

# HEP NTUA Weekly Report

13/10/2021

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# Summary

- ttX analysis:
  - Combination of all years in Fiducial level
  - Unfolding
    - Show systematic variations after unfolding for Parton and Particle levels
    - Unfold using the bulk sum of response matrices from all years
  - Combination of each variation in fiducial
    - Unfolding for each combined variation → combination of acceptance/efficiency and responses
  - Planning a ttX round table presentation
  - We have been writing the AN
- We are trying to create a pipeline for the analysis
  1. D
- Z' analysis
  - Writing documentation for PhD thesis

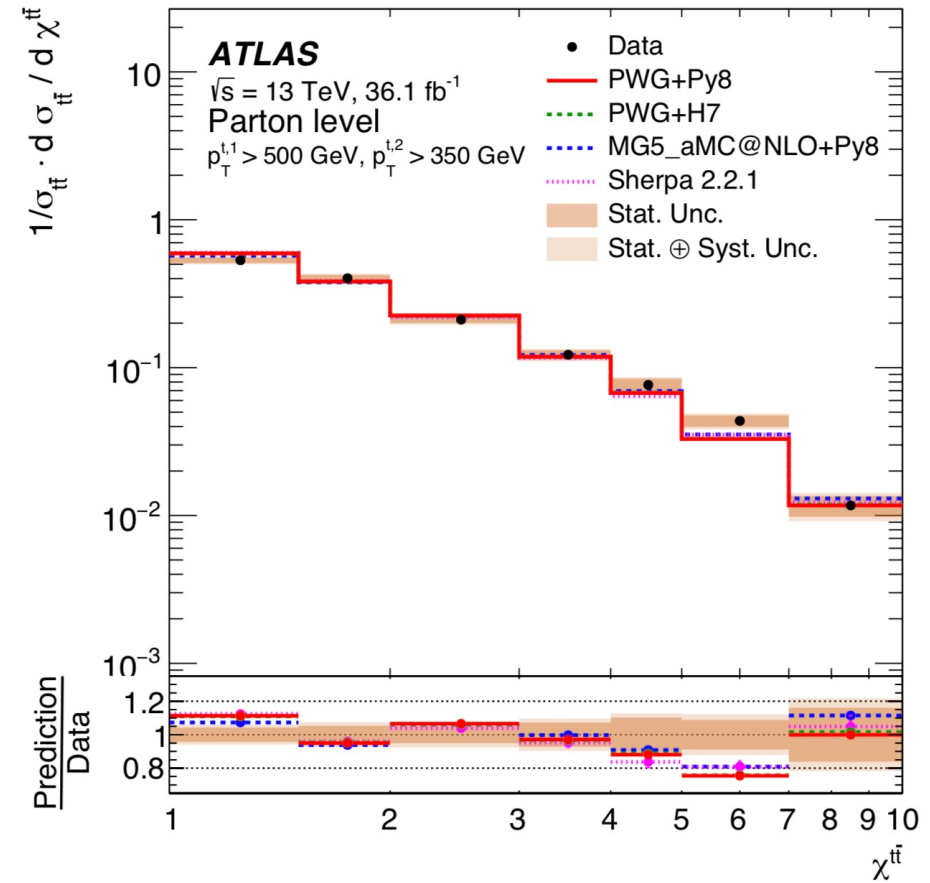
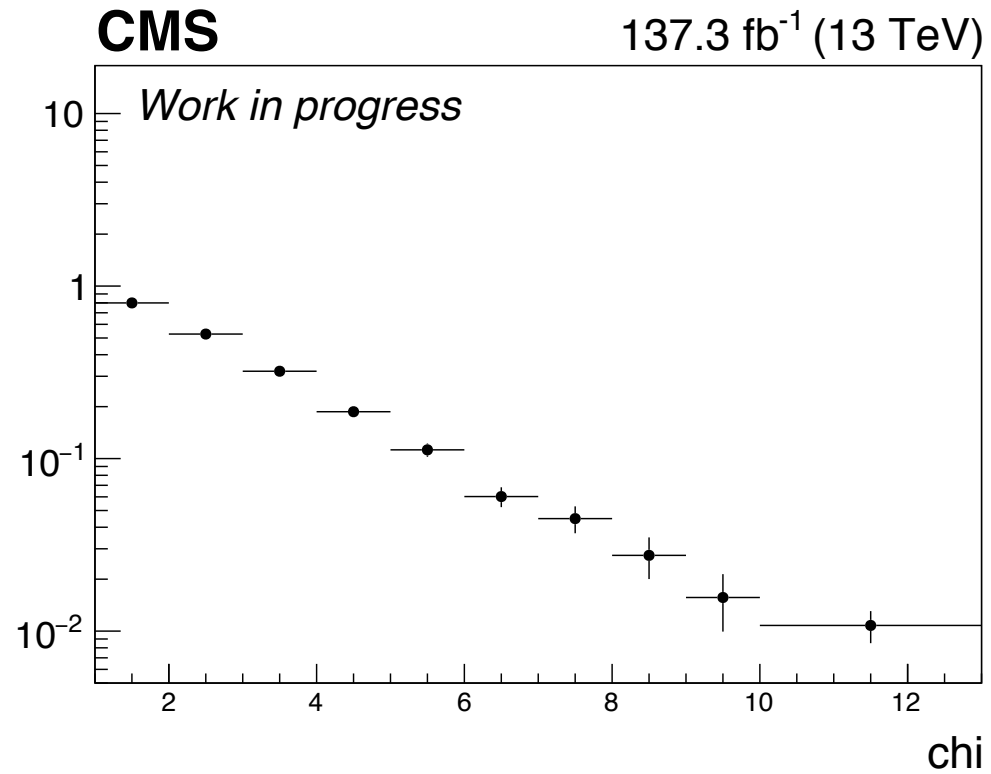


