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Determination of the strong coupling and its running from measurements of inclusive jet production at CMS

The value of the strong coupling αS is determined in a comprehensive analysis at next-to-next-to-leading order accuracy in quantum chromodynamics. The analysis uses double-differential cross section measurements from the CMS Collaboration at the CERN LHC of inclusive jet production in proton-proton collisions at centre-of-mass energies of 2.76, 7, 8, and 13 TeV, combined with inclusive deep-inelastic data from HERA. The value αS(mZ) = 0.1176+0.0014−0.0016 is obtained at the scale of the Z boson mass. By using the measurements in different intervals of jet transverse momentum, the running of αS is probed for energies between 100 and 1600 GeV.

Secondary track

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