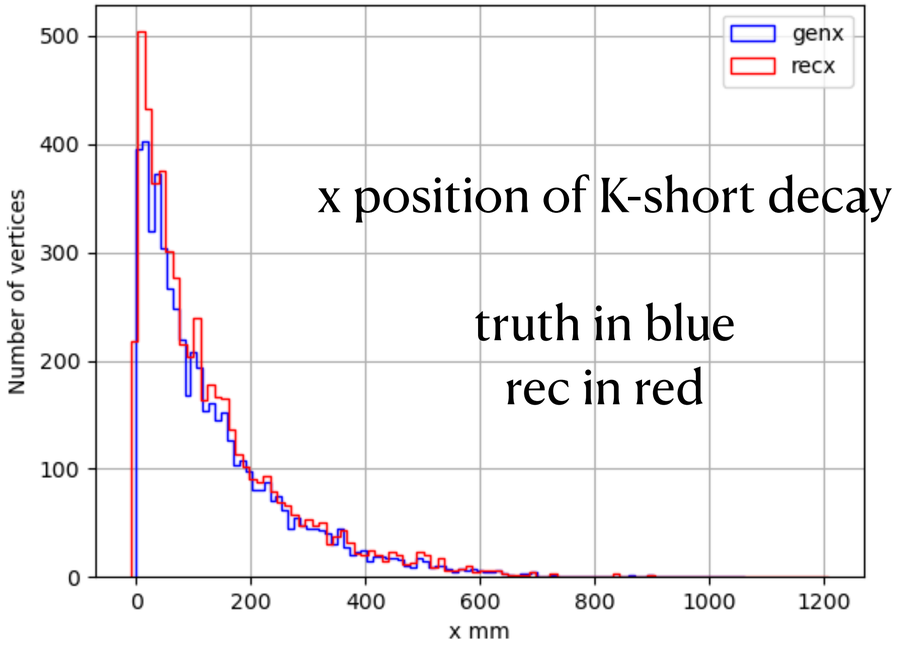
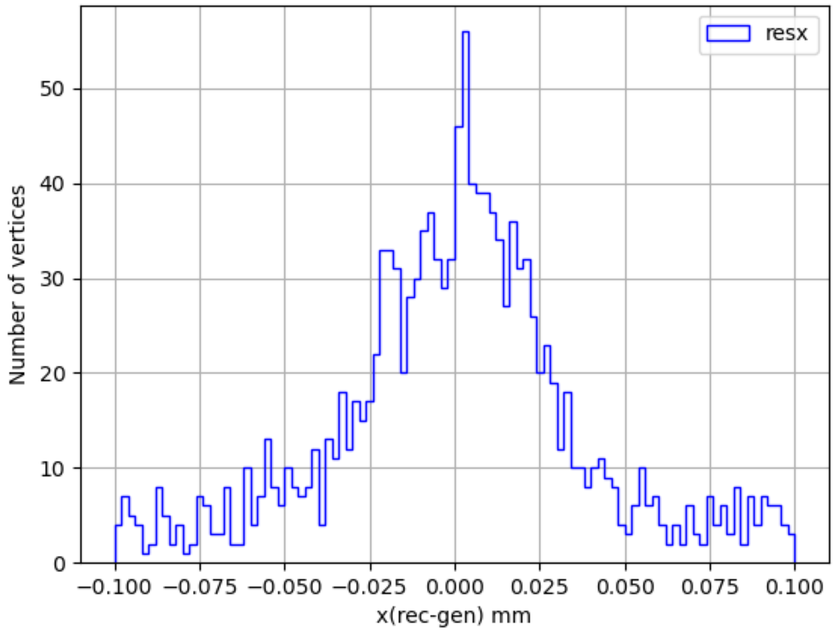
Trk, Vtx, PID

