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Upsilon measurements in p+p, p+Au and Au+Au collisions at √⊠NN = 200 GeV with the STAR experiment

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Measurements of quarkonium production have played an important role in understanding the properties of the Quark-Gluon Plasma (QGP) formed in relativistic heavy-ion collisions. The suppression of quarkonia in the medium due to color screening has been proposed as a direct signature of the QGP formation. However, other effects, such as regeneration of quarkonia by the coalescence of uncorrelated quark-antiquark pairs, co-mover absorption, and cold nuclear matter effects, add additional complications to the interpretation of the observed quarkonium suppression. Compared to charmonia, bottomonia suffer much less from regeneration contribution and co-mover absorption. Furthermore, different bottomonium states may dissociate at different temperatures, known as "sequential melting", which can be used to constrain the temperature of the medium.

Quarkonium measurements have been traditionally performed in the dielectron channel at STAR. In early 2014, the Muon Telescope Detector (MTD), which provides muon identification and triggering capabilities at mid-rapidity, was fully installed into the STAR experiment. It allows measurements of quarkonia via the di-muon channel with much smaller Bremsstrahlung radiation and thus much better invariant mass resolution than the dielectron channel. In this talk, we will present the measurements of Y suppression in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV via both the di-muon and dielectron channels. The centrality and transverse momentum dependences will be reported and compared to those at the LHC and theoretical calculations. We will also show the Y measurements in p+p and p+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV via the dielectron channel using the data taken in year 2015. These measurements provide a significantly improved p+p reference and quantification of the cold nuclear matter effects for Y measurements at RHIC.

Preferred Track

Quarkonia

Collaboration

STAR

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