

New Measurements of Quarkonium 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, referred to as hot nuclear matter effects, depend on the size and temperature of the QGP, 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 modifications of parton distribution functions in nuclei, energy loss in the cold nuclear matter, 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 the color-screening effect in QGP and extract its properties.

In this talk, we will present new measurements of J/ψ and Υ production with the STAR experiment, including precise results on the 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 will be made to results from Au+Au collisions and to model calculations, and physics implications will be discussed.