



Contribution ID: 211

Type: **not specified**

Bottom quark effects on the pt_Z spectrum and the W mass determination

Wednesday 18 April 2018 14:30 (30 minutes)

We study lepton-pair production in association with bottom quarks at the LHC, and present the predictions obtained at next-to-leading order in QCD, both at fixed order and matched with a QCD parton shower, for several differential distributions. We discuss the estimate of the theoretical uncertainties and consider the dependence on the perturbative QCD scales (renormalisation, factorisation and shower), we compare different parton shower models and matching schemes. We focus on the inclusive lepton-pair transverse momentum distribution, and propose a simple procedure to accurately include bottom quark effects, beyond the standard massless approximation. We estimate how this alternative formulation may affect the tuning of QCD parton shower parameters and in turn we extrapolate its impact in the simulation of charged-current Drell-Yan observables and in the W boson mass determination.

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Session Classification: WG4: Hadronic and Electroweak Observables

Track Classification: WG4: Hadronic and Electroweak Observables