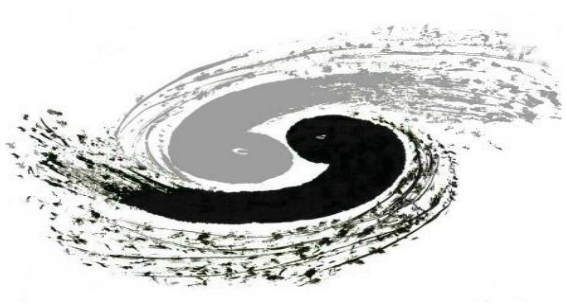


CEPC

Jets, samples and Wednesday working meeting

Kaili Zhang

zhangkl@ihep.ac.cn

On Sample Cross Section

E240

process	cross section	expect numbers of events in 20 ab^{-1}
Higgs boson production, cross section in fb		
$e^+e^- \to ZH$	196.9	4×10^6
$e^+e^- \to \nu_e\bar{\nu}_e H$	6.2	1.3×10^5
$e^+e^- \to e^+e^- H$	0.5	1×10^4
total	203.6	4.1×10^6
background processes, cross section in pb		
$e^+e^- \to e^+e^-(\gamma)$(Bhabha)	930	1.9×10^{10}
$e^+e^- \to q\bar{q}(\gamma)$	54.1	1.1×10^9
$e^+e^- \to \mu^+\mu^-(\gamma)$	5.30	1.1×10^8
$e^+e^- \to \tau^+\tau^-(\gamma)$	4.75	9.5×10^7
$e^+e^- \to WW$	16.7	3.3×10^8
$e^+e^- \to ZZ$	1.1	2.2×10^7
$e^+e^- \to e^+e^- Z$	4.54	9.0×10^7
$e^+e^- \to e^+\nu W^-/e^-\bar{\nu}W^+$	5.09	1.1×10^7

E360

process	cross section	expect numbers of events in 1 ab^{-1}
Higgs boson production, cross section in fb		
$e^+e^- \to ZH$	126.6	1.2×10^5
$e^+e^- \to \nu_e\bar{\nu}_e H$	29.6	2.9×10^4
$e^+e^- \to e^+e^- H$	2.8	2.8×10^3
total	159.0	1.6×10^5
background processes, cross section in pb		
$e^+e^- \to e^+e^-(\gamma)$(Bhabha)	325	3.25×10^8
$e^+e^- \to q\bar{q}(\gamma)$	23.2	2.3×10^7
$e^+e^- \to \mu^+\mu^-(\gamma)$	2.1	2.1×10^6
$e^+e^- \to t\bar{t}$	0.566	5.7×10^5
$e^+e^- \to WW$	11.3	1.1×10^7
$e^+e^- \to ZZ$	0.68	6.8×10^5
$e^+e^- \to e^+e^- Z$	5.83	5.8×10^6
$e^+e^- \to e^+\nu W^-/e^-\bar{\nu}W^+$	6.04	6.0×10^6

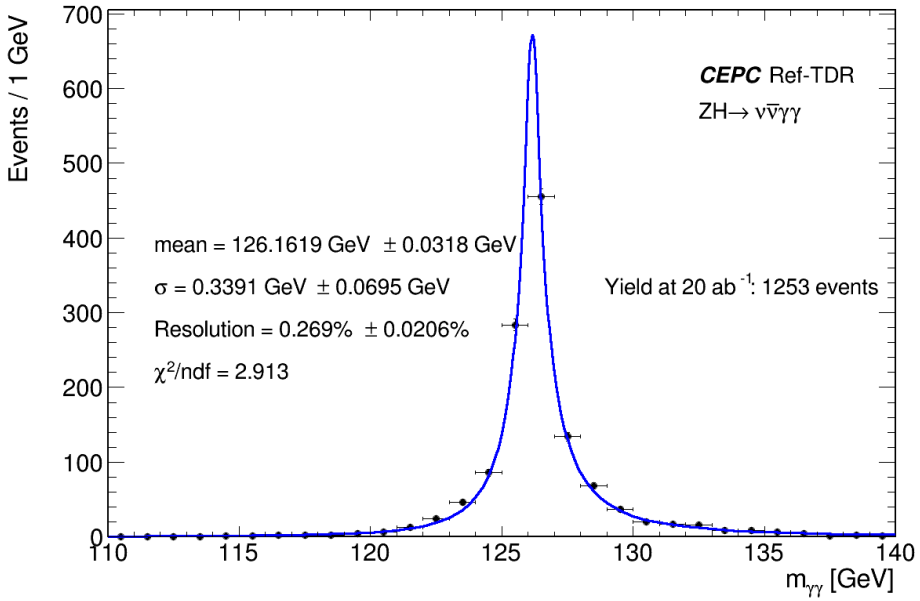
2Fermion qq ratio

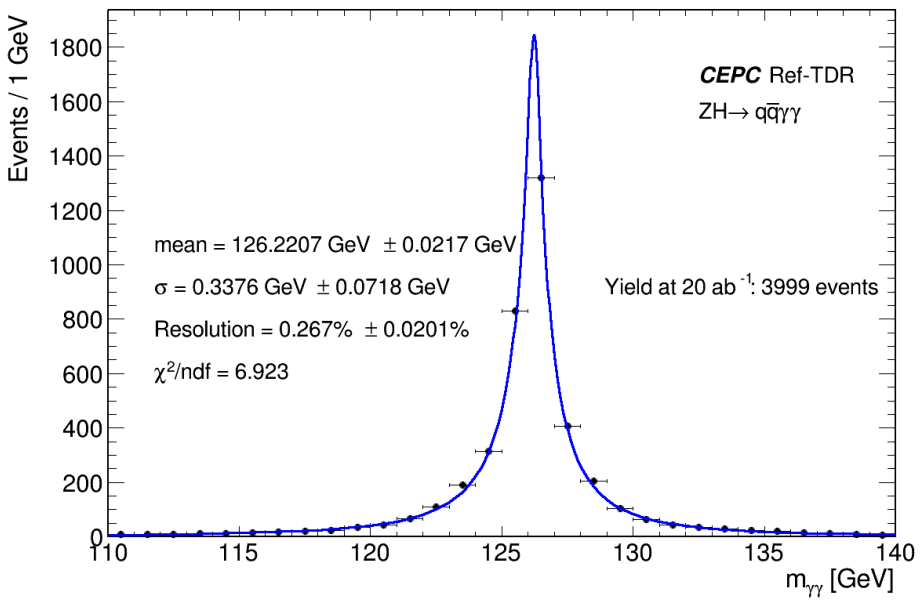
Results based in Whizard1.9.5, with ISR.

