

$B^+ \rightarrow \rho^+ \rho^0$ status

Riccardo Manfredi

Trieste Physics Meeting
Dicembre 9, 2022

Recap from last showing

Keep exploring possible ways to overcome the mismodelling.

Need to finalise π^0 selection a la Okubo-san, compare with mine and in case re-train CSMVA.

Cut on helicity angles

Strategy

Simplified model: 2 signals, BBbar, continuum.

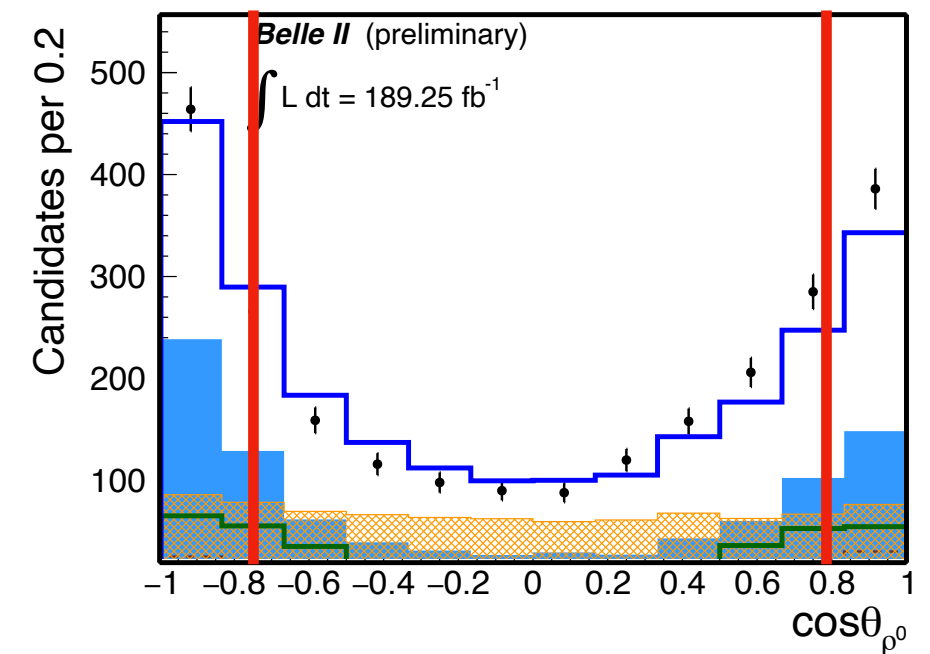
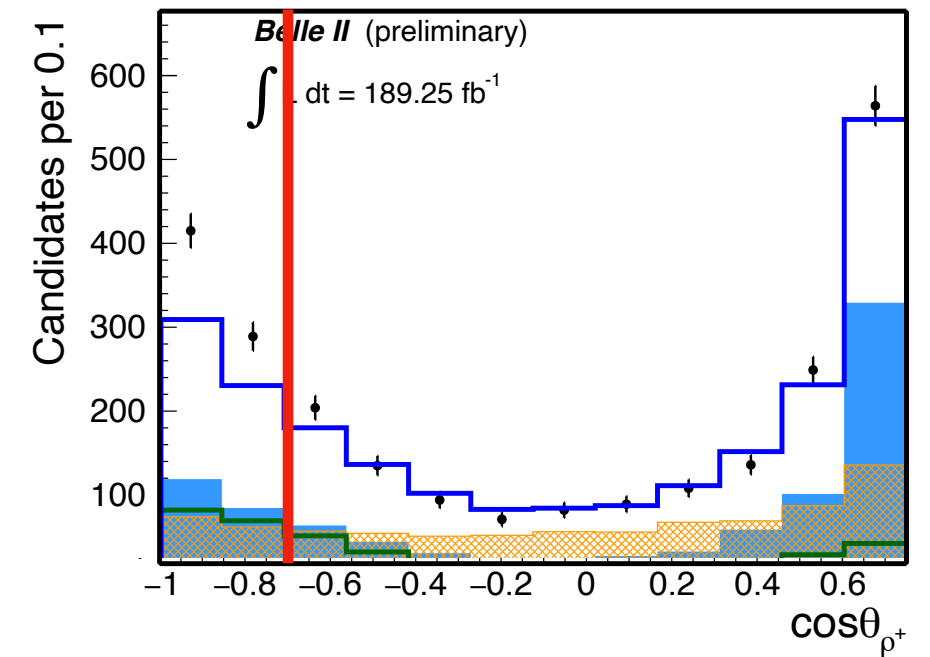
Stick to model from Moriond 2022.

Generate toys with this model and fit them.

