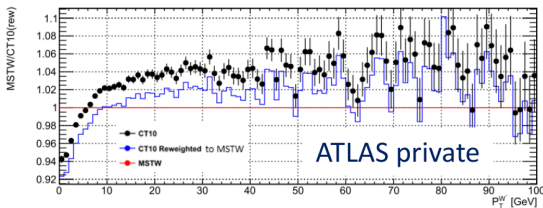


- PDF uncertainties are likely to be among the dominant uncertainties for the W mass and for the weak-mixing angle
- How to correctly estimate PDF uncertainties?
- How to reduce PDF uncertainties?

Estimation of PDF uncertainties - Which prediction?

- For the measurement of the W mass at the Tevatron, q_T resummed predictions (RESBOS) have been used
- At the LHC we are moving to NLO+PS generators, but...
- Are the NLO+PS predictions appropriate for the estimation of PDF uncertainties?



- PDF reweighting fails for Powheg, pointing out a deeper issue also common to aMC@NLO:
- PDF variations in NLO+PS are done on the *underlying-born* configuration, and PDF are fixed in the PS
- Is this a step back with respect to NLO, and to NLO+NNLL?

Estimation of PDF uncertainties - Correlation with non-pQCD parameters

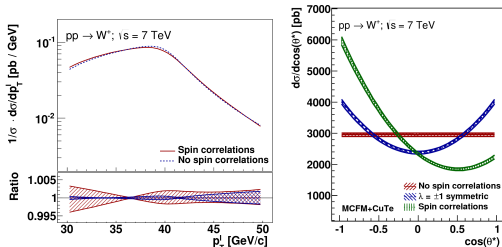
- How to deal with the correlation between PDF and non-pQCD parameters?
- The recent ATLAS A14 tune shows that non-pQCD parameters of the PS have different optimal values depending on the (LO) PDF

Param	CTEQ	MSTW	NNPDF	HERA
SpaceShower:pT0Ref	1.30	1.62	1.56	1.61
BeamRemnants:primordialKThard	1.72	1.82	1.88	1.83

- Usually, we first fit PDF on data which are not sensitive to non-pQCD, and then tune or fit the non-pQCD parameters
- Are there better approaches to address correlation? Iterative fits, combined fits
- Lot of progress towards fast NLO+PS grids, how can we take advantage of this?

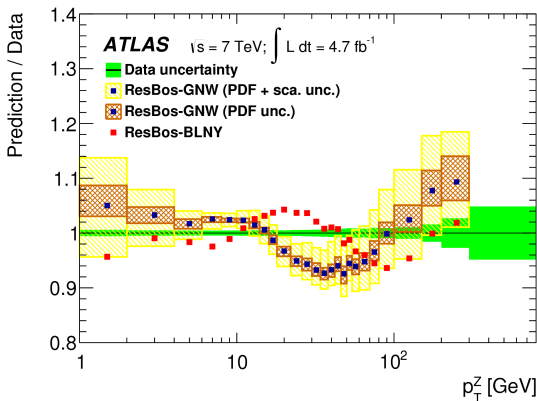
- Precise measurements of EWK parameters are sensitive probe of new physics
- Should we use conservative PDF4LHC prescriptions, like envelope, META PDF, etc... as we plan to do for searches?
- Charm-initiated production is a significant uncertainty for the W p_T spectrum
- Bottom-initiated production is a significant uncertainty for the Z p_T spectrum
- c and b quarks are treated as massless in the DY predictions, our only handle on their uncertainties are the m_b and m_c parameters in the HF schemes
- Please provide m_b and m_c variations in the newest PDF sets if possible, in the same form as α_s variations

Reduction of PDF uncertainties



- The PDF uncertainty on the first family of quarks, valence and sea, turned out to be the dominant source of uncertainty for the W mass and for the weak-mixing angle, more important than the strange PDF
- W asymmetry at the LHC is probably the most natural observable to constrain the valence PDF, in the same Bjorken- x range as needed for the measurements
- HERA 2 data will help, are there other measurements which can help to constrain u and d PDFs?

Reduction of PDF uncertainties



- $Z p_T$ is sensitive to PDF and non-pQCD
- Do we have tools for a combined fit of PDF and non-pQCD parameters to the $Z p_T$ spectrum?
- Are aMCFast or RESBOS the best frameworks for doing such a combined fit? Is it possible to have fast RESBOS grids?

DISCUSSION