Status of CEPCSW simulation

November 2nd, 2020

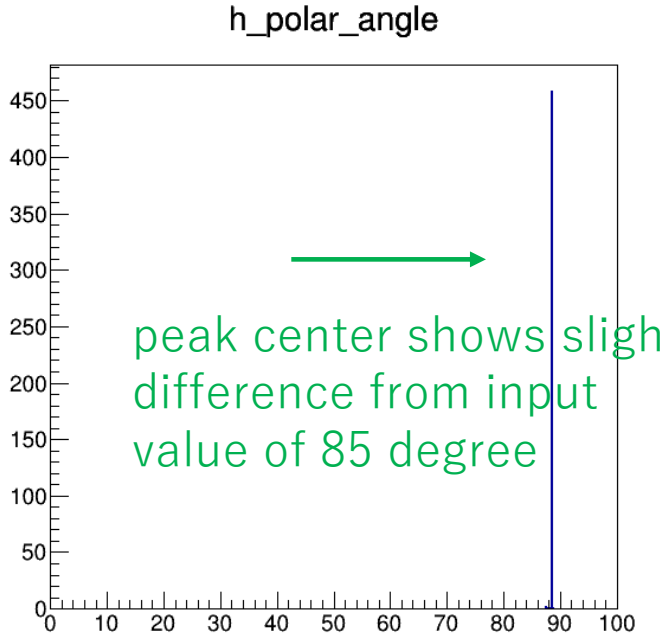
Contents

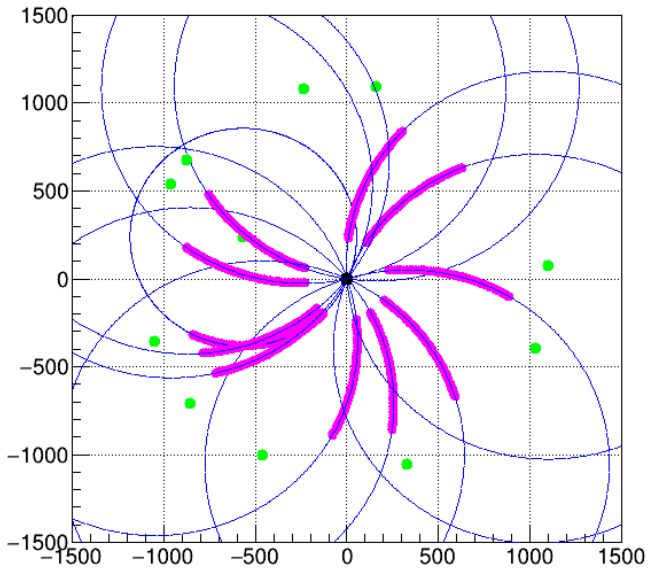
- A follow-up report from a trial of evaluation of tracking performance from the CEPCSW samples using a Helix fitting

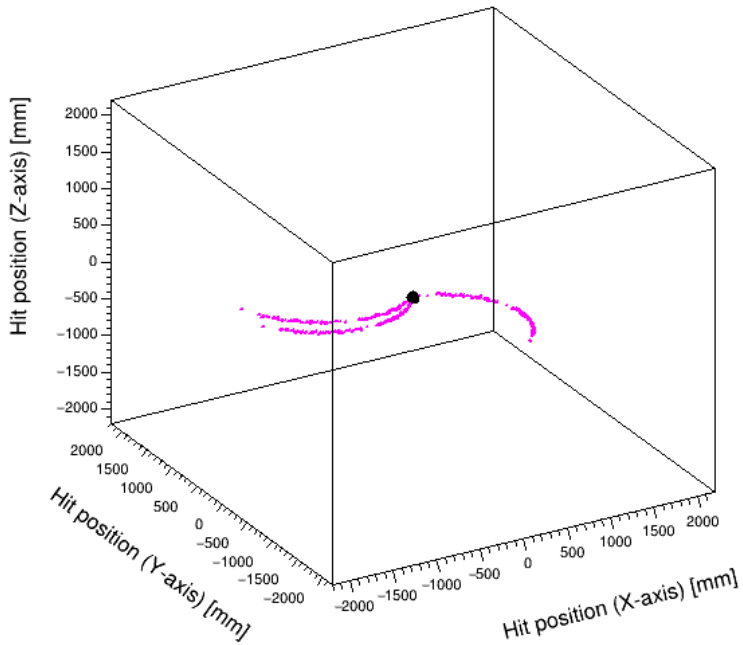
Fitting to the hits

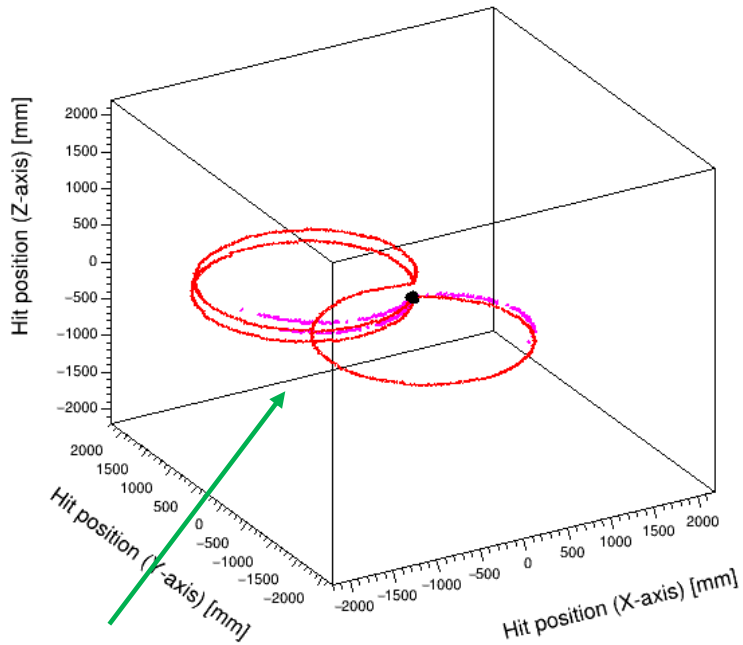
-- Using MarlinTrk/HelixFit

-- some distributions (for instance, polar angle, 3D fitting, etc) shows a bit difference.

