

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

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Trieste Physics Meeting
July 29, 2022

Status

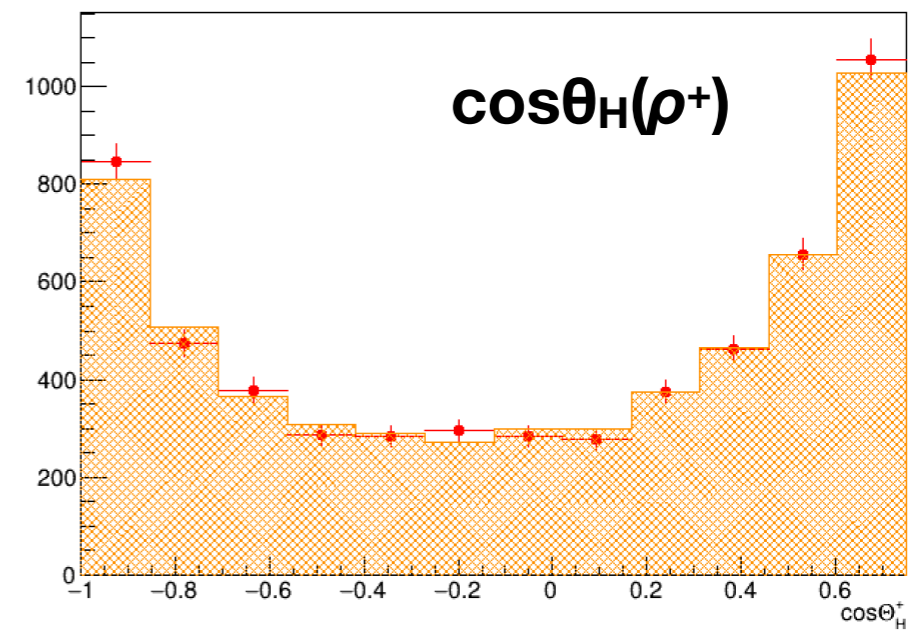
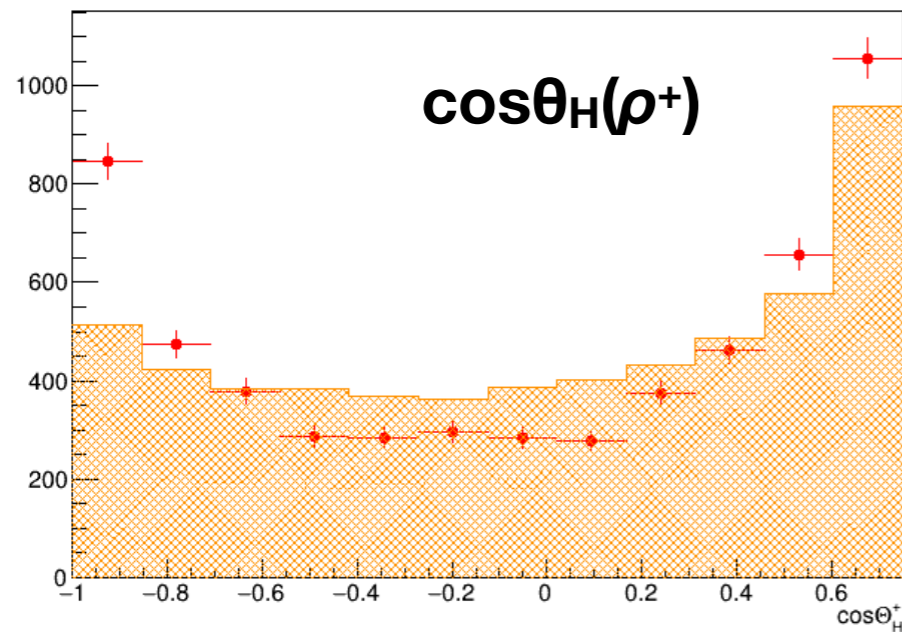
From the last report (https://agenda.infn.it/event/32048/contributions/176149/attachments/94491/129359/recap_mismodelling.pdf): mismodelling mainly in the continuum, seems to be solved by reweighting, origin still unclear.

Talked with Diego: reweighting continuum only seems to cure it, let's check this first.

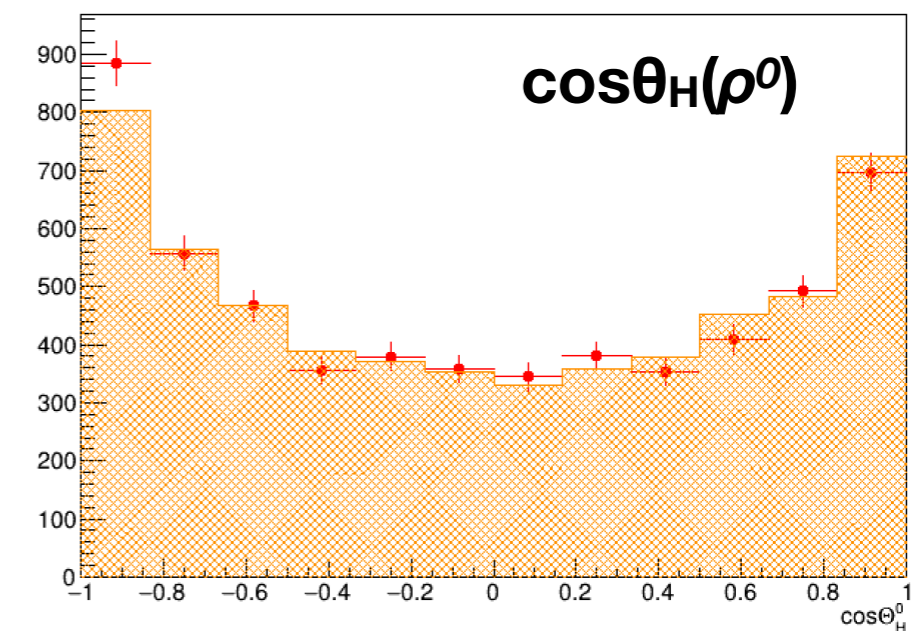
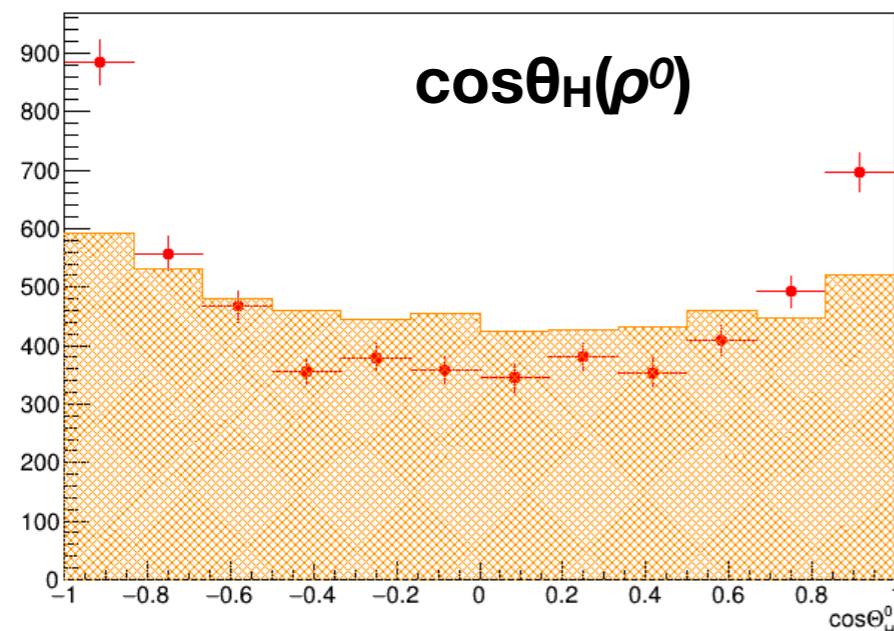
Further investigation left with lower priority.

Impact of track momenta

We know that track momenta are highly correlated with angles. In fact track momenta show also large discrepancies (see backup). Does reweighting on momenta heal the angles? Use approach by Eldar: 2Dx2D weights based on each ρ 's daughters momenta.



