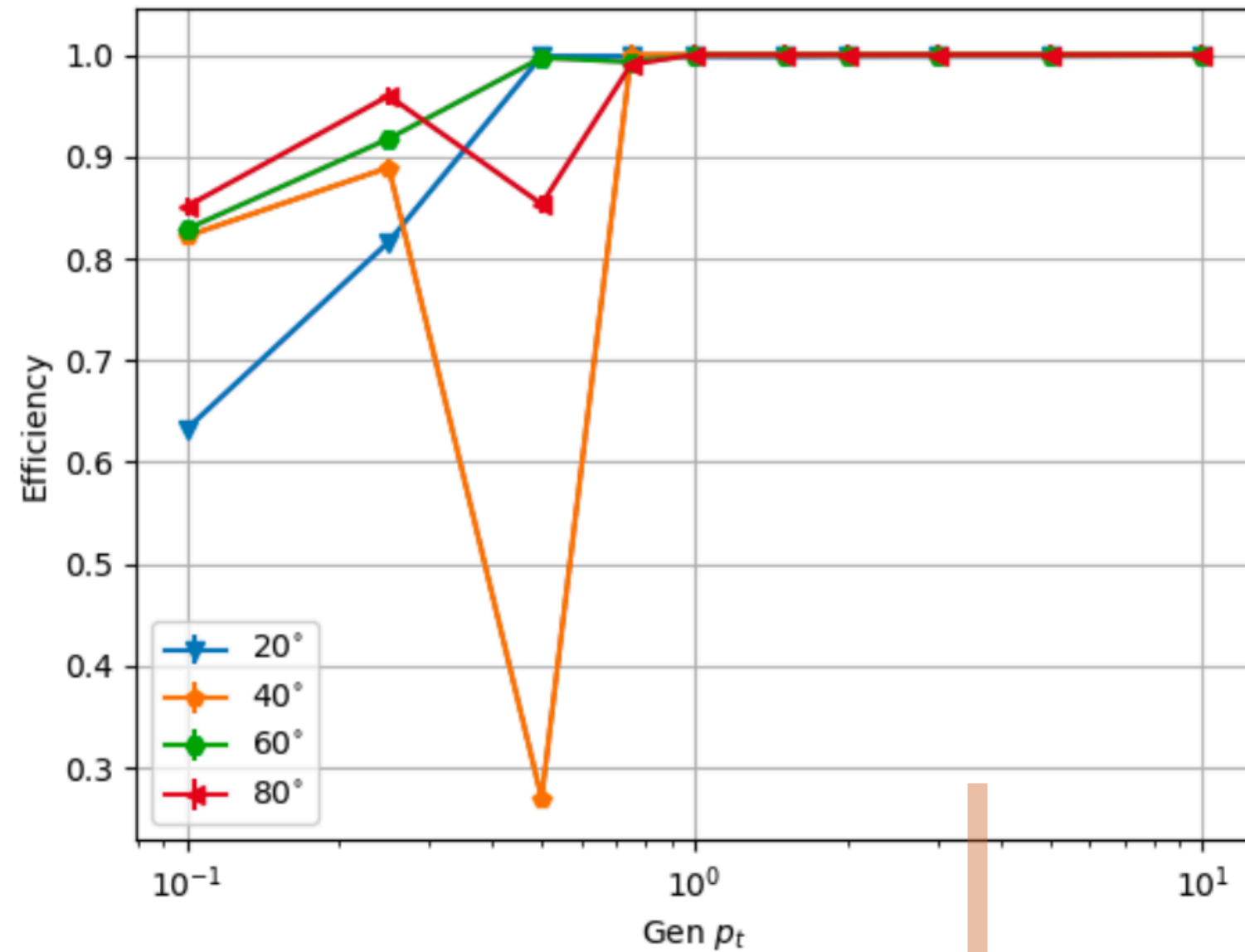


Tracking & PID performance

X.Ma, H.Zhu, **C.Zhang**/04Nov2024

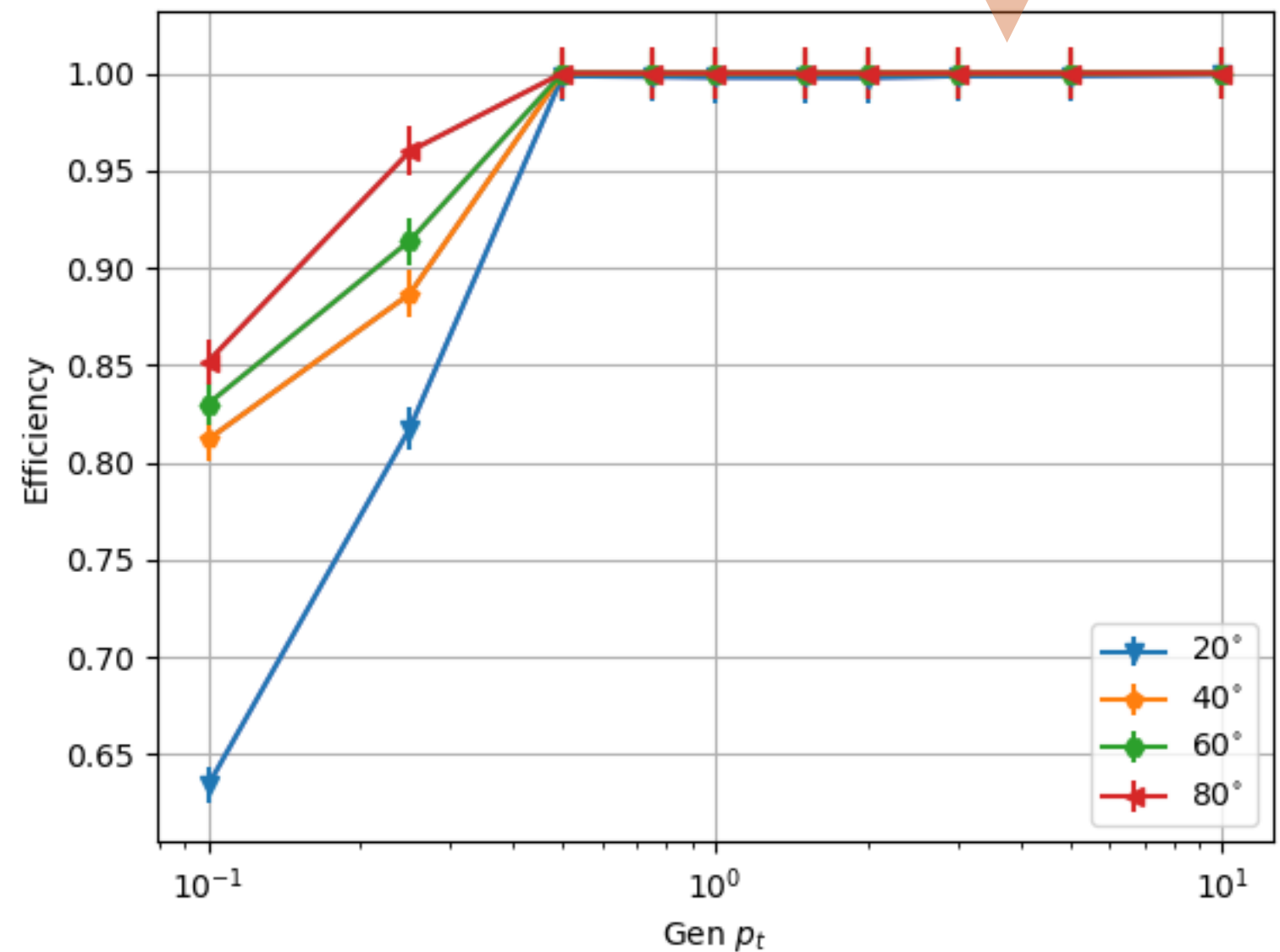
Tracking



- Trk Eff. touch 99% around 0.5 GeV based on new release of tdr.24.10.0

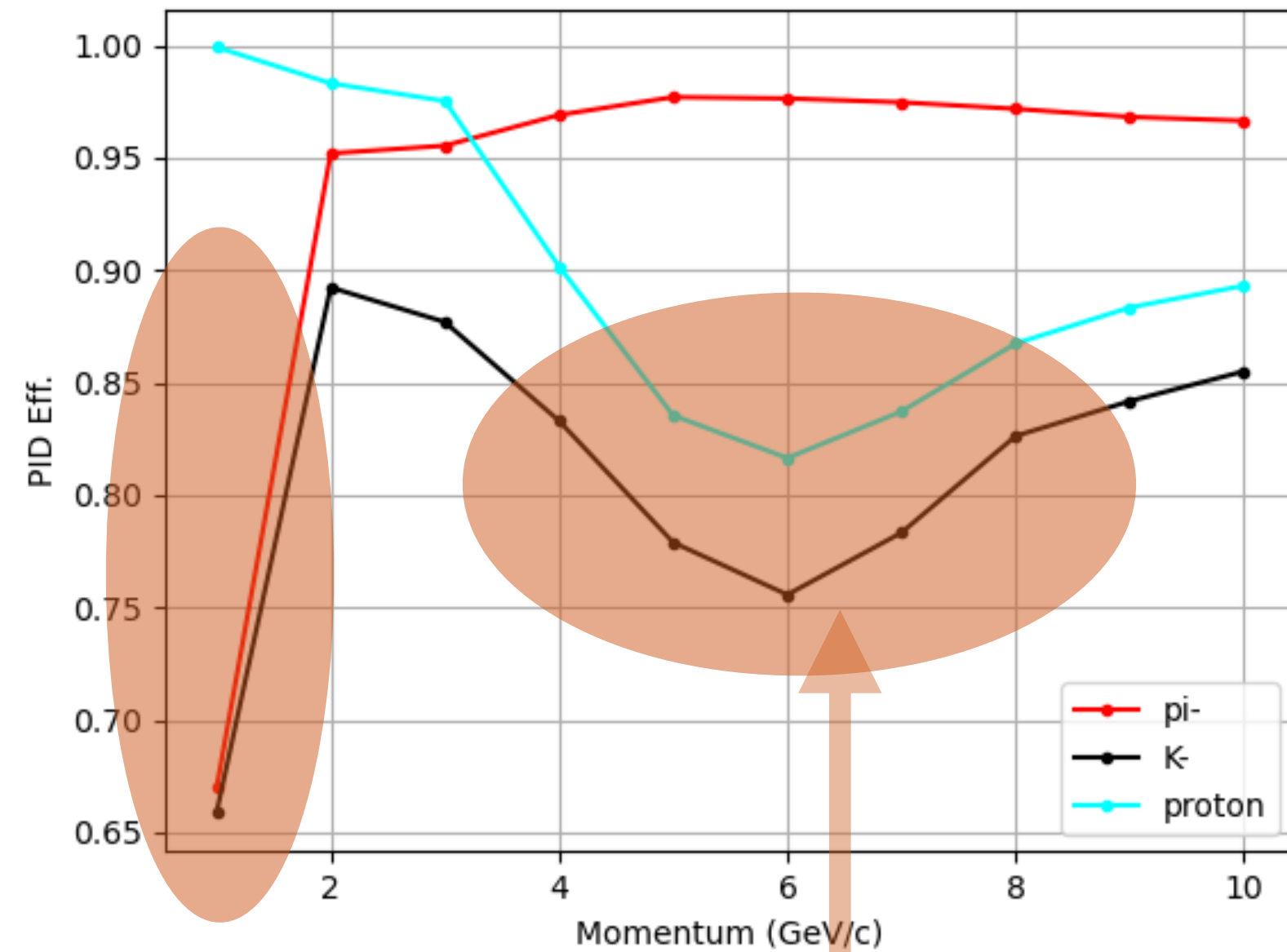
- !MR129, updates about TPC tracking

