

# $J/\psi$ production in Au+Au collisions at $\sqrt{s_{\text{NN}}} = 54.4$ GeV

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## Abstract

1        Heavy quarkonia are ideal probes of the Quark-Gluon Plasma (QGP).  $J/\psi$  is  
2        the most abundantly produced quarkonium state accessible experimentally and its  
3        suppression due to the color screening effect in hot and dense medium has been  
4        suggested as a signature of the formation of the QGP. Besides the screening ef-  
5        fect, there are other mechanisms, such as the cold nuclear effects and charm quark  
6        recombination, which could affect the  $J/\psi$  yield in heavy-ion collisions. Measure-  
7        ments of  $J/\psi$  production at different collision energies will help to understand the  
8        interplay of these mechanisms for  $J/\psi$  production. STAR has observed significant  
9        suppressions of the  $J/\psi$  production at mid-rapidity in Au+Au collisions at  $\sqrt{s_{\text{NN}}}$   
10       = 39, 62.4 and 200 GeV. However, the nuclear modification factors show no sig-  
11       nificant collision energy dependence from SPS to RHIC top energy within large  
12       uncertainties.

13       In 2017, STAR took a large sample of 54.4 GeV Au+Au collisions and the statis-  
14       tics is more than ten times of the 39 and 62.4 GeV Au+Au data. In this talk, we  
15       will present new measurements of inclusive  $J/\psi$  production in Au+Au collisions at  
16        $\sqrt{s_{\text{NN}}} = 54.4$  GeV by STAR experiment. The collision energy and transverse mo-  
17       mentum dependences of the nuclear modification factors will be presented. Physics  
18       implications of these results will also be discussed.