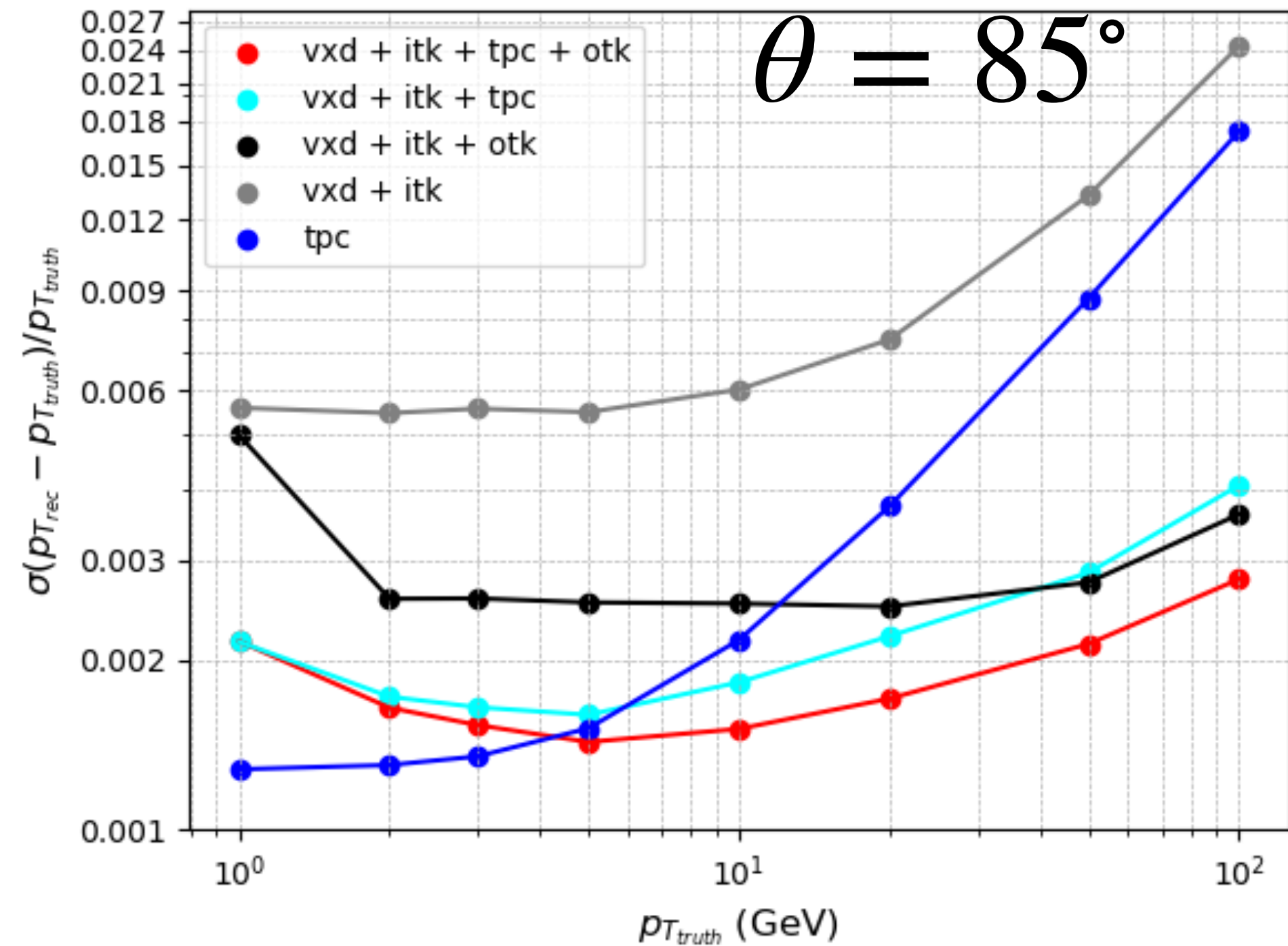


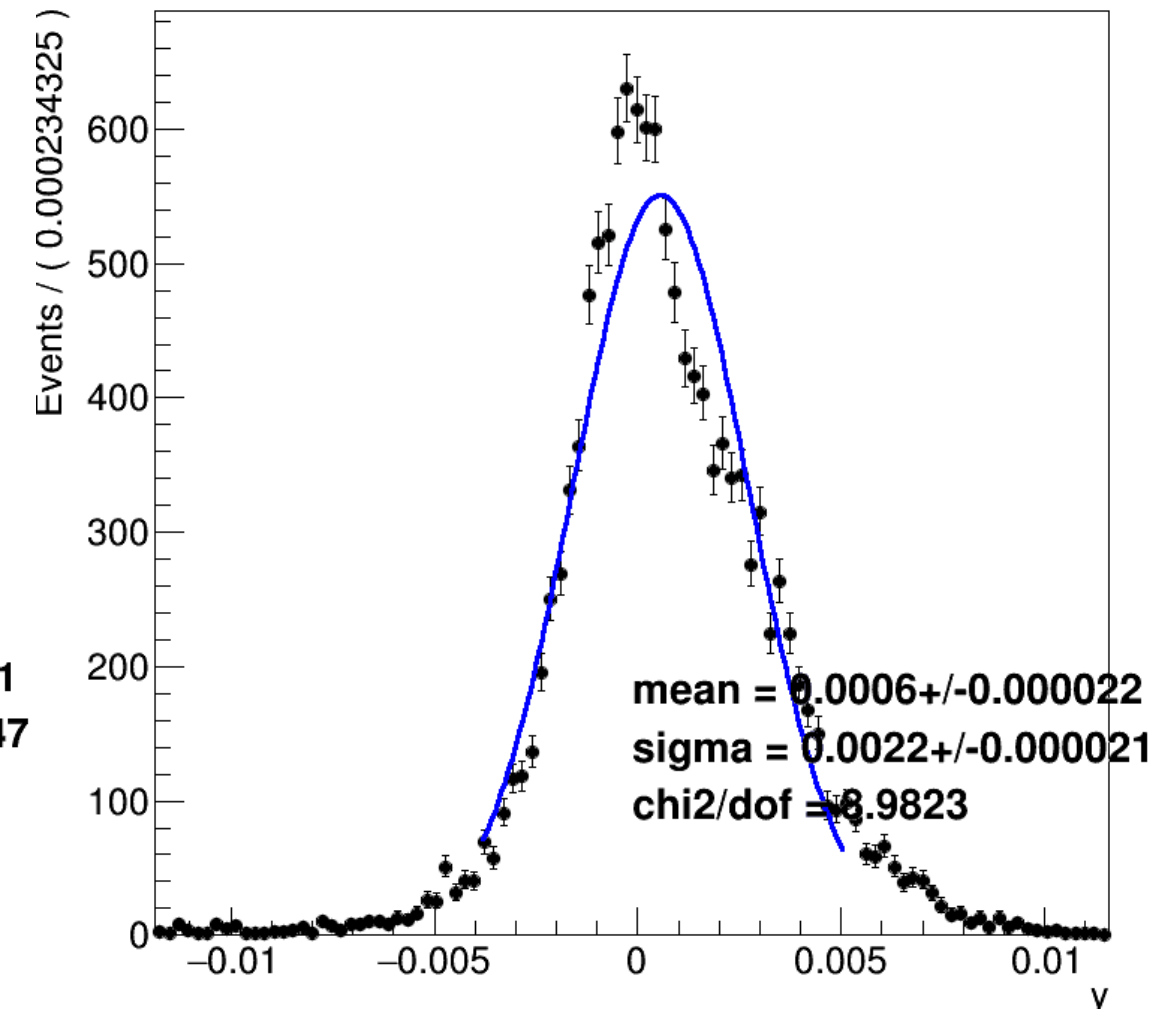
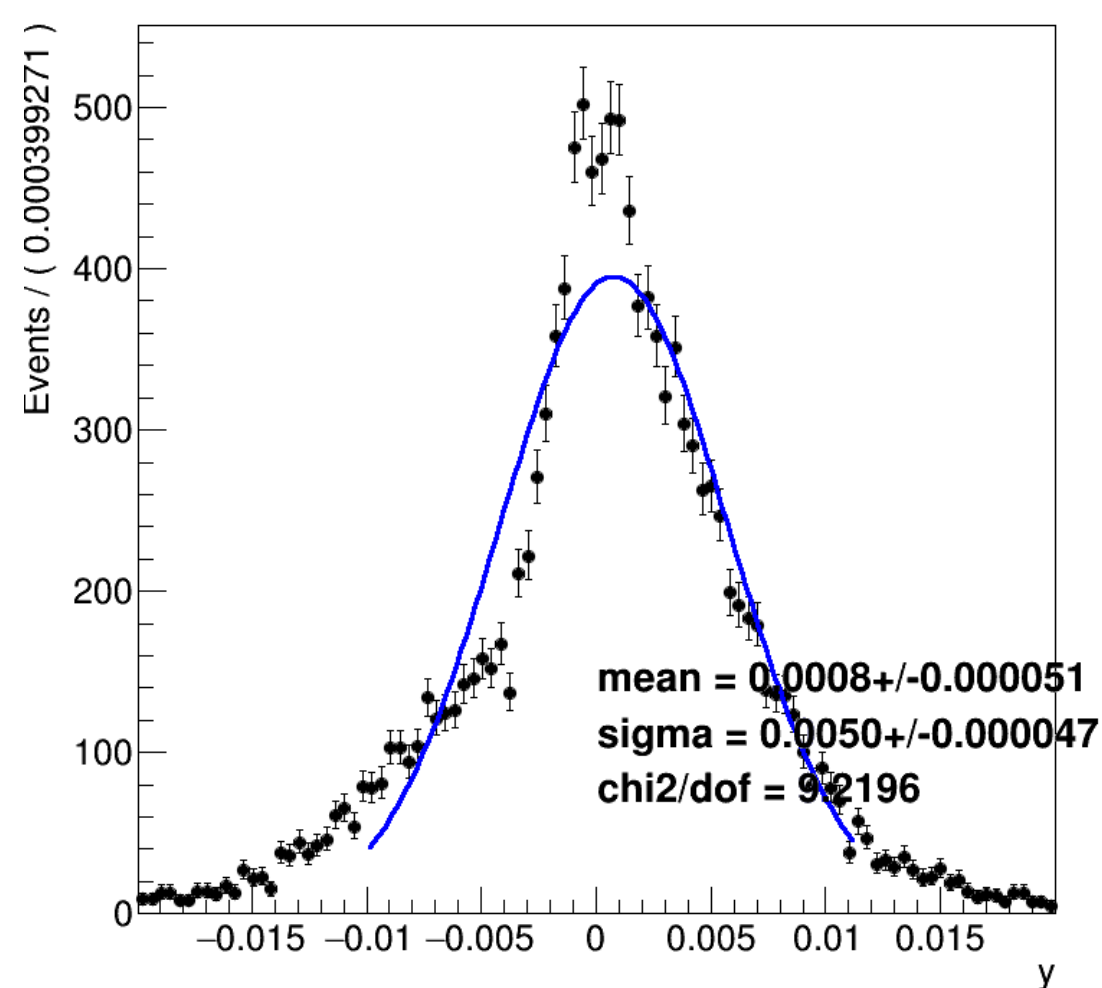
Tracking & PID performance