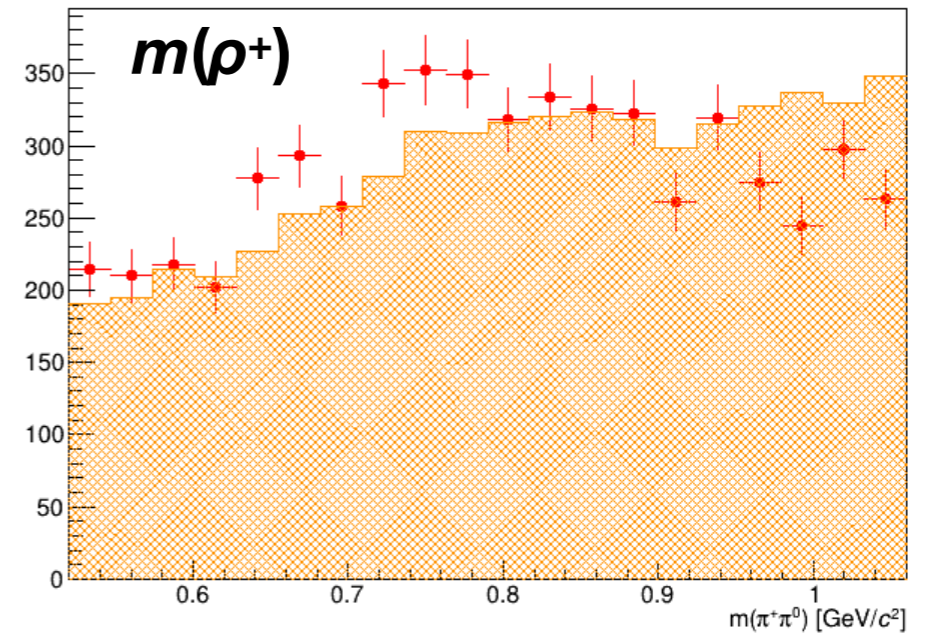
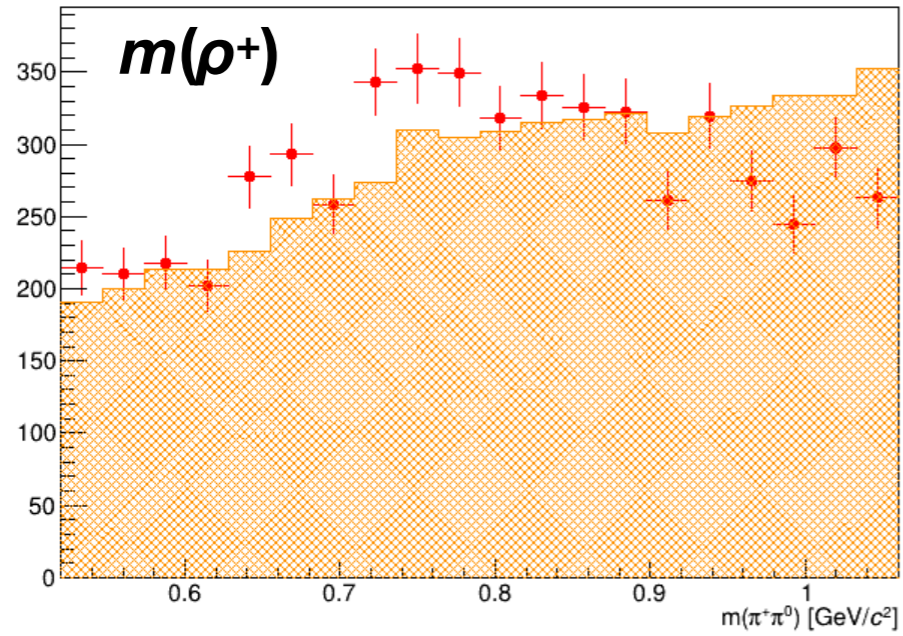
Weights



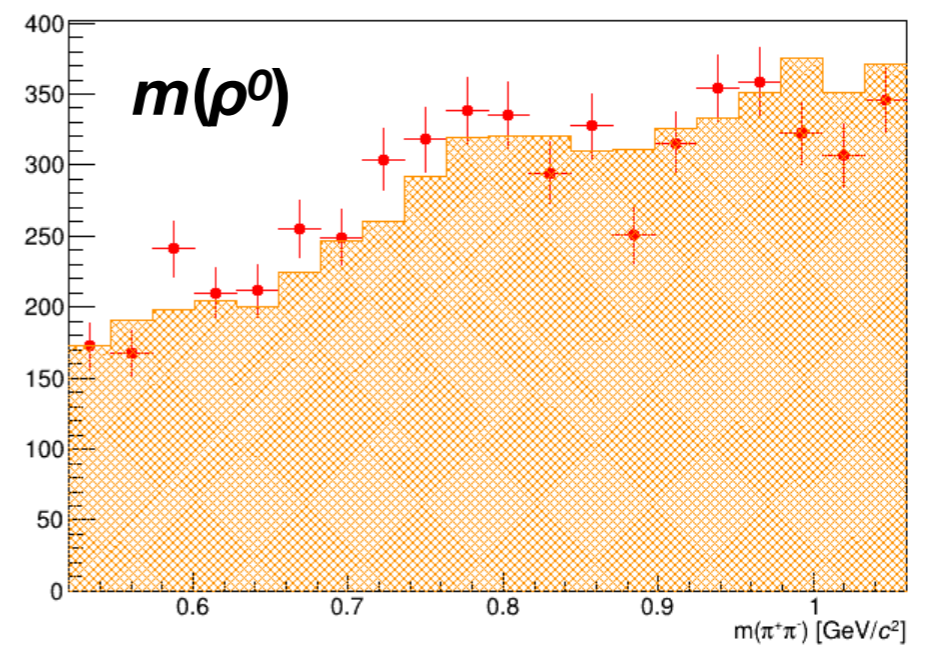
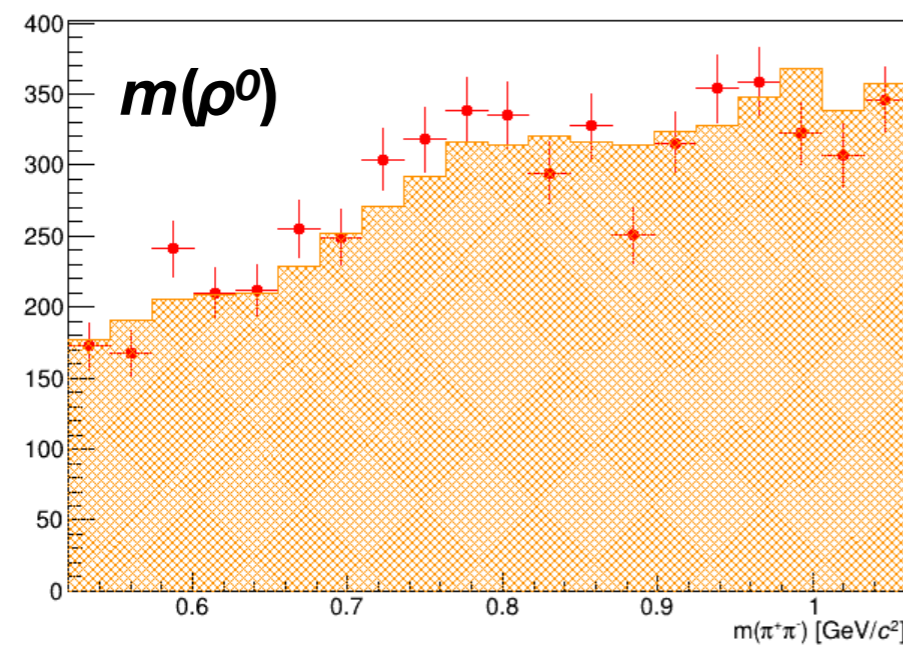
Improved but not fully healed. Is there something else entering?

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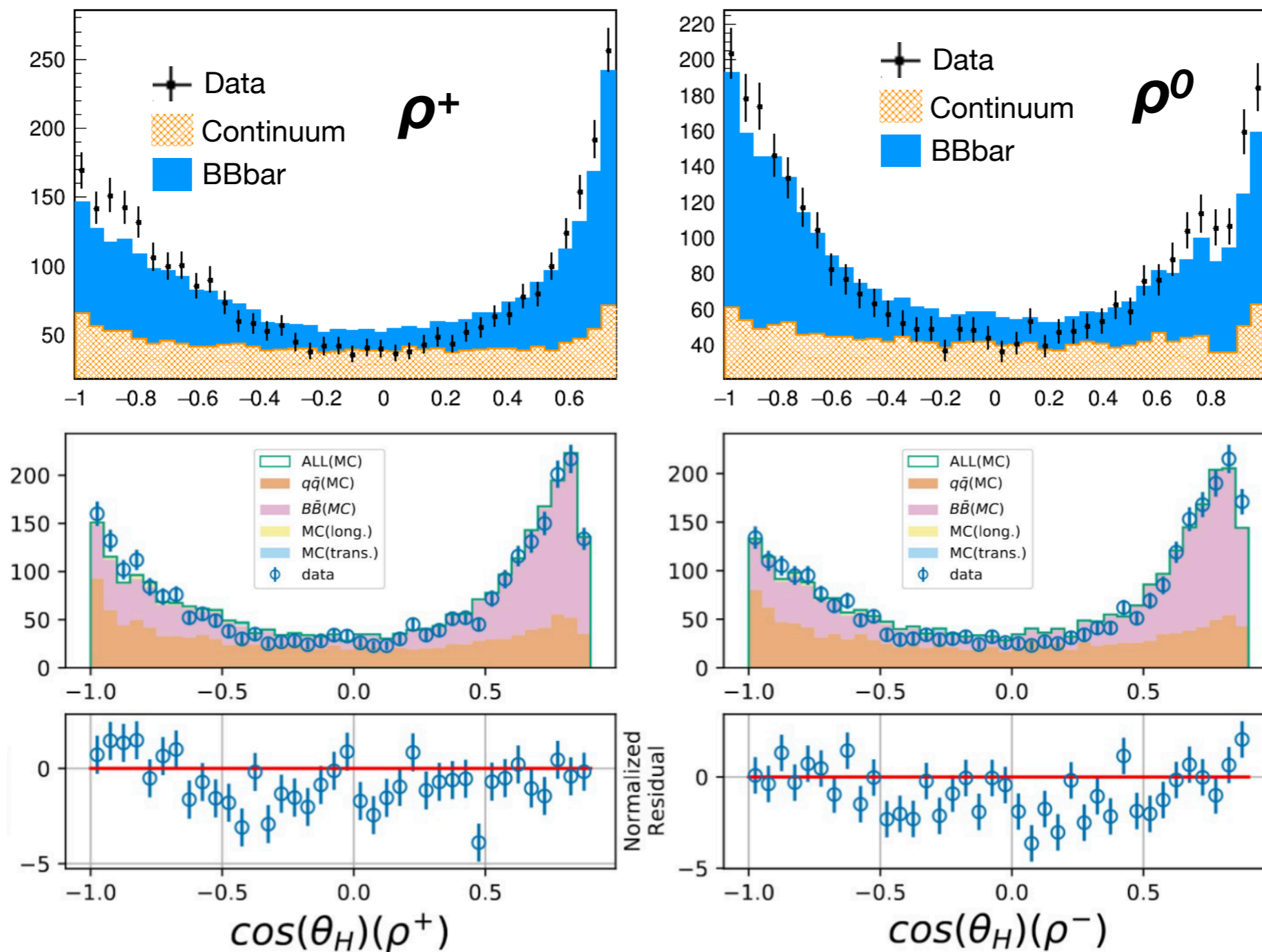
Weights



