

Some ideas on data presentation and publication

- detector or hadron level comparisons
 - to fold or unfold ?
- the advantages of using Rivet

Detector - to - hadron level correction

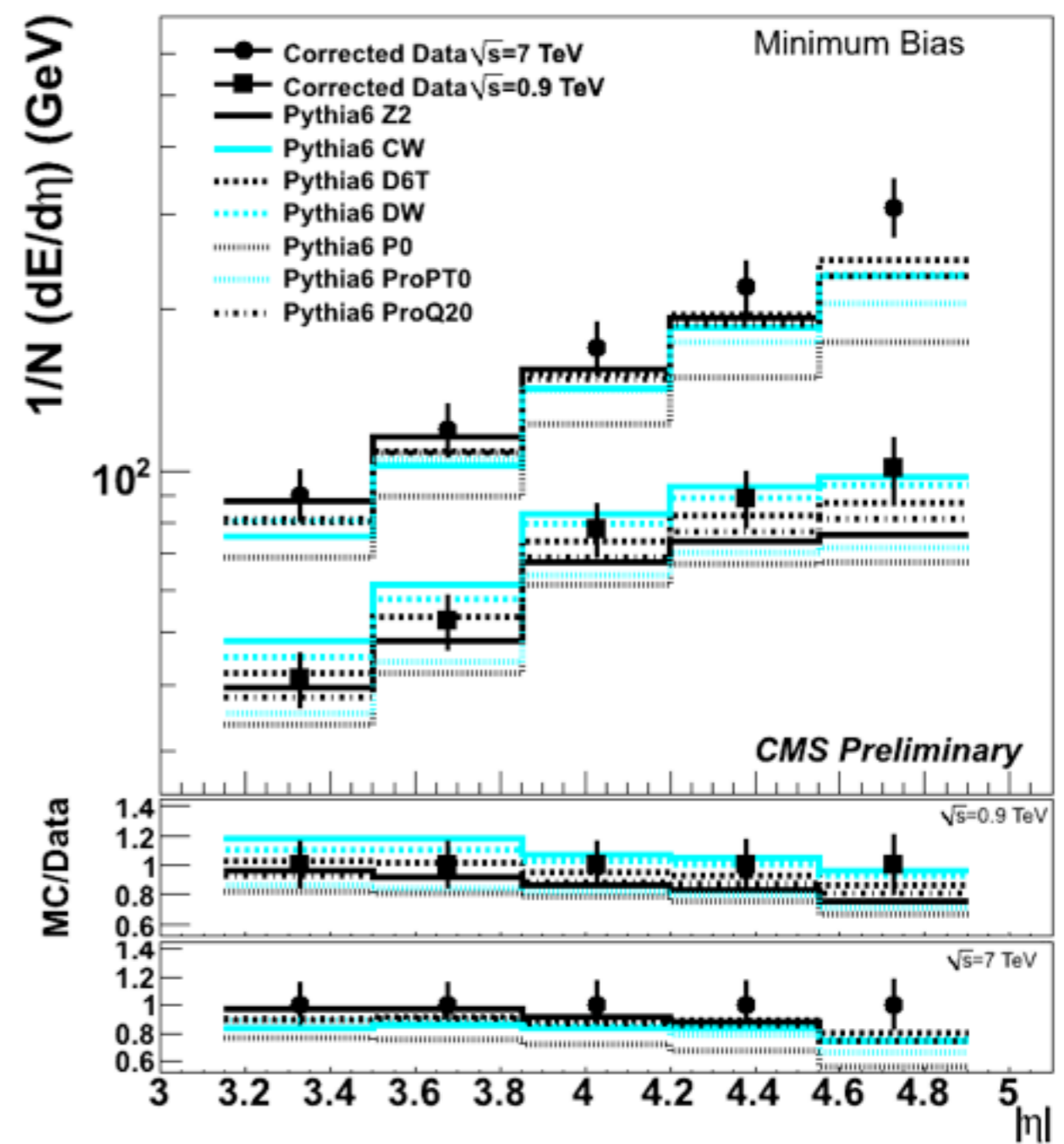
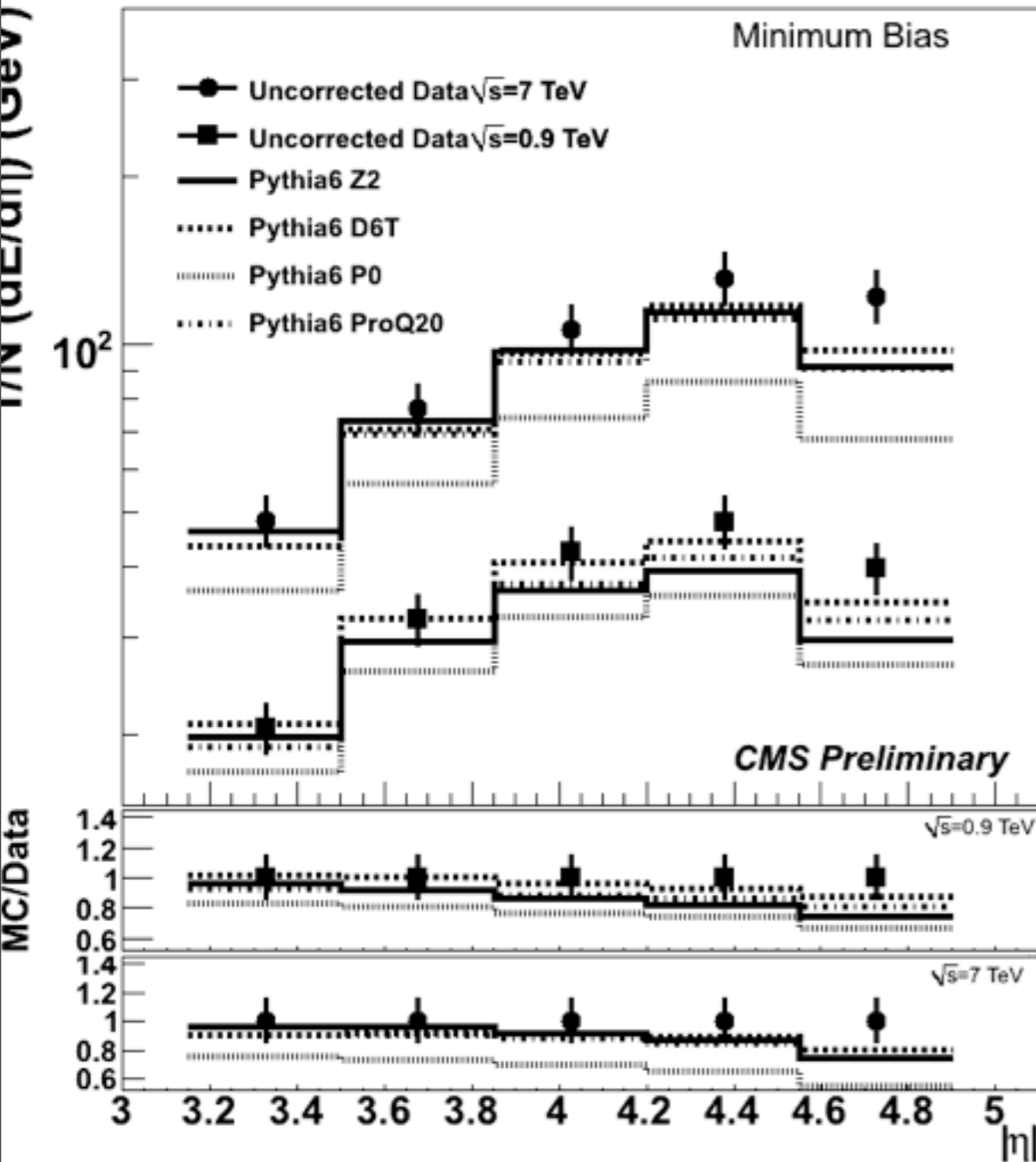
- General problem of detector to hadron level correction