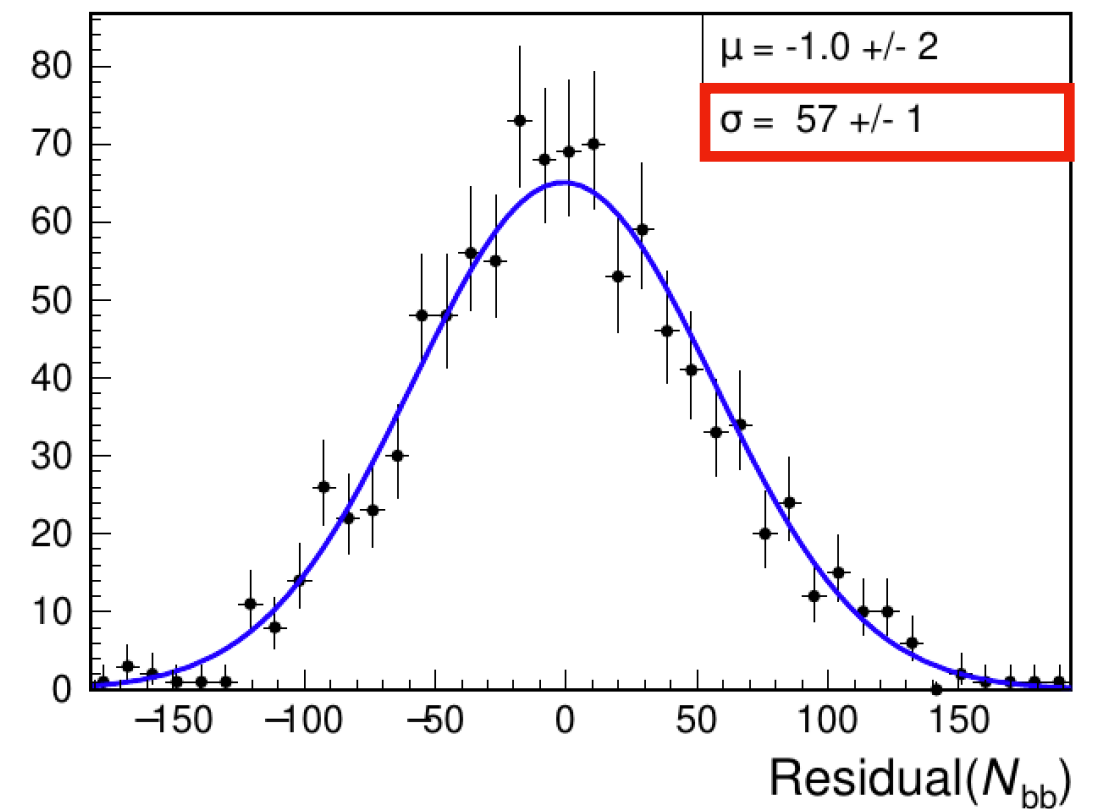
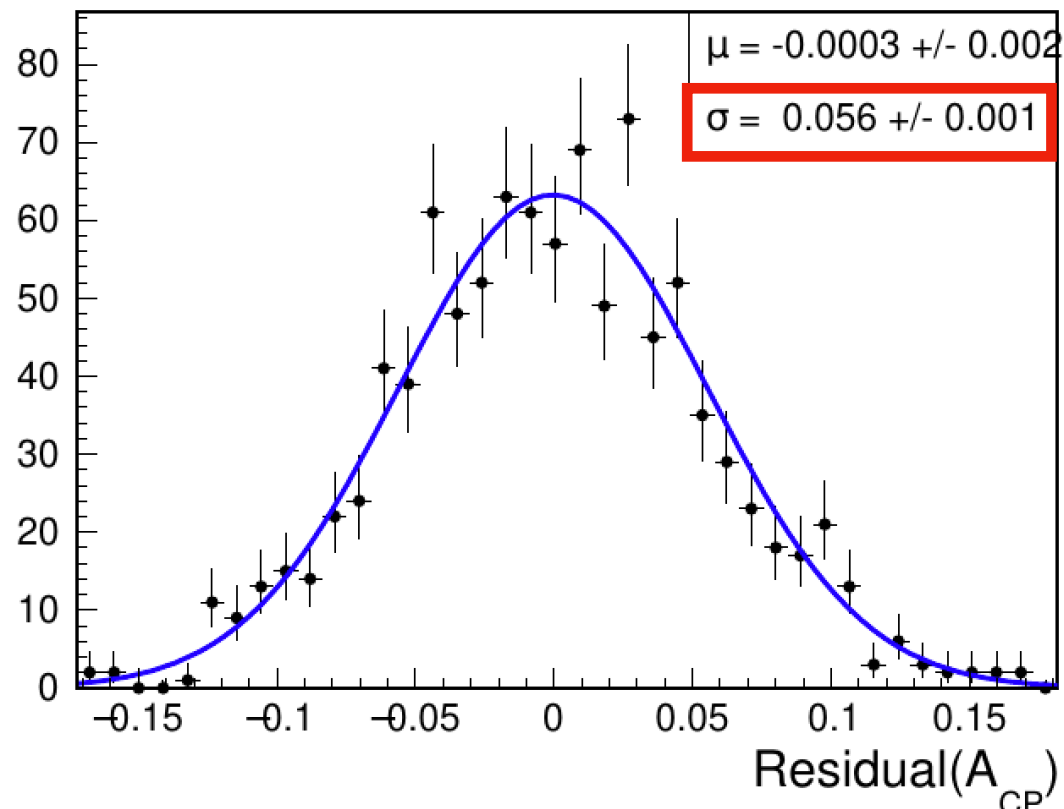
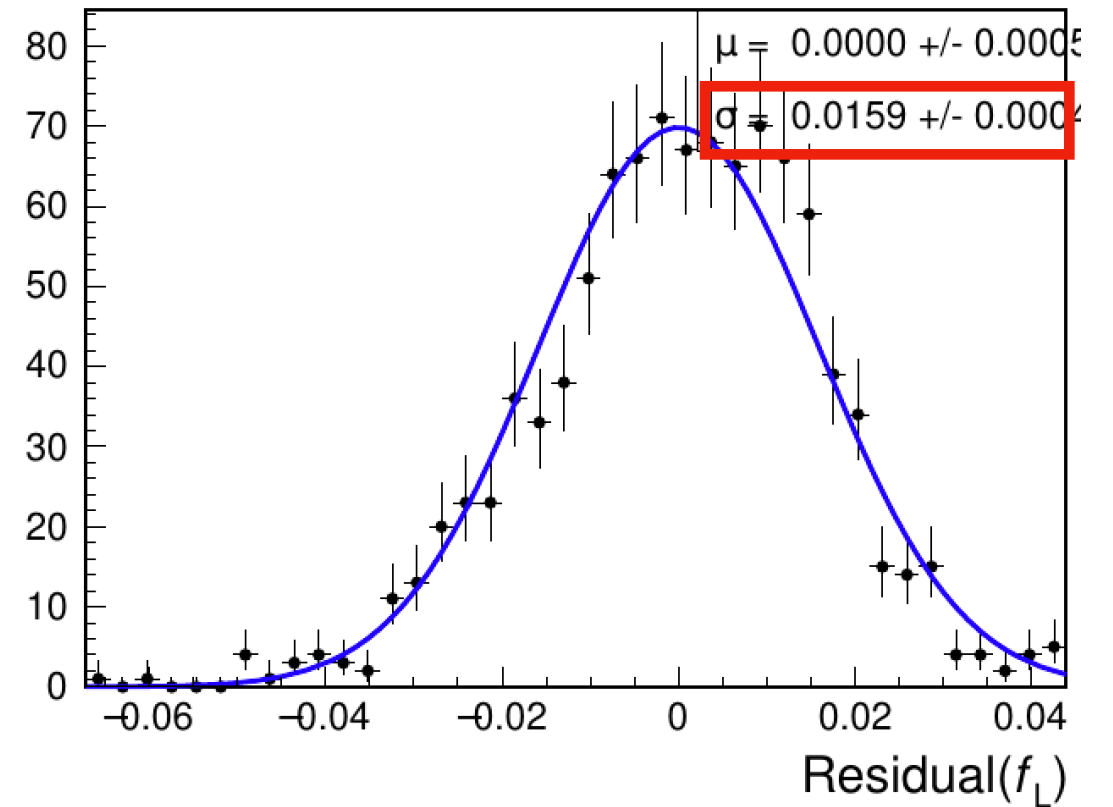
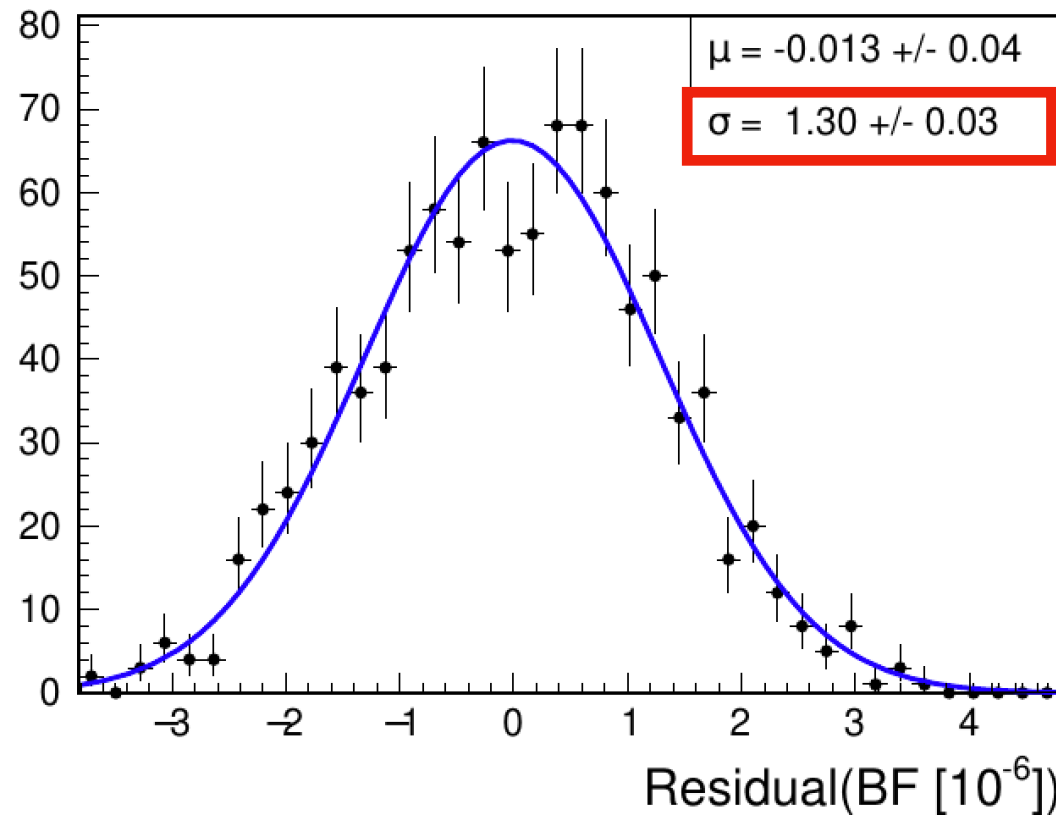
Cut at $|\cos\theta| < 0.75$ for both ρ^+ and ρ^0 .

Generate and fit toys with this model.

