

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

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Trieste Physics Meeting
June 02, 2022

The situation

Building up on last report (https://agenda.infn.it/event/31584/contributions/172548/attachments/91604/124429/B2ts_0527.pdf): re-tightened CS cut on off-res data; observed that vertex-based selections sculpt the acceptance.

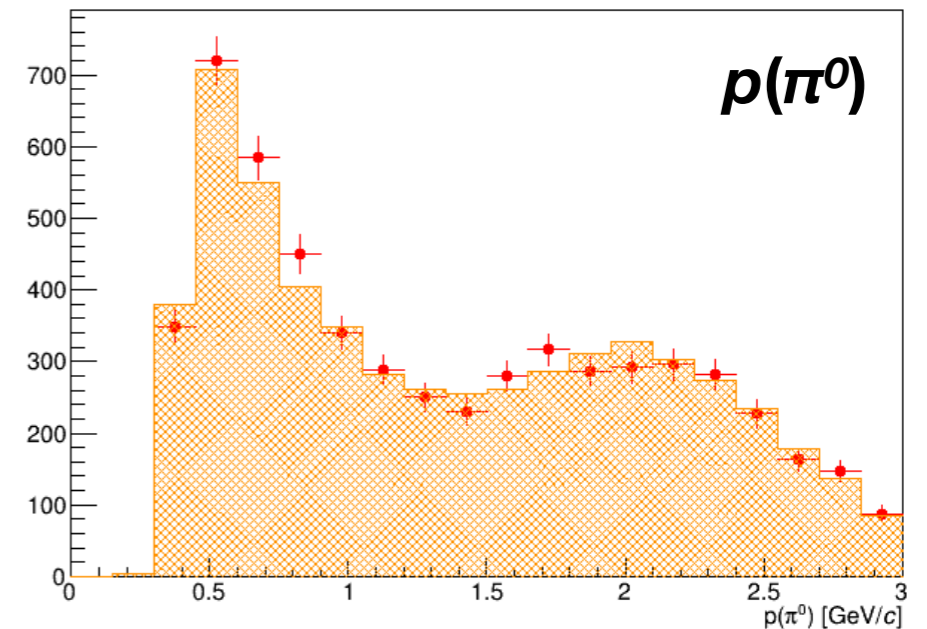
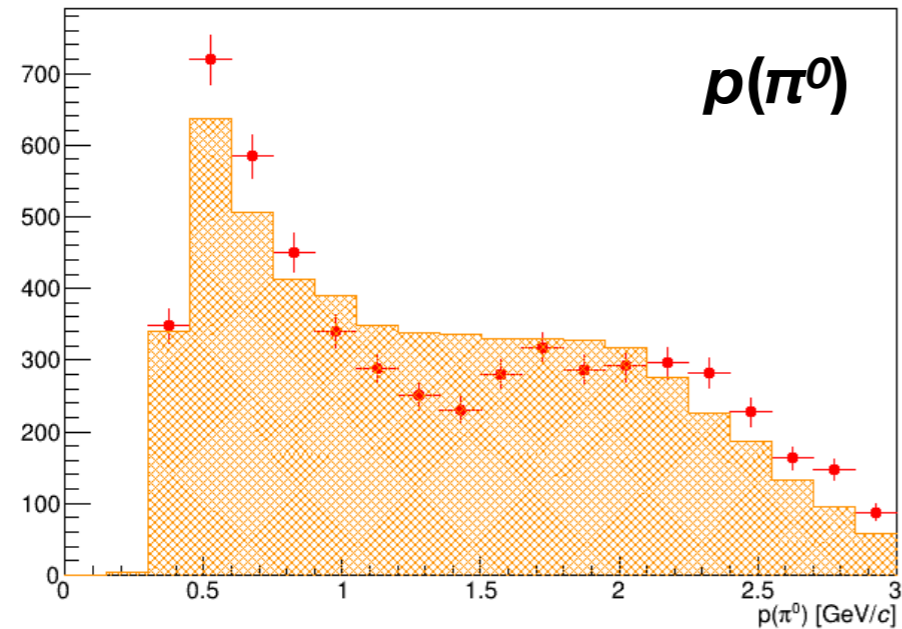
Mismodeling: present both in continuum and $B\bar{B}$, also in the control channel $B \rightarrow D\rho$. Want to get to the origin of such mismodelling

Possible causes:

