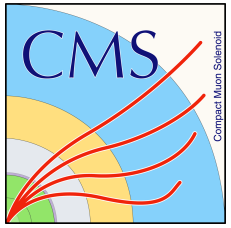
Weekly Report
NTUA
29/4/2020

George Bakas

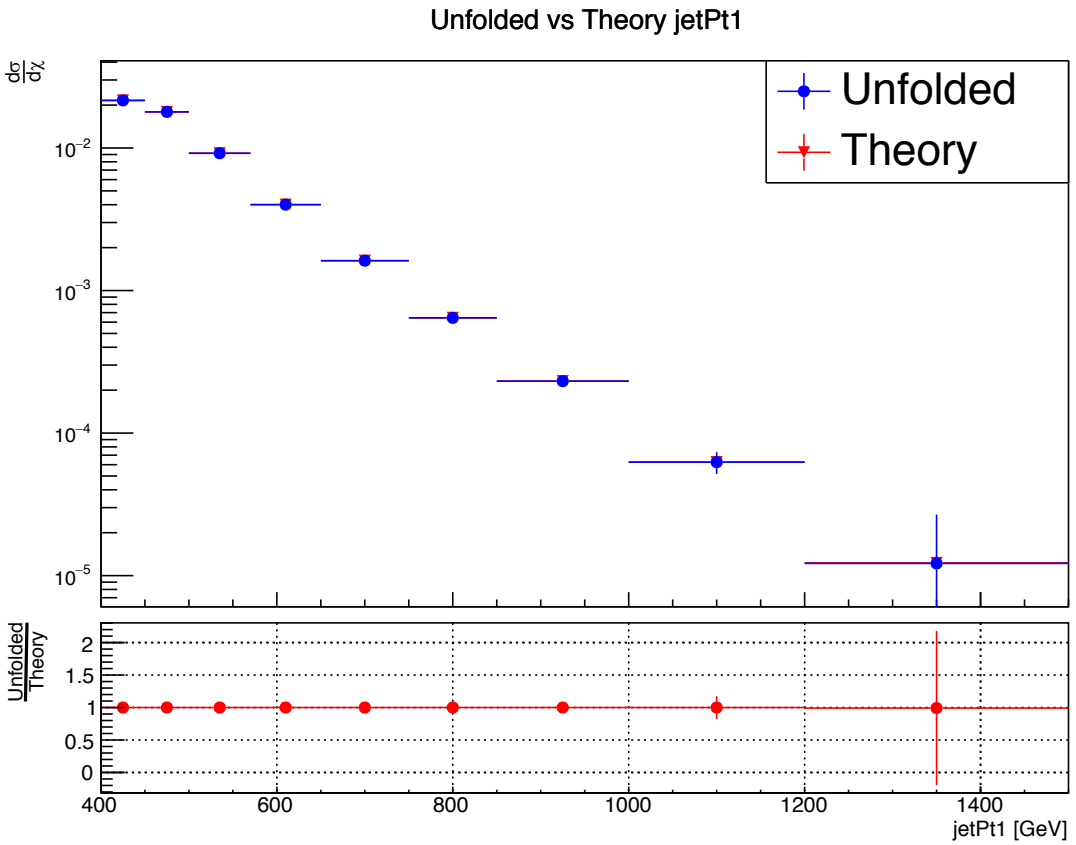


Status Report

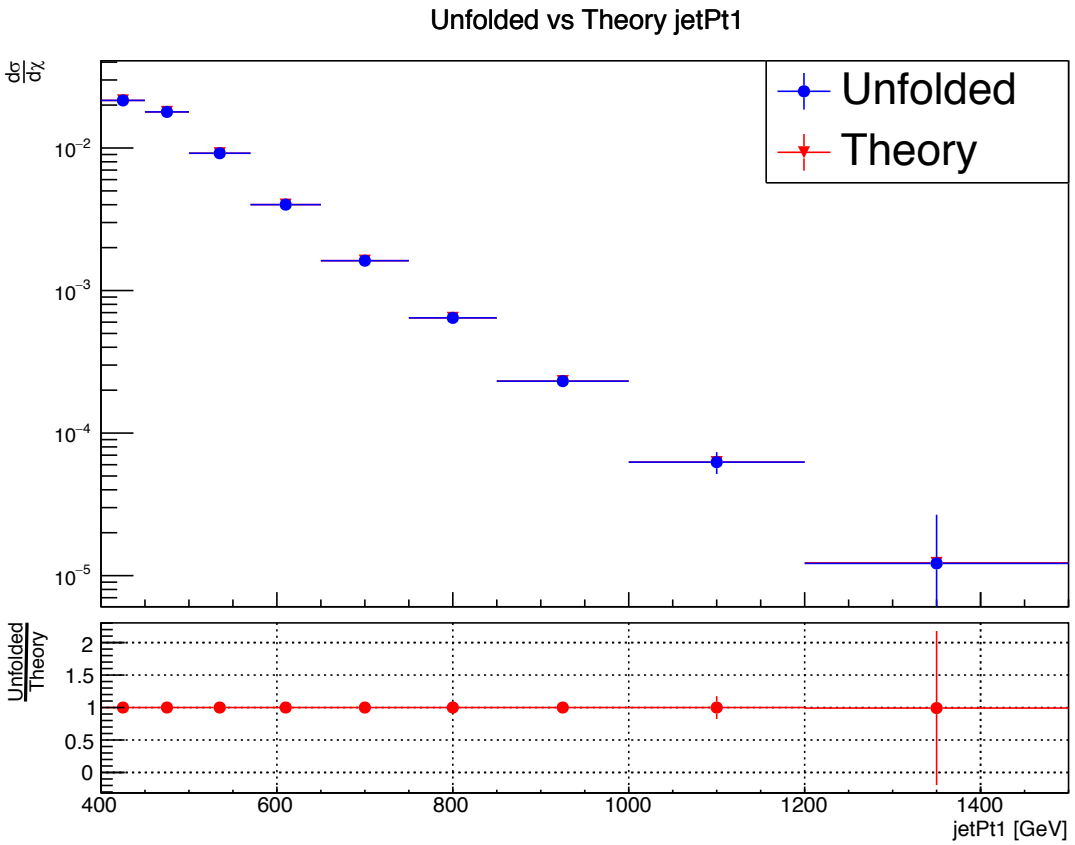
- Analysis:
  - Giannis and I are trying to find bugs in codes up to signal extraction
  - Signal Extraction
    - Again we have the same problems with (1+kx)Q(x), k ↑ ↑ (2016)
  - Unfolding results:
    - Rebinning:
      - mJJ, ptJJ and sub-leading jetPt
      - With new binning we seem to have better results..
      - Also using the high mtt samples (2016 are ok) we get better results because we have more statistics
    - Global Correlation shows worse closure than Inverse matrix or L-curve methods
    - L-curve method and Inverse matrix have the same errors