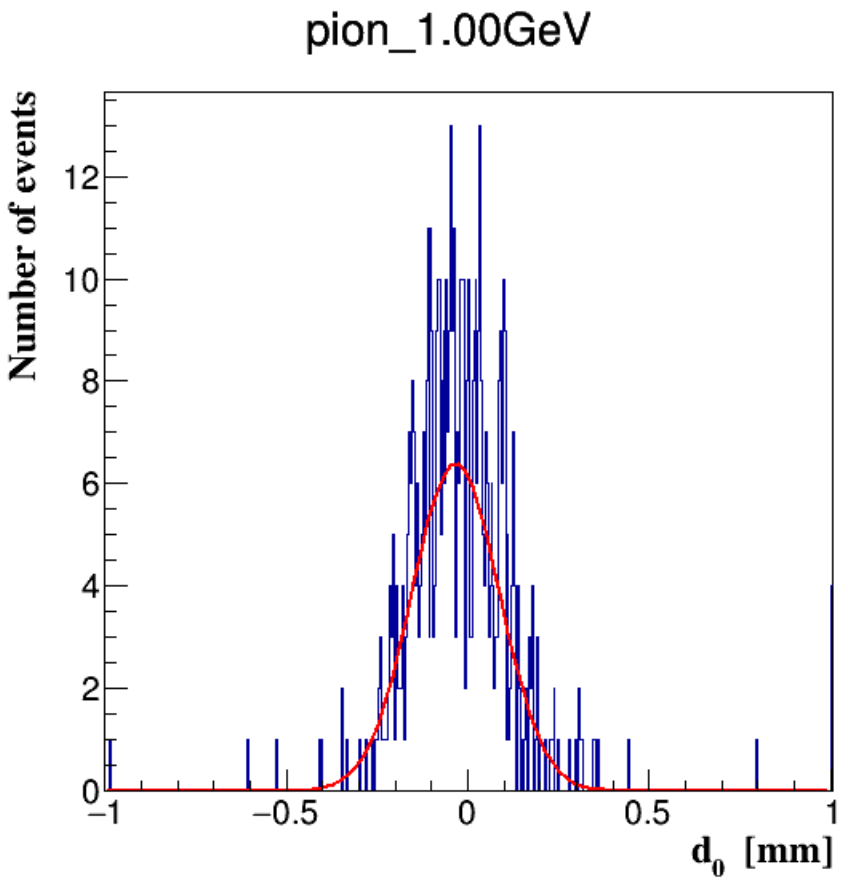


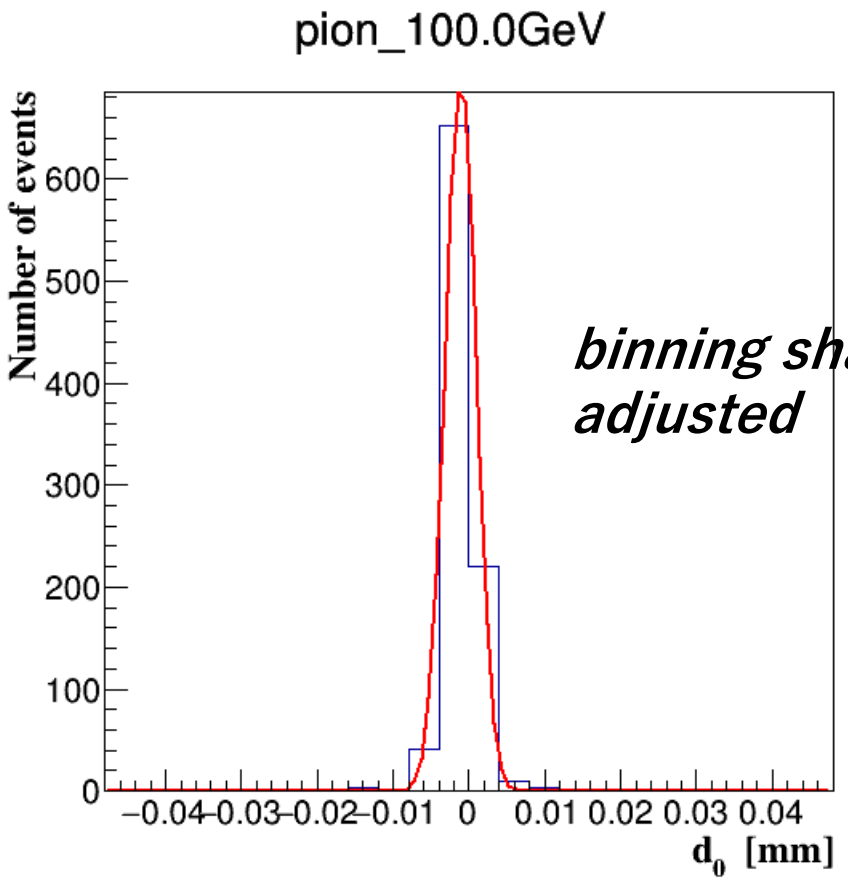






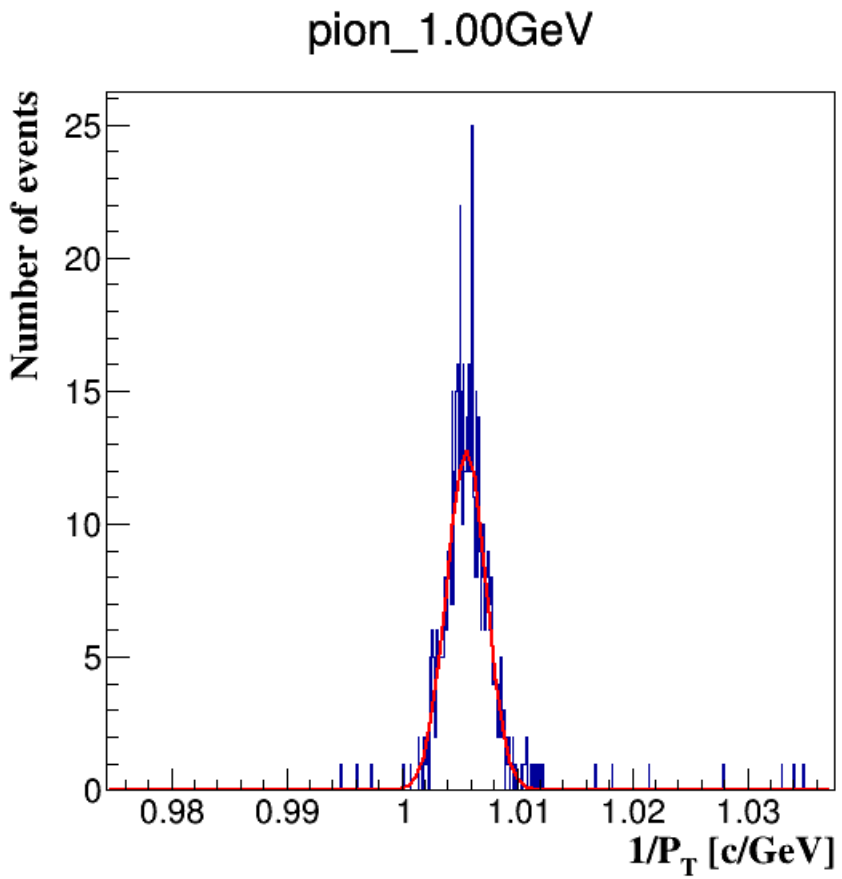
