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Production of c-cbar pairs at LHC: k_t-factorization and double-parton scattering

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We discuss charm production at LHC. The production of single $c\bar{c}$ pairs is calculated in the k_t-factorization approach. We use several unintegrated gluon distributions from the literature. Some of them include effect of small-x saturation and fulfill Balitsky-Kovchegov evolution equation. The hadronization is included with the help of fragmentation functions found for the production of c ($\bar{c}$) in e^+e^- collisions. Differential distributions for several
charmed mesons will be presented and compared to recent results of the ALICE and LHCb collaborations. Some missing strength is identified.
Different schemes of fragmentation are discussed.

Furthermore we discuss production of two pairs of $c\bar{c}$ within a simple formalism of double-parton scattering (DPS). Surprisingly large cross sections, comparable to single-parton scattering (SPS) contribution, are predicted for LHC energies.
Both total inclusive cross section as a function of energy and differential distributions are shown.
We include recently discussed evolution of double partons in the case of two scales.
We discuss perspectives how to identify the double scattering contribution. We find much larger cross section for large rapidity distance between charm quarks from different hard parton scatterings compared to single scattering.
First predictions for two $c\bar{c}$ pair production in single-parton scattering will be presented.

Predictions for the production of different pairs of charm mesons (D0D0, $D0\bar{D}0$, etc.) are presented for the kinematics of LHCb experiment.
I will show also predictions for so-called nonphotonic electrons and muons coming from the semileptonic decays of charmed mesons.
The double-parton scattering gives large contribution with large (pseudo)rapidity gap between electrons (e^+e^+,e^- e^-, e^+e^-) or muons. This can be measured experimentally.

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