COMETA polarisation study

Second meeting, 24th April 2024

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Setup

➔ SM parameters, selection cuts & clustering algorithms
➔ observables, histogram binning, distribution format

PENDING QUESTIONS

− shall we go for Run-2 or Run-3 energy?
− should we go for left and right separately es well?
− top-quark and Higgs-boson widths set to zero: is it ok?
− shall we go for the full off-shell calculation as well, to check off-shell effects?
− is the ATLAS setup correct?

➔ start LO runs asap to make first comparison: next meeting end of May (?)

GitHub access & material

➔ please send to me your GitHub nickname to give you access to the COMETA git repository
➔ will create a results/ folder where you can put the distributions in the format required
➔ send also your institution details to appear on the note we are filling

At a given accuracy, for a give MC tool, and for a given polarisation state, the file you generate for a certain observable should be named

`<MC tool>_<observable label>_<accuracy>_<polarisation state>.dat`

where the observable labels are shown in Table 1. Try to keep the MC-tool name as short as possible. The fixed-order accuracy options are

`lo, nloqcd, nloew, gg, nnlo`

corresponding to LO (qq), NLO QCD ($qg, \bar{q}g, q\bar{q}$), NLO EW (including $q\gamma, \bar{q}\gamma, q\bar{q}$), gluon-intitiated loop-induced (gg), and NNLO QCD (excluding gg). The accuracy options for showered predictions are

`lops, nlops`

corresponding to LO and NLO QCD matched to PS (inluding QCD+QED shower, switching off hadronisation and MPIs). The polarisation-state options are

`ll, tt, lt, tl, uu, lu, ...`

where the first (second) index is associated to the Z boson decaying to e^+e^- ($\mu^+\mu^-$), "l" stands for longitudinal, "t" for transverse, and "u" for unpolarised. As an example, if I generate with POWHEG-BOX-RES the positron-rapidity distribution for the doubly longitudinal signal at fixed NLO QCD order, the generated file should read,

`pwg_yep_nloqcd_ll.dat`

Contribution from ATLAS & CMS people

➜ contacted WG3 leaders (Matteo Presilla, Valentina Cairo) and known CMS/ATLAS people involved in the business (Joany Manjarres, Pietro Govoni, Karolos Potamianos, Frank)

➜ CMS: suggested to contact Guillelmo Ceballos (VBS samples), Costanza Carrivale (new gen's) and Bugra Bilin (Gen-group convener)

➜ ATLAS: input from Frank (already involved from SHERPA side), Karolos (involved in VBS), Lailin Xiu et al. involved in the ZZ measurement

MORE INPUT? Who? How?

Unlikely to have access to simulated samples, interest in VBS but beyond the scope of our comparisons

Proposal: contact suggested people, ask to provide `best' TH predictions from tools used by ATLAS/CMS (if samples are already available) for observables we are comparing, or generate samples (if not available yet).

Next meeting

➔ start LO runs asap to make first comparison

➔ after contacting ATLAS/CMS suggested hands-on people, we invite them at the next meeting

➔ next meeting end of May (realistic to have at least LO runs by then)