Parton level MC

Simple matrix inversion

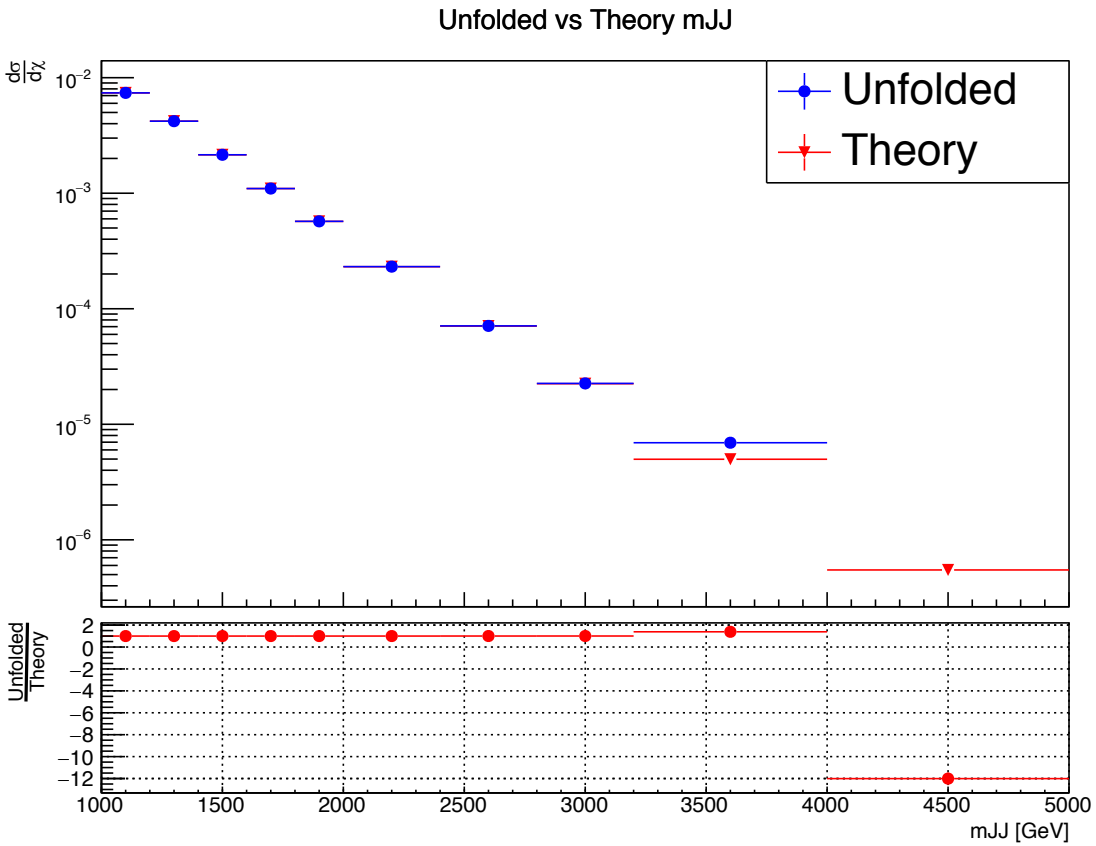


Scan L-curve method