- Good news from Kaili and Fangyi, we have some understanding about multi-trks

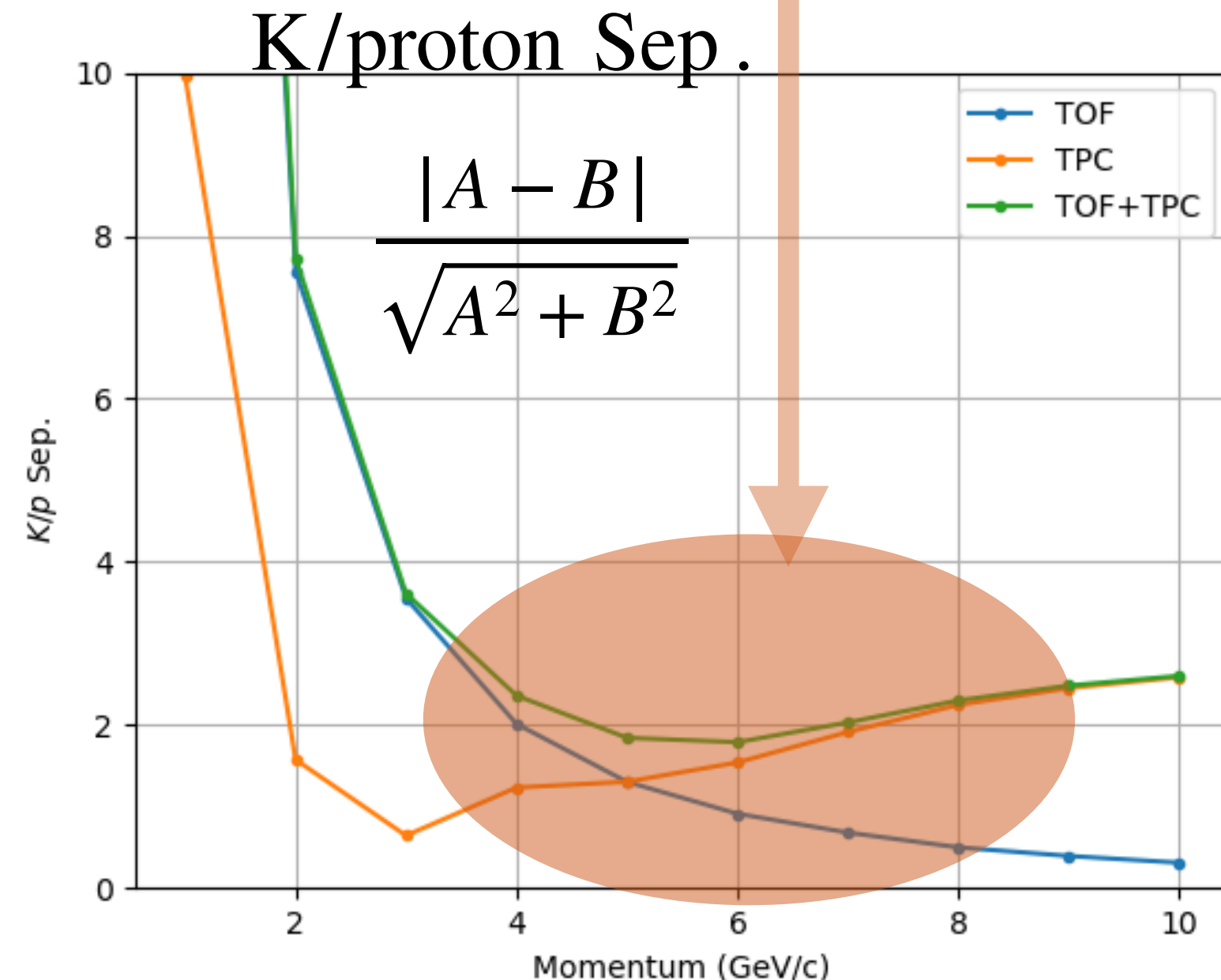


PID

Right PID Eff. @ $\theta = 45^\circ$

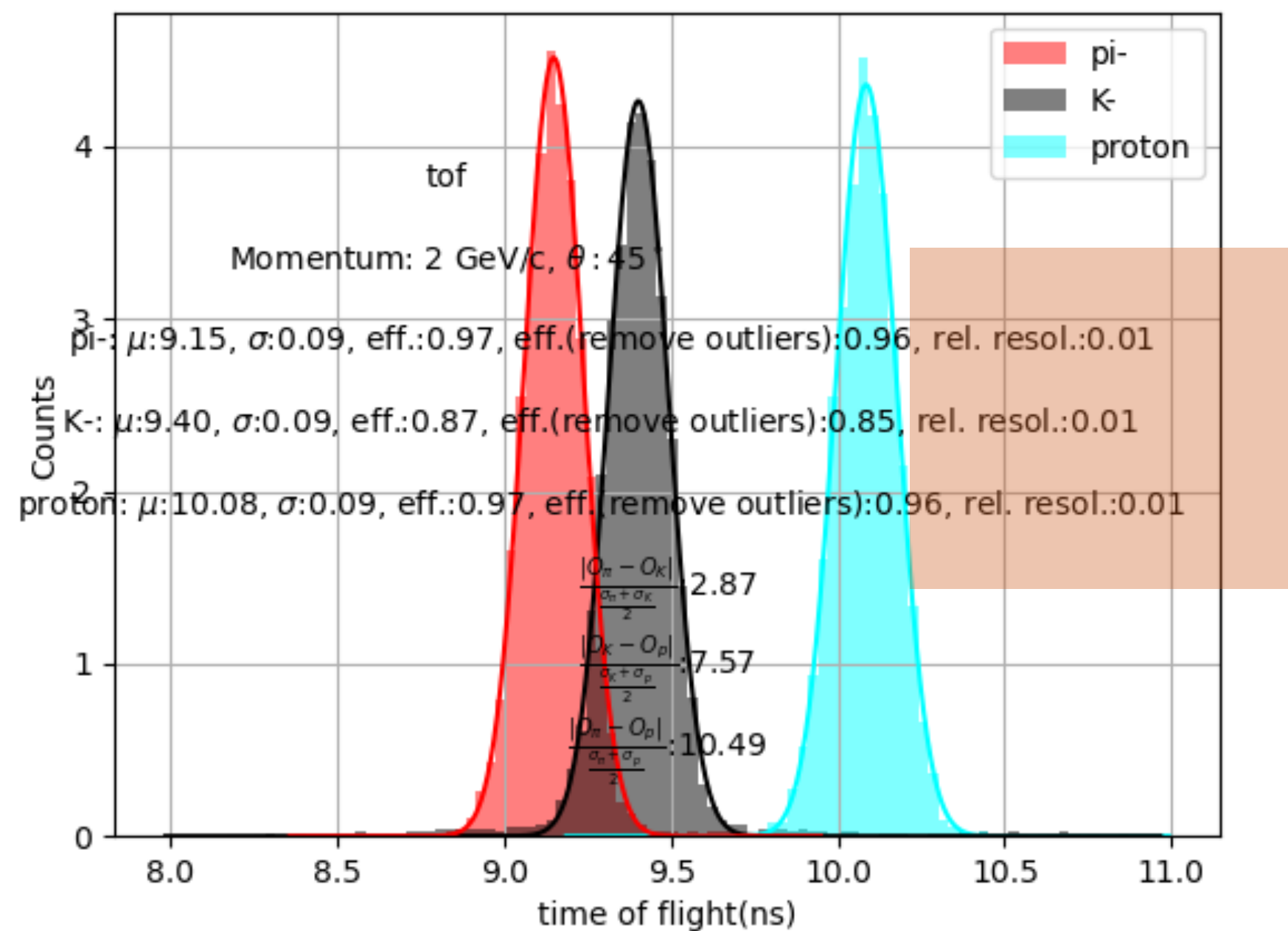


- Explained two PID Eff. drops around 1 GeV and 6 GeV respectively
 - 1 GeV, larger K/pi confusion because ToF efficiency gets loss (see previous presentations from Xiaotian)
- 6 GeV, larger K/p confusion because K/p separation power decreases
 - The relationship between separation power and PID efficiency can be described by sigma rule
 - Sep. power $5 - 3\sigma \sim$ C.L (Eff.) $1 - 99.97\%$
 - Sep. power $3 - 2\sigma \sim$ C.L (Eff.) $99.97\% - 68\%$



PID global performance

ToF distribution @ 2GeV, $\theta = 45^\circ$



- Checked PID Eff. and purity over momenta-theta space (see my presentation in the last working meeting)
 - Particle gun + assumption pi/K/p ~ 10:3:1, Eff/Pur ~ 80%/90%
- Noticing a potential issue on ToF resolution
 - ToF truth was smeared 50 ps ~ relative resol. 0.005 %
 1. Truth time itself has uncertainty because of sensor thickness, $c = 0.3\text{mm/ps}$
 - Has the ref. ToF resolution included this part already?
 2. Current reconstruction model assumes trajectory is determined by momenta and polar angle (ideal helix model)
 - Track length is a const. \rightarrow ToF is a const.

To do

- Gross check with Gas-chamber for more details
- Discussion with OTK group for the smear on truth ToF