

J/ψ production in Au+Au collisions at $\sqrt{s} = 54.4$ GeV

Content

Heavy quarkonia are ideal probes of the Quark-Gluon Plasma (QGP). J/ψ is the most abundantly produced quarkonium state accessible experimentally and its suppression due to the color screening effect in hot and dense medium has been suggested as a signature of the formation of the QGP. Besides the screening effect, there are other mechanisms, such as the cold nuclear effects and charm quark recombination, which could affect the J/ψ yield in heavy-ion collisions. Measurements of J/ψ production at different collision energies will help to understand the interplay of these mechanisms. STAR has observed significant suppressions of the J/ψ production at mid-rapidity in Au+Au collisions at $\sqrt{s_{NN}} = 39, 62.4, \text{ and } 200$ GeV. However, the nuclear modification factor shows no significant collision energy dependence from SPS to RHIC top energy within large uncertainties. In 2017, STAR took a large sample of 54.4 GeV Au+Au collisions and the statistics is more than ten times of the 39 and 62.4 GeV Au+Au data. In this talk, we will present new measurements of the inclusive J/ψ production in Au+Au collisions at $\sqrt{s_{NN}} = 54.4$ GeV. The collision energy and transverse momentum dependences of the nuclear modification factor will be presented. Physics implications of these results will also be discussed.

Summary

This work is for the STAR Collaboration

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