# Summary

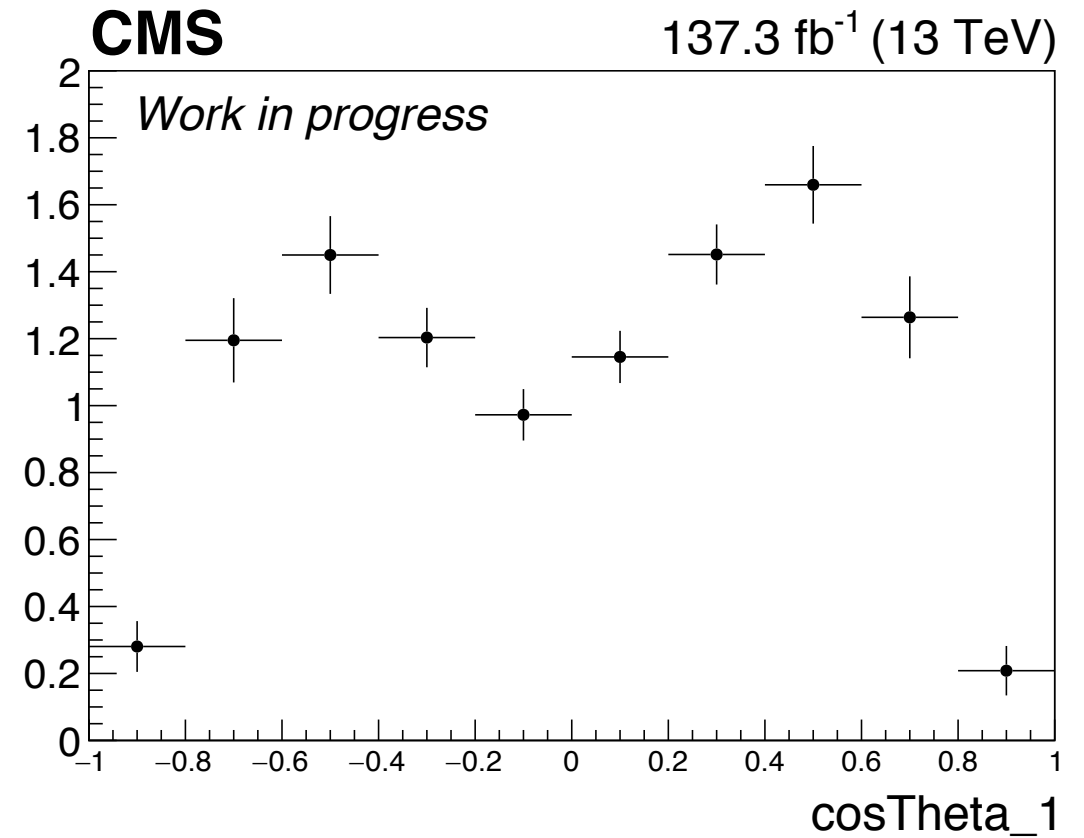
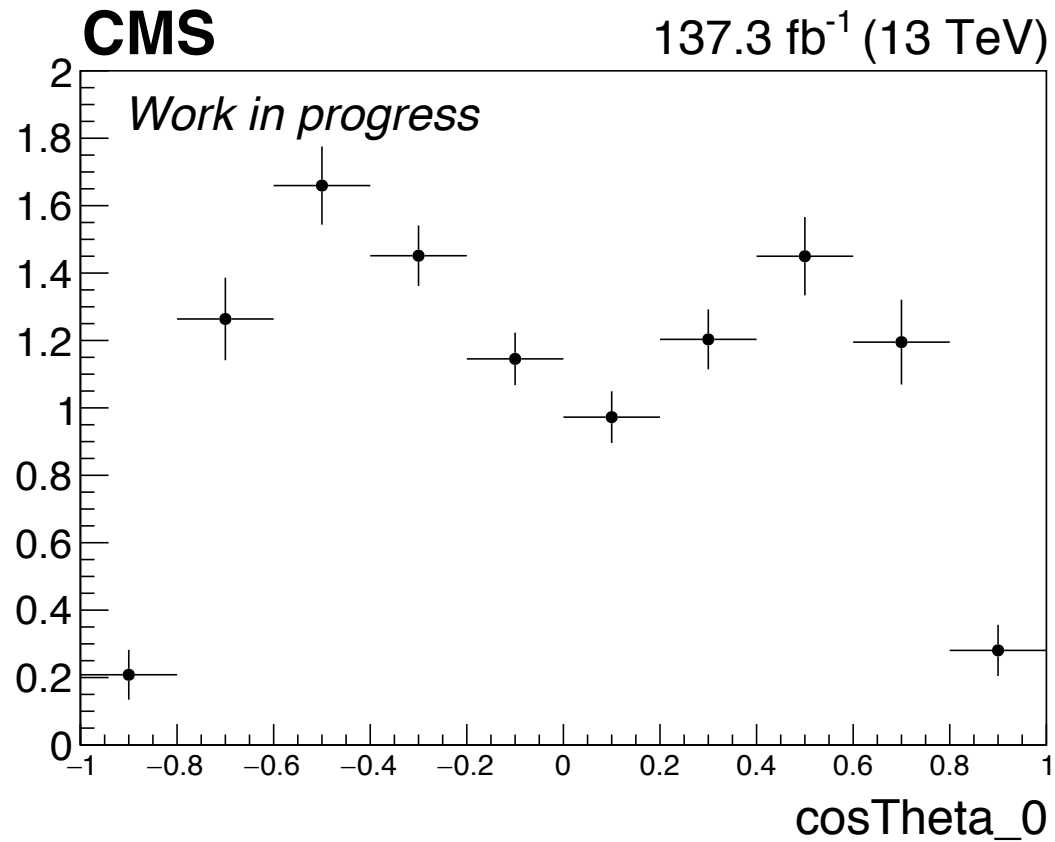
- ttX analysis Pipeline Creation
  1. We want to be able to handle all Nominal files and their variations in an automated way
  2. This requires deciding consistent naming conventions and a efficient planning
  3. Handling of:
    1. Nominal
    2. Parton Shower Weights
    3. PDF Variations
    4. JES
    5. Scale Variations
    6. bTagVariations
    7. Top quark mass variations
  4. Per year For all these we need to
    1. Create template files that have 2btag and 0btag in Extended and Reduced jetMassSoftDrop phase space
    2. 9 variables ( $m_{JJ}$ ,  $p_{TJJ}$ ,  $y_{JJ}$ ,  $jetPt[0,1]$ ,  $jetY[0,1]$ ,  $chi$ ,  $|\cos\Theta^*|$  [0,1])
    3. Template fit files (bkg qcd, bkg subdominant) and signal templates for all variations
    4. Fit on extended signal region for all variations
    5. Response matrices, Acceptance, Efficiency
    6. Signal Extraction
  5. Combine all Fiducial Level results (4 years) into 1 Extracted Signal for all variations
  6. Unfold the combined result into **Parton & Particle** levels
  7. Show systematic variations compared to the Nominal file
  8. The same procedure must be done using different nominal files
    1. Fill in 2btag histograms in our signal region in the parton
    2. For each variation and each year
    3. Combine all years together
    4. Calculate systematics for samples other than the nominal



