Inclusive measurement without central $\Delta\phi_{jj}$ region

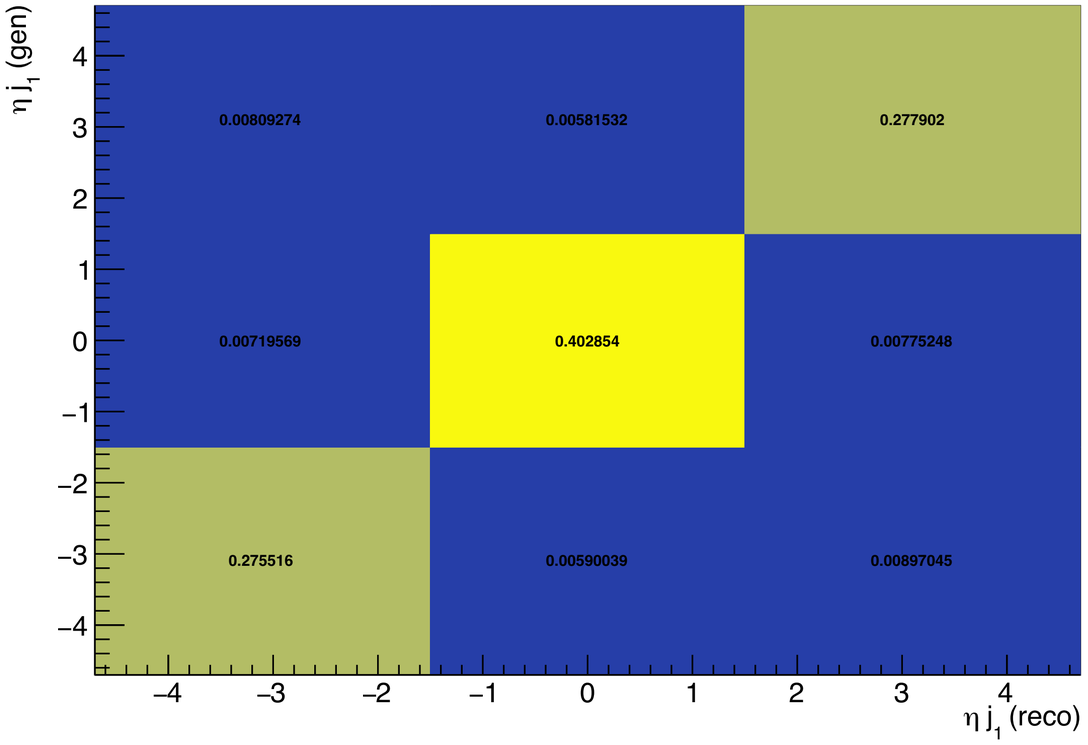
Summary

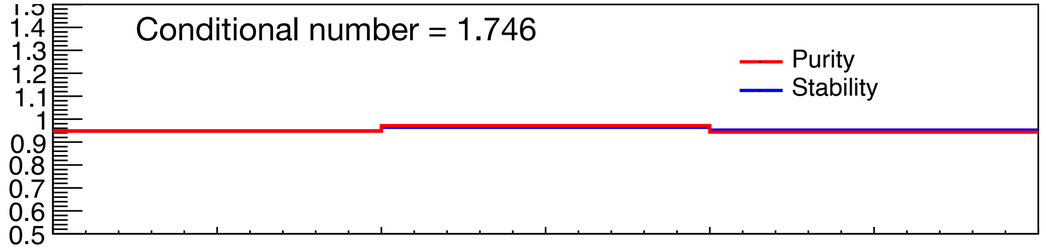
- Total of 6 observables measured differently with Full Run 2 data
  - $\Delta\phi_{jj}$,, η_{j1}, η_{j2}, C_{γ}, m_{jj}, p_T^{γ}

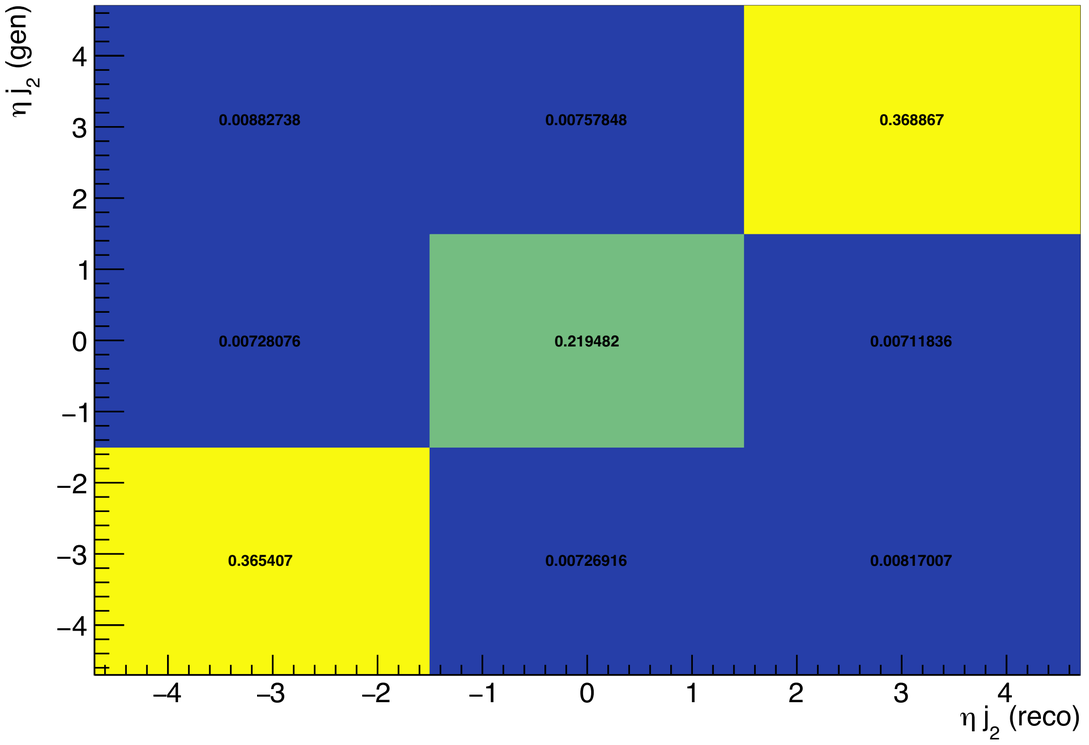
Binning optimized based on # events, purity, stability. conditional number and Data/MC ratio

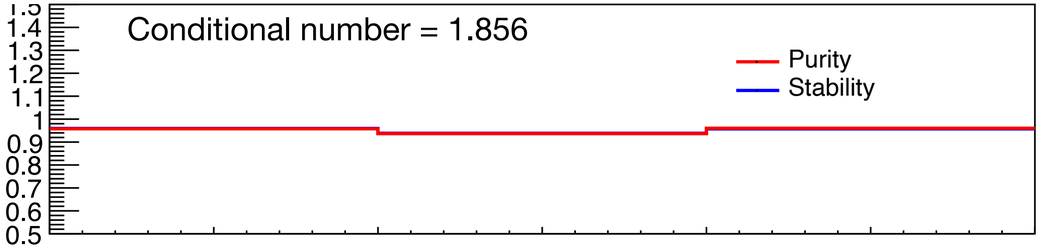
$$C_{\gamma} = \exp[-\frac{4}{(\eta_{\mathrm{j1}} - \eta_{\mathrm{j2}})^2}(\eta_{\gamma} - \frac{\eta_{\mathrm{j1}} + \eta_{\mathrm{j2}}}{2})^2]$$

Response Matrix

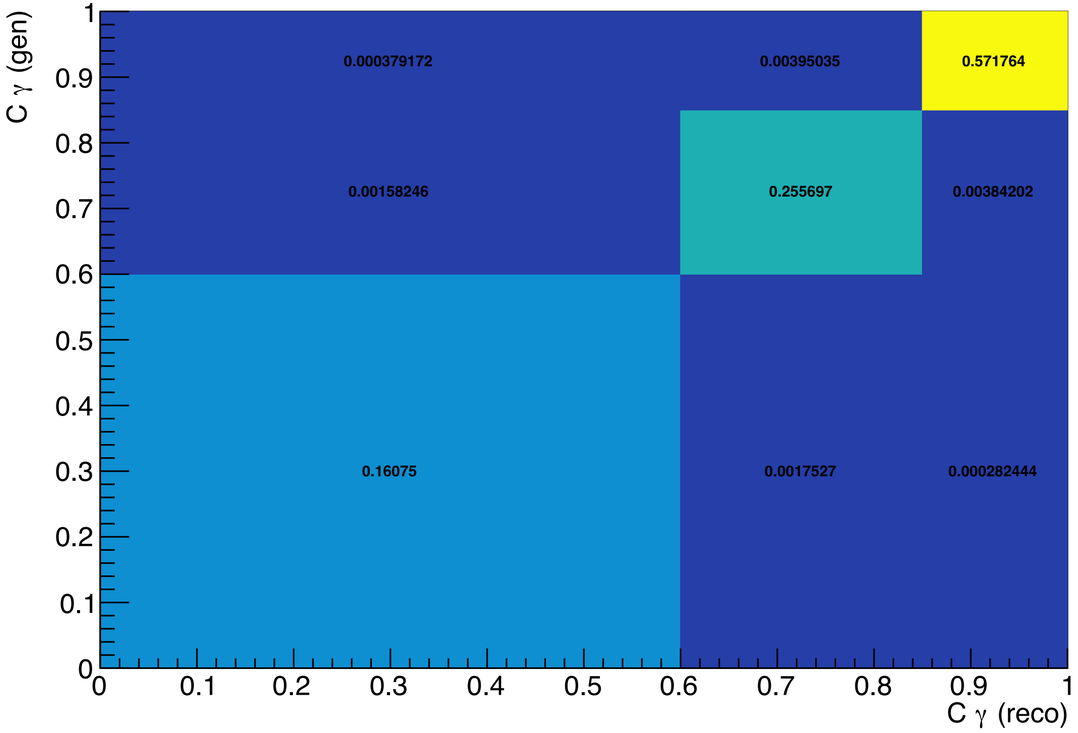


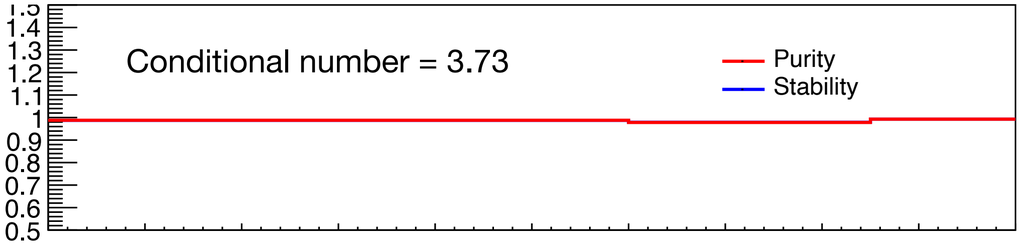


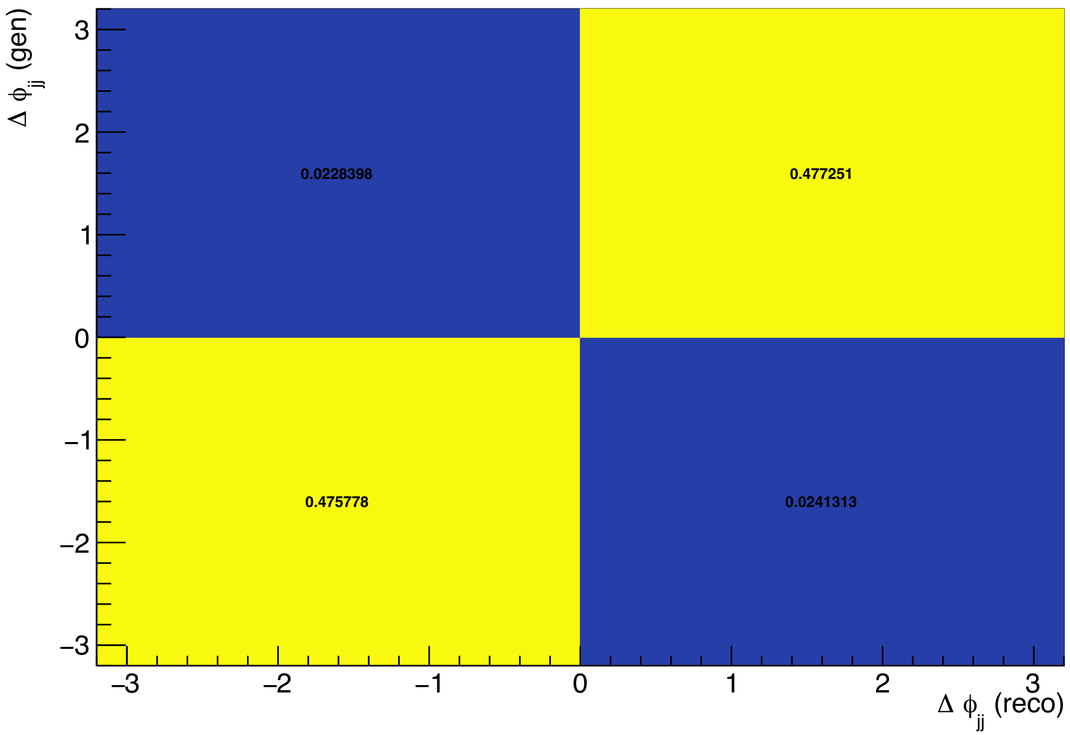


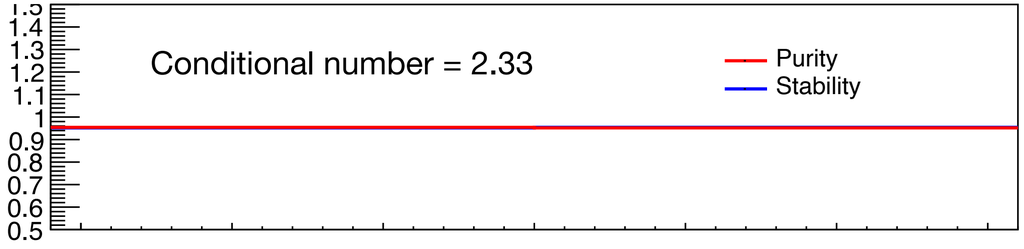


Response Matrix (II)