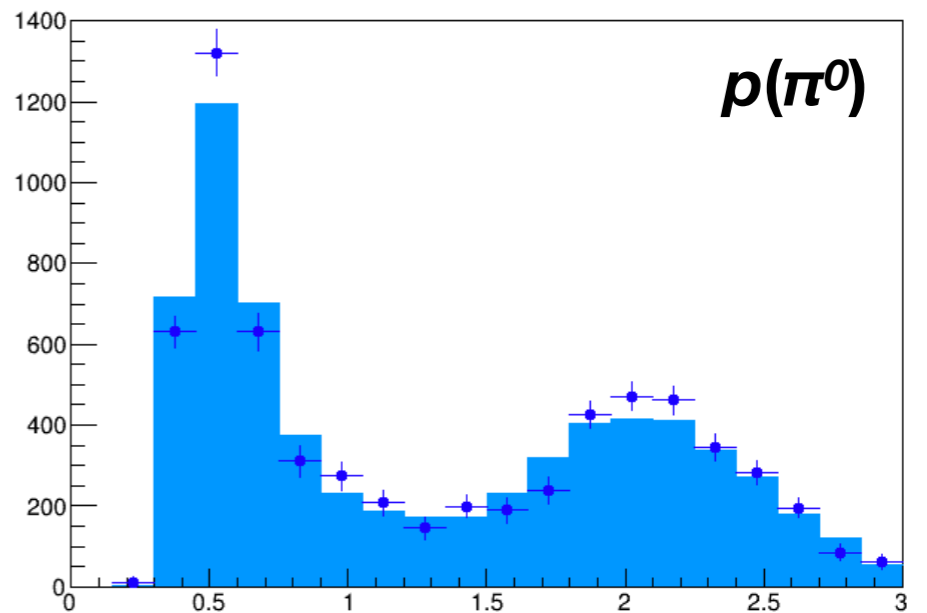
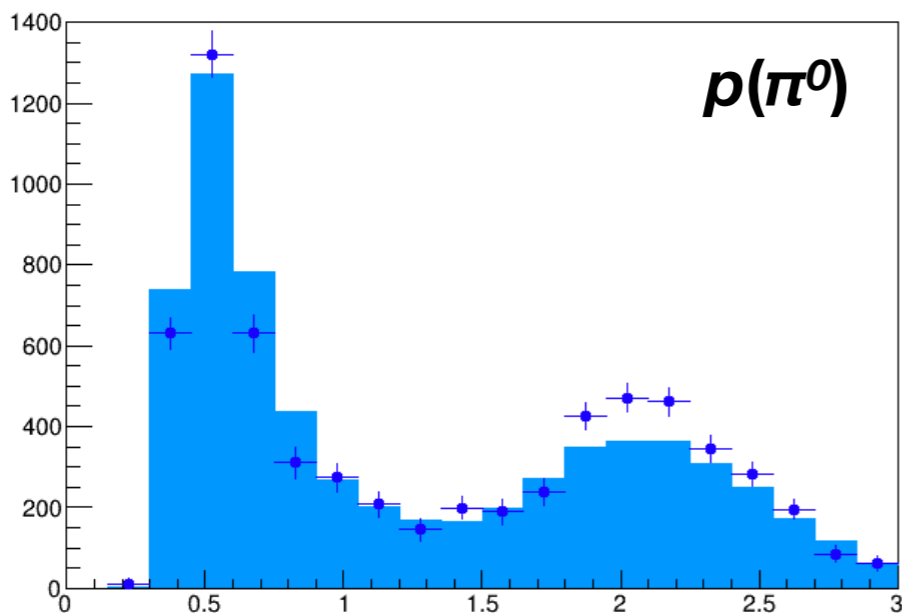
- sample composition non correctly reproduced
- acceptance mismodeling

Reweighting check

Mirco: what happens to momenta if we reweight on helicity angles?
Use different weights for continuum and BBbar. (More plots in backup)