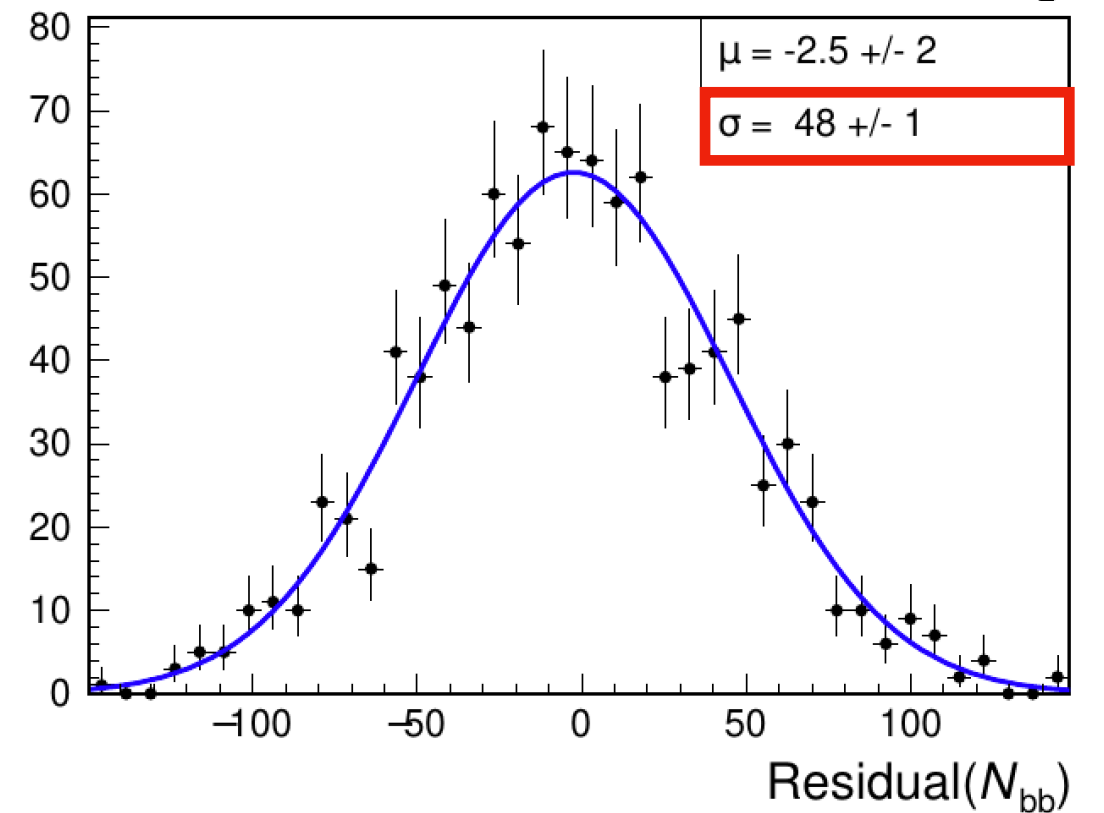
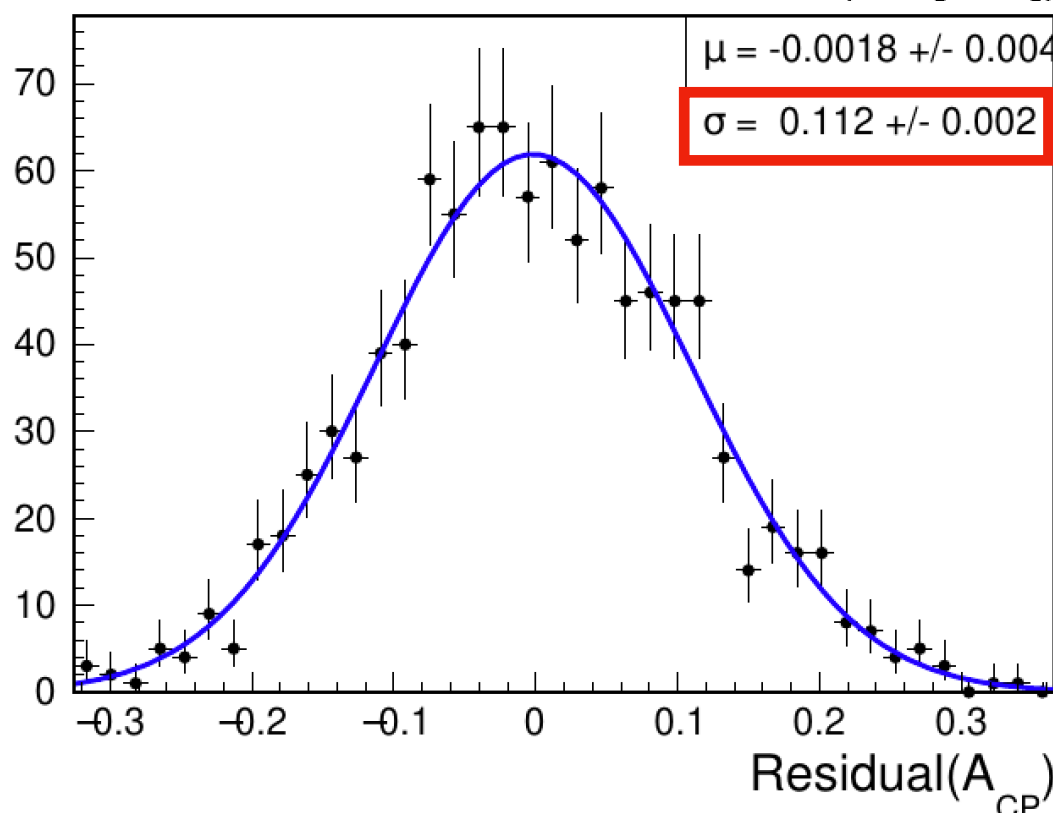
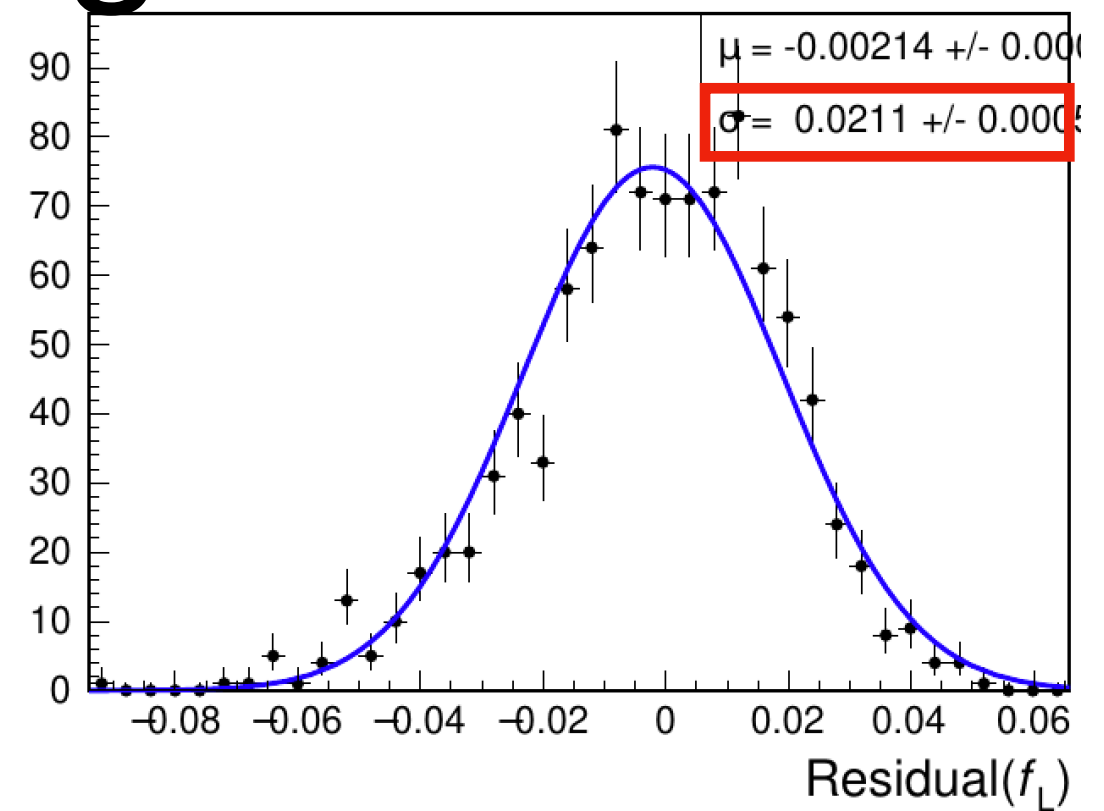
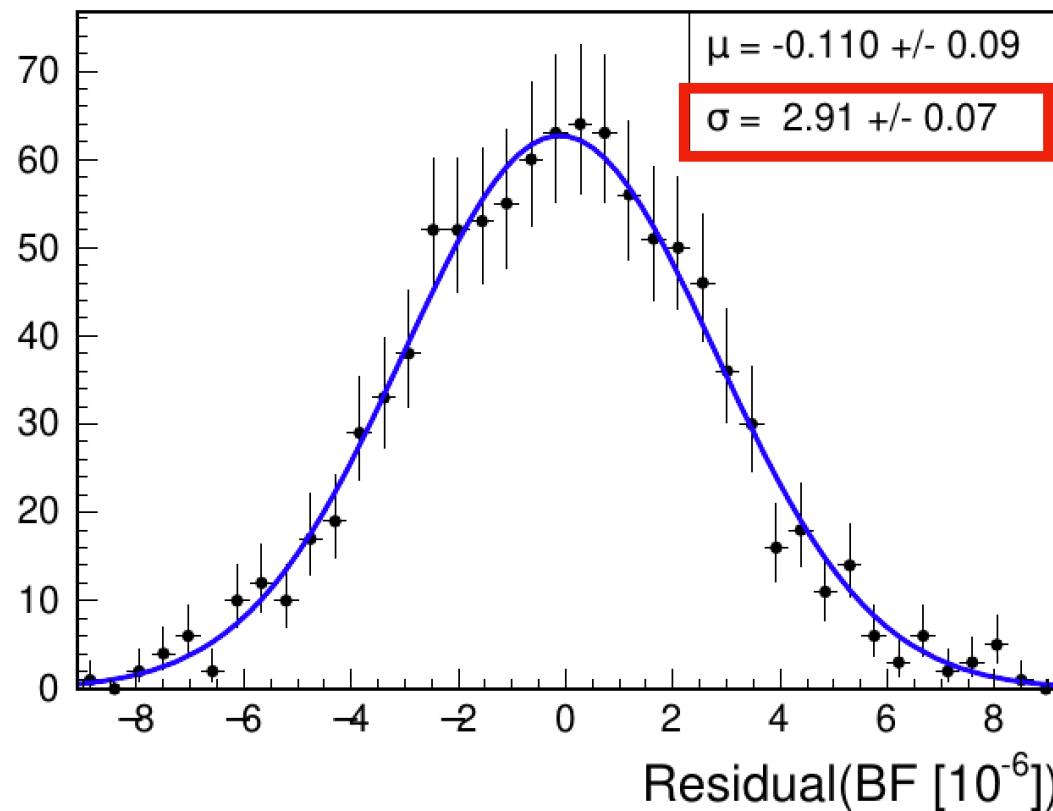
Compare width of results distributions.



Default model



Cut on angles



Outcomes

Precision largely degraded on BF — expected since signal has a ~80% drop when cutting the angles edges.

