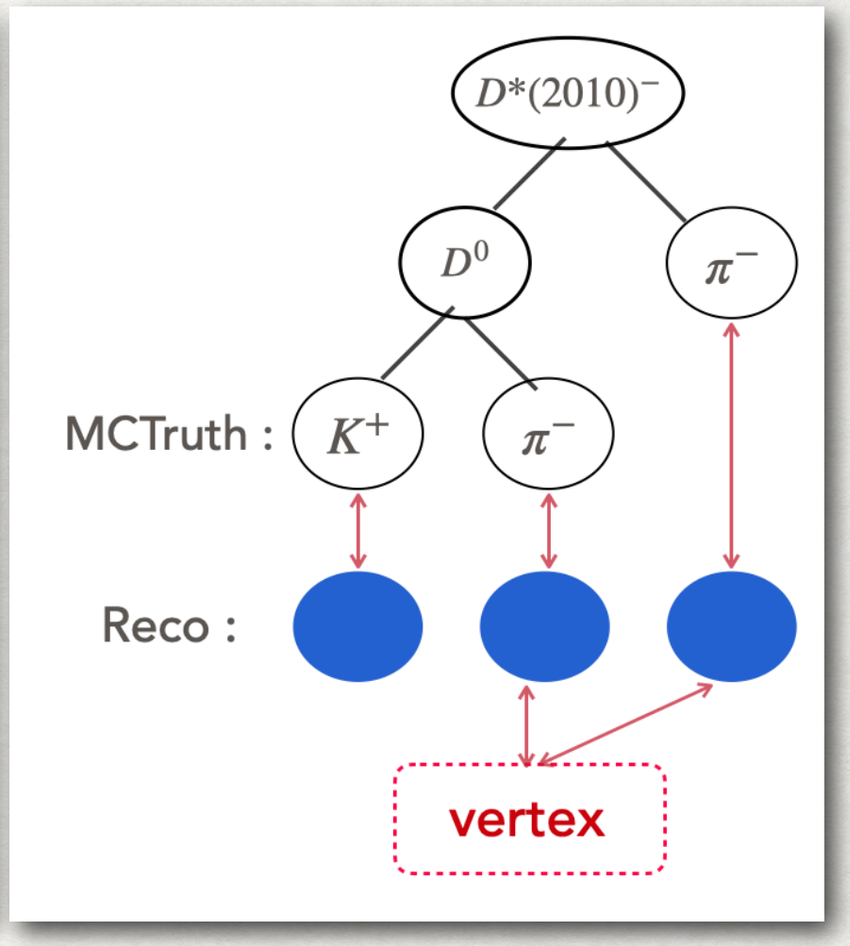
- The secondary vertex reconstruction performance are relies to the hadron flight direction, the distance of hadron endpoint to IP, the energy of hadron.
- If the distance of hadron endpoint to IP is larger than 2mm, the overall reconstruction efficiency can be larger than 80%.
- Next, we will compare these conditions with Z->bb samples and explore more vertex reconstruction methods (cluster, Topological vertex finding).

Many thanks!

