



中国科学院高能物理研究所
Institute of High Energy Physics
Chinese Academy of Sciences

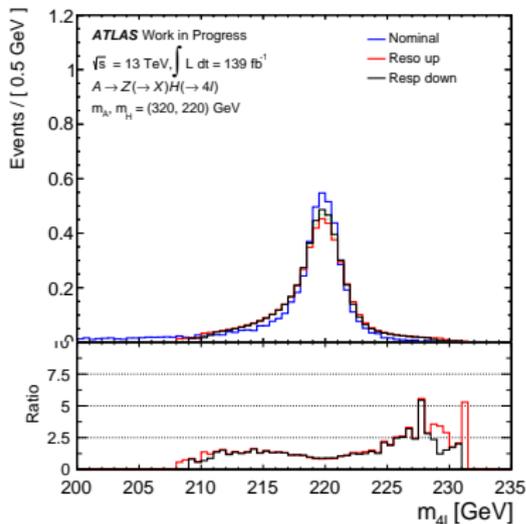
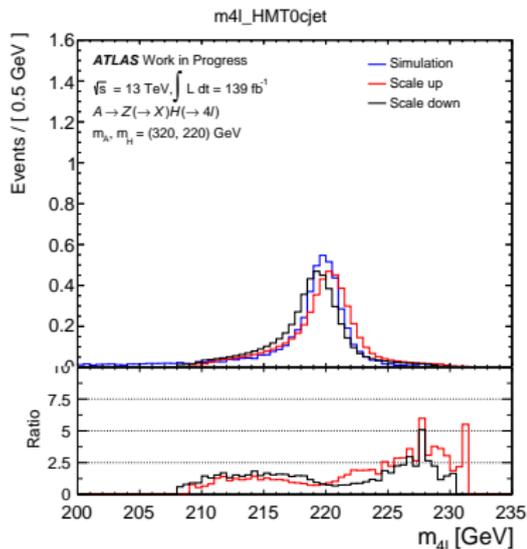