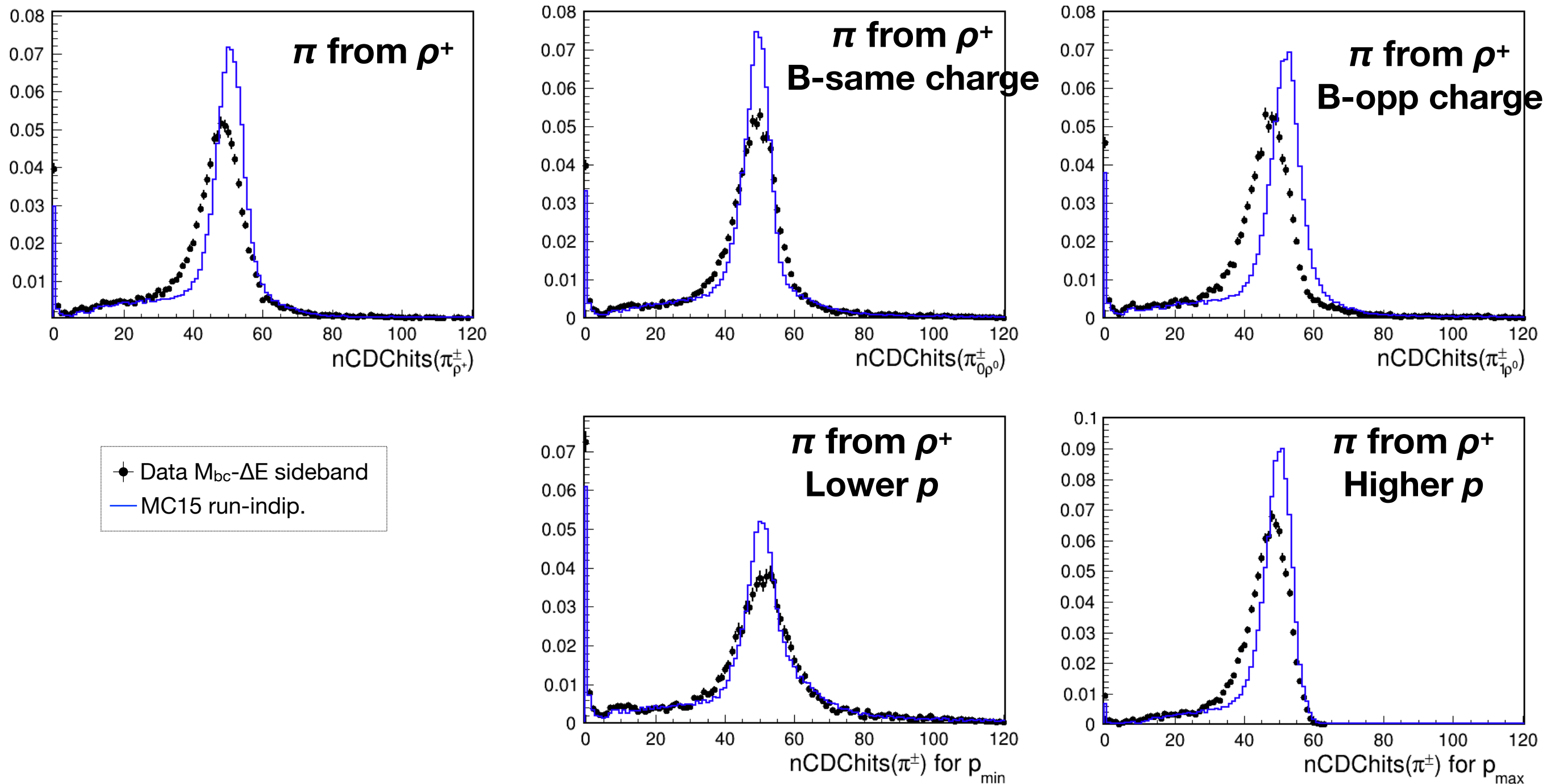
Uncertainty worsen by 2x factor on A_{CP} . Unexpected?

Uncertainty increases also in f_L . Strange that on BB it improves.

Cutting on angles seems not a viable solution.

