

Status report

Jiwon Park

DESY

November 13, 2024



UNTERSTÜTZT VON / SUPPORTED BY

Alexander von
HUMBOLDT
STIFTUNG

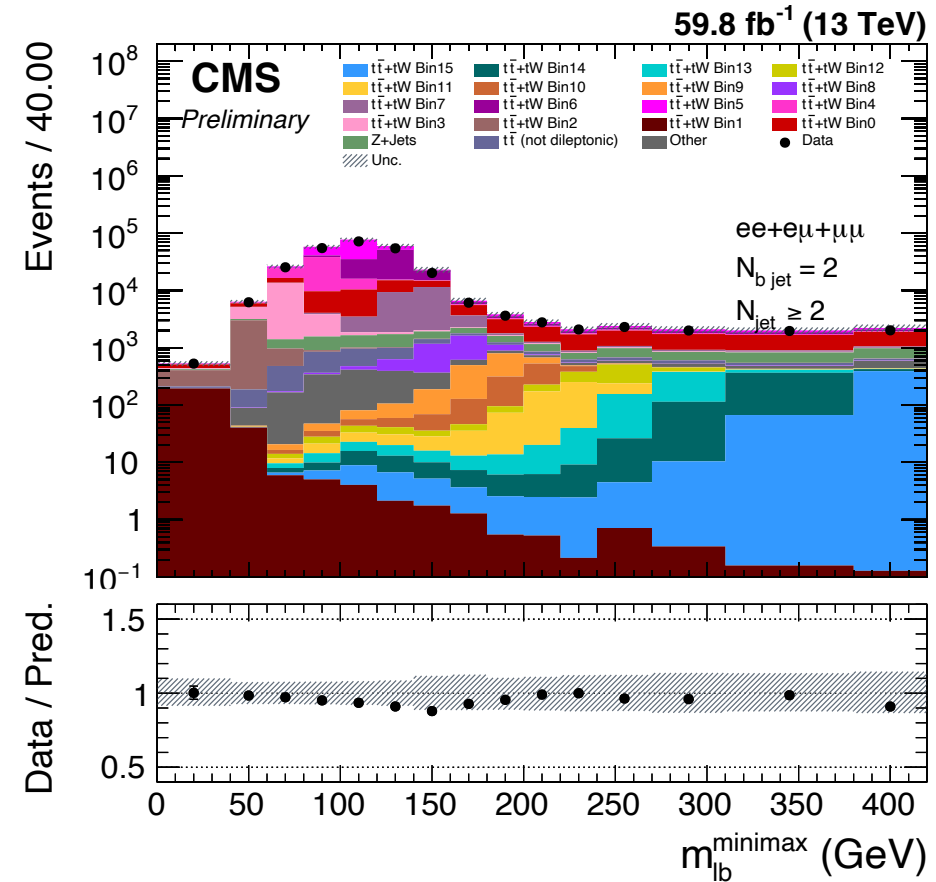
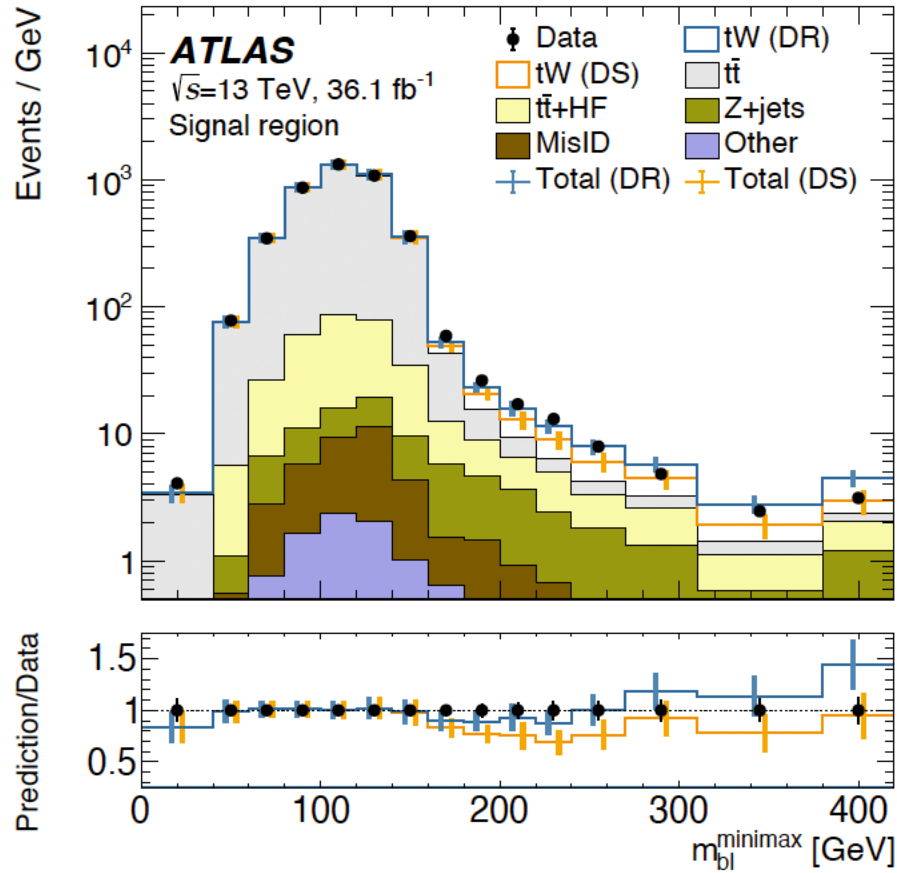


Data/MC per year

- Data/MC with bb4l cross section = tt+tW = 96.447 pb (ee+emu+mumu)
 - 2016APV: 0.81
 - 2016: 0.90
 - 2017: 0.98
 - 2018: 0.91
 - Run2: 0.91
- Data/MC with bb4l cross section ~ tt ~ 88.96 pb (ee+emu+mumu)
 - No response from Tomas yet
 - 2016APV: 0.88
 - 2016: 0.98
 - 2017: 1.06
 - 2018: 0.99
 - Run2: 0.99

