

Introduction and news

- Welcome to our usual preparatory meeting to the general LHC SM meeting which starts tomorrow Tuesday!

- News item 1: yet one more change in our WG organisation,

Conveners (and affiliation!) as of now are:

Fulvio (theory), David (d'Enterria) and Simone (CMS), Mika (LHCb), Aram and Daniel (ATLAS)

Many thanks to Aleko who has been actively participating in the working group since 2018! And welcome David!

- Workshop next year will most likely take place in Pavia, Italy.
Dual-purpose workshop with completion/documentation of past work and discussion of further/new work in the WG (see next slides)
Time slot in April (?) to be defined with organisers
Please let us know if certain dates are already known to be impractical for you.

Completion/documentation : QED/EW

- Clara covered almost completely where we stand in her overview report last meeting.
Mauro will give a very similar overview on behalf of our WG on Thursday afternoon
- Outstanding items for completion:
 - missing calculations (eg WZGRAD2)
 - everything LO QCD until now, last step is to run Powheg-EW in the same setup for all aspects with LO to NLO QCD as the only change.
This should give us a feeling on whether any significant changes in the shape of the corrections to A_4 /AFB might be expected from QCD itself.
We know however that the predicted value of A_4 in the pole region does indeed vary significantly, even from NLO to NNLO QCD. Assessing this is orthogonal somewhat to the work done on the QED/EW corrections themselves.
 - uncertainties (Ayres for virtual corrections and Stefan for QED corrections)
 - photon-induced processes will be discussed in a factorised way based on work done by Alessandro (HORACE) and Sergey/Lidia (MC-SANC)

Completion/documentation : QED/EW

- **Documentation status:**
- **Good news! Recently, Alessandro/Doreen/Stefan/Ayres have started on the main body of the paper, building partly on what had been built up over the years in git repository by Elzbieta/Daniel**
- **Fulvio and Daniel will act as main editors for this paper**
- **Goal would be to have skeleton fleshed out enough by end January or so, such that all appendices by each calculation can really be written using this as a foundation over February/March**
- **Paper could be in good shape by April workshop if this works out.**

Completion/documentation : resummation benchmarking

- Tobias will give an overview in a specific talk tomorrow in general meeting, focused especially on N3LO developments and level-3 benchmarking itself
- Outstanding items for completion:
 - presentation of uncertainties at level 3 (and also possibly 2) using agreed upon categorisation of uncertainties in broad terms as Sudakov and non-Sudakov like.

Need to come to grips with quantitative comparison of these uncertainties between the different calculations and with a building of consensus on how to deal with the regions of large spread between them.

- producing level 3 moving beyond DYTurbo $\mathcal{O}(\alpha_s^2)$ predictions to the higher-order predictions from MCFM and NNLOJET for the fixed order predictions.
- probably need to deal also with “N3LO” PDFs from MHST?
- agree definitely to postpone pTW and pTW/pTZ to a future publication?
- section on NP physics will be written as planned, factorised from the rest of the paper for simplicity (see discussion today for future work in this area)

Completion/documentation : resummation benchmarking

- **Documentation status:**
- **Frank and Aram will act as main editors for this paper**
- **Goal would be to have skeleton fleshed out enough by end January or so, such that all appendices by each calculation can really be written using this as a foundation over February/March**

Since unified notation (as much as feasible) would greatly help the readability of this paper, a proposal will be circulated by Aram/Frank before end of January, such that major issues which might appear for certain calculations and authors can be resolved before things are cast in stone.

- **Paper could be in good shape by April workshop if this works out.**

Completion/documentation : other items

- **Beyond publications in journals, there will be an overall CERN report, where we would :**
 - a) summarise the two publications**
 - b) document the work done using pseudo-data for weak mixing angle by Aleko (see short update today) to establish a strategy for combination of run-2 measurements by the three experiments**
 - c) perhaps if feasible document early work on eg pseudo-data for NP physics fits if time-scale allows?**
 - d) anything else?**

Future work directions

- **Topics critical to W mass measurements:**
 - **PDF toys and correlation measurements:** the saga goes on with as main primary goal at the moment work focused on toys produced based on a minimal set of data similar but not identical to that used by PDF4LHC21 to be fitted by several flavours of MHST parametrisations. Before proceeding with the real goal of measuring the correlations between different global PDFs, this work should likely be documented properly first.
 - **QED effects as discussed in our last meeting :** we may have enough people in the various experiments with different tools (WINHAC, HORACE, Powheg-EW) to compare Z and W on the same footing, i.e. differently than what was done for pure neutral current for weak mixing angle, and to derive an optimal recipe for W mass measurements together with its uncertainties **(should be few MeV in the end?)**
 - **combination of p_T^Z and ϕ^* fiducial measurements (topic discussed between ATLAS and CMS for 36 fb-1 papers a year or so ago)**

Future work directions

- **Other topics welcome!**