Weekly update

Abdualazem Fadol

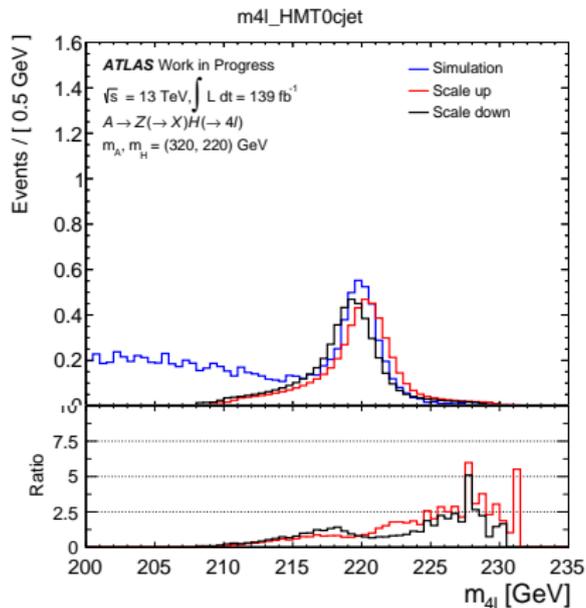
August 29, 2022

Systematic shape on the signal



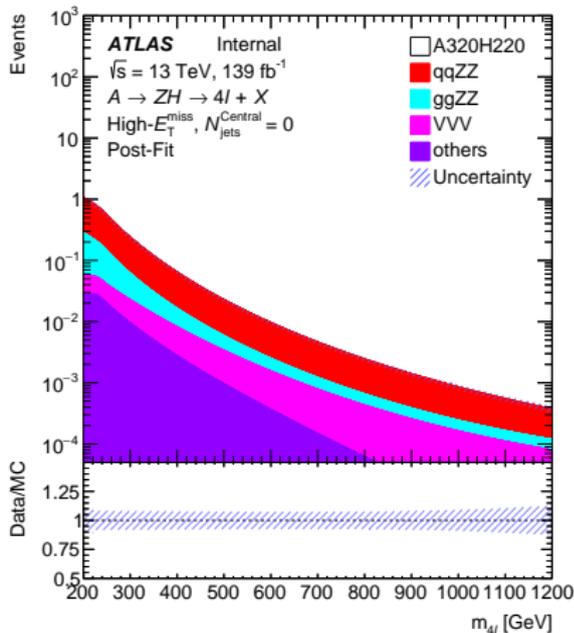
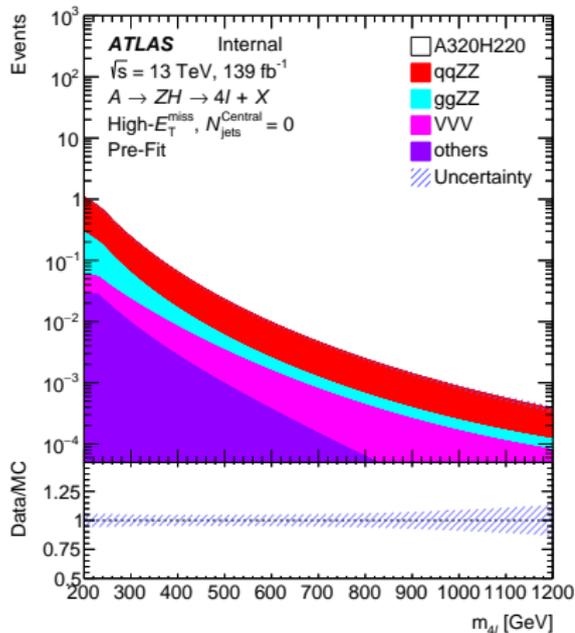
- The nominal signal is used as a histogram in the final fit after interpolating it.
- However, to get the shape systematic the signal is fit to a DSCB plus Gaussian.
- Then the σ_{DSCB} is modified by 1.4% up and down to get the shape systematic on the resolution.
- and the mean is modified by 0.23% up and down to get the shape systematic on the scale.

Systematic shape on the signal



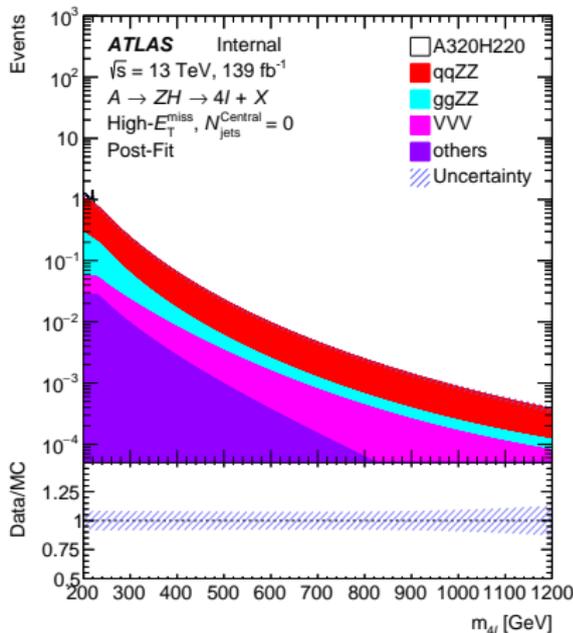
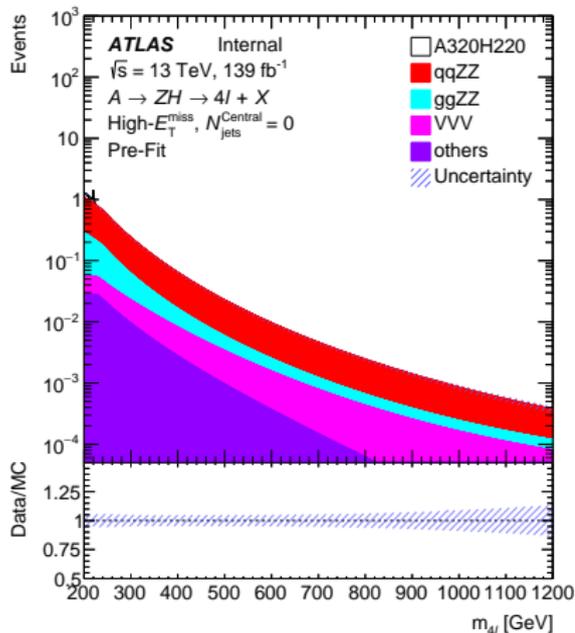
- The nominal signal which contains $A \rightarrow Z(\rightarrow 2\ell)H(\rightarrow 2\ell + X)$ and $A \rightarrow Z(\rightarrow X)H(\rightarrow 4\ell)$

