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TMD pdfs and DY lepton pair production at LHC

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We consider the transverse momentum dependent (TMD) quark densities of the proton which are very important ingredients for unpolarized Drell-Yan lepton pair production in proton-proton collisions at the LHC energies. We calculate the TMD sea quark density as a convolution of the Catani-Ciafaloni-Fiorani-Marchesini-evolved gluon distribution and the TMD gluon-to-quark splitting function. This splitting function contains all single logarithmic small- x corrections to the sea quark evolution for any order of perturbation theory. Based on the $O(\alpha_s)$ production amplitude $q^* + q^- \rightarrow Z/\gamma^* \rightarrow l^+ + l^-$, calculated by taking into account the effective $q^* q^- Z/\gamma^*$ vertex, we analyze the distributions on the dilepton invariant mass, transverse momentum and rapidity and specific angular correlations between the produced leptons as measured by the CMS, ATLAS and LHCb collaborations. We show that our predictions are sensitive to the TMD quark distributions of the proton.

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