C.Zhang/11Nov2024

Tracking resolution



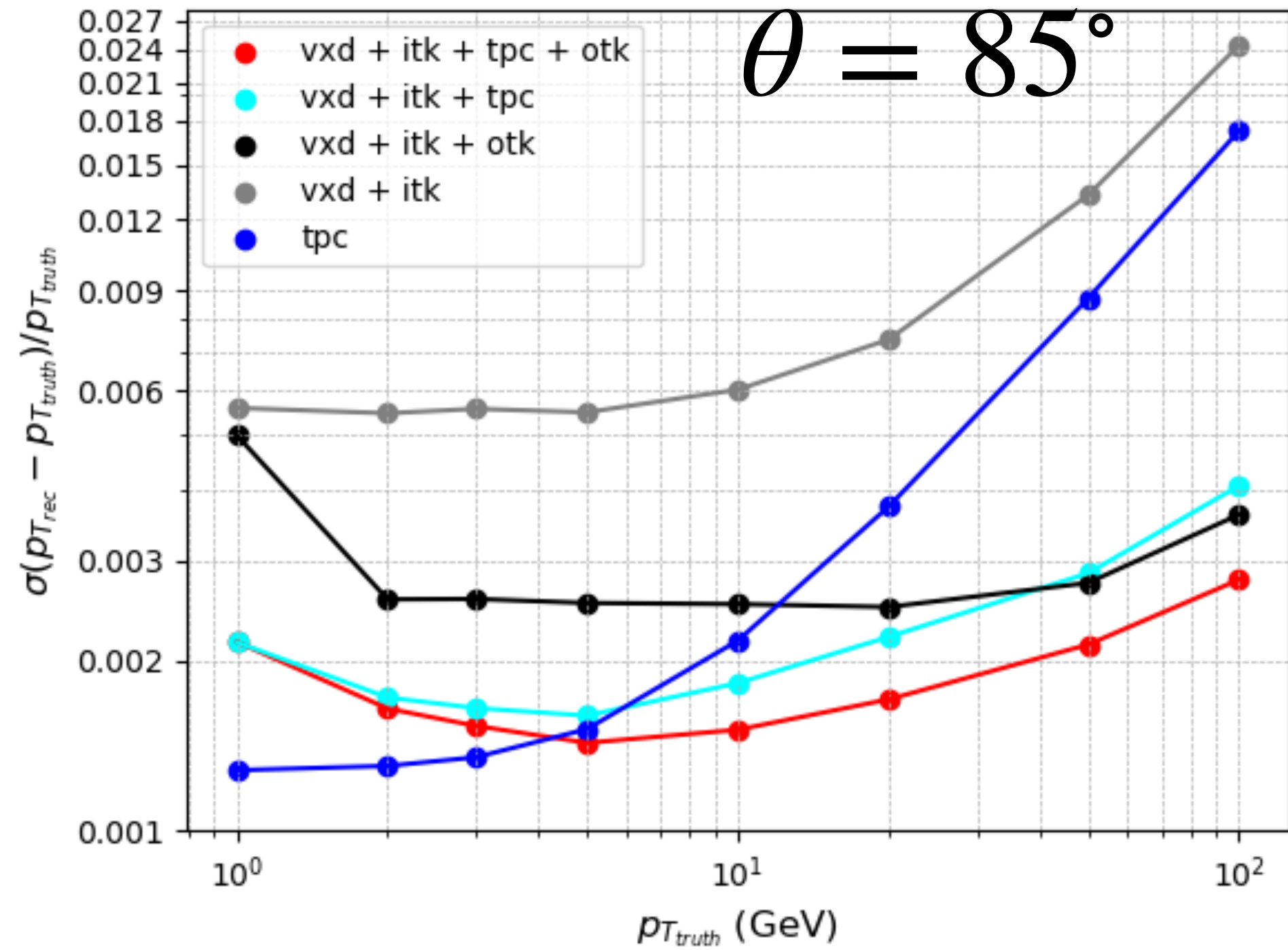
- SW release 24.10.0
- Particle gun muons (no FSR effects)
- Remove muons with $N_{trk} > 1$
- Fit distribution of $\frac{Rec_{p_T} - Gen_{p_T}}{Gen_{p_T}}$ in a sub-range of 2 sigma with Gaussian



- Globally the performance is fine
- For low p_T track there are more than one peaks on the distribution, working on that supervised by Chengdong Fu