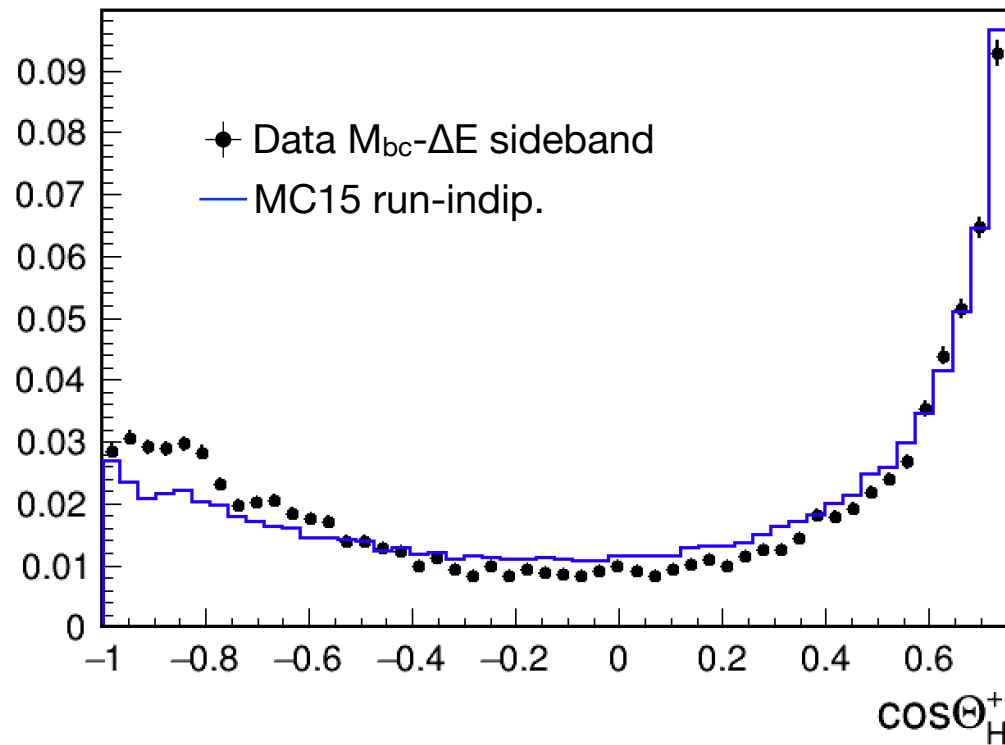
Look at CDC hits

CDC hits

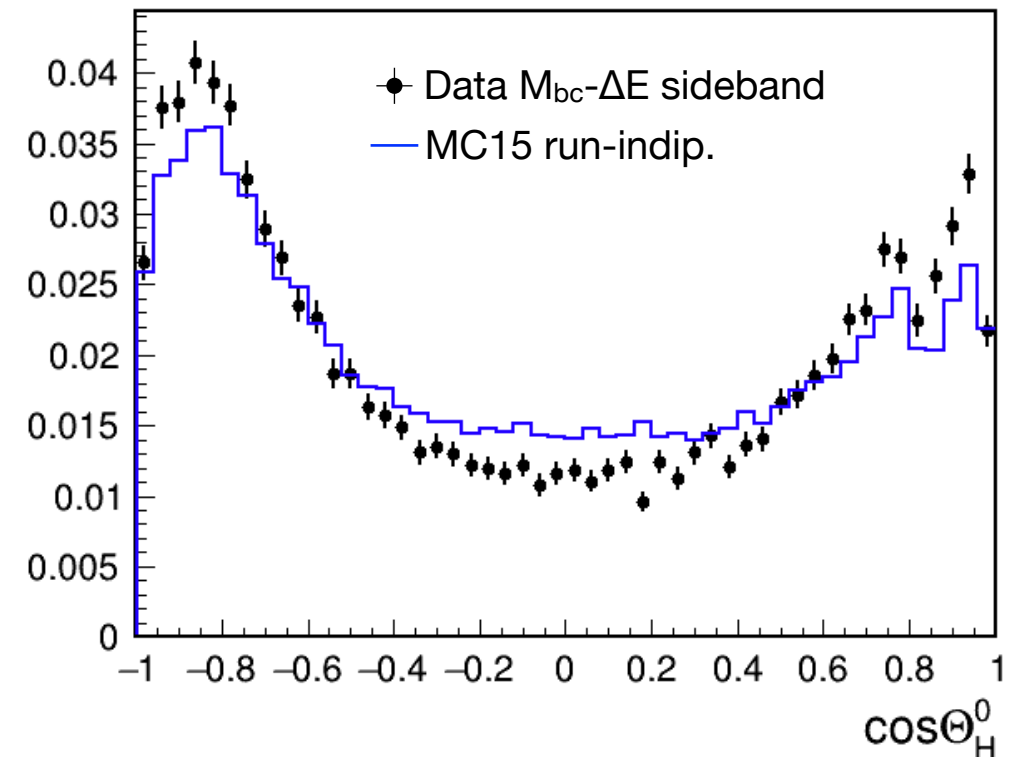
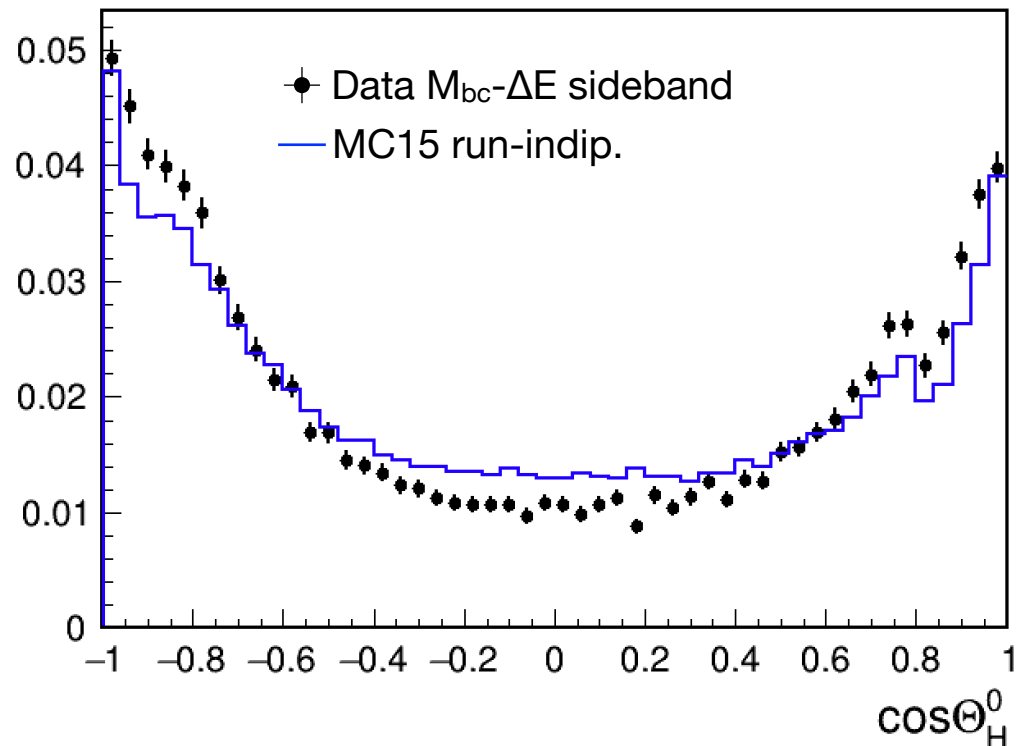
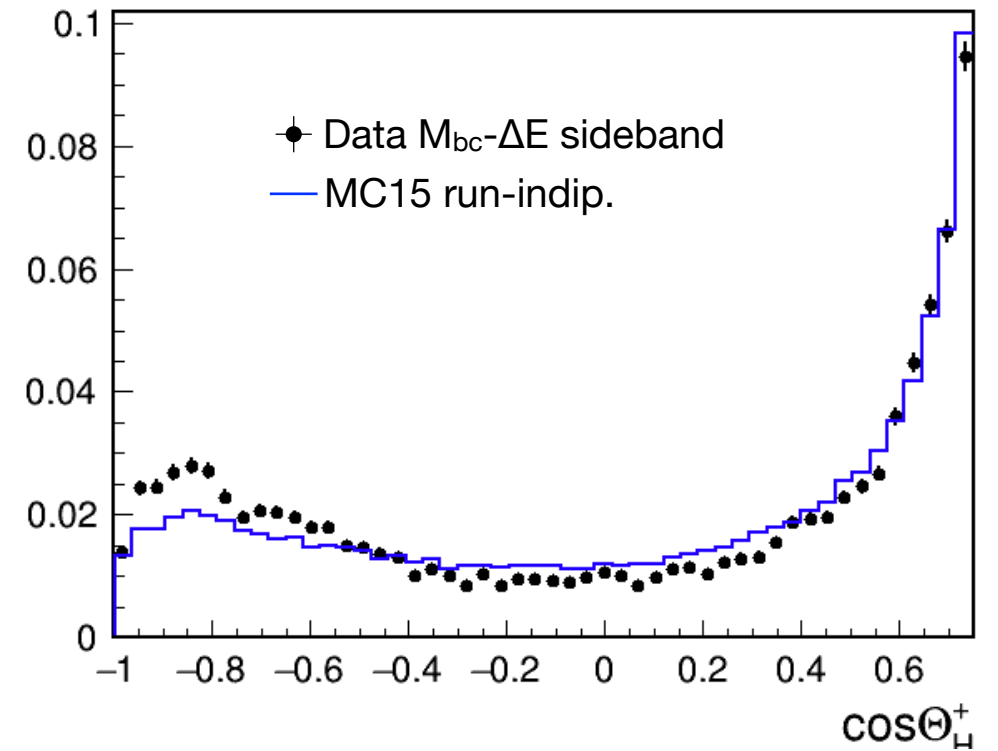
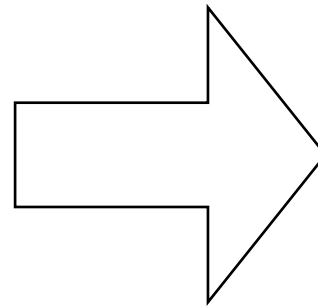


