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Type: Talk

## Measurements of the Vector boson production with the ATLAS Detector

Wednesday 23 August 2017 17:00 (30 minutes)

((W Mass - STDM-2014-18, Z3D (W/Z precision 7 TeV - STDM-2012-20, W+jets 8 TeV - STDM-2016-14 , Z+1jet 8TeV - STDM-2016-11, kt splitting scales - STDM-2015-14, Z+jets 13TeV STDM-2016-01)

The electroweak sector of the Standard model can be tested by precision measurements of its fundamental parameters, such as the W boson mass or the electroweak mixing angle. In this talk, we present the first measurement of the W boson mass, based on the 7 TeV data set corresponding to an integrated luminosity of 4.6 fb<sup>-1</sup>. With these samples the detector and physics modelling has been studied in great detail, leading to an overall uncertainty of 19 MeV. The ATLAS collaboration also performed a new precise triple differential cross-section measurement as a function of M(ℓℓ), dilepton rapidity and cos<sup>2</sup>\* defined in the Collins-Soper frame. This measurement provides sensitivity to the PDFs and the Z forward-backward asymmetry, AFB, which is derived and will be presented. This builds the foundation for a possible future extraction of the weak-mixing angle.

The production of jets in association with vector bosons is an important process to study perturbative QCD in a multi-scale environment. The ATLAS collaboration has performed new measurements of vector boson + jets cross sections, differential in several kinematic variables, in proton-proton collision data taken at center-of-mass energies of 8 TeV and 13 TeV, which will be presented. The measurements are compared to state-of-the-art theory predictions. They are sensitive to higher-order pQCD effects, probe flavour and mass schemes and can be used to constrain the proton structure. In addition, we present a new measurement of the splitting scales of the kt jet-clustering algorithm for final states containing a Z-boson candidate at a centre-of-mass energy of 8 TeV.

### Topic:

Topic: High Energy Particle Physics

### Summary

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**Session Classification:** Parallel session

**Track Classification:** A High Energy Particle Physics: