Contribution ID: **366**   Type: **Parallel talk**

Production of $\chi_c(i)\chi_c(j)$ pairs in proton-proton collisions in k_t-factorization and collinear approaches

Saturday, 13 July 2019 12:00 (15 minutes)

The matrix elements for $g^*g^* \to \chi_c(J_i)\chi_c(J_j)$
for off-shell gluons were derived [1].
The matrix elements are used then in the k_t-factorization
approach for the $pp \to \chi_c(J_i)\chi_c(J_j)$ reaction.
Different combination of the chi_c mesons are considered.
We use the Kimber-Martin-Ryskin (KMR) unintegrated gluon distributions
to evaluate cross sections. We concentrate on large rapidity separation
between χ_c mesons.
Several differential distributions for a selected value of
the center of mass energy are calculated and shown.
A feed-down from double χ_c production to the double J/ψ
channel is estimated and compared to the dominant direct production
of two J/ψ quarkonia.
This mechanism is important in the context of very small σ_{eff}
found from the analysis of J/ψ production.
Similar analysis is repeated for the collinear factorization approach
[2]. The leading order contributions ($2 \to 2$ processes)
are rather small, compared to the k_t-factorization result.
We include higher-order contributions of $2 \to 3$ processes with
two χ_c mesons and one gluon. Several differential distributions
will be presented and discussed. Again we will focus on large rapidity
distances between the χ_c mesons.
A comparison to the k_t-factorization approach will be
made. Conclusions will be formulated.

1) A. Cisek, W. Sch\"afer, A. Szczurek,
Phys. Rev. **D97** (2018) 114018.

2) I. Babiarz, W. Sch\"afer and A. Szczurek, arXiv:1902.08426 (hep-ph).
in print in Phys. Rev. D.

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Session Classification: QCD and Hadronic Physics

Track Classification: QCD and Hadronic Physics