

Precision Standard Model measurements with the ATLAS detector and their constraints on proton structure

Dr. Pavel Starovoitov

Kirchhoff-Institut für Physik, Universität Heidelberg

Large Hadron Collider (LHC) pushes protons to the nearly speed of light and collides them inside four experiments: ALICE, ATLAS, CMS, LHCb, to examine Standard Model (SM) of particles physics and to spot manifestations of beyond SM phenomena. The proton structure is the key ingredient in the theoretical calculations of experimental observables in proton-proton collisions, while the uncertainties in the determination of the proton parton content are one of the most important factors limiting the precision of theoretical predictions at the LHC. In this talk I will present a set of differential cross section measurements of W- and Z-boson production in association with hadron jets, inclusive jet and dijet production in proton-proton collisions at centre-of-mass energies of 7, 8 and 13 TeV performed by the ATLAS experiment. These measurements will be compared to the state-of-the-art SM calculations and the data-to-theory discrepancies will be discussed. The constraining power of these measurements on the proton structure will be highlighted using the results of the combined QCD analysis of this set of measurements together with deep inelastic scattering data from ep-collisions at the HERA collider.