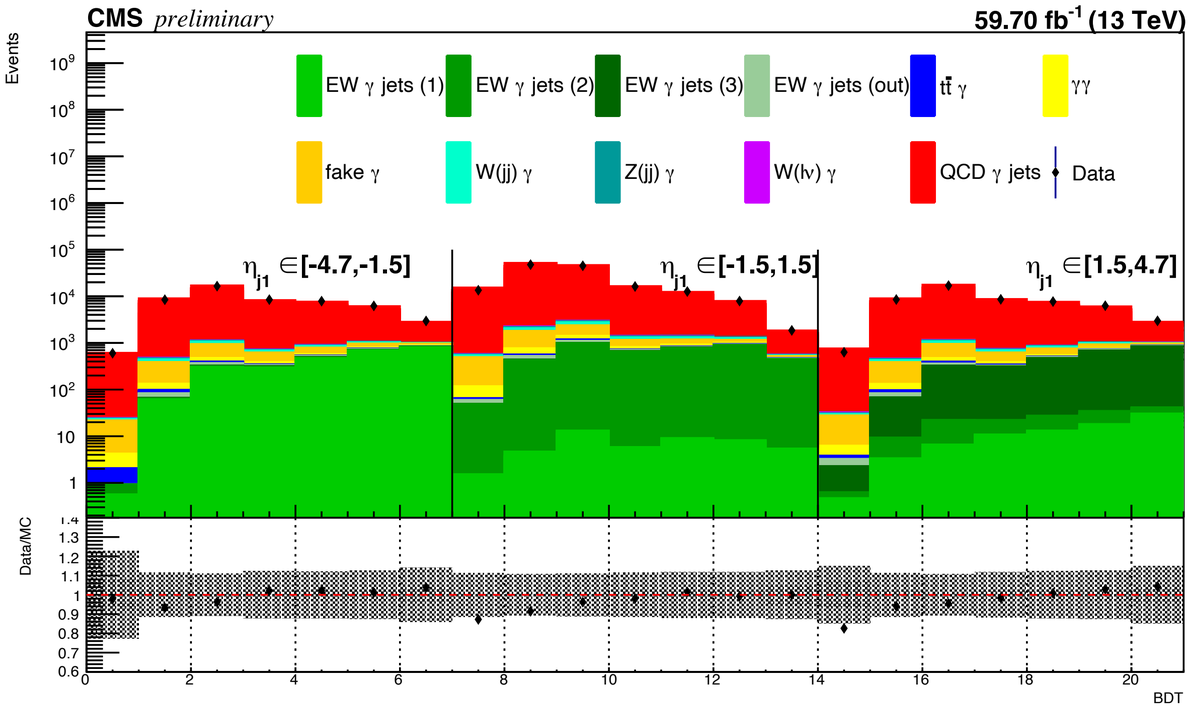


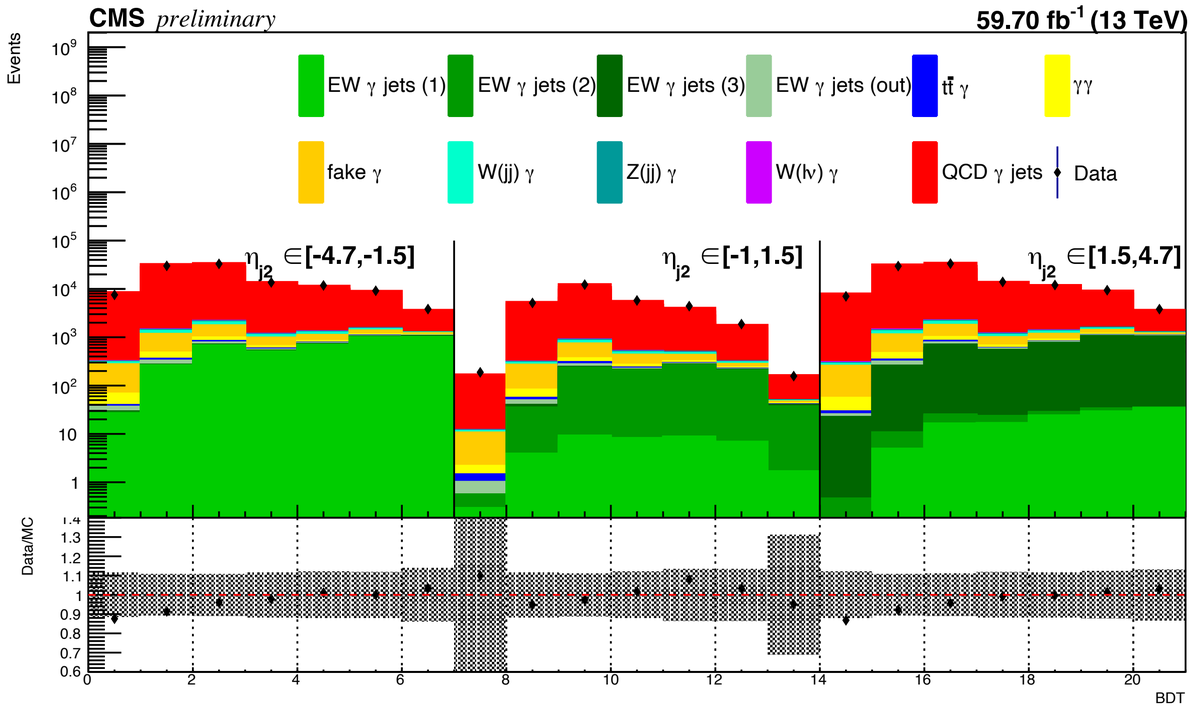




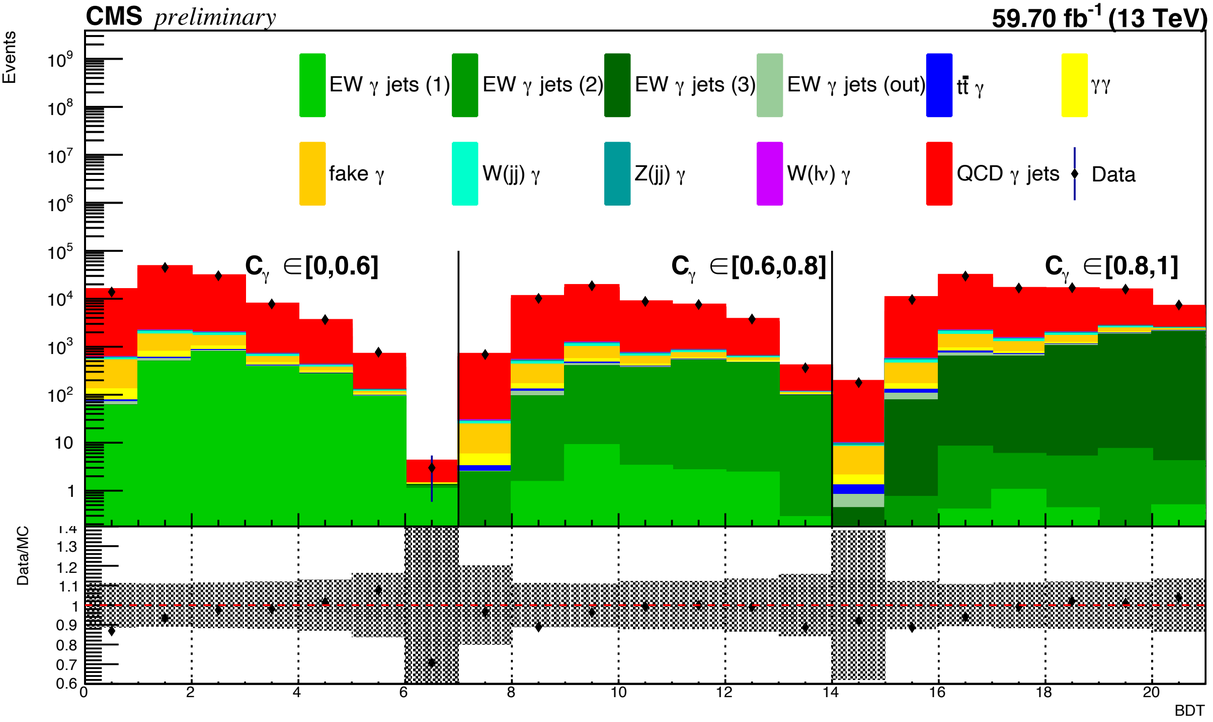
Data/MC (Prefit)

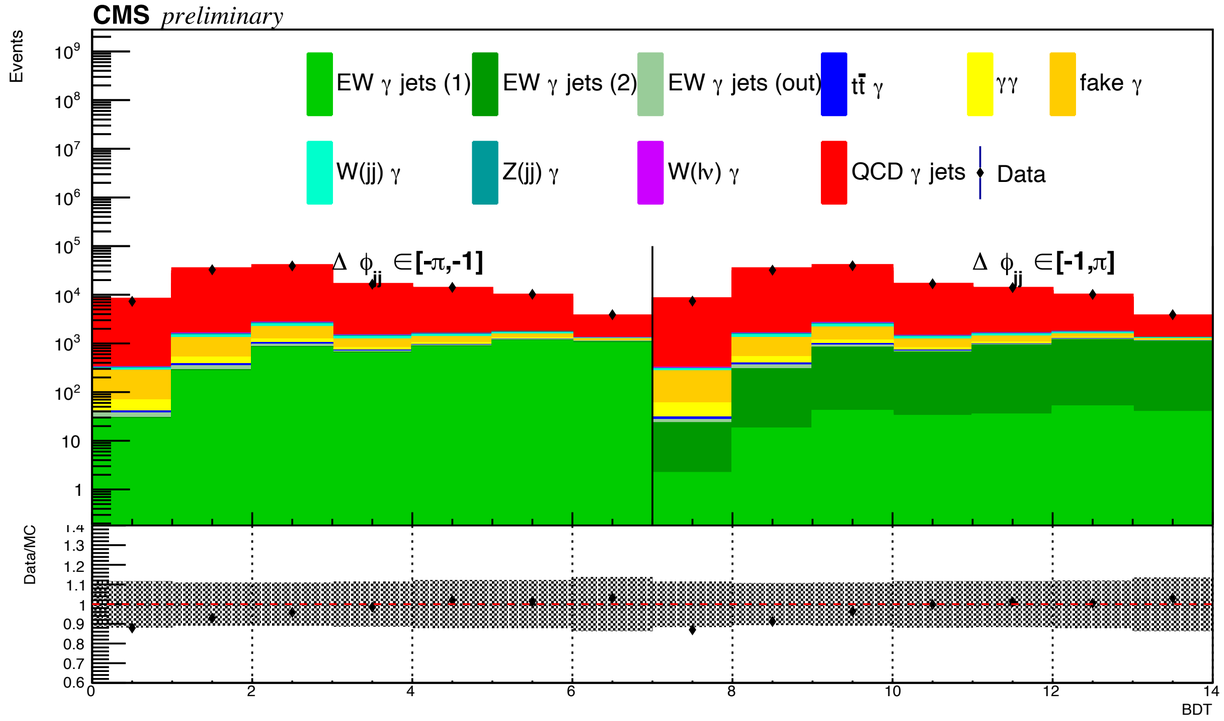
Prefit distributions





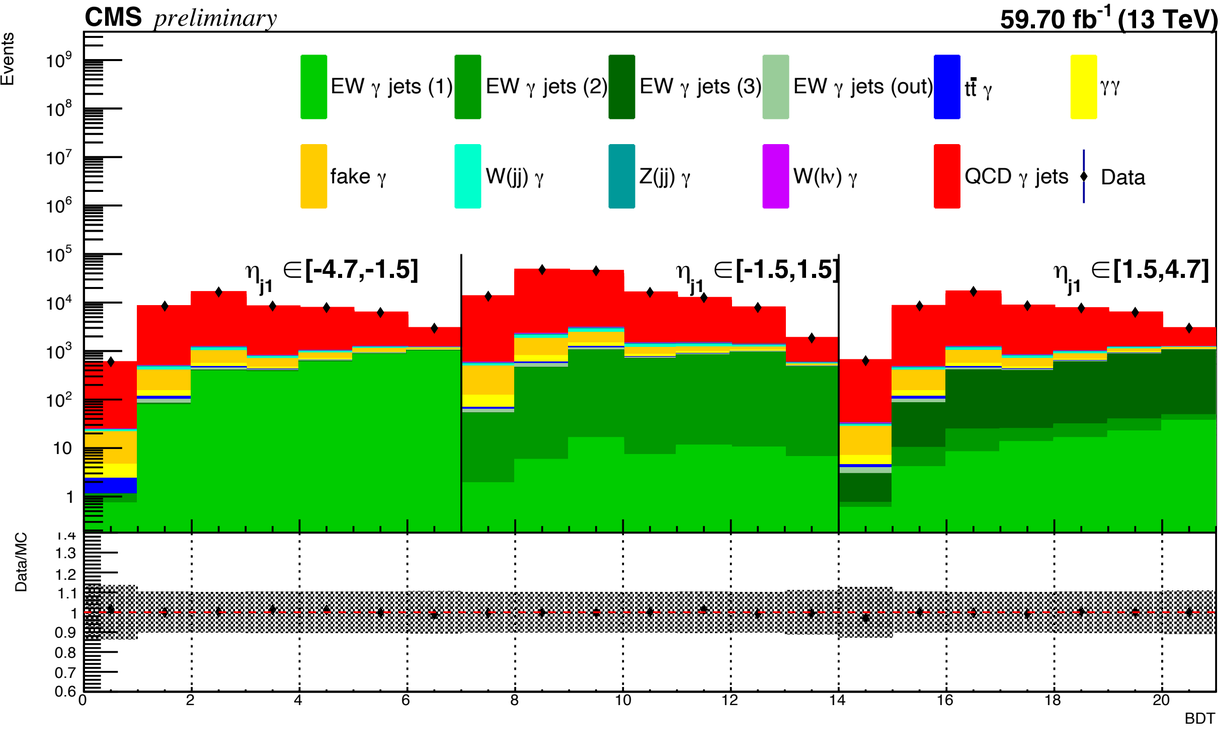
Prefit distributions

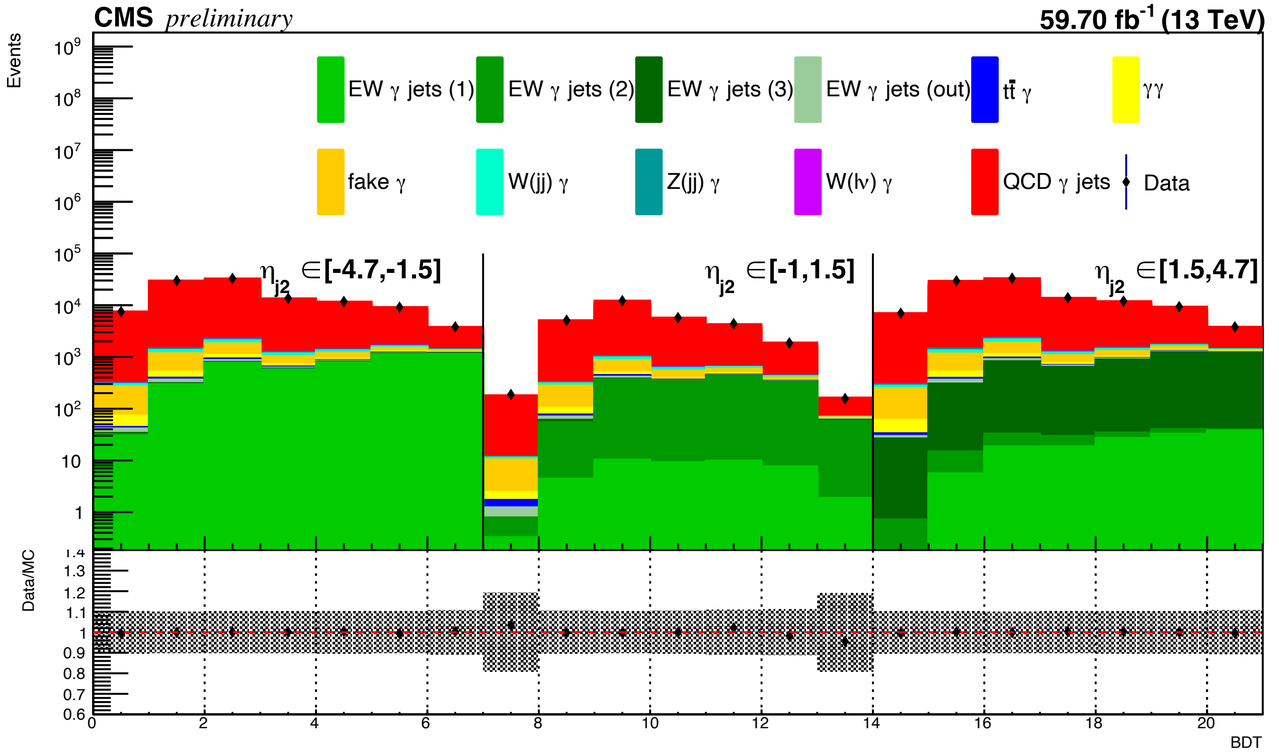




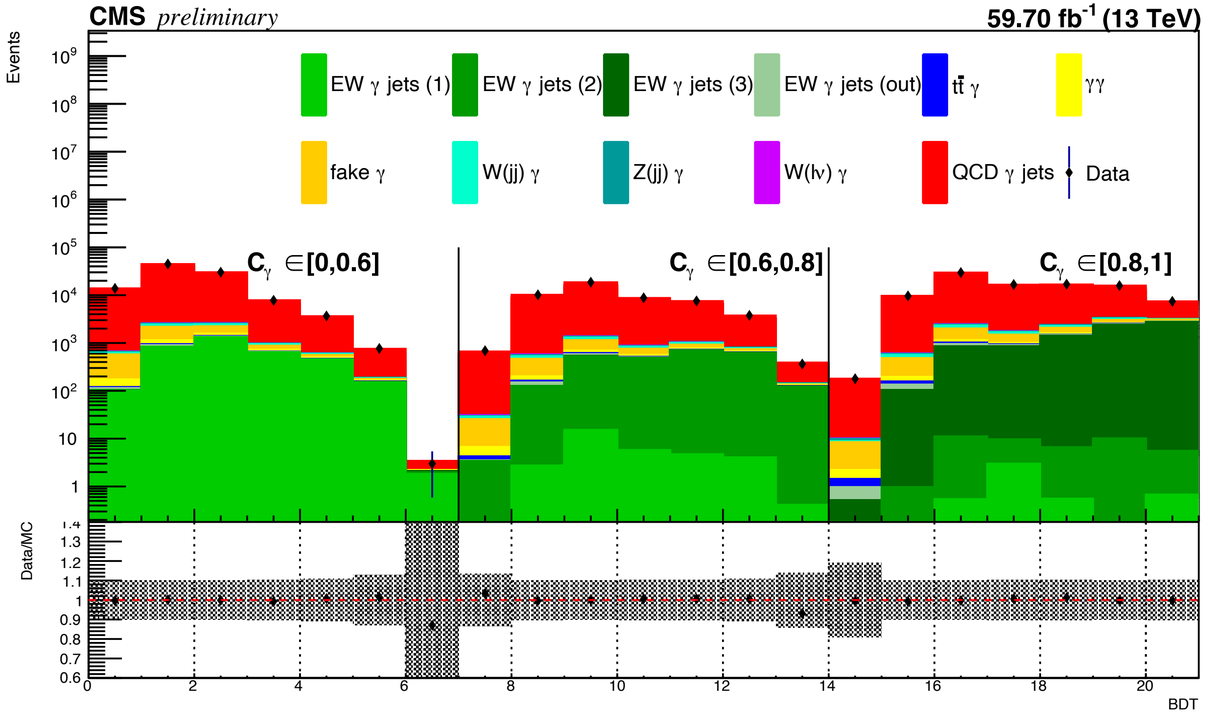
Data/MC (Postfit)