C.Zhang/09Dec2024

Vtx

- For secondary vertex
  - 10k particle-gun K-short, pT=2GeV, $\theta = 85^{\circ}, \phi = 0^{\circ}$
    - 70% $K_s^0 \rightarrow \pi^+\pi^-$ events
    - Displaced vertices were reconstructed
    - The poor precision is suspected to be due to the smaller number of hit for long distance decays



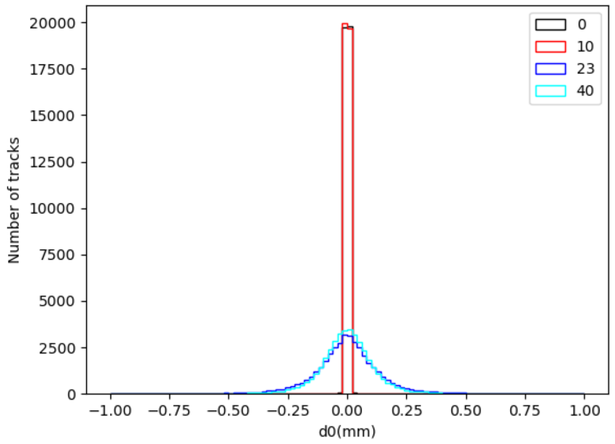


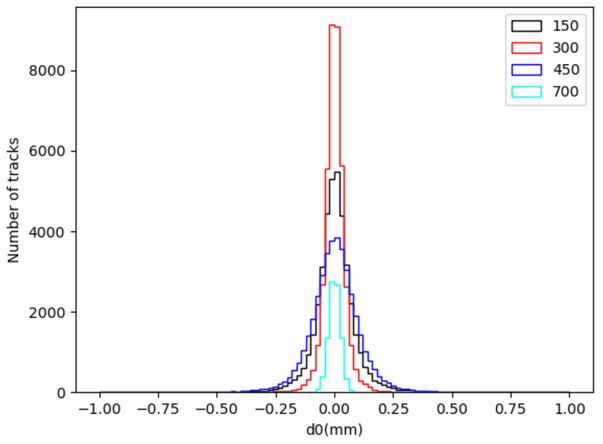
Vtx

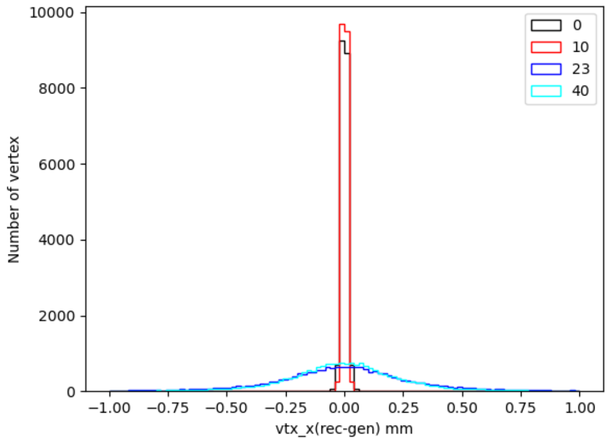
Particle-gun muon pair from (x, 0, 50)

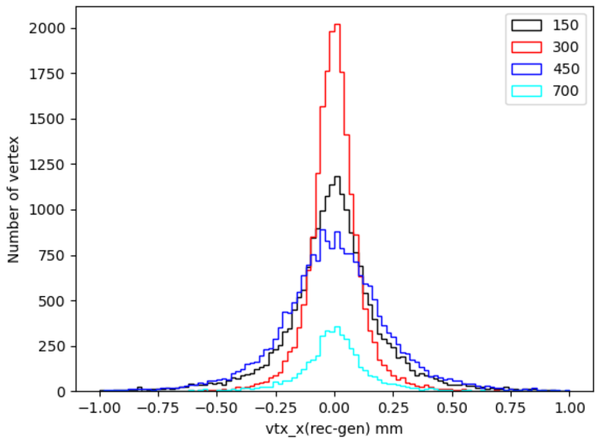
phi=0~60, theta=80~90

Layer	R(mm)	muon pair x position
		0, 10
VXD-L1	12.5~18	
		23
VXD-L2	28~35	
		40
VXD-L3	45~53	
		150
ITK-L1	240	
		300
ITK-L2	350	
		450
ITK-L3	570	
TPC	600-1800	
		700
OTK	~1800	









