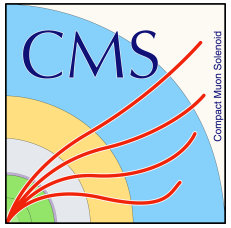
HEP NTUA
Weekly Report

12/1/2022

George Bakas



Summary

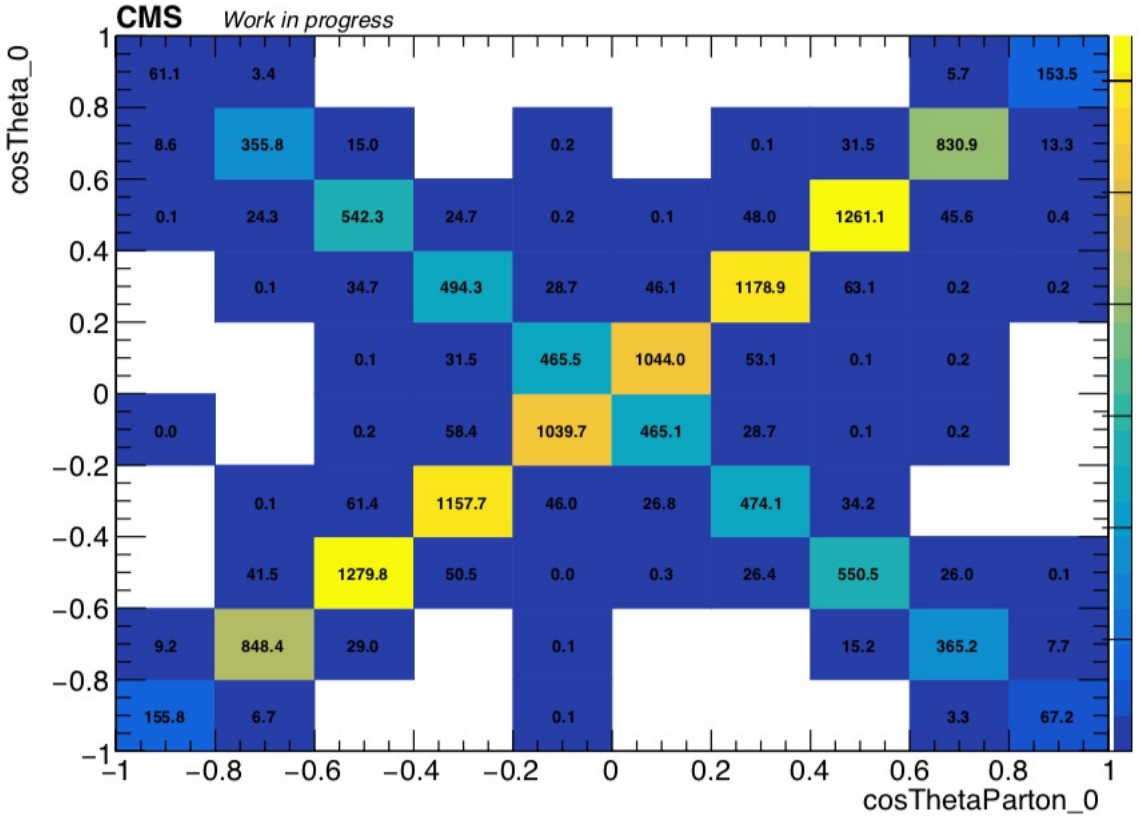
- ttX analysis:
  - We are writing the AN:
    1. Basic outline along with text
    2. Input all images that are needed for the analysis
    3. Appendices that include
       - Response matrices, efficiencies, acceptance, purity and stability per year
       - Fiducial Measurements per year
       - Systematic uncertainties breakdown per year
       - Closure tests

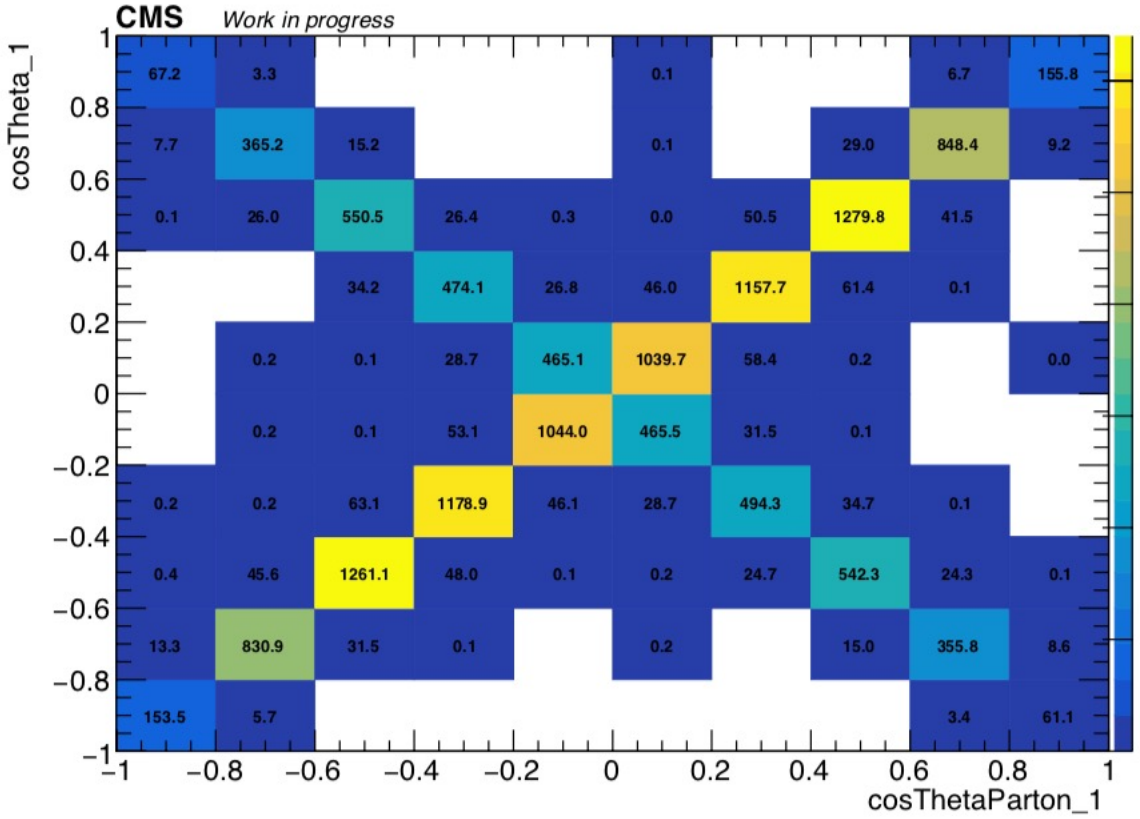
  - Problem with cosθ* (leading and subleading jet) responses matrices
    - Not diagonal because we were looking into [-1,1] region
    - Switch to |cosθ*|
    - Using binning that ATLAS also used
    - Unfolded results (Parton & Particle Phase space)
    - JES uncertainties not included while ht condor is down

  - ArdEnvino
    - We need more BME280 sensors
    - System is built only to run on these sensors
    - Hardware looks ok, we need to find dynamic way to set MAC address of the Arduino Ethernet shield

