Comment from ARC chair Claude Charlot

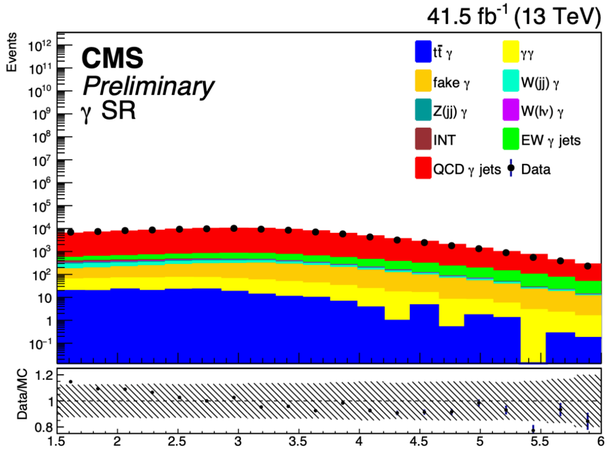
Concerning the disagreement in detajj, please produce expectation with the simulation reweighted as the data shape in detajj (before unblinding)

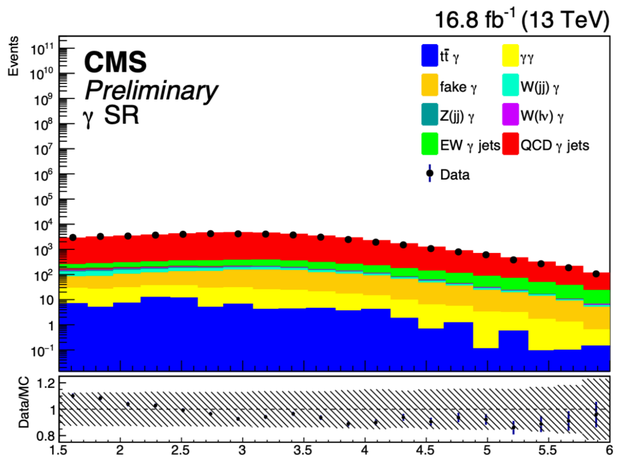
https://cms-analysis.github.io/HiggsAnalysis-CombinedLimit/latest/tutorial2023/parametric_exercise/?h=bias#impacts

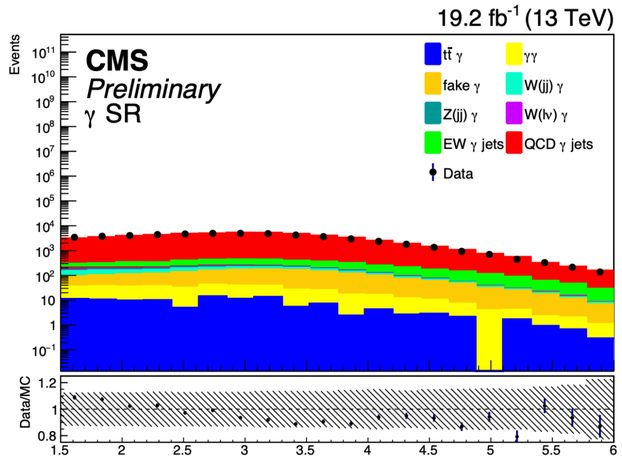
We need to understand how our choice of background function may impact the fitted signal strength

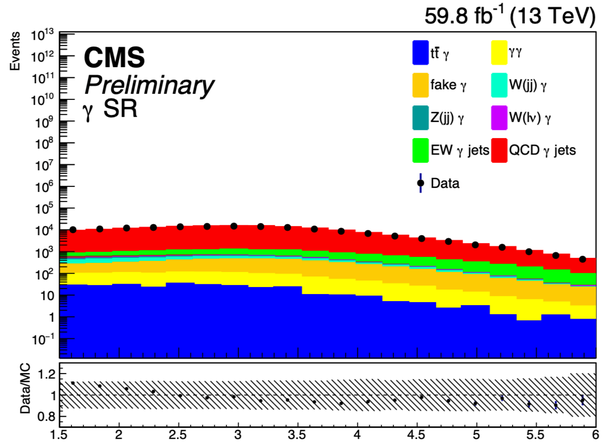
We generate 1000 (“throw") toy datasets with some choice of background function and fit back with another