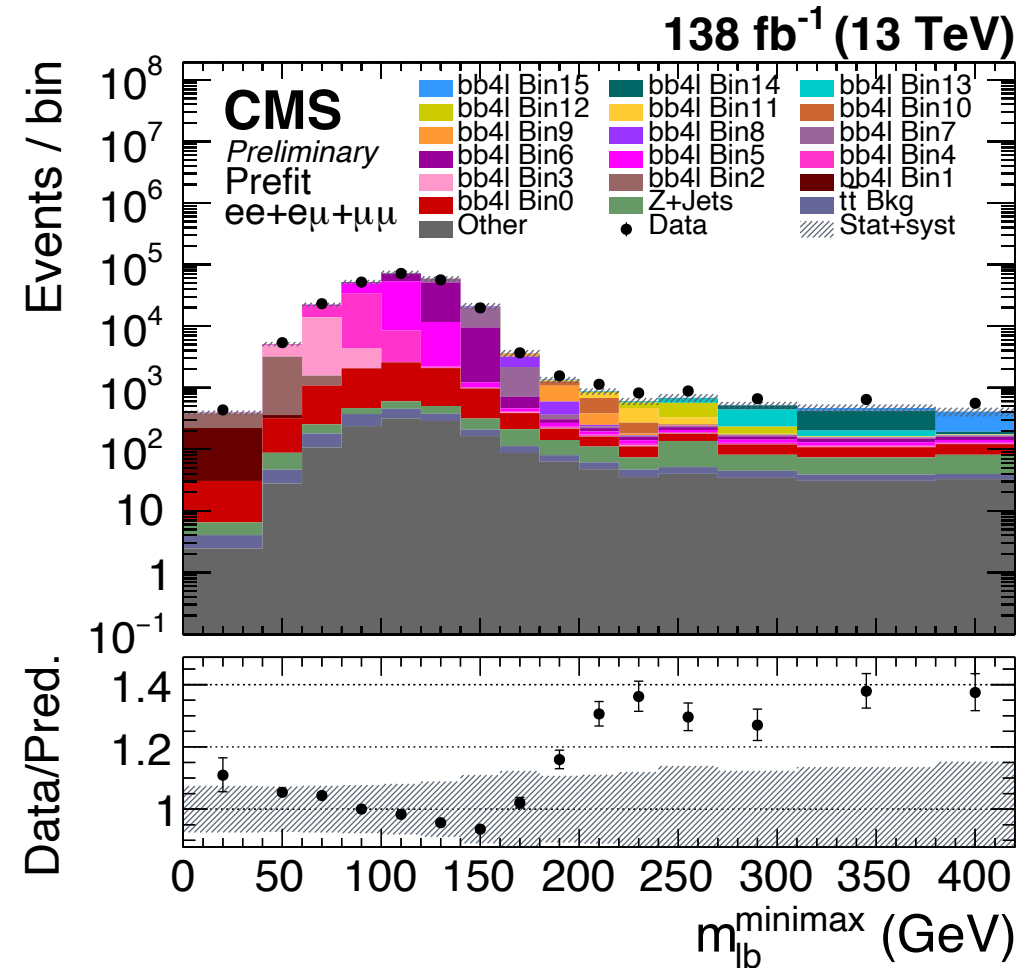
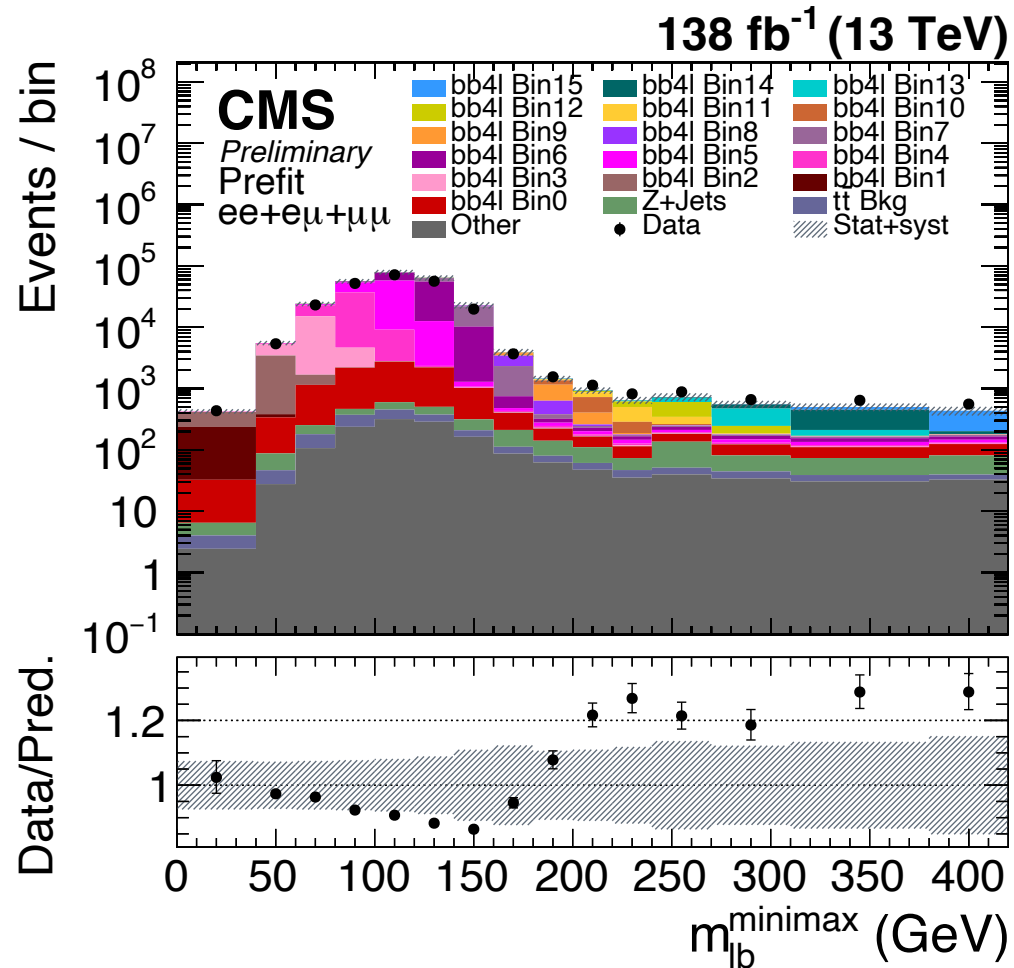
From ATLAS 36.1 fb⁻¹ and CMS tt+tW