Tracking resolution

- Full simulation

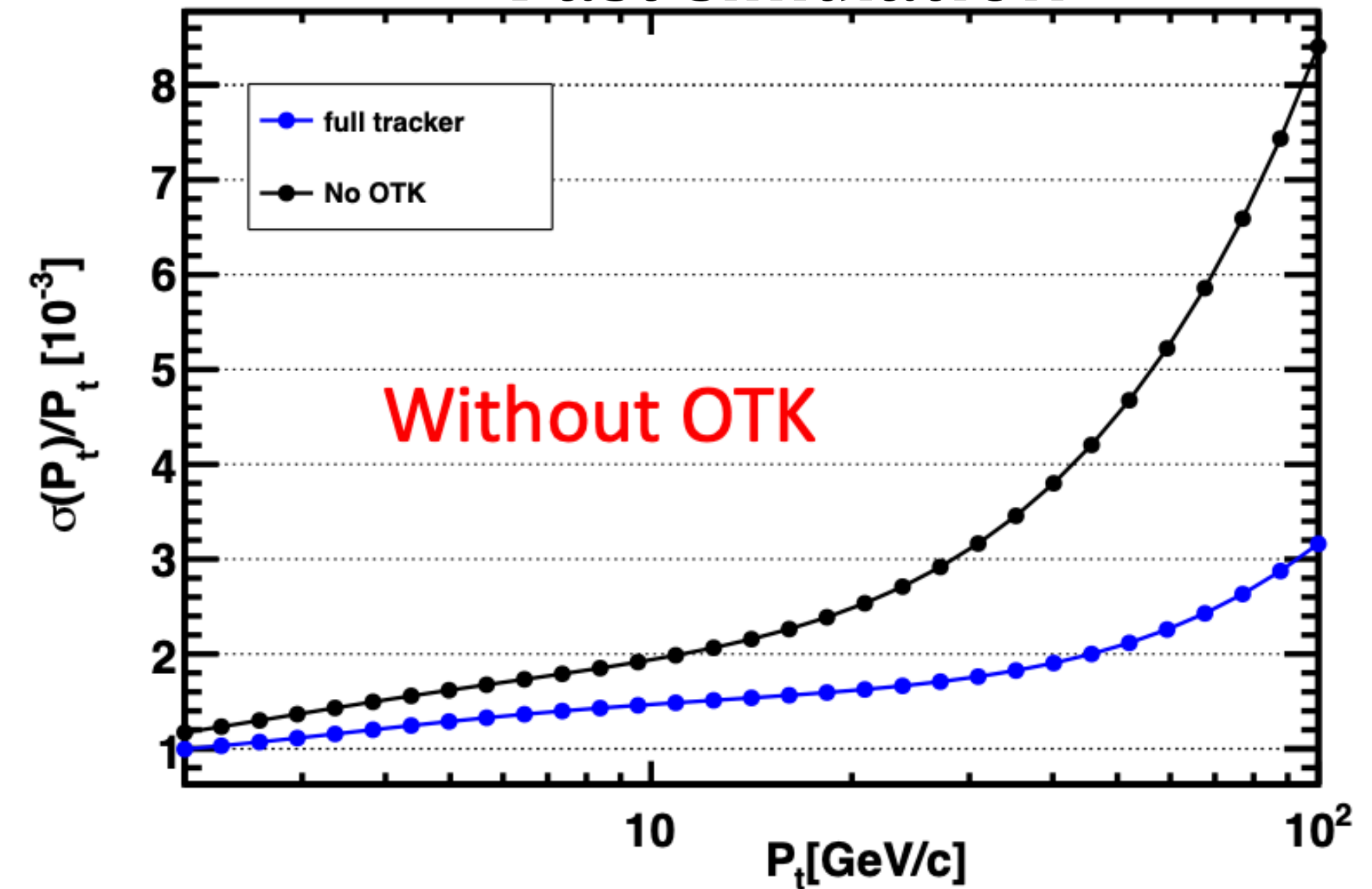


- For the impact from OTK

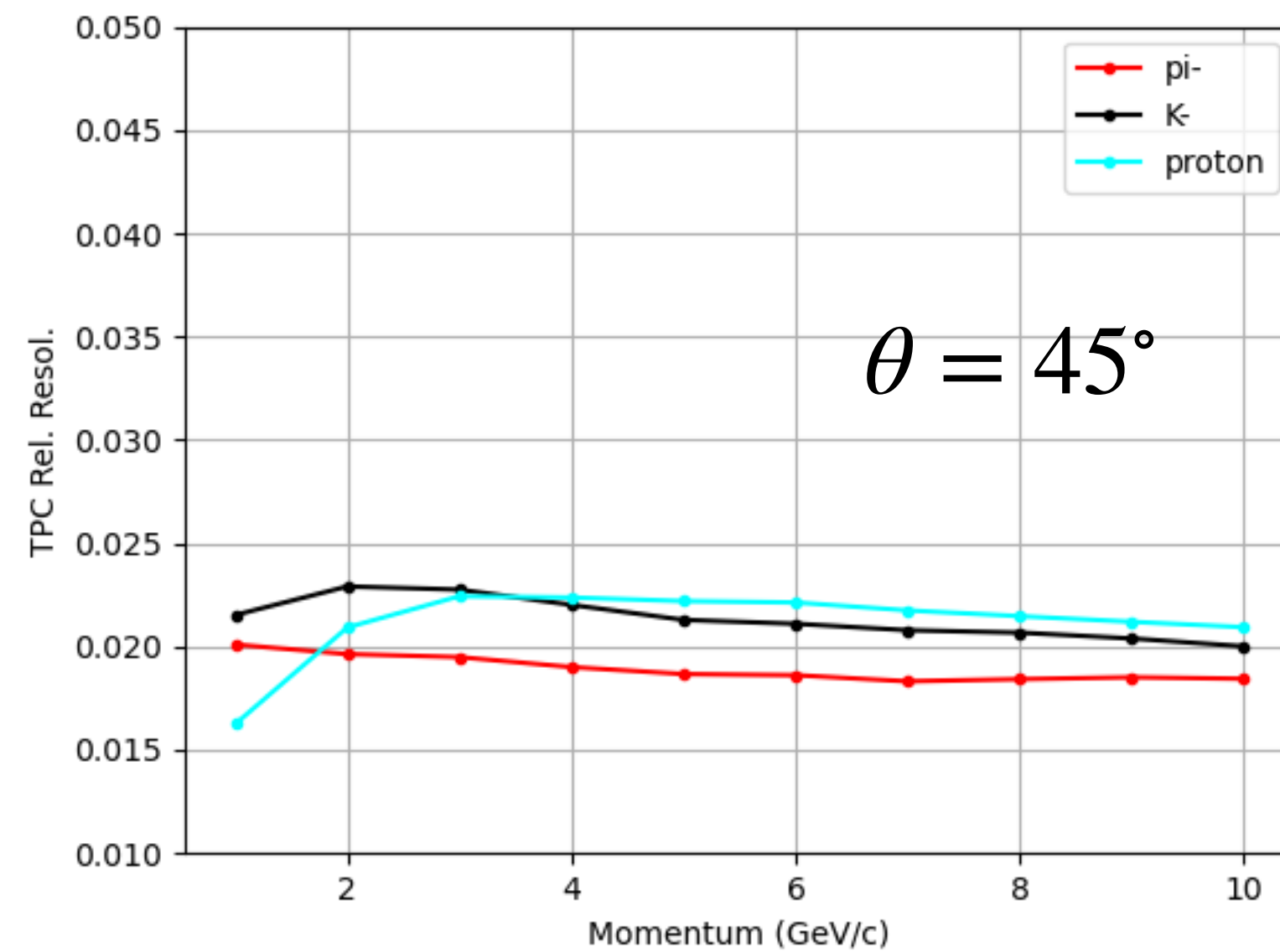