If there is no bias present then we would expect to obtain a normal distribution centered at 0, with a standard deviation of 1









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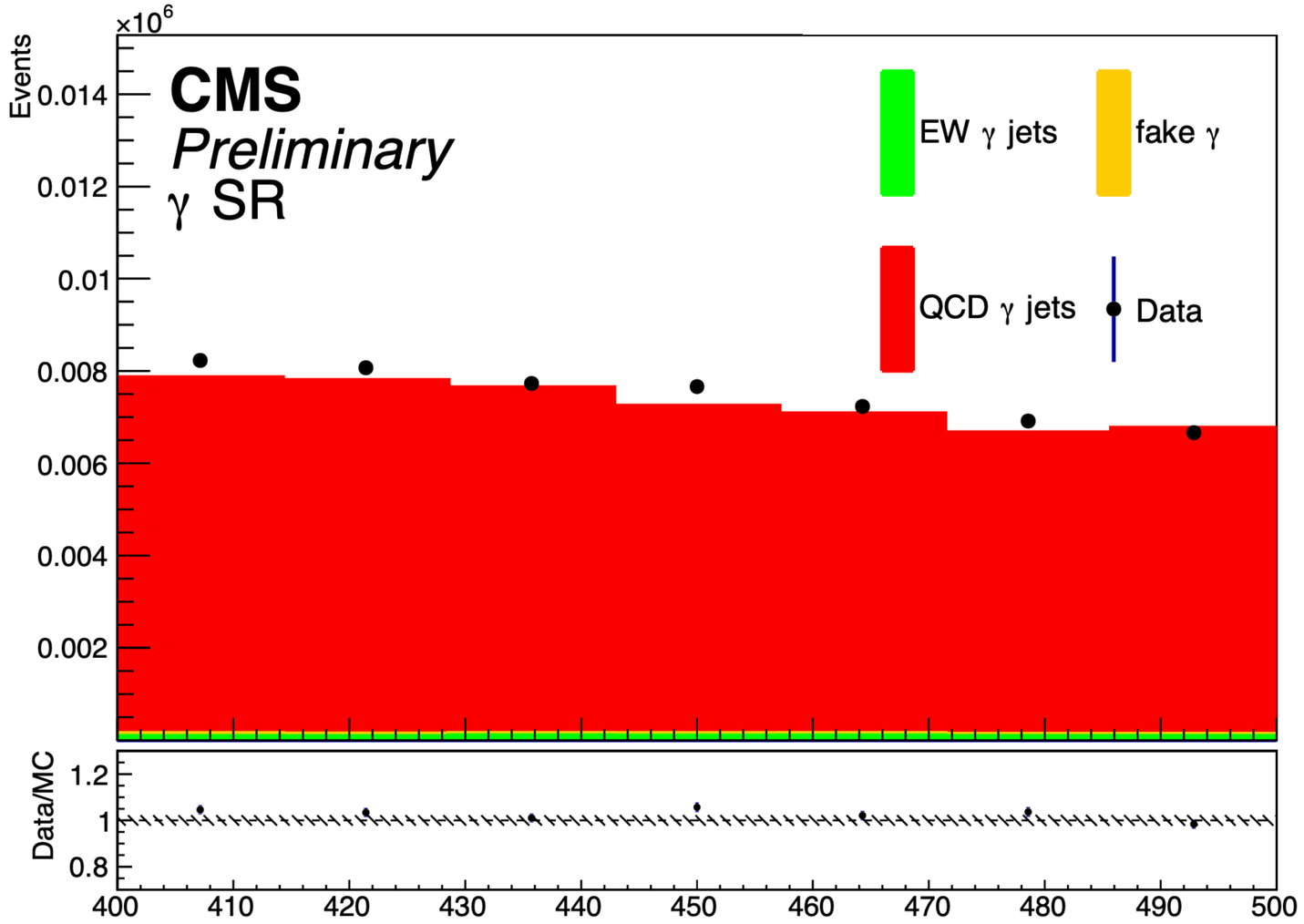
The SF's to reweigh the detajj distribution is taken from a CR with $400 < m_{jj} < 500$. In this region we have almost no signal.