Fit results for background only Asimov data



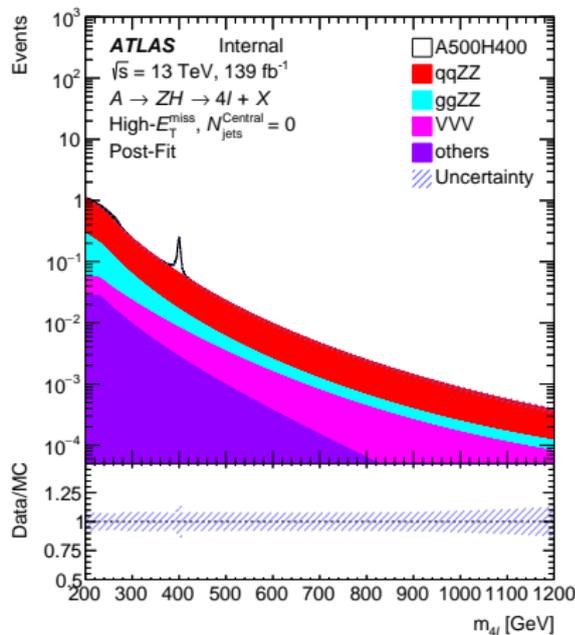
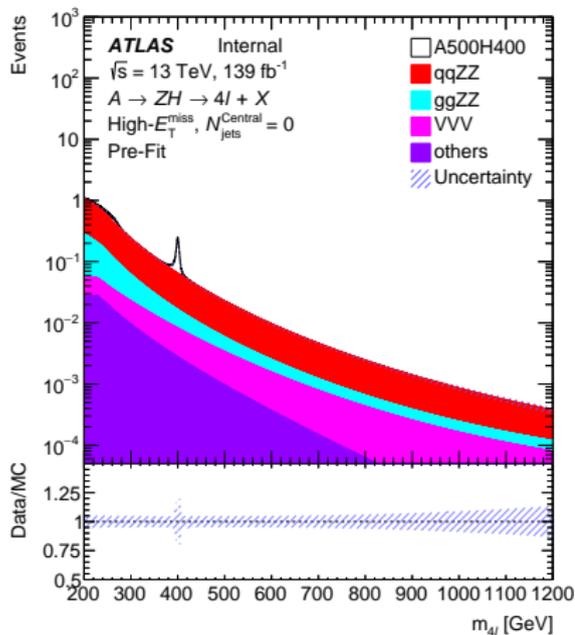
- The expected upper limit is found to be 0.284 fb it's $\sim 7\%$ compared to the previous results. The main difference is using the full histogram range compared to use DSCB plus Gaussian.

Fit results for signal plus background Asimov data



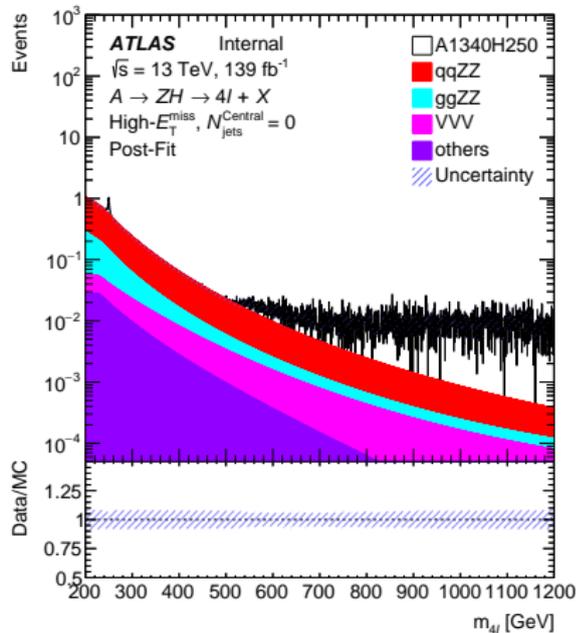
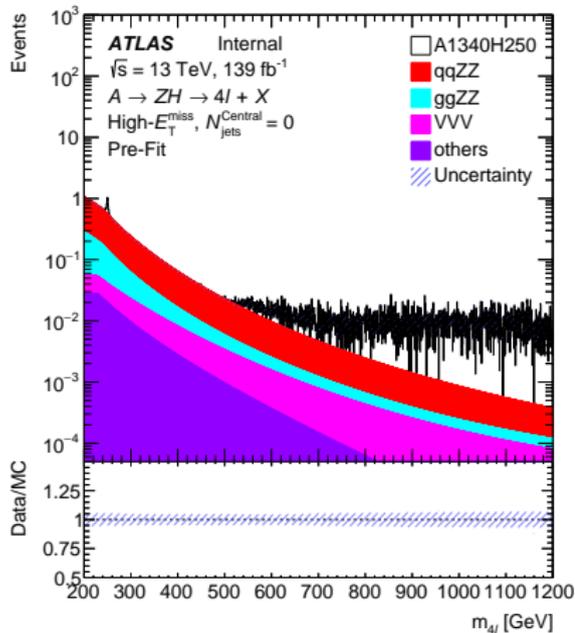
□ Fixing the $\sigma(gg \rightarrow A) \times \text{BR}$ to one.