**Known to be discrepant in data vs MC.
What happens if we cut on these?**

Effect on sidebands

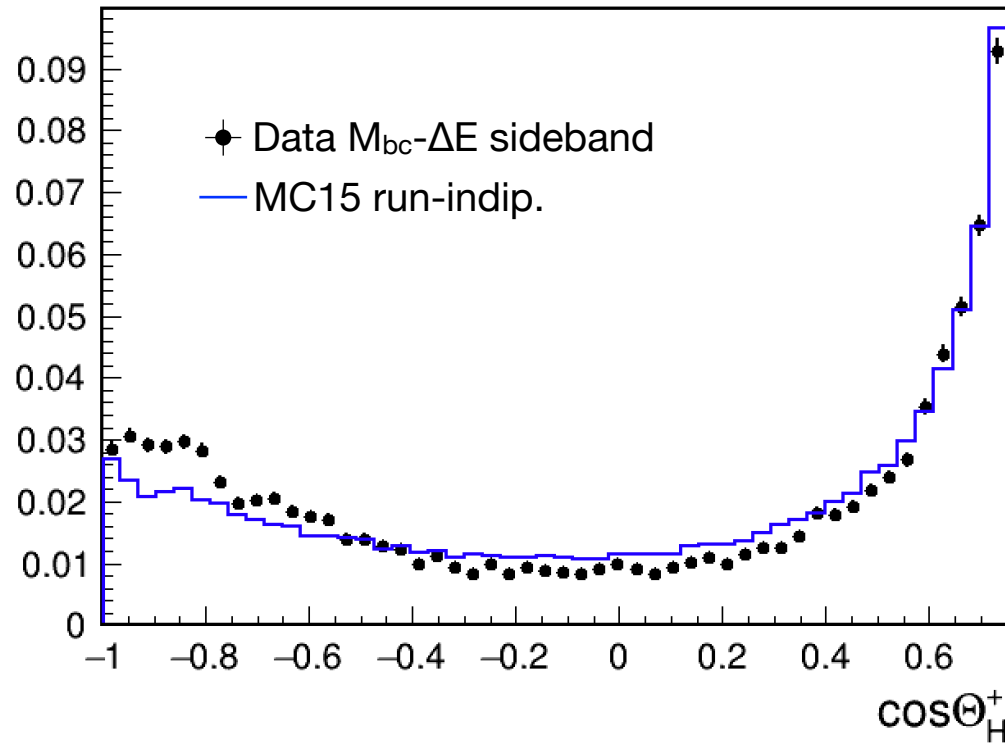


$nCDCHits > 10$
on all tracks

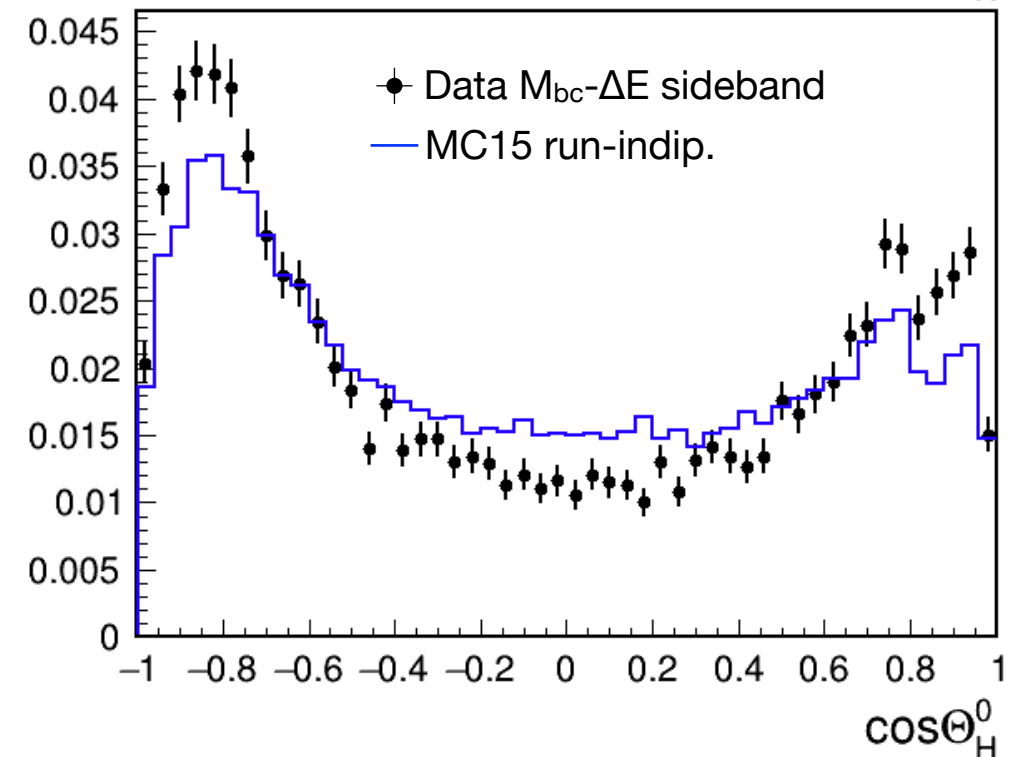
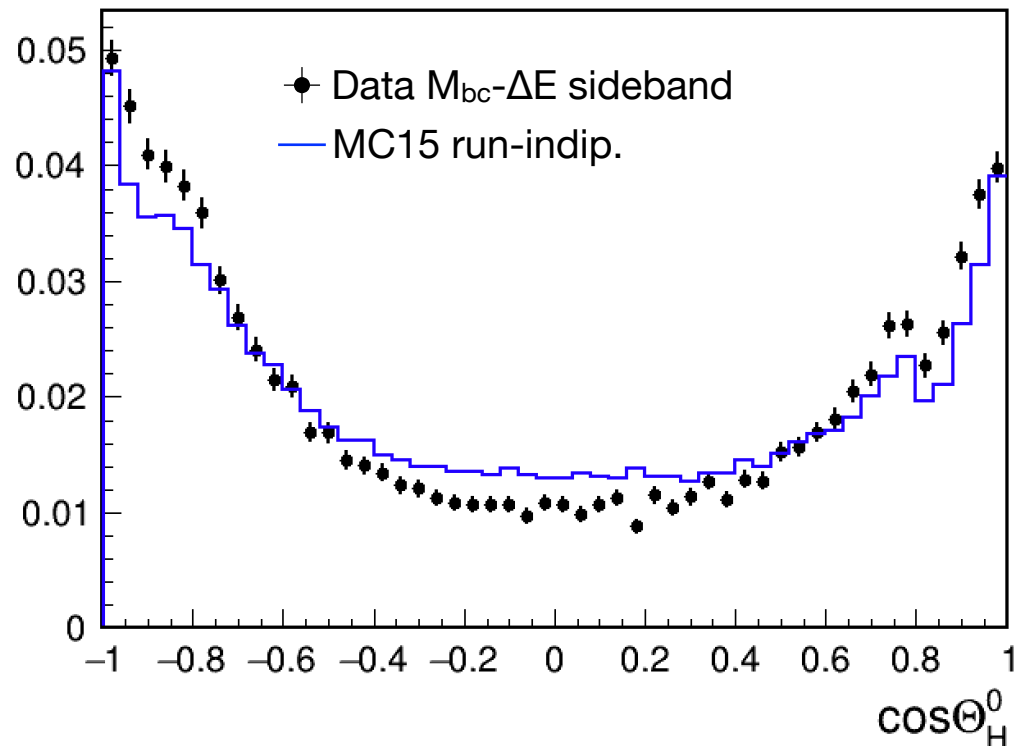
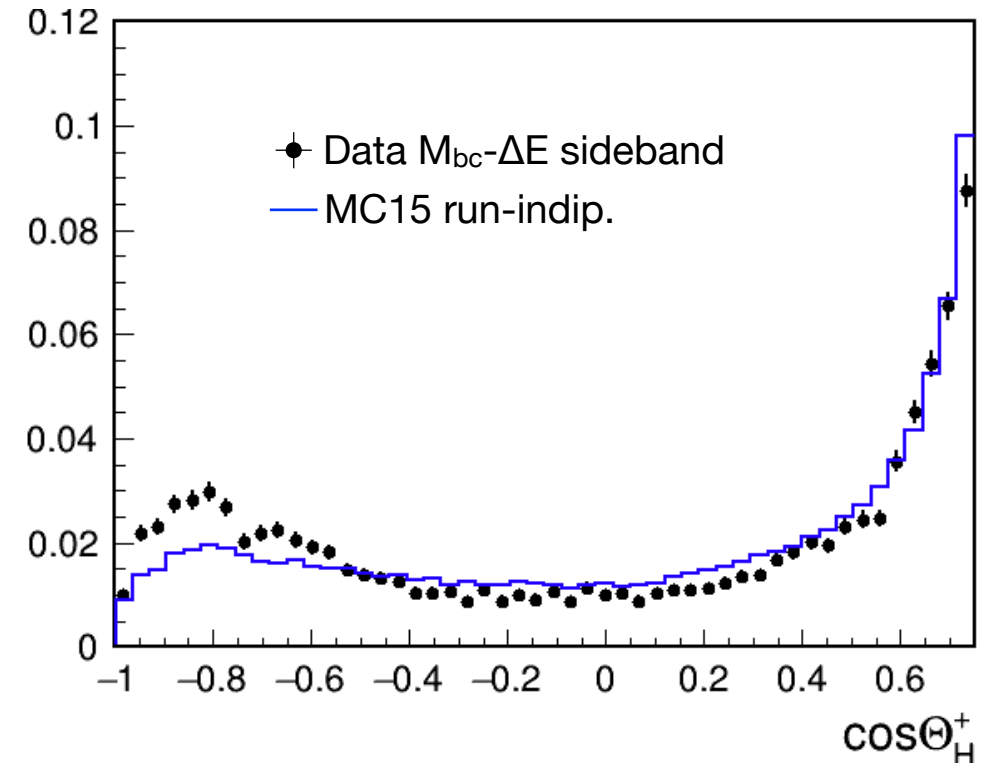


Discrepancies are enhanced.