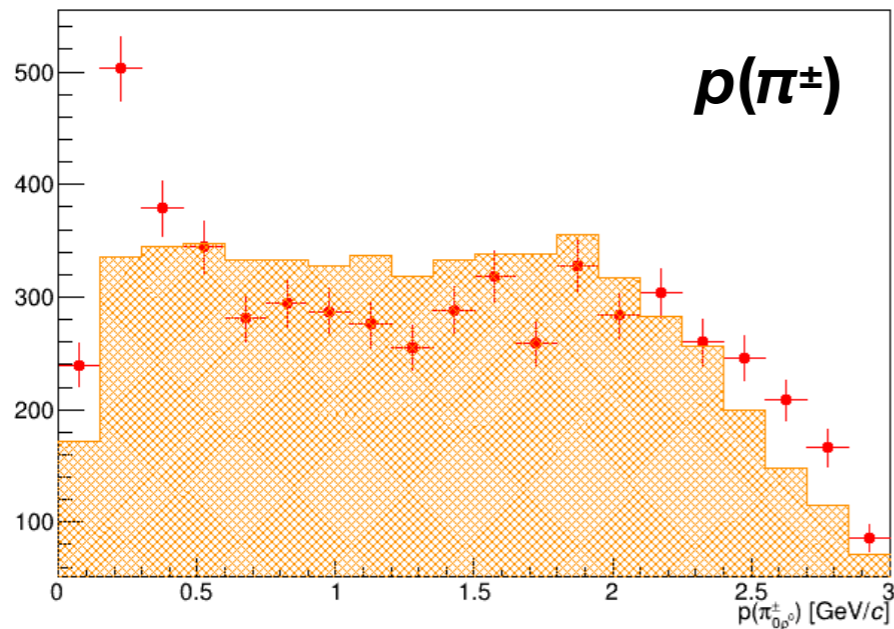
Weights



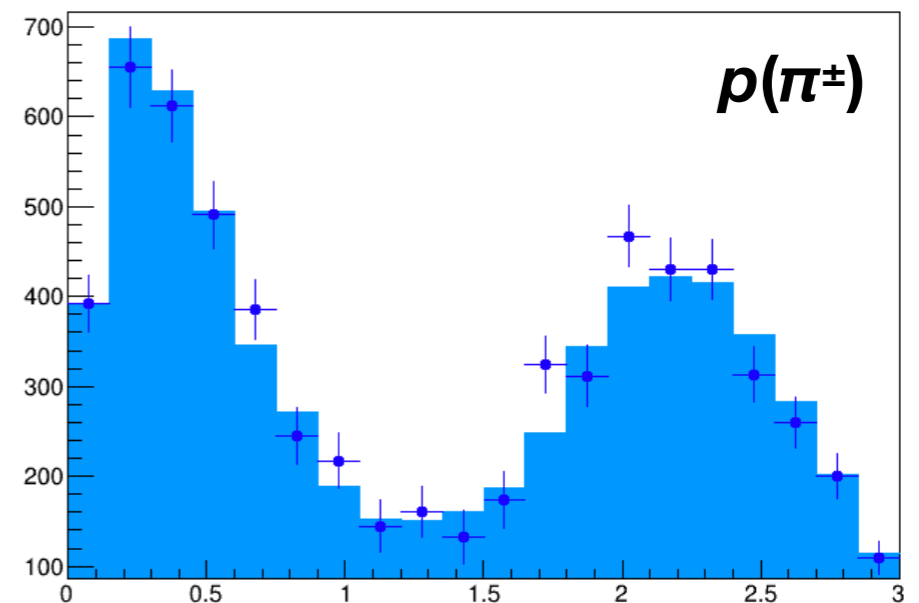
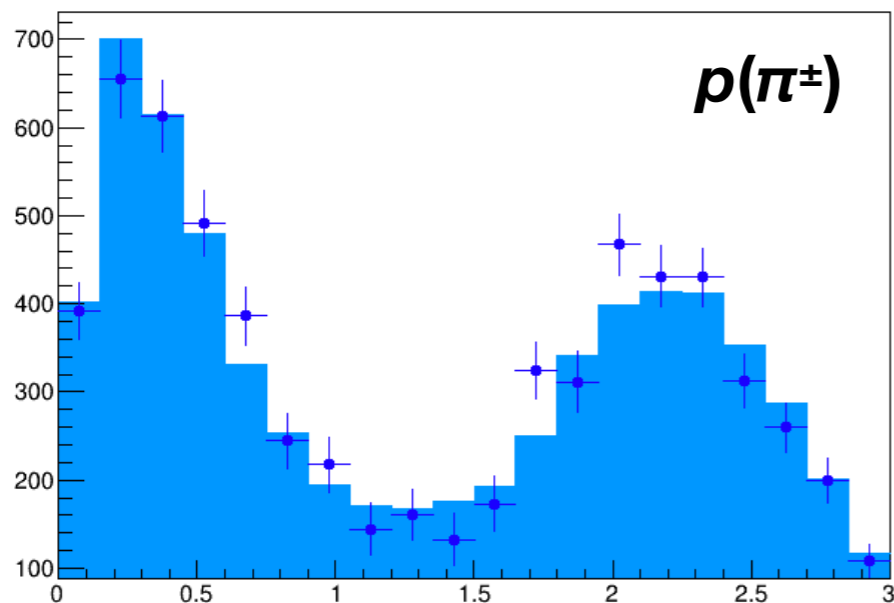
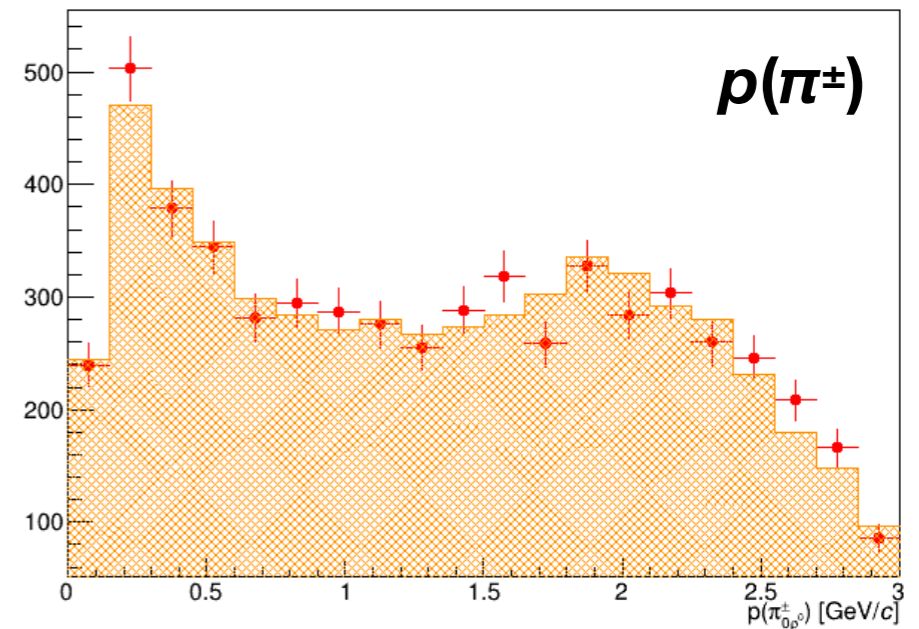
Reweighting on helicity angles improves momentum distributions.