Fit results for signal plus background Asimov data



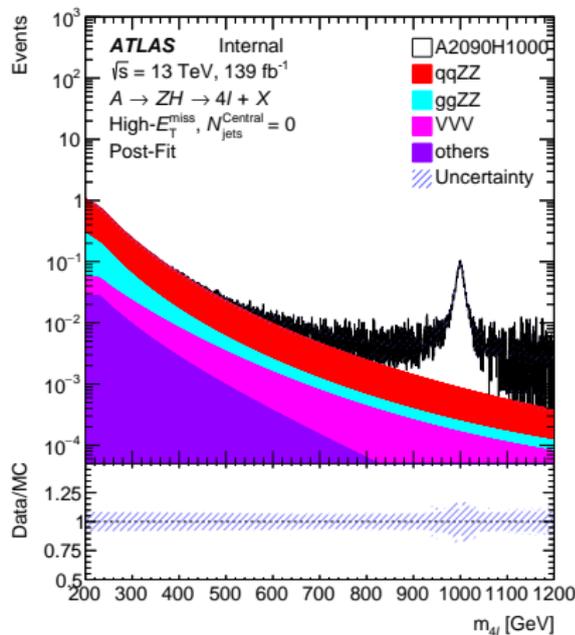
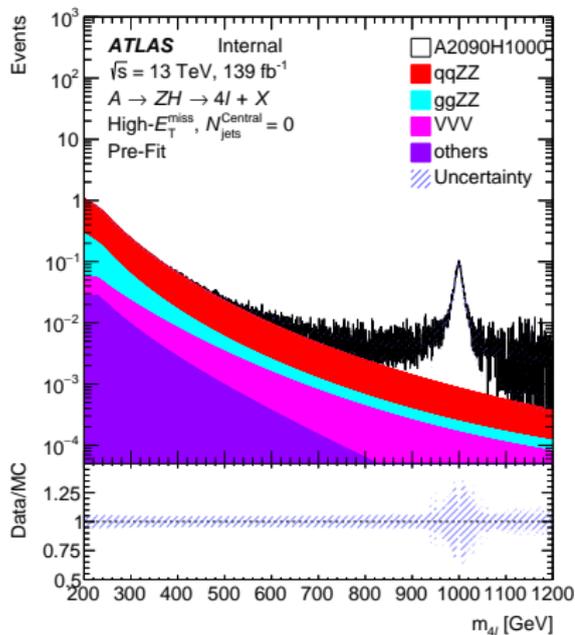
□ Fixing the $\sigma(gg \rightarrow A) \times \text{BR}$ to one.

