Yellow report : update on Monte Carlo chapter

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Aims

• Slightly different emphasis to later chapters, i.e. focus more on introduction than outlook.

• Main aim of chapter is to describe the MCs used in later chapters (so this does not have to be repeated) :

‣ Processes (diffractive and forward physics) generated.

‣ Approximations/limitations in the underlying models and implementation.

‣ Discussion of uncertainties.

‣ Outlook : what future work is planned (if any)? Theoretical improvements to be included? Further tuning needed? What future LHC data would be most useful for this?

‣ ...?

Contributions

- Idea is to have an individual section for each MC, with a contribution covering these topics from one of the authors. Some contributions are confirmed, aim to have more confirmations very soon.

- MCs to be included so far (see yellow report plan) :

  ‣ Pythia - Peter Skands

  ‣ Herwig - tbc

  ‣ Phojet - tbc

  ‣ FPMC - Oldrich Kepka, Christophe Royon, Matthias Saimpert

  ‣ Exhume - tbc

  ‣ Superchic - LHL, Valery Khoze

  ‣ DIME - LHL, Valery Khoze

  ‣ EPOS - Tanguy Pierog

  ‣ QGSJETII - Sergey Ostapchenko
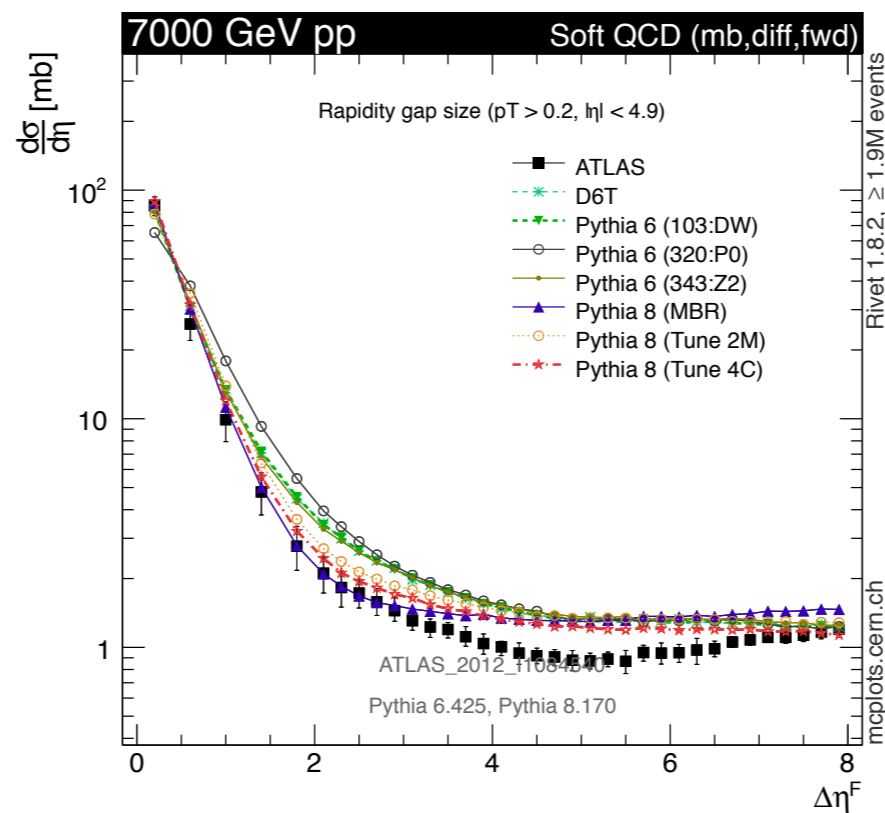
  ‣ Others??

Other topics to cover : MC comparison

• As well as describing each MC individually, it would be useful to show some comparison plots for 'benchmark' forward physics processes.