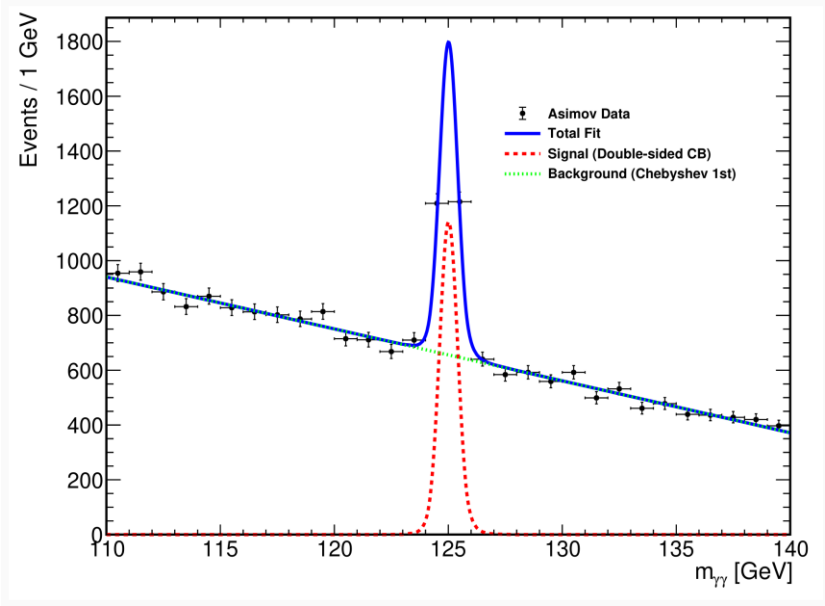
Zpole	pb	Ratio	E240	fb	Ratio	E360	fb	Ratio
bb	6706	21.93%	bb	10747	19.87%	bb	4547	19.72%
cc	5228	17.10%	cc	10935	20.22%	cc	4724	20.48%
dd	6709	21.94%	dd	10728	19.83%	dd	4539	19.68%
ss	6706	21.93%	ss	10774	19.92%	ss	4518	19.59%
uu	5230	17.10%	uu	10908	20.17%	uu	4736	20.54%
	30579			54093			23064	

