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Measurement of the transverse momentum distribution of Z bosons decaying to dimuons in pp collisions at center-of-mass energy of 8 TeV

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The measurement of the transverse momentum distribution of the dimuon system, produced in the Drell–Yan process is reported for the Z boson mass range of 60 to 120 GeV/c^2. The results are obtained using a data sample of proton-proton collisions at a center-of-mass energy of 8 TeV, collected by the CMS experiment at the Large Hadron Collider, corresponding to an integrated luminosity of 18.4pb^{-1}. The measured transverse momentum distribution is compared to the most commonly used event generators in the CMS experiment such as Powheg+Pythia, MadGraph. Furthermore, the transverse momentum distribution is compared with several tunes of Pythia for the underlying event in the low transverse momentum regime and the most accurate theoretical calculation at Next-to-Next-to Leading Order (NNLO) from FEWZ package is used in the high transverse momentum regime. It is concluded that Pythia generator with Z2star and Madgraph describe the data well at low q_T and high q_T regimes, respectively. An overall agreement with the predictions of the standard model is observed.

Key words: CMS, dimuon, LHC, physics, transverse momentum

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