Open charm meson production at LHC

Rafał Maciuła[(a)]

[(a)] Institute of Nuclear Physics PAN, PL-31-342 Cracow, Poland

I will disscus the production of open charm mesons in proton-proton collisions at the LHC. We present results of calculations of the D^0, D^+, D_S^+ and D^{*+} meson production for the $\sqrt{s} = 7$ TeV. Both single-particle distributions and correlation observables will be shown. The applied perturbative model of theoretical predictions for charm quarks production is based on k_t-factorization approach and unintegrated gluon distribution functions (UGDFs). We use KMR, Kutak-Stasto and different CCFM-based UGDFs from the literature. The hadronization of charm quarks into open charm mesons $c \to D$ is done by means of Peterson, Braaten et al. and Kartvelishvili fragmentation functions. The obtained total cross sections as well as differential distributions in rapidity and transverse momentum are presented. The estimated uncertainties of the model due to renormalization and factorization scales, UGDFs and fragmentation model will be also disscused. We get good description of the recent preliminary ALICE and LHCb data in different pseudorapidity regions. We will also present first numerical estimation of total and differential cross sections for identical charmed mesons pair $D^0 D^0$ production via double-parton scattering (DPS) mechanism. The DPS cross sections are predicted to be significantly large and can be studied by all LHC collaborations providing new insights into mechanism of double-parton scattering.

E-mail: rafal.maciula@ifj.edu.pl