

Test of QCD Using Proton-Proton Collisions at the LHC

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Beauty quarks are pair-produced through strong interactions in multi-TeV proton-proton (pp) collisions at the CERN Large Hadron Collider (LHC) primarily through the flavor creation, flavor excitation, and gluon splitting mechanisms. Each of these mechanisms contribute differently to the shape of the differential cross section with respect to several angular correlation variables, referred to as ΔA , taken between the beauty and antibeauty quarks (b and \bar{b} , respectively). By measuring the shape and absolute normalization of these distributions it is possible to test theoretical predictions of Quantum Chromodynamics (QCD).

In this talk a measurement of the differential production cross sections with respect to the ΔA between two hadronic jets arising from the hadronization and decay of b or \bar{b} (referred to as b hence forth) produced in pp collisions at the LHC observed with the Compact Muon Solenoid (CMS) detector is presented. The data sample was collected by the CMS detector in 2010 at a center-of-mass energy of 7 TeV using a single-muon trigger. Hadronic jets are identified as originating from b quarks based on the presence of nearby charged particles with high impact parameter tracks with respect to the primary pp interaction point. The results obtained from data are compared with the theoretical predictions given by QCD and found to agree within statistical and systematic uncertainties.