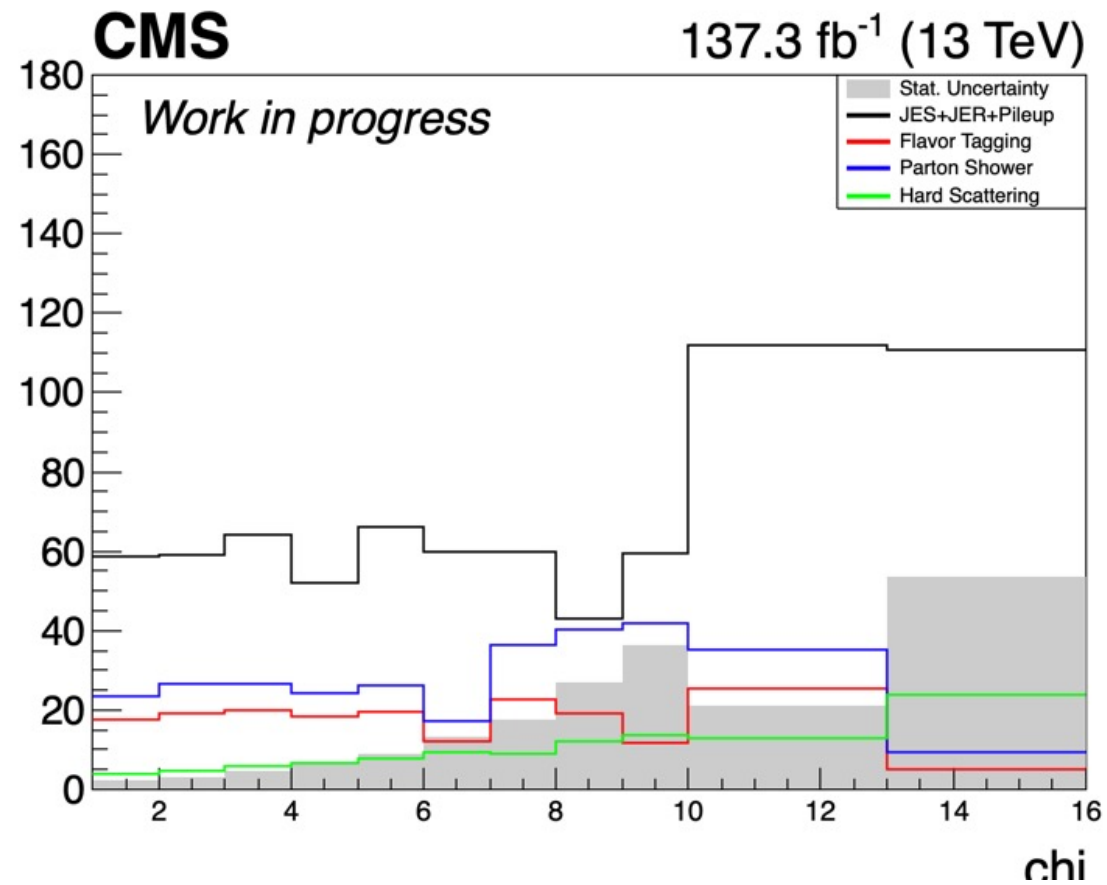
# Normalized Cross Section in Parton Level (Work In Progress)