- ATLAS: 10–30% excess in prefit with DR
- CMS: Agree well with DR sample. Caution: Loose btag



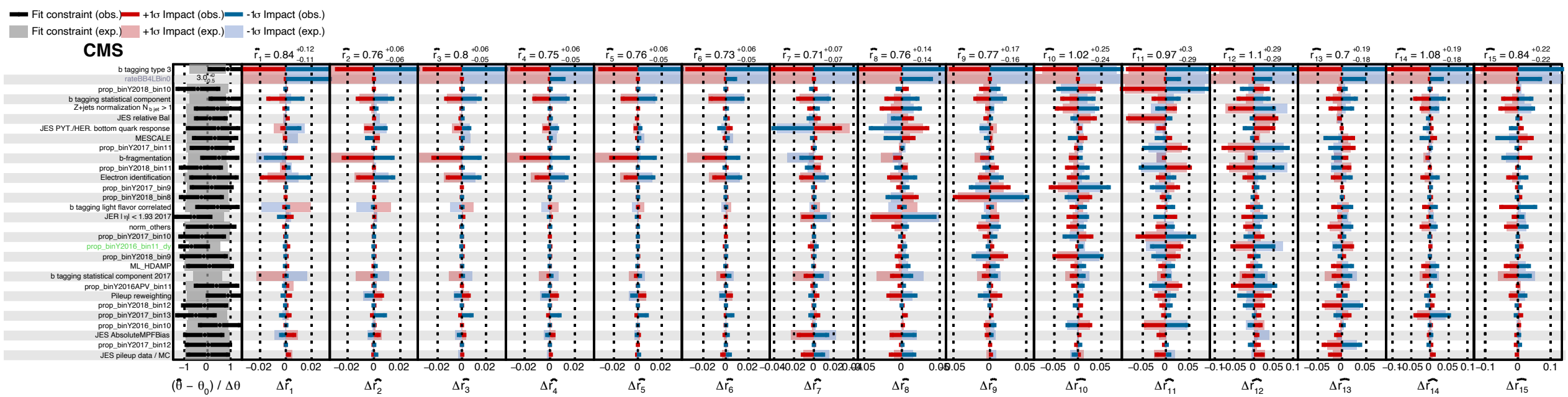
Prefit distributions

- Left: 96.447 pb / right: 88.96 pb



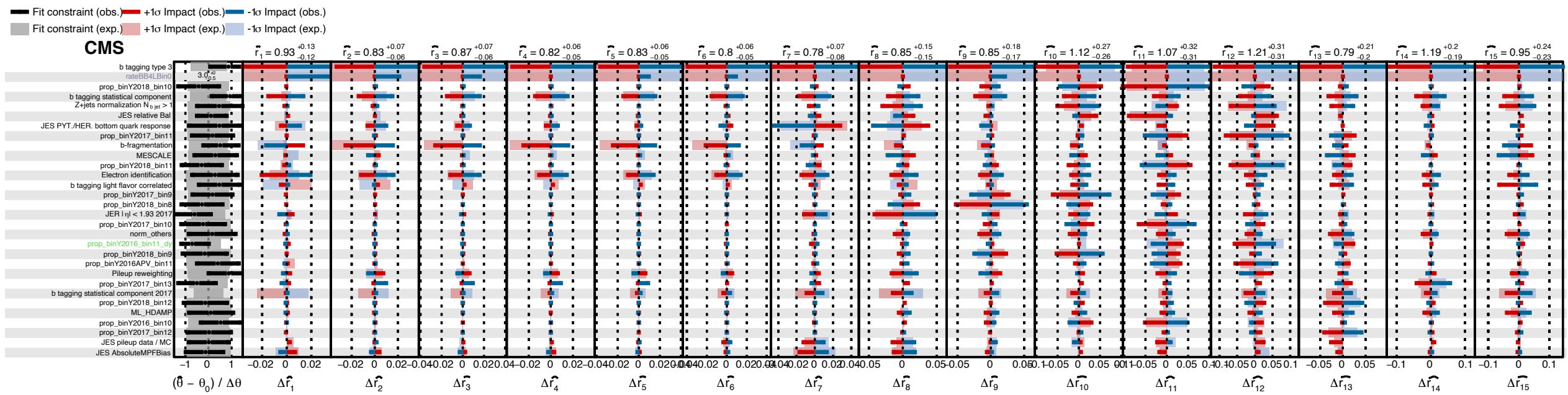
Impacts (1)

- 96.447 pb
 - Somehow signals are scaled down, and Bin0 (out-of-acceptance) bb4l scaled up by * 3
 - Large pulls from some of uncertainties