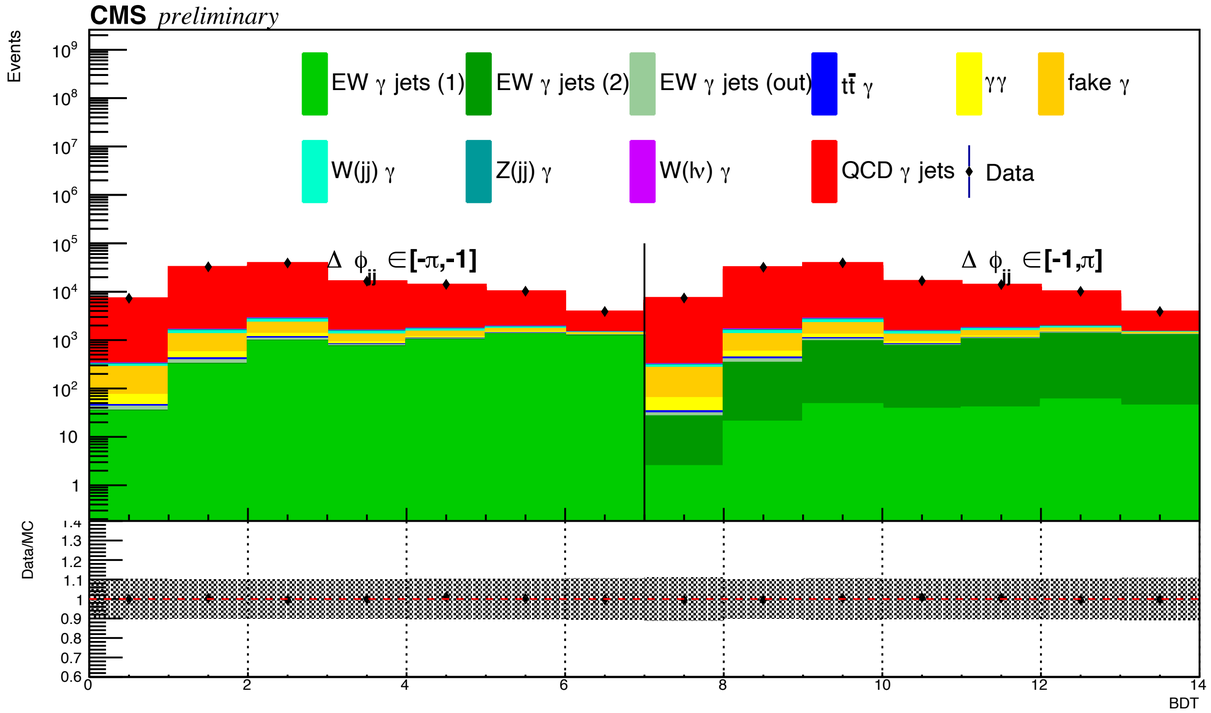
Postfit distributions





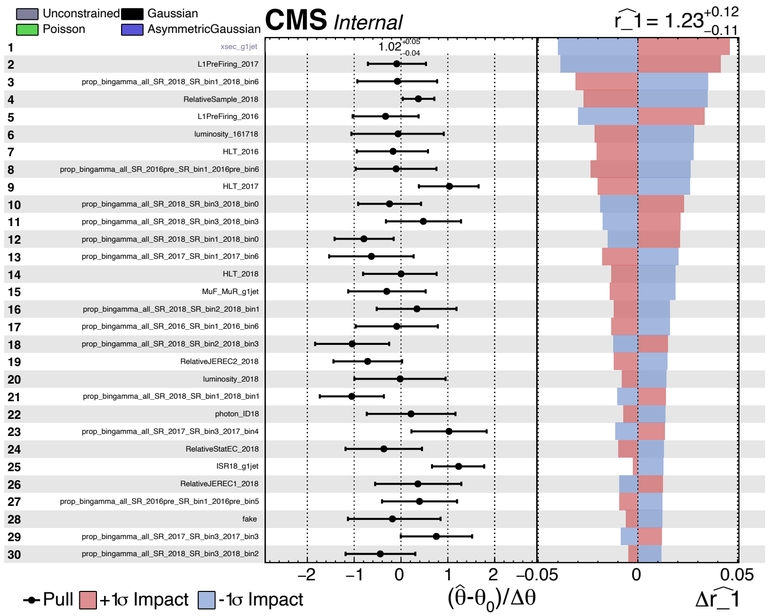
Postfit distributions

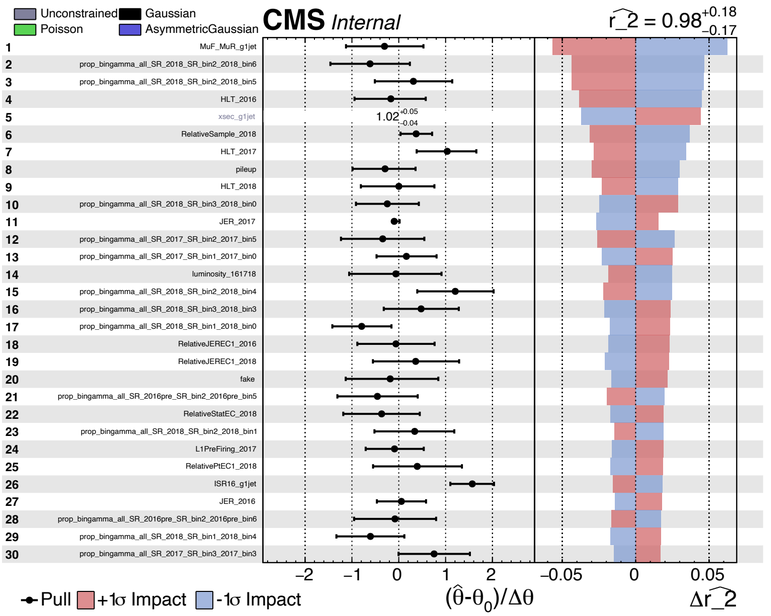


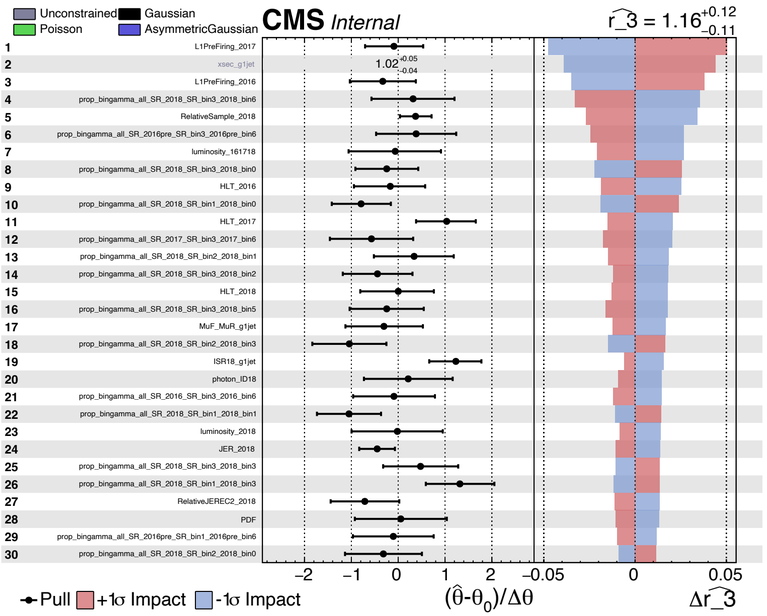


Impact plots

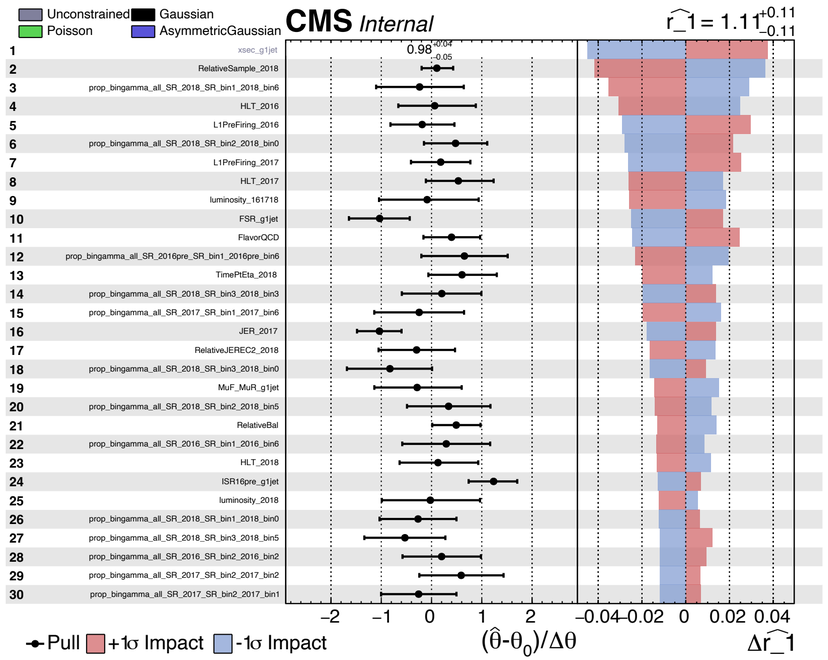
η_{j1} - Unfolded results

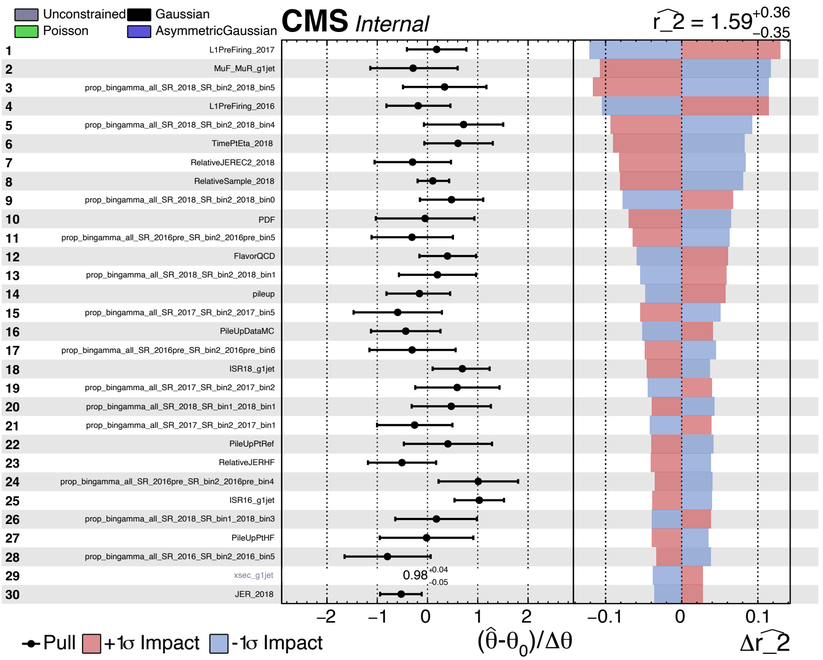


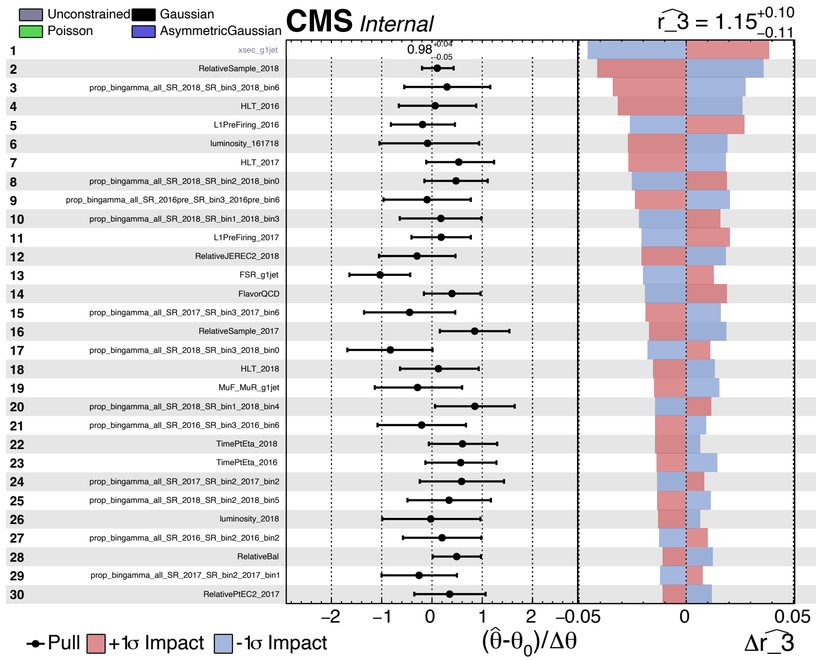




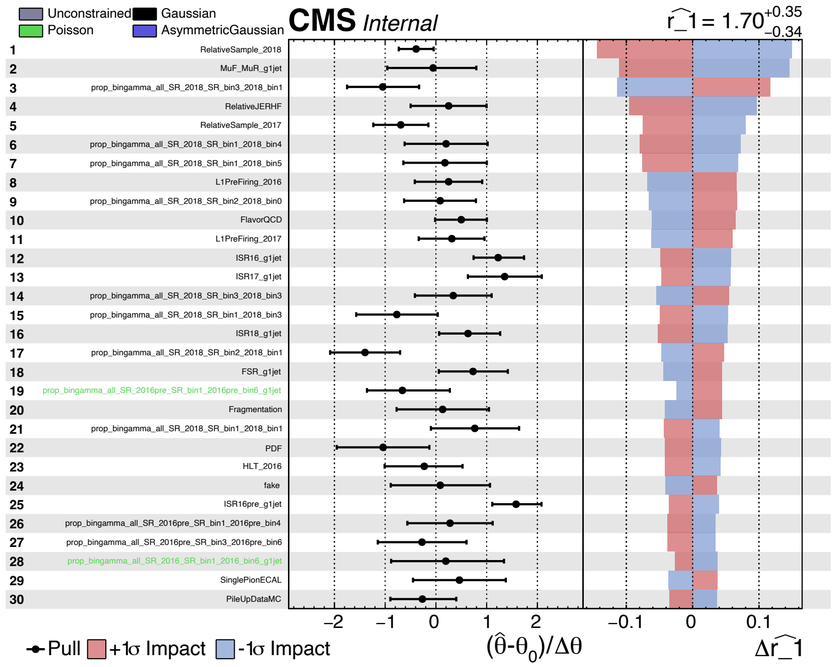
η_{j2} - Unfolded results

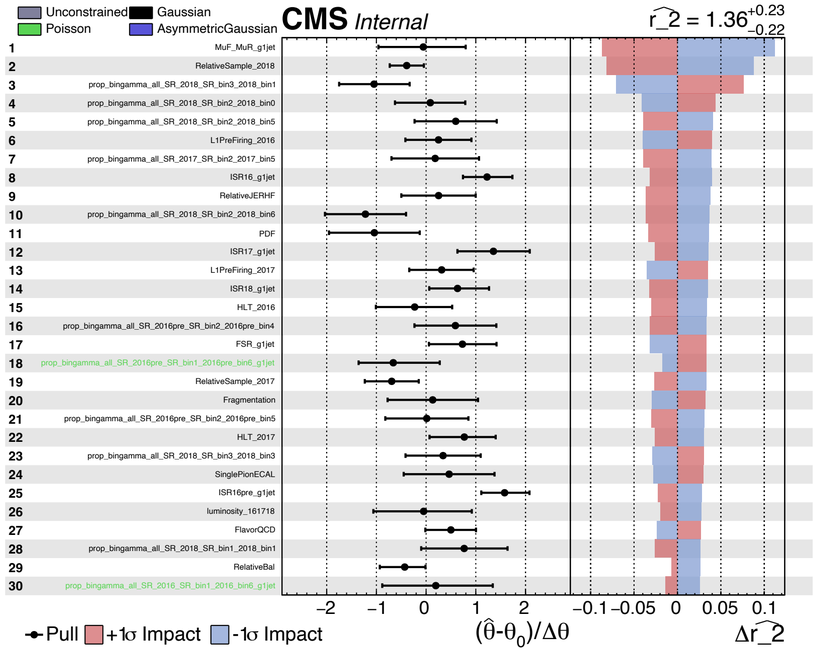


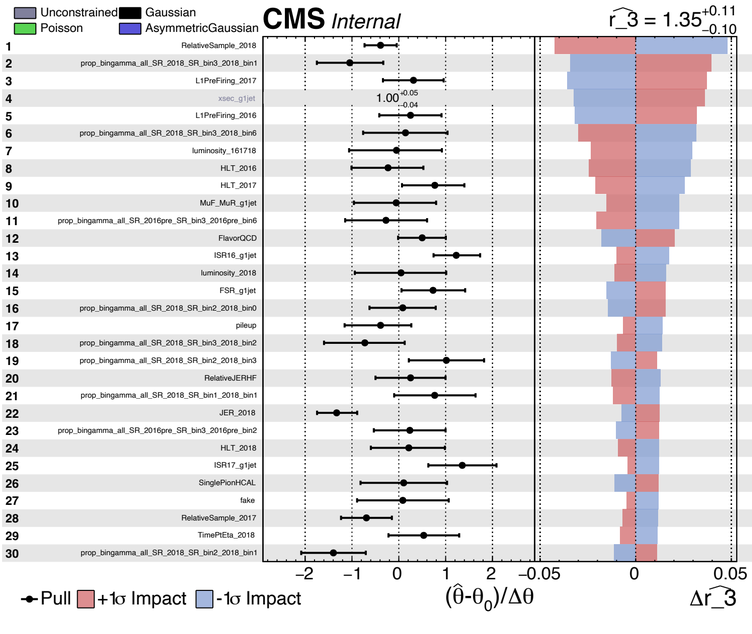




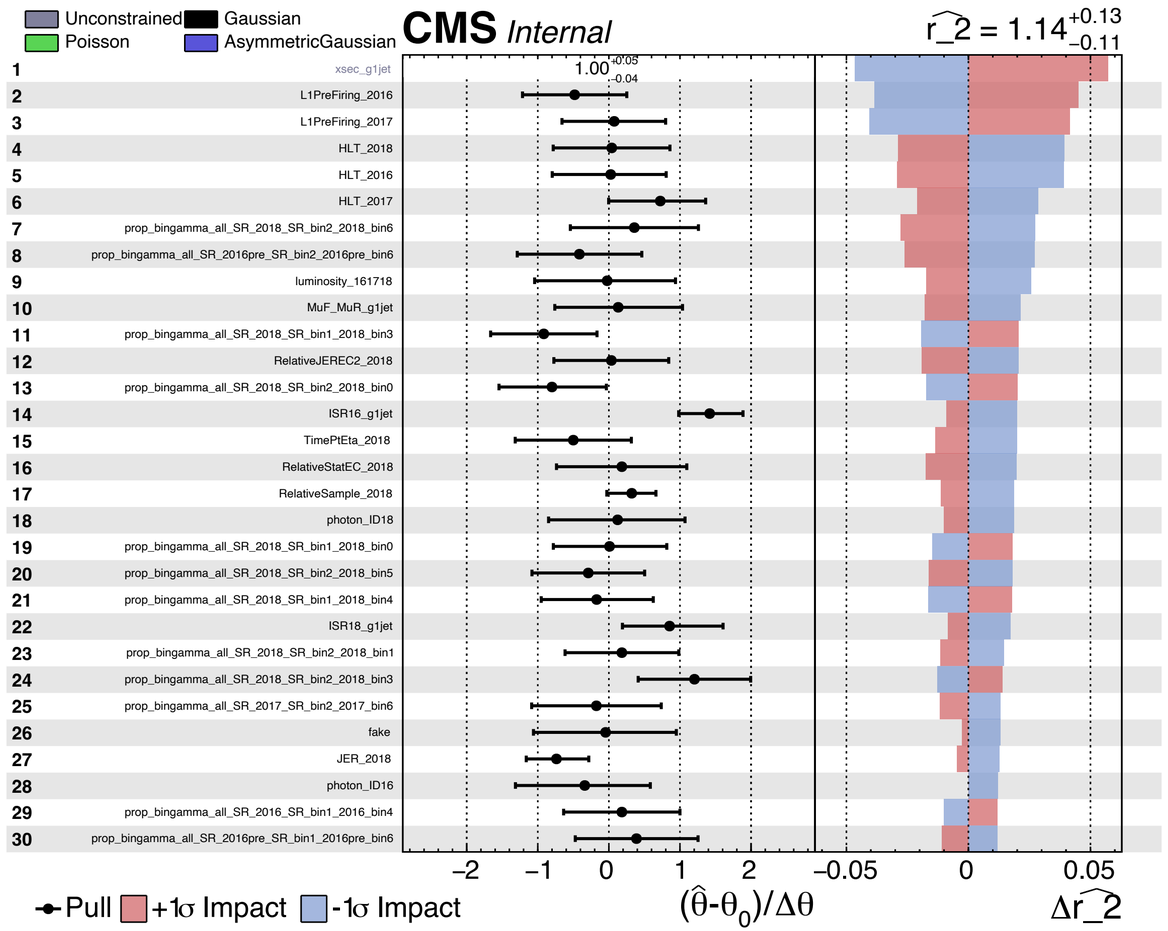
C_γ - Unfolded results

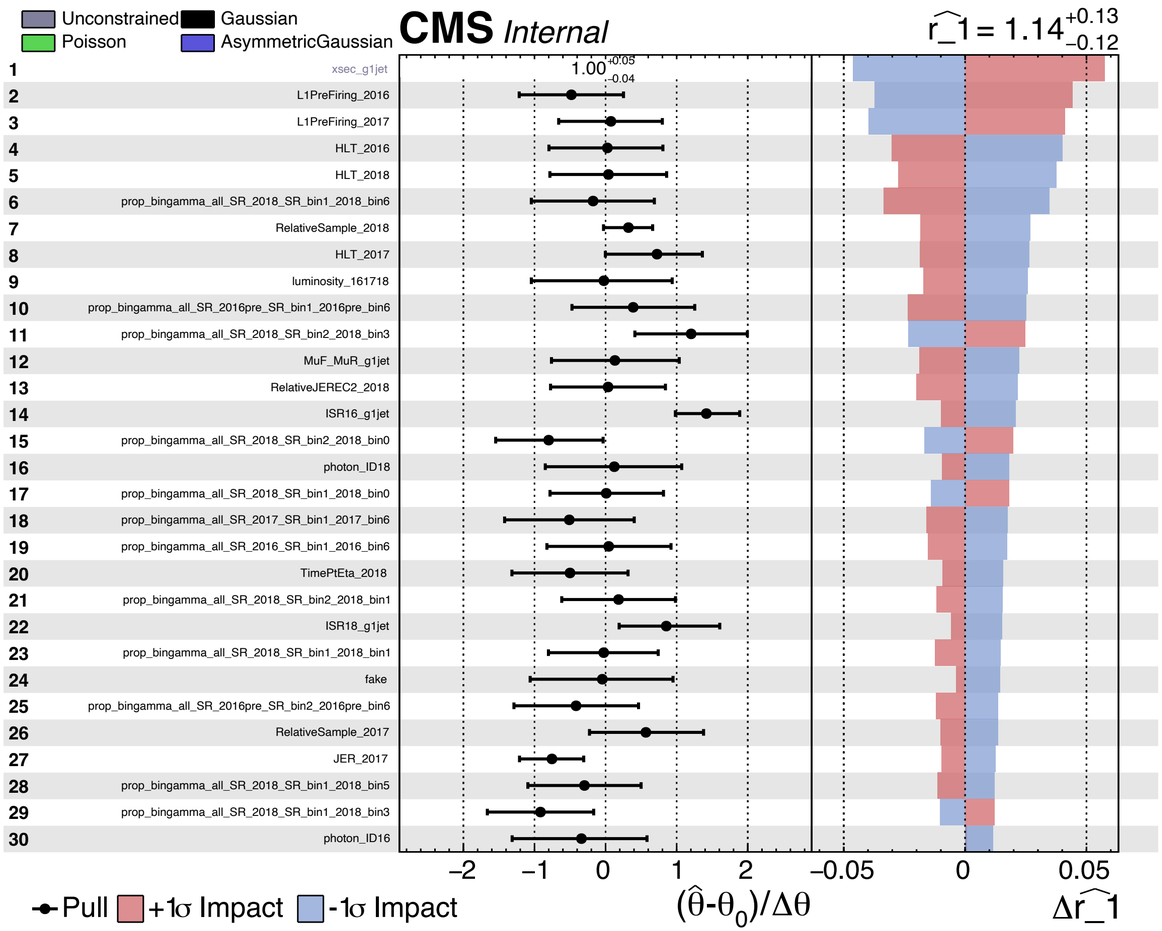