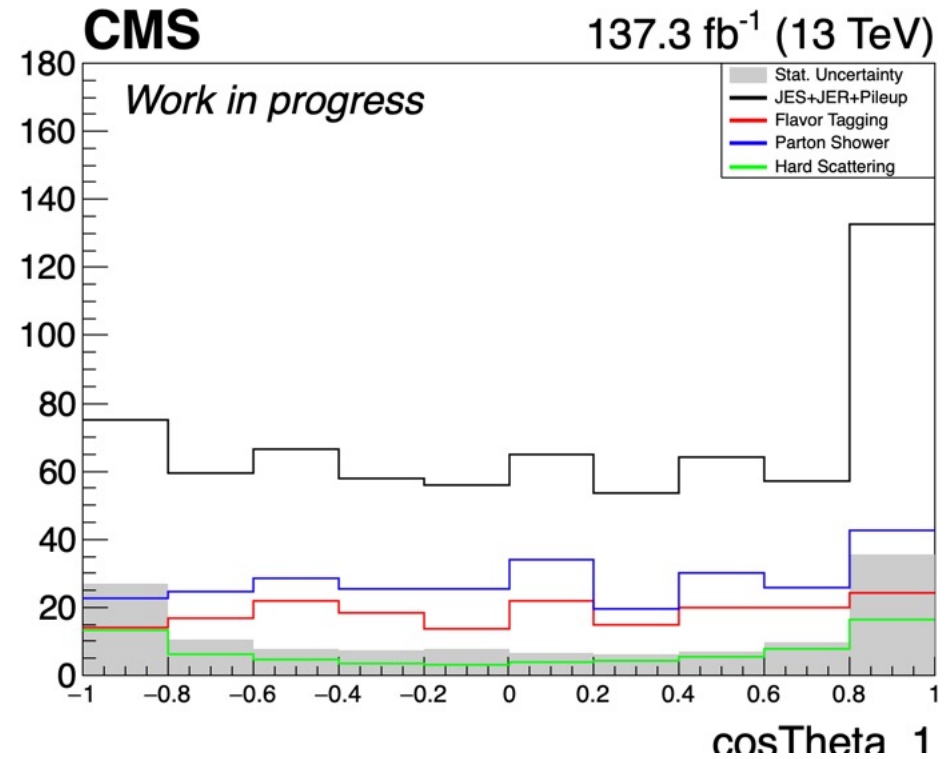
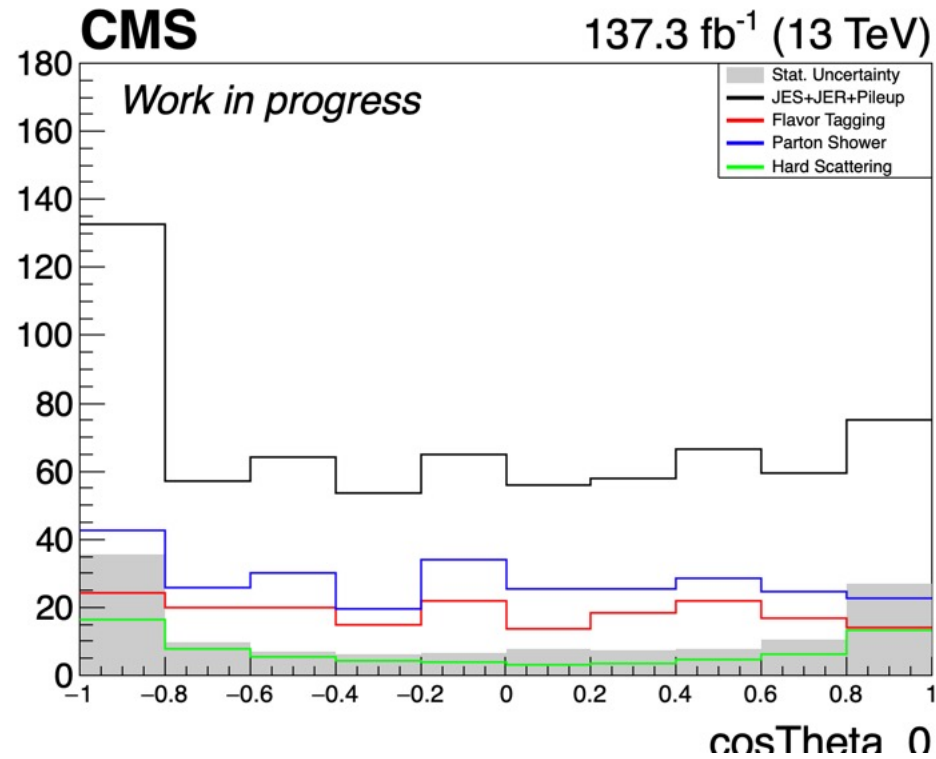
# Normalized Cross Section in Parton Level (Work In Progress)