Effect on sidebands

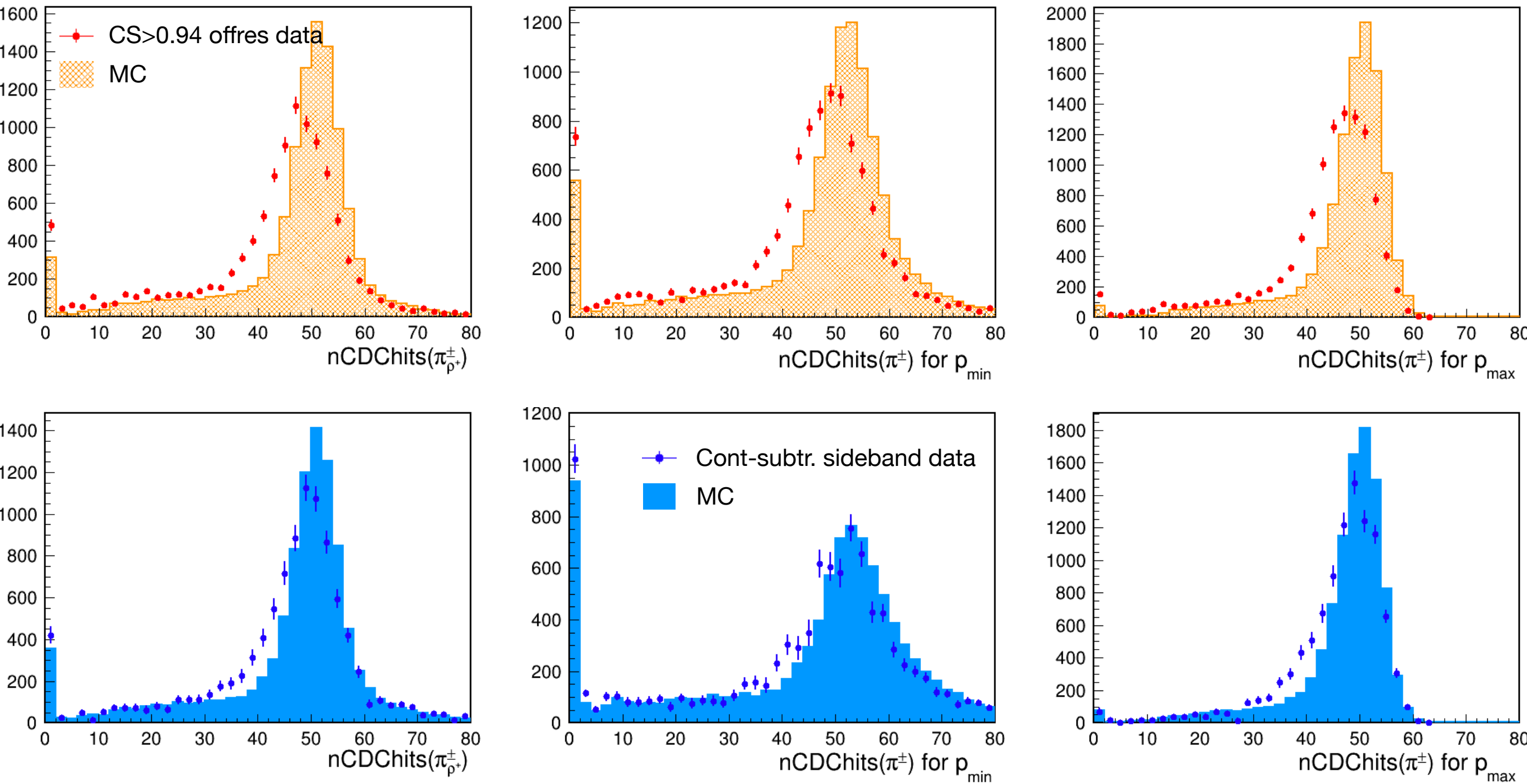


$nCDCHits > 40$
on all tracks



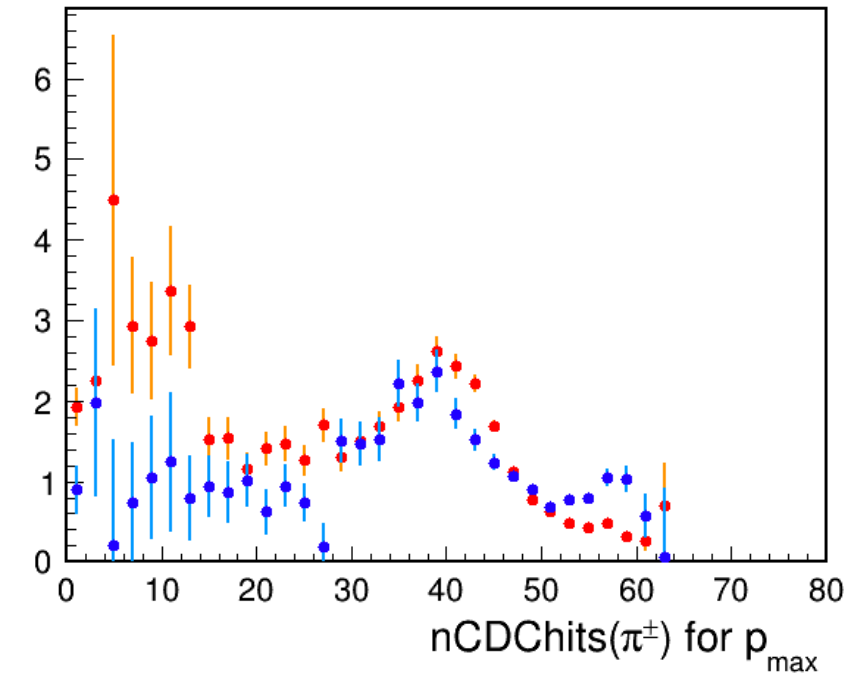
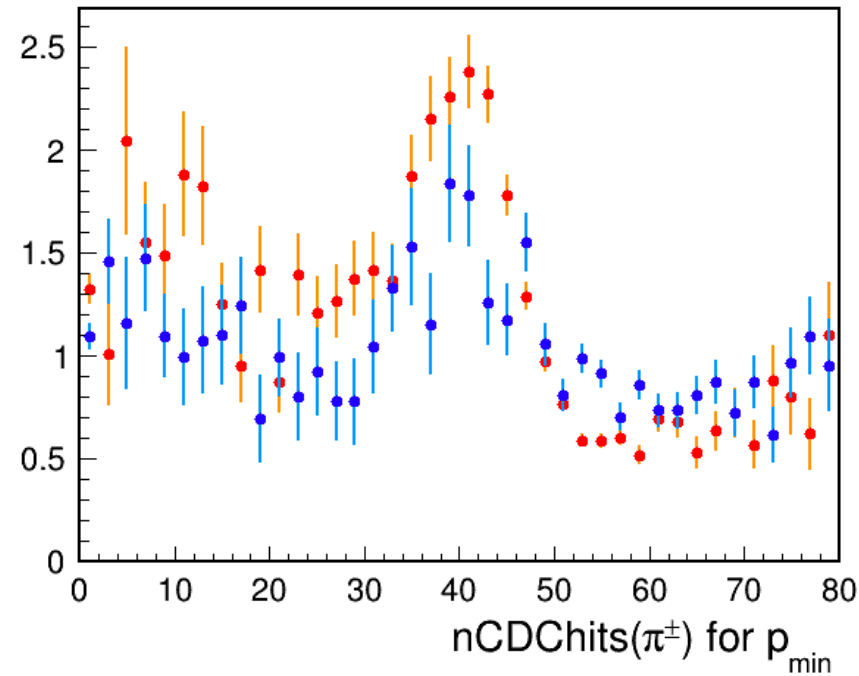
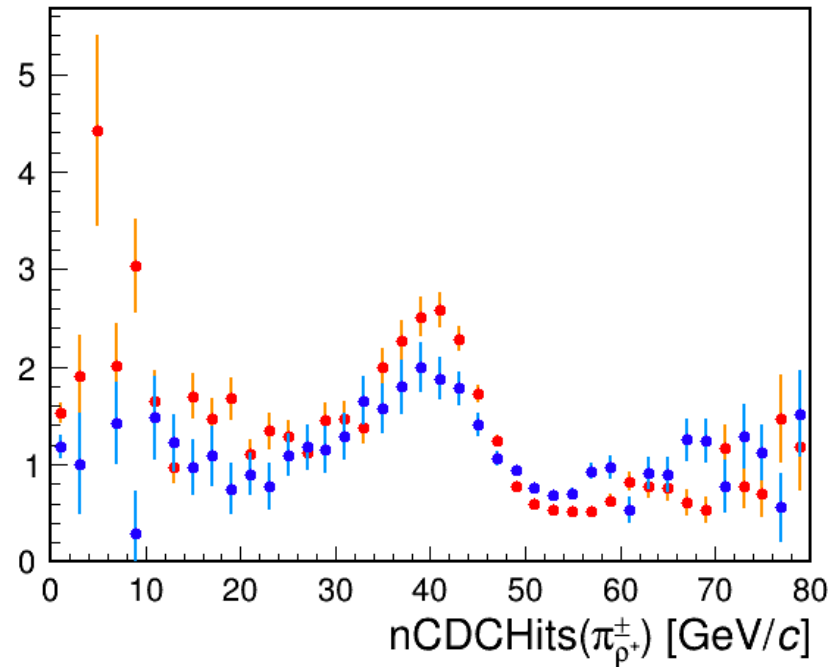
Discrepancies are even more enhanced.

What about reweighing?



**If there is any CDC hits mismodelling, the effect should be ~same in every sample.
Is it so?**

Compare ratios



**They are different in some regions.
Probably differences in sample composition affect this too.
Should we look for an unbiased way to take weights for CDC hits?**

Next steps

Finalize π^0 selection studies and eventual CSMVA retraining (slowed by farm not working).

Does it make sense to think about reweighing on CDC hits?

