

Measurement of J/ψ multiplicity dependent production in p+p $\sqrt{s} = 510$ GeV with STAR at RHIC

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The investigation of quarkonium production allows for the study of the properties of strongly interacting matter, such as interactions with the quark-gluon plasma (QGP) and nucleonic gluon content. While such probes are essential, a detailed description of the quarkonium production mechanism is not yet completely understood. Proposed explanatory mechanisms, including multi-parton interactions, string screening, and higher gluon radiation are discussed, as well as the guidance this measurement and related probes provide to model calculations. Within the QGP, understanding the interplay between suppressed production and regenerative recombination may directly benefit from a heightened understanding of the underlying production mechanisms.

Herein we present dielectron channel measurements of J/ψ production of $1.5 < p_T < 12$ GeV/c at mid rapidity ($|y| < 1.0$) as a function of charged particle multiplicity. Specific observables include multiplicity dependent transverse momentum spectra and self-normalised J/ψ yields. The presented analysis utilizes the largest to date analyzed sample of quarkonia the STAR experiment has obtained from p+p collisions in the dielectron channel. Consistent with measurements at 200 GeV, 7 TeV and 13 TeV, a faster-than-linear rise is observed for which models converge at low values of normalized multiplicity. Their divergence at higher values emphasizes the potential for improvement from extending the measurement range.

Category

Experiment

Collaboration

STAR

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