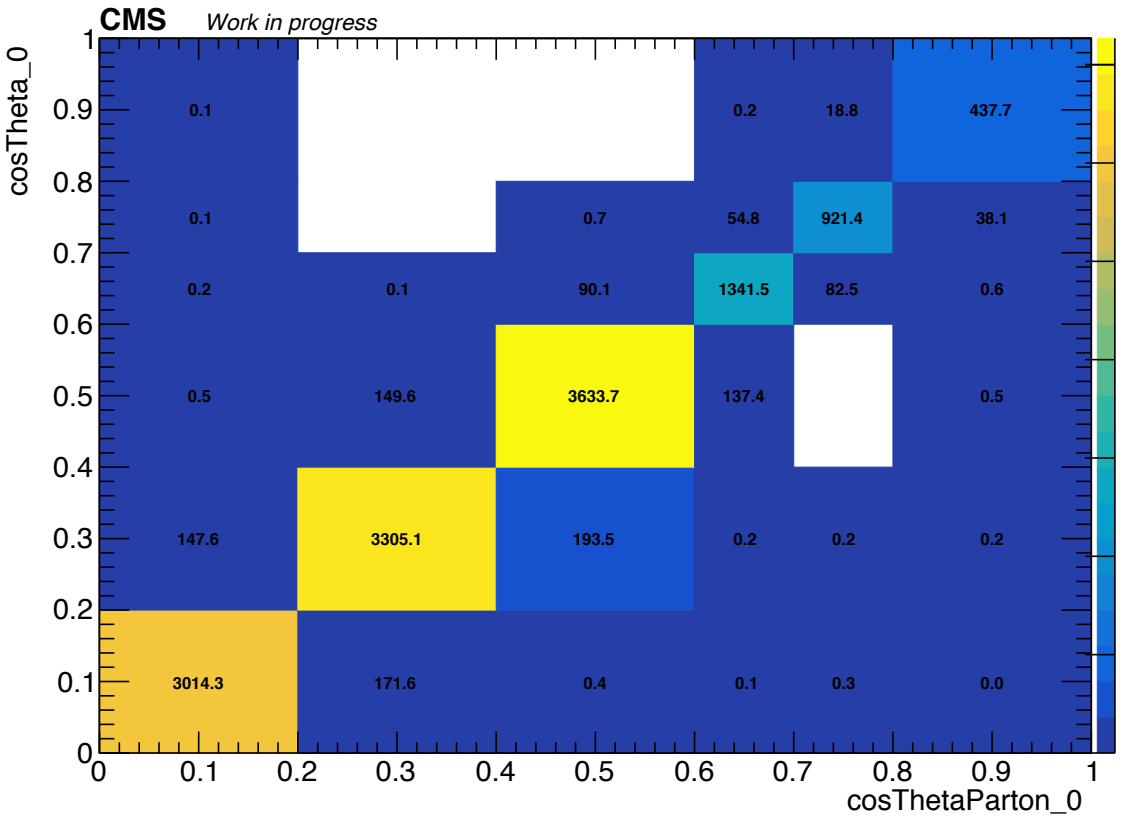
Contents

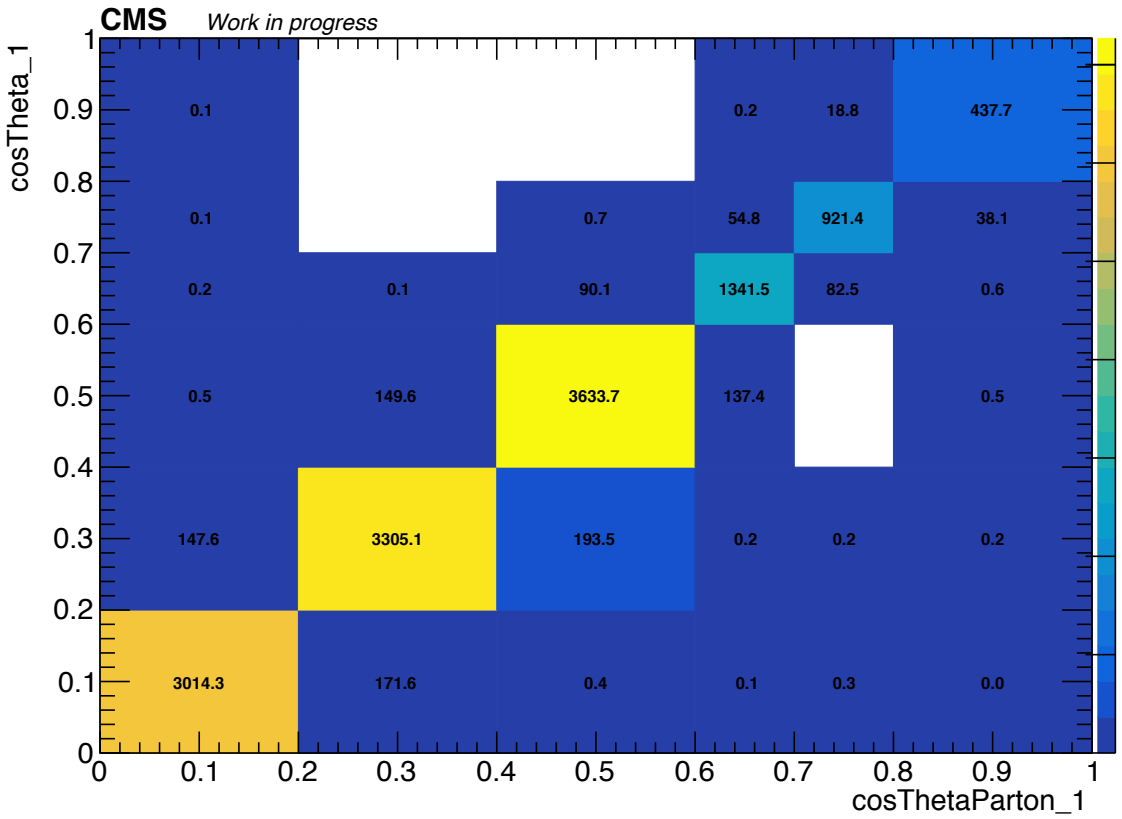
Response Matrices with old binning



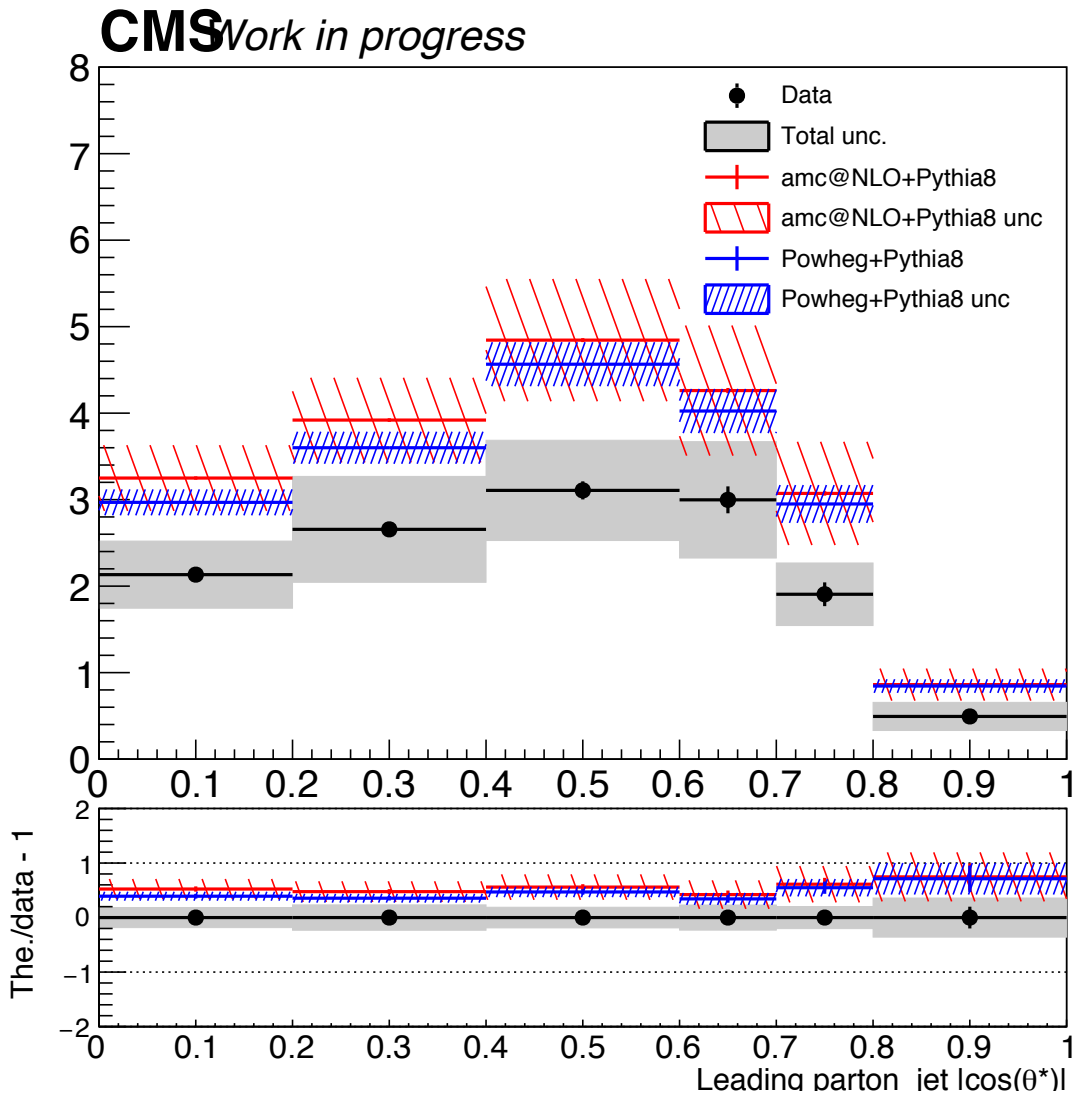


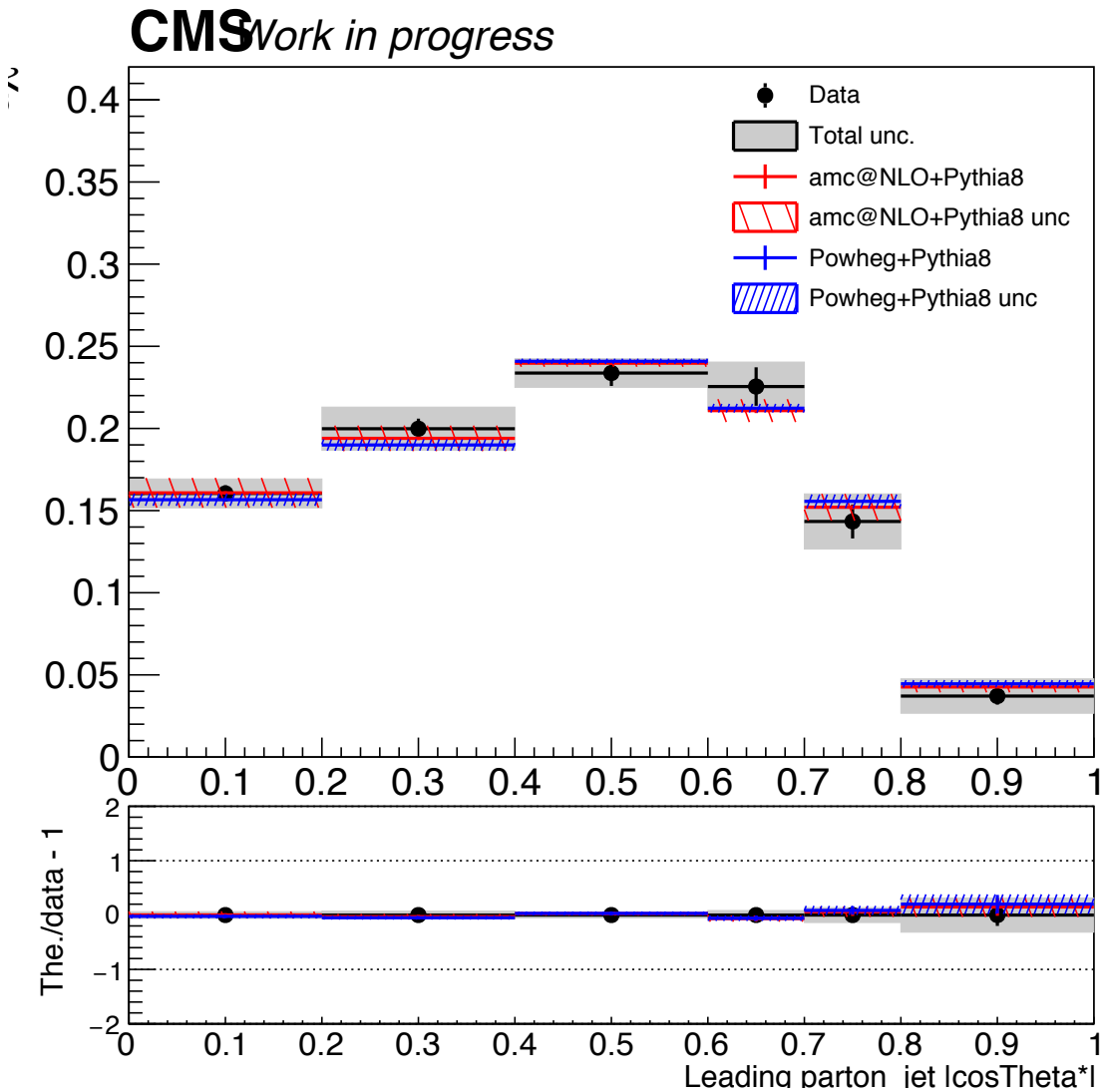
Response Matrices with new binning