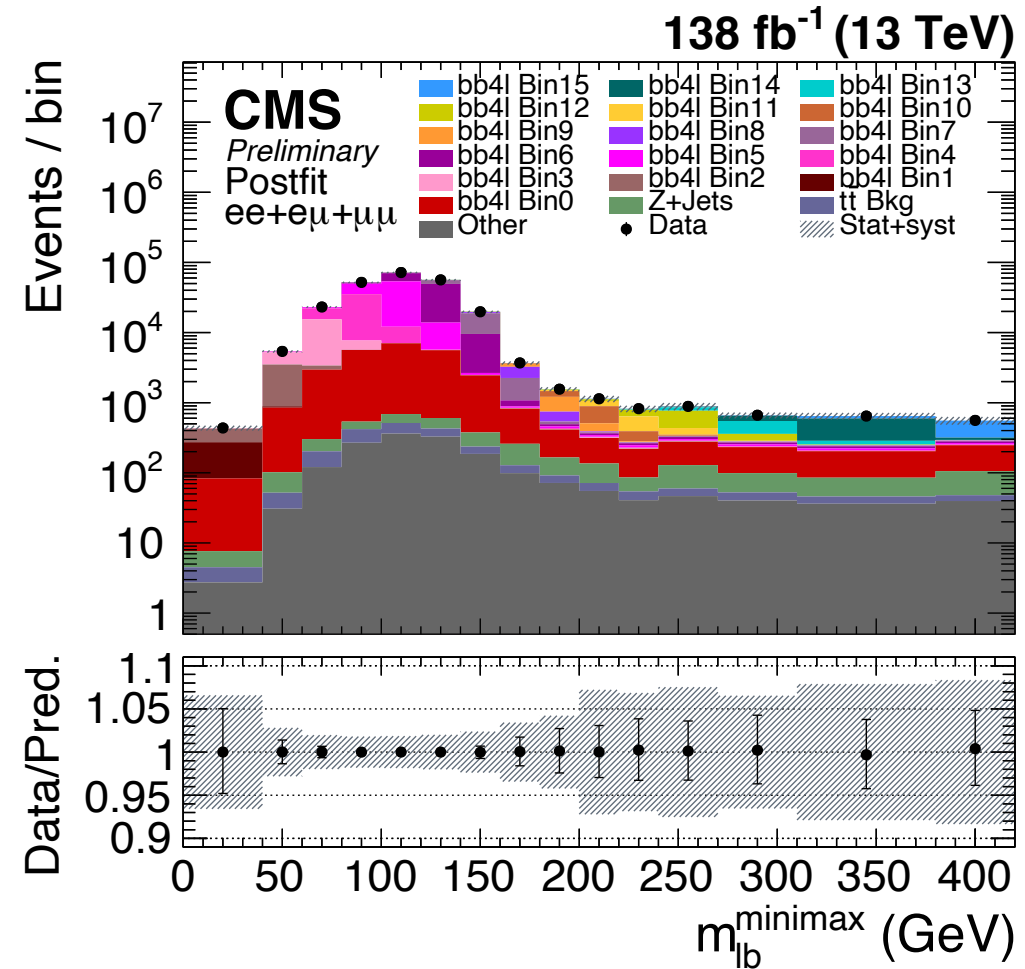
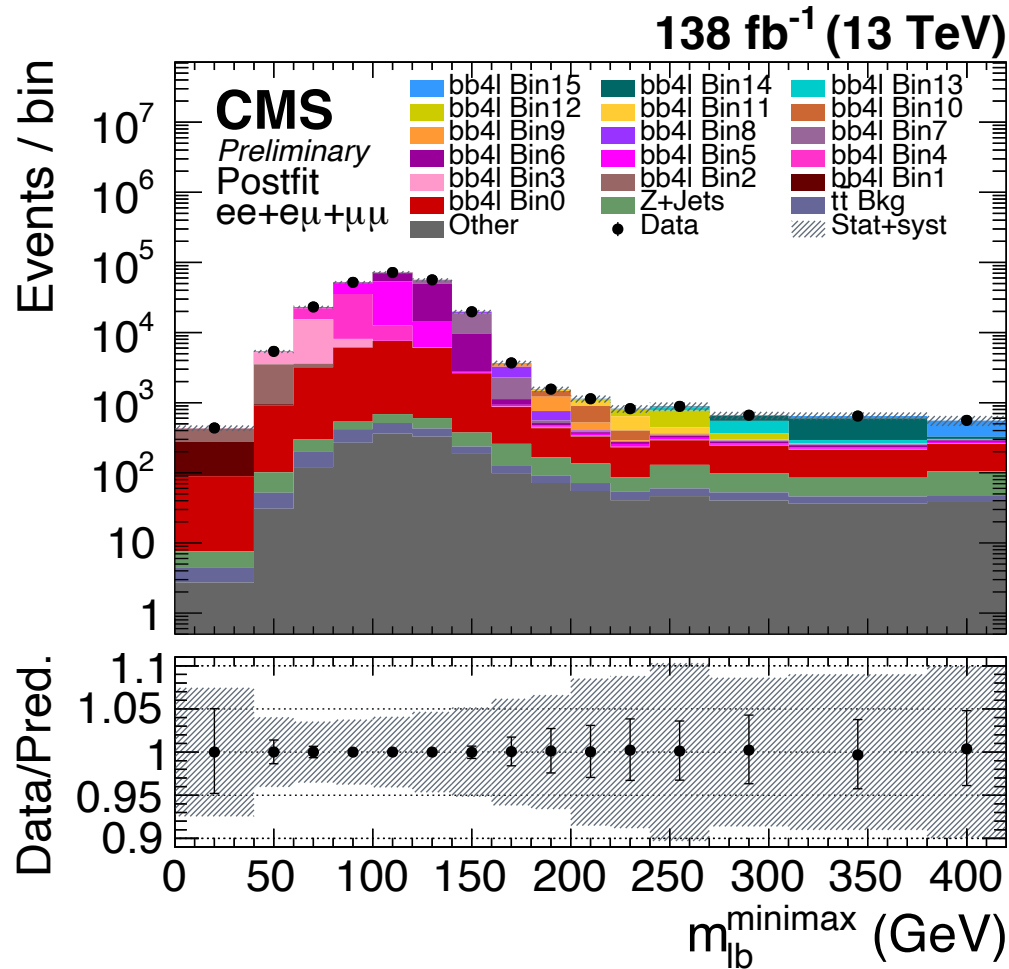
Impacts (2)