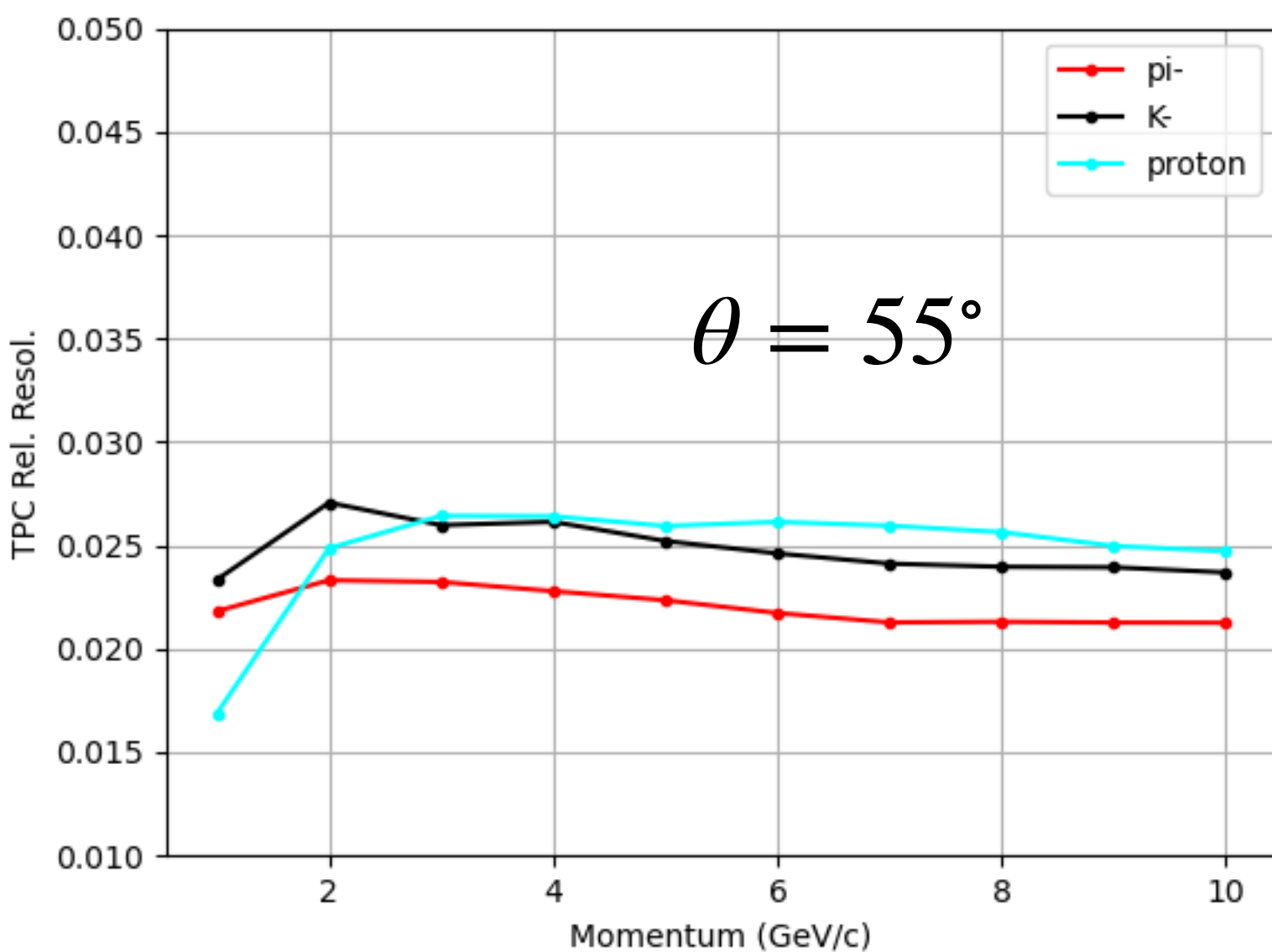
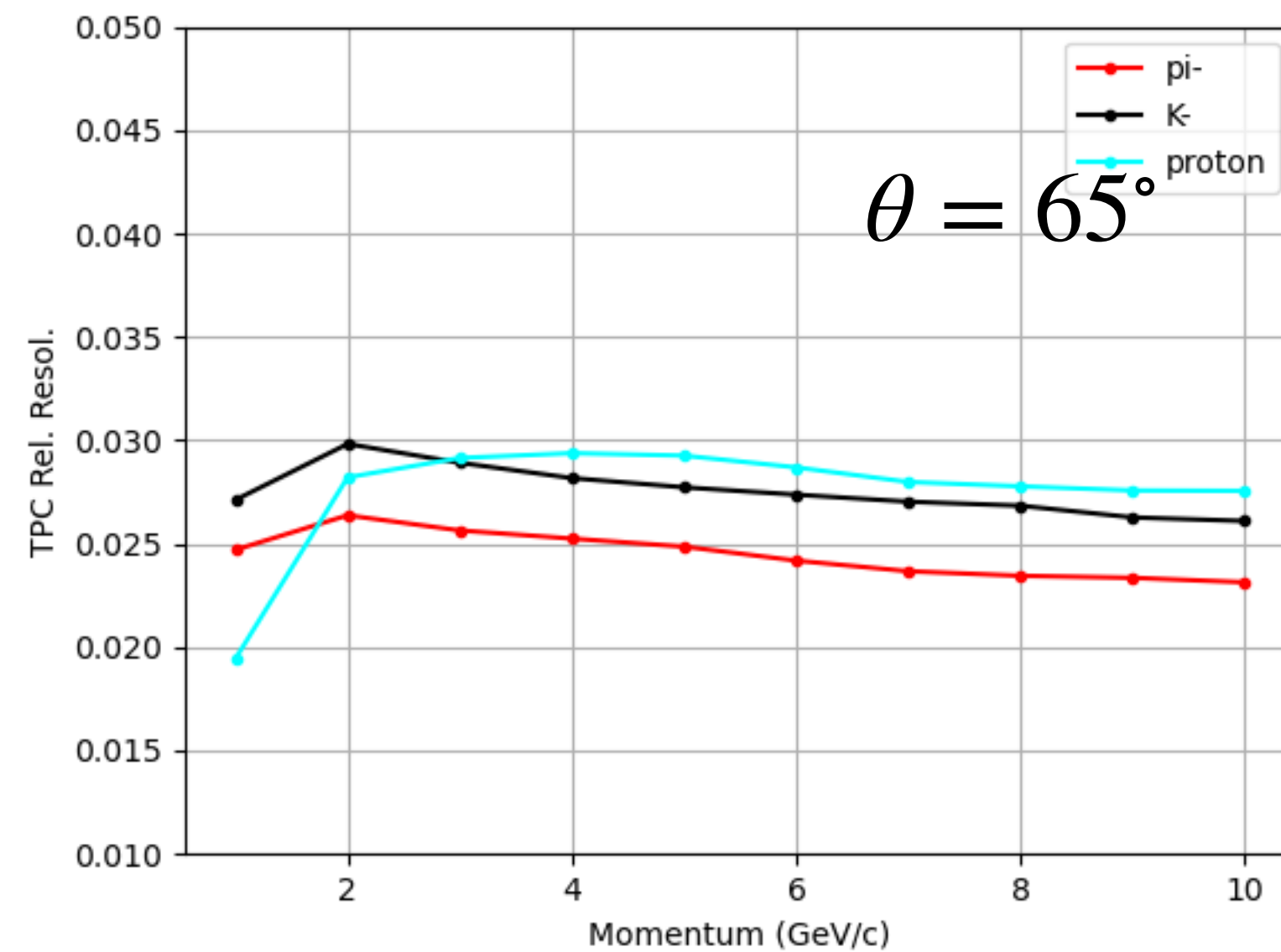
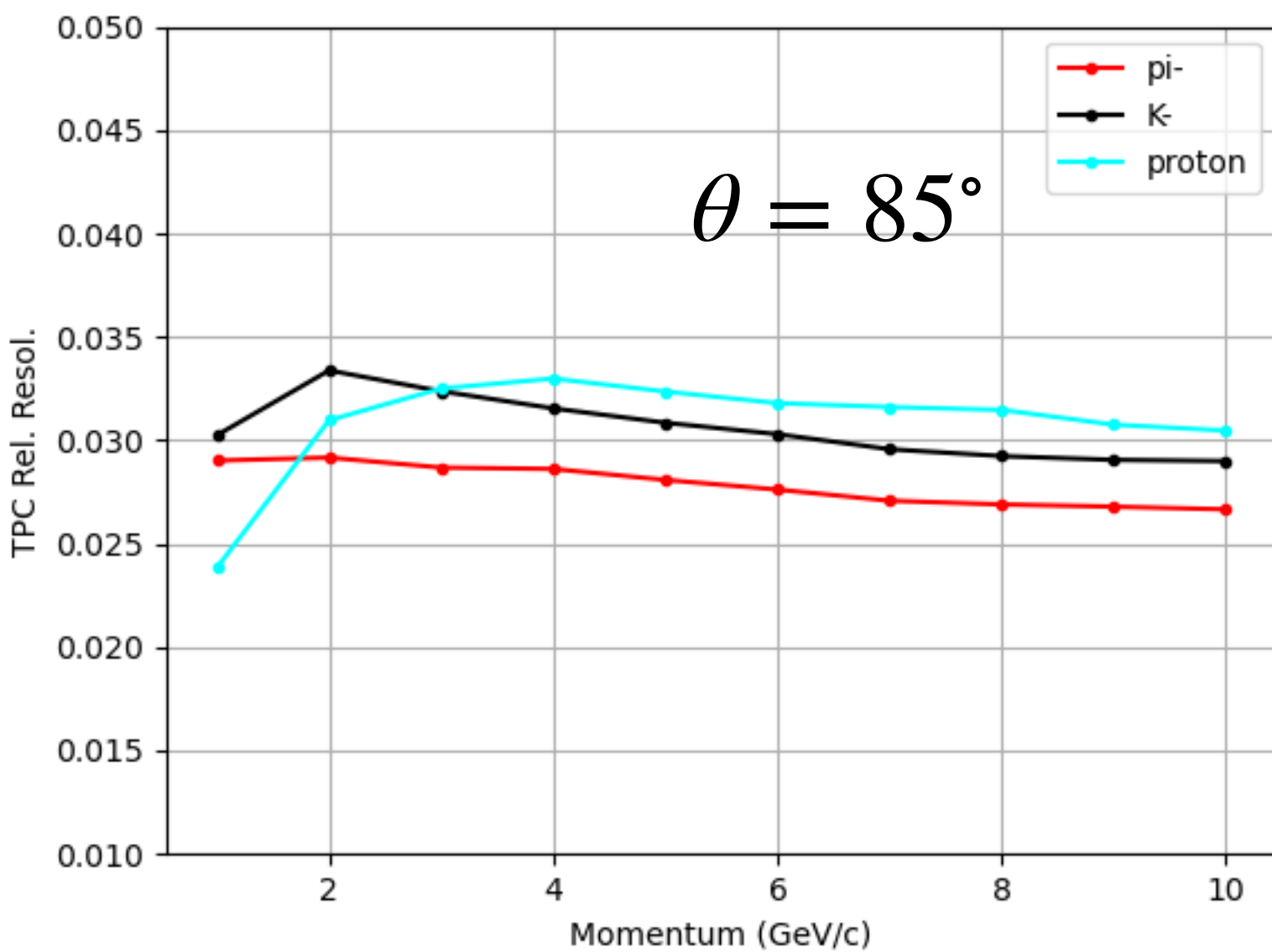
- Configuration used by fast simulation will be updated