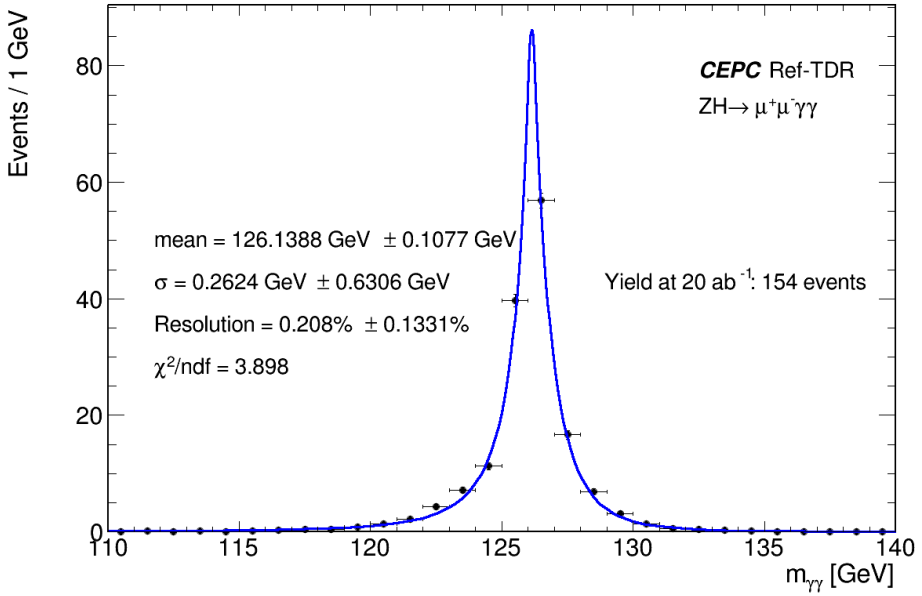
$H \to \gamma\gamma$ study

@Reda







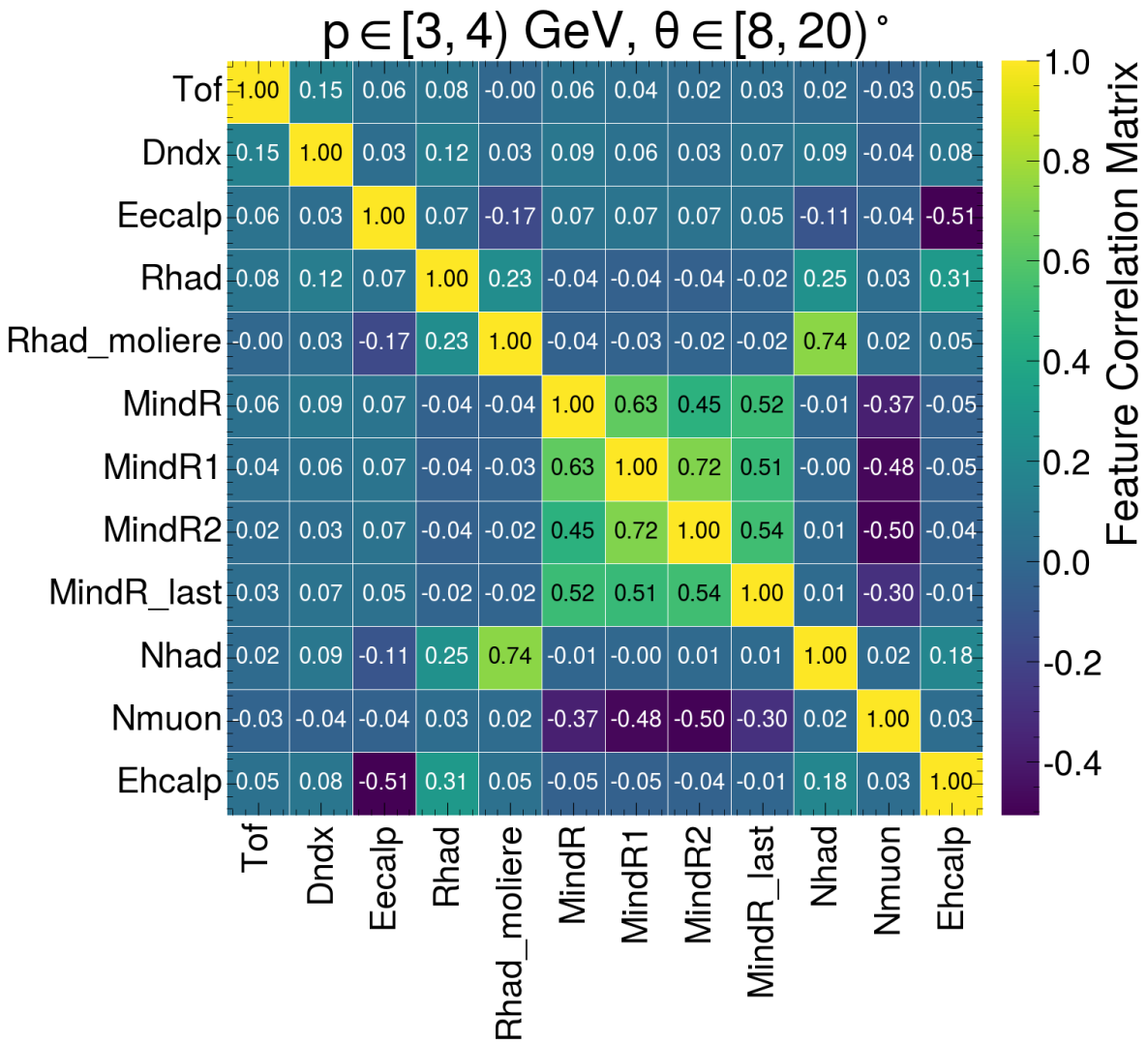


Signal/bkg shape ready for next step.