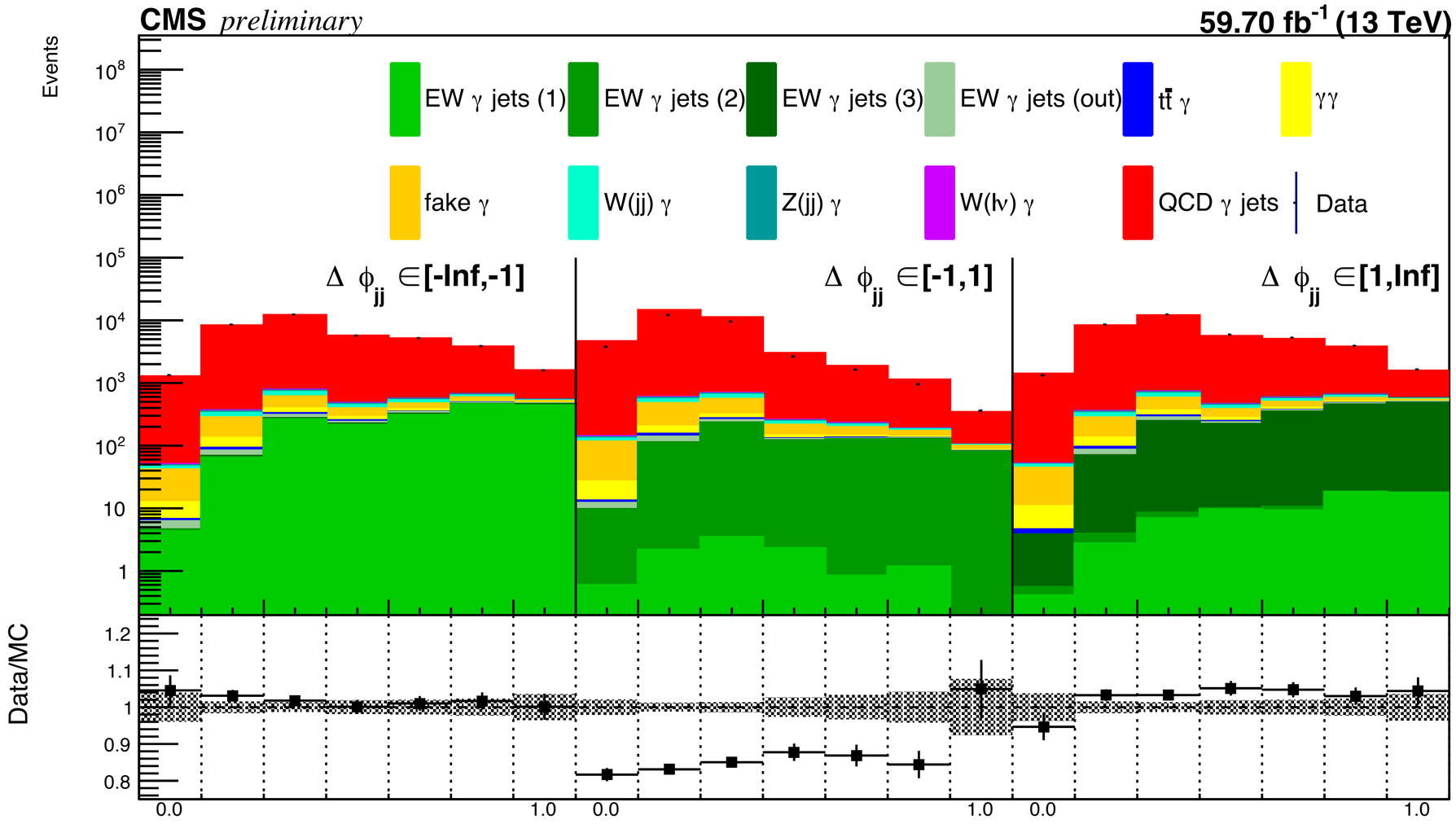
$\Delta\phi_{jj}$ - Unfolded results





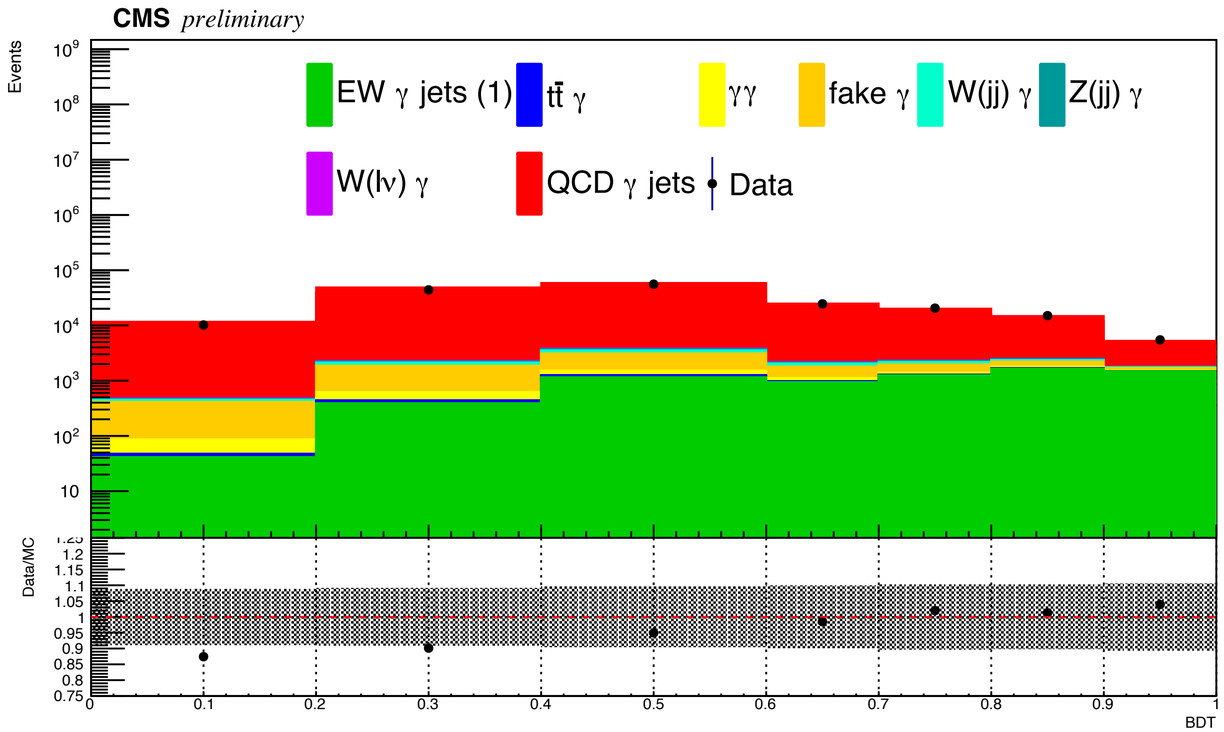
More bins?

More bins?

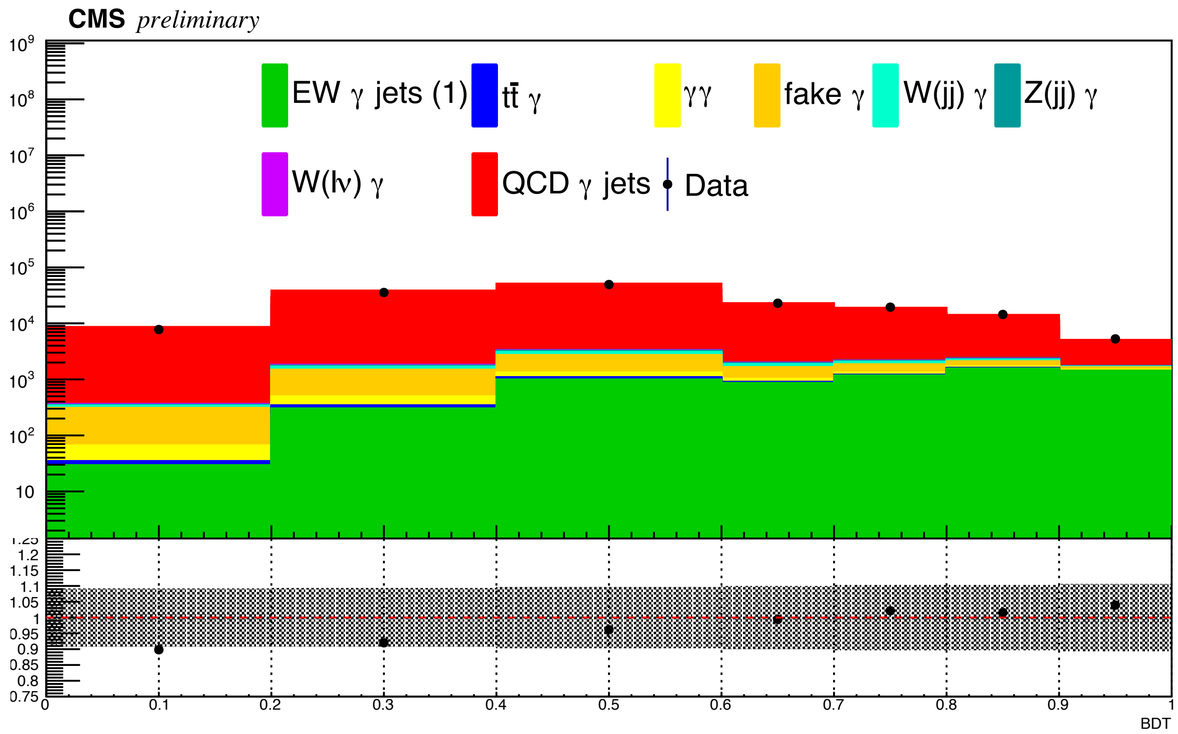


Data/MC disagreement found in some variables when unblinding differential distributions.

Is the problematic bin affecting the inclusive result?



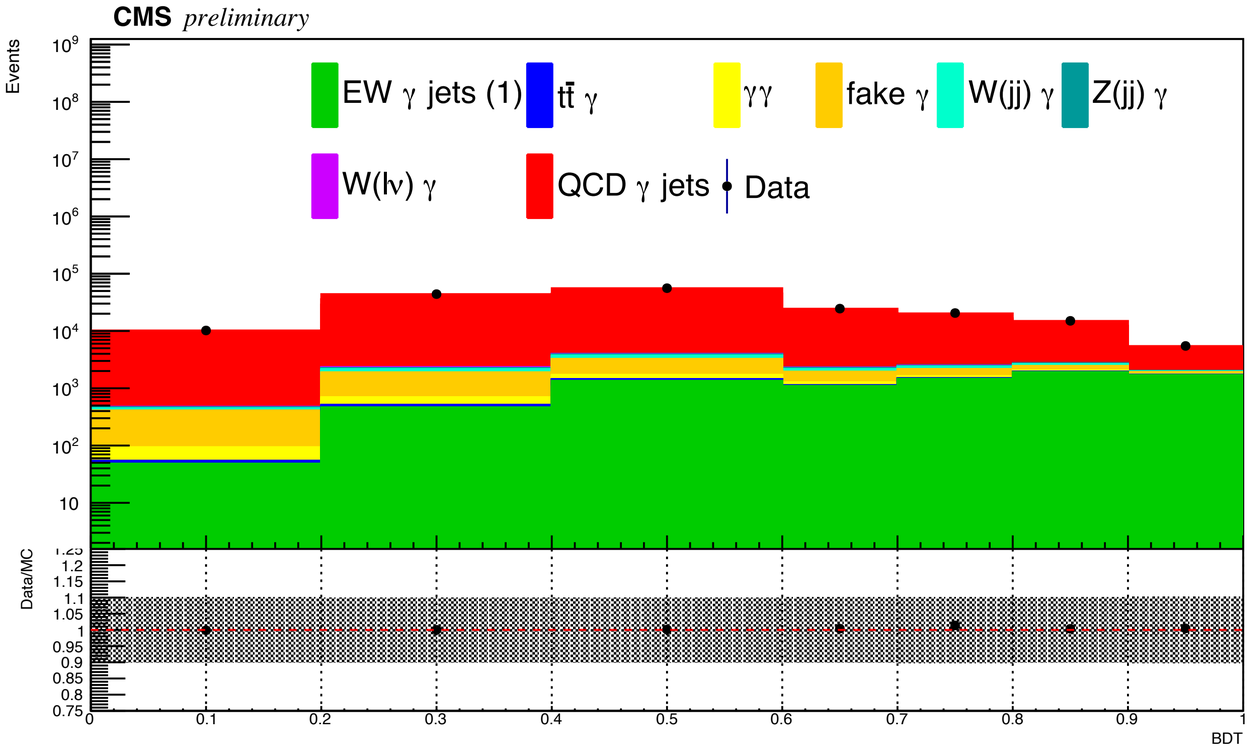
Inclusive BDT distribution **with** the central $\Delta\phi_{jj}$ bin



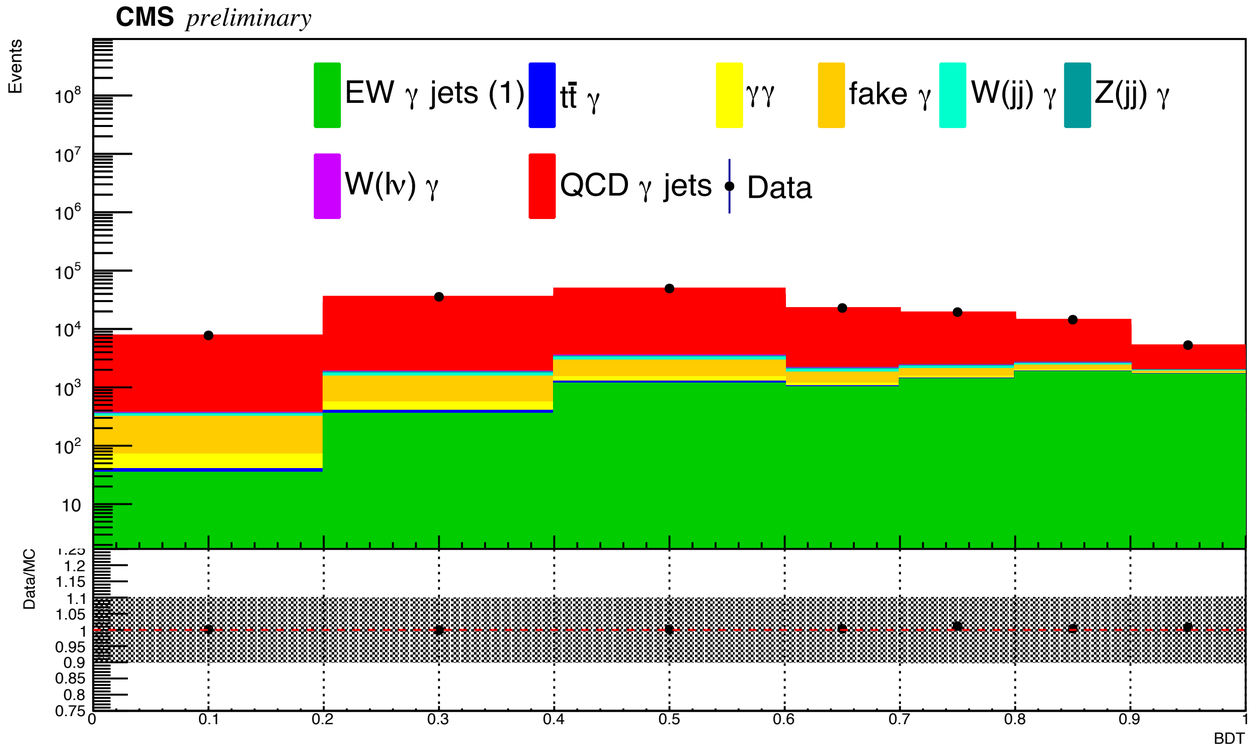
Inclusive BDT distribution **without** the central $\Delta\phi_{jj}$ bin

Similar distributions

Is the problematic bin is affecting the inclusive result?