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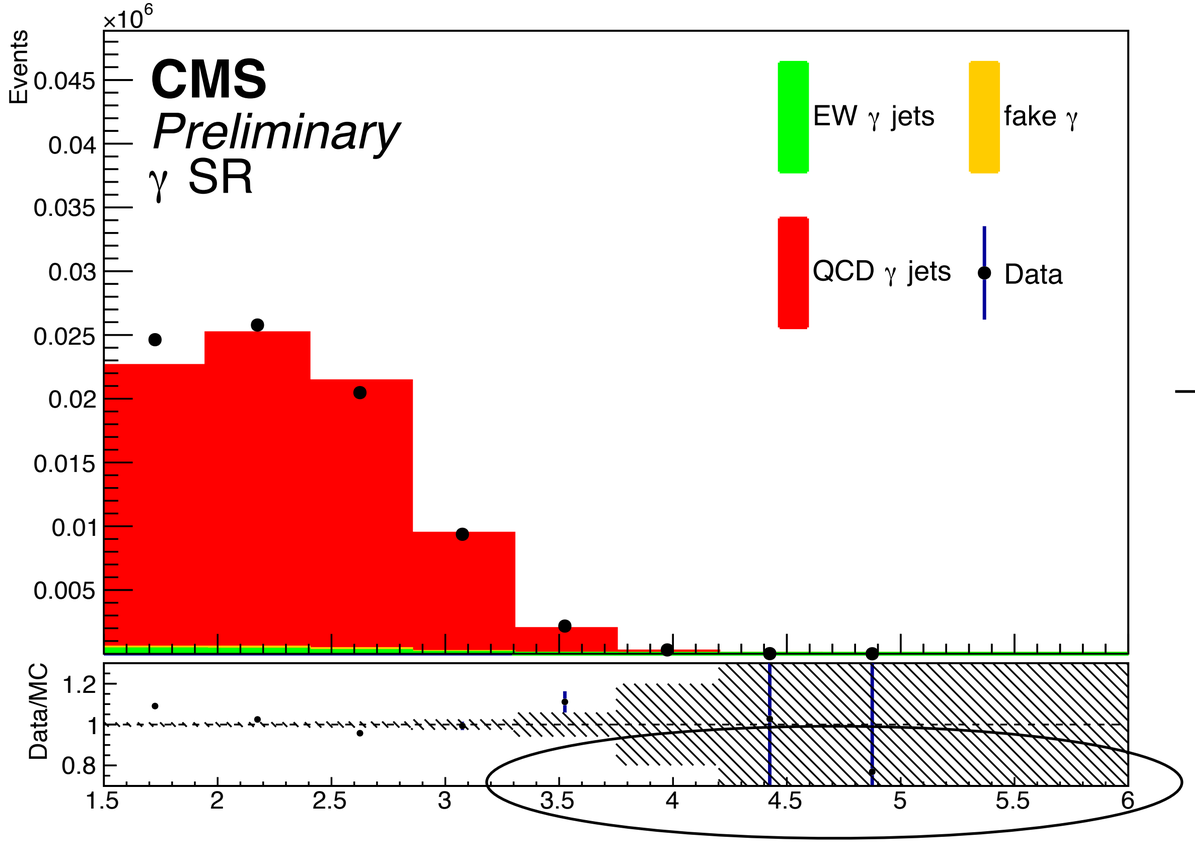
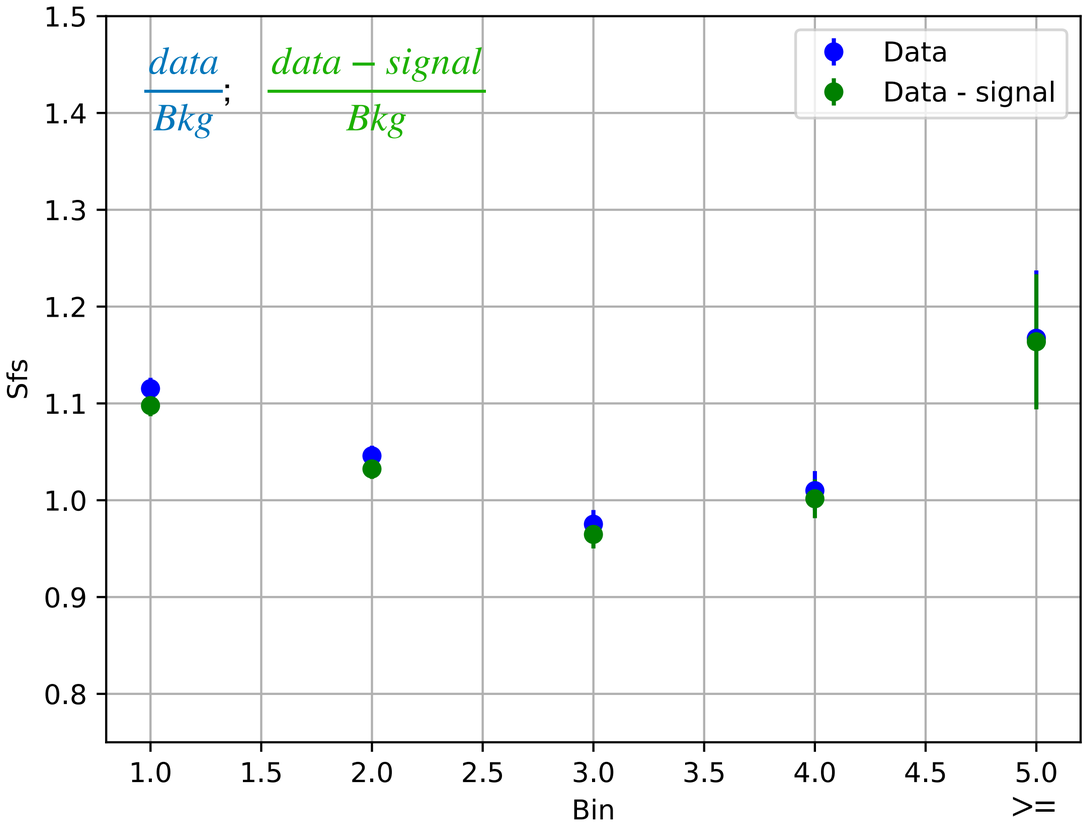
$\Delta\eta_{jj}$ distribution in the CR. SF's are derived scaling to data and data minus signal. Both SFs's are compatible within uncertaincties.





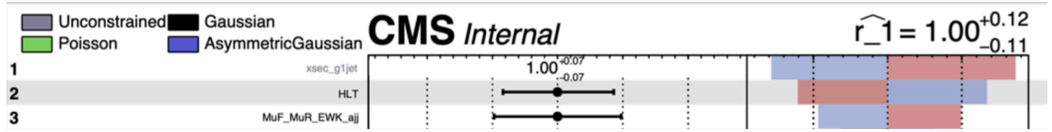
A pull value, P, is calculated for each toy dataset according to,

$$P = (r_{truth} - r_{fit})/\sigma_{fit}$$

What threshold do we use to define “acceptable” bias?

A bias of 20% will change the value of the total uncertainty by less than 2%

$$\sqrt{1 + 0.2^2} = 1.019$$



We have a total uncertainty of 12%. The bias effect is negligible therefore the background modeling is acceptable (assuming all the mis-modeling comes from the background)