- d_0 and vertex have the same order of precision variation with position
- From x=10 to x=23, the precision decreases too rapidly
- x=300 is better than x=150 because it is closer to the corresponding first hit than x=150 (to adjust particle-gun position)
- If muon pair originates at x=700, TPC more likely to return a single track. Htrk=2 applied, note its normalisation

Particle-gun muon pair from (x, 0, 50)

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Vtx

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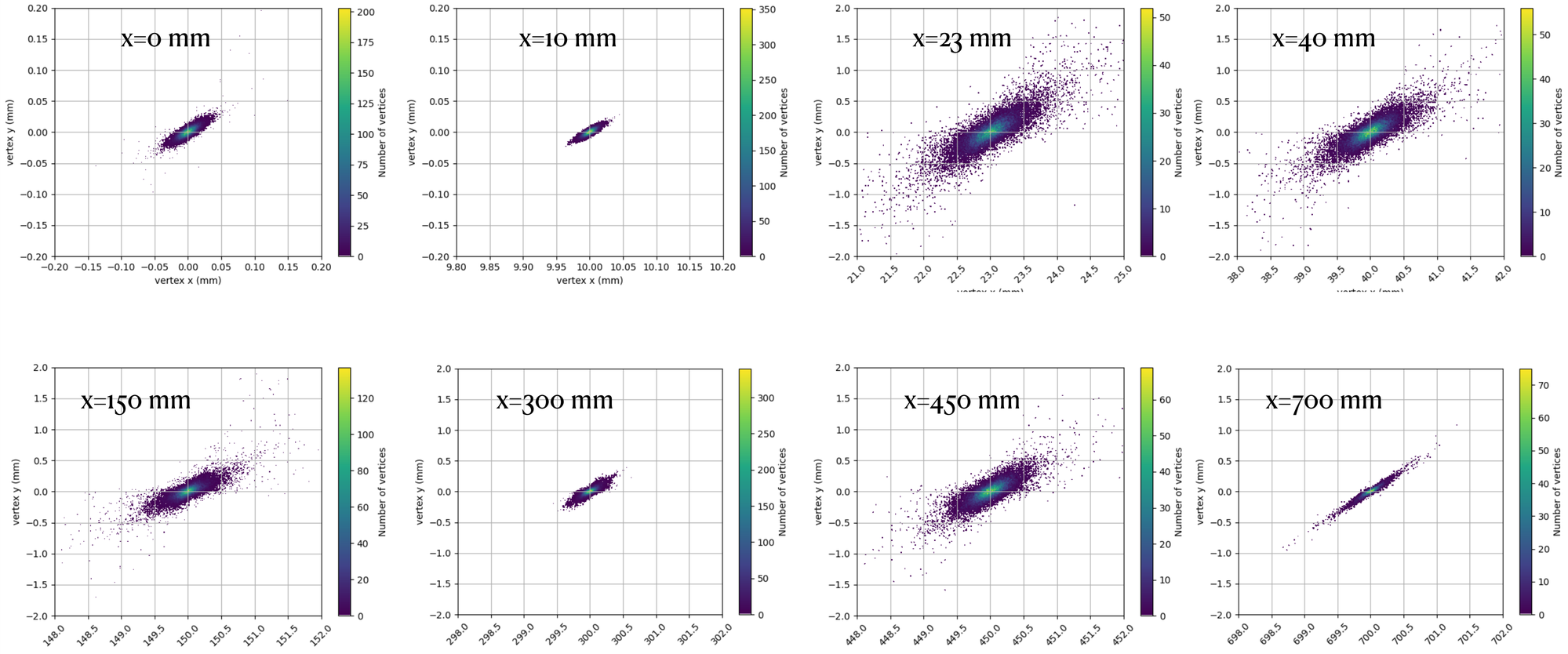
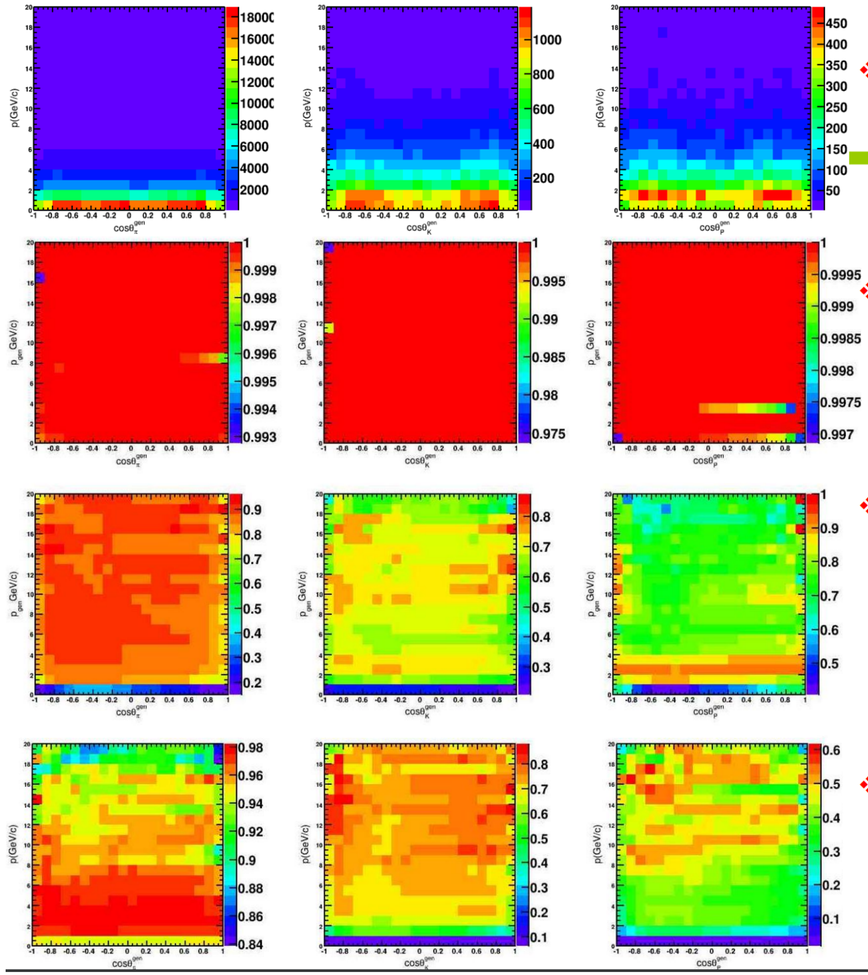


- x-y correlation may be due to the particle gun θ, ϕ.
- Since x=10 is closer to the first hit than x=0, it is better than x=0.
  - **The number of hits, material budget, distance to the nearest hit** vary with the position of secondary vertex

PID

- PID using calorimeter under developing, will give a talk on this meeting soon (Ligang Xia, NJU)
- First look at PID @ $Z \rightarrow qq$. Last week $H \rightarrow gg$ (Xiaotian Ma)
- PID Code for CyberPFO submitted (Chenguang Zhang)



- Phase space $(p_{\mathrm{gen}}, \cos\theta_{\mathrm{gen}})$ 0-20GeV
- Track efficiency distribution of truth $\pi/K/p$ (have dN/dx or t)
- PID efficiency distribution of truth $\pi/K/p$ (minimum combined χ^2)
- Purity distribution of truth $\pi/K/p$

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