- 88.96 pb
 - Still scaled down, but tension is relaxed



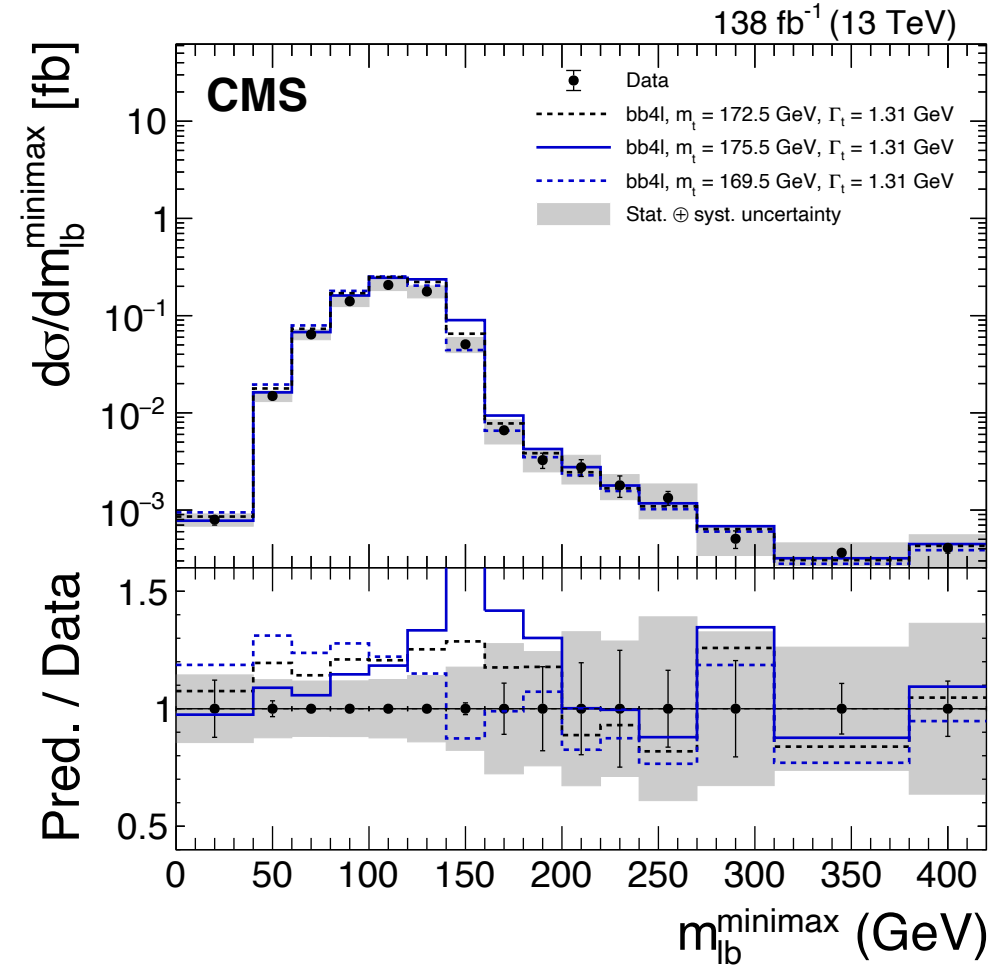
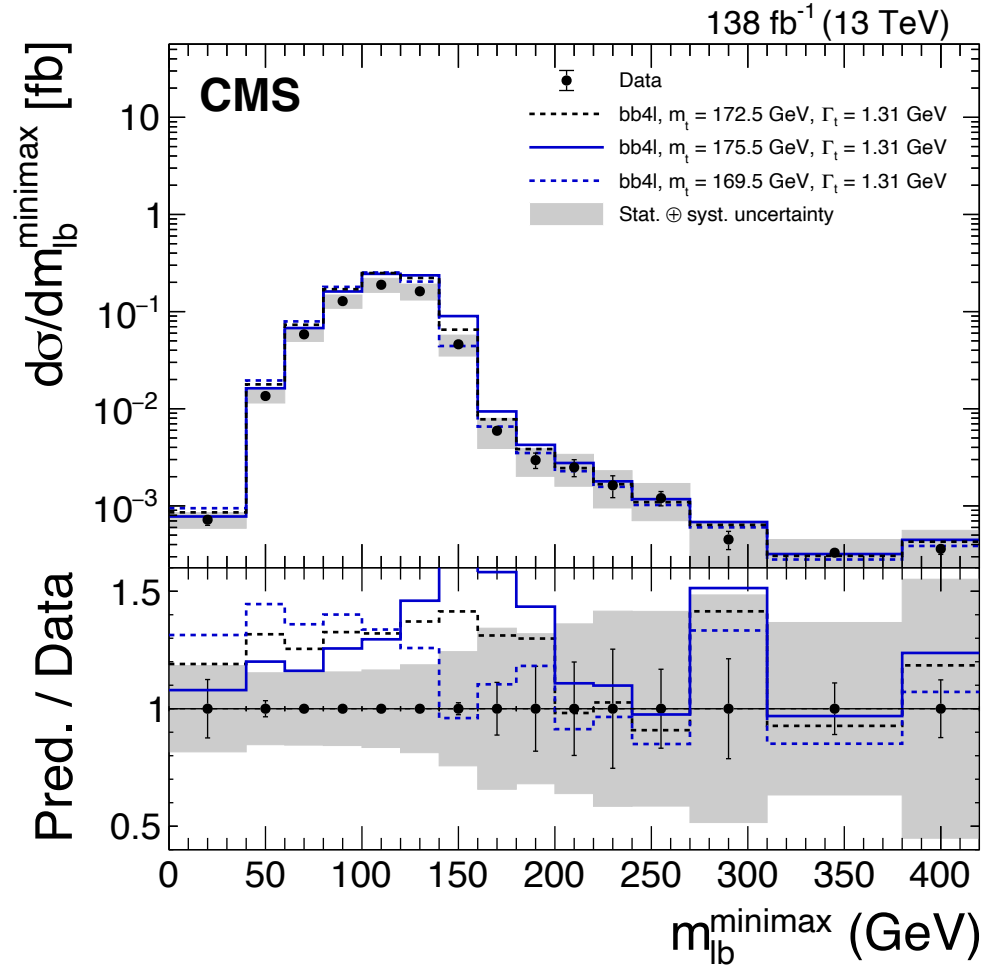
Postfit distributions

- Left: 96.447 pb / right: 88.96 pb
 - Data/MC agreement affects postfit uncertainty - If they agree well, unc. can be constrained further