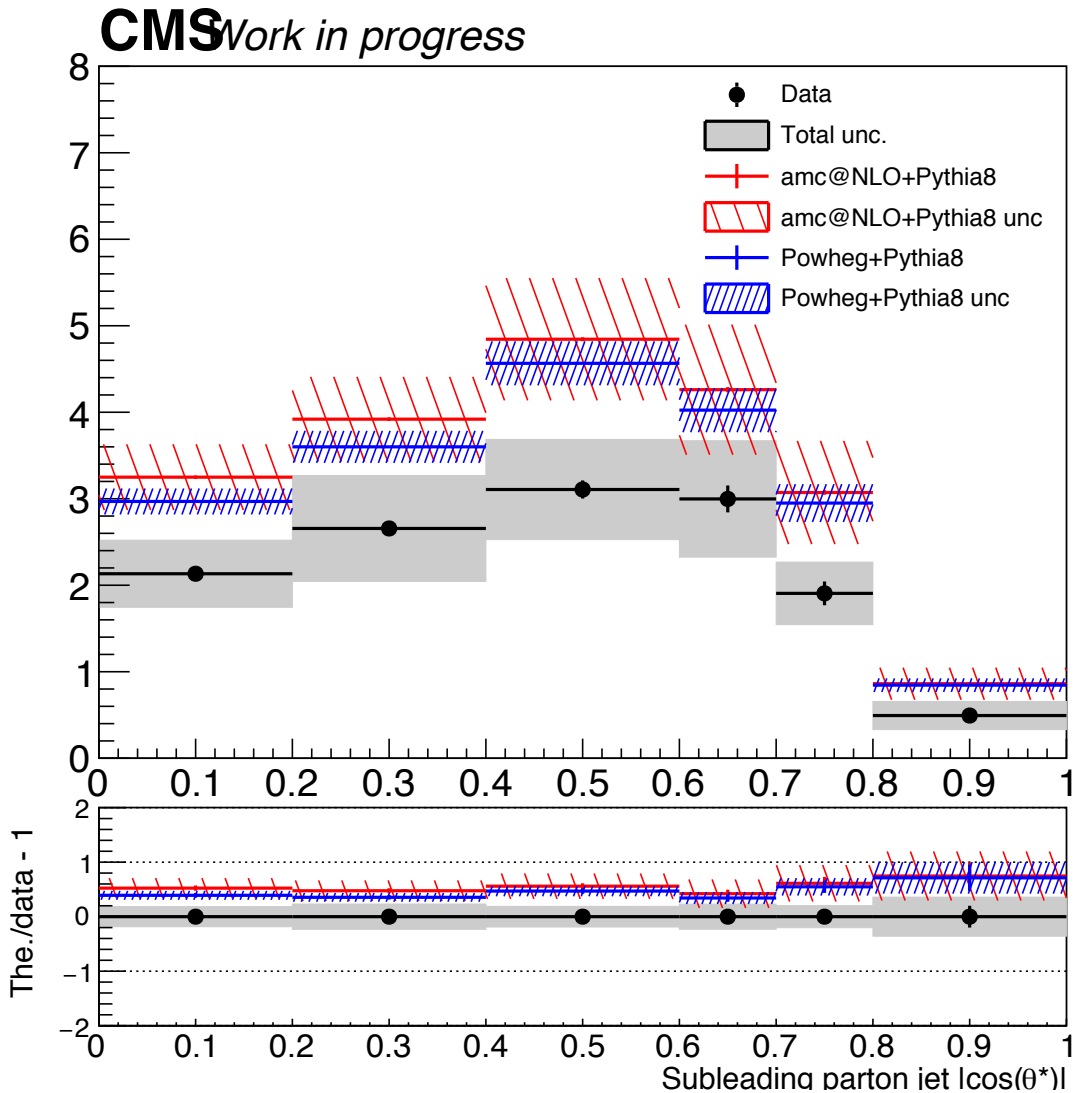


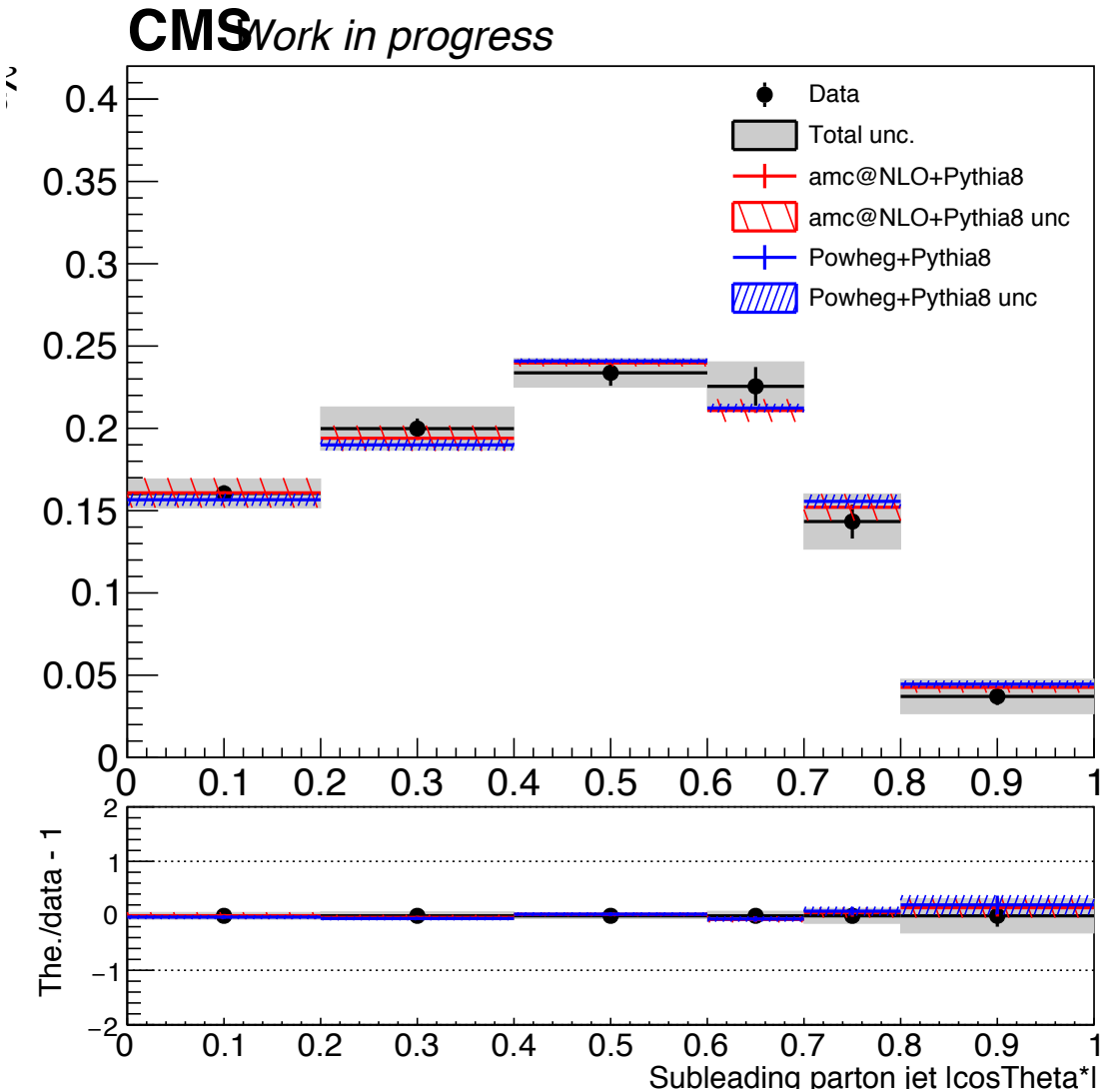
Final Results Parton



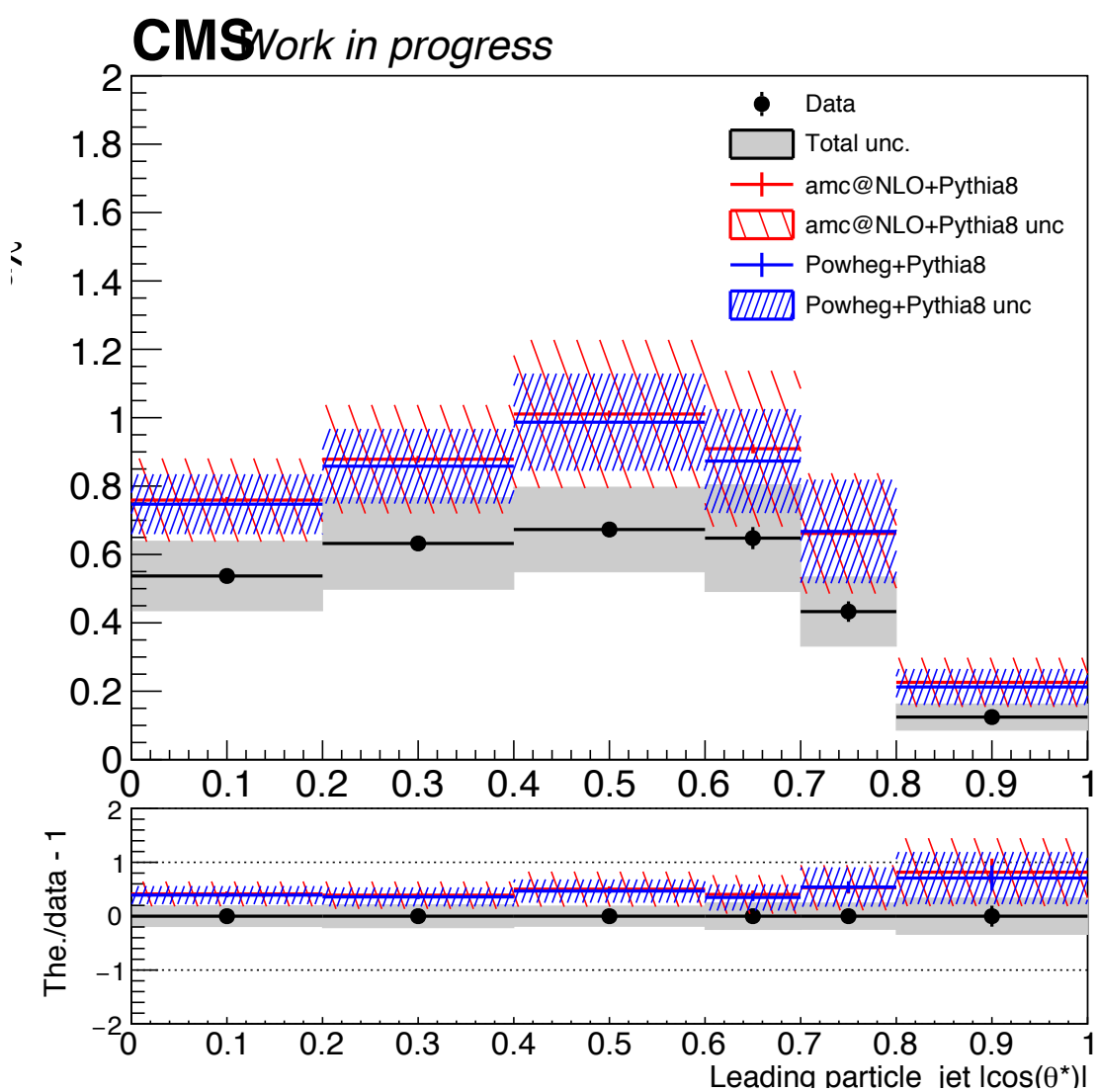


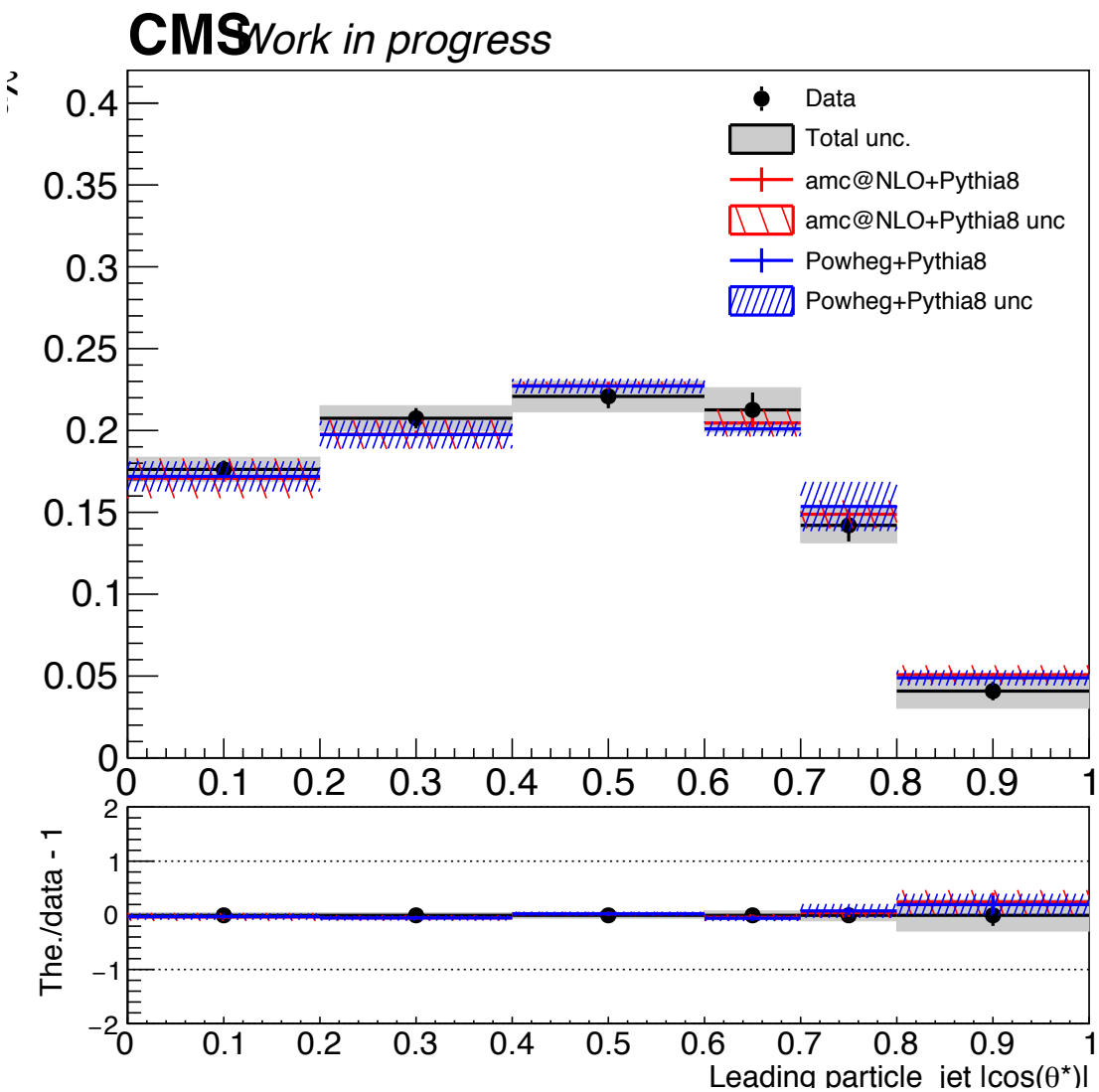
Final Results Parton