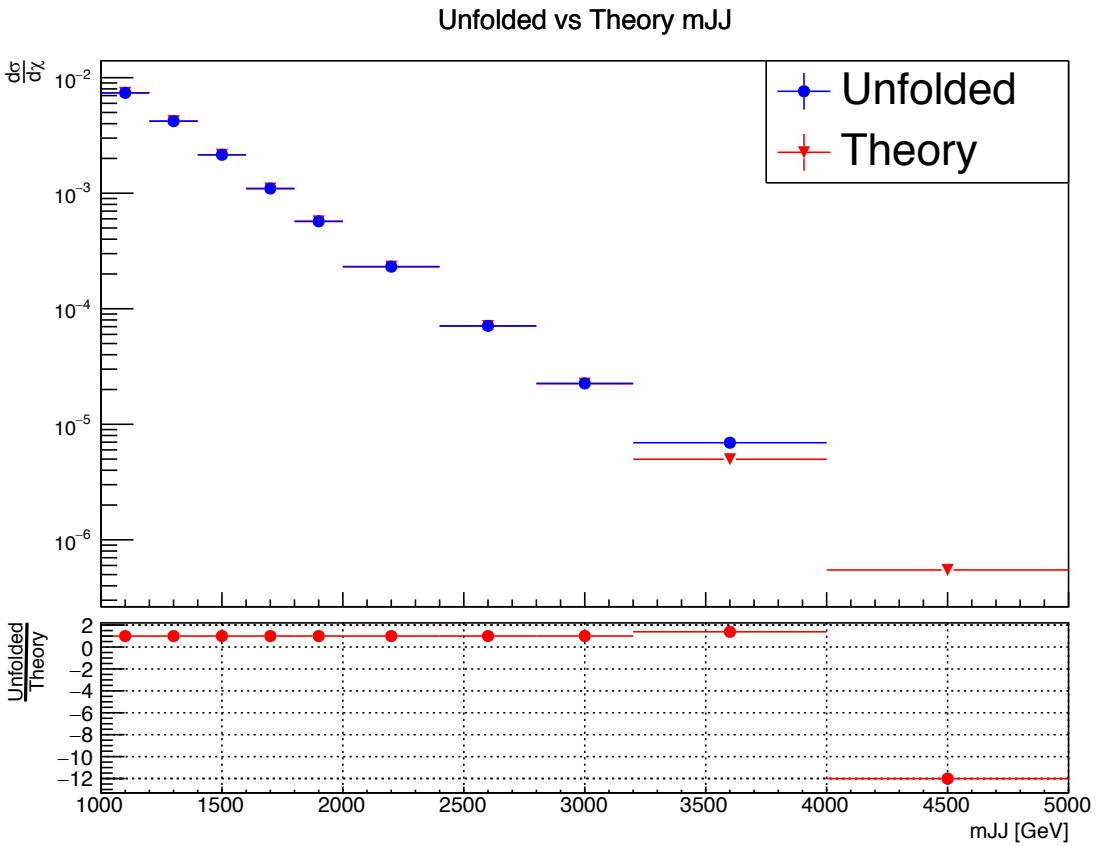


Parton level MC

Simple matrix inversion

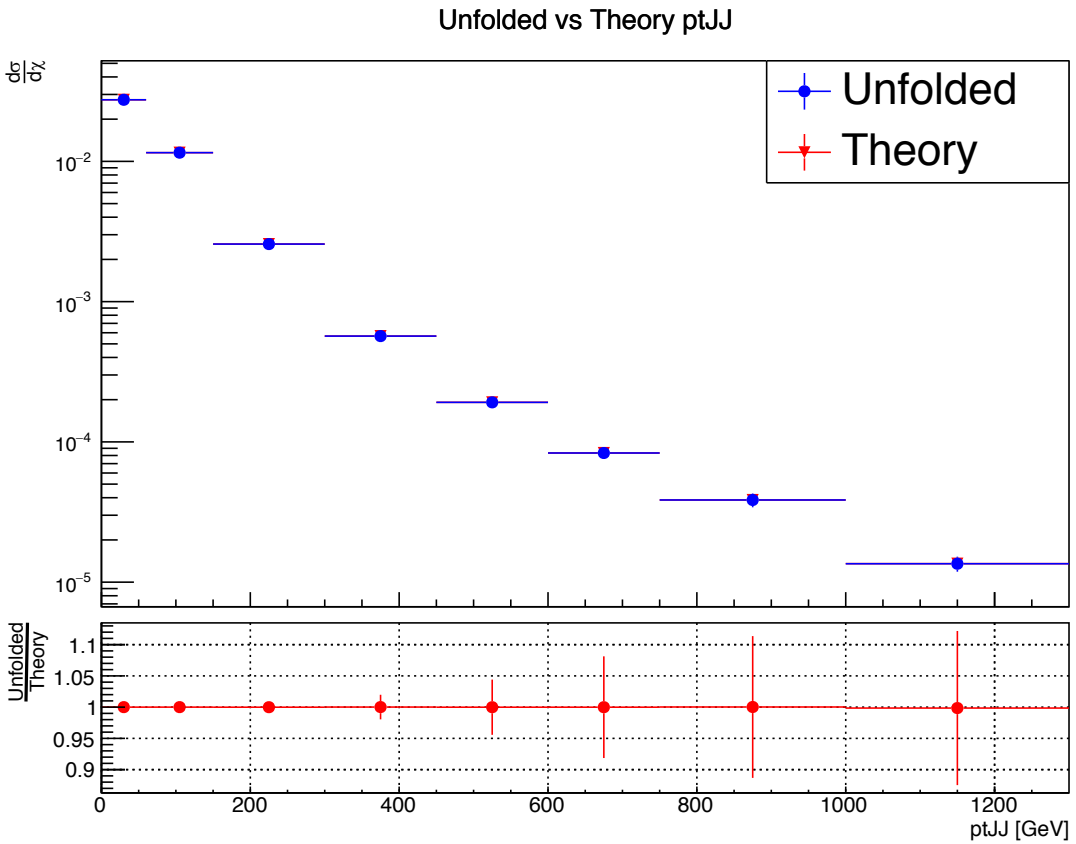