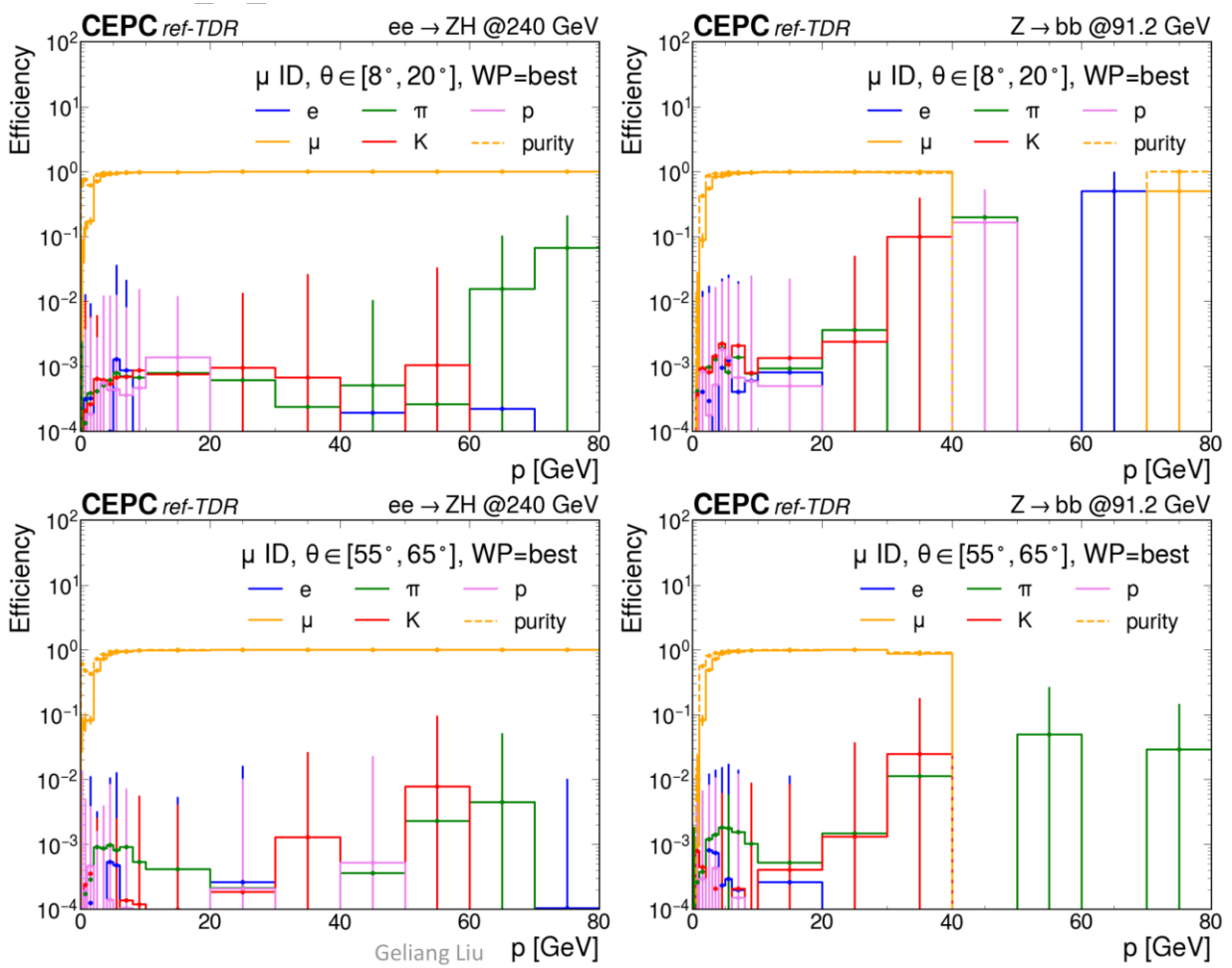
PID update

@Geliang

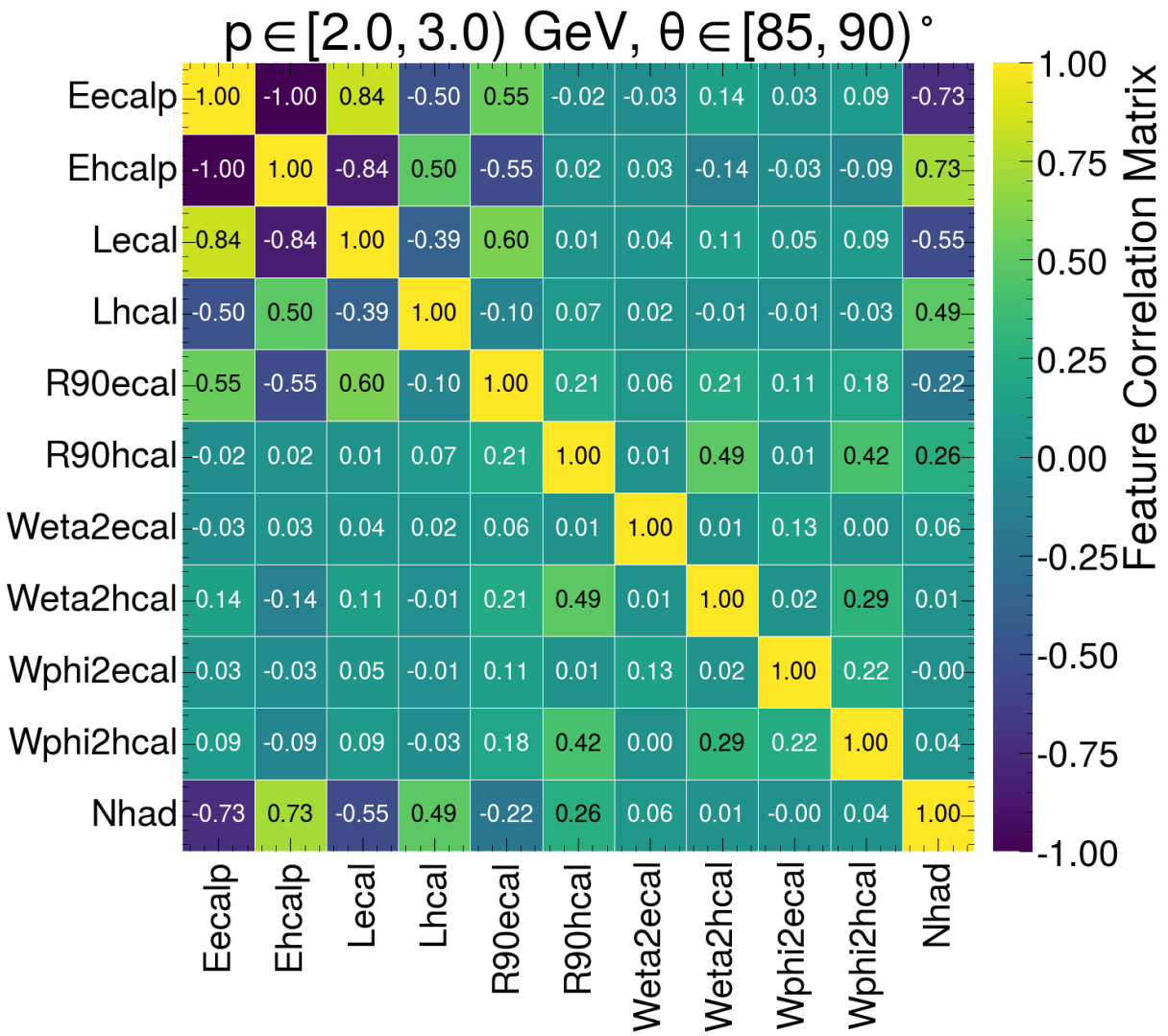
Importance@Correlation on XGBoost



Particle gun very difference, but ZH and Zbb comparable.

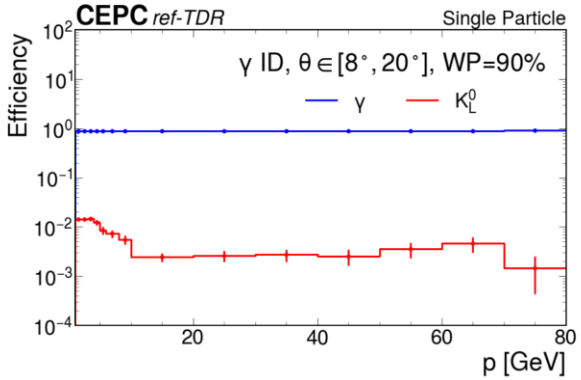


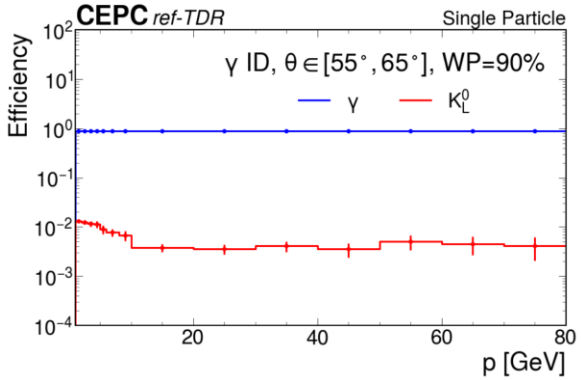
Preliminary Photon ID



Input features

- E_{ECAL}/p, l_{ECAL}, R^{90}_{ECAL}, W^{η}_{ECAL}, W^{ϕ}_{ECAL}
- E_{HCAL}/p, l_{HCAL}, R^{90}_{HCAL}, W^{η}_{HCAL}, W^{ϕ}_{HCAL}, $N_{hadClus}$