Reweighting check

Mirco: what happens to momenta if we reweight on helicity angles?
Use different weights for continuum and BBbar. (More plots in backup)



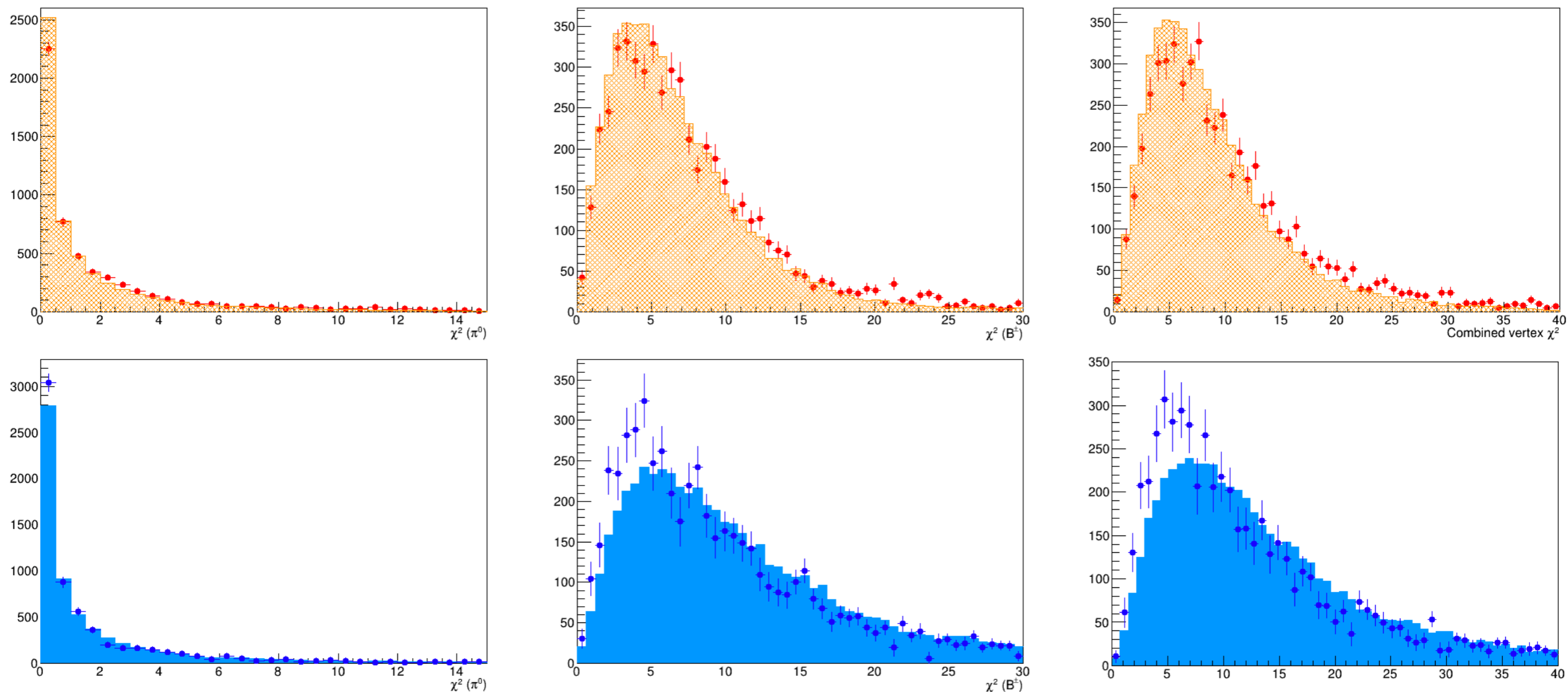
Weights



Reweighting on helicity angles improves momentum distributions.

Vertex variables

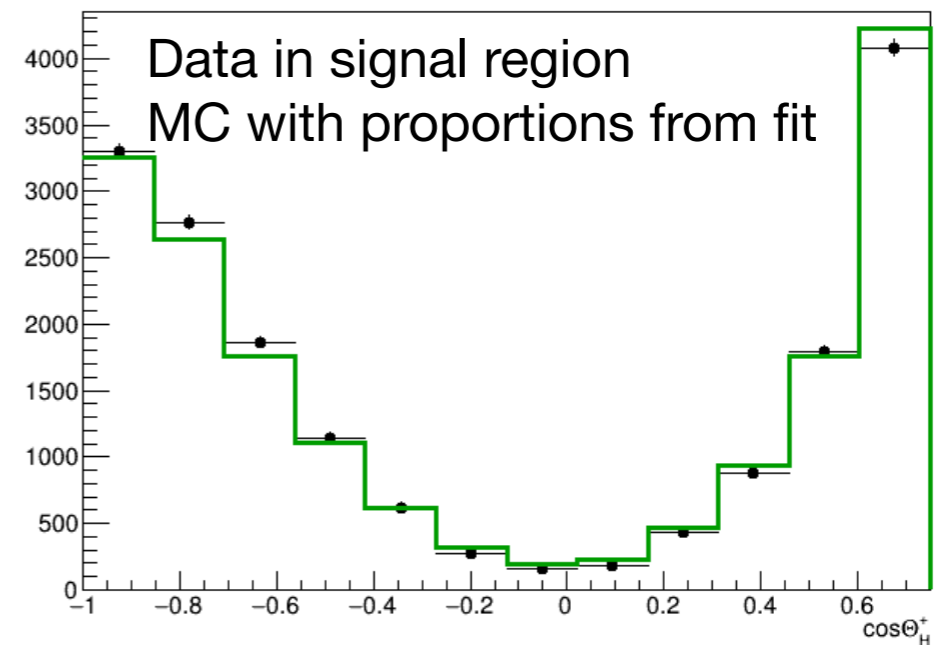
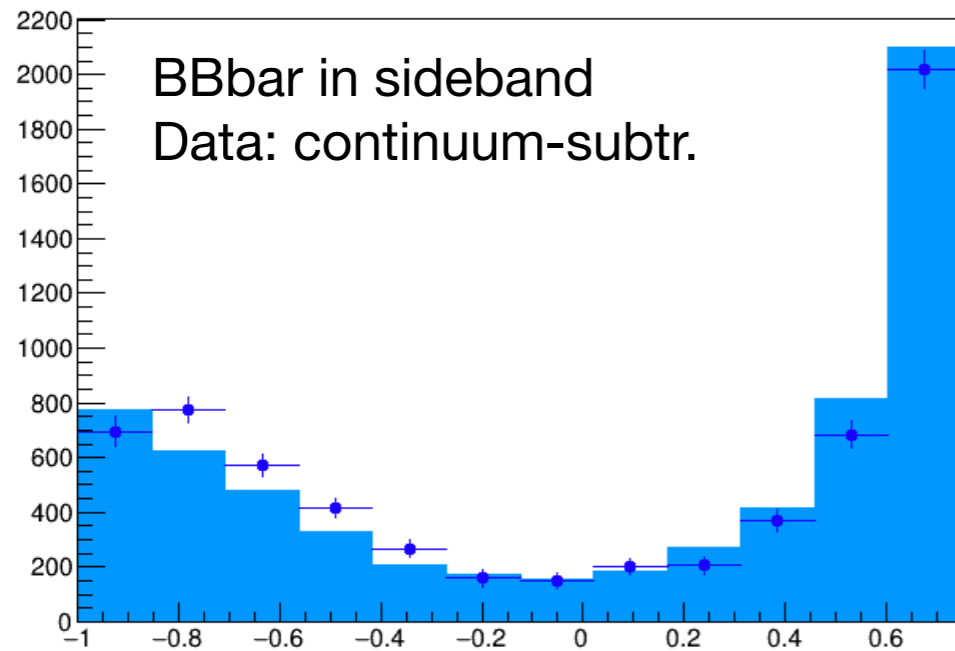
Observe that acceptance (in MC) is already sculpted in reco, and changes after BCS based on π^0 and B^+ vertices. Check variables in **continuum** and **BBbar** samples. Distributions in samples before applying the best-candidate selection.