Scan L-curve method

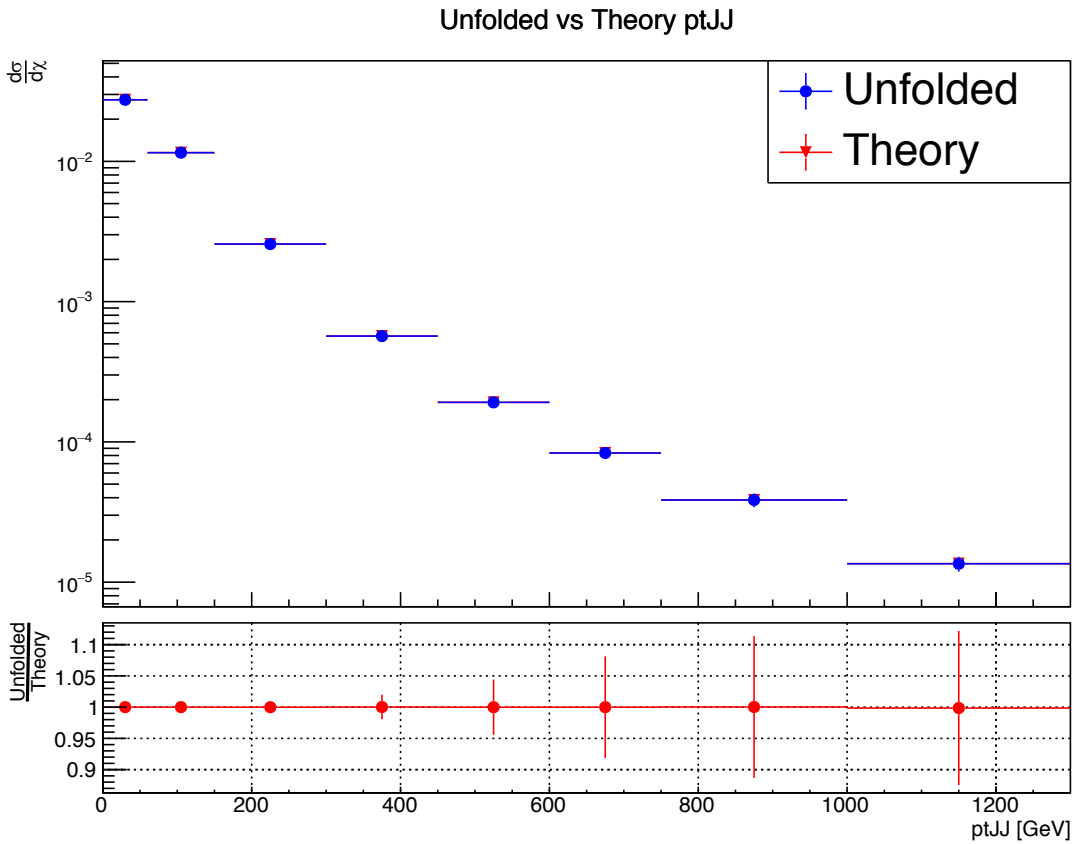


Parton level MC

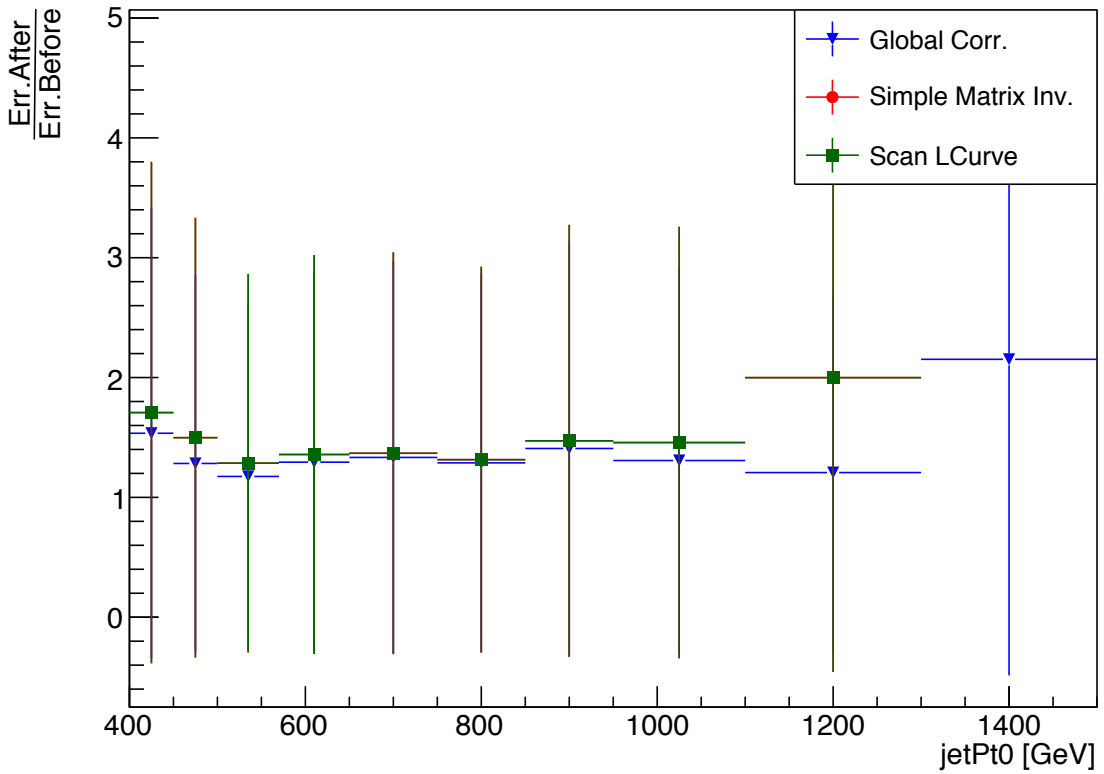