$\theta = 85^\circ$

- Fast simulation



TPC dN/dx resolution



- Reference nima.2022.167835

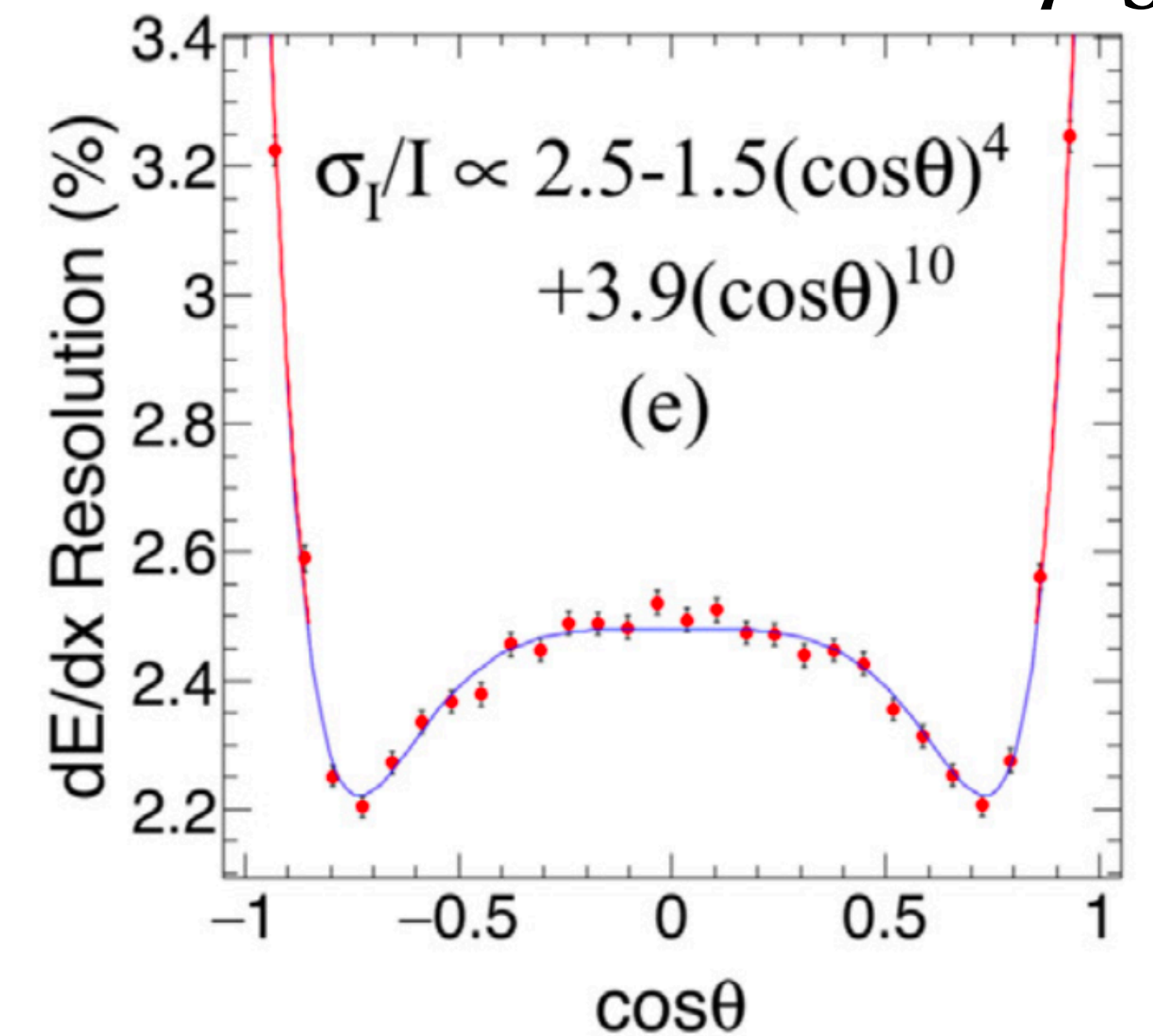


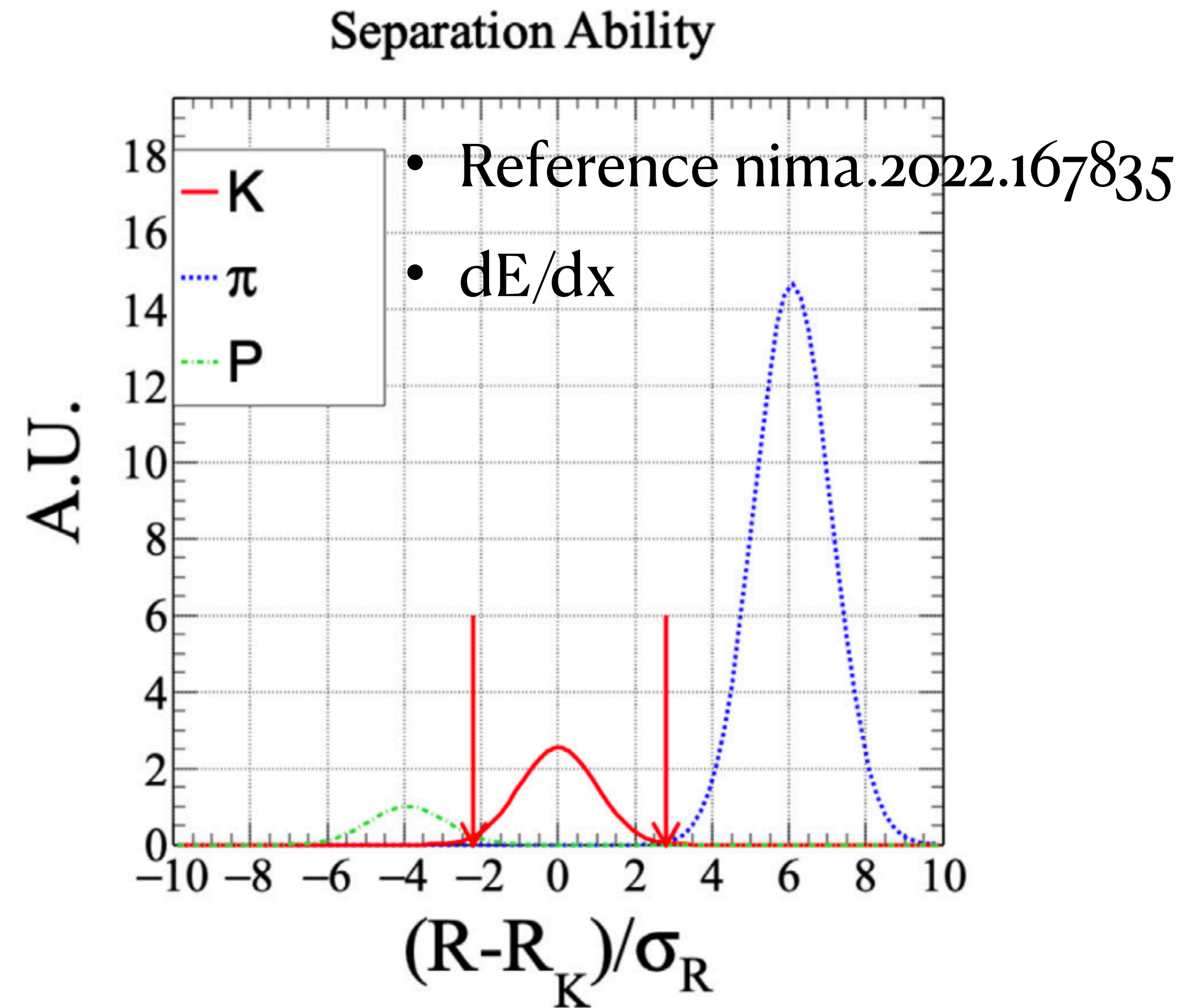
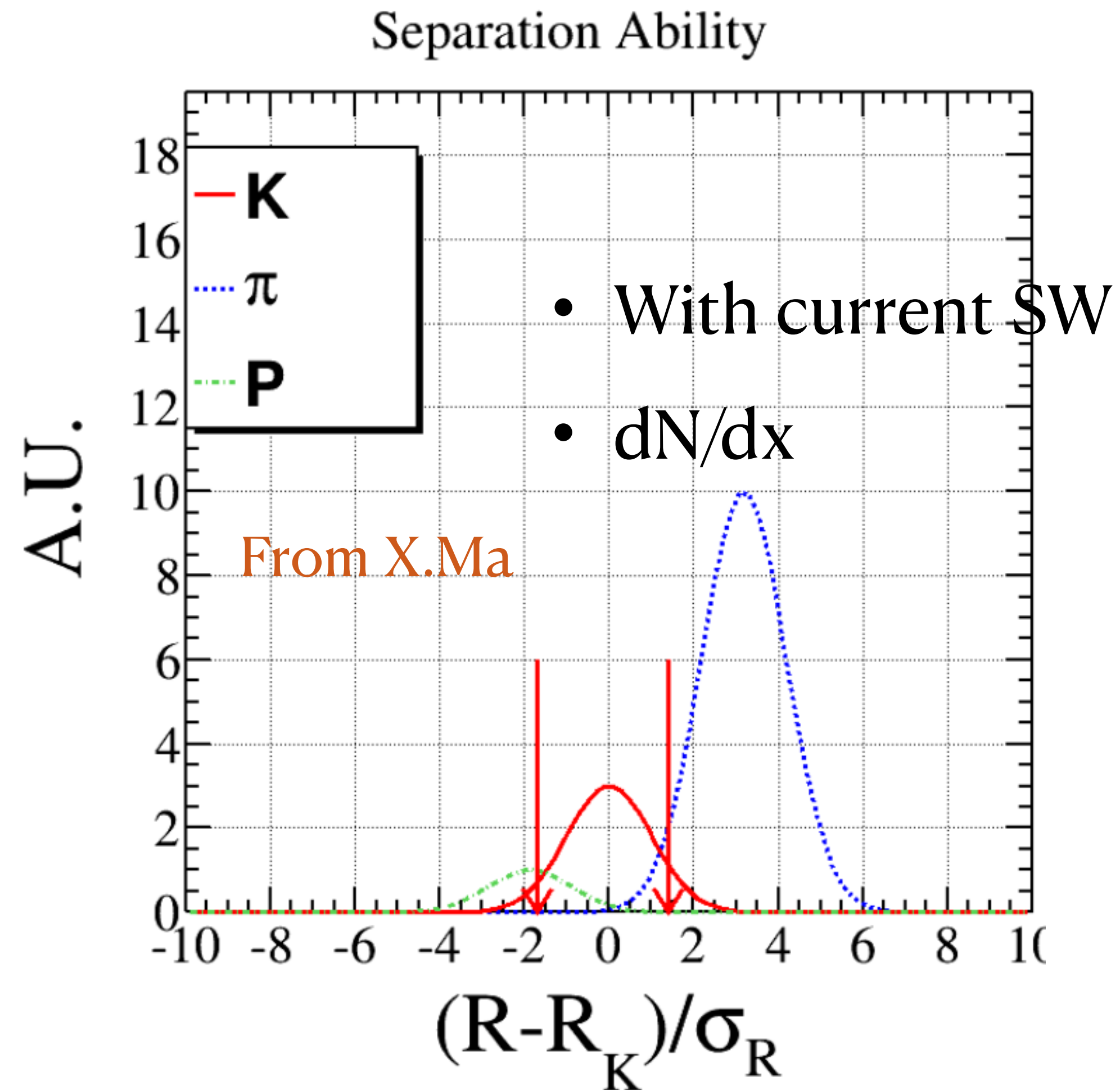
Table 3