# Systematics in Parton Level (Work In Progress)



# Systematics in Parton Level (Work In Progress)



BACKUP



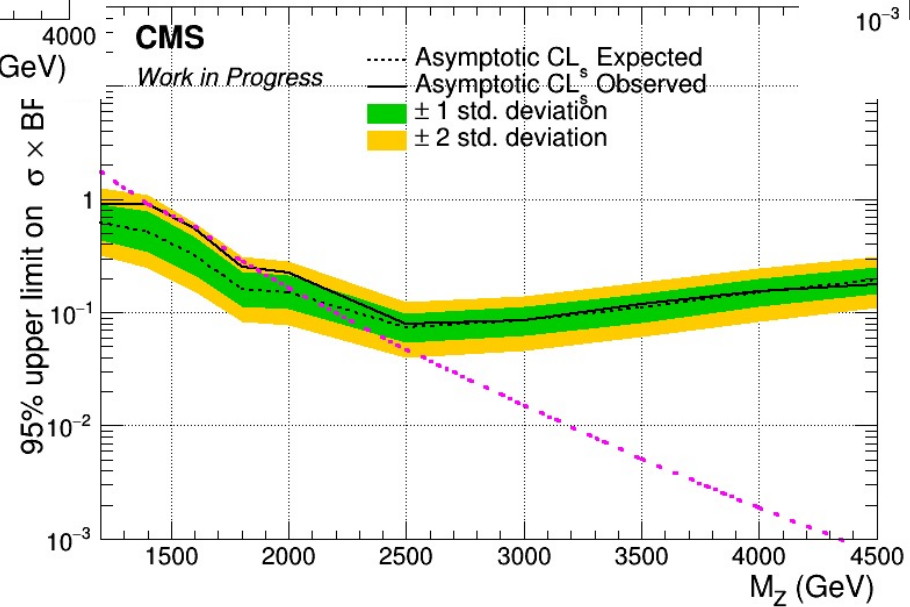
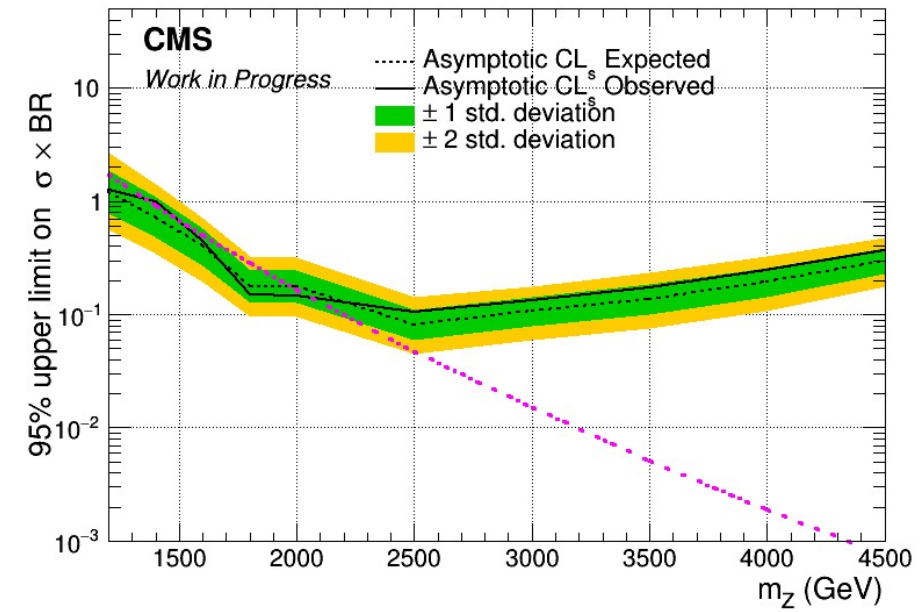
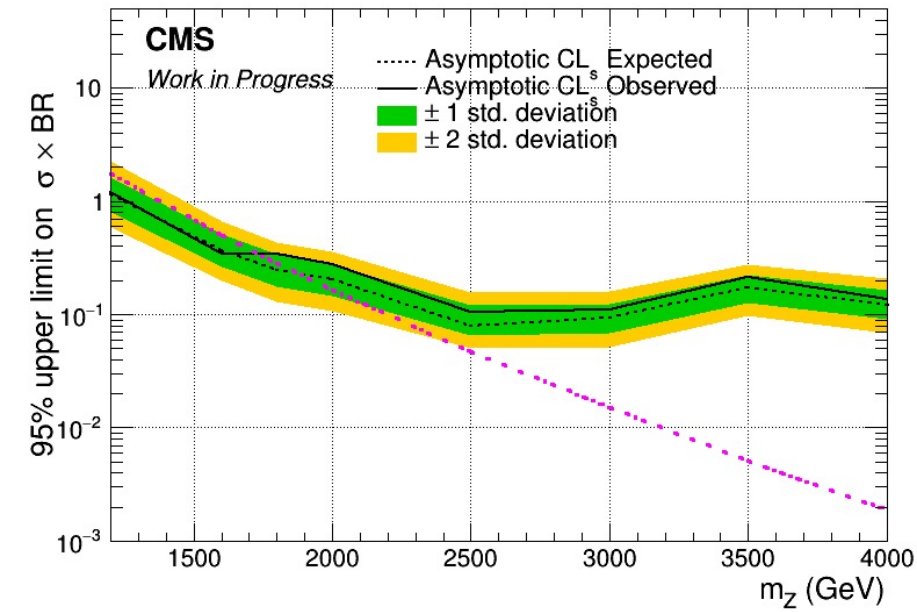