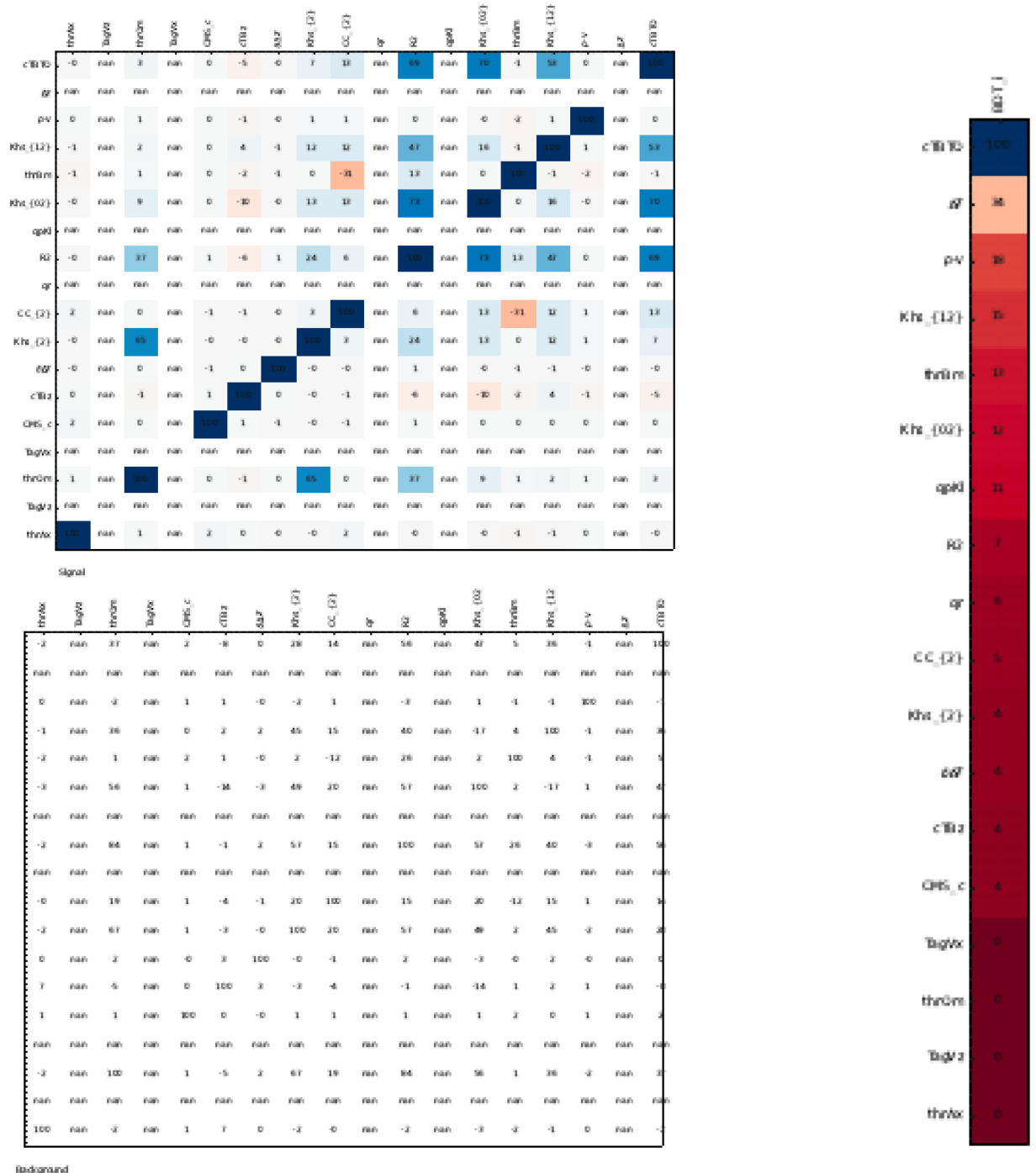
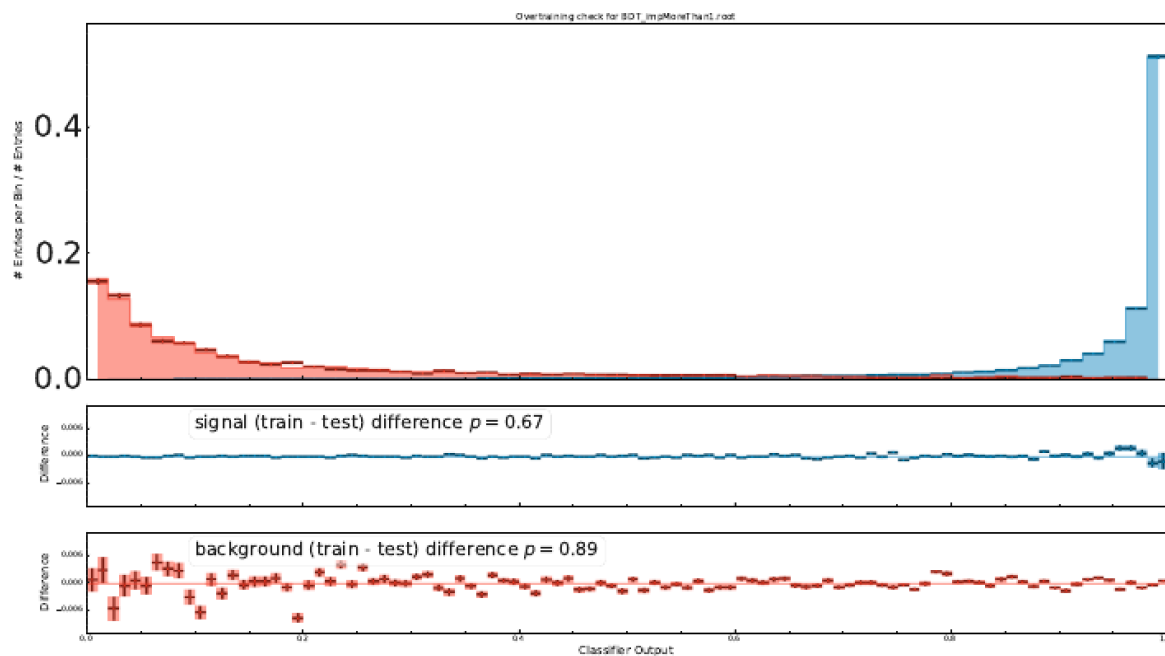
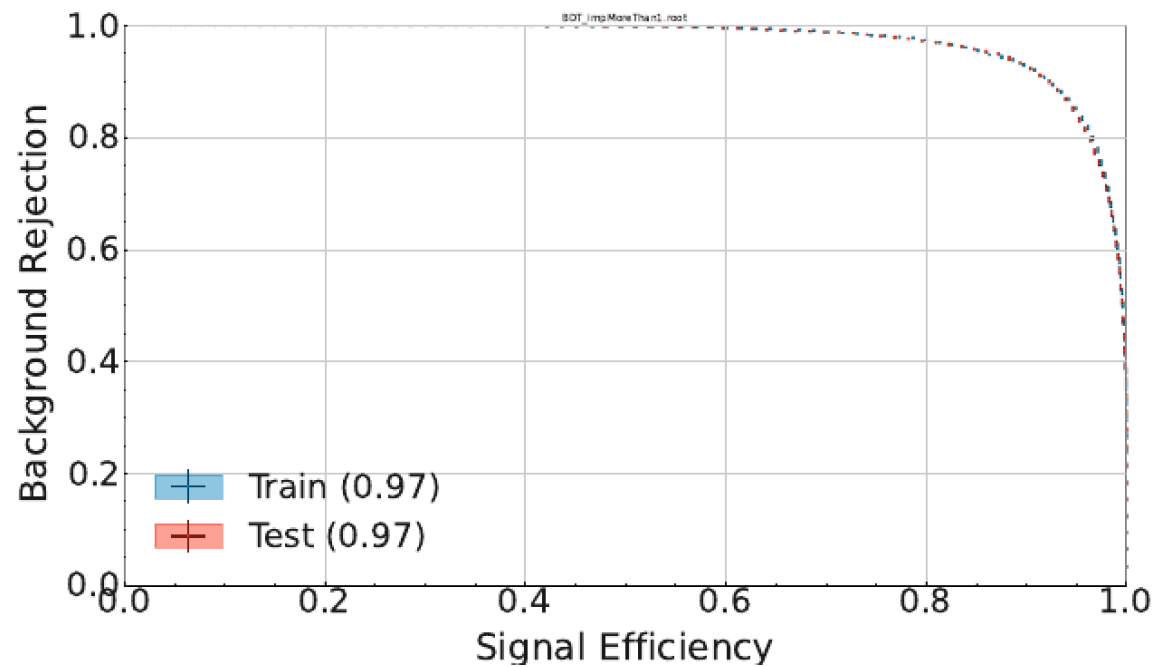
Finish to study correlations.

Backup

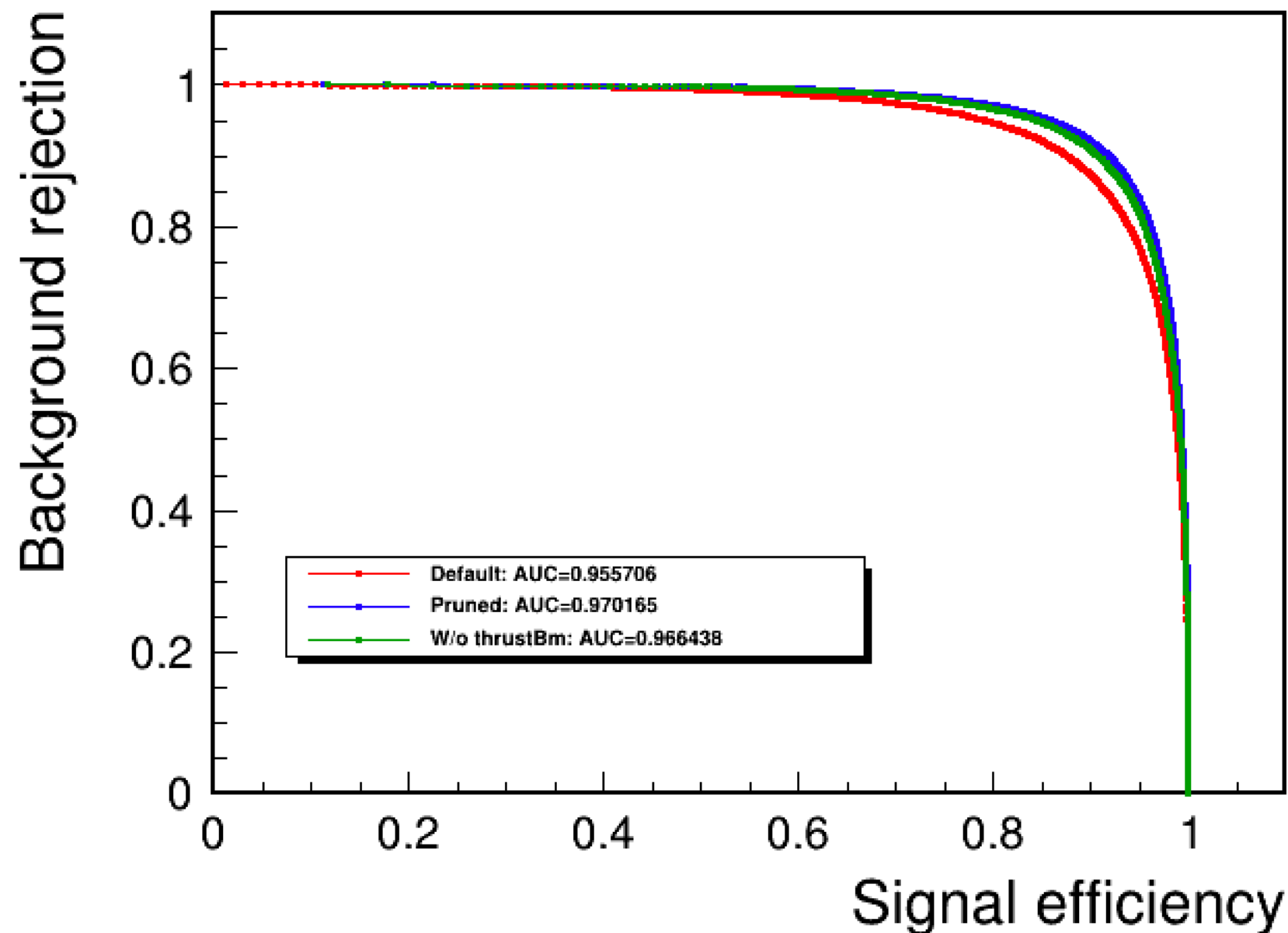
CSMVA

New training

Same set of variables of older CS, pruned the ineffective ones. Tried also to remove thrust of signal side because of it's correlation with fit variables. Plots are ugly — done with old Fernando's script.



CSMVA performance



**Performance improved by training with pp samples + pruning.
Removing correlated variable gives small but acceptable worsening.
It's still better than the one currently in use.**