Nothing changes in the masses.

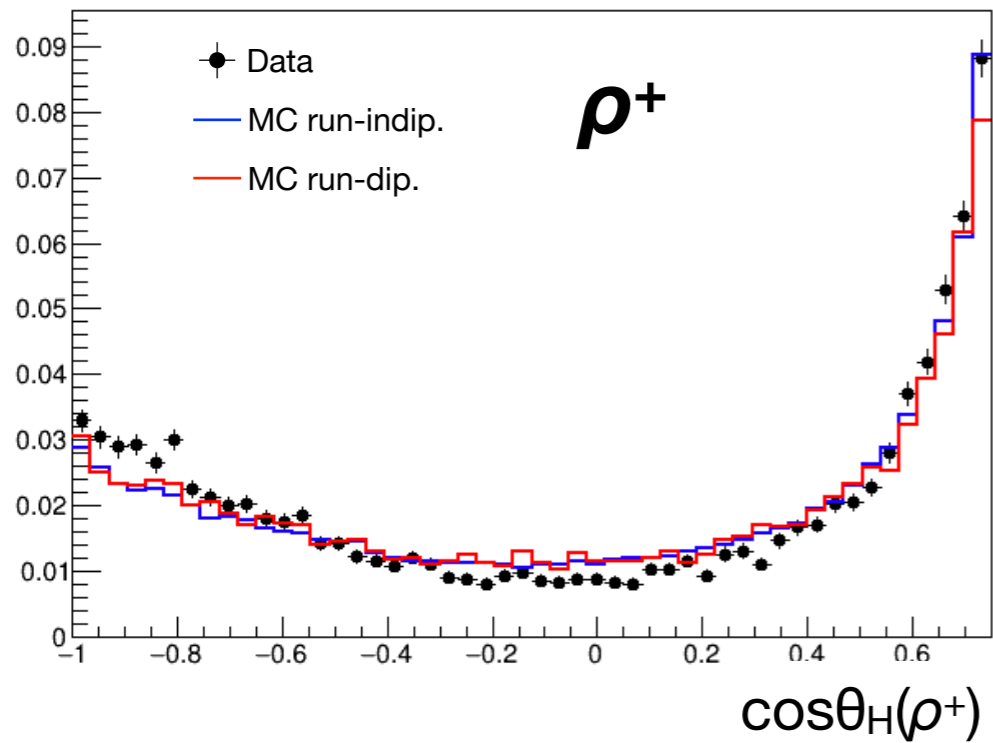
Discrepancies from $\rho^+\rho^-$

Compare w/ $\rho^+\rho^-$ plots, using same selection (tight on γ/π^0 , no PhotonMVA).
Scale by a factor 1/3 the histograms to mimic their statistics.

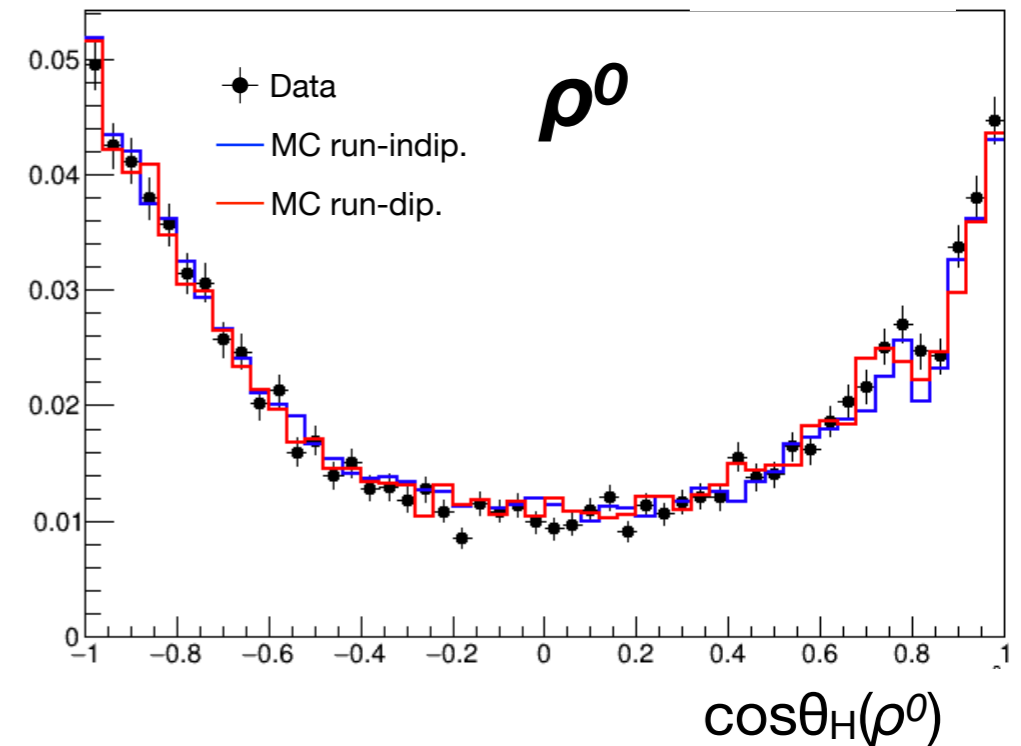
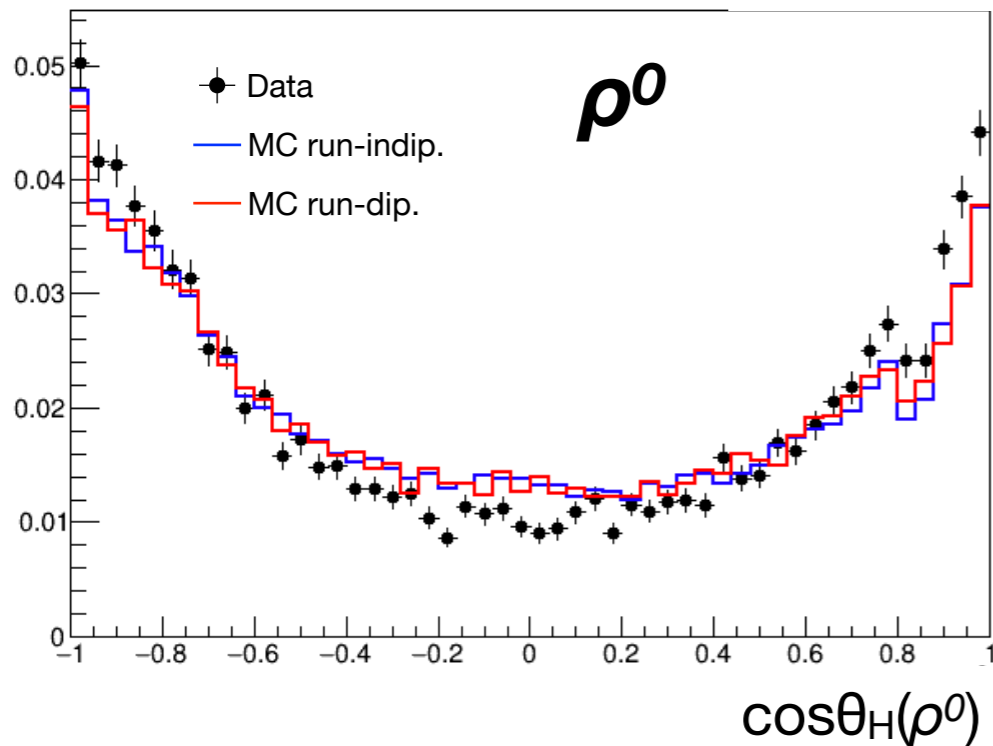
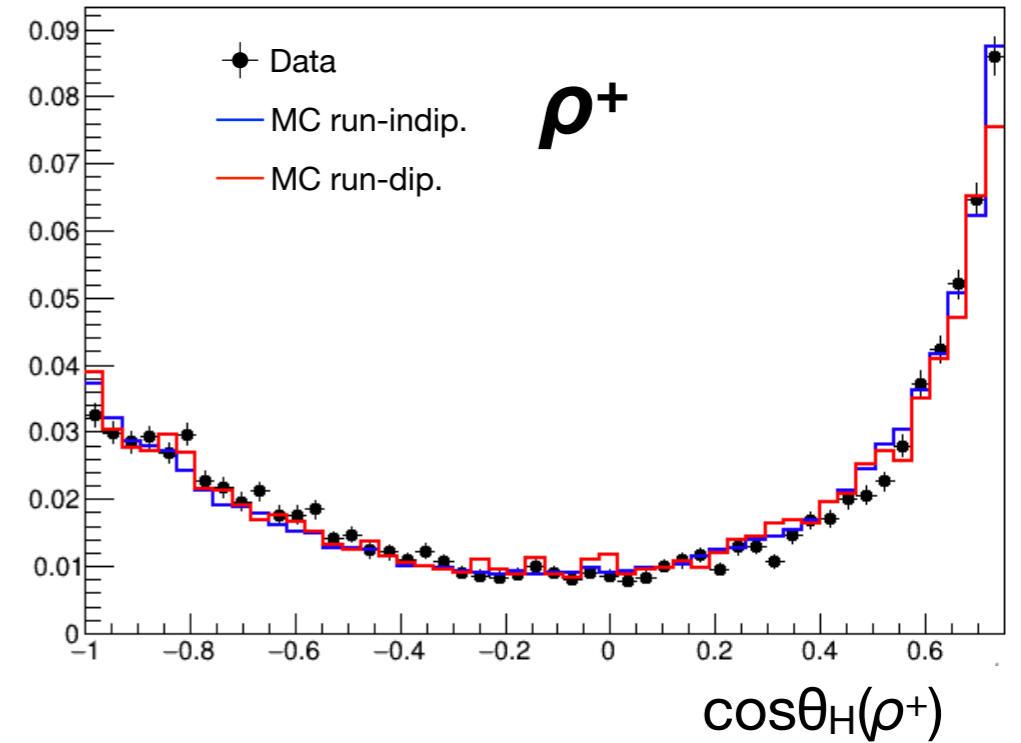
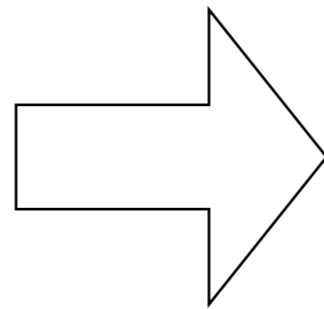


