

Study of J/ψ production vs event multiplicity in $p + p$ and $p + Au$ collisions in the PHENIX experiment at RHIC

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J/ψ production has been studied extensively in high energy $p + p$ and heavy ion collisions at RHIC and other facilities in the world, and several promising pQCD based production models have been investigated in details, however, our understanding of the production mechanisms still remain largely uncertain. The recent observations of enhanced particle yields, including J/ψ , in high event multiplicity $p + p$ collisions at LHC and RHIC suggest strong contributions from possible semi-hard Multi-Parton Interactions (MPI). Such effect will affect not only our understanding of particle productions in the traditionally considered pQCD “hard-scattering” regime, but also the interpretation of other important global observables, such as event centrality and impact parameter in heavy ion collisions, as well as some spin asymmetries in polarized $p + p(A)$ interactions. To gain further insight into particle production mechanisms in hadronic interactions, we study the J/ψ yield as a function of event multiplicity determined over a broad range of rapidity, considering both possible global and local correlations.

The PHENIX experiment has collected a large sample of $J/\psi \rightarrow \mu^+ \mu^-$ decays at the forward (and backward) rapidity of $1.2 < |\eta| < 2.2$ in $p + p$ and $p + Au$ collisions at $\sqrt{s_{NN}}=200$ GeV. A comparison of J/ψ yields from $p + p$ and $p + Au$ in the same event multiplicity could shed new light on our understanding of MPI in $p + p$ and also the multi-nucleon interactions in heavy ion $p + Au$ collisions. The latest status of this study will be presented.

Submitted on behalf of a Collaboration?

Yes

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