

High Energy Physics - Phenomenology

Single-inclusive production of large- p_T charged particles in hadronic collisions at TeV energies and perturbative QCD predictions

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The single inclusive spectrum of charged particles with transverse momenta $p_T=3-150$ GeV/c measured at midrapidity by the CDF experiment in proton-antiproton (p-pbar) collisions at $\sqrt{s}=1.96$ TeV is compared to next-to-leading order (NLO) perturbative QCD calculations using the most recent parametrizations of the parton distributions and parton-to-hadron fragmentation functions. Above $p_T\sim 20$ GeV/c, there is a very sizeable disagreement of the Tevatron data compared to the NLO predictions and to xT-scaling expectations, suggesting a problem in the experimental data. We also present the predictions for the p_T -differential charged hadron spectra and the associated theoretical uncertainties for proton-proton (p-p) collisions at LHC energies ($\sqrt{s}=0.9-14$ TeV). Two procedures to estimate the charged hadron spectra at LHC heavy-ion collision energies ($\sqrt{s}=2.76, 5.5$ TeV) from p-p measurements are suggested.

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