• Consider distributions in kinematic variables of interest, for same event selection, for a range of MCs/tunes...
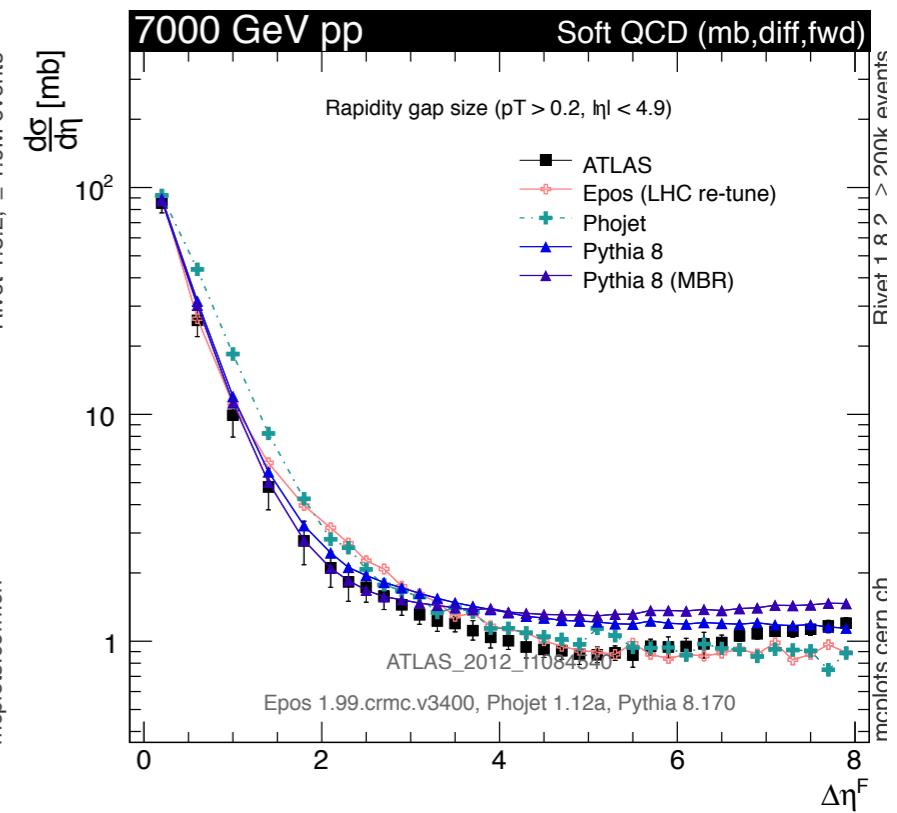
ATLAS forward rapidity gap cross section

