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## Prompt hadroproduction of C-even quarkonia in the light-front $k_T$ -factorization approach

*Tuesday, 13 April 2021 12:54 (18 minutes)*

In this talk, we present a thorough analysis of  $\eta_c(1S, 2S)$  and  $\chi_{c0}, \chi_{c1}$  quarkonia hadroproduction in  $k_T$ -factorisation in the framework of the light-front potential approach for the quarkonium wave function.

The off-shell matrix elements for the  $g^* g^* \rightarrow \eta_c, \chi_{c0}$

vertices are derived in terms of the quarkonium light-front wave function.

We discuss the role of the Melosh spin-rotation and relativistic corrections estimated by comparing our results with those in the standard nonrelativistic QCD (NRQCD) approach. We elaborate on the importance of taking into account the gluon virtualities, which distinguishes our approach from the ones based on TMD distributions.

We compare our results for  $\eta_c(1S)$  to measurements by the LHCb collaboration. The LHCb kinematics probes one of the gluons at small- $x$ , and we consider the possible impact of gluon saturation effects.

Based on:

I.Babiarz, R.Pasechnik, W.Schafer and A.Szczurek,

“Prompt hadroproduction of  $\eta_c(1S, 2S)$  in the  $k_T$ -factorization approach,”

JHEP 02, 037 (2020)

doi:10.1007/JHEP02(2020)037

[arXiv:1911.03403 [hep-ph]].

I.Babiarz, R.Pasechnik, W.Schafer and A.Szczurek,

“Hadroproduction of scalar  $P$ -wave quarkonia in the light-front  $k_T$ -factorization approach,”

JHEP 06, 101 (2020)

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[arXiv:2002.09352 [hep-ph]].

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