# Brazilian Plots (2016\_preVFP, 2017 and 2018) with sliding mJJ Cut

2016\_preVFP

2017

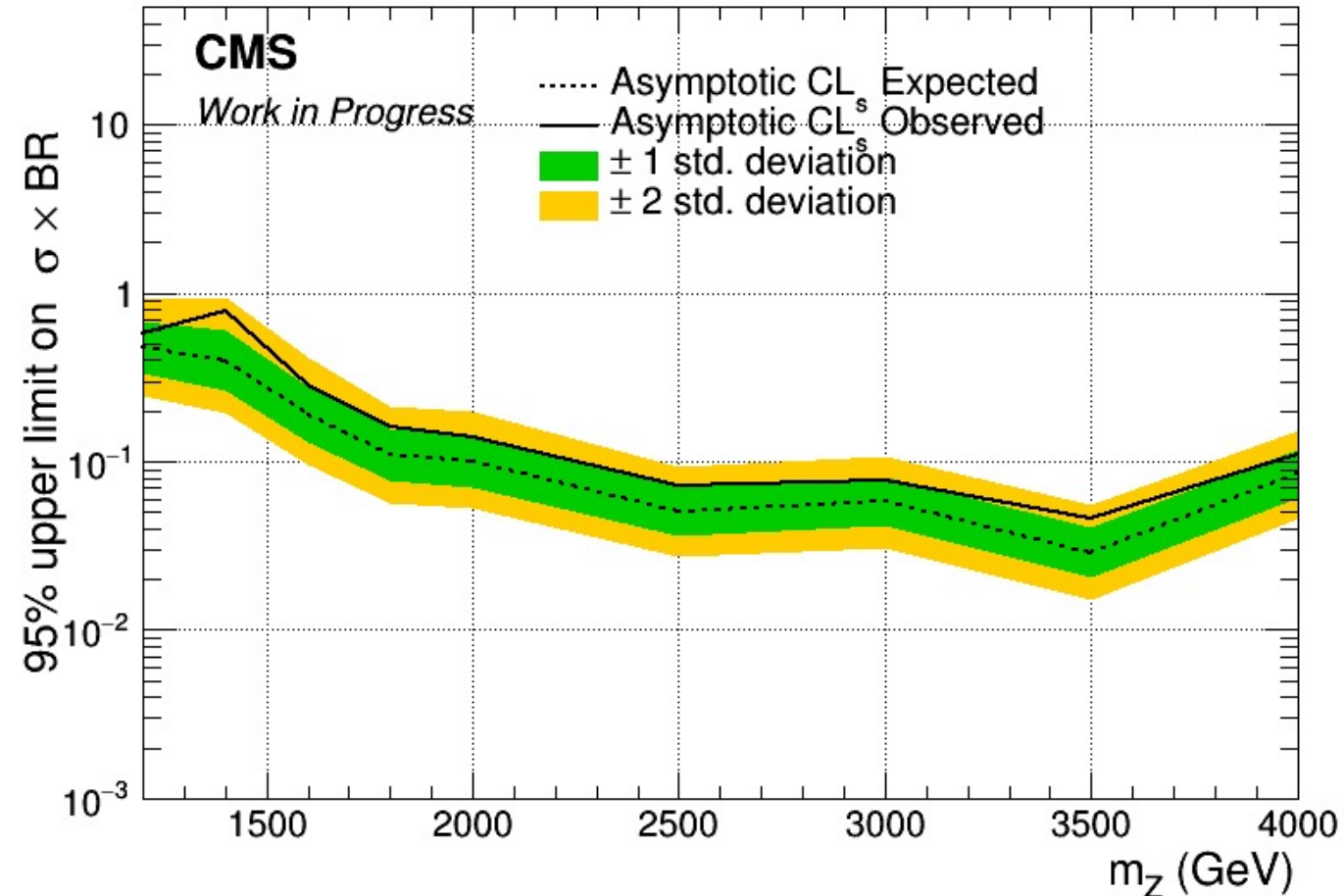
2018



# Combined Datacard for 2016\_preVFP, 2017 and 2018

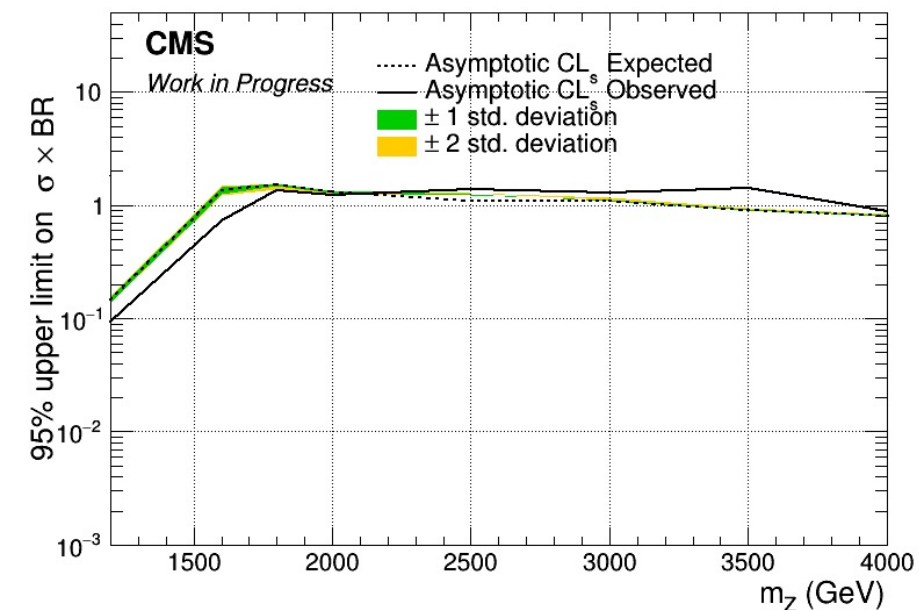
## Mass Cut Mapping

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"mZ\_2500\_25":2000, "mZ\_3000\_30":2000, "mZ\_3500\_35":2000, "mZ\_4000\_40":2000, "mZ\_4500\_45":2000}