Backup


MCTruth :
$D^*(2010)^-$
D^0
K^+
π^-
π^-
Reco :
vertex


MCTruth :
$D^*(2010)^-$
D^0
K^+
π^-
π^-
Reco :
vertex

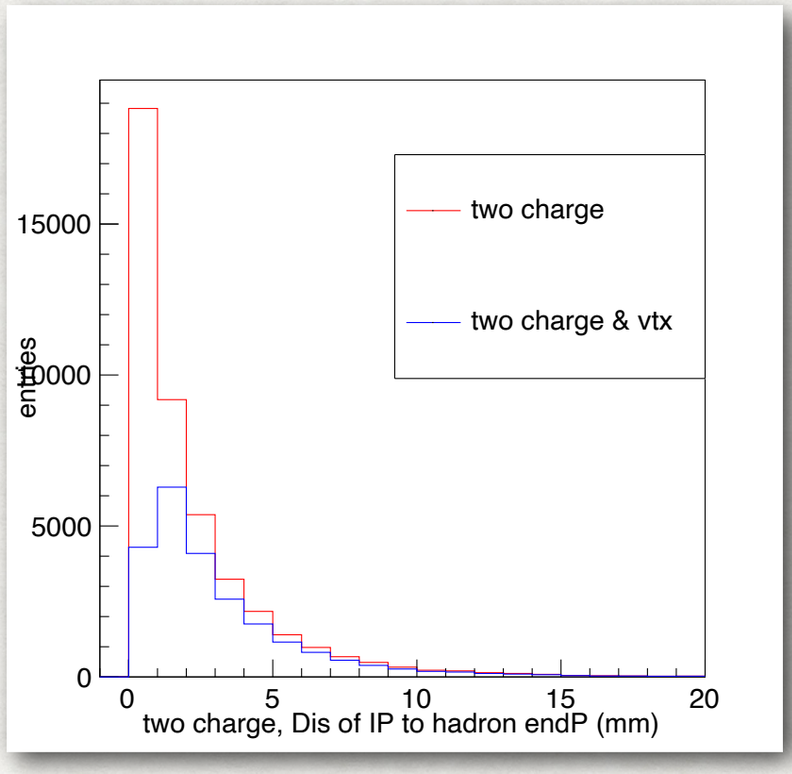

MCTruth :
$D^*(2010)^-$
D^0
K^+
π^-
π^-
Reco :
vertex

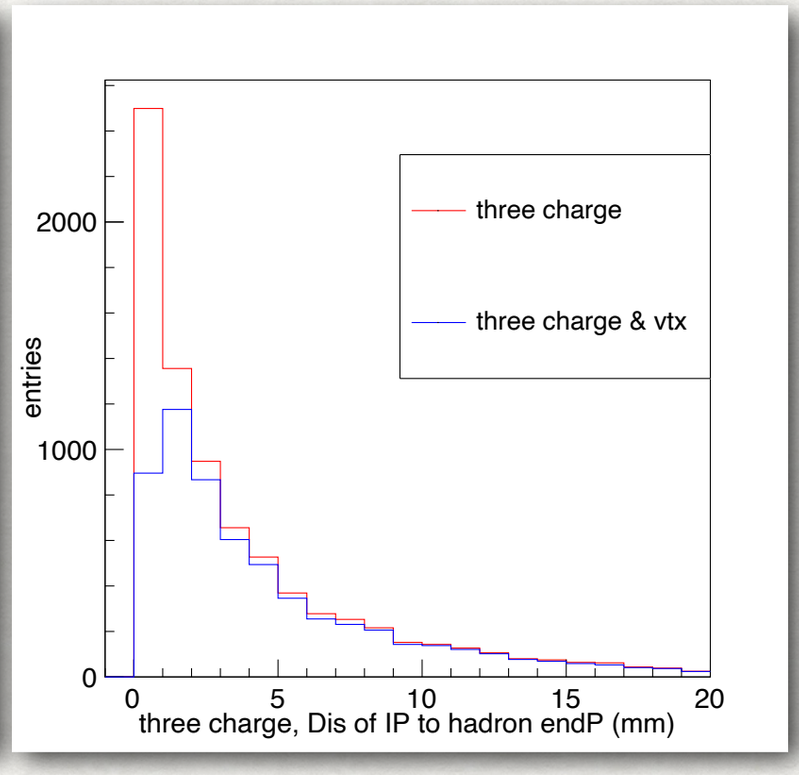
red line : should been reconstructed

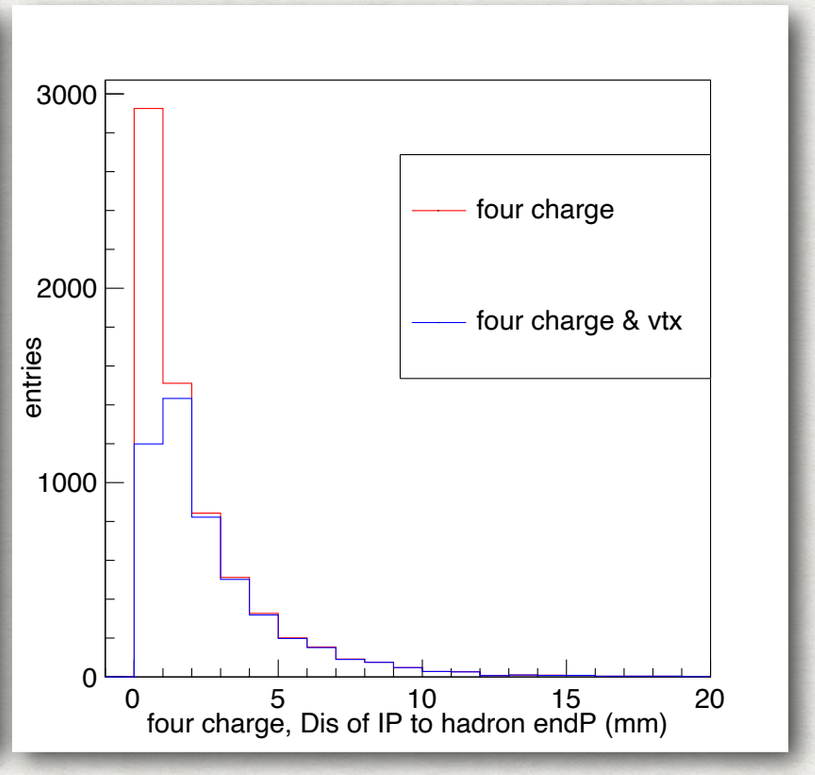
blue line : had been reconstructed

X-axis : the distance of hadron endpoint to IP

the efficiency of vertex reconstruction







hadron decay to two charge

three charge

four charge particles