d0 distribution (pion, 1GeV, 100GeV)

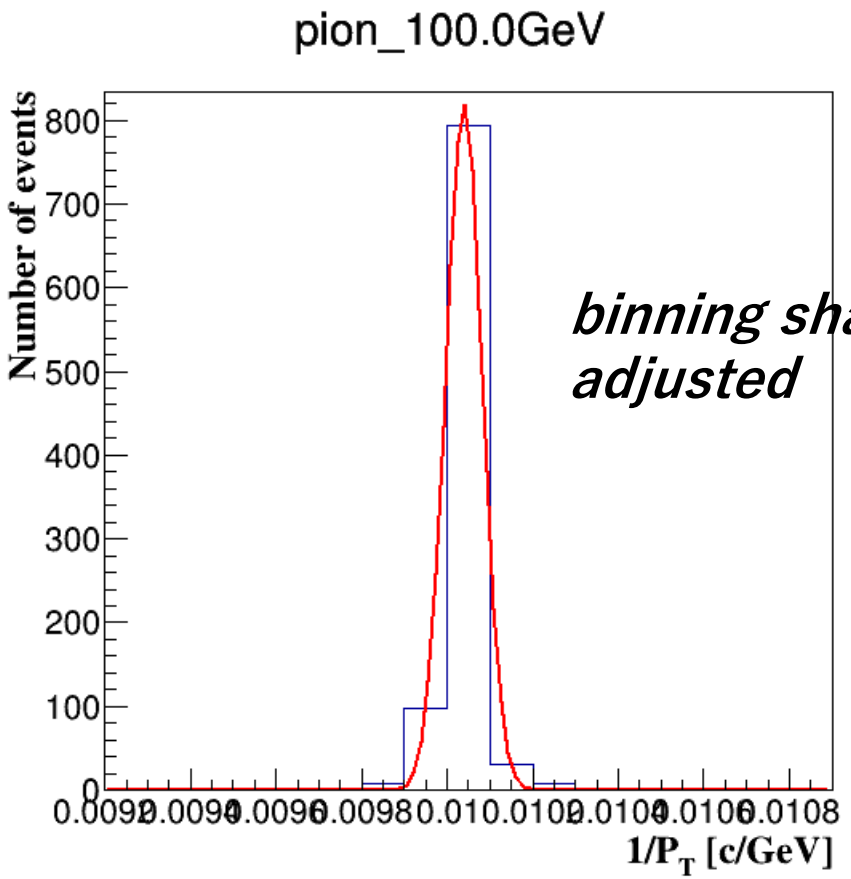




binning shall be adjusted

$1/P_T$ distribution (pion, 1GeV, 100GeV)