Simple matrix inversion

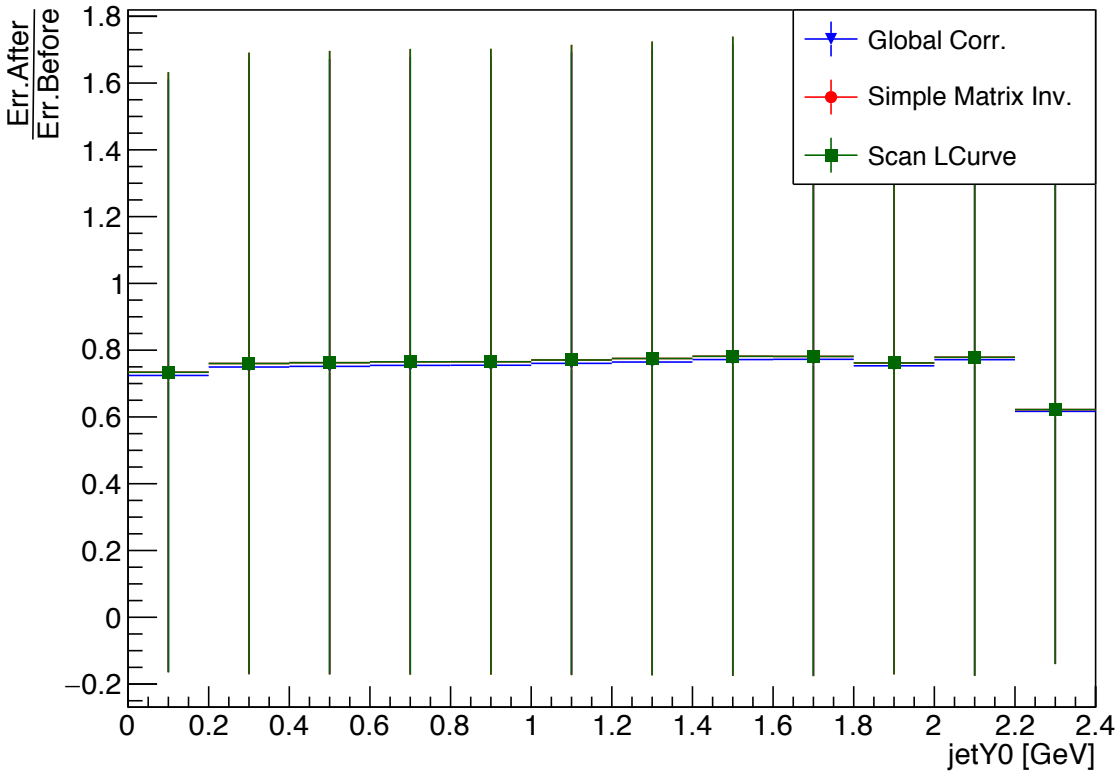


Scan L-curve method



Error Propagation