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Measurements of jet production properties in pp collisions with the ATLAS detector

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Several aspects of the jet production in pp collisions have been measured by the ATLAS collaboration. The measurements of the production cross sections of inclusive, di- and tri-jet events probe the dynamics of QCD and can constrain the parton proton structure. The cross sections are measured using jets clustered with the anti-kT algorithm with different distance parameters and compared to expectations based on next-to-leading order QCD calculations, corrected for non-perturbative effects, as well as to next-to-leading order Monte Carlo simulations. Ratios of inclusive cross sections measured at different centre-of-mass energies allow for reduced experimental and/or theoretical uncertainties. Double-differential dijet and trijet cross sections have been measured in proton-proton collisions at 7 TeV as a function of di- and tri-jet masses and the jet rapidity separation. An NLO QCD analysis of the data indicates constraining power for parton distribution functions of the proton. Measurements of multi-jet systems with or without a veto on additional jets, probe QCD radiation effects. The measurement of the dijet azimuthal decorrelations is sensitive to the strong coupling constant. Measurement of splitting scales in the kt clustering algorithm using jets from W+jet events provide a way to investigate jet clustering at different resolution scales. These measurements constitute precision tests of QCD in a new energy regime.

Summary

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