

# Estimates for the transverse single-spin asymmetries in $p^\uparrow p \rightarrow J/\psi X$ process at PHENIX RHIC and SPD NICA

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In our work we are interested in the transverse single-spin asymmetry (TSSA) of  $p^\uparrow p \rightarrow J/\psi X$  process, incorporating both transverse-momentum and spin effects. To predict production cross section of prompt  $J/\psi$  we use two different approaches, the nonrelativistic QCD (NRQCD) factorization approach and the Improved Color Evaporation Model (ICEM), and show how the predicted results for TSSAs depend on choice of a hadronization model. For unpolarized cross sections we compare LO predictions of different factorization models, namely the standard Generalized Parton Model (GPM), the Parton Reggeization Approach (PRA) and also the Collinear Parton Model (CPM) at NLO, with data of the PHENIX collaboration and between each other. Within a region of small transverse momenta all these models are in agreement. For the TSSA we consider two models of initial-state factorization: the GPM and its Colour-Gauge Invariant formulation (CGI-GPM). Estimates for the TSSAs in  $p^\uparrow p \rightarrow J/\psi X$  process for the conditions of the future SPD NICA experiment are presented for the first time.

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