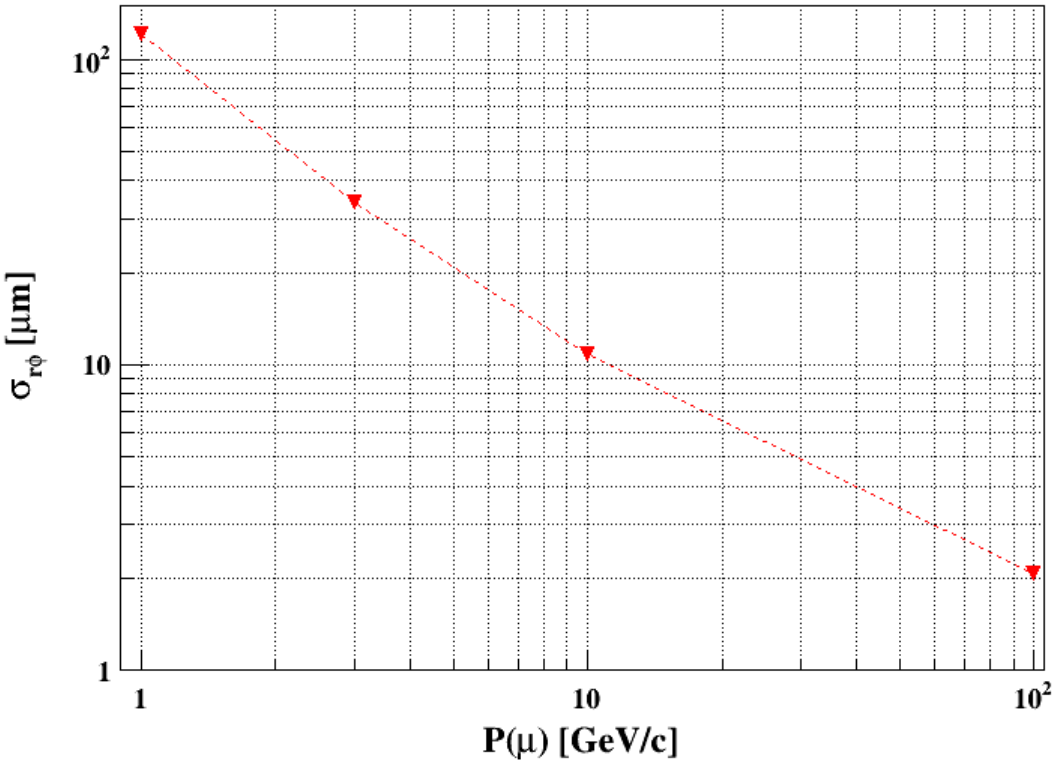




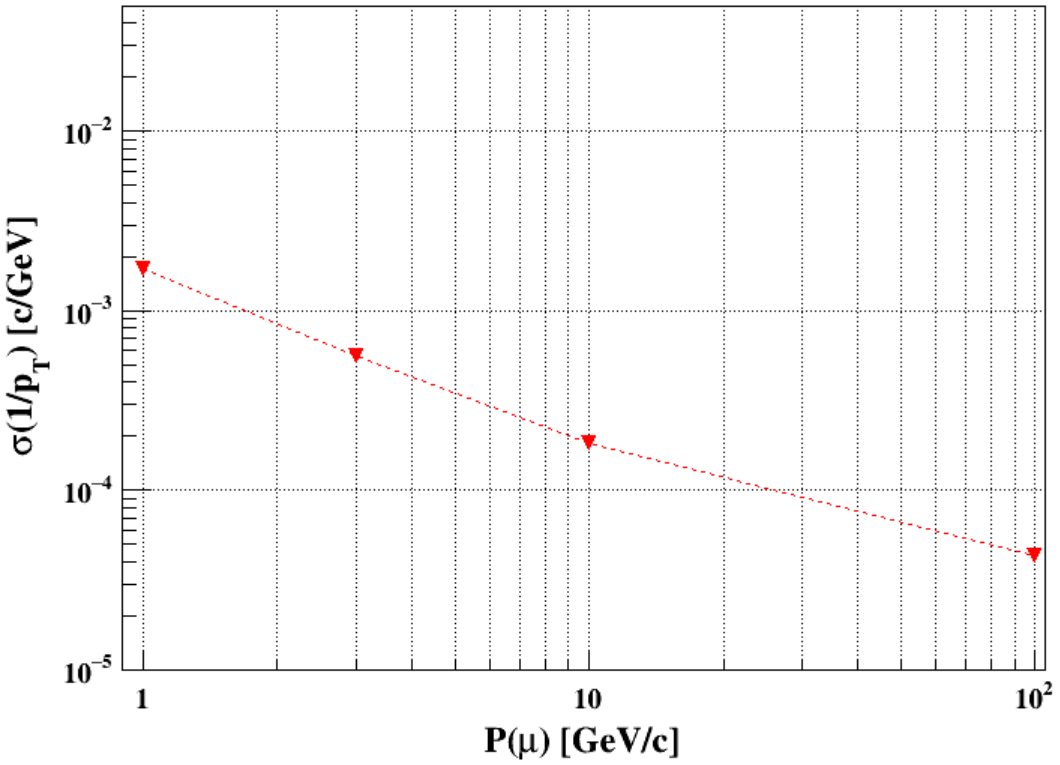
binning shall be adjusted

Comparison of performance

Taking Gaussian sigma for each distribution and plot them according to their input momentum



