

Measurements of J/ψ Production at RHIC with the STAR Experiment

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Quarkonium production is modified in ultra-relativistic heavy-ion collisions with respect to p+p collisions due to color-screening and recombination of heavy quark pairs inside the hot QCD medium, known as the quark-gluon plasma (QGP). Such modifications depend on the size and temperature of the QGP droplet, the binding energy and formation time of the quarkonium, as well as the abundance of heavy quarks created in the collisions. On the other hand, cold nuclear matter effects, such as modification of parton distribution functions in nuclei, energy loss, nuclear absorption, and co-mover effects, can also induce differences to the p+p reference. Measurements of quarkonium production in different collision systems can disentangle cold and hot nuclear matter effects, and help us better understand color-screening effect or quarkonia dissociation in QGP and extract the properties of QGP.

In this poster, we present results on J/ψ production measured by the STAR experiment, including new precise results on nuclear modification factor R_{pA} in p+Au collisions and the first results on R_{AA} in $^{96}_{44}\text{Ru}+^{96}_{44}\text{Ru}$ and $^{96}_{40}\text{Zr}+^{96}_{40}\text{Zr}$ collisions at $\sqrt{s_{NN}} = 200$ GeV. Comparisons are made to results from Au+Au collisions and to model calculations, and physics implications are also discussed.