Other topics to cover : MC comparison
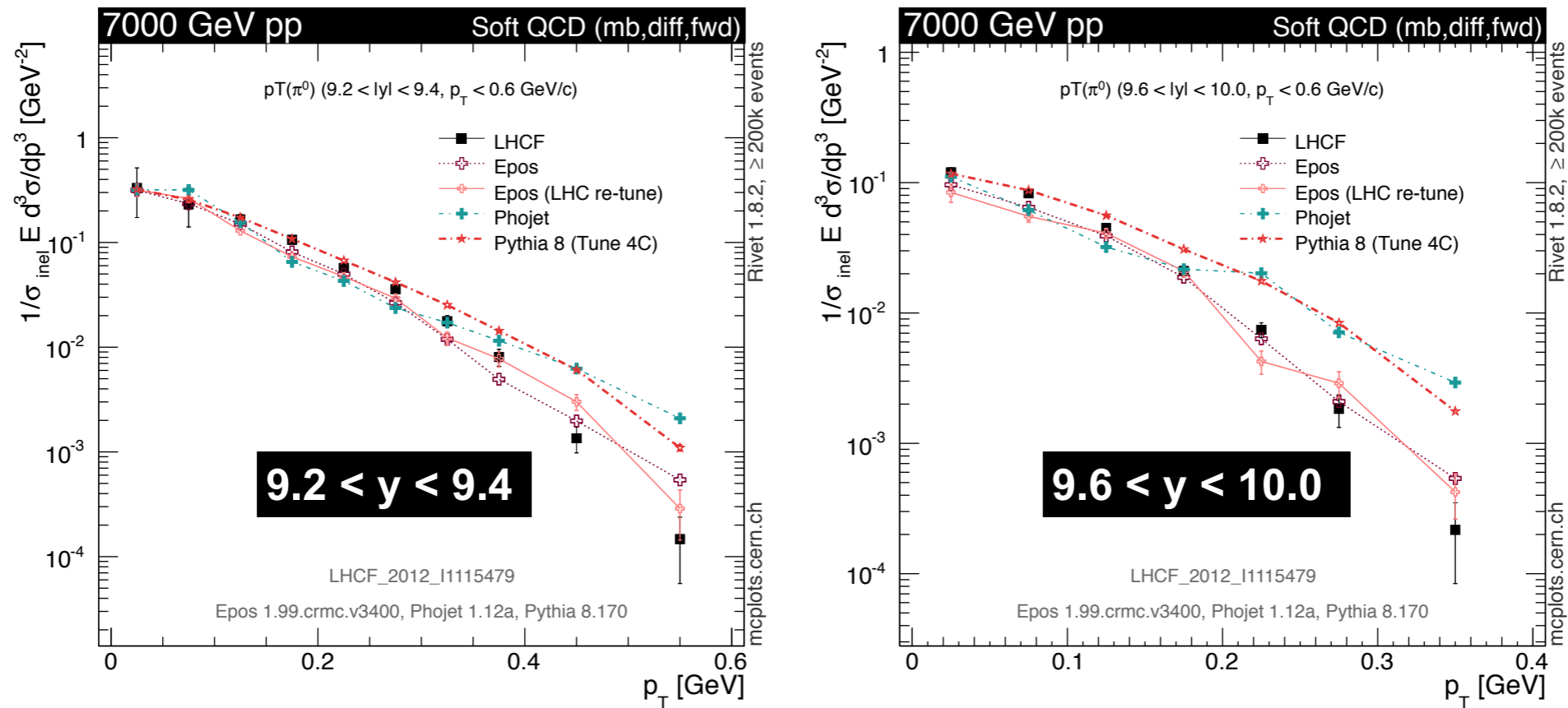
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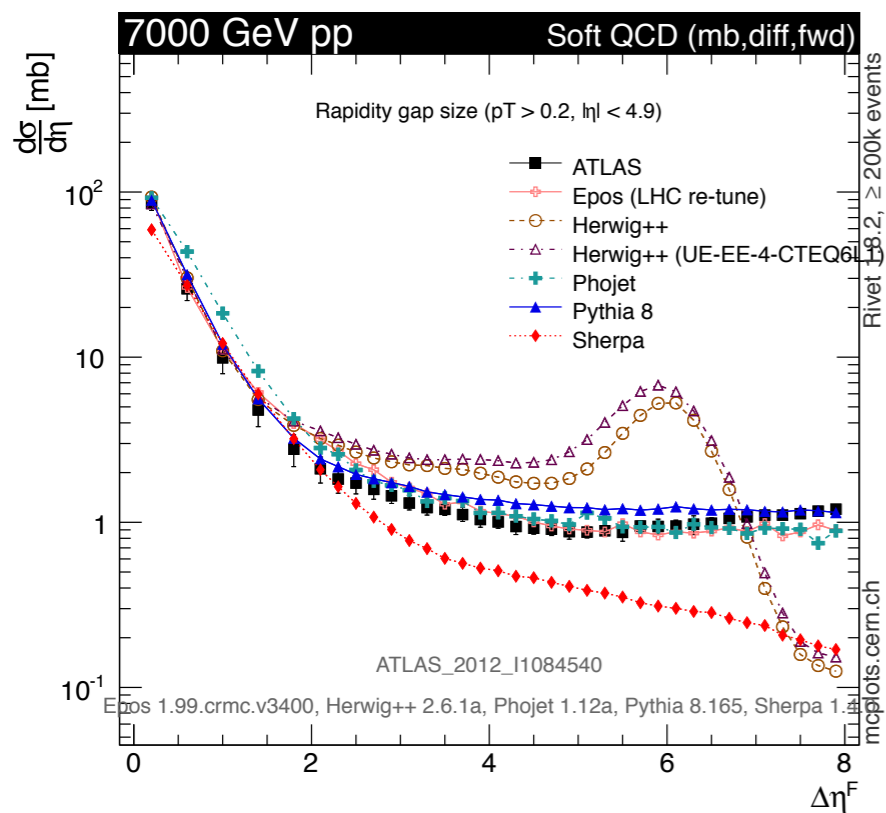
Taken from Sercan Sen's talk 'LHC forward analyses: MC study' at Calabria meeting

- Plots shown here compare with existing data. Perhaps more sensible in the report to consider predictions for future LHC data.
- To do : decide on benchmark processes to consider. Volunteer needed to perform this analysis! Suggestions welcome...

Other topics to cover?

- Other topics listed in report plan:

  - Multiple interaction treatment in MC - double J/ψ
  - Highlight theoretical uncertainty on differences between pp and $I\!\!P p$ (Peter Skands)

- Discussion of these topics to be confirmed.
- Suggestion for other topics of discussion are welcome...

Summary and Outlook

• Aim is to produce a mostly introductory chapter, with individual sections describing the MCs on the market (processes generated, limitations/ uncertainties, future work/tuning, useful future data...).

• In addition, a direct comparison of the MC predictions for some selected 'benchmark' forward physics processes. Demonstrate how future LHC data may discriminate between the different underlying models $\rightarrow$ provide better understanding of forward direction. Need to decide on processes to consider, and volunteer needed for analysis.

• Suggestions for other topics of discussion are welcome...