Much larger differences in BBbar. Could explain the small angular mismodelling for BBbar, but not the one observed in continuum.

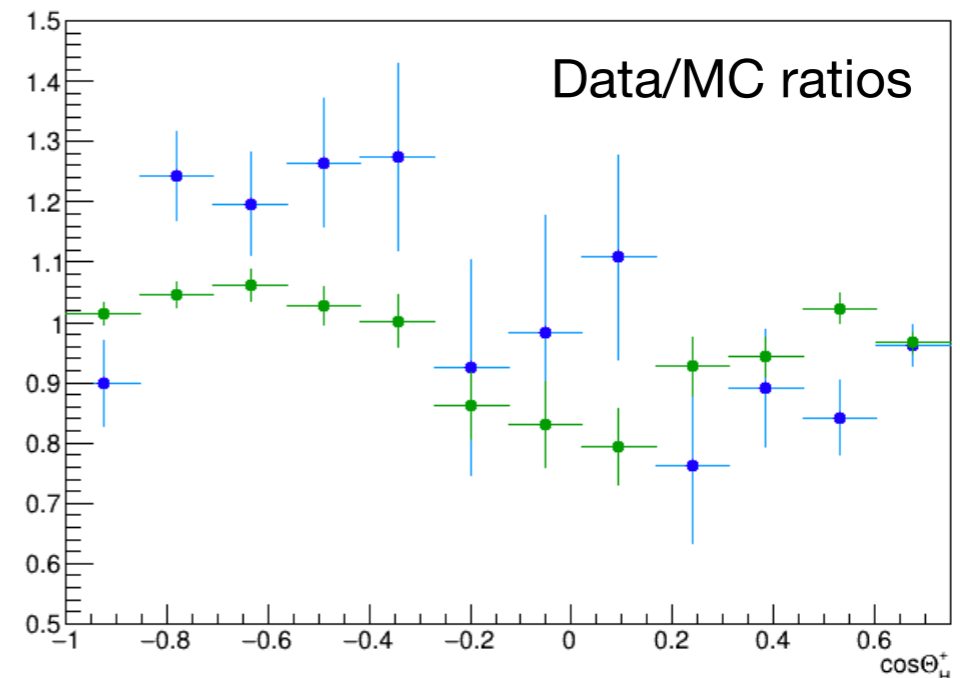
Same BBbar mismodelling?

Compare disagreement found in $B \rightarrow \rho\rho$ sideband and in $B \rightarrow D\rho$ signal region.



Discrepancies are similar in the two channels: over 1 at $-0.8 \sim -0.4$, then decrease, then increase again. Anyway the magnitude differs.

Could be the same effect, impacting differently because of the different compositions. How can this be checked?



Summary – action items

Discrepancies in helicity angles: large for continuum, also present in $B\bar{B}$.

Try to verify if it is an acceptance problem.

The only selections affecting acceptance are the baseline reconstruction and the best-candidate selection. Vertices of π^0 and B show larger mismodellings in $B\bar{B}$: continuum is either caused by baseline track selection or by a poor simulation of the composition.

To complete the picture: mismodellings in $\rho\rho$ $B\bar{B}$ sideband and in $D\rho$ (\sim pure $B\bar{B}$) look similar, might be the same acceptance issue.