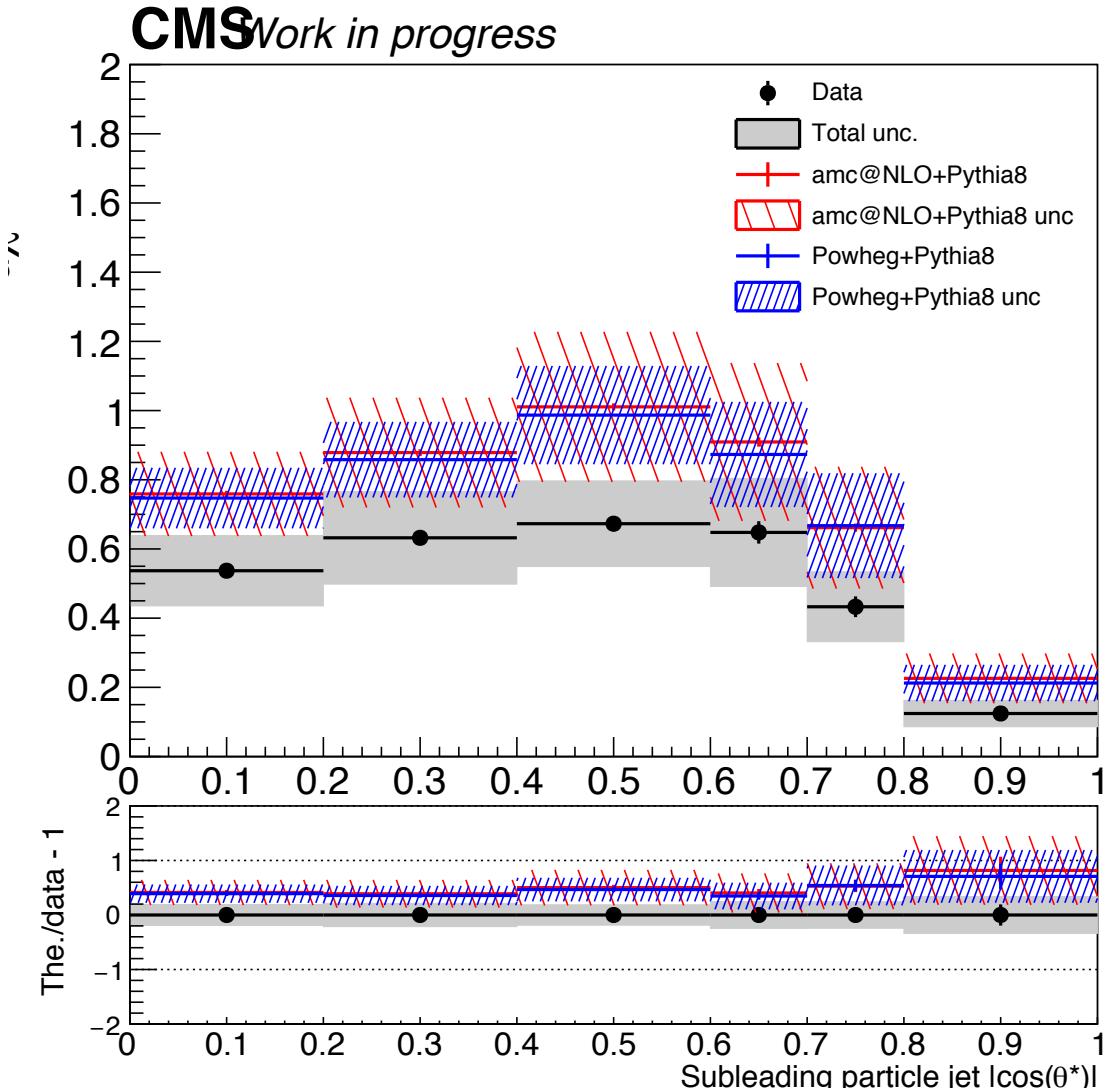


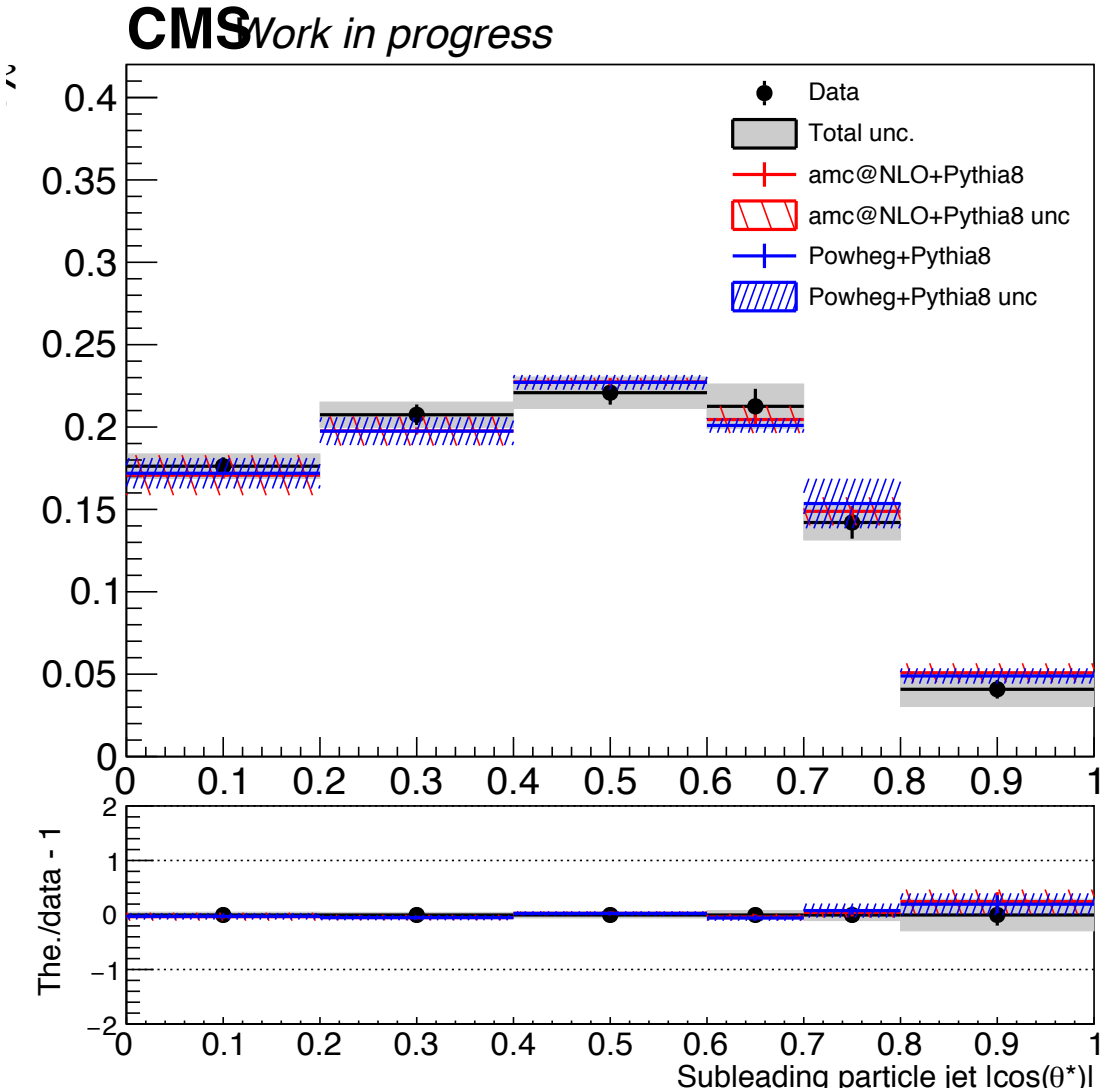
Final Results Particle





Final Results Particle





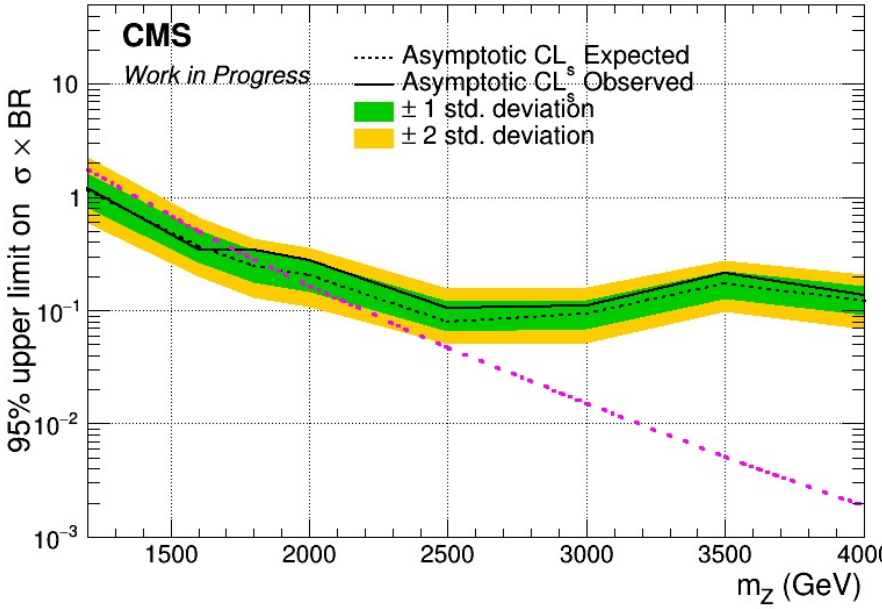
BACKUP

Summary

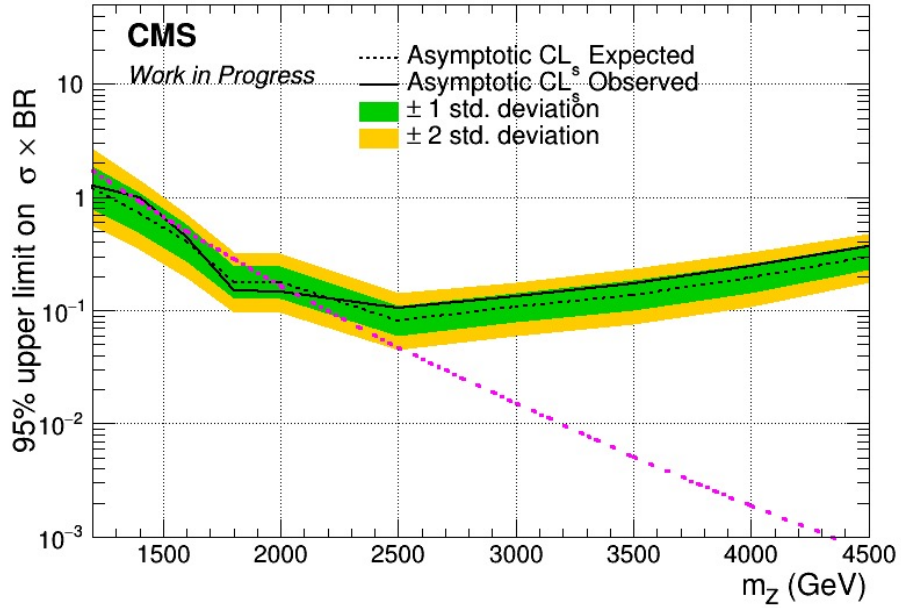
- ttX analysis Pipeline Creation
  1. We want to be able to handle all Nominal files and their variations in an automated way
  2. This requires deciding consistent naming conventions and a efficient planning
  3. Handling of:
     1. Nominal
     2. Parton Shower Weights
     3. PDF Variations
     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 (mJJ, pTJJ, yJJ, jetPt[0,1], jetY[0,1], chi, |cosTheta*|[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