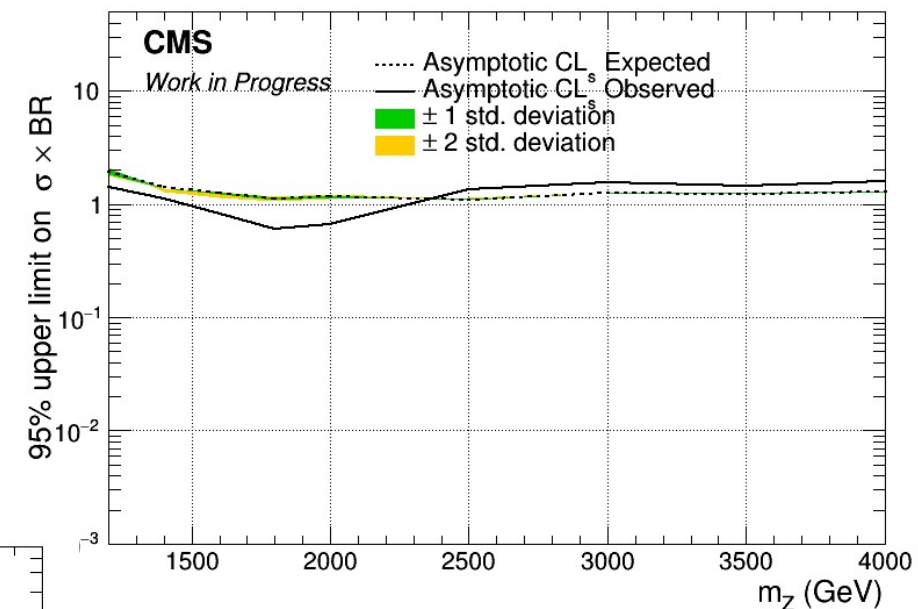


# Brazilian Plots (2016\_preVFP, 2017 and 2018) with sliding mJJ Cut wrt 2018

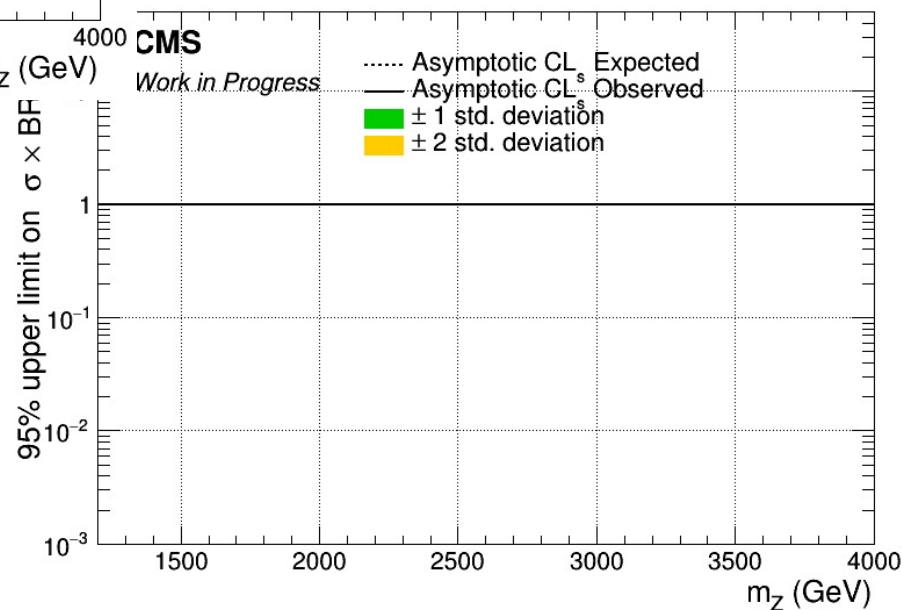
2016\_preVFP



2017



2018



# Combined Datacard for 2016\_preVFP, 2017 and 2018 wrt 2018

## Mass Cut Mapping

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