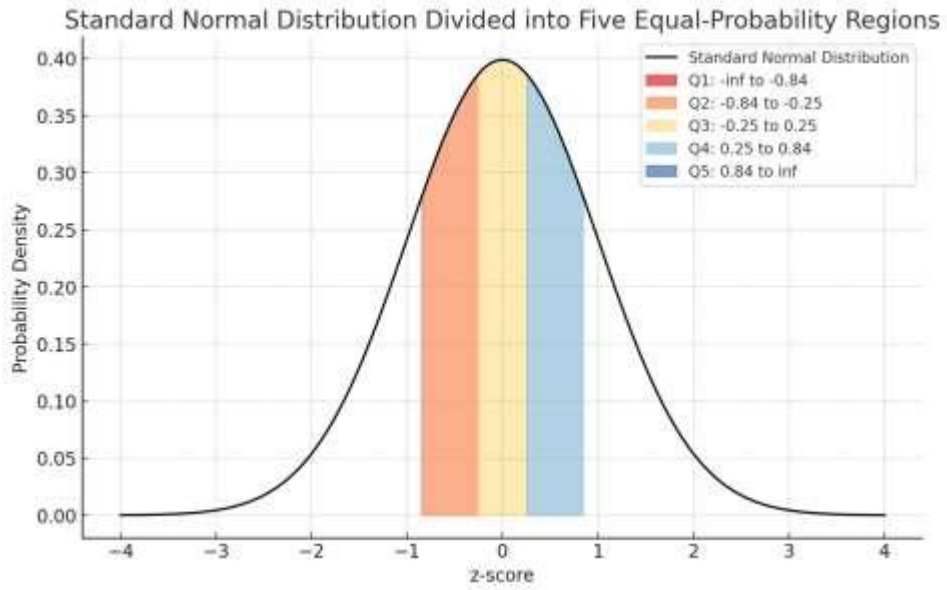
Generally gamma and Klong can be separated.

AFB asymmetry

@Han Shuo

CEPCSW 25.3.6	Z ->mumu	Z->tautau	Z->bb	Z->ee
Total	984396	187855	88200	**32397**
PID selection	907804	6691	9715	**3**
Z mass window	854634	7	0	**0**
|costheta|>0.05	827597	7	0	**0**
Wrong selection	2			
costheta > 0	421049	1	0	**0**
costheta < 0	406548	6	0	**0**
AFB	0.0175218			

- Add one uniform interference y*
- Simulate beam spread



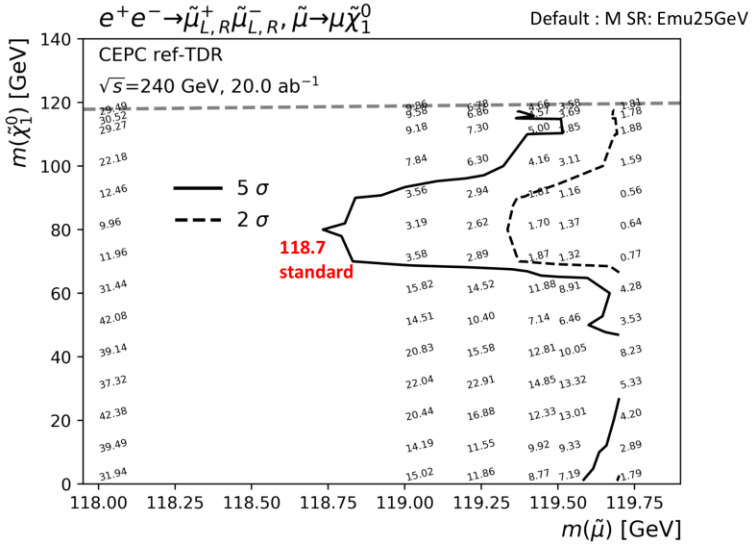
We calculated five types of uncertainties:

- Energy spread: result assuming gaussian distribution of Ecm with a 0.13% energy spread, compared with no energy spread, this uncertainty is 2 ×10−5
- The impact of γ*→μμ: result from counting forward/backward events, compared with fitting m(μμ), this uncertainty is 1 ×10−5
- The acceptance of |cos(θ)| > 0.05 and other kinematic cuts: result by cutting on MC particles, compared with nominal result, this uncertainty is 7 ×10−6
- The θCM resolution: result by using PFO, compared with the result using their ΔR<0.05 matched MC particles, this uncertainty is 5 ×10−6
- The uncertainty from mis-identification and backgrounds are smaller than 1 ×10−6

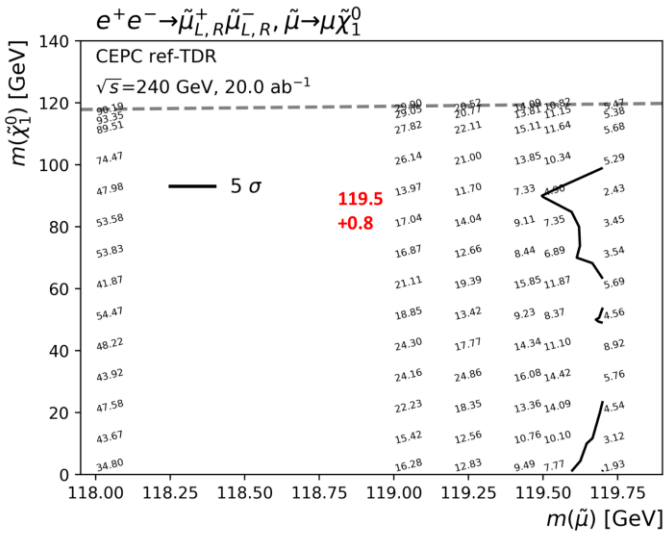
Smuon Errors

@Lyu Feng

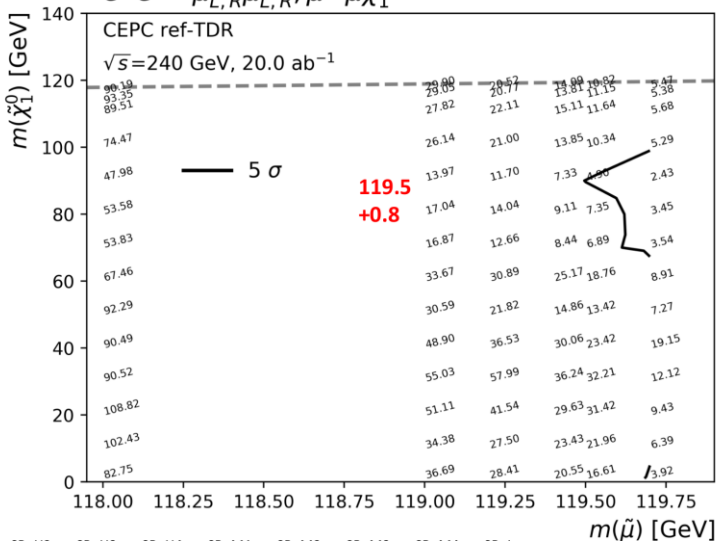
1. Current stat. ⊕ 5% sys, no muid **Standard**



