Very low-$p_T$ $J/\psi$ production in Au+Au collisions at $\sqrt{S_{NN}} = 200$ GeV at STAR

Ziyang Li (for the STAR Collaboration)
State Key Laboratory of Particle Detection and Electronics,
Department of Modern Physics,
University of Science and Technology of China
Motivation

- Significant enhancements of the J/ψ production via e⁺e⁻ decay channel at very low p_T observed by the STAR collaboration in peripheral Au+Au 200 GeV and U+U 193 GeV collisions.
  - Much weaker centrality dependence compared to the hadronic production.
  - Consistent with coherent photon-nucleus interactions.
- Measurement of J/ψ production via μ⁺μ⁻ decay channel can provide complementary information to the previous dielectron results.

The STAR detector and raw signal extraction

- Maximum Likelihood method is used for raw signal extraction.

TPC: track reconstruction and particle identification (full $\phi$ coverage, $|\eta| < 1$)
MTD: triggering on and identifying muons (45% in $\phi$, $|\eta| < 0.5$)
• Significant enhancement at $p_T < 0.2$ GeV/c is observed for $J/\psi$ production with respect to the extrapolation of fit of data for $p_T > 0.2$ GeV/c, which is reflected in a large enhancement of $R_{AA}$ above unity.
**p_T^2 distribution and excess yield**

- An exponential fit is applied to the -t distribution, and the slope parameter is $153 \pm 55 \text{ (GeV/c)}^{-2}$, consistent with that expected for an Au nucleus [199 (GeV/c)]$^{-2}$ within uncertainties. The slope parameter is $177 \pm 23 \text{ (GeV/c)}^{-2}$ from published results via e$^+e^-$ channel.

- Excess yield consistent with equivalent photon approximation (EPA) calculation.