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

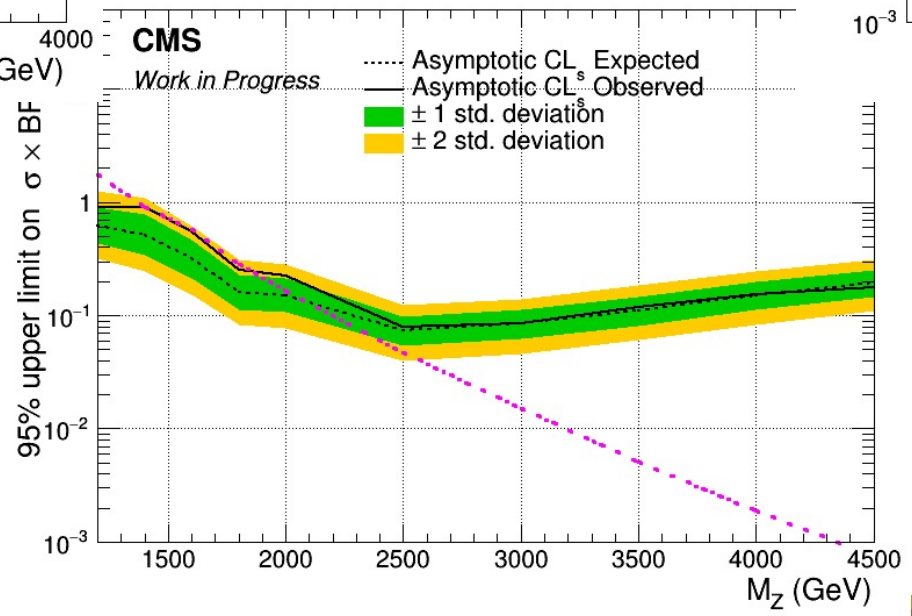
2016_preVFP



2017



2018



Combined Datacard for 2016_preVFP, 2017 and 2018

Mass Cut Mapping

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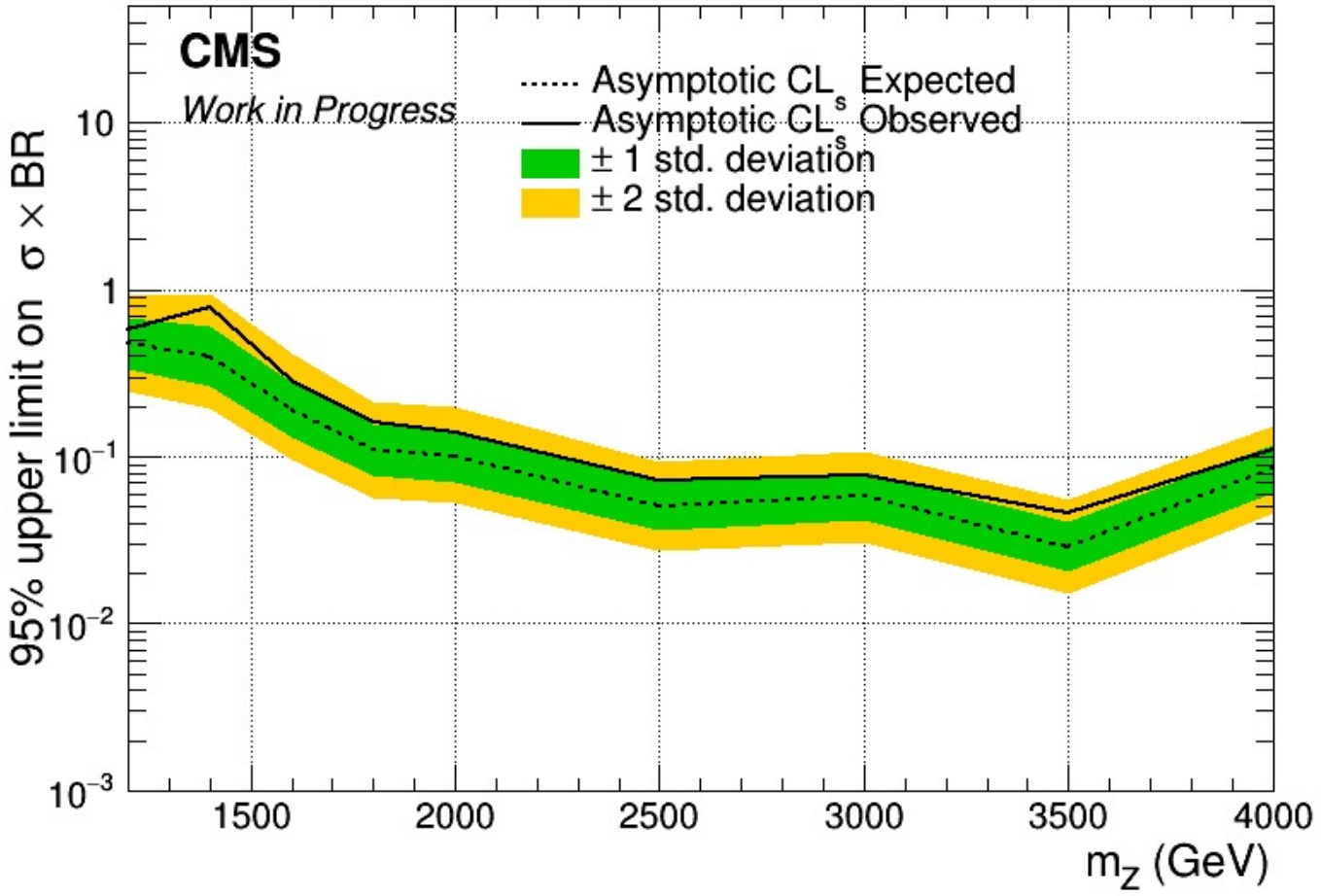
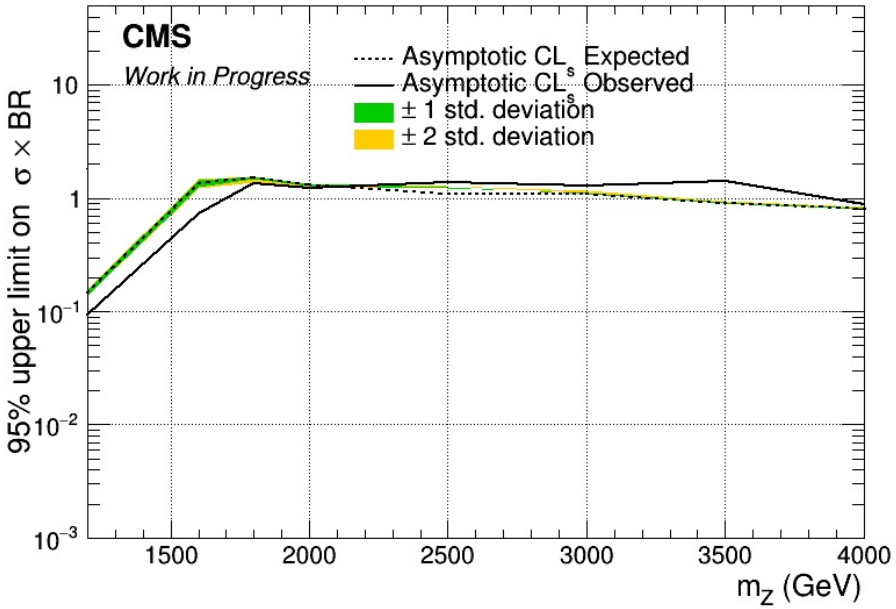
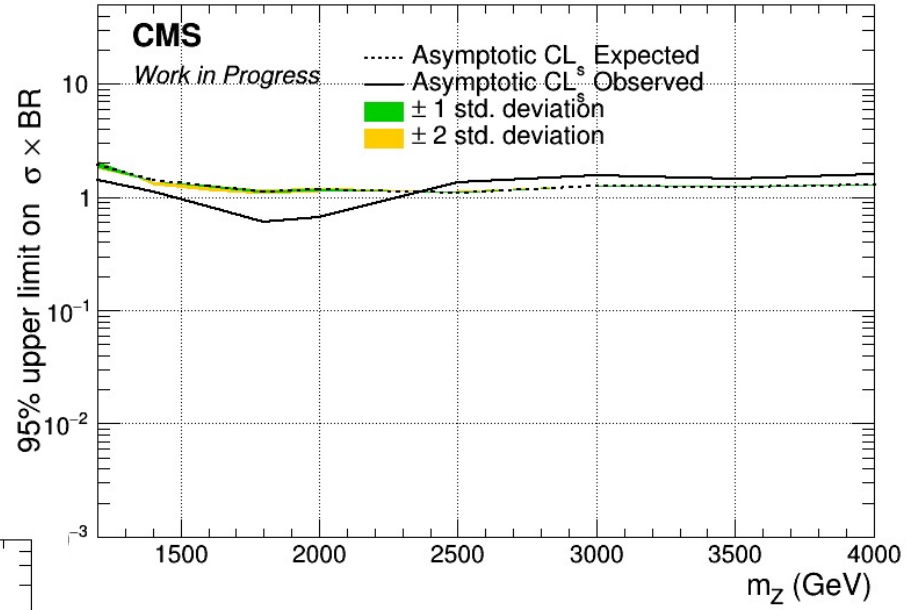