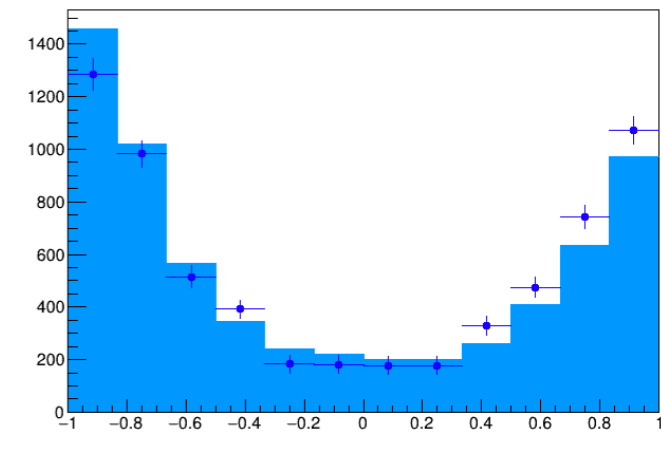
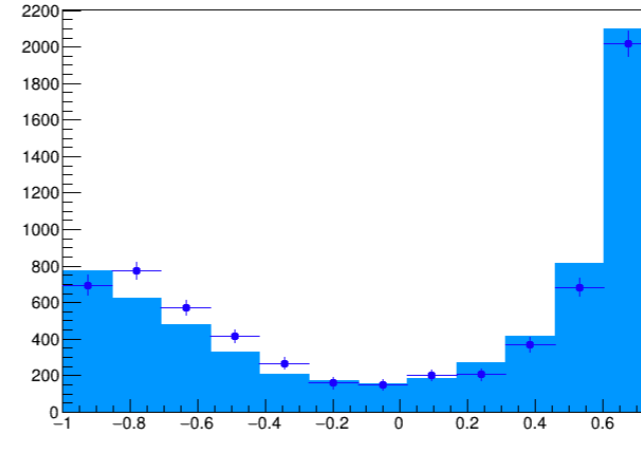
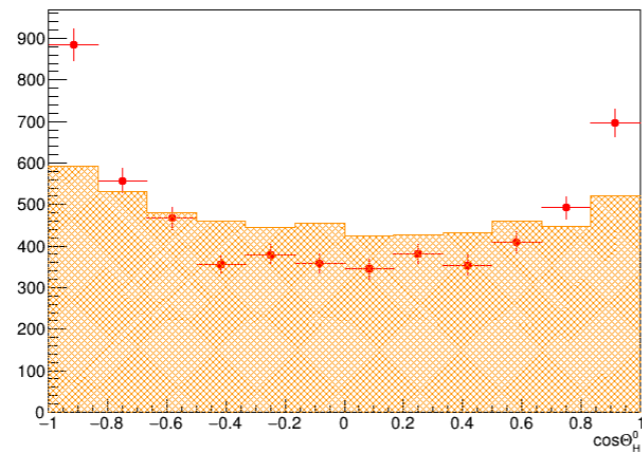
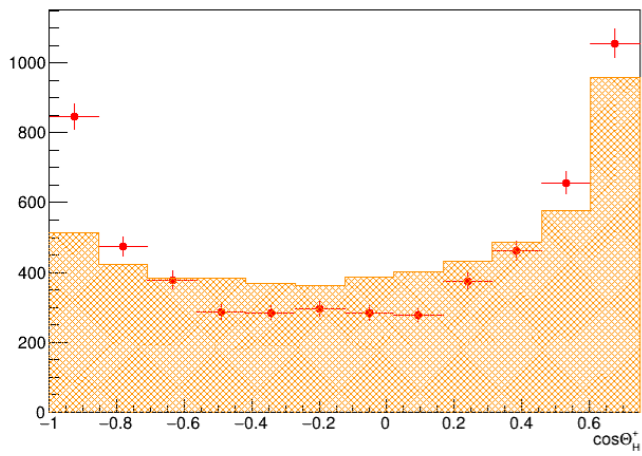
Not sure on how to proceed/what to prioritise now.

(Reco with $E(\gamma)$ corrections ongoing to check if they solve something)

