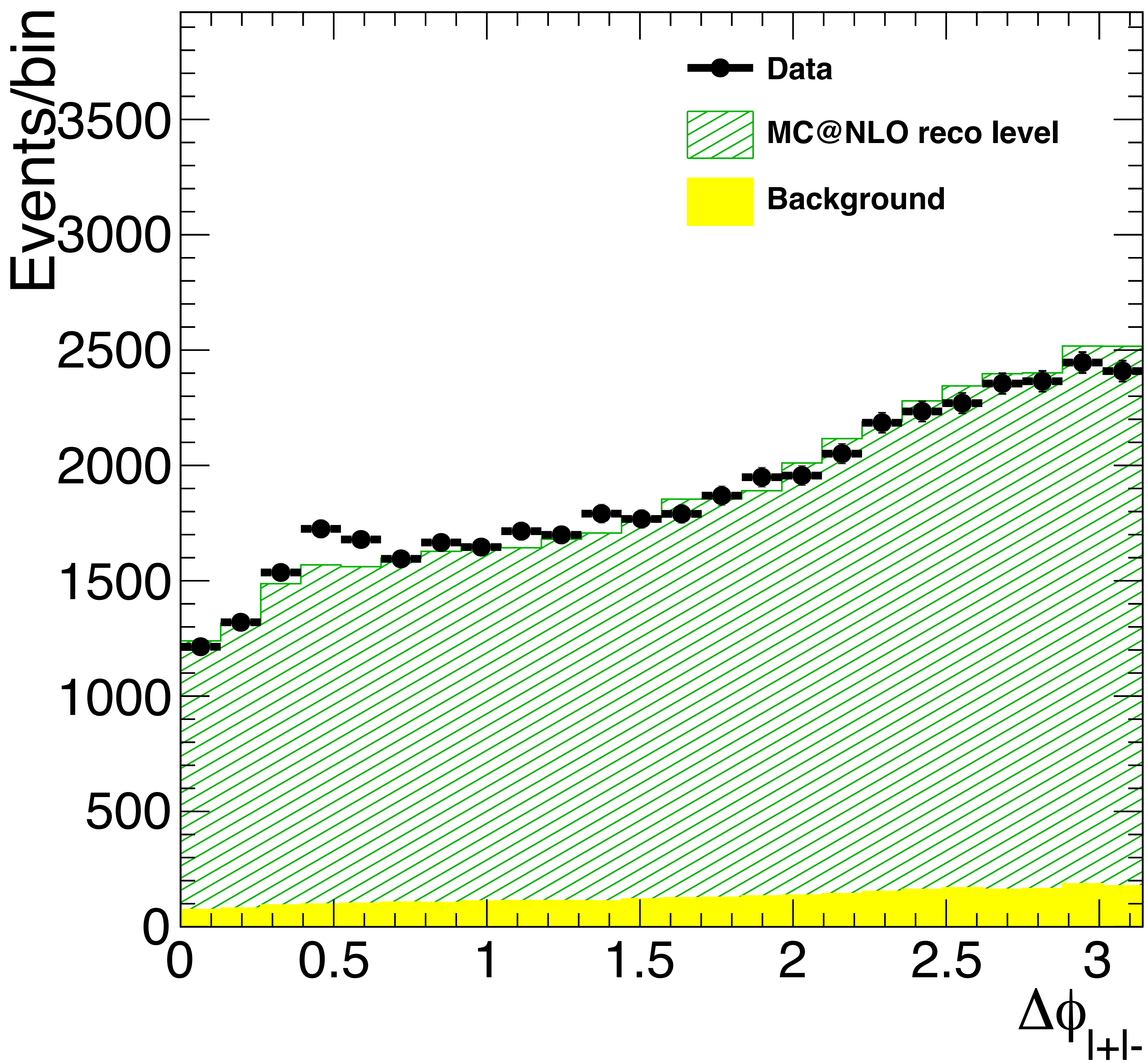
Raising M_{ll} cut to 30 GeV

Plots show reco-level distribution to be used as input to the unfolding, as in slide 30 of https://www.dropbox.com/s/1hsdsgv22zz38u7/afbchat_140820.pdf