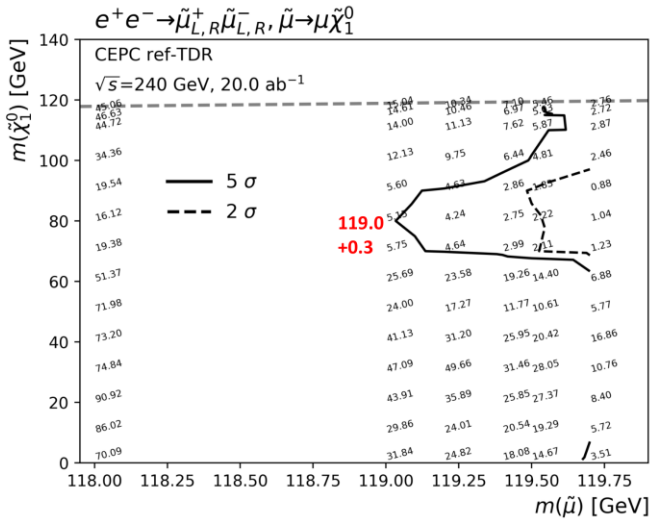
2. Current stat. ⊕ 0% sys, no muid **0% sys is important**



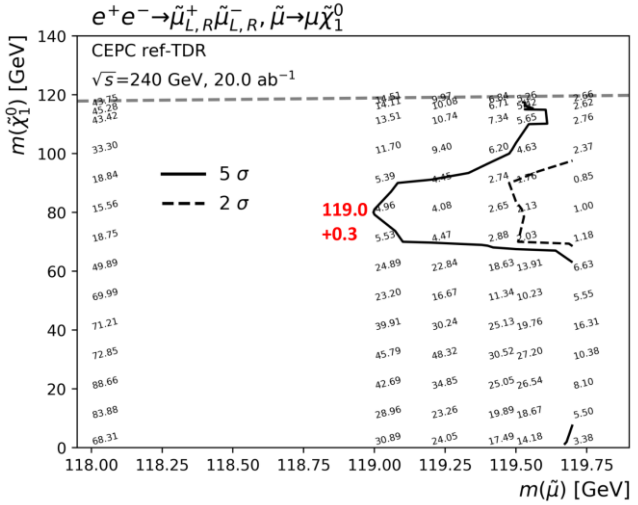
3. 3% stat. ⊕ 0% sys, no muid **3% stat less important**



