Angular Distribution of $Z^0$ Bosons in $Z^0$+Jet Events

LUIS LEOLO, Florida International University, CMS COLLABORATION — The $Z^0$ boson center-of-mass angular distribution is measured in proton-proton collisions at $\sqrt{s} = 7$ TeV, at the CERN LHC. The advantage of studying the angular distribution is that the partonic cross section is solely a function of $\hat{s}$ and $\cos\hat{\theta}$; it does not depend on the details of the parton distribution functions. The data sample, recorded with the CMS detector, corresponds to an integrated luminosity of approximately 36 pb$^{-1}$. Events in which there is a $Z^0$ and at least one jet, with a transverse momentum threshold of 20 GeV and absolute rapidity less than 2.5, are selected for this analysis. Only the $Z^0$’s muon decay channel is studied. Within experimental and theoretical uncertainties, the measured angular distribution is in agreement with next-to-leading order perturbative QCD predictions. This analysis extends the phase space available to previous Tevatron studies by probing larger values of $\hat{s}$ and center-of-mass rapidities.

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