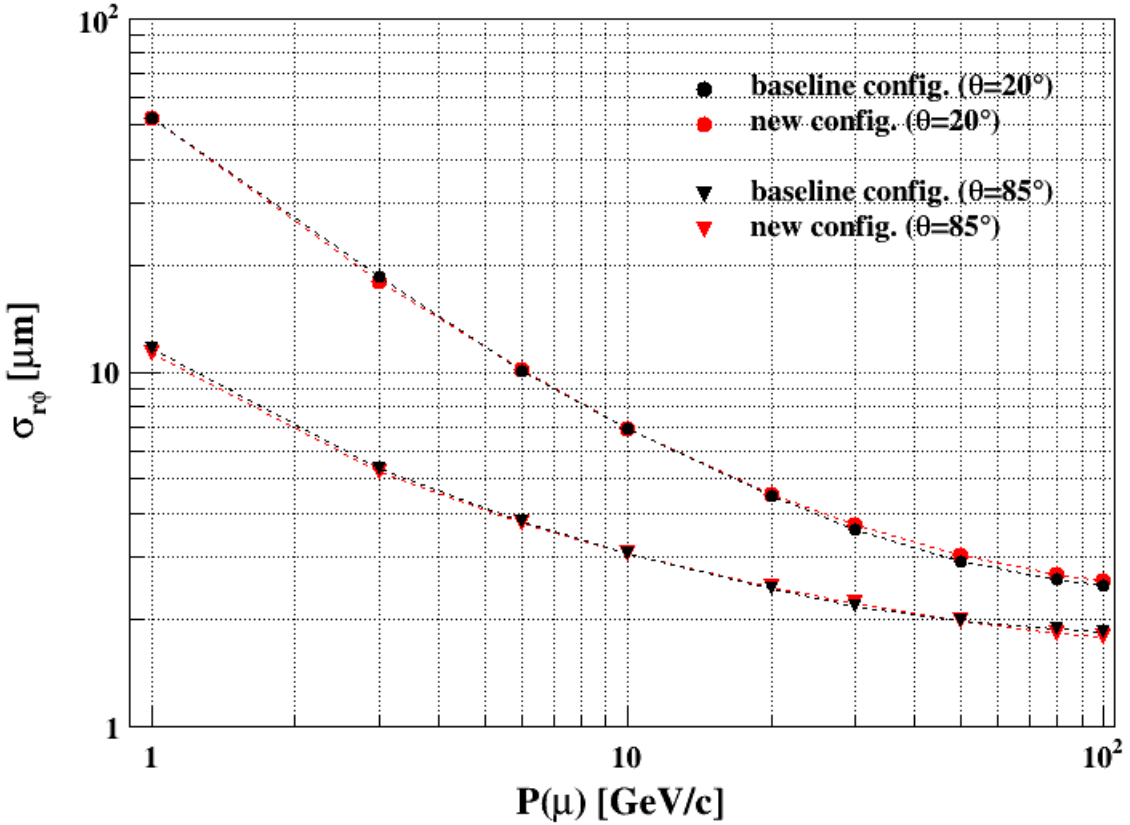
IP resolution

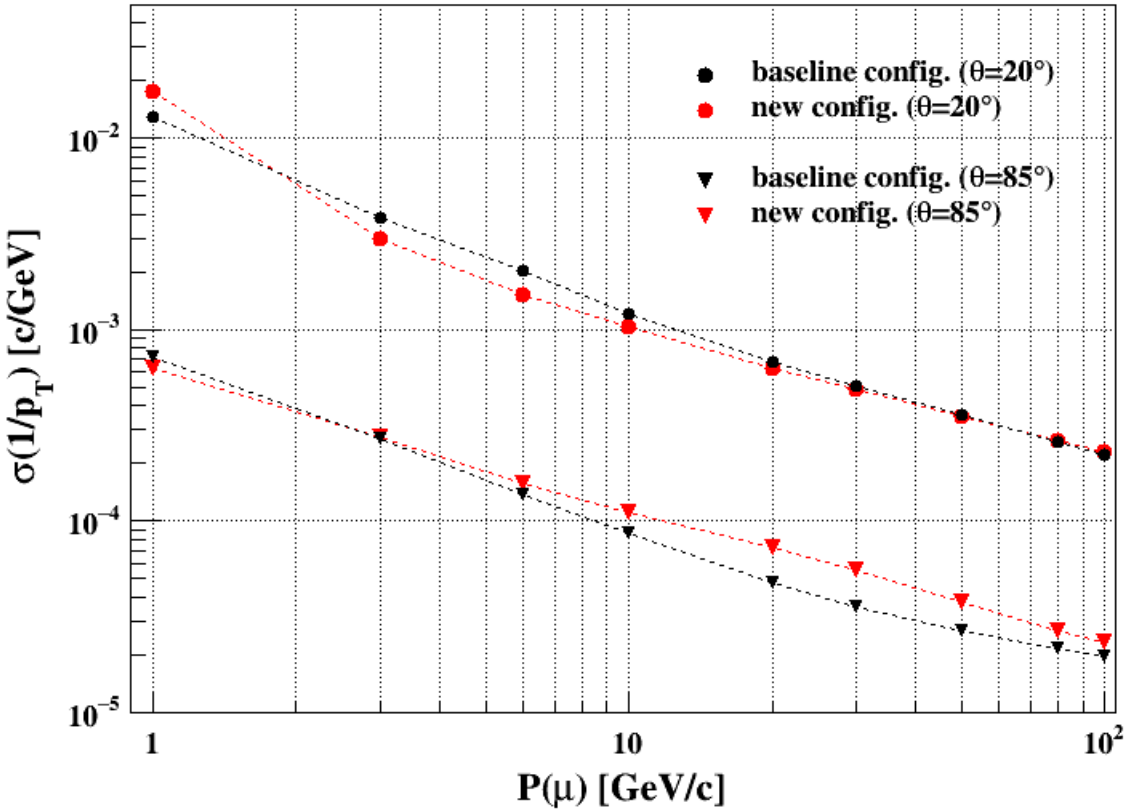


Momentum (Pt) resolution

Comparison of performance

slide from the meeting (2020-06-23)

