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## Simplified Template Cross Section measurements of the $V(H \rightarrow b\bar{b})$ process with the ATLAS detector at $\sqrt{s}=13$ TeV

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Presented are the studies of the production of the Standard Model Higgs boson in association with a  $W$  or  $Z$  boson, where the Higgs decays to  $b\bar{b}$  and the  $W/Z$  bosons decay leptonically. The  $H \rightarrow b\bar{b}$  decay has a branching fraction of  $\sim 58\%$ , so this study allows the probing of the dominant Higgs decay mode, as well as providing the best sensitivity to the  $WH$  and  $ZH$  production modes and allowing the study of the Higgs at high transverse momentum. These points are important for the interpretation of the Higgs measurements in Effective Field Theories (EFTs). Since  $b$ -hadrons are the only down-type hadrons that can be effectively tagged, this decay mode also allows the study of the Yukawa coupling of the Higgs boson to the down-type quarks.

The full Run-2 dataset, corresponding to  $139 \text{ fb}^{-1}$  of instantaneous luminosity, was collected in proton-proton collisions with the ATLAS detector at a centre of mass energy of  $\sqrt{s} = 13$  TeV. The cross-sections of this process were measured using the Simplified Template Cross Section (STXS) method. Here, the cross sections are measured as a function of the  $W/Z$  boson transverse momentum in different fiducial volumes based on kinematic cuts. Results of both the resolved (where each  $b$ -jet is reconstructed as a separate jet) and the boosted (where the two  $b$ -jets are reconstructed as one fat jet) analyses are shown, as well as the future prospects of the combination of these two different methods.

### Apply to be considered for a student ; award (Yes / No)?

yes

### Level for award;(Hons, MSc, PhD, N/A)?

PhD

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