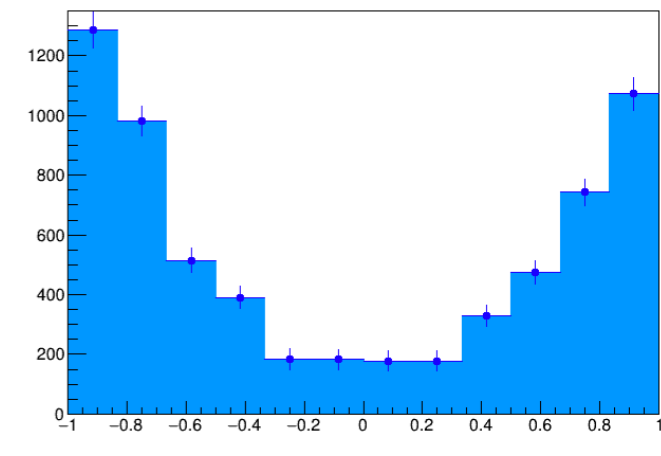
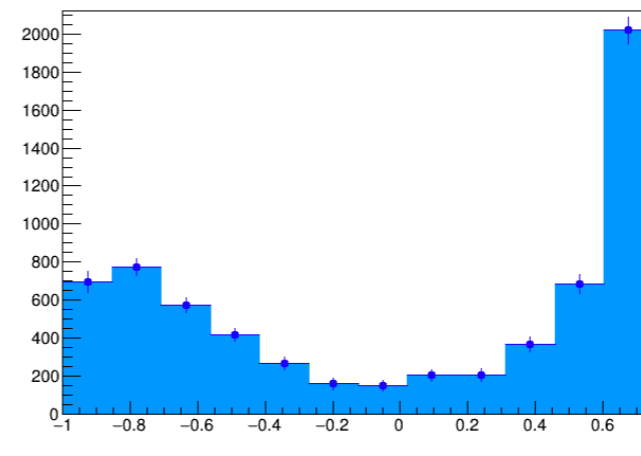
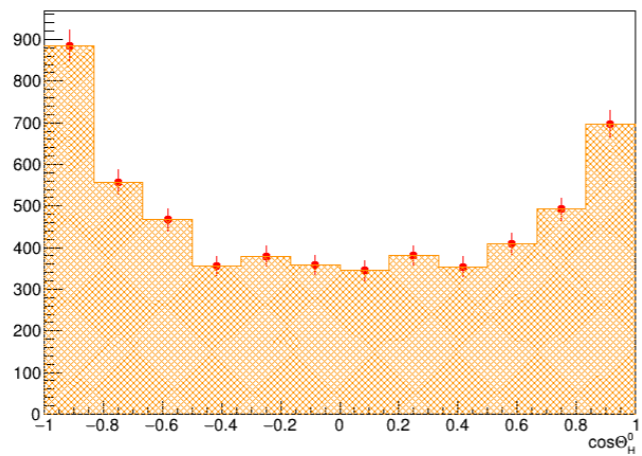
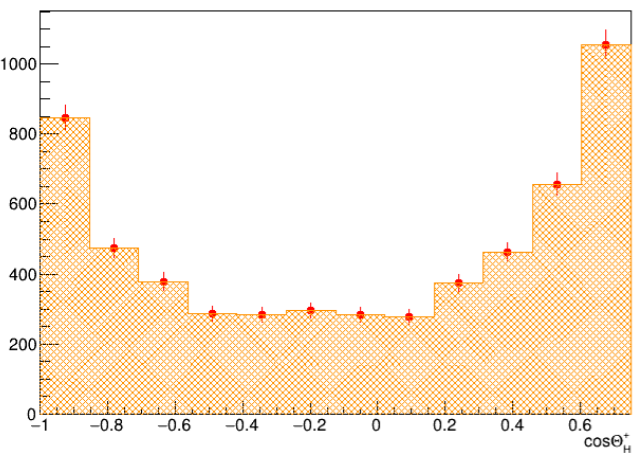
backup