After Unfolding





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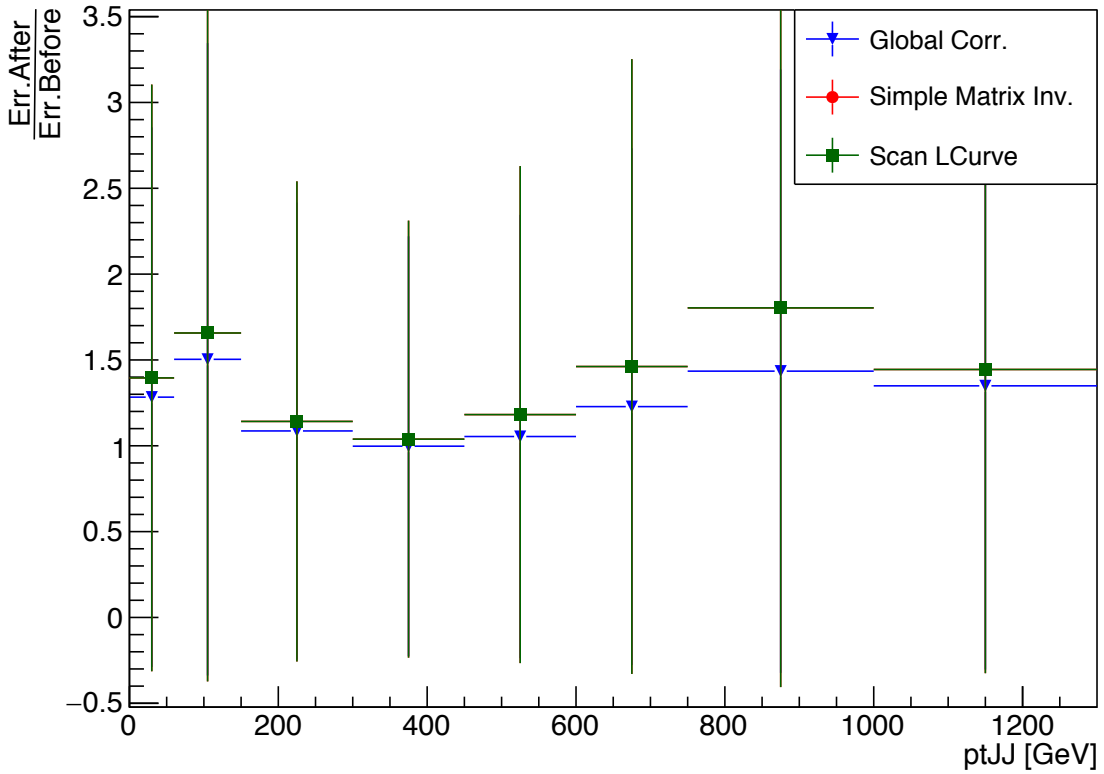