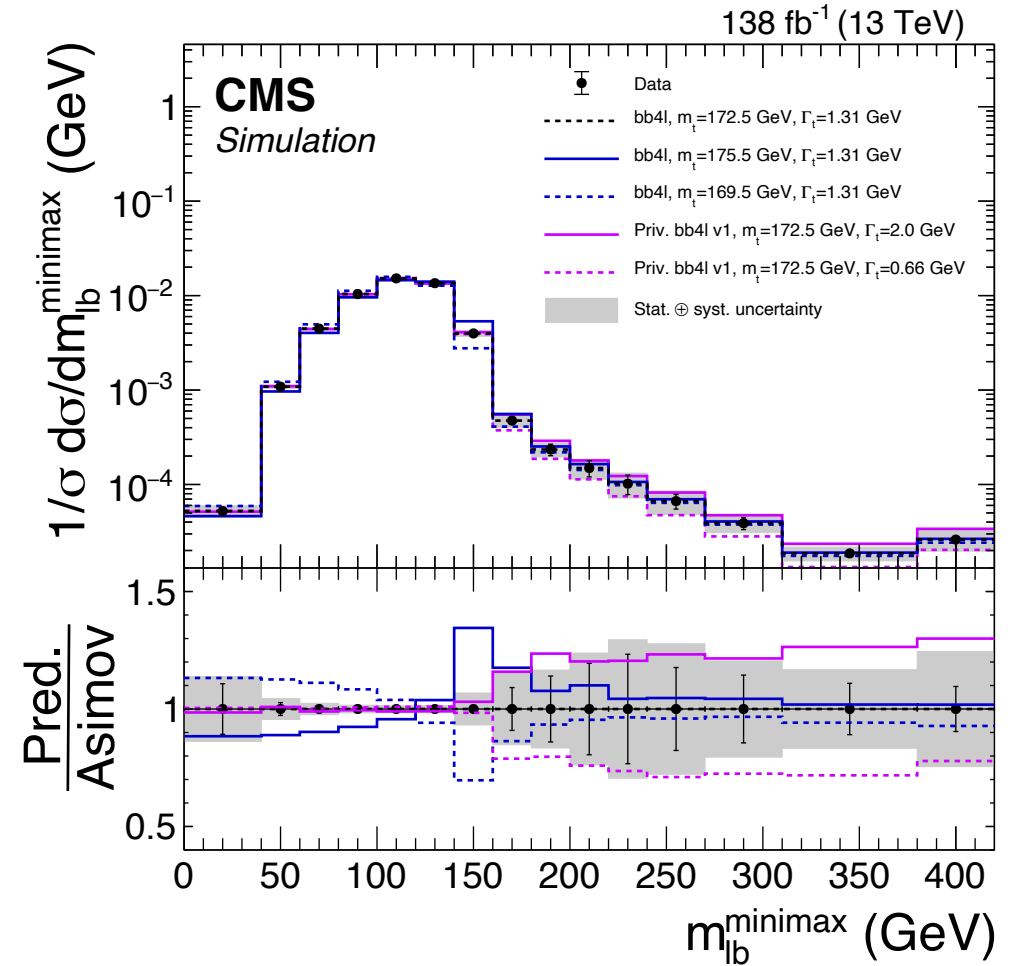
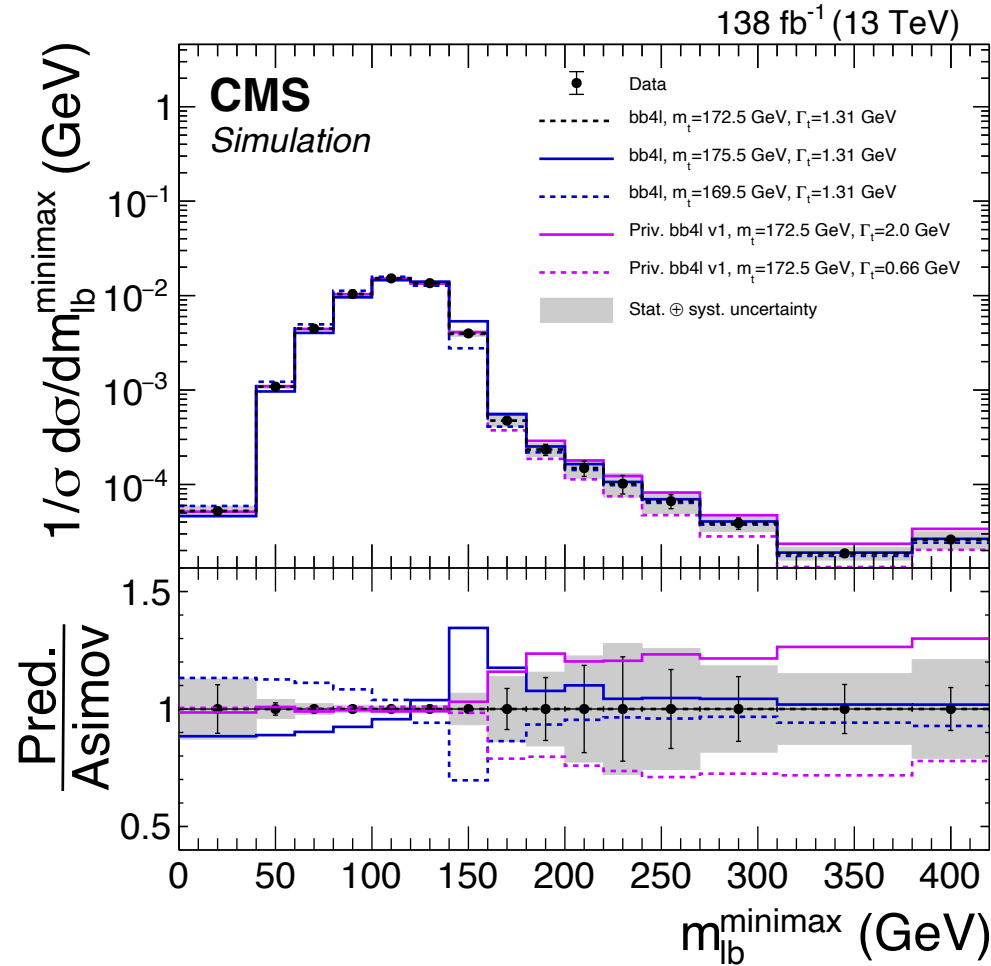
Differential cross section