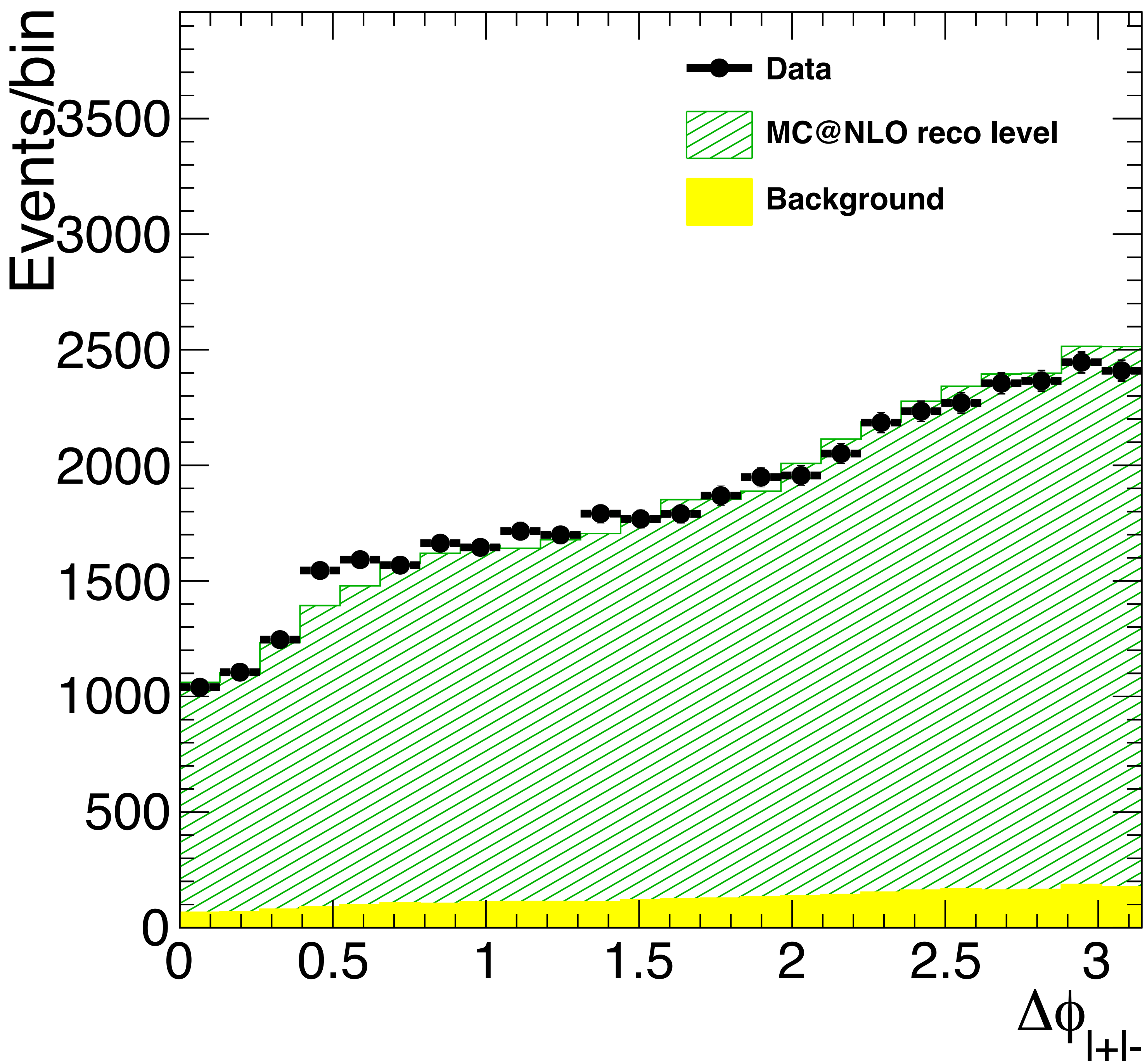
The MC is normalised to the data.

