

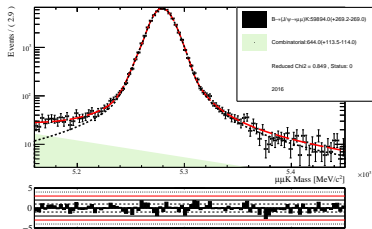
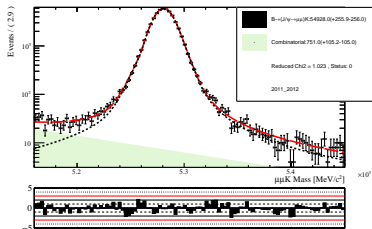
## RC COMMENTS DISCUSSION

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JULY 25, 2019

# HARMONISE CUTS DIFFERENTLY

- Suggested to harmonise cuts as  $B^+ \rightarrow p(\mu^+)\bar{p}(K^-)\mu(\mu^+)\nu$
- Makes a lot of sense.  $B \rightarrow J/\psi K$  fits changed.

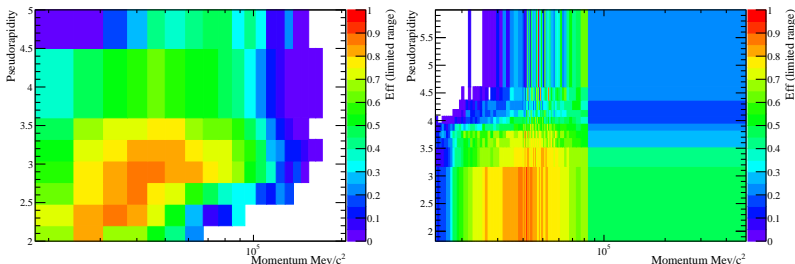


## PRELIMINARY CHANGES IN TABLE

| Systematic Source     | Systematic on total relative efficiency in bins of $p\bar{p}$ mass |               |               |               |               |
|-----------------------|--|---------------|---------------|---------------|---------------|
|                       | 1.87 – 2.0 GeV   | 2.0 – 2.2 GeV | 2.2 – 2.4 GeV | 2.4 – 2.6 GeV | 2.6 – 5.0 GeV |
|                       | Run 1  |               |               |               |               |
| Kinematic Reweighting | 9.014 %  | 9.188 %       | 8.859 %       | 9.586 %       | 8.365 %       |
| KR NO NTRACKS         | 6.562 %  | 5.929 %       | 2.809 %       | 0.641 %       | 3.817 %       |
| MC STAT               | 6.703 %  | 5.687 %       | 5.57 %        | 5.547 %       | 4.801 %       |
| Tracking              | 2.847 %  | 2.827 %       | 2.841 %       | 2.835 %       | 2.851 %       |
| $q^2$ Reweighting     | 0.044 %  | 0.036 %       | 0.006 %       | 0.027 %       | 0.057 %       |
| PID                   | 11.5 %   | 10.1 %        | 9.8 %         | 11.1 %        | 10.6 %        |
| PID NEW               | 1.985 %  | 1.048 %       | 0.662 %       | 0.902 %       | 1.352 %       |
| Data/MC agreement     | 0.4%   | 0.4%          | 0.4%          | 0.4%          | 0.4%          |
|                       | Run 2  |               |               |               |               |
| Kinematic Reweighting | 5.514 %  | 6.243 %       | 5.275 %       | 6.157 %       | 7.682 %       |
| KR NO NTRACKS         | 8.281 %  | 7.684 %       | 5.033 %       | 5.919 %       | 5.859 %       |
| MC STAT               | 8.899 %  | 6.844 %       | 6.551 %       | 6.533 %       | 5.118 %       |
| Tracking              | 2.806 %  | 2.809 %       | 2.8 %         | 2.803 %       | 2.812 %       |
| $q^2$ Reweighting     | 0.061 %  | 0.017 %       | 0.014 %       | 0.035 %       | 0.087 %       |
| PID OLD               | 10.4 %   | 10.7 %        | 11.6 %        | 10.8 %        | 11.3 %        |
| PID NEW               | 1.985 %  | 1.048 %       | 0.662 %       | 0.902 %       | 1.352 %       |
| Data/MC agreement     | 0.4%   | 0.4%          | 0.4%          | 0.4%          | 0.4%          |