Fit results for signal plus background Asimov data



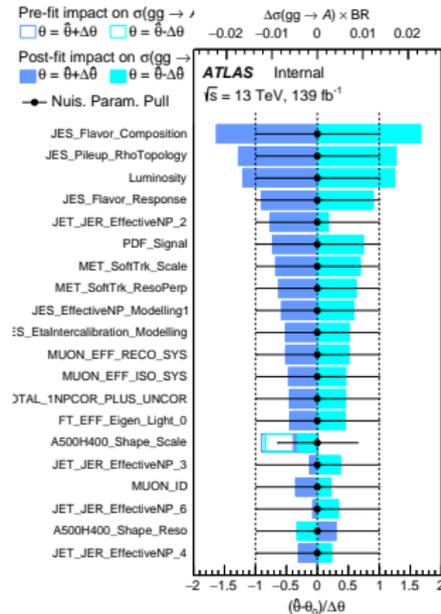
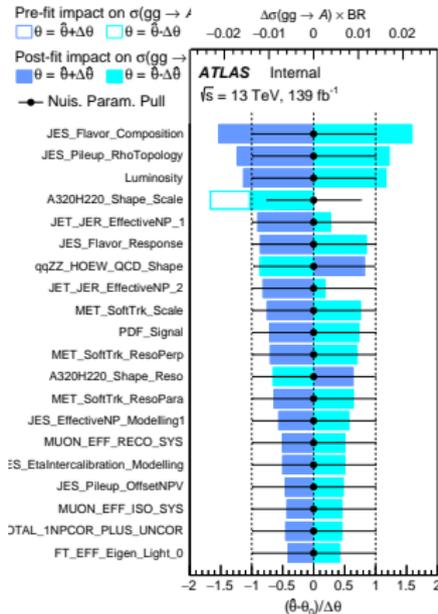
□ Fixing the $\sigma(gg \rightarrow A) \times \text{BR}$ to one.

Fit results for signal plus background Asimov data



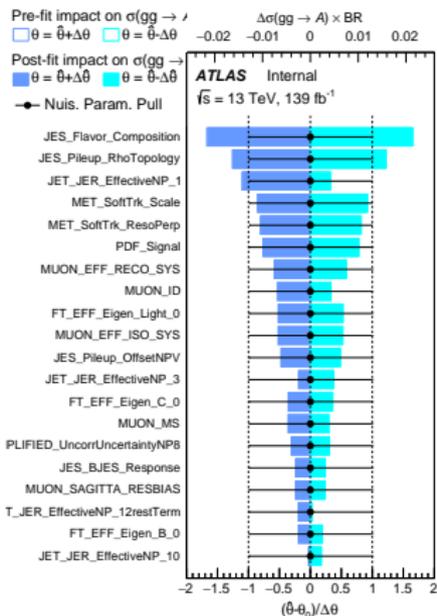
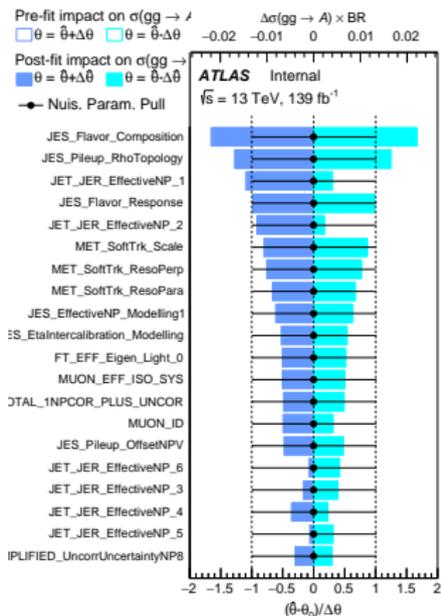
□ Fixing the $\sigma(gg \rightarrow A) \times \text{BR}$ to one.

The impact on the $\sigma(gg \rightarrow A) \times \text{BR}$



A320H220 (left) and A500H400 (right)

The impact on the $\sigma(gg \rightarrow A) \times \text{BR}$



A1340H250 (left) and A2090H1000 (right)

- Most of the technical problems were solved:
 - Using the actual histograms after interpolating them
 - Extract the systematic shape on the signal form the DSCB plus Gaussian
- We have 7.9k signal mass points that we need to calculate their limit.
- Managed to get the upper limit for 900 mass points; one can't submit lots of condor jobs
- due limited space in the afs account.
- To do:
 - Getting the upper limit for all the mass point
 - The exclusion plots
 - Redoing the $R \rightarrow SH \rightarrow 4\ell + E_T^{\text{miss}}$ results using histograms.
- I'm currently improving the note in parallel.