Statistics may be hiding mismodeling in $\rho^+\rho^0$.

Reweight continuum only



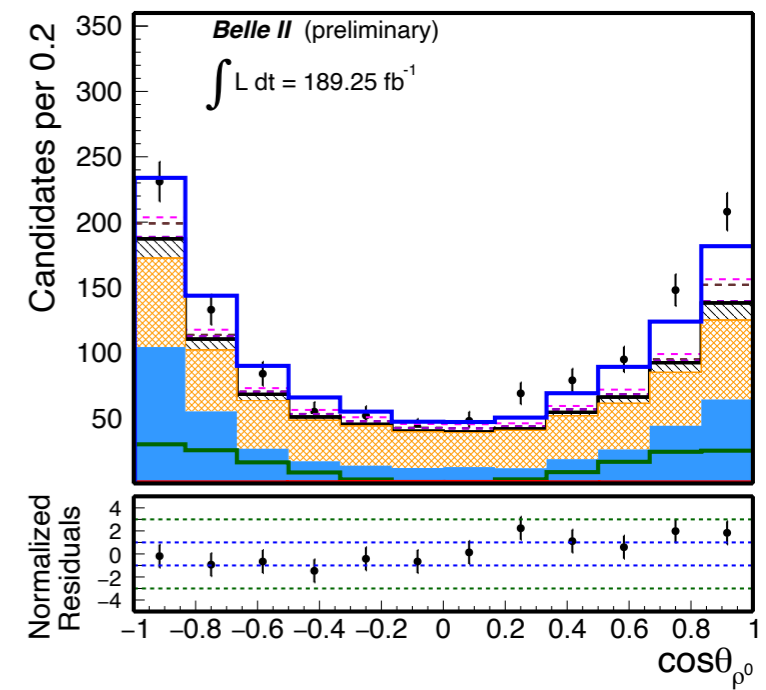
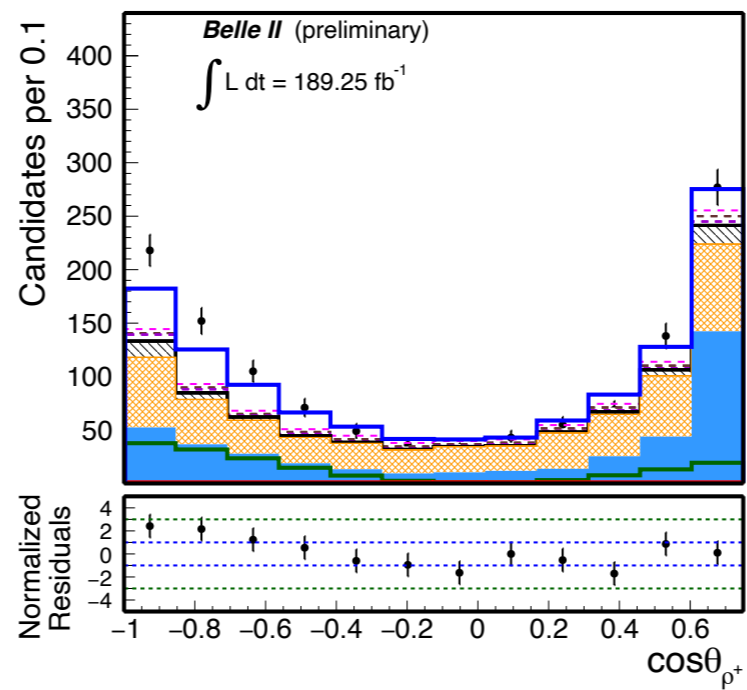
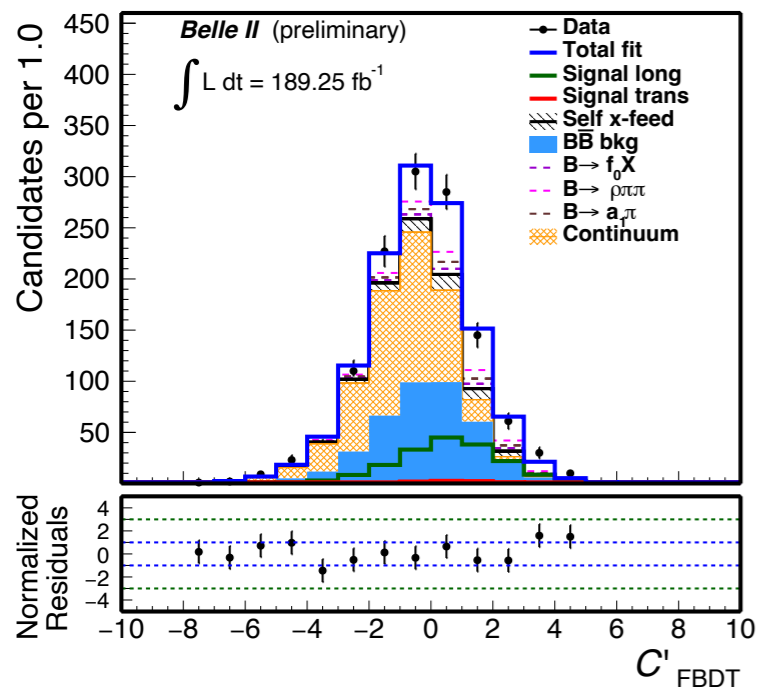
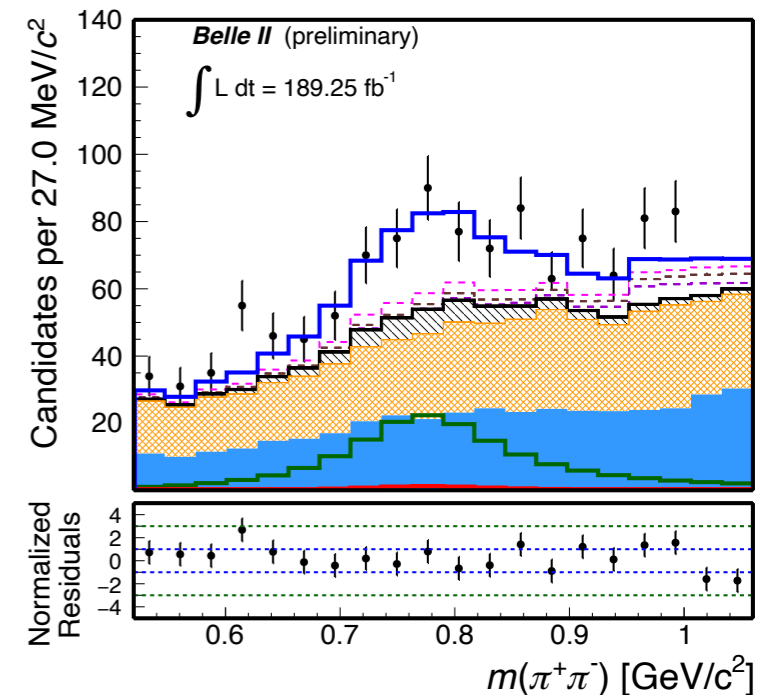
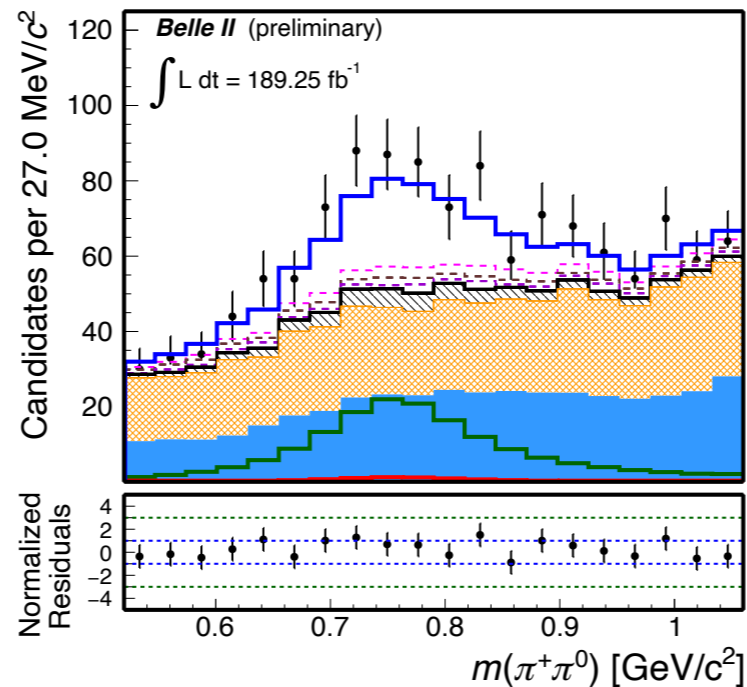
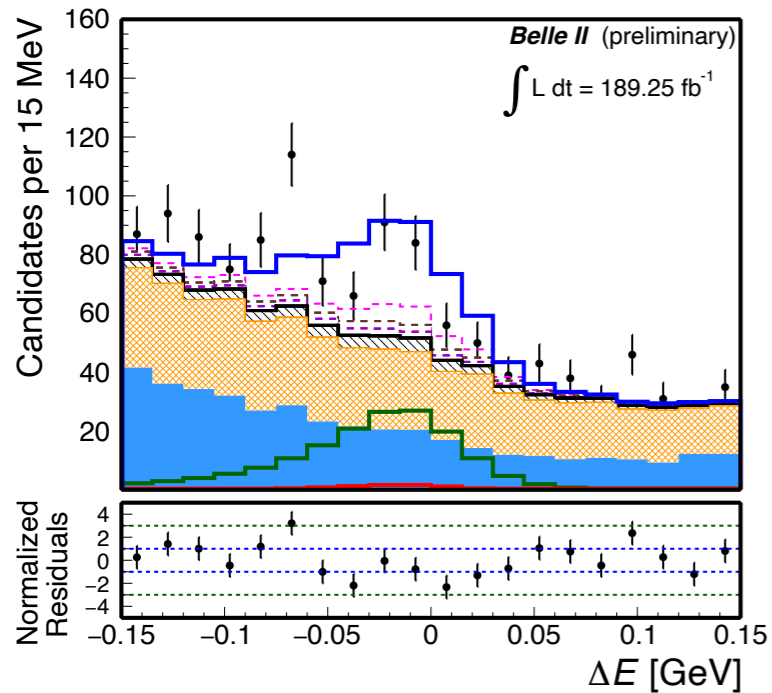
2Dx2D weights
from π momenta