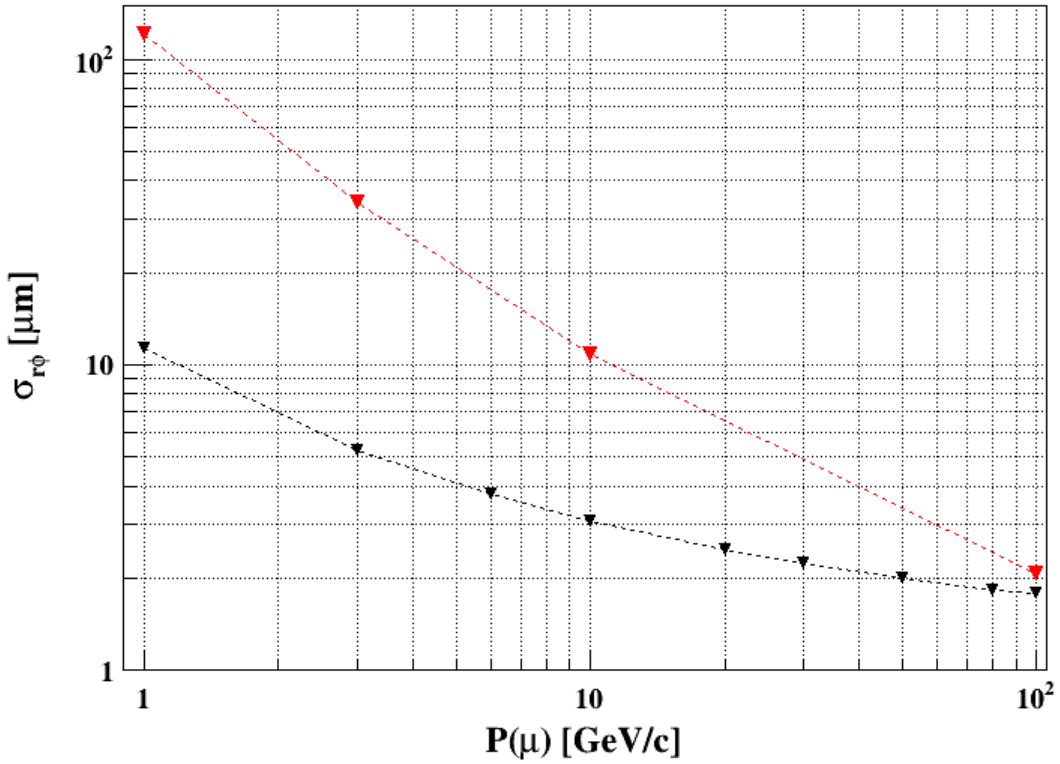


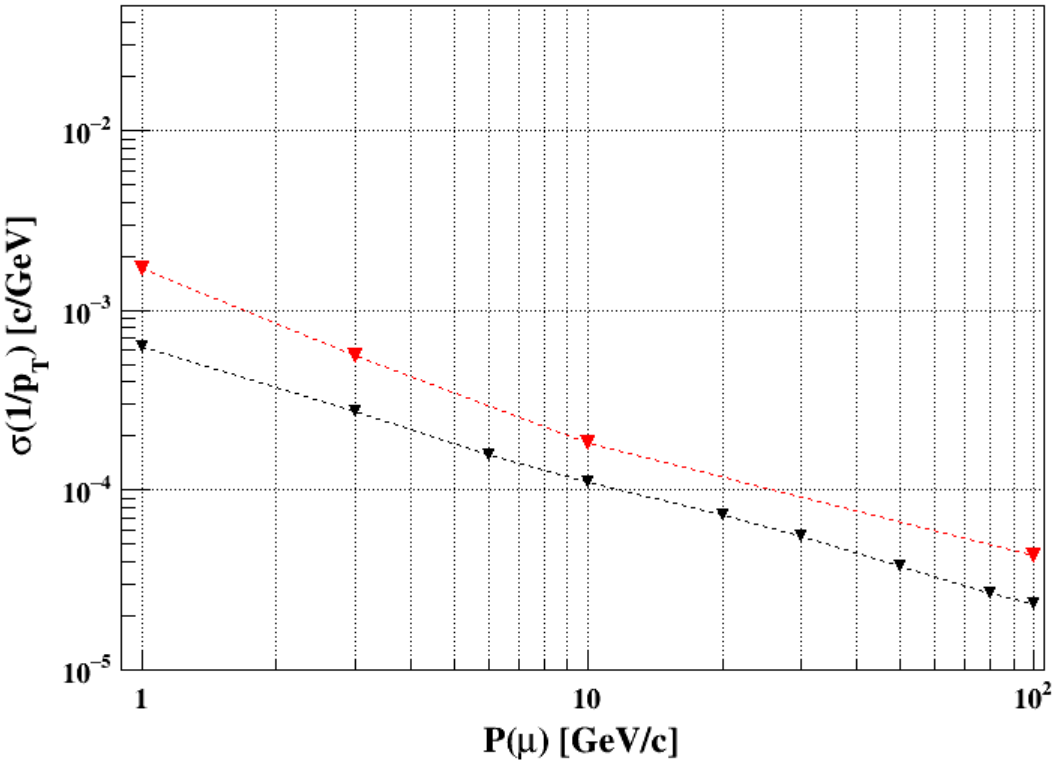


Comparison of performance

——— : Using CEPCSW sample with the helix fit

——— : from LDT results, only 2MDC configuration (its color is red in previous page)





Summary

・Further investigation for the tracking performance evaluation needs tracking routine update (such as w Kalman filtering, but not sure the detail by myself),
rather than sticking on a simple Helix fitting

backup (slide shown at meeting on October 19th)

Contents

- A first trial to see what happen for the IP resolution from the CEPCSW
- A simple circle fitting to X-Y plane of the hits are used, after some investigations.

- #Although I have separately started to test with the latest CEPCSW) the results in this slide was obtained from already existing simulated rootfiles.