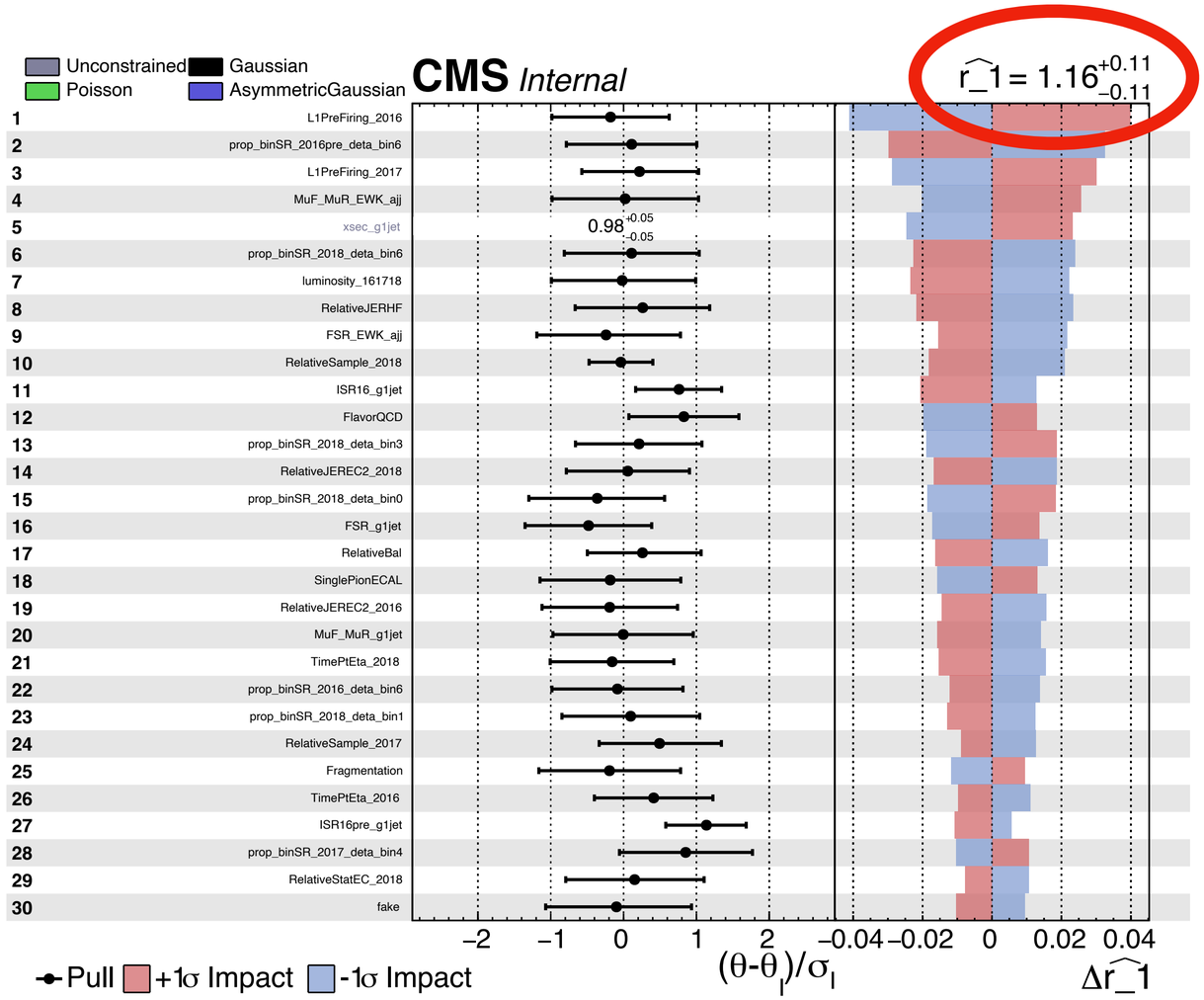


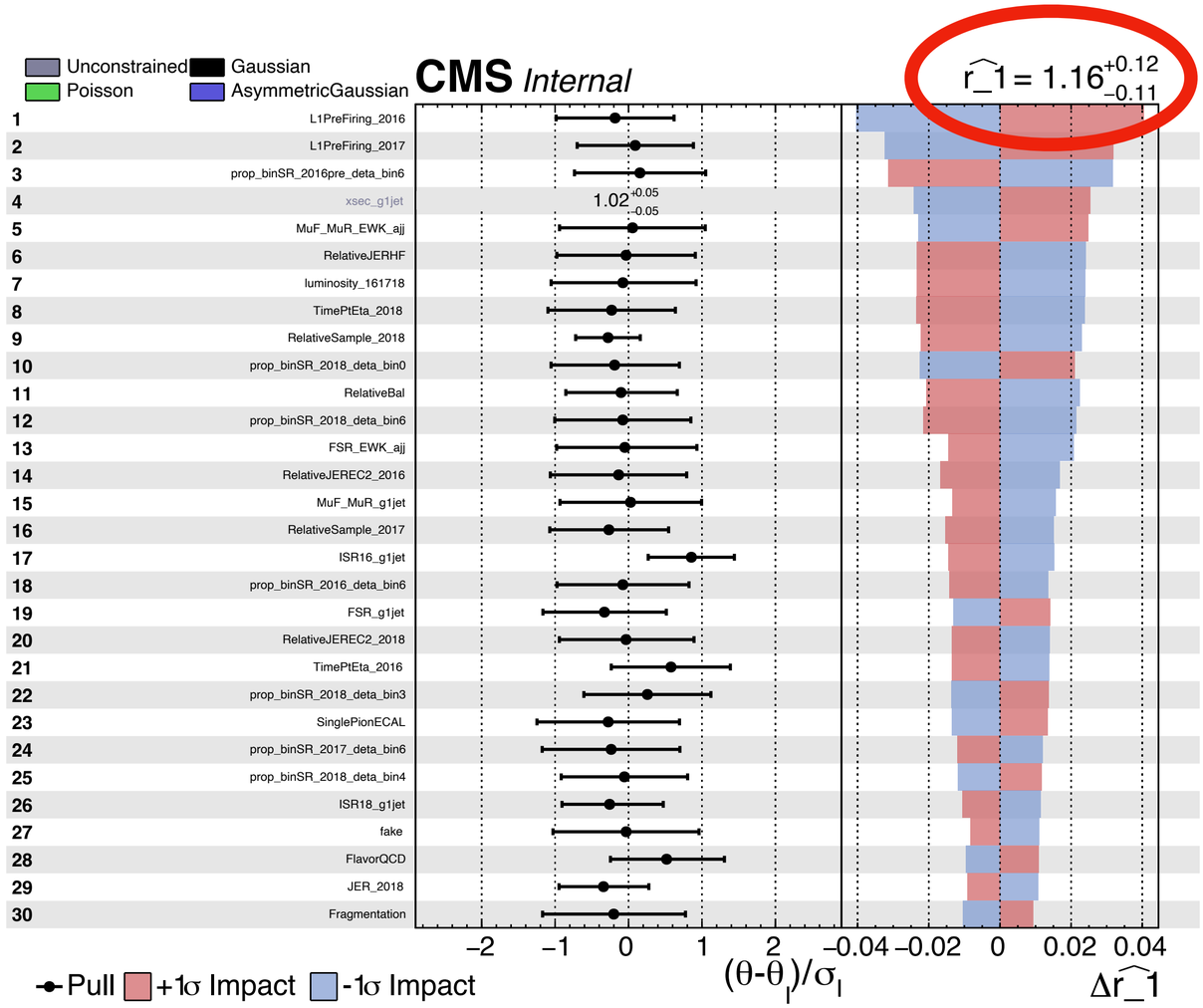
Inclusive postfit BDT distribution **with** the central $\Delta\phi_{jj}$ bin



Inclusive postfit BDT distribution **without** the central $\Delta\phi_{jj}$ bin

Inclusive measurement remains unchanged





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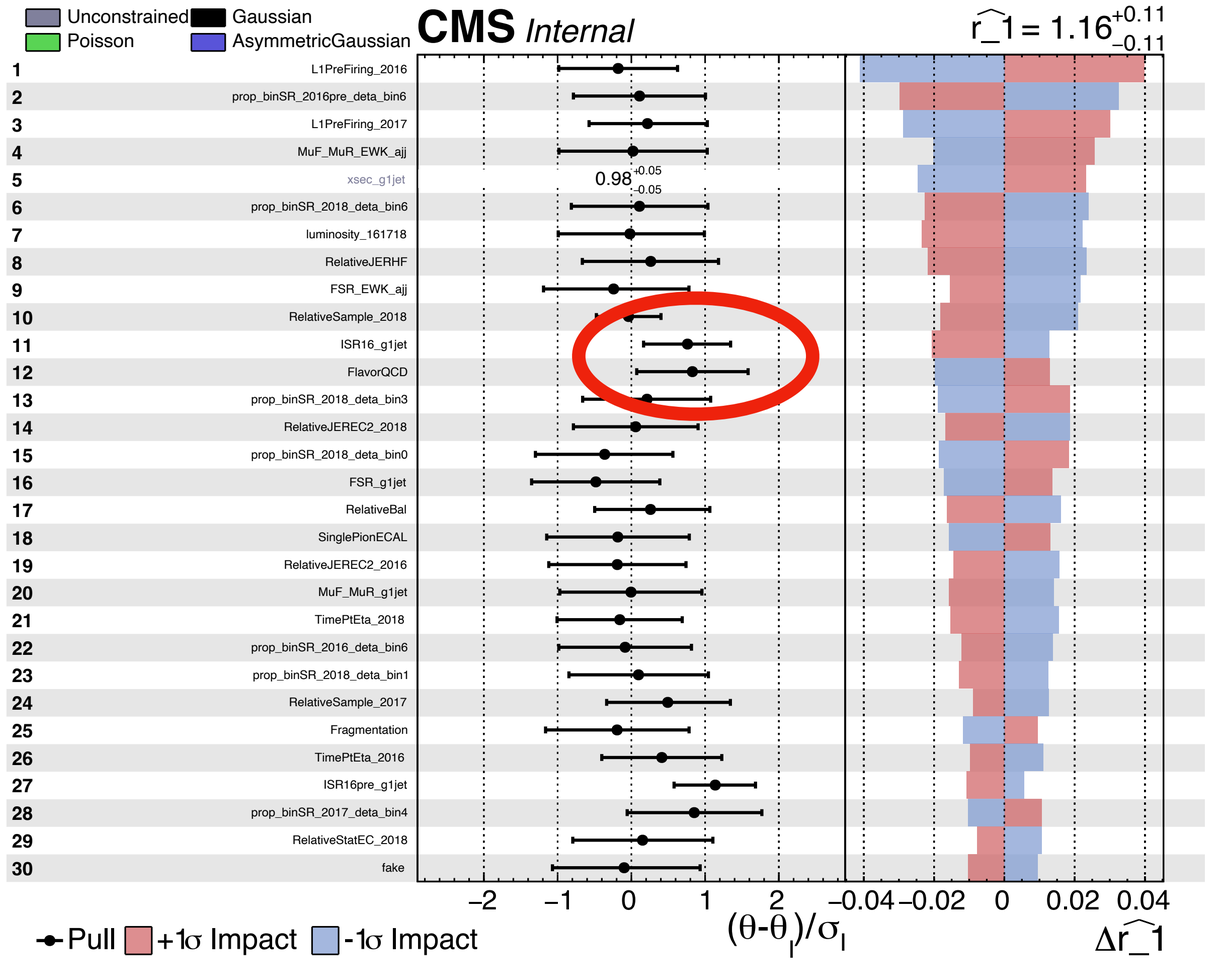
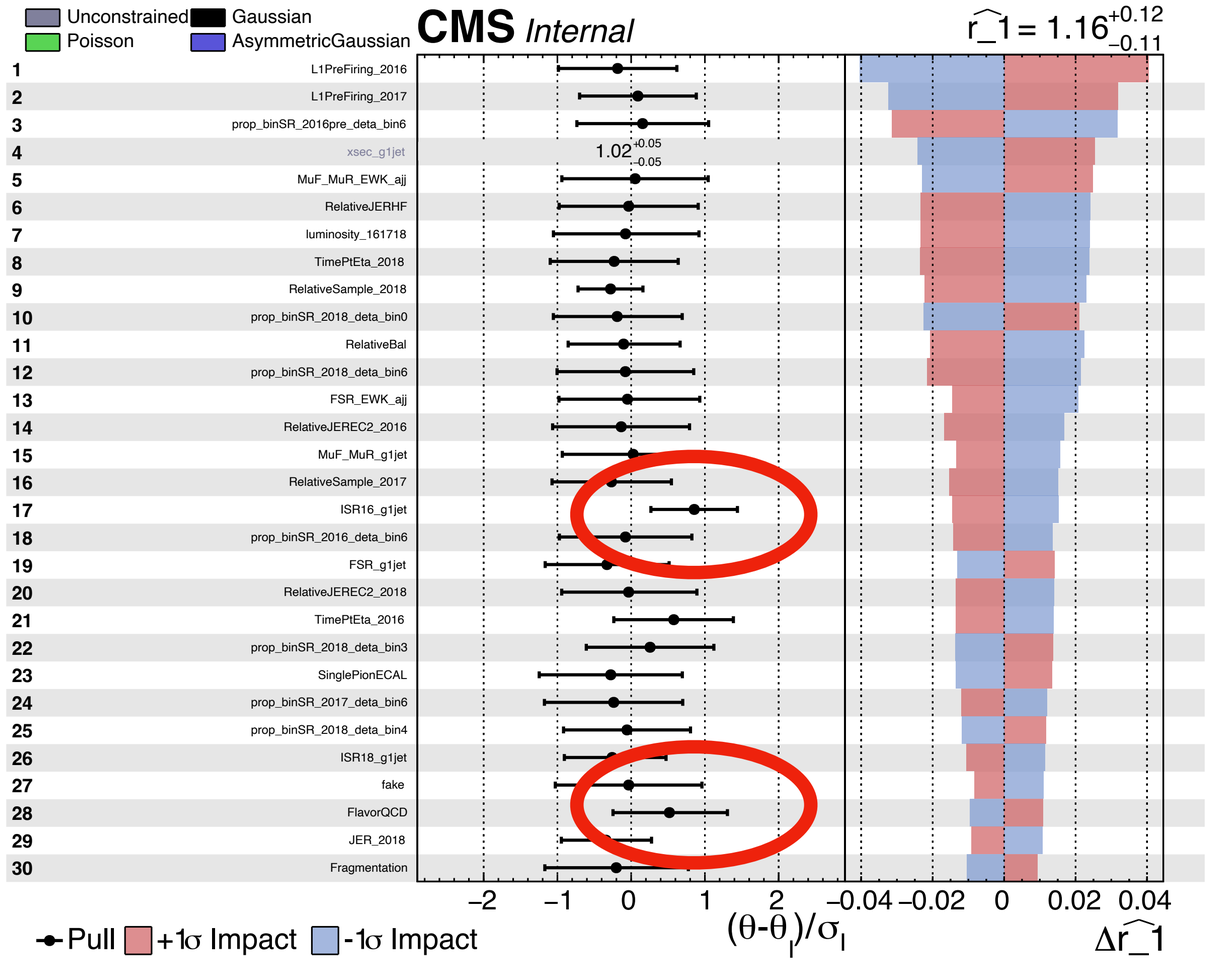
Pulls are going in the same direction