Reweighting checks

Helicity angles

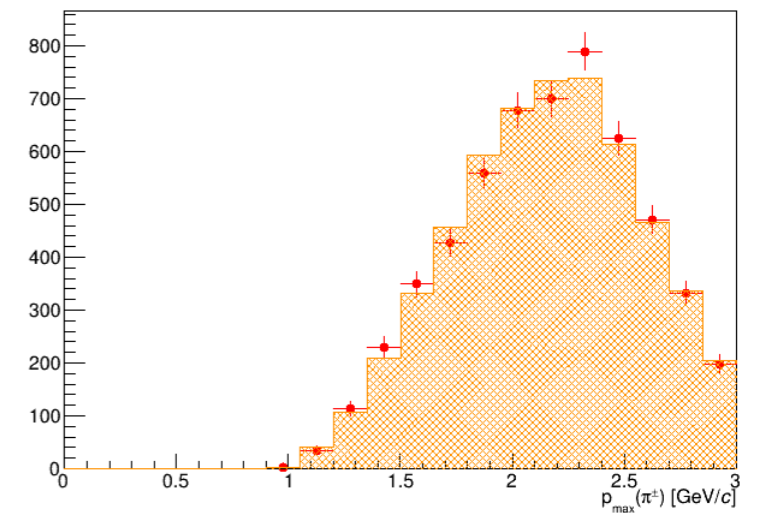
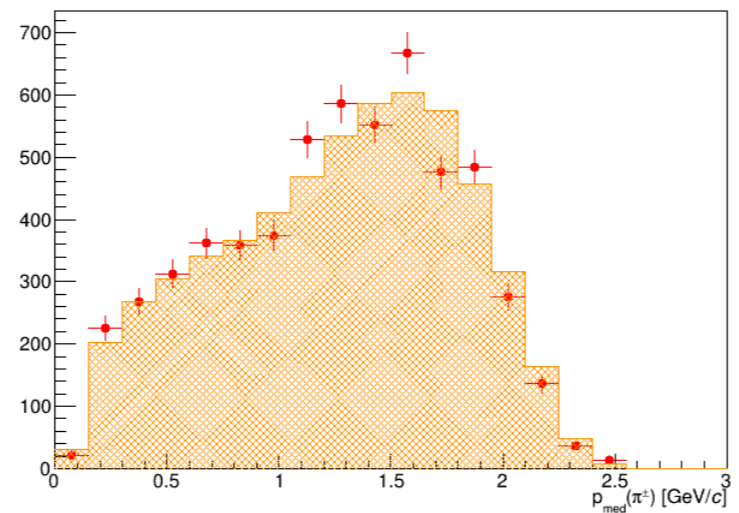
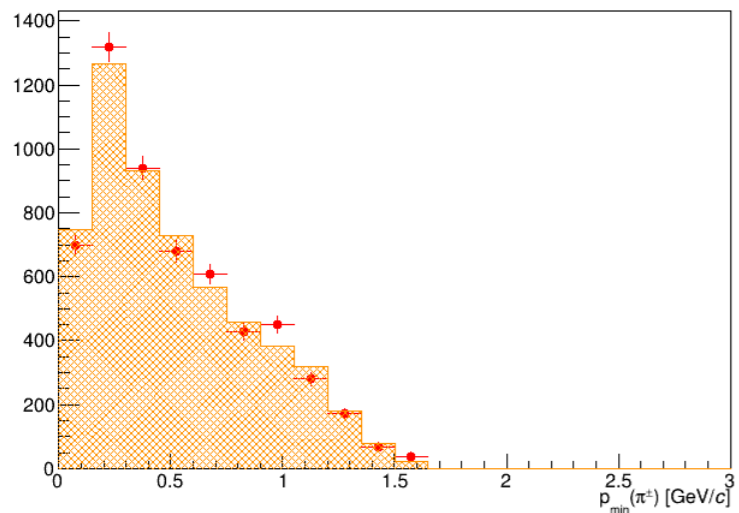
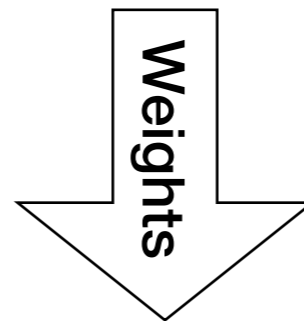
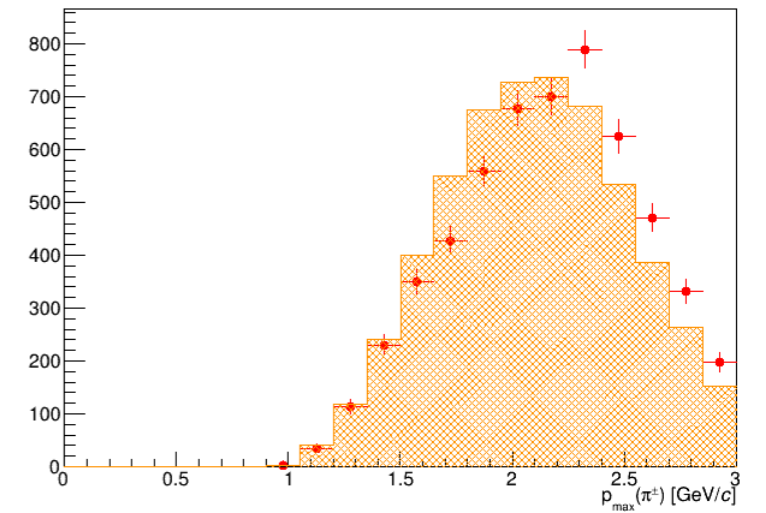
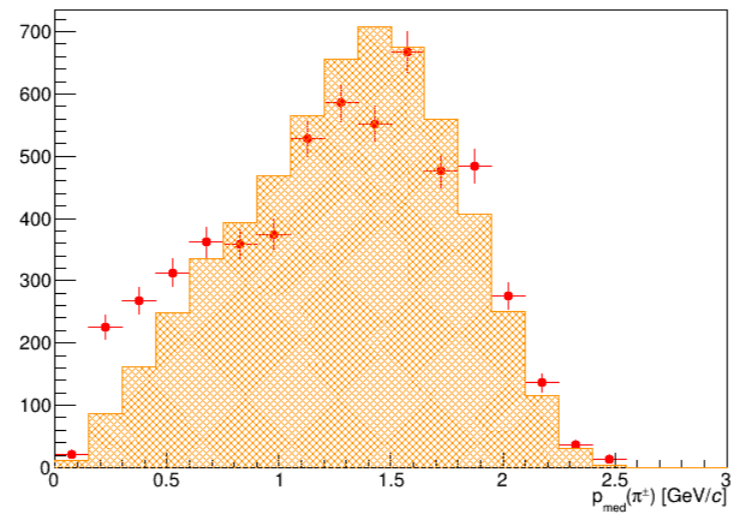
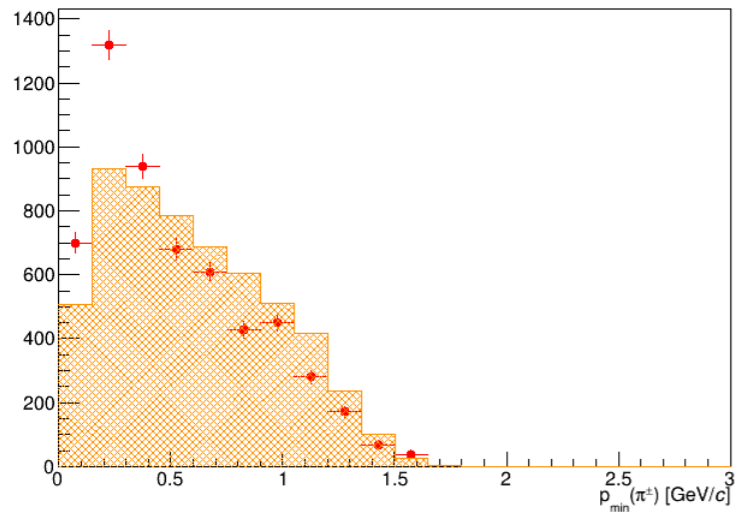


Weights



Reweighting checks

Track momenta - continuum



Reweighting checks

Track momenta - $B\bar{B}$