- # only DCH hits are used, for confirmation of circle fitting

Confirmation of the CEPCSW circumstance

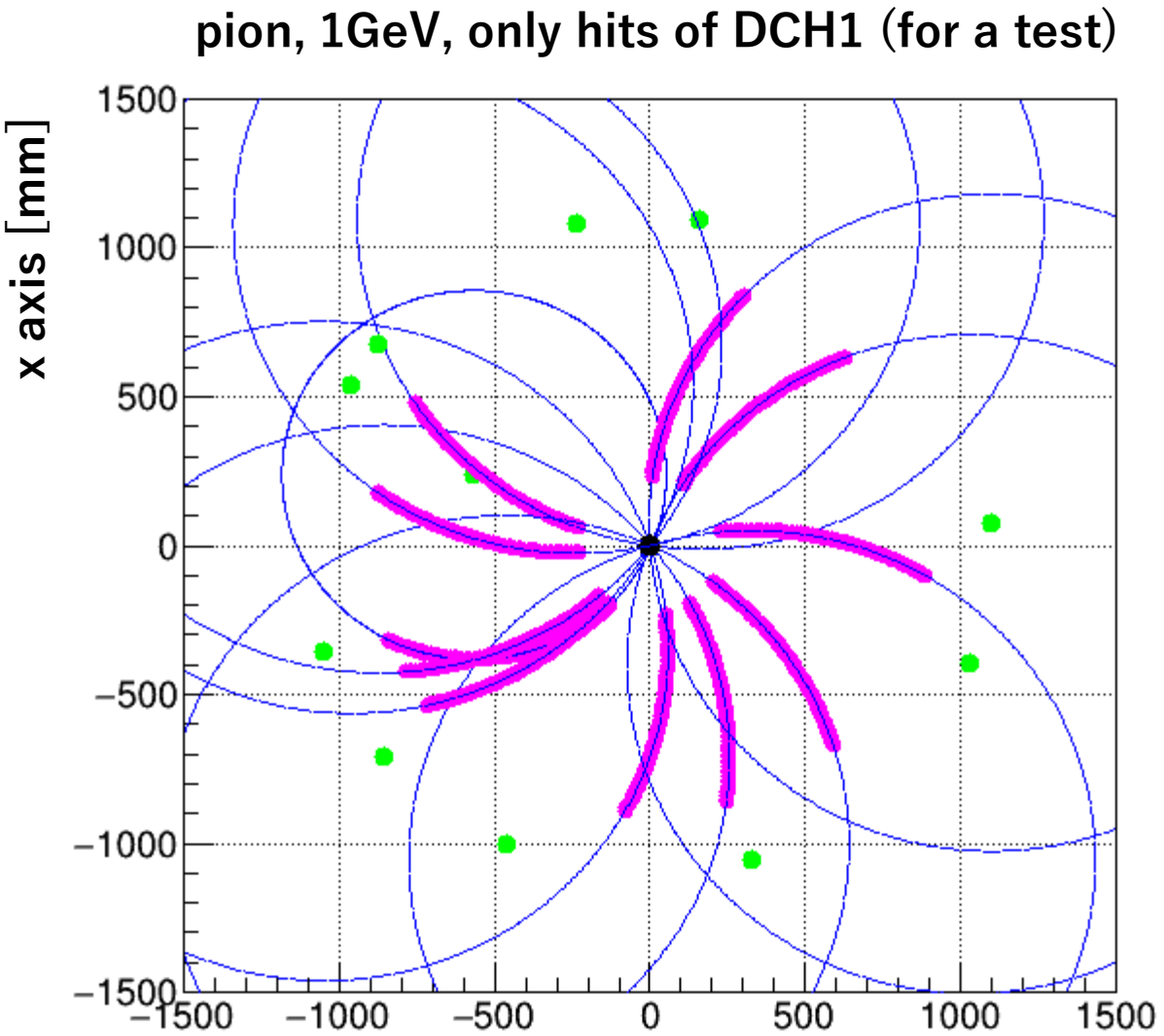
Fitting to the hits

-- Using MarlinTrk/HelixFit

-- To avoid multi-tracks, cuts on number of hits is applied on the events to select single track for fit (therefore, ~ 1500 ? events of 2000events were fitted)

-- the weight is given as arbitrary set values, $w=1/\sigma^2$, where $\sigma=0.2\mu m$ (as long as one detector type, it might be no effect ...)

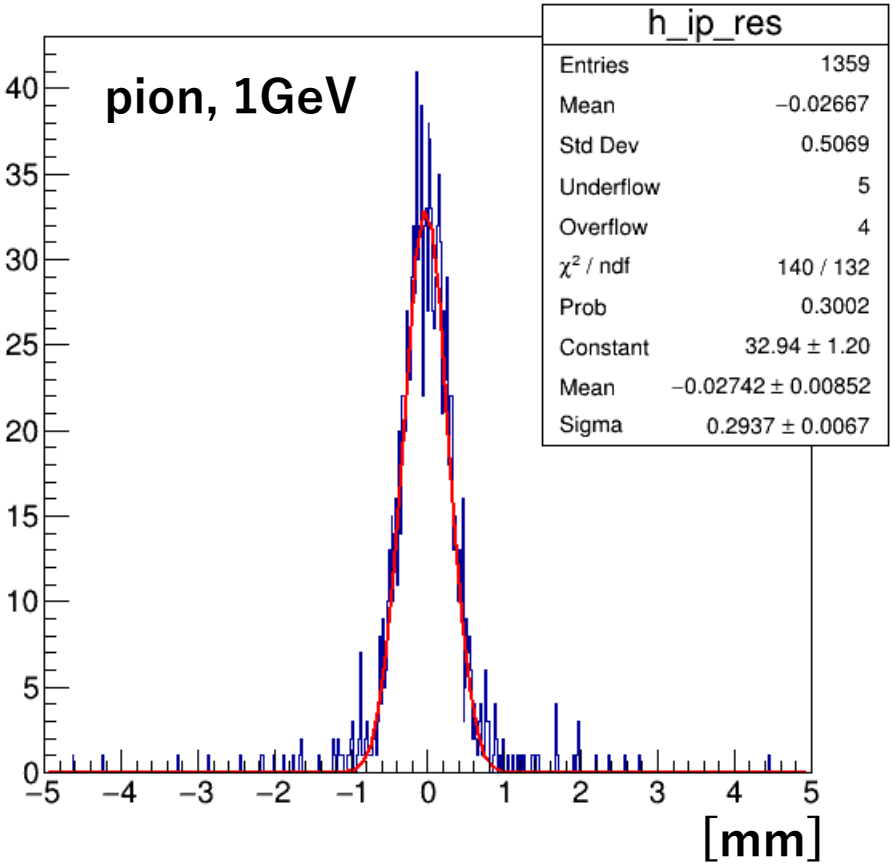
-- input values are x, y hit positions. Z coordinate is not considered at this moment