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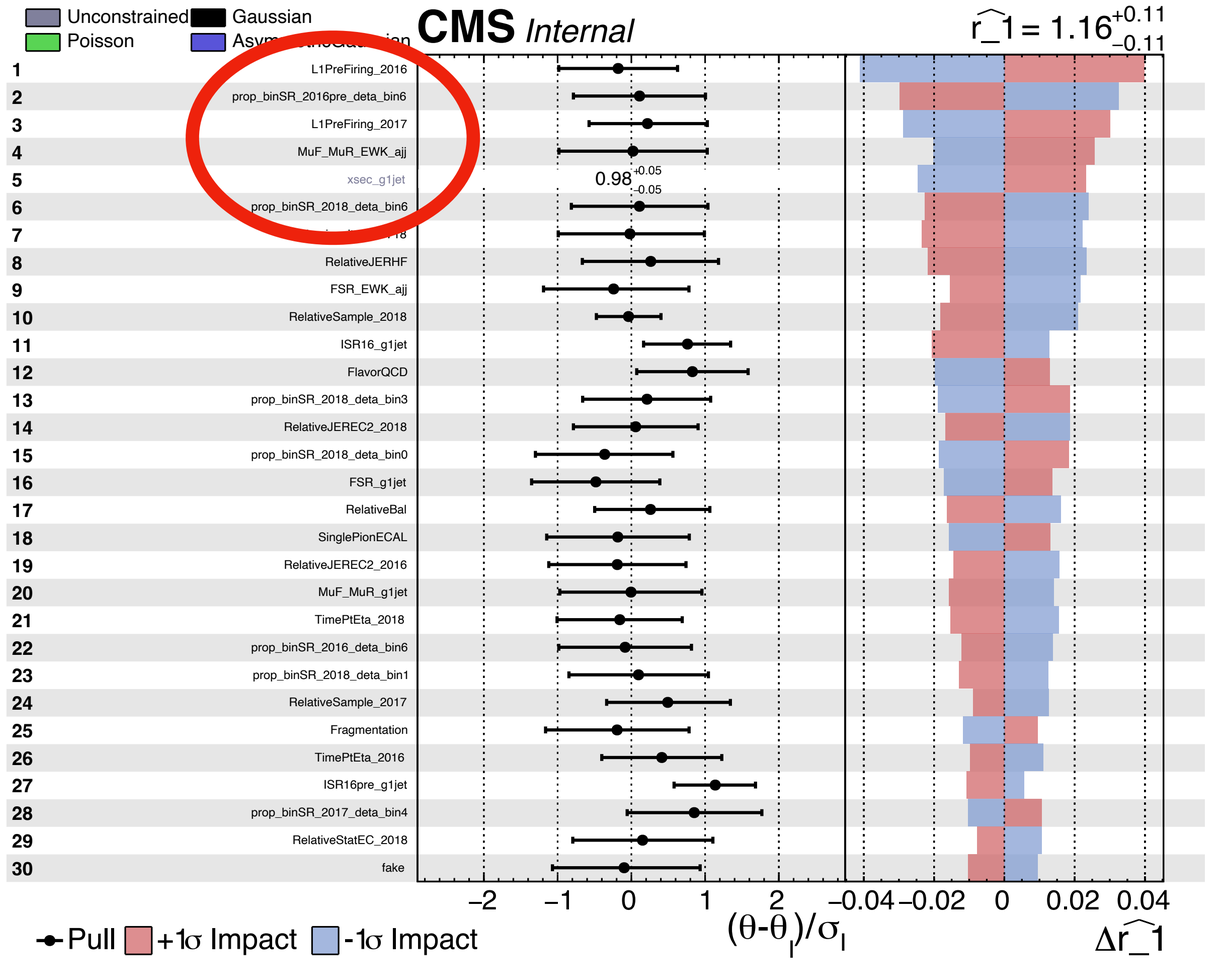
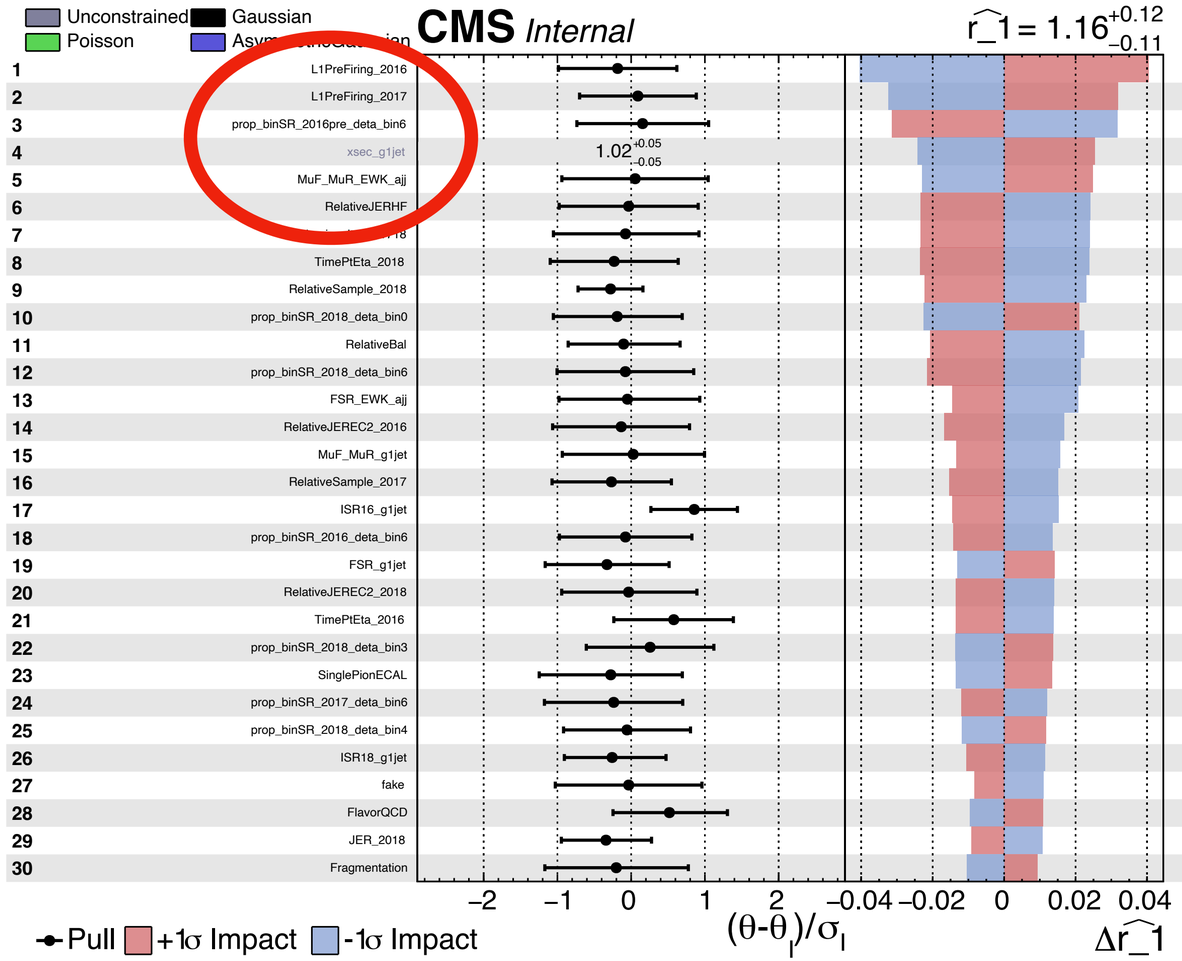
Ranking of nuisance parameter is similar





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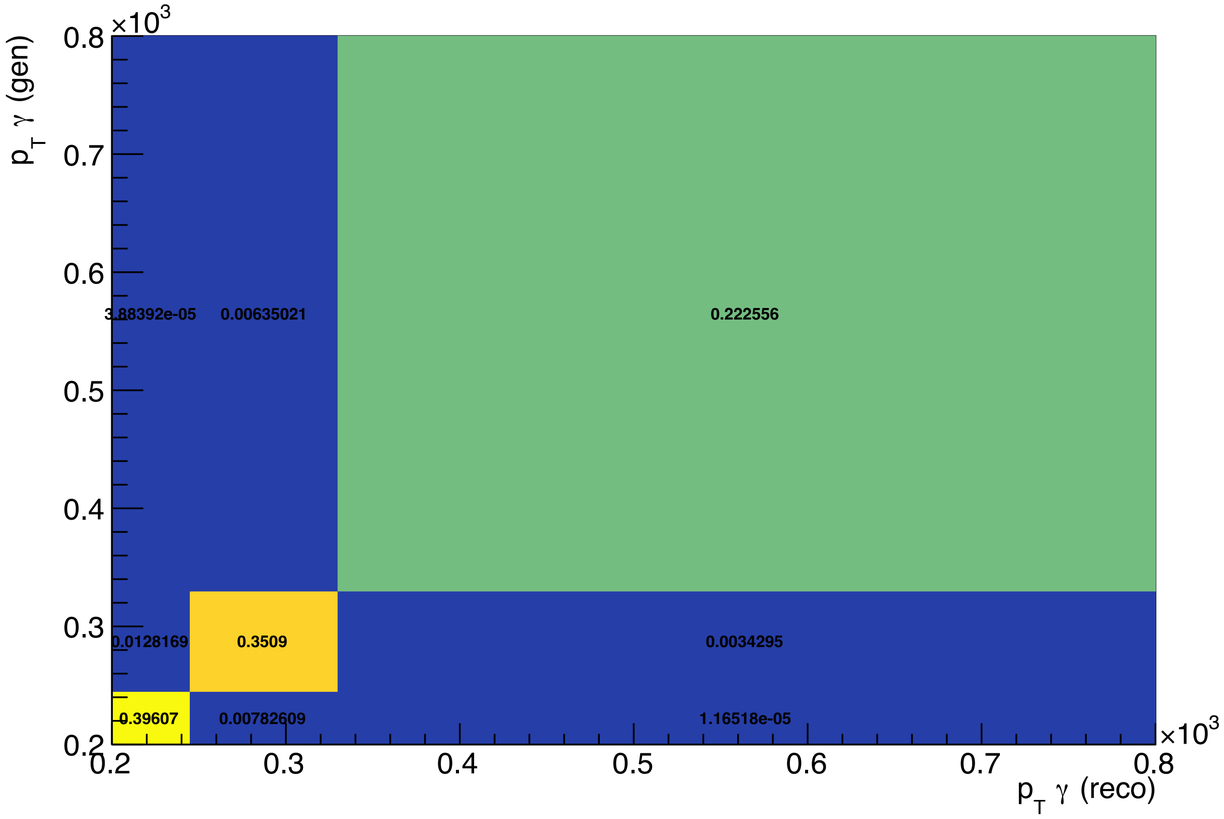
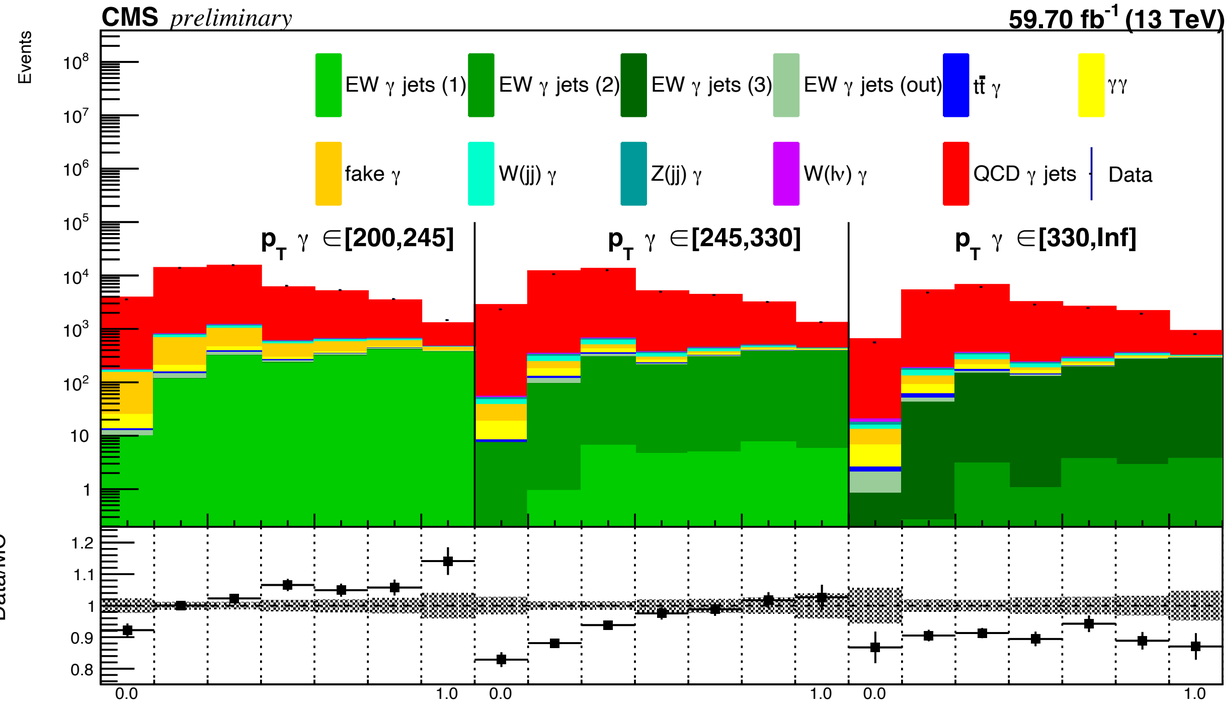
BDT vs C_γ (correlated & uncorrelated)

BDT vs C_γ (correlated & uncorrelated)

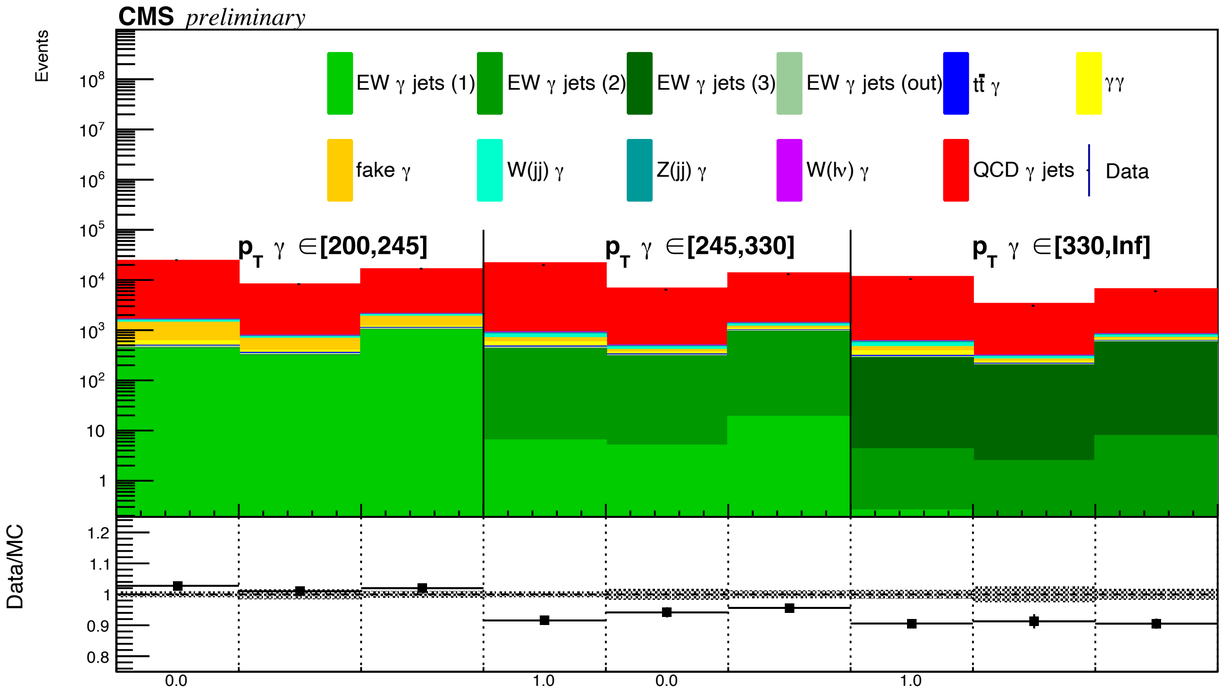
With the same binning, the $p_T(\gamma)$ is unfolded using BDT score and C_γ distributions with theory and experimental shape nuisance parameters correlated(uncorrelated) between rec. bins.



Prefit distributions



BDT



C_γ

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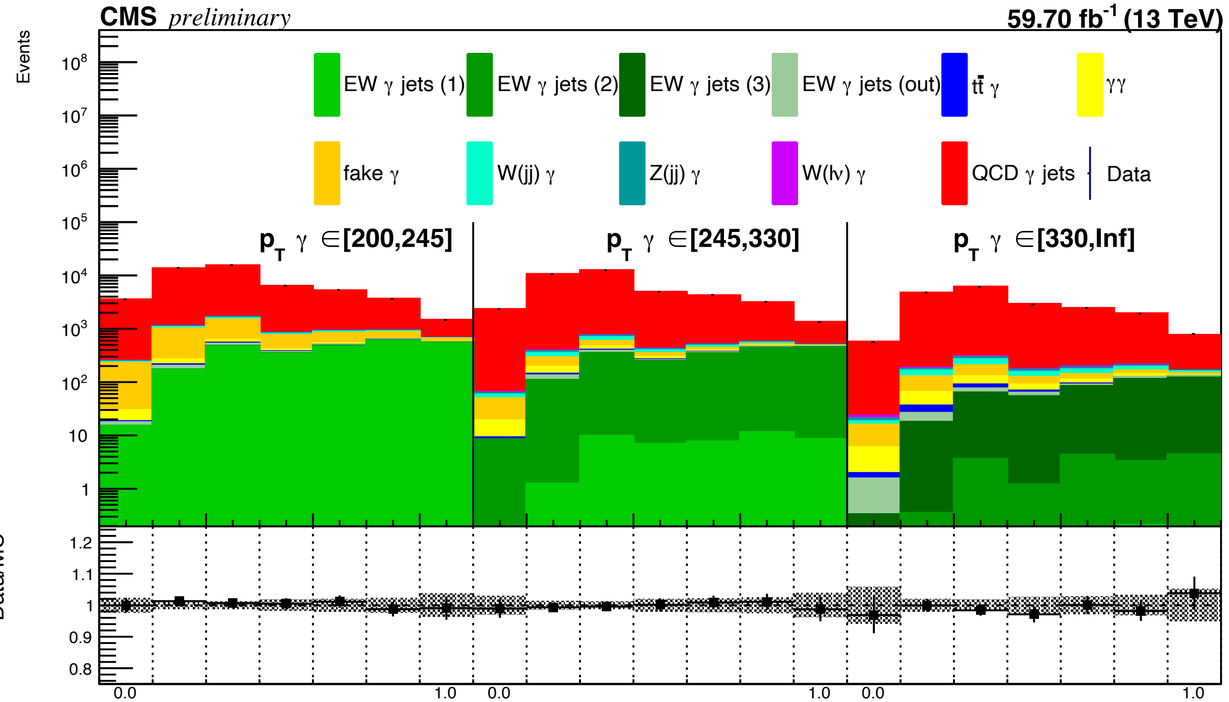
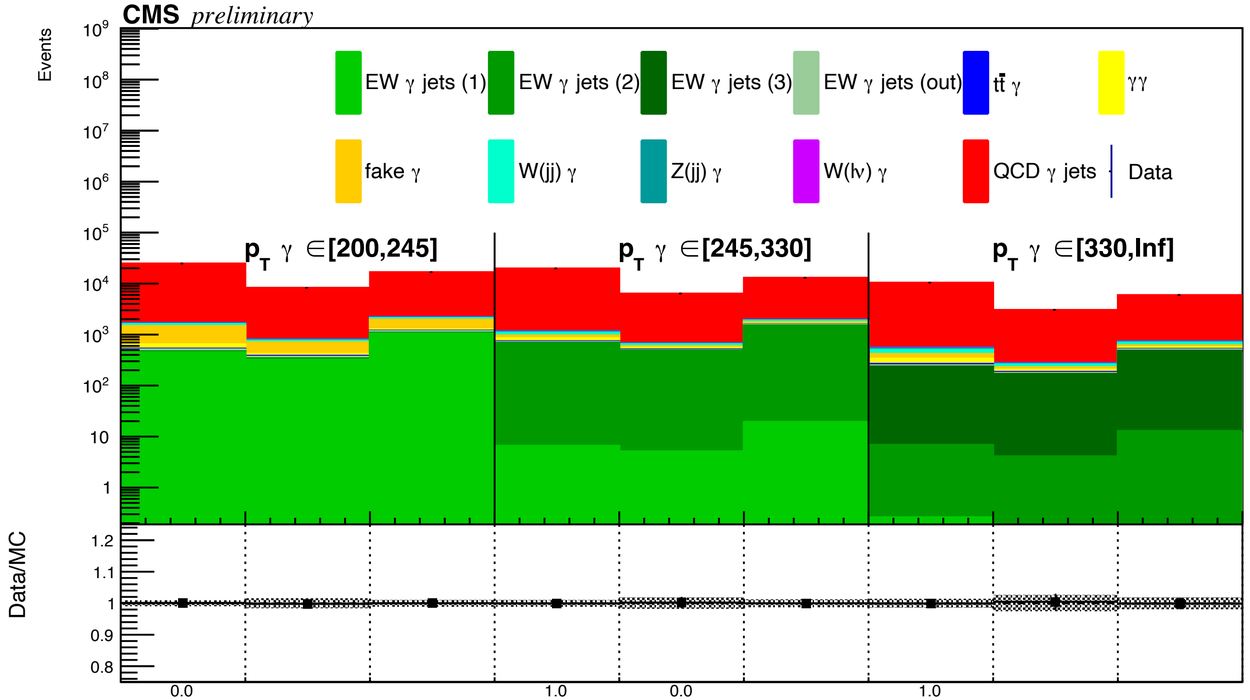
Postfit distributions