**Reweighting on continuum only improves the agreement.
No ri-rd differences.**

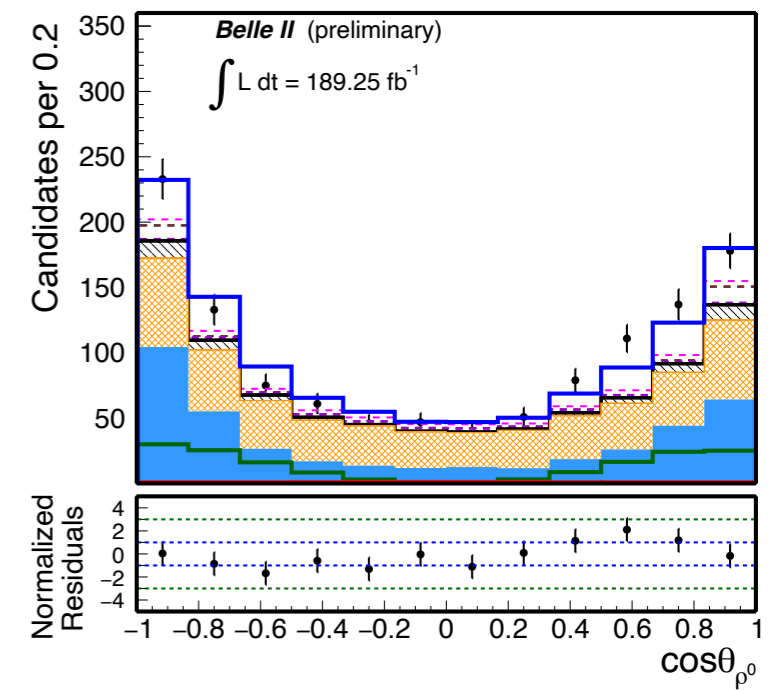
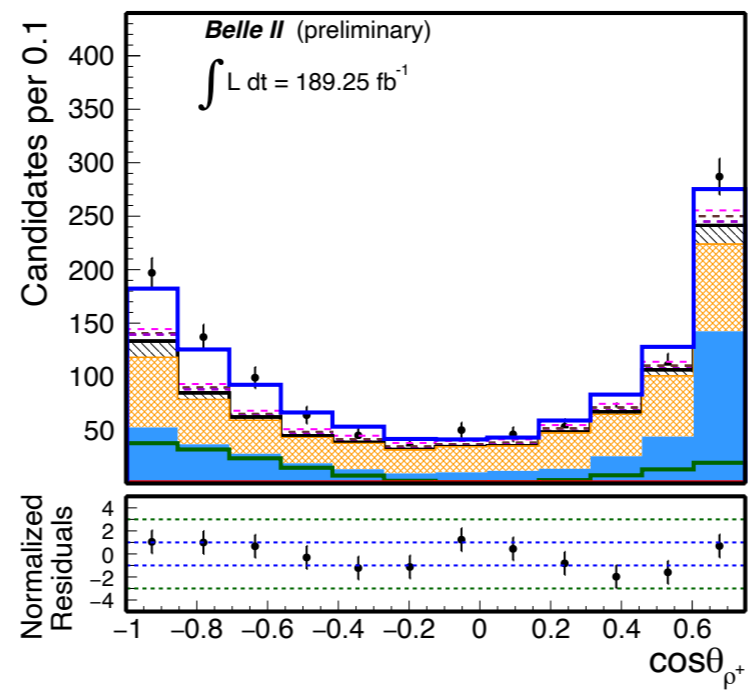
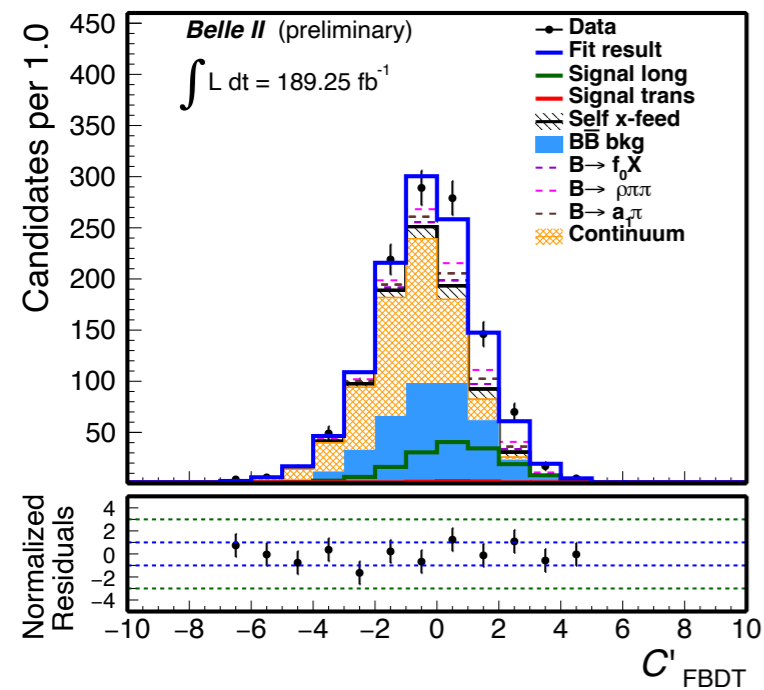
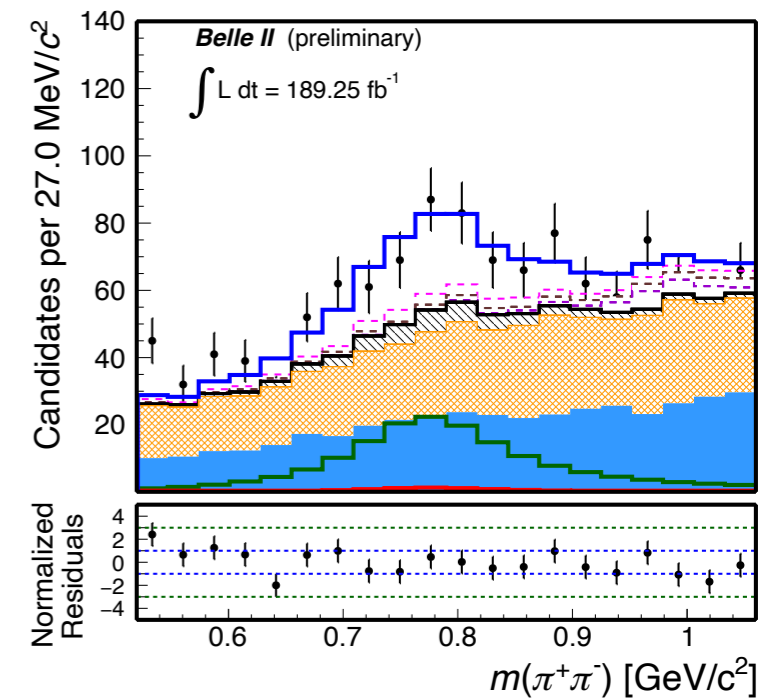
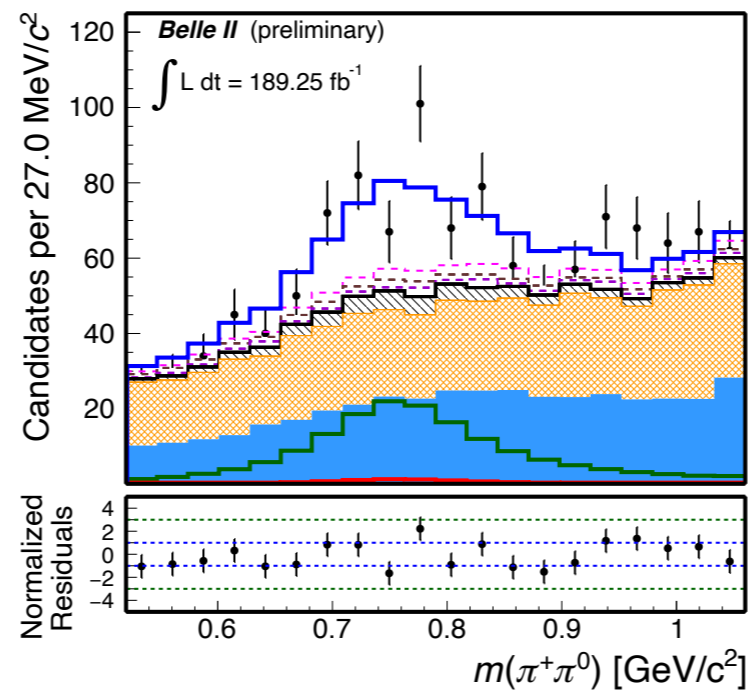
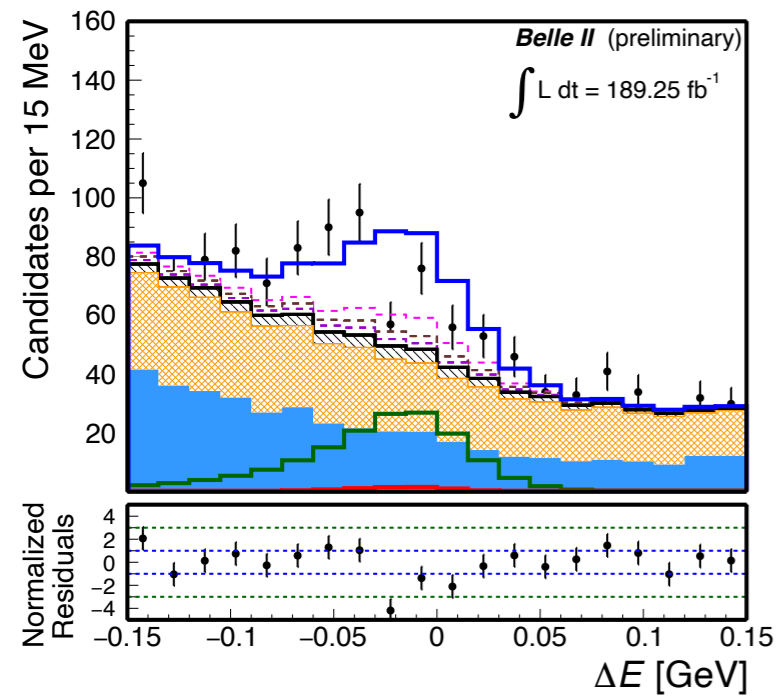
Fit with new continuum