- Left: 96.447 pb / right: 88.96 pb



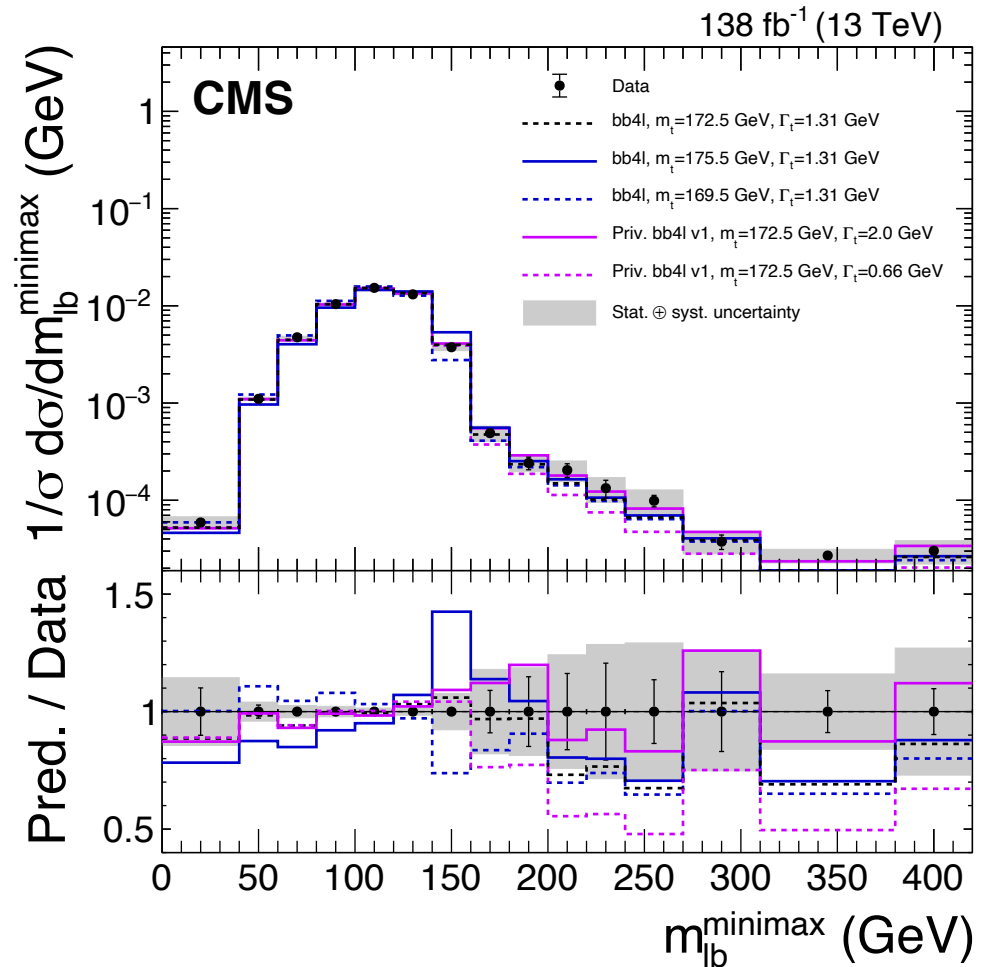
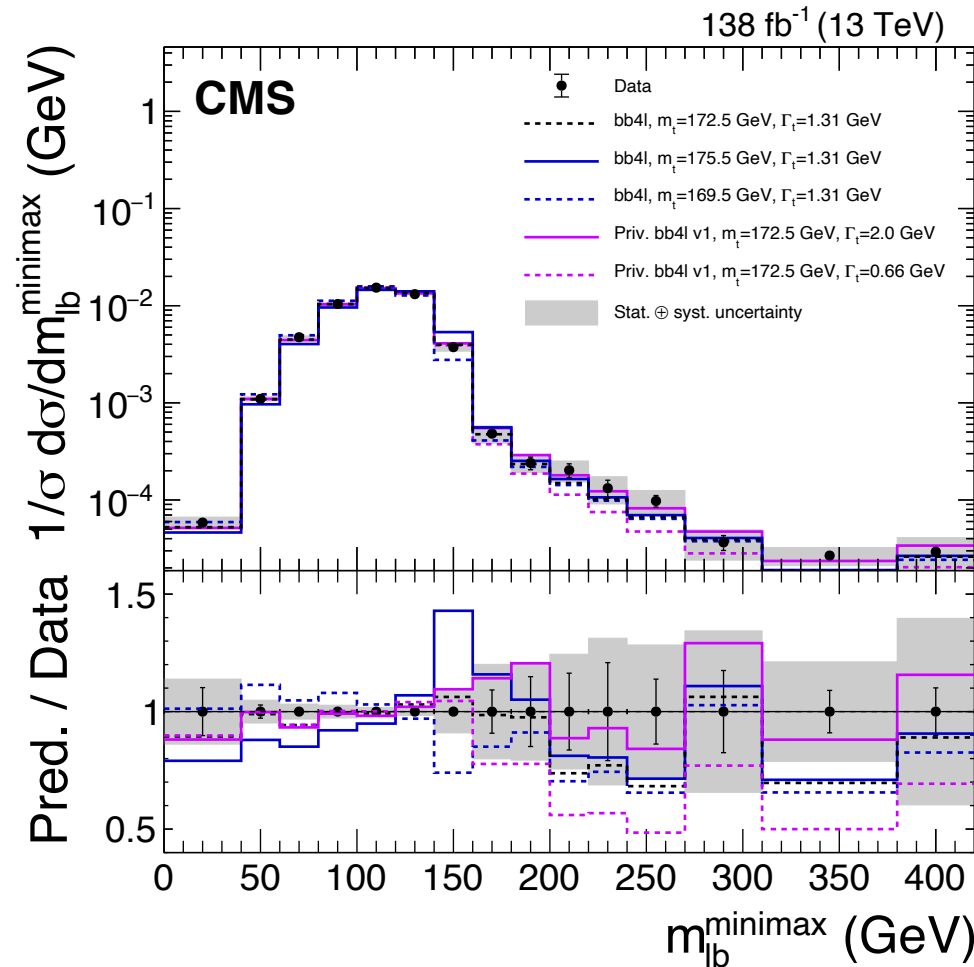
Normalized differential cross section (blinded)