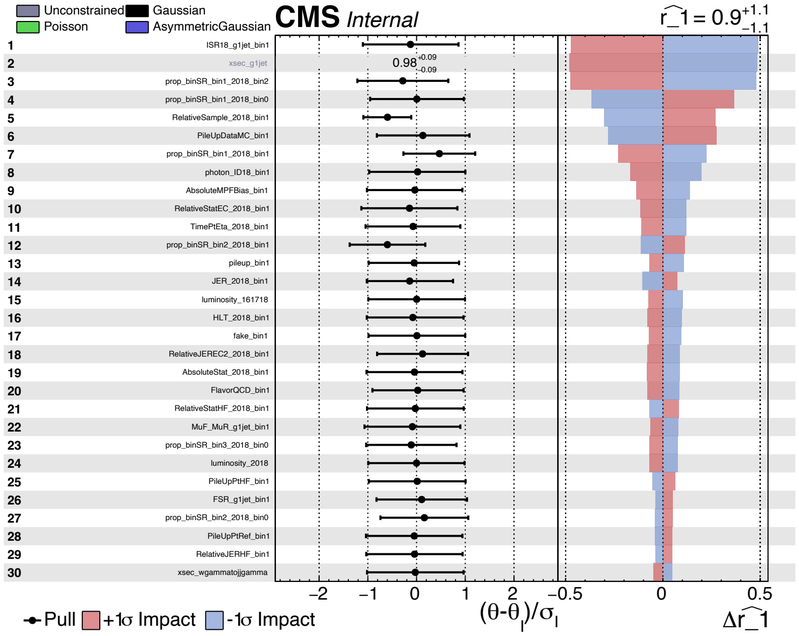
BDT



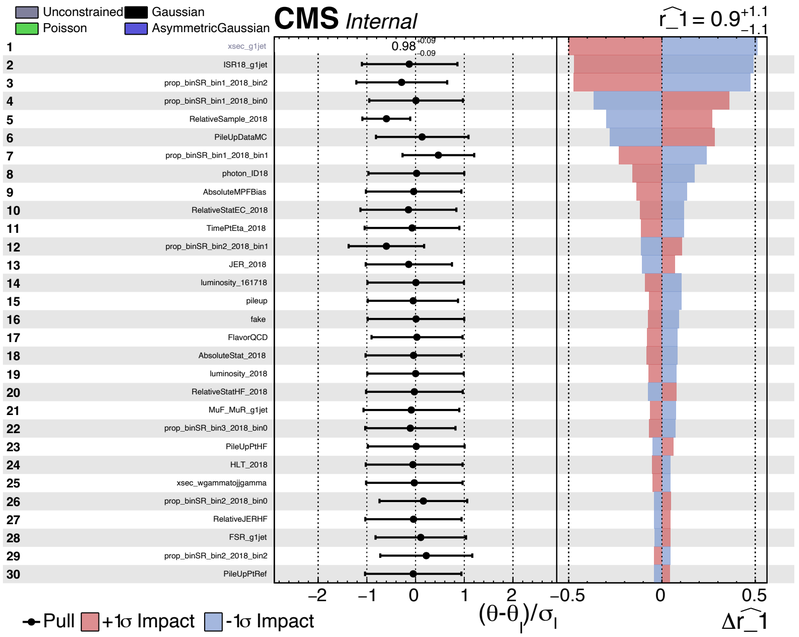
C_γ

Impact plots - bin1

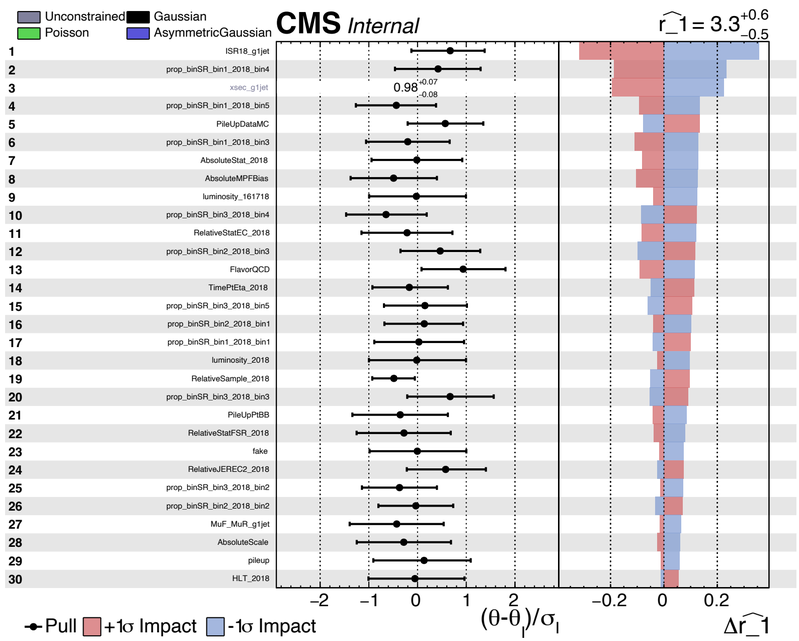
C_γ (uncorrelated)



C_γ (correlated)



BDT (correlated)



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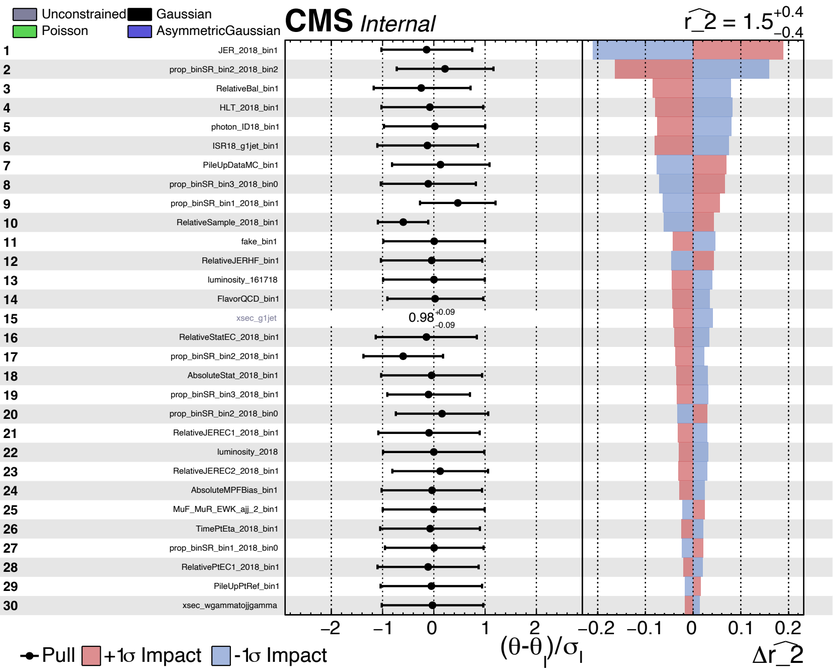
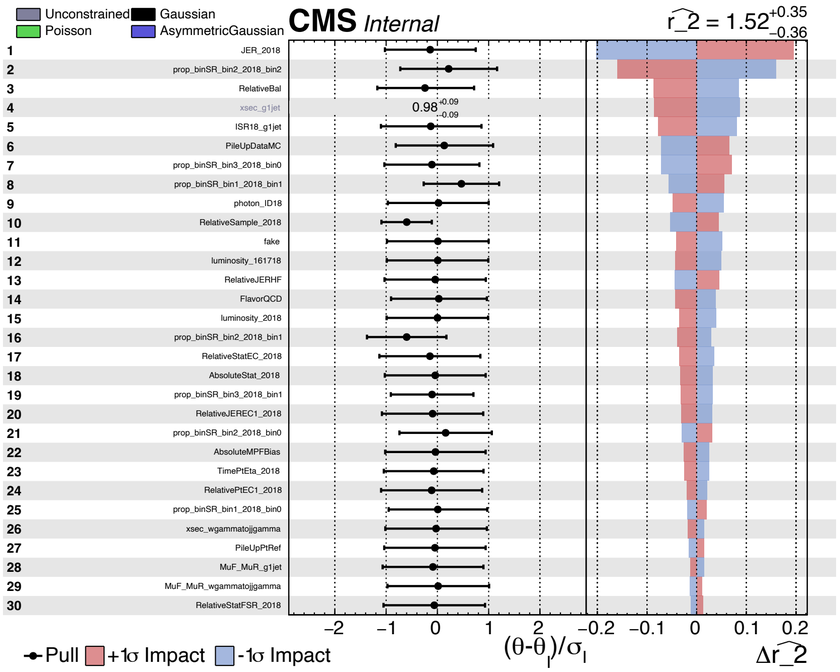
Impact plots - bin1

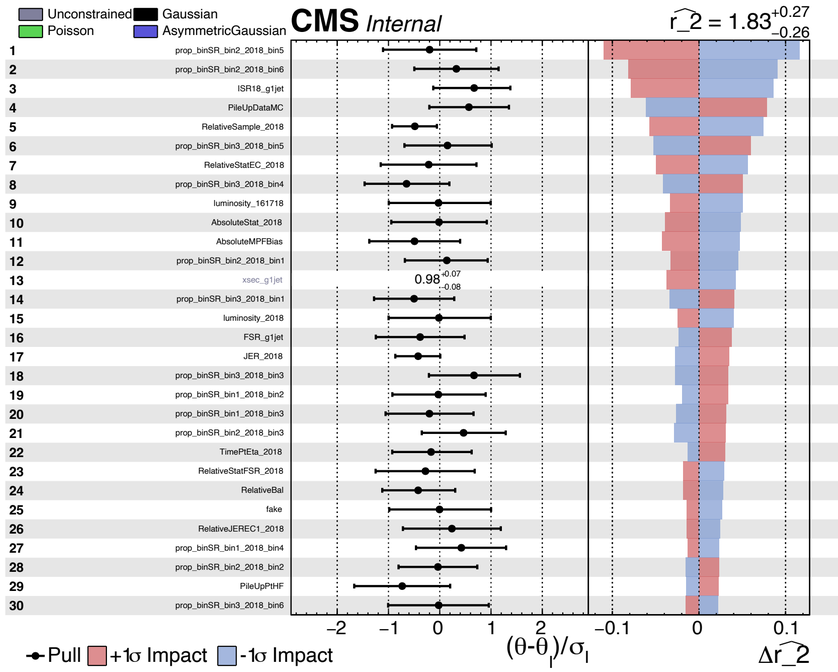
C_γ (uncorrelated)

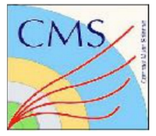


C_γ (correlated)



BDT (correlated)





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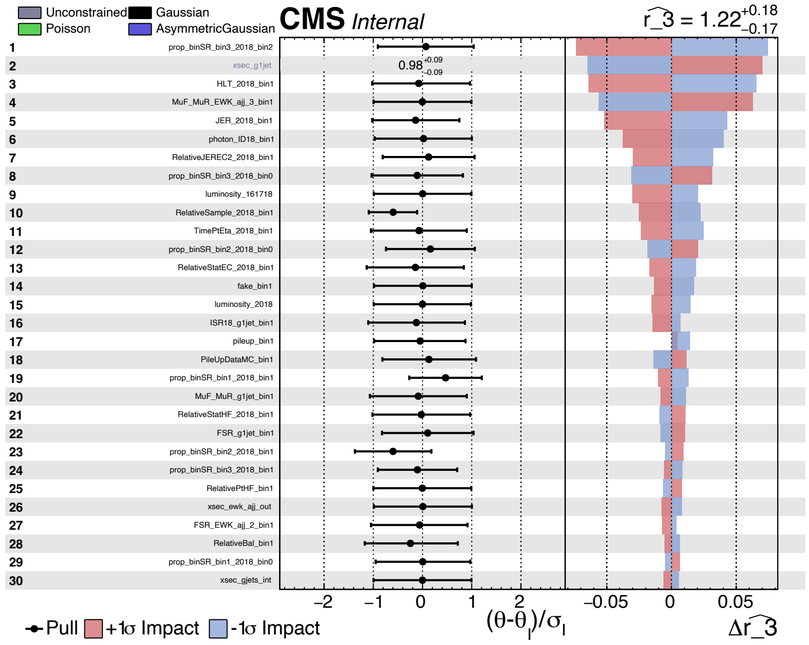
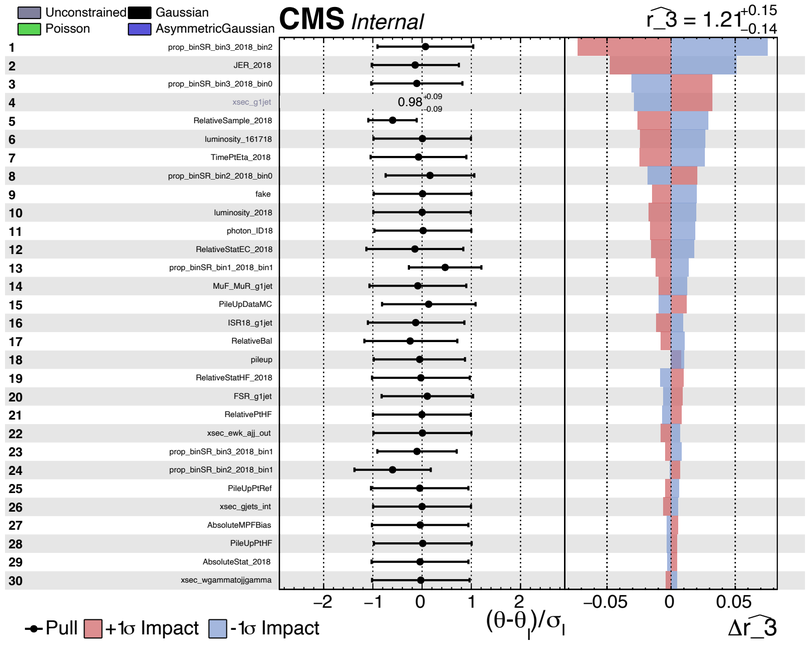
Impact plots - bin1

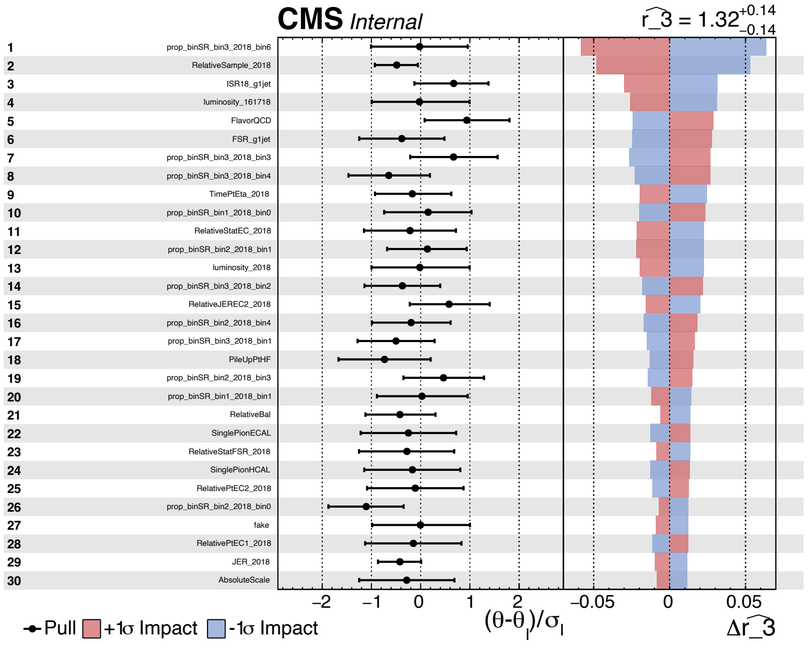
C_γ (uncorrelated)



C_γ (correlated)



BDT (correlated)



