Great interest is addressed to the (W)H \rightarrow (W)WW^* process which allows studying the properties of the Higgs boson when it is only coupled with the W boson. Independent analyses of the 139 fb^{-1} of ATLAS data have been carried out, according to the number of charged leptons in the final state.

With 3 charged leptons (3\ell) in final state, two independent signal regions (Z-dom and Z-dep SR) were studied. They have different sensitivity w.r.t. the background processes that include Z bosons.

An Artificial Neural Network (ANN_{\text{Zdom}}) classifier was implemented to improve the signal sensitivity in Z-dom SR w.r.t. the above background processes, more suppressed by the Z-dep definition (i.e. without Same-Flavour-Opposite-Sign leptons). ANN_{\text{Zdom}} has 15 input variables (from grid search optimisation):

\[ p_{i}^{\text{pt}} \left| \sum_{j} p_{j}^{\text{pt}} \Delta m_{t01j}, \Delta m_{t112j}, \Delta m_{t012j} \right|, \]

\[ \Delta m_{t01j}, \Delta m_{t112j}, m_{t01j}, m_{112j}, m_{t012j}, E_{T}^{\text{miss}}, \Delta \phi_{lW}, \eta_{W} \]

\[ m_{W}^{\ell} = \sqrt{2p_{1}^{\text{pt}} \cdot E_{T}^{\text{miss}} (1 - \cos \Delta \phi_{lW} E_{T}^{\text{miss}})} \]

The normalisation of the dominant WZ background is constrained by the data of these control regions.

The measurement of the total uncertainties on the combined 1-POI \( (\sigma_{WW} \times BR_{W \rightarrow WW}) \) and 2-POI \( (\sigma_{WW} \times BR_{W \rightarrow WW} \times \sigma_{ZH}) \) fits.

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