The K^\pm identification performance with different factors, $\sigma_{actual} = fact$ with/without combination of TOF information at the Z-pole.

	Factor	1.	1.2	1.5
dE/dx	ϵ_K (%)	95.97	94.09	91.19
	pur_{K^+} (%)	81.56	78.17	71.85
dE/dx & TOF	ϵ_K (%)	98.43	97.41	95.52
	pur_{K^+} (%)	97.89	96.31	93.25

PID

- K/pi separation at 12GeV, $\theta = 72^\circ$



PID

- TPC PID workflow in SW

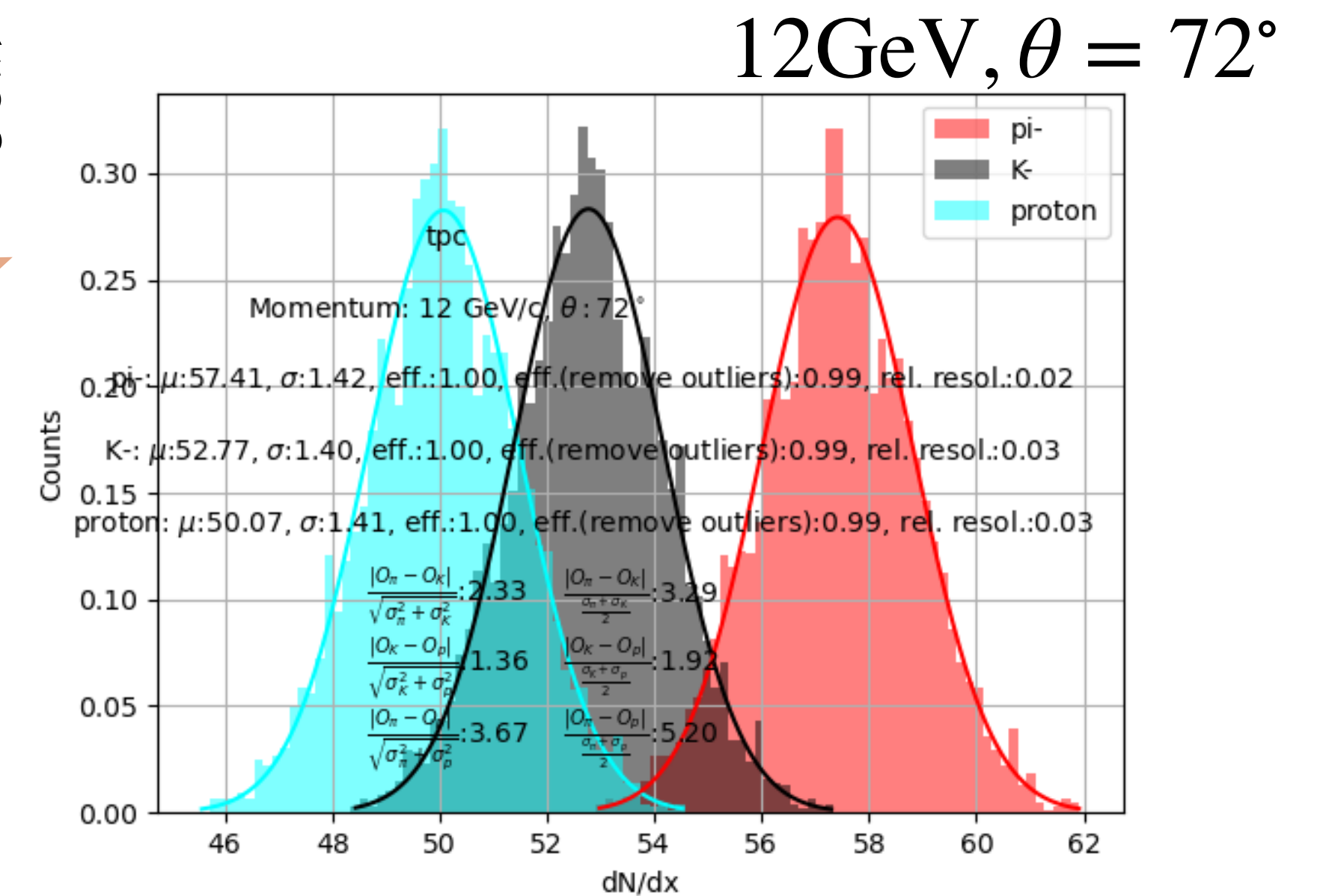
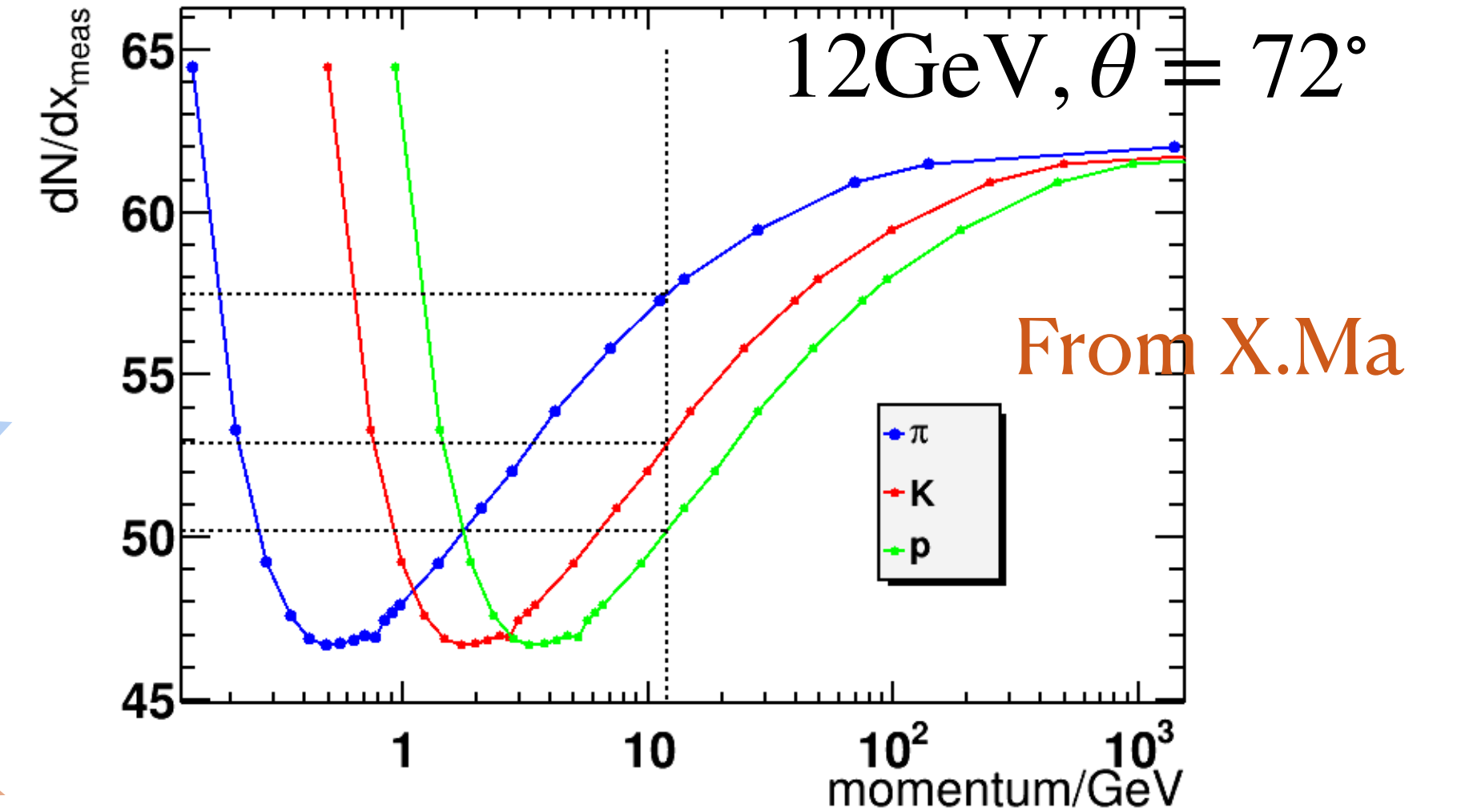
1. PID performance using Garfield (TPC settings, drift, diffusion, avalanche included)
2. Generate dN/dx LUT for ionisation mean and sigma
3. Incident particle gets its dN/dx and error from the LUTs