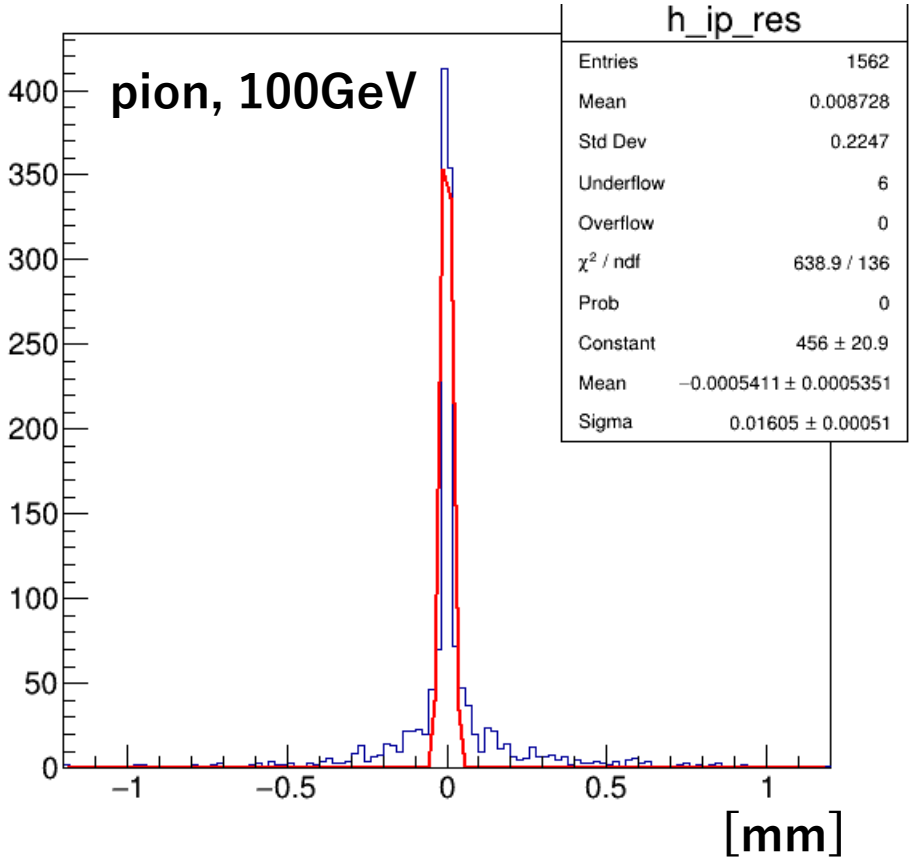
(pink is showing hits, where as the blue curve is fit result)

d0 (=for $\sigma_{r\phi}$) distribution

・ Assuming that initial position of the injected particle is the origin = (0.0, 0.0, 0.0) so that obtained d0 is directly shown without any position subtraction

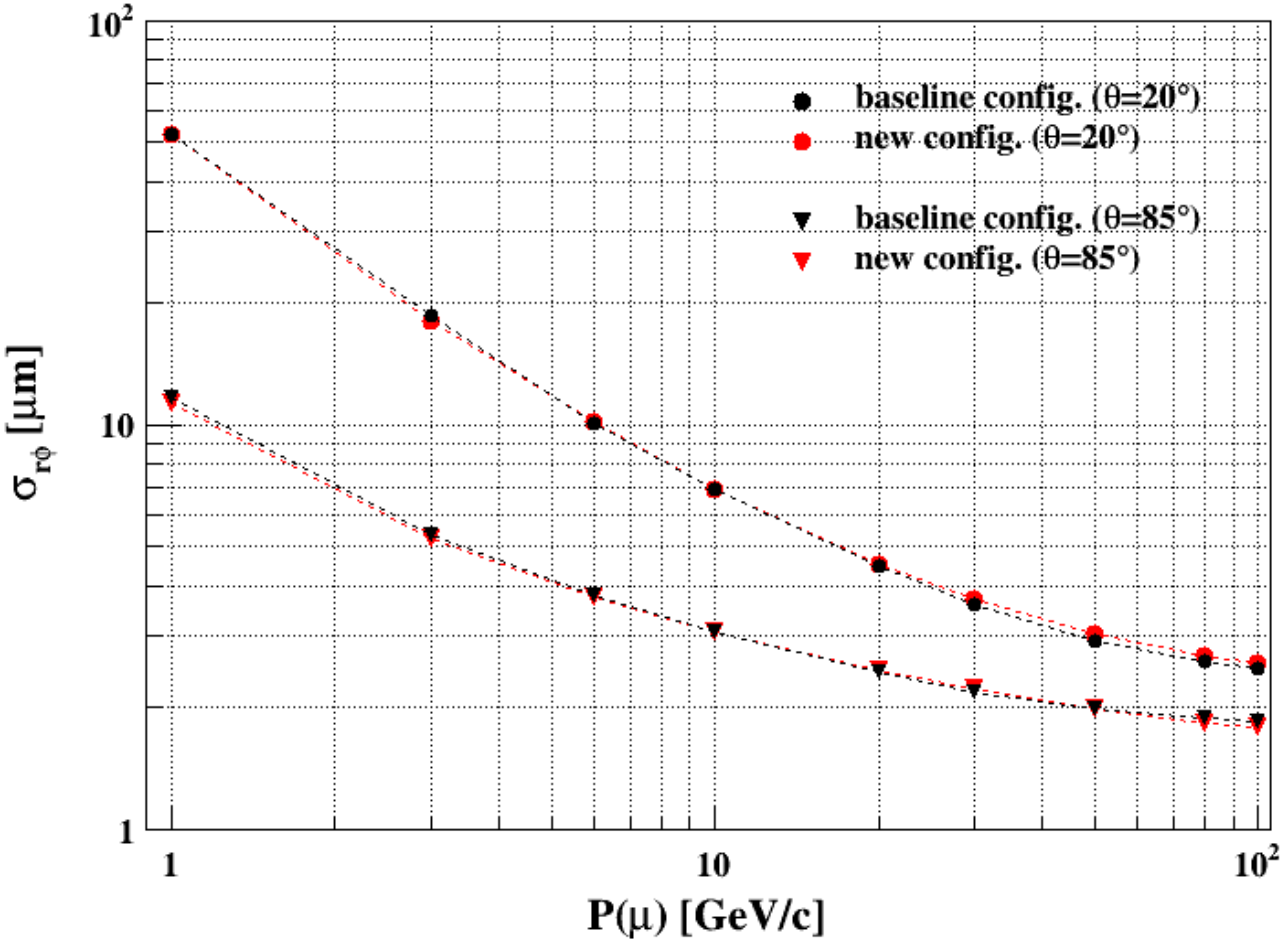


σ=294μm



σ=16μm

Ref: IP resolution from the LDT



The values in previous page are much worse. Need to include VTX hits etc. as well as tracking routine

Next steps

- Need further checks (actually going further to have numbers which can be compared with references…)
- Include VTX (& SIT/SET) hits which are also stored in the rootfiles
- Momentum resolution

  (Pt would be easy, need Z coordinate info. for P ?)

- At the same time, could I ask helps/suggestions about the tracking available at the CEPCSW ?