Higgs to WW Workshop

Sunday, 11 March 2012 - Thursday, 15 March 2012

Grand Hotel Terme Re Ferdinando

Scientific Programme

Objects definition, performance studies and optimisation.

The section is devoted to the optimisation and study of the objects, with particular focus on:

1) electron and muon isolation criteria: optimisation and scale factor evaluation;

2) migration to rel 18 and muon definition (3rd chain versus staco comparison?)

3) b-tagging algorithm study, performance and optimisation;

4) Standard missing ET optimisation: parametrisation as a function of vertices, pile-up modelling, missing Et significance studies;

5) Track MET studies: quality criteria for Track MET, use of the module and the direction of the track MET variable, use in high pile-up environment;

6) JEts, forward jets, pile-up and energy scale systematics, can we improve the treatment of the out of time pile-up and the transition region problem?

Background reduction and data driven estimation.

1) Selection criteria for rejection of reducible background.

a) W+jets, isolation and missing Et cuts, reduce the systematic error of the fake factor method, try a different, less systematic affected, approach: same sign control region, isolation variable shape fit.

b) Drell-Yan: shape sensitive reweighting procedure at low missing ET, evaluation of the systematics, reduction of systematics uncertainties of the ABCD method;

c) top: define new control region to constraints b-tagging scale factor, try a full top event reconstruction using sub-threshold jets, use anti-btagging for sub threshold jets.

d) dedicated, multilepton selections for Wgamma, Wgamma* and W+J/Psi background to use as a control region or to assign a systematics to MC predictions in signal region).

The lnulnu final state.

1) Cut based analysis optimisation at low Higgs mass; 2) approach to low pT: keeps the two bin statistically combined approach? 3) WW and top normalisation strategy;

4) MVA analysis: BDT input variables choices, use ME output as a further input to BDT? Treatment of shape and finite MC statistics systematics; 5) fermiophobic Higgs
analyses.

The lnuqq analysis and theoretical issues for signal and background for the lnulnu and lnuqq channel.

1) Theoretical error on the WW background shape variables: mT, BDT inputs, constraint WW normalisation also at low mass?
2) theoretical error on the top extrapolation parameters, efficiency of the selection cuts and systematics on the BDT input variables;
3) Signal theoretical error, finite top mass effect on the Higgs pT, interference with the gg->WW background, heavy Higgs line shape implementation; 4) theoretical uncertainties on the diboson backgrounds; 4) The lnuqq analysis strtaegy: high mass optimisation, MVA techniques in the lnuqq channel, VBF topology at low mass; 5) background parametrisation, implementation in the combination architecture.

Systematic treatment, statistics approach and MC needs.

1) Treatment of systematics error in the cut flows, plots and fit; 2) systematic error presentations (event yield cut variation versus prefit error and covariance matrix); 3) shape uncertainties for systematics that are not implemented as a global event weight; 4) MC samples needs for signal and background (dibosons, W+J/Psi, W+gamma*), filtering criteria for backgrounds with large cross section: Z+jets (high and low mass), W+jets, top, W+gamma; 5) MC signal production with last PowHeg implementation; 6) mc12 validation status.