Brazilian Plots (2016_preVFP, 2017 and 2018) with sliding mJJ Cut wrt 2018

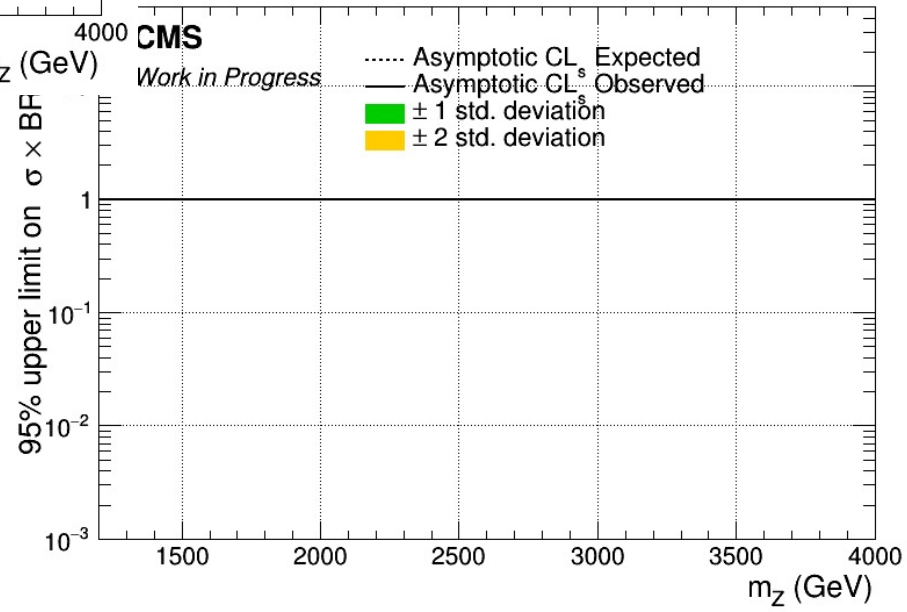
2016_preVFP



2017



2018



Combined Datacard for 2016_preVFP, 2017 and 2018 wrt 2018

Mass Cut Mapping

{"mZ_1200_12":1000, "mZ_1400_14":1200, "mZ_1600_16":1400, "mZ_1800_18":1600, "mZ_2000_20":1600,
"mZ_2500_25":2000, "mZ_3000_30":2000, "mZ_3500_35":2000, "mZ_4000_40":2000, "mZ_4500_45":2000}