dN/dx curves from LUT

Agree

Simulated results based on the dNdx curves from LUT

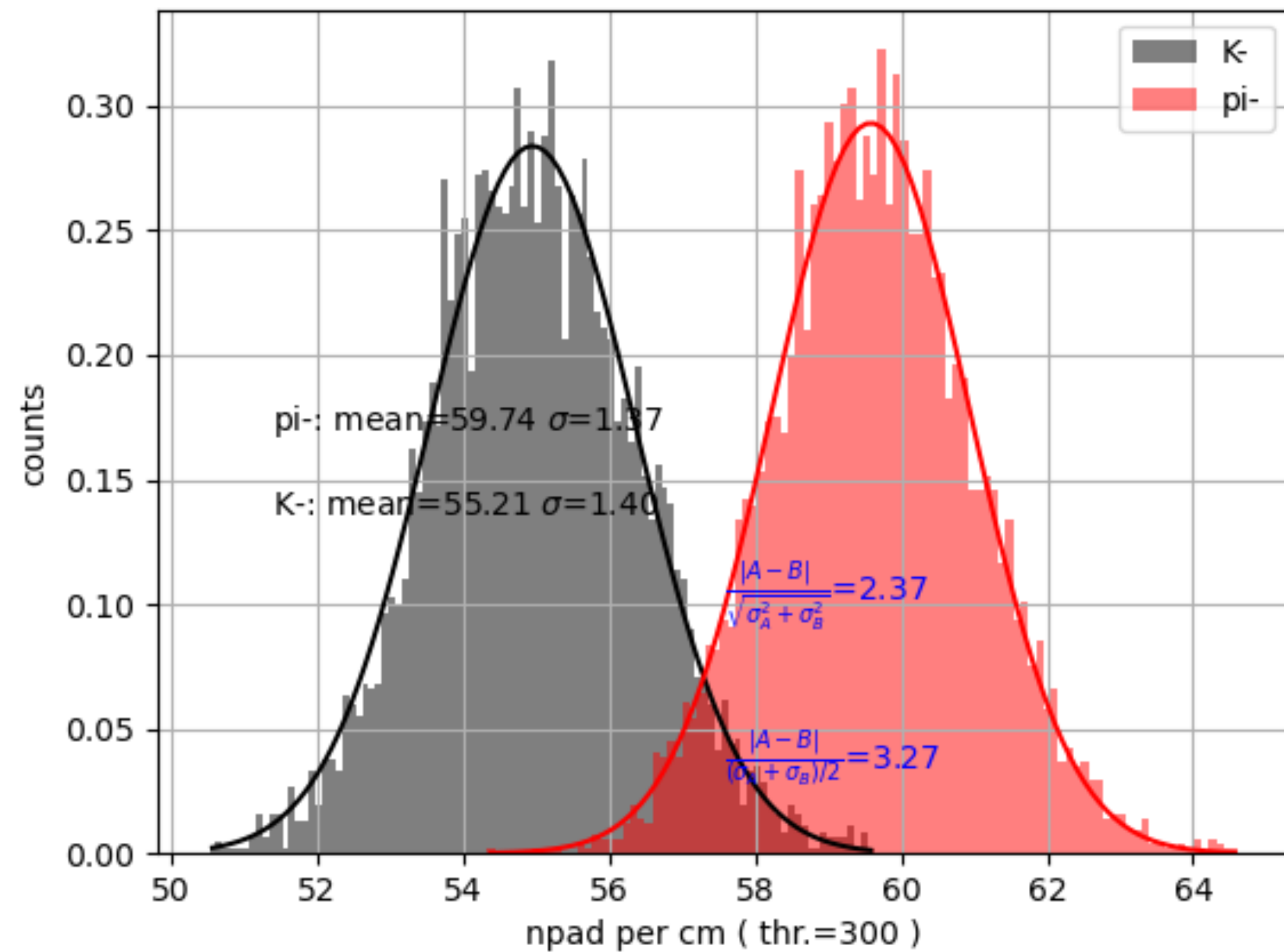
- A sanity check



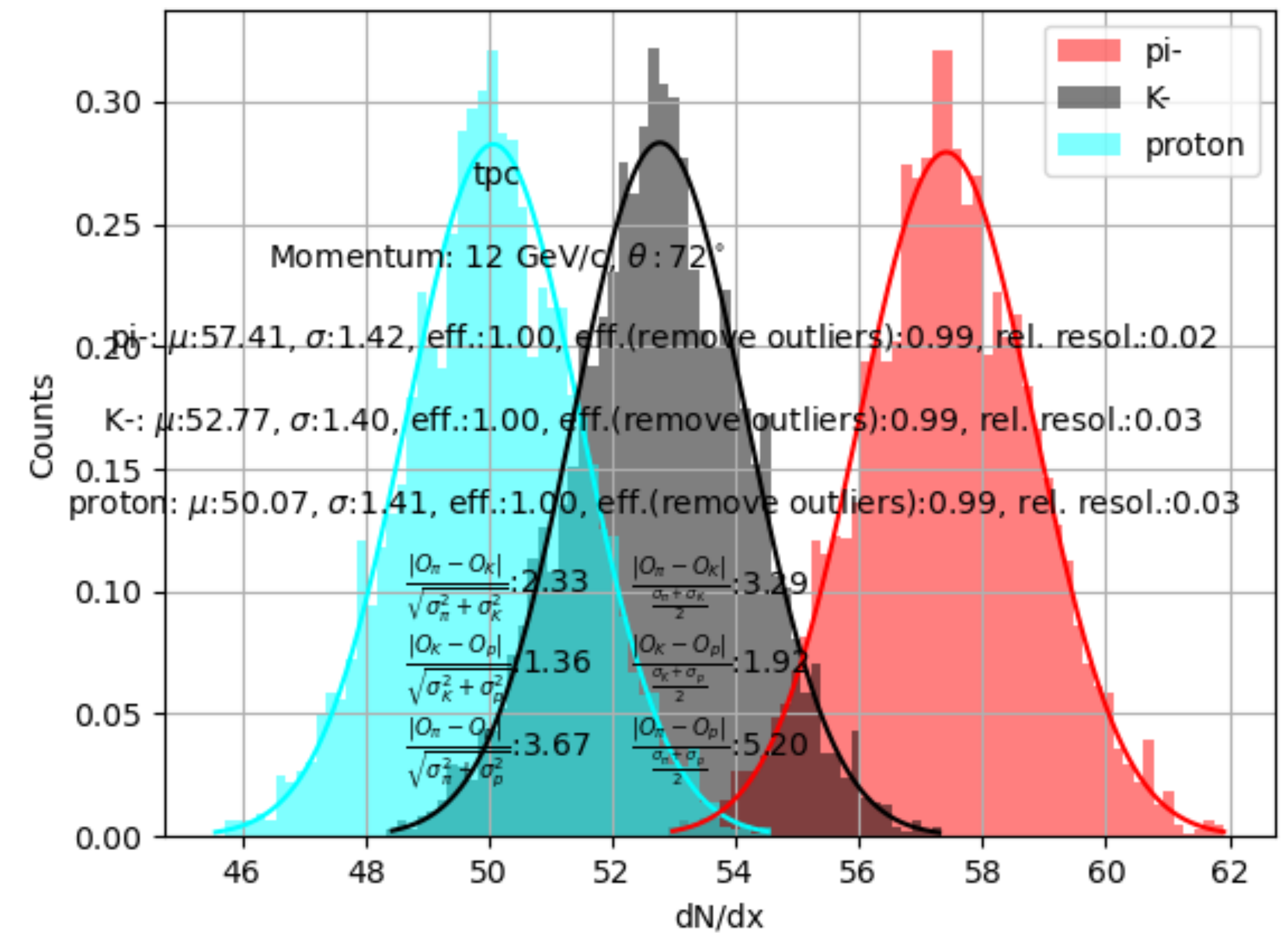
PID

- Check the input LUT using Garfield software standalone

- Garfield standalong 12GeV, $\theta = 72^\circ$