M_{ll}>12 cut



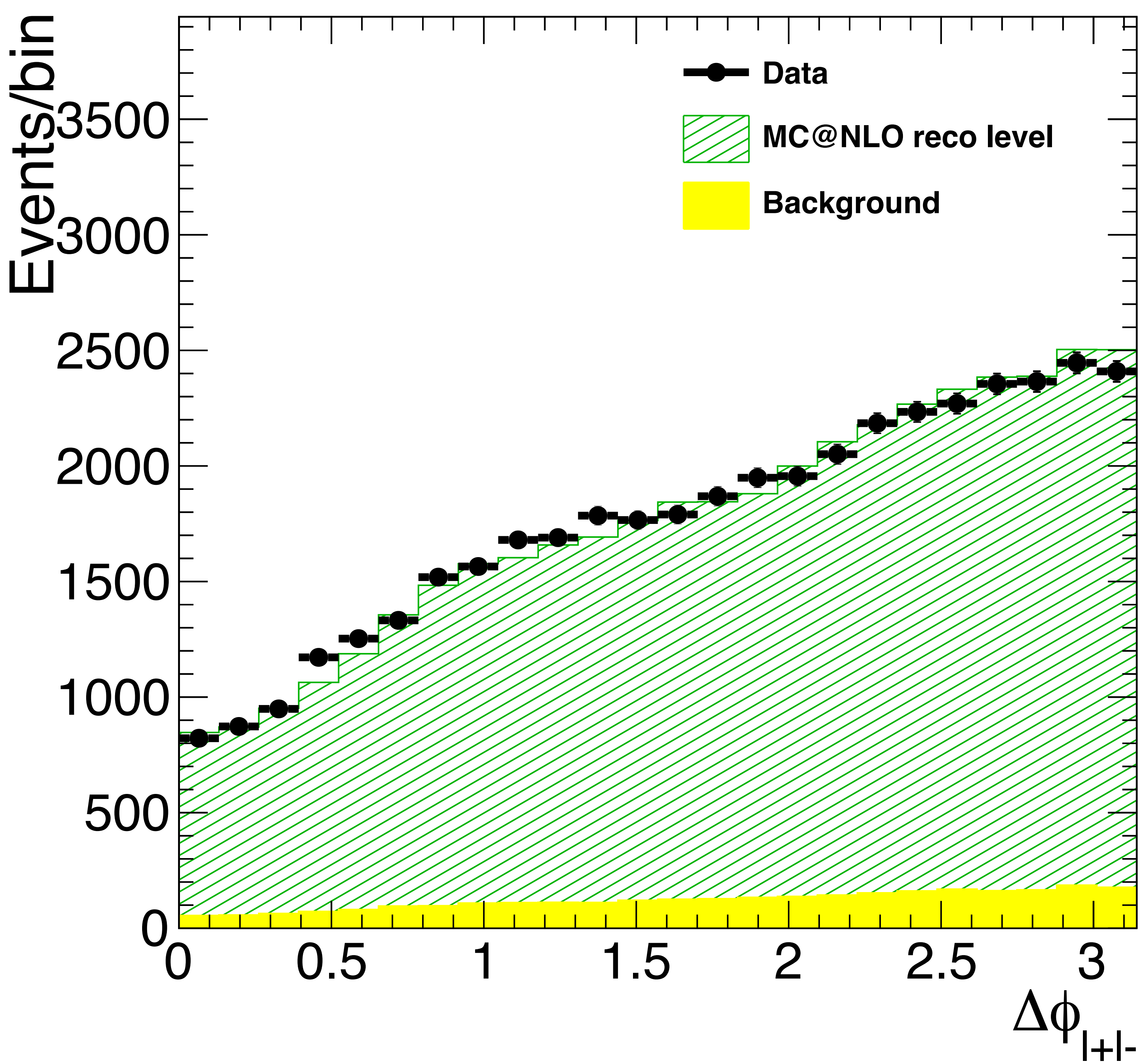
- Significances:
  - bin4: 3.4σ
  - bin5: 2.6σ
- Data/MC:
  - bin4: 1.10
  - bin5: 1.08

M_{ll}>20 cut



- Significances:
  - bin4: 3.5σ
  - bin5: 2.6σ
- Data/MC:
  - bin4: 1.11
  - bin5: 1.08

