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Charmonium production in Ru+Ru and Zr+Zr collisions at $\sqrt{s_{\mathrm{NN}}}$ = 200 GeV with STAR

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"Charmonium is an important to probe the properties of the quark-gluon plasma (QGP) created in heavy-ion collisions due to the modification of its yield by the effects of dissociation and regeneration in QGP. The production of J/ψ in heavy ion collisions has been extensively studied at RHIC energies. However, many new observables studied at LHC energies are yet to be explored at RHIC energies. 4 billion isobaric collisions ($^{96}_{44}Ru$ + $^{96}_{44}Ru$ and $^{96}_{40}Zr$ + $^{96}_{40}Zr$) at $\sqrt{s_{\mathrm{NN}}}$ = 200 GeV has been collected by STAR in 2018, providing a unique opportunity for the study of charmonium with observables has never been explored at RHIC before.

In this contribution, the first measurement of $\psi(2\mathrm{S})$ production in heavy ion collisions at RHIC will be presented with the 4B isobaric collision date. The J/ψ and $\psi(2\mathrm{S})$ signals are reconstructed via the e^+e^- decay channel with machine learning technique. Centrality and transverse momentum dependence of the ratio of $\psi(2\mathrm{S})$ yield over that of J/ψ will be shown and physics implication will be discussed."

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