

Prospects of the $H \rightarrow b\bar{b}$ coupling measurement at the LHeC with a full detector simulation (live)

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A Future Large Hadron electron Collider (LHeC) would allow to collide an intense electron beam with a proton or ion beam from the High Luminosity–Large Hadron Collider (HL-LHC). Preliminary studies suggest that not only a rich physics program in the context of deep-inelastic scattering is possible, but also that several high precision Higgs coupling measurements could be performed. In particular, studies suggest uncertainties of 0.8% and 7.4% on the Higgs boson coupling strength to b- and c-quarks respectively. However, these studies are based on fast detector simulations and hence might be subject to several optimistic assumptions. Within this study, we present prospects of the $H \rightarrow b\bar{b}$ coupling measurement at the LHeC using the public software infrastructure of the ATLAS Experiment at the LHC for a full detector simulation. This approach does not only consider correctly low-level interactions between the decay particles and the detector material, but also uses state-of-the art reconstruction algorithms. Since the acceptance of the ATLAS detector is somewhat smaller than a potential future LHeC detector, dedicated extrapolation techniques for the reconstruction- and fake-rate efficiencies have been applied and their uncertainties estimated.

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