

$H \rightarrow ZZ \rightarrow llqq \Delta\phi_{jj}$ reweight

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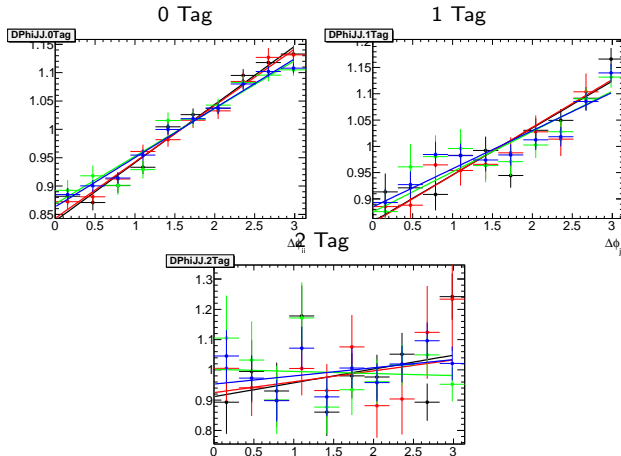
$H \rightarrow ZZ \rightarrow llqq$ Meeting

Introduction

- Revisit $\Delta\phi_{jj}$ reweight
- Have seen that $\Delta\phi_{jj}$ and hence p_T^{\parallel} is not well described by the Z MC
- Try to derive a reweight from the m_{jj} SBs
 - Similar to HSG5
- By comparing kinematics in SBs of various width found that need to restrict to $50 < m_{jj} < 150$ to not deviate significantly
 - Similar to 7 TeV window (had widened it to gain stats)
 - Still about 1.5 times the SR stats
 - $\Delta\phi_{jj}$ and p_T^{\parallel} modelling much more consistent between SR and SBs
- Derived for $p_T^{\text{jet}} > 45, 20$ GeV

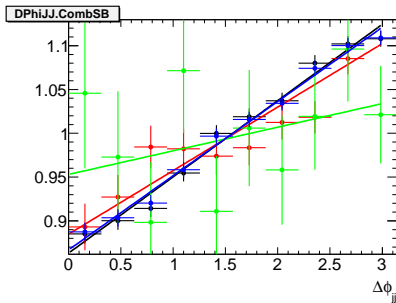
Reweight

- Compare $\Delta\phi_{jj}$ ratio in SR, low SB, high SB and comb SB for 0/1/2 tag. Slopes are consistent.

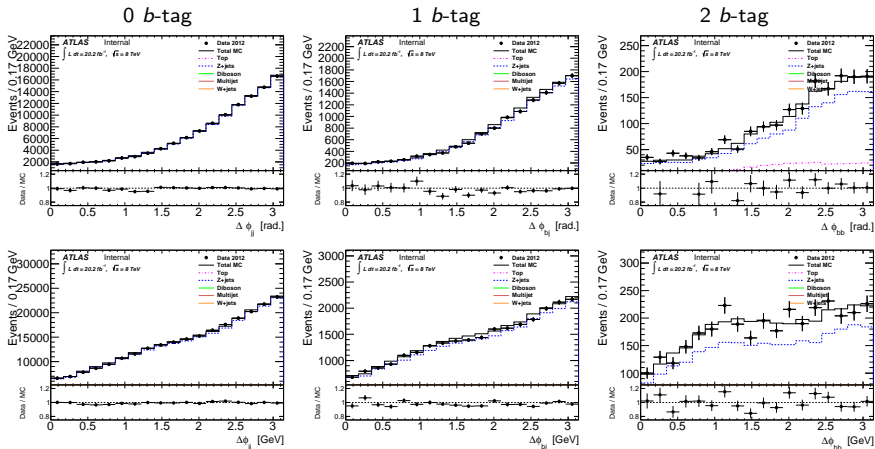


Reweight (2)

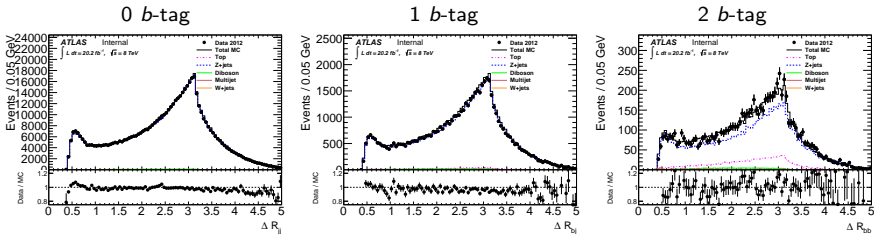
- Compare $\Delta\phi_{jj}$ ratio in 0, 1, 2 and N tag for comb SB. Slopes are consistent except 2 tag, but very low stats.
- Fit for N tag is: $0.900 + 0.063\Delta\phi_{jj}$
 - HSG5 see $0.88 + 0.068$
 - Need to check uncertainty and assign systematic



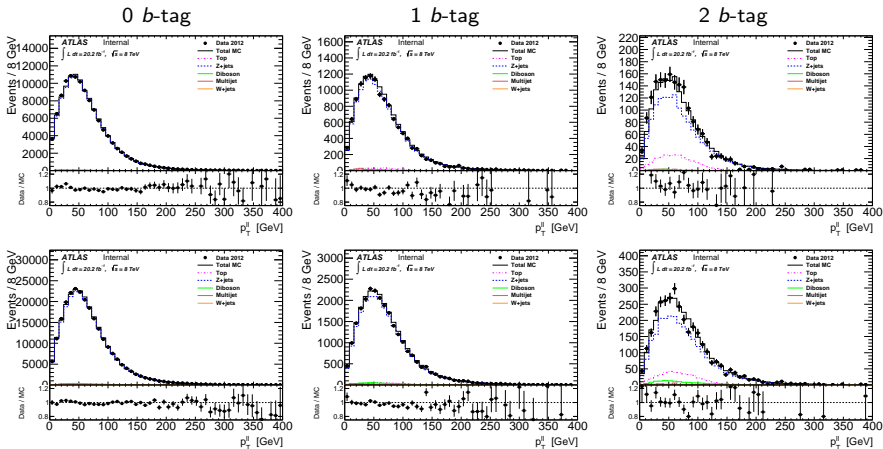
- Well described in SR (top) and m_{jj} SB (bottom) after reweight



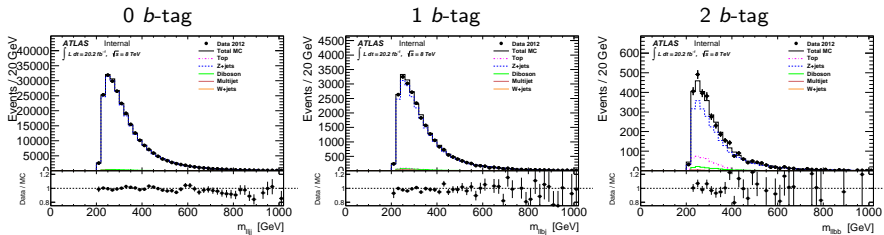
- Pretty well described after reweight (no m_{jj} cut)



- Well described in SR (top) and m_{jj} SB (bottom) after reweight



- Reasonably well described in SB region after reweight



Summary

- $\Delta\phi_{jj}$ reweight seems consistent between SR/SB and N tags
- Suggest:
 - Apply $p_T^{\text{jet}} > 20, 45$ as default cut (rising for higher m_H)
 - Apply derived $\Delta\phi_{jj}$ reweight as baseline
 - Use $50 < m_{jj} < 150$ GeV as SB
- Hopefully can decide on baseline p_T^Z etc cuts asap too