Reweight continuum: B^+



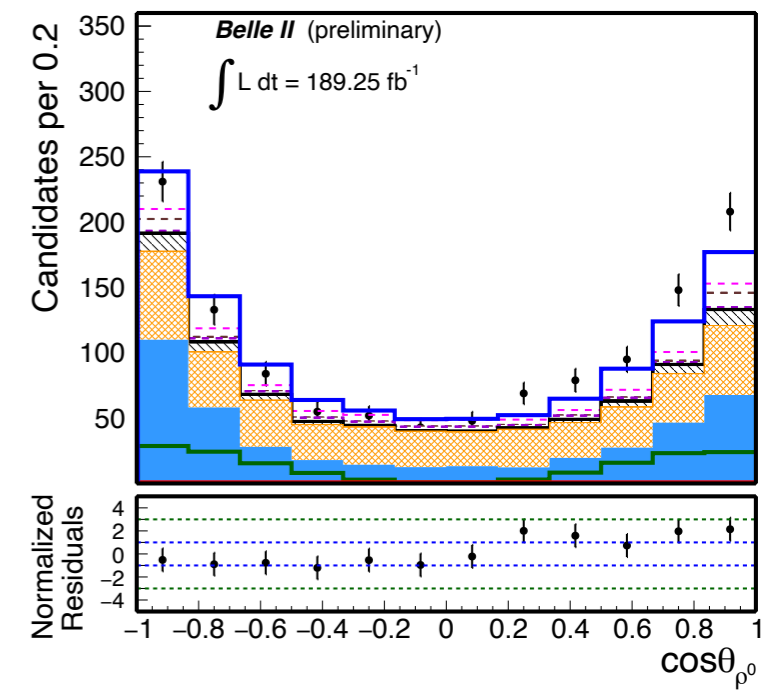
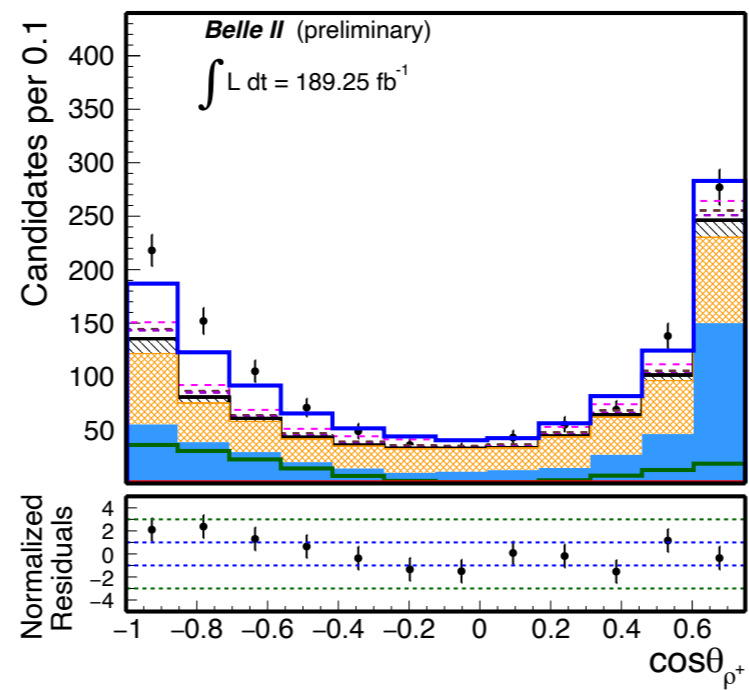
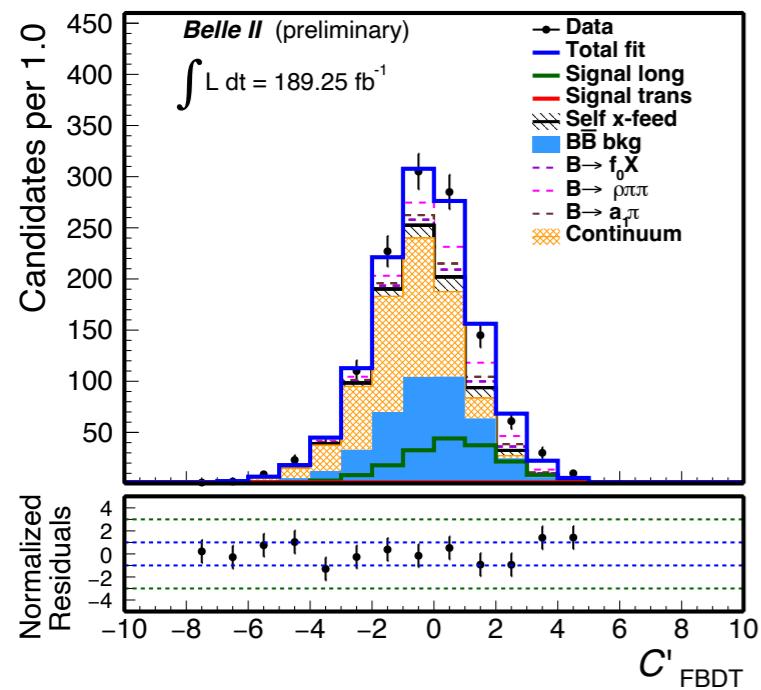
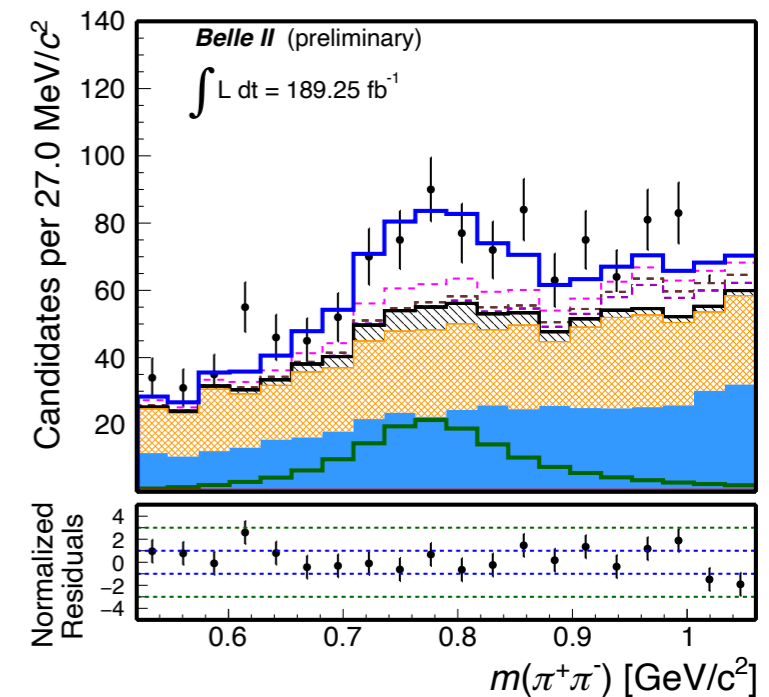
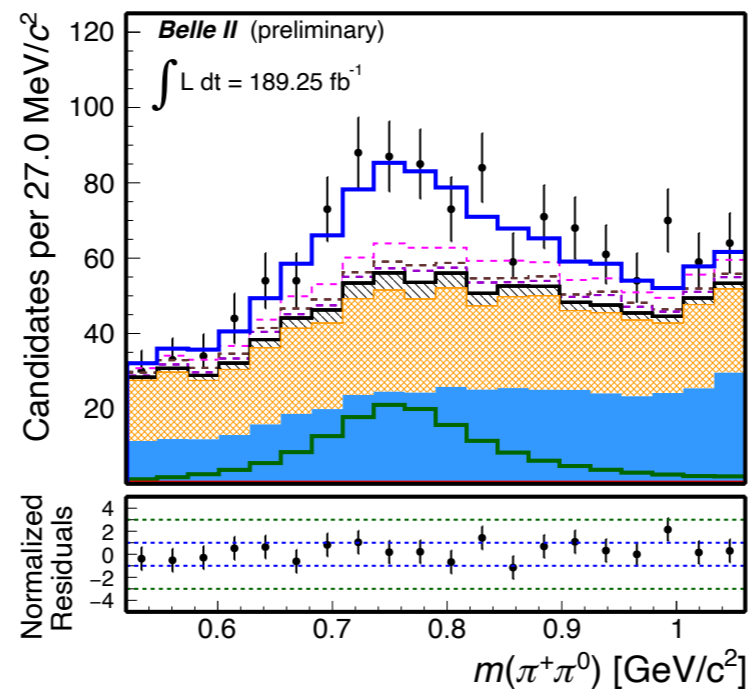
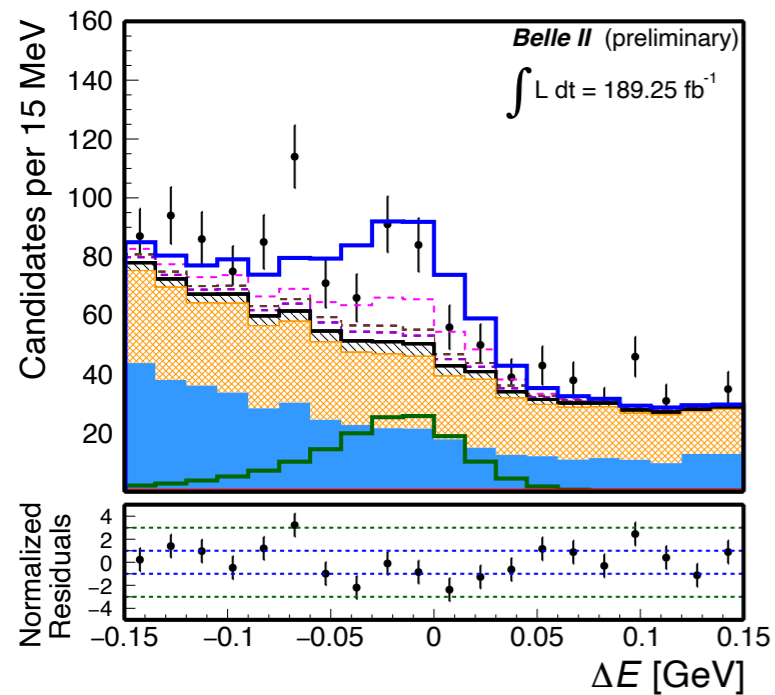
Still mismodelling in angular distributions.