M_{ll}>30 cut



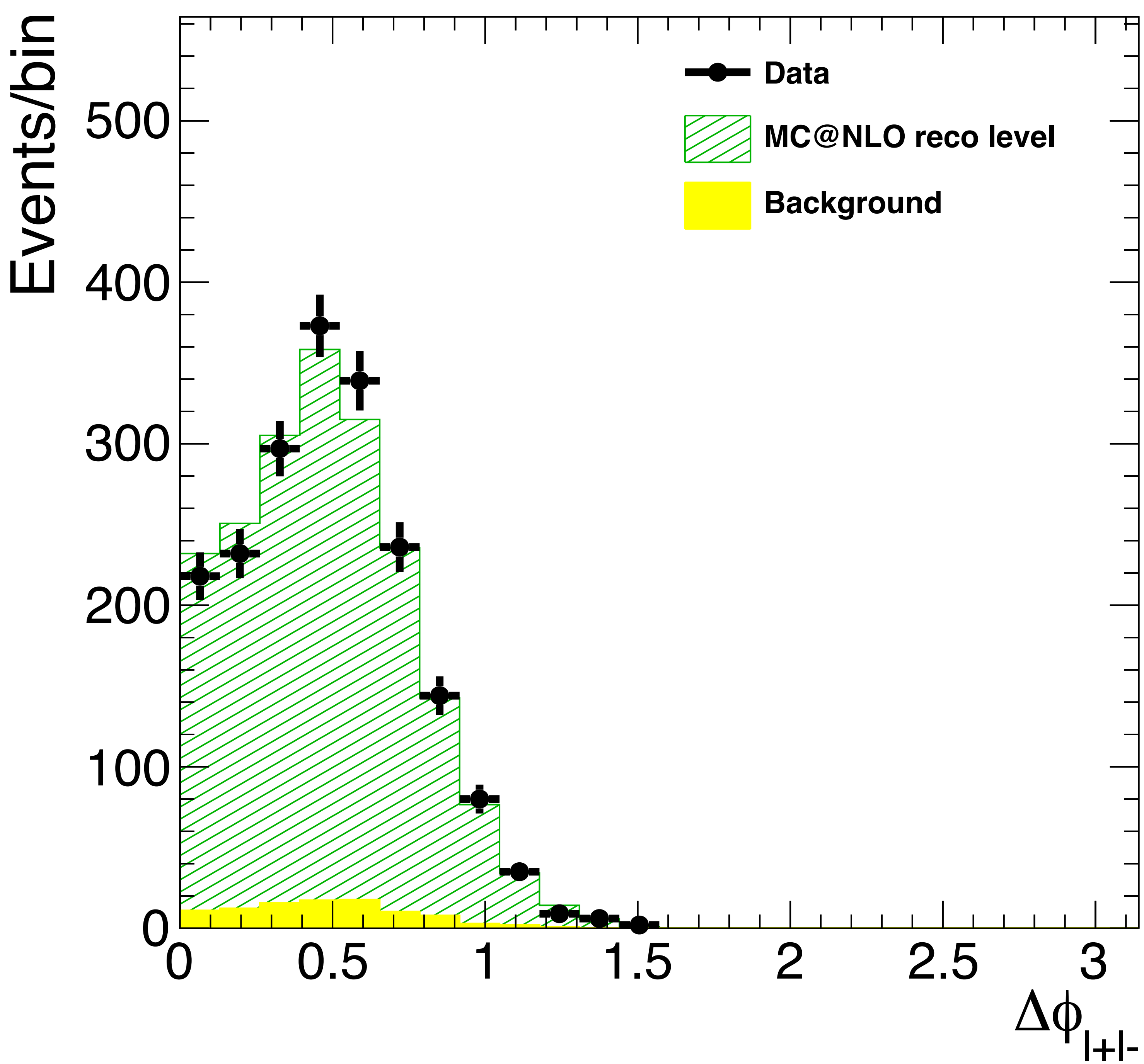
- Significances:
  - bin4: 2.9σ
  - bin5: 1.7σ
- Data/MC:
  - bin4: 1.10
  - bin5: 1.06

Conclusion

- With M_{ll}>30 GeV, the significance of the bump is much reduced
- However, the data/MC ratio is only slightly improved
- The improvement is therefore largely simply due to removing a fraction of events in the region near 0.5 (see backup)
- Pragmatically, the distribution on slide 4 looks “OK”, even if we haven’t understood or properly removed the bump
- For now, a M_{ll} cut at 30 GeV might be our best option

Backup

$20<M_{ll}<30$ requirement



- The distribution is peaked close to 0.5, so the cut preferentially removes events in the “bad” region
- However, the bump in the data/MC ratio is barely larger than in the region $M_{ll}>30$, so the cut does not strongly preferentially target bad events (i.e. those responsible for the bump in data/MC).
- The advantage of the cut is therefore mainly that it tends to remove events in the bad region
  - and also that it removes the badly modelled part of the M_{ll} distribution