- Left: 96.447 pb / right: 88.96 pb



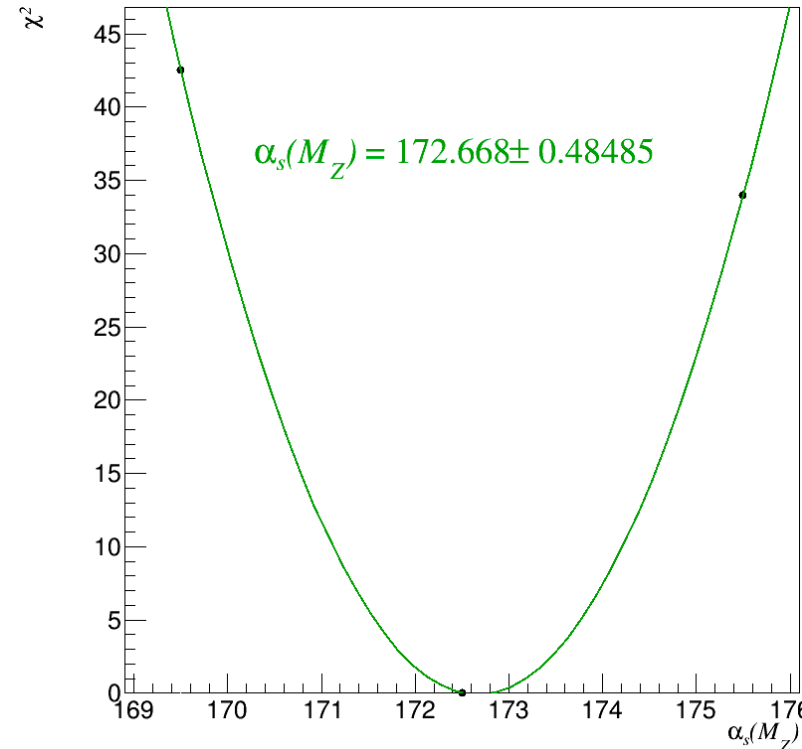
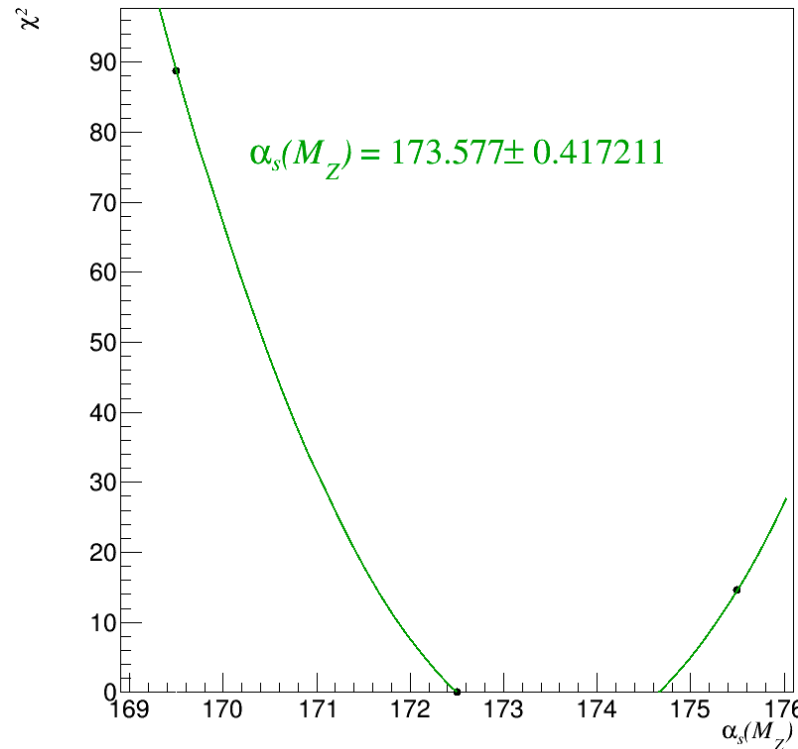
Normalized differential cross section

- Left: 96.447 pb / right: 88.96 pb
 - Looks fine for normalized distribution (by construction)
 - Fluctuation in tail did not disappear



Mass extraction

- xFitter setting (for later use)
 - Total postfit uncertainty as 'stat const'
 - Their correlation matrix (for normalized distribution) as 'Statistical correlations'
 - Normalized cross section can go down to 10^{-5} , where numerical precision becomes important
- Left: using full distribution / Right: only near the peak
 - Partial fitting was not working in the beginning, but it seems to be ok



Ongoing works & miscellaneous

- bb4l powheg gridpack is ongoing (will have tarball in coming days)
 - step-by-step, will take minimum 1-2 days if everything is settled
- Data/MC: Oviedo didn't see huge difference by years
 - Now running all years from my side, by moving intermediate files to pnfs
 - Need to check if there is any problem with 2016APV (possibly cross check with bb4l v1)
- Combine and postfit are working fine - workflow is finalized
 - Run2 fit + impact takes 1.5 hrs
- Valentina is working on the implementation of theory uncertainties of bb4l in xFitter
- TOP-22-011 CWR
 - Contact person promised to fill out CWR answers, but less than 1/3 has been processed in two months since CWR-ended (excluding language comments)
 - Wanted to go for FR by end of this year but it doesn't seem possible
 - Will go back to it once bb4l issue is identified