Reweight continuum: B^-



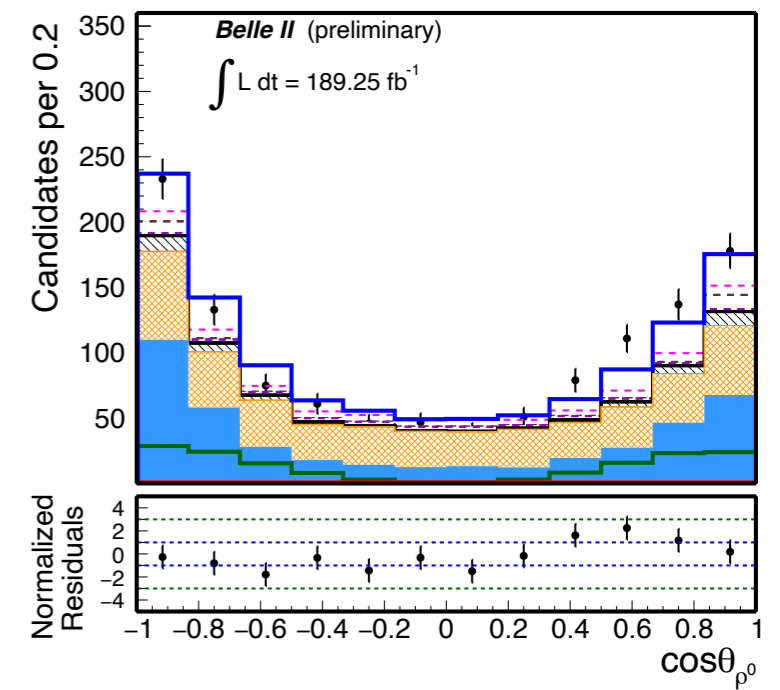
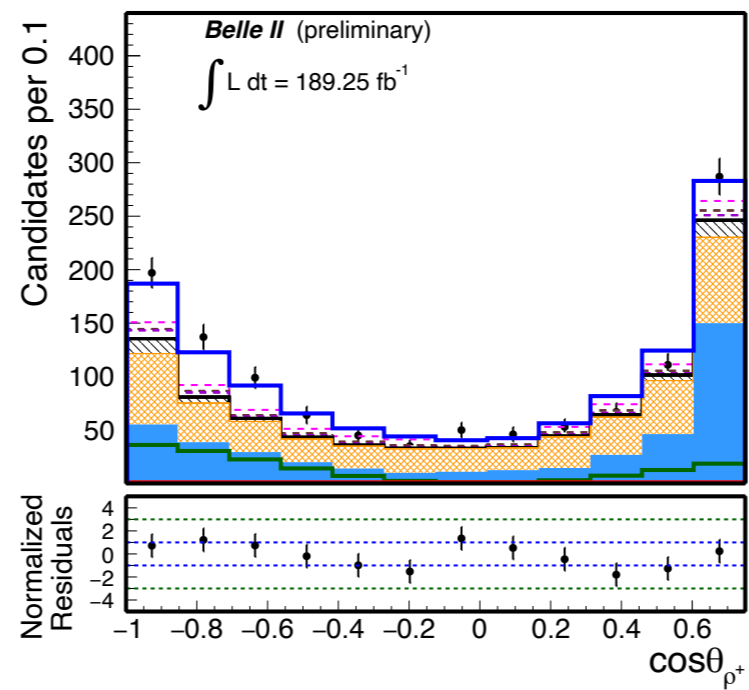
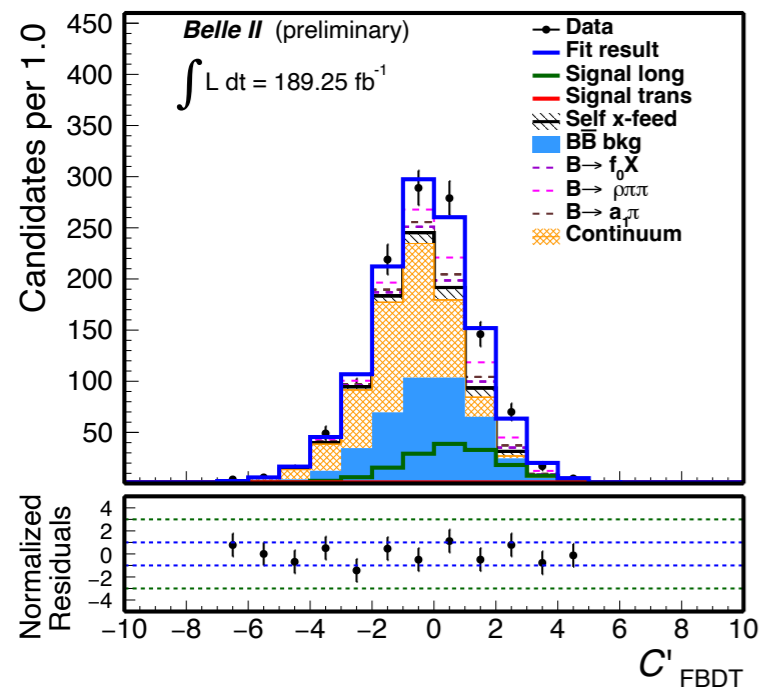
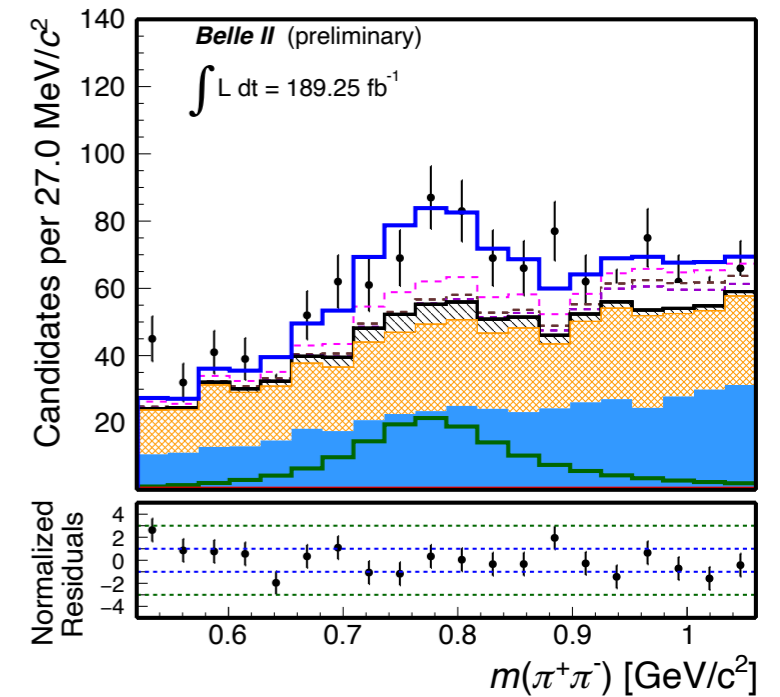
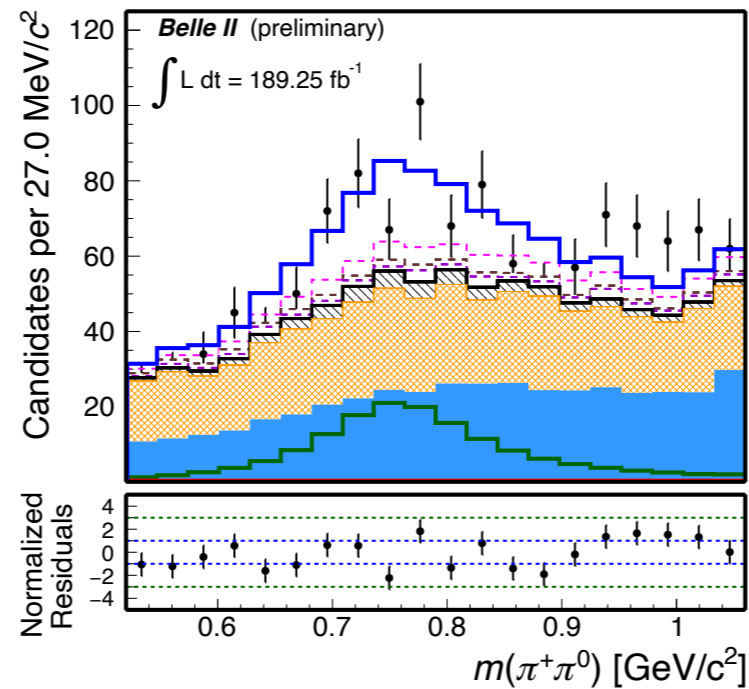
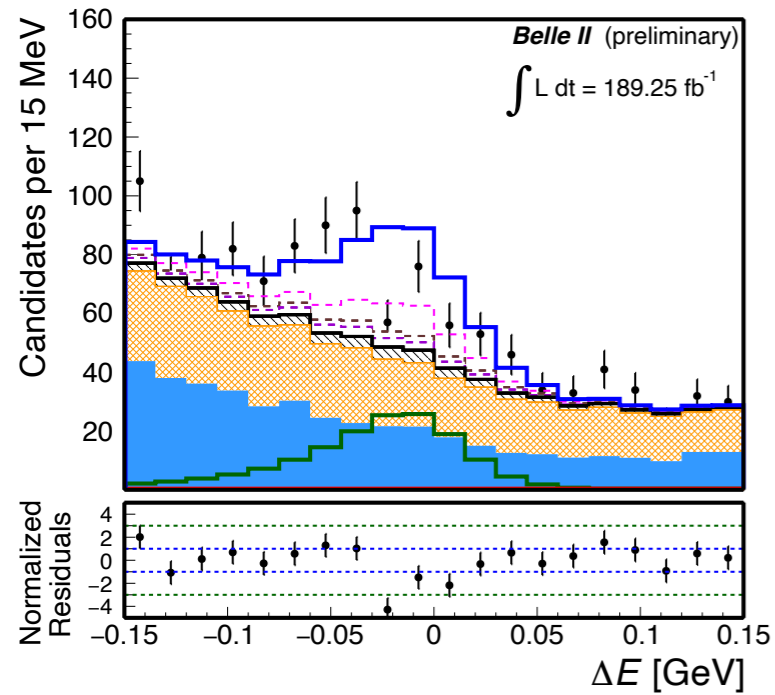
Still mismodelling in angular distributions.

Use offres data: B^+



**Still mismodelling in angular distributions.
 Not much change wrt using reweighted continuum.**

Use offres data: B^-



**Still mismodelling in angular distributions.
 Not much change wrt using reweighted continuum.**

Results

	Moriond default	Reweight continuum	Offres data
$f_+ = (1 - A_{CP})/2$	0.533 ± 0.034	0.528 ± 0.031	0.534 ± 0.033
BF [10^{-6}]	23.2 ± 2.2	26.4 ± 2.2	24.9 ± 2.2
f_L	0.943 ± 0.034	0.967 ± 0.027	0.991 ± 0.028
SxF fraction	0.316 ± 0.028	0.317 ± 0.028	0.316 ± 0.028
BB background	839 ± 51	813 ± 53	857 ± 51
$B \rightarrow f_0$ decays	47 ± 22	47 ± 22	61 ± 24
$B \rightarrow \rho\pi\pi$ decays	134 ± 53	78 ± 45	131 ± 47
$B \rightarrow a_1\pi$ decays	55 ± 25	50 ± 25	43 ± 25
Continuum background	932 ± 73	986 ± 71	916 ± 73

Syst BF: 2.7

Syst f_L : 0.027

Large fluctuations in BF and f_L . Need to investigate.

Summary – action items

Reweighting continuum momenta is solid, doesn't sculpt masses, and heals the discrepancy observed in the sidebands.

Fit tried with reweighed continuum and with off-resonance data show results compatible within systematic uncertainty, but the angles are still mismodelled.

Trying to investigate why (now having issues with sideband fit non converging).