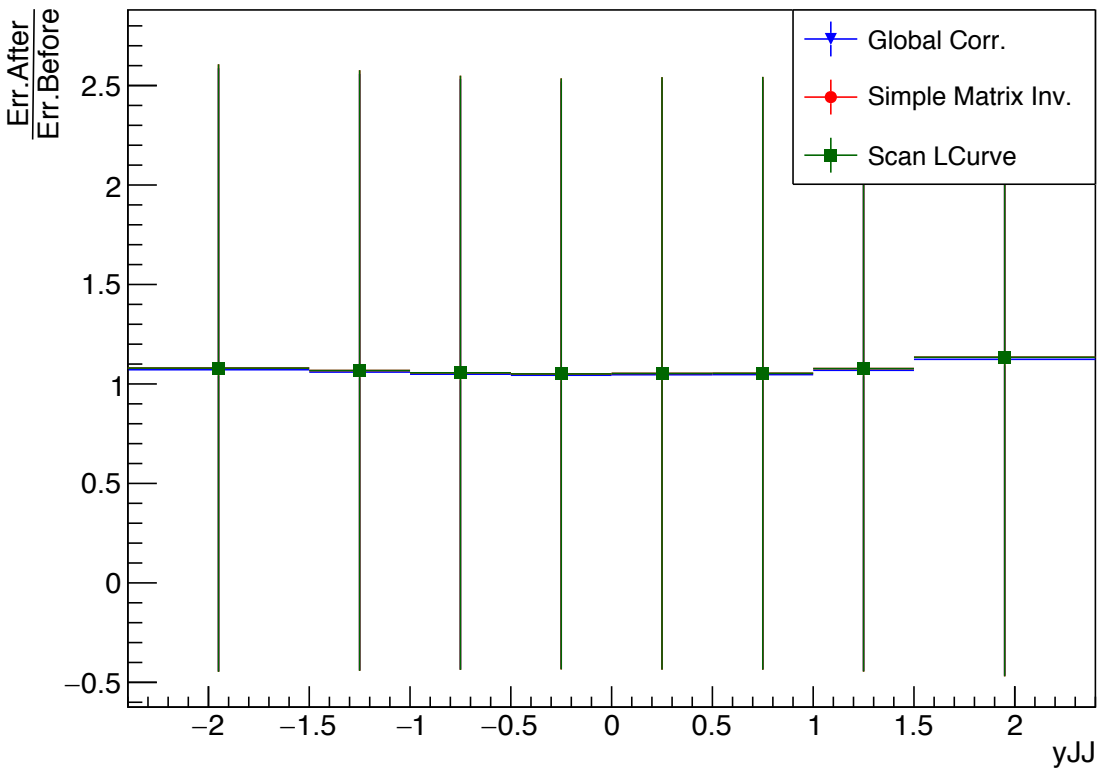

BACKUP

Minimum of global Correlation

Trying to solve the inverse problem of $y = Ax \rightarrow x = A^{-1} y$ where:

- x: Extrapolated to Parton
- A is the response matrix
- y: reco input
- V_x is the covariance matrix of x

This method finds the minimum mean value of global correlation coefficients (ρ_j):
Where ρ_j is defined as:

$$\rho_j = \sqrt{1 - [(V_x)_{jj} \cdot (V_x^{-1})_{jj}]^{-1}}, \quad where \;\; 0 \leq \rho_j \leq 1$$

1. The global correlation coefficient is a measure of the total amount of correlation between element j of x and all other elements.
2. The arithmetic and the geometric mean of all n global correlation coefficients is determined for a large range of τ-values.
3. The τ-value with the smallest mean value is accepted.