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Precision measurements of Standard Model parameters in ATLAS

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ATLAS has used the W and Z boson production processes to perform a range of precision measurements of SM parameters. The recoil of the Z-boson is sensitive to quark and gluon emissions and is used to determine the strong coupling constant in a novel approach. The production rate of Z+jet events with large missing transverse momentum is used to measure the decay width of the Z boson decaying to neutrinos. Differential measurements of this topology with minimal assumptions on theoretical calculations are discussed and allow comparisons to the Standard Model as well as the interpretation in beyond-the-Standard-Model scenarios. The LHC pp collision data collected by the ATLAS experiment at sqrt(s)=7 TeV is revisited to measure the W boson mass and its width. Finally, the ratio of branching ratios of the W boson to muons and electrons has been measured from top-antitop production cross sections, confirming the Standard Model assumption of lepton flavour universality in W-boson decays at the 0.5% level.

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