$$O_i = \sum_j \mathcal{D}_{ij} \hat{O}_j$$

- We need:
 - True Observable \hat{O}
 - Correction (smearing) Matrix \mathcal{D}_{ij}
- Unfolding from detector to hadron level:
 - need to invert correction matrix
 - introduces instabilities, need regularization procedure
 - **Only needed, if comparison to non-numerical prediction**

An example: forward E-flow

- Detector level
- CMS-PAS-FWD-10-011
- Corrected to hadron level



- bin-by-bin correction method used
- correction for dead material in front of detector and loss of low energy particles

Unfolding or folding

- general ansatz:

$$O_i = \sum_j D_{ij} \hat{O}_j$$

Similar idea presented by M. Schmelling at Physics at LHCb 26-19 April 2011, Bad Honnef
<http://lhcb-physics2011.physi.uni-heidelberg.de/Programme/talks/M-Schmelling.pdf>

- For most of comparison with theory predictions use Rivet package
 - **Rivet** = program code which allows to run MC generator and produce directly histograms which can be compared with measurements
 - We can include in Rivet smearing matrix D_{ij} ,
 - run generator, convert hadron level to detector level
 - compare MC at "det" with measurement at det level
- **Advantages:**
 - no need for unfolding
 - no problem with inversion of D_{ij}
 - "no" or small model uncertainty
 - "no" problem with migration effects
 - applicable for all tuning purposes
- **Disadvantages**
 - no direct comparison with other experiments
 - no direct comparison with theory

Resume

- For some measurements it is easier to stay at detector level
 - provide transformation matrix from hadron -to - det level
 - avoid inversion of this matrix
- detector level measurements with transformation matrix can be used similar to hadron level measurements using Rivet
 - for user and tuner no difference
- **Advantage:**
 - **concentrate** on determination of transformation matrix
 - experimental details are included there
 - avoid spending time on technical issues of inversion of matrix
 - we have not yet entered the discussion on which unfolding procedure is correct