## LARGE PID SYSTEMATIC

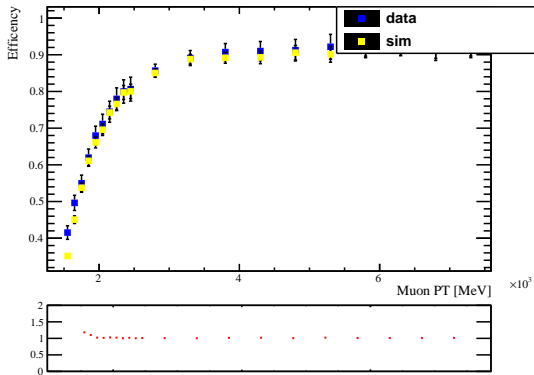
- The alternative binning looks like this:
- There was a mistake here! Used RICH 2 threshold for one and not the other.
- RICH 2 threshold cut of 18GeV is now applied and this systematic is much smaller



- nTracks potentially redundant here. If we trust the ntracks in the calib sample.

# L0 TRIGGER CORRECTION

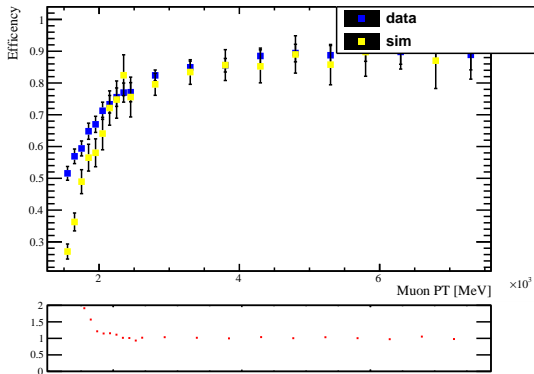
- Using the “harmonised” muon for TISTOS



Correction applied throughout.

# L0 TRIGGER CORRECTION

- Using the “harmonised” muon for TISTOS



Expected issue at low muon PT for 2016.

## REWEIGHTING SYSTEMATIC:

- Removed nTracks to see the effect
- Two major consequences
- Does it affect the efficiency shift? Not much.
- What is the effect on the PID when trusting the multiplicity in the calib sample and not using the sim nTracks at all?
- Large difference now through the reconstruction efficiency, not the trigger.
  - Trigger diff.  $\sim 3\%$
  - Reco. diff.  $\sim 9\%$
  - (depending on the bin)

## nTRACKS AND PID

- Bin PIDCalib in nTracks AND scale/reweight in nTracks

OR

- Do not use the simulation nTracks distribution. Given you expect the Calib multiplicity to match the data.

(I was double counting in my alt sample. Gave rise to a very large PID systematic.)



## CORRELATIONS

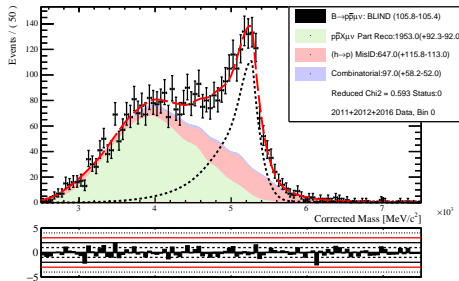
- Argument taken that pid binning systematic is likely correlated. Conservative choice can be taken with 100% correlation.
- Will use this going forward
- Other than tracking and PID is there any other efficiency systematic that concerns you

# MC STAT

- Now largest syst
- Dominated by the gen lvl sample used for DecProdCuts (hard to get good stats in the low ppbar mass region)
- Will produce many more

# HLT1 LINES ADDED.

- In now for efficiency, explicitly with Bminus\_Hlt1TrackMuonDecision\_TOS or Bminus\_Hlt1TrackAllL0Decision\_TOS
- Fits have changes slightly as a result



## ON AND OFF SYSTEMATICS

- Tracking and reweighting systematics used to be done with an on/off method.
- I now do not use on/off systematics at all.

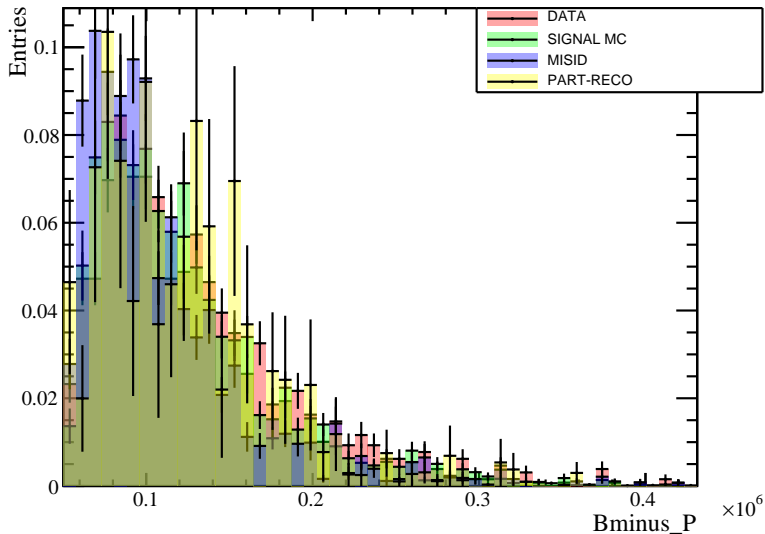
## NOTE

- If you agree with these changes I will update the analysis note with them, along with the other correction you have pointed out

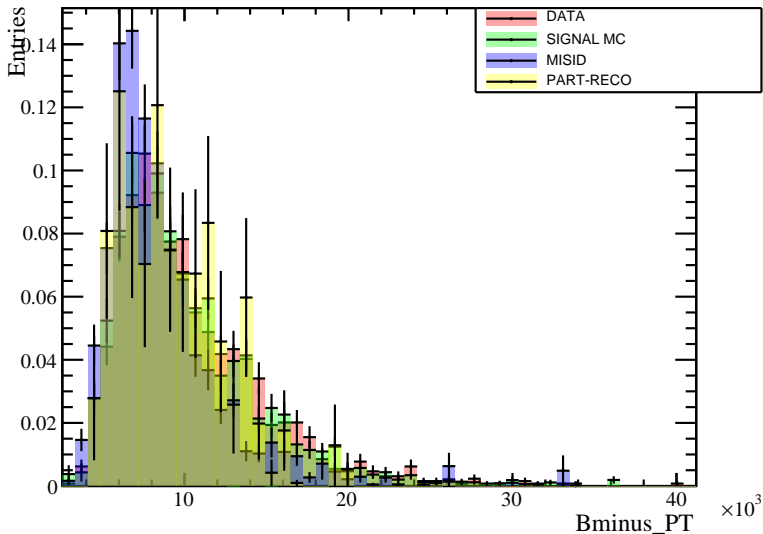
## DATA/MC PRELIMINARY PLOTS

- Cut around  $4900 < \text{MCORR} < 5600$
- 1st bin of pp mass
- Signal is not very pure so not sure we expect good agreement
- Need to normalised these properly

## DATA/MC PRELIMINARY PLOTS P

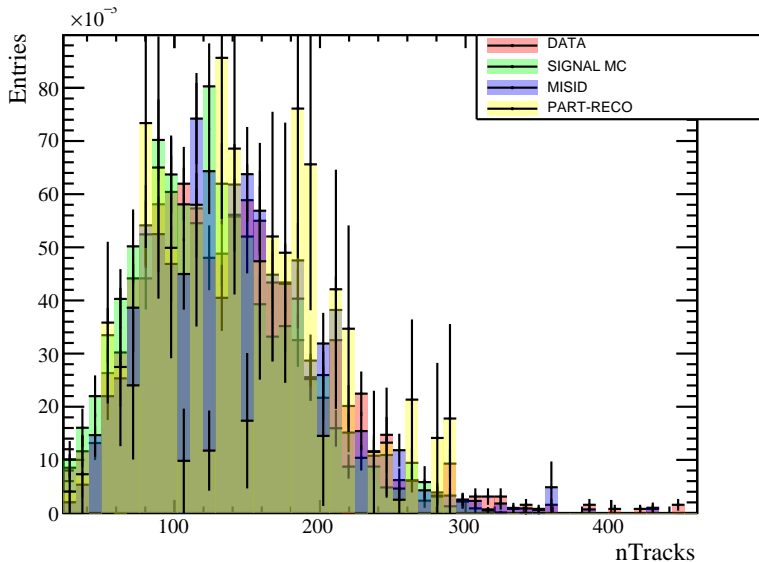


## DATA/MC PRELIMINARY PLOTS PT





## DATA/MC PRELIMINARY PLOTS nTRACKS



# PID HISTOS SAME AXIS