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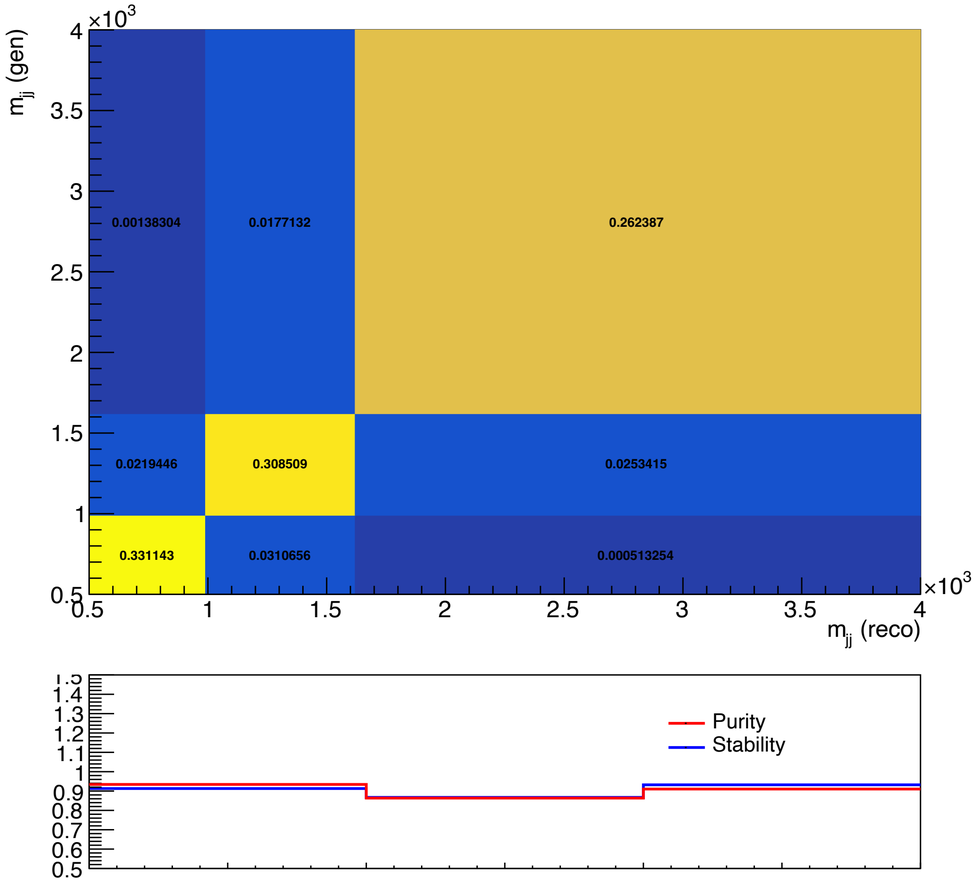
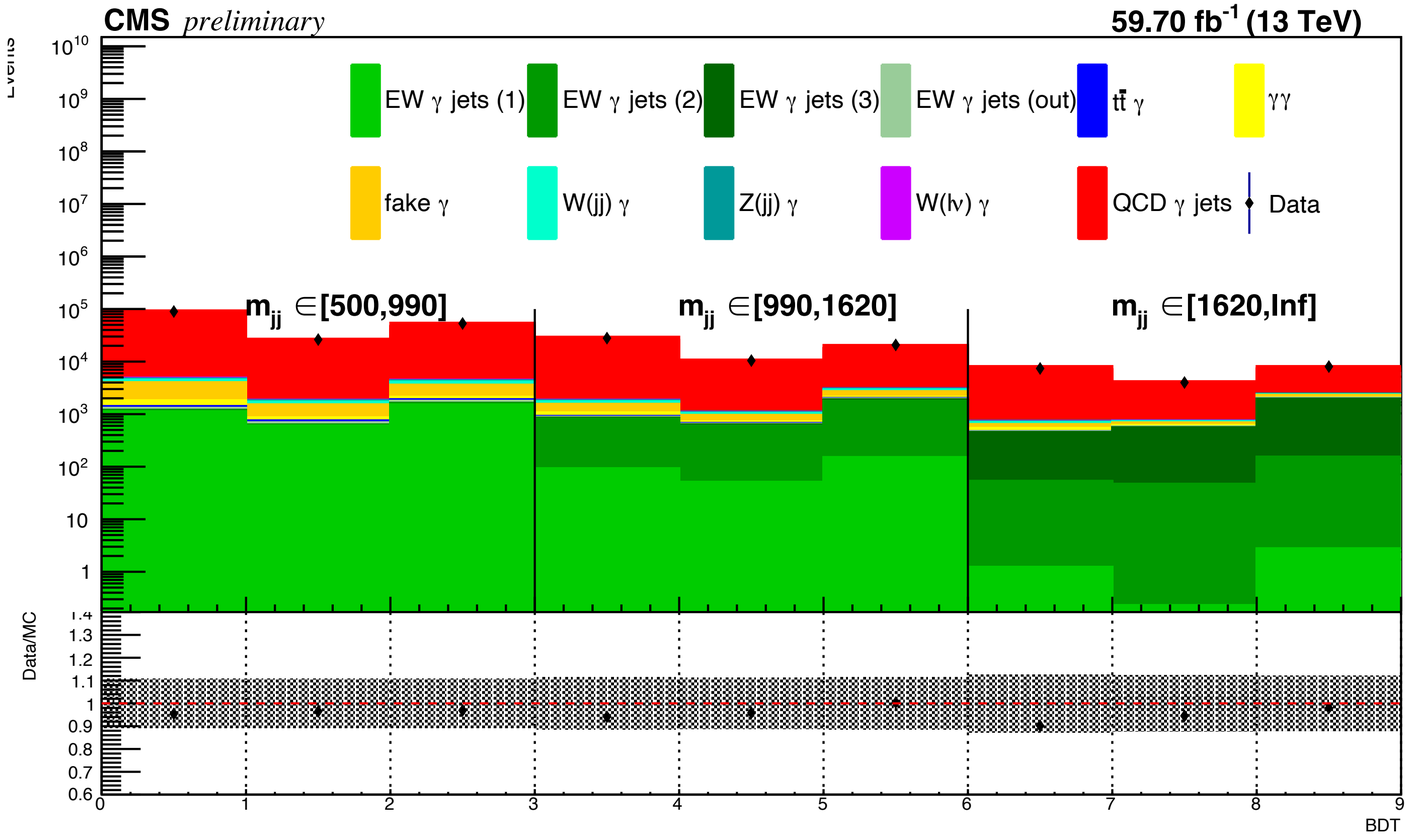
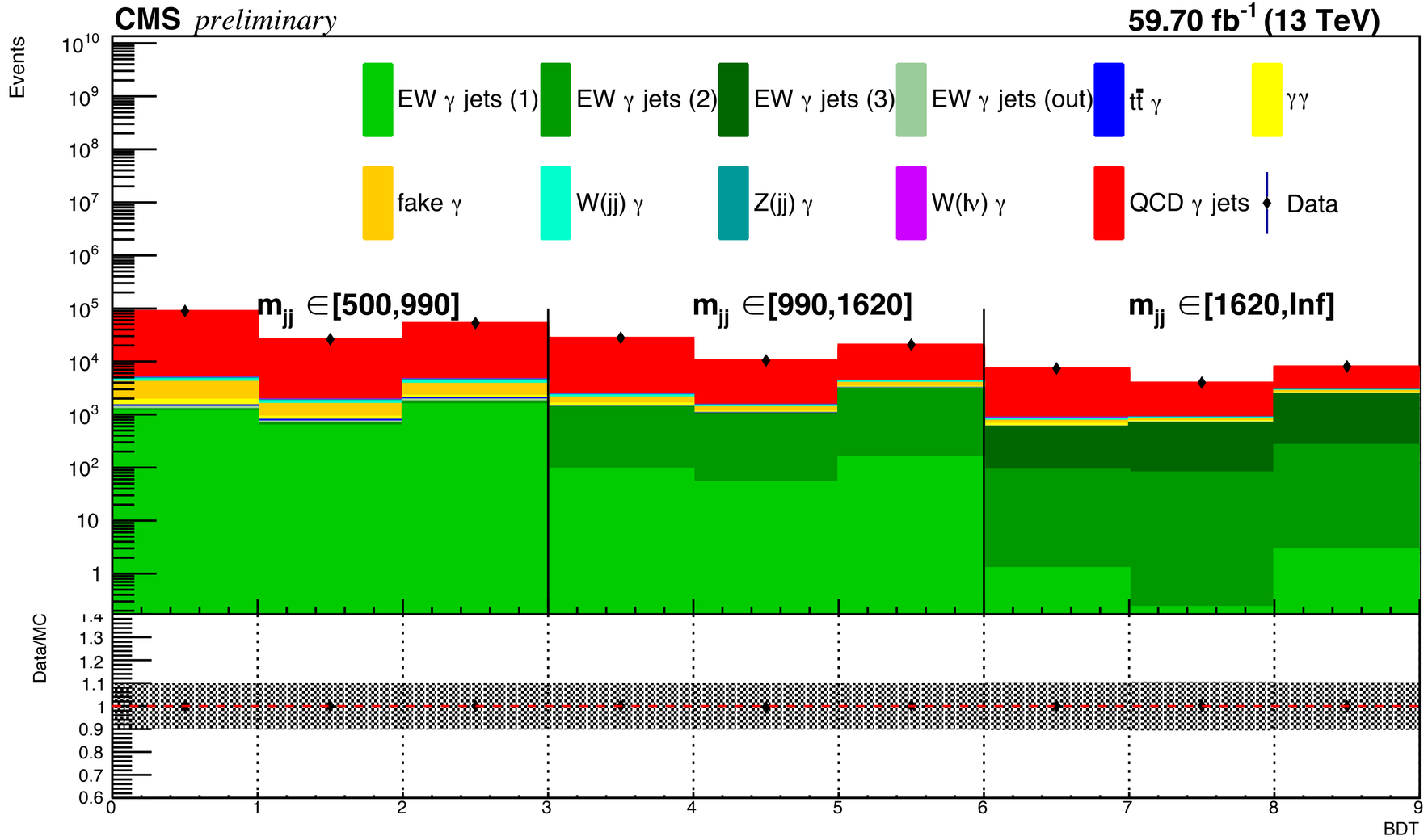
M_{jj} - with C_γ and correlated nuisance parameters

Prefit distributions

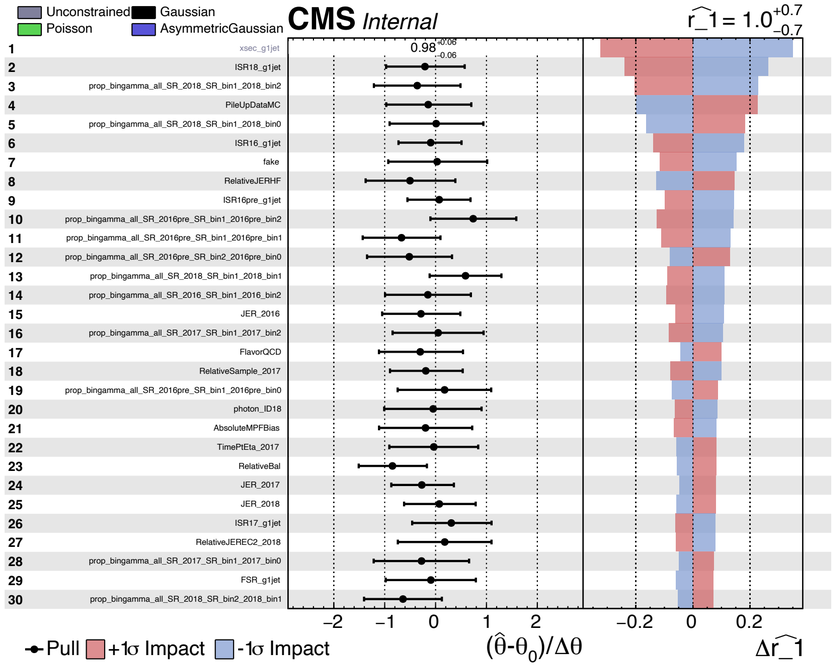


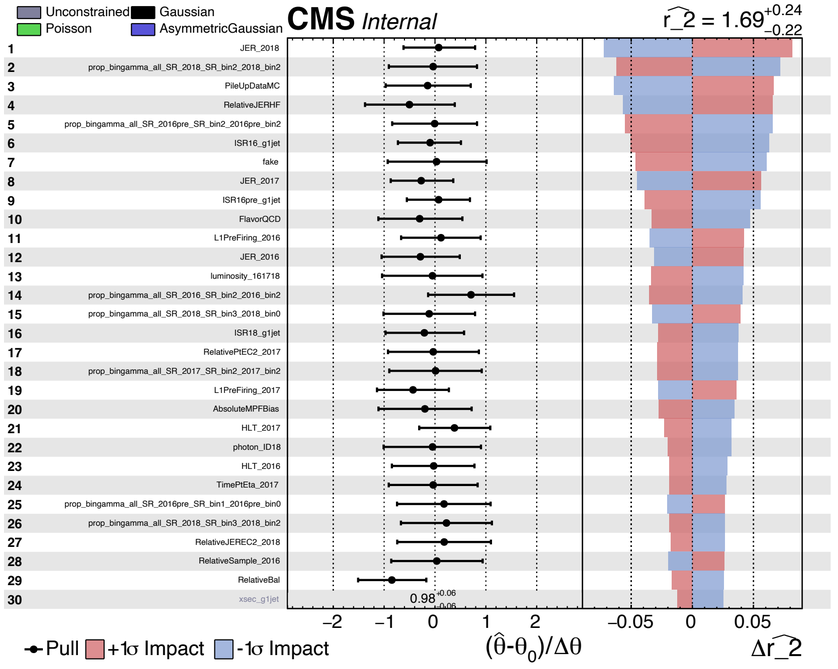


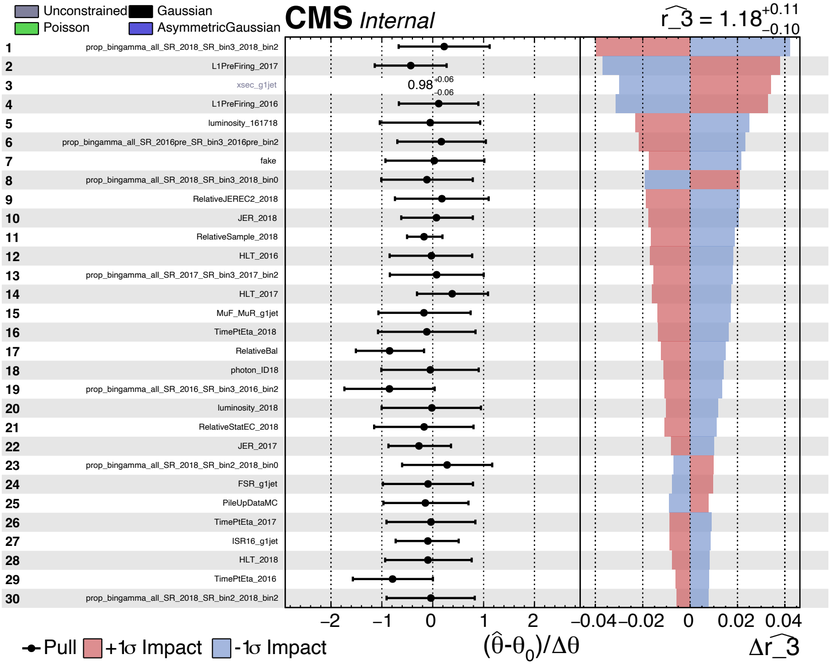
Postfit distributions



Impact plots m_{jj} - bin1, bin2, bin3







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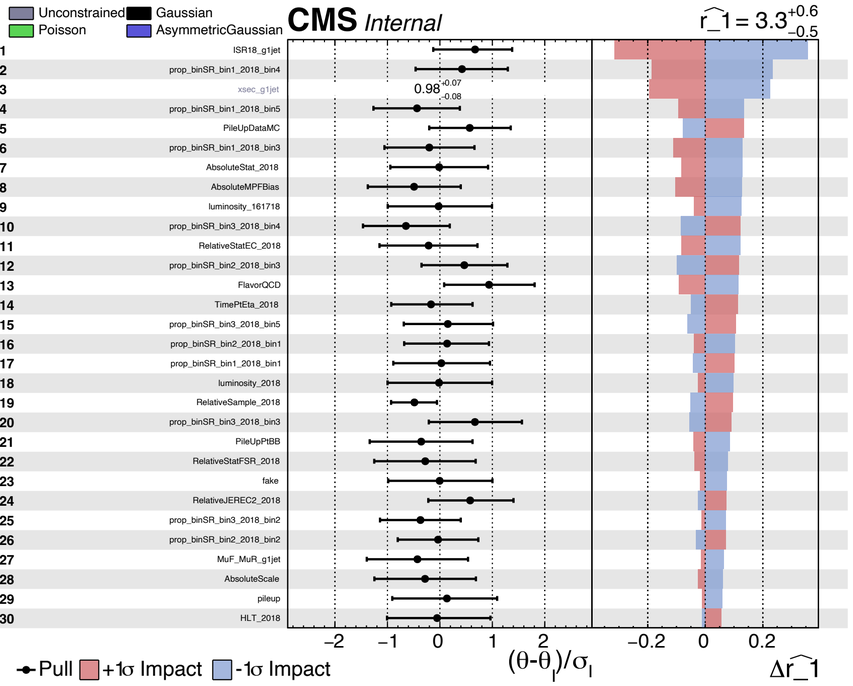
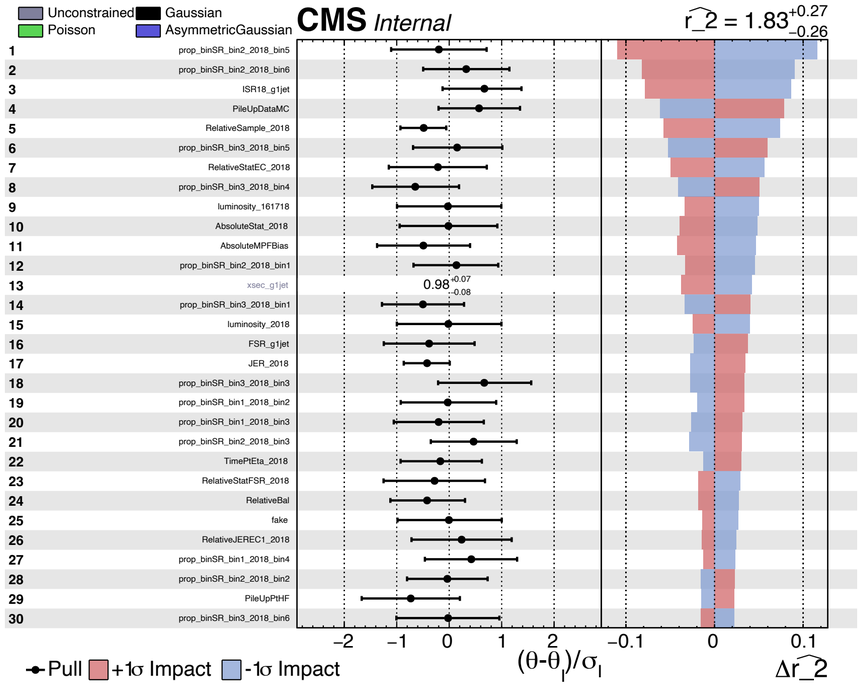
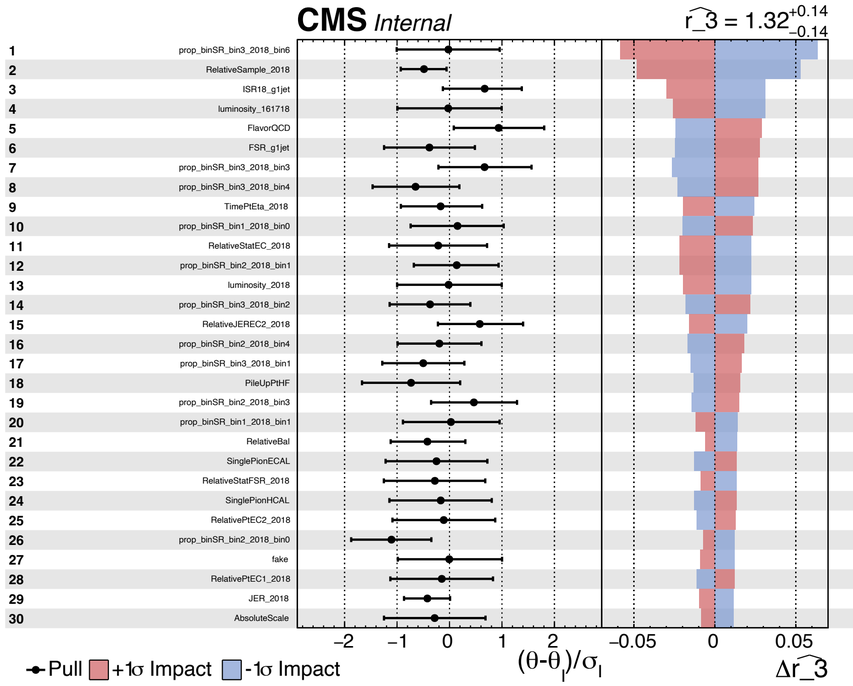
m_{jj}- 3 bins [500,990,1620,∞] - 2018







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