4. 3% stat. ⊕ 3% sys, no muid **3% sys is dominant**

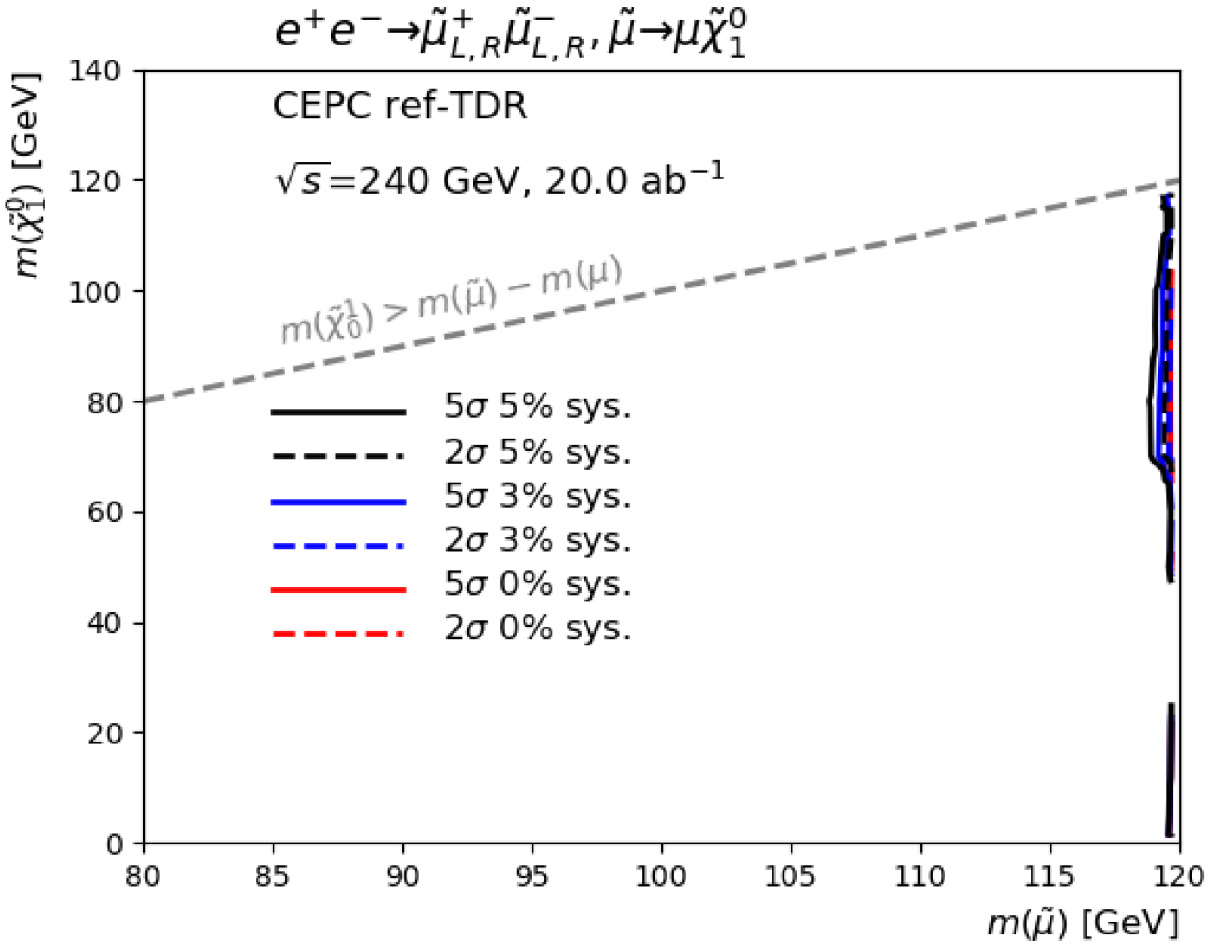


5. 3% stat. ⊕ 3% sys ⊕ muid 96% **miud is not significant**

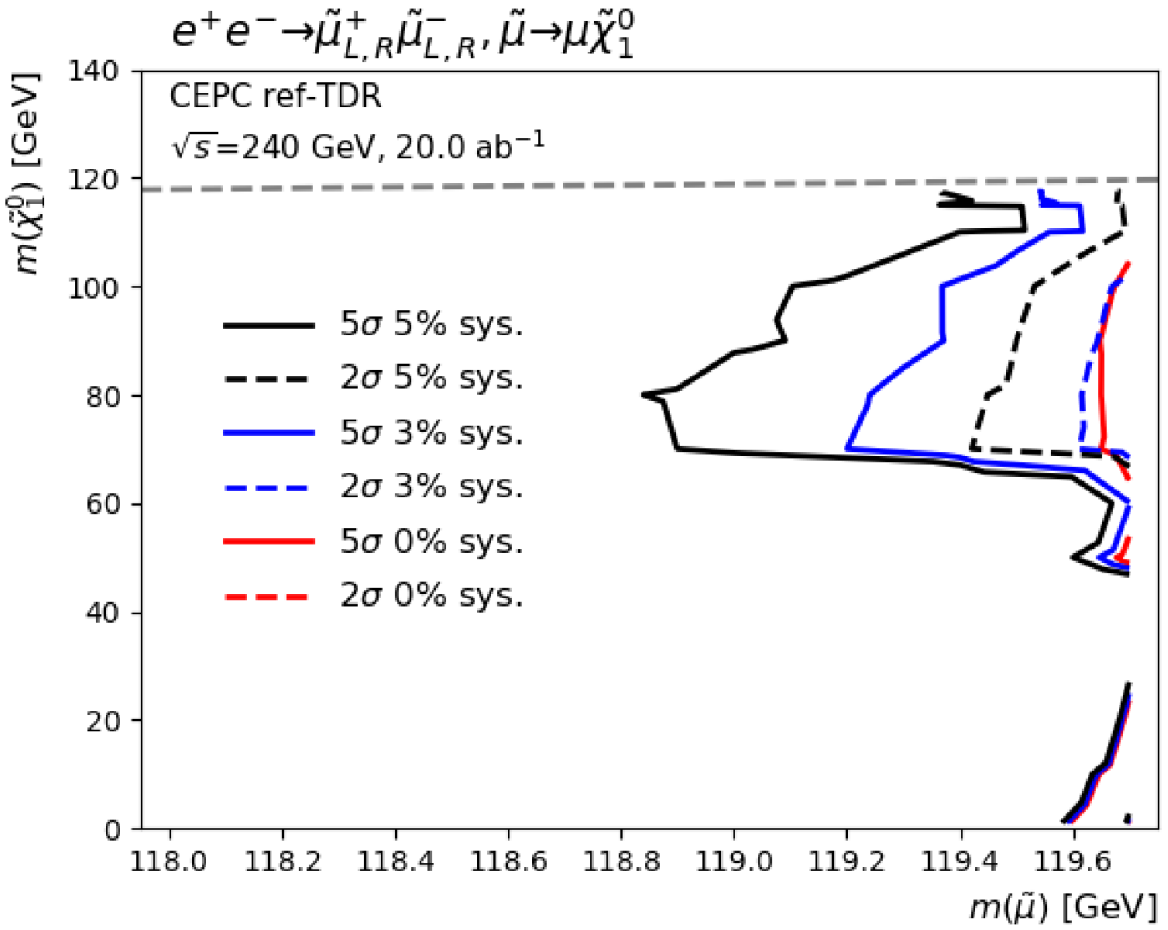


Smuon Summary

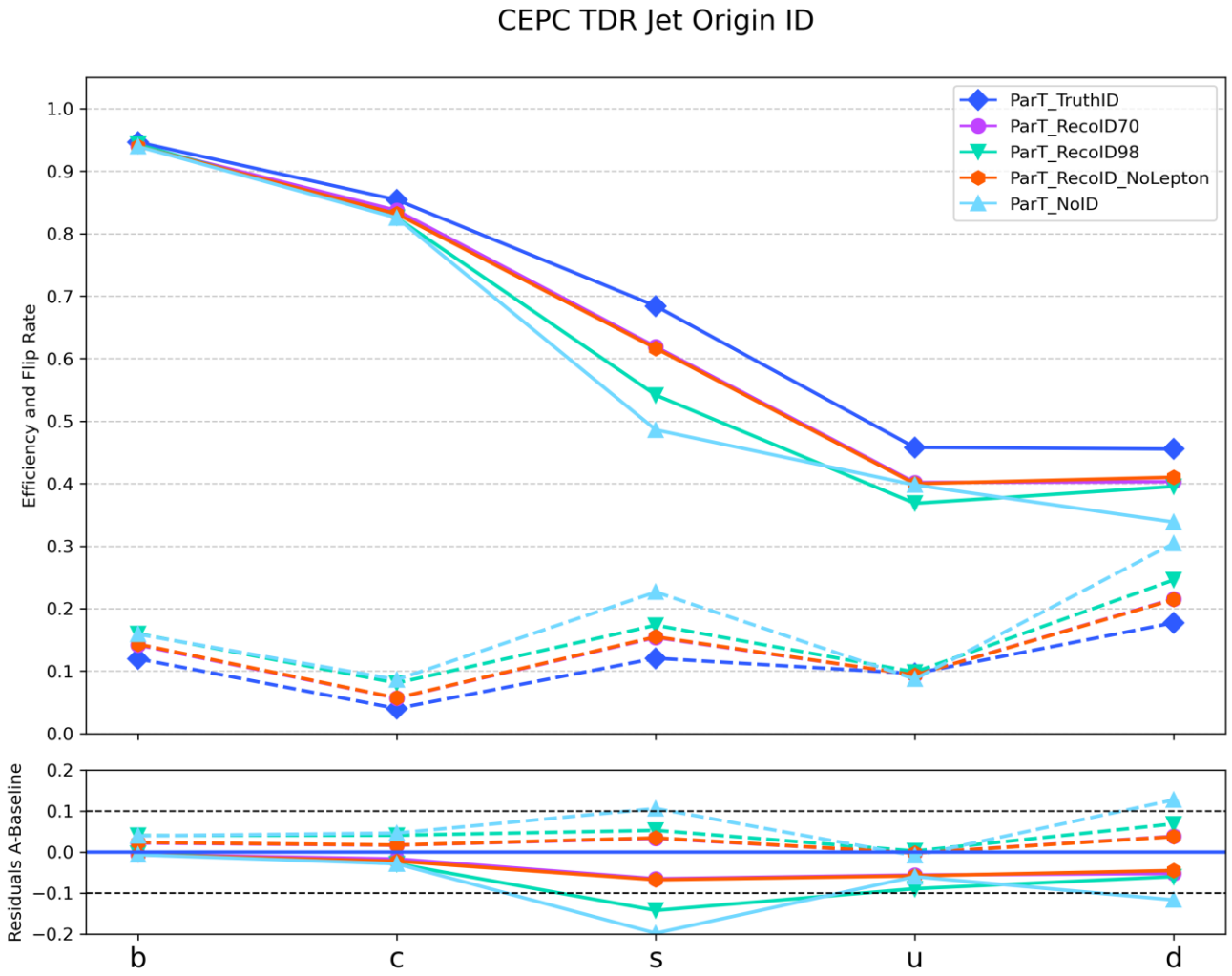
Final Result



Final Result: Enlarged



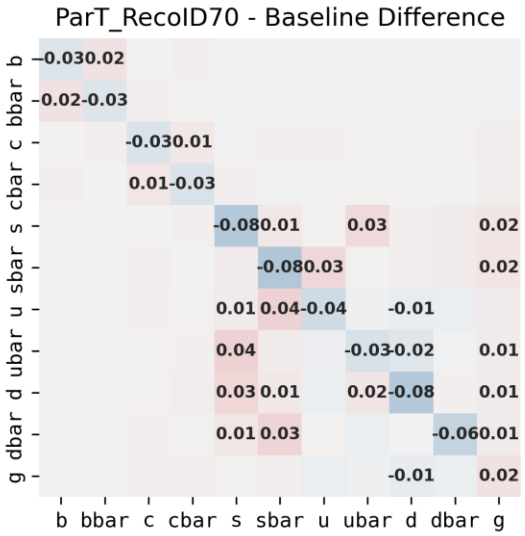
Current JOI+Reco_Nolepton

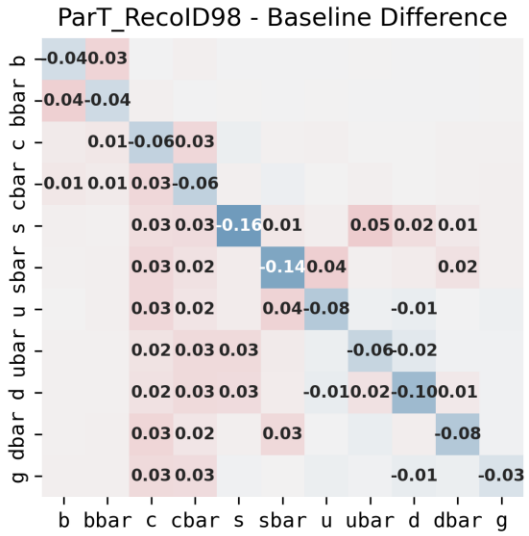


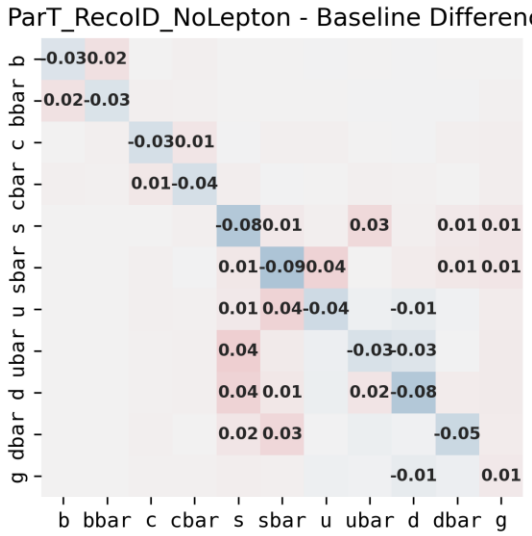
