



Contribution ID : 227

Type : Oral talk

Angular distributions of D -meson in the $D\bar{D}$ -pair production at high energy

Friday, 30 October 2026 12:15 (15)

The process of D -meson production is usually considered an important probe for investigating gluon parton distribution functions in the proton, as well as the heavy quark hadronization mechanism in QCD. In this report, we demonstrate that studying the angular distribution of the D -meson in the $D\bar{D}$ -pair production can be used to check the applicability of different factorization approaches, such as the collinear parton model (CPM)[1], TMD-factorization (TMD)[2], and high-energy factorization (HEF)[3]. First, angular distributions are sensitive to the ratio $r = p_T/M$, where p_T is the $D\bar{D}$ -pair transverse momentum and M is its invariant mass. Significantly different azimuthal angle spectra were found in two regions, $r \ll 1$ and $r \gg 1$, which correspond to the applicability regions of TMD and CPM, respectively. At large $r \gg 1$, where TMD is inapplicable, we found different angular distributions predicted by the fixed-order NLO CPM and by HEF, where all-order resummation is applied using unintegrated parton distribution functions in the proton [4].

References:

- [1] J. Collins, Foundations of Perturbative QCD (Cambridge University Press, Cambridge, 2011).
- [2] J. C. Collins, D. E. Soper, and G. F. Sterman, Adv. Ser. Dir. High Energy Phys. 5, 1 (1989).
- [3] J. C. Collins and R. K. Ellis, Nucl. Phys. B360, 3 (1991). S. Catani and F. Hautmann, Nucl. Phys. B427, 475 (1994); L.V. Gribov, E. M. Levin, and M. G. Ryskin, Phys. Rep. 100, 1 (1983);
- [4] M. A. Nefedov, V. A. Saleev, and A. V. Shipilova, Phys. Rev. D 87, 094030 (2013); A. V. Karpishkov, M. A. Nefedov, and V. A. Saleev, Phys. Rev. D 96, 096019 (2017); M.A. Nefedov and V.A. Saleev, Phys. Rev. D102 (2020), 114018;

Primary author(s) : ALIMOV, Lev (Samara University); BEKTIMIROV, Konstantin (Samara University); Prof. SALEEV, Vladimir (JINR)

Presenter(s) : ALIMOV, Lev (Samara University)

Session Classification : High energy physics: theory

Track Classification : High energy physics: theory