Dear all

Please find below the minutes and action items from the CMS/ATLAS meeting on 13/10/11 on H->WW. In summary our meeting was two fold. Firstly, we learn from each other as to what procedures are followed to calculate the theoretical errors on various quantities. Secondly, it was agreed to pursue the unification of some of the theoretical errors by the end of October. This will be reported at the Yellow Book 2. Below are the items following the order in which they were discussed. Comments/corrections are highly welcome.

1. Definition of alpha parameters for WW extrapolation. CMS uses data-driven methods for Higgs masses up to 200. For Higgs mass hypotheses the theoretical predictions are used. ATLAS uses the data driven method throughout. It was agreed that we converge on the procedure for the calculation of the theoretical error for the alpha parameter. Since the scale dependence does not play a big role propose to change the scales by factors of two (including the procedure to incorporate scale uncertainties when changing scales in different directions). CMS uses the difference between Magraph and MC@NLO as a separate systematic, using the first as the nominal value. CMS uses pp->lnulnu in Madgraph, excluding the contribution from ZZ. MC@NLO is used for the scale variations. POWHEG is not available yet in either experiment

Action Item: converge on the scale variations of the alpha parameters for WW in 0j and 1j

2. Contribution from gg->WW. Both experiments use the

same generator to model this process. When using the normalization from theory CMS uses 50% as the theoretical error, where ATLAS uses 30%. Both experiments agree that a factor of 2 change in the scales leads to a 30% variations. Need to get reference for the 50% error used by CMS.

Action item: get reference for the 50% theoretical error used by CMS.

3. Interferences of gg->WW and gg->H->WW. Both ATLAS and CMS feel that the issue is resolved and that the interferences are a small effect after the application of the final event selection

4. Scale variations for WW+0j,1j,2j. The scale variations for WW+0j are done at NLO (currently available in both experiments). CMS uses LO for WW+1j and WW+2j. Propose to use LO scale variations for the time being. Rei may want to contact the two theory groups that calculated the WW+1j rates at NLO (Campbell, Ellis et al, Dittmaier et al)

Action item: converge on the scale variations for WW+nj, including LO variations for W+1j and WW+2j. Rei to contact theorists who calculated WW+1j at NLO.

5. EW WWjj. CMS has complete study of rate and interference effects with VBF H->WW.

Action item: CMS to report on the study, take it from there.

6. Scale uncertainties for gg->H+j. These are divided into inclusive and exclusive (contamination of gg->H after VBF

cuts). CMS uses 20% (at NLO) for the inclusive theory error whereas ATLAS uses 70% (at LO). It was felt that both experiments could use the NLO scale uncertainty (20%) but this would require making sure that the results from the baseline MC agree with the NLO prediction. This can be done by raising the pt of the jets, in order to minimize hadronization effects. Regarding the exclusive contribution it is agreed that both experiments run MCFM, get the relative gg->h contribution and the scale variations. Consult with the MCFM authors.

Action items: Ensure that the baseline gg->H MC gives prediction consistent with that obtained at NLO at parton level. To evaluate relative contribution of gg->h after VBF cuts use MCFM. Obtain scale uncertainties with MCFM. Both experiments are encouraged to do the exercise and compare.

7. Central jet veto in VBF. For the moment use theory error emerging from scale uncertainties of the fixed order calculation.

Action item: CMS and ATLAS to compare the scale uncertainties with the fixed order ME after the application of the central jet veto.

Issues related to W+jets, top and treatment of theory errors for MVA are not discussed in the minutes. It was felt that these issues require a time scale beyond the time line of the Yellow book.

cheers

bruce