Truth:	0.5936
Reco70:	0.5510
Nolep:	0.5494
Reco98:	0.5153
NoID:	0.5030

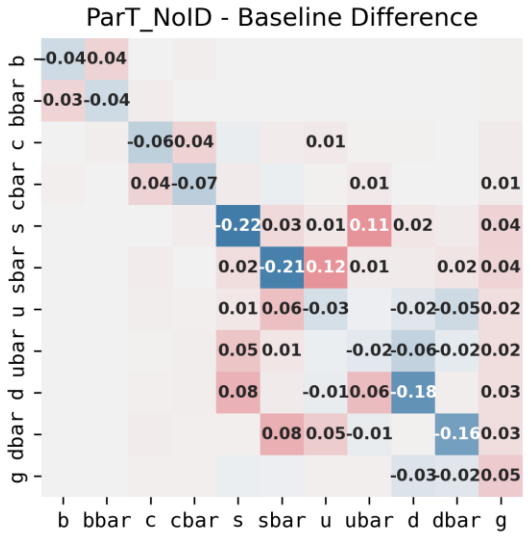
Matrix difference

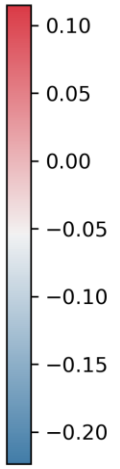
WP no lepton use TOF and TPC information and assign tracks to p/K/pi.
This WP gives high accucacy and low noise in PID. While Reco98 brings large noise.
Good quality partial labels beat noisy predictions.











More JOI updates, please refer to the report last Friday and last Wednesday.