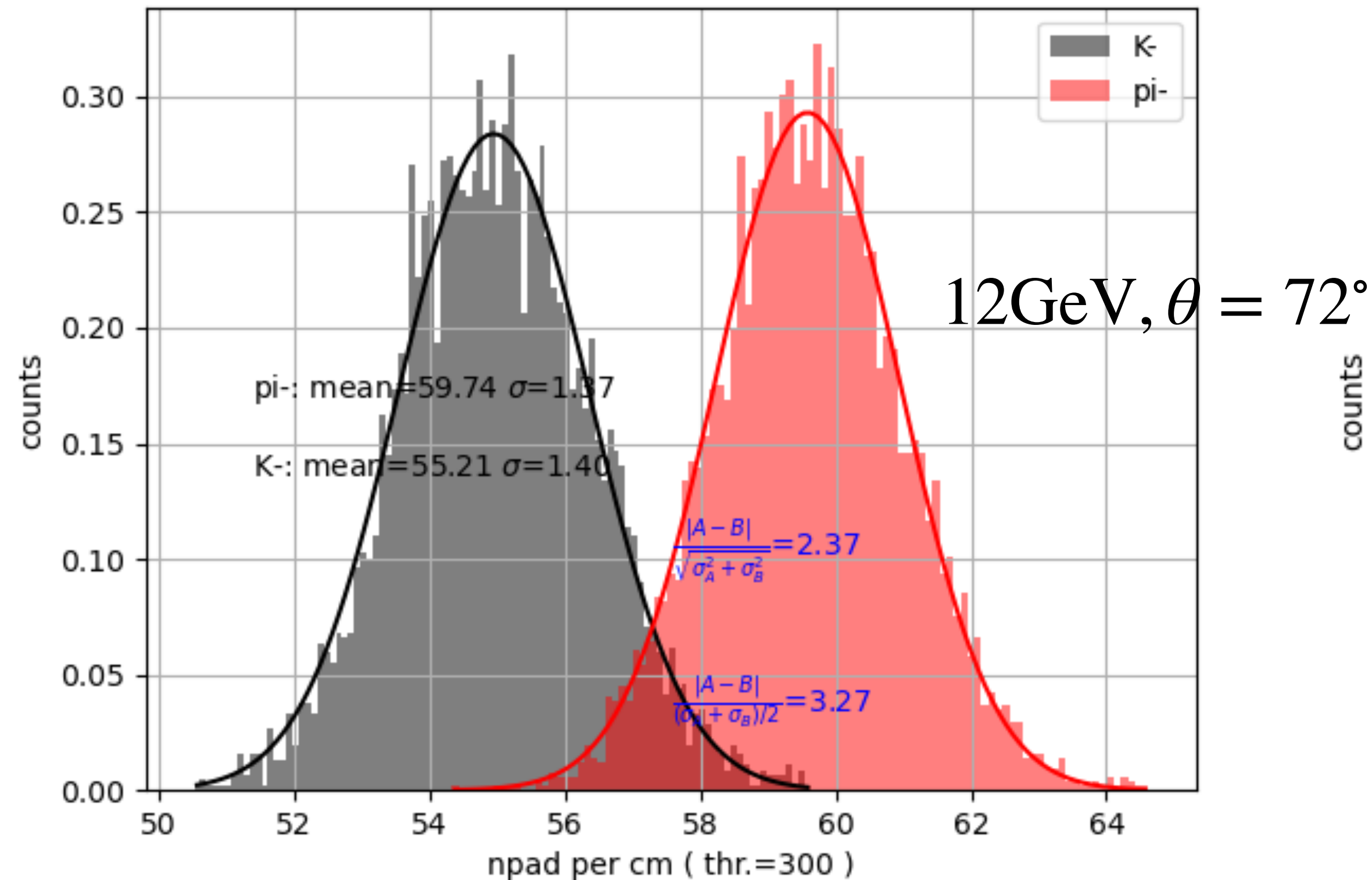
- From SW



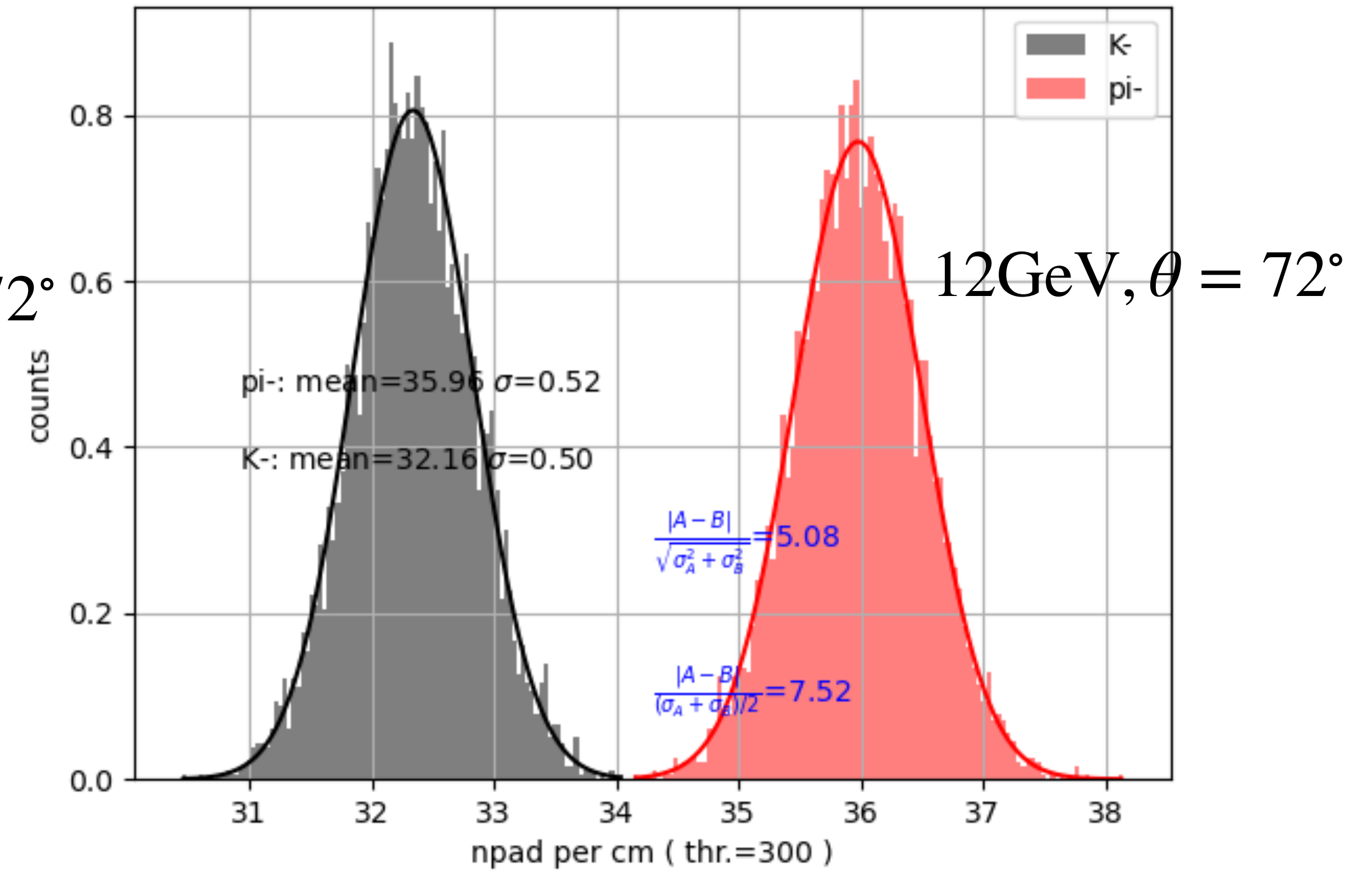
PID

- Check the input LUT using Garfield software standalone

- Garfield stand-alone (Rec)



- Garfield stand-alone (Truth)



- Hope to improve TPC dNdx PID algo. supervised by L.Wu, G.Zhao

Back up