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# J/ψ production in isobaric collisions at $\sqrt{s_{NN}}$ = 200 GeV with the STAR experiment

**Yan Wang (for the STAR Collaboration)**

State Key Laboratory of Particle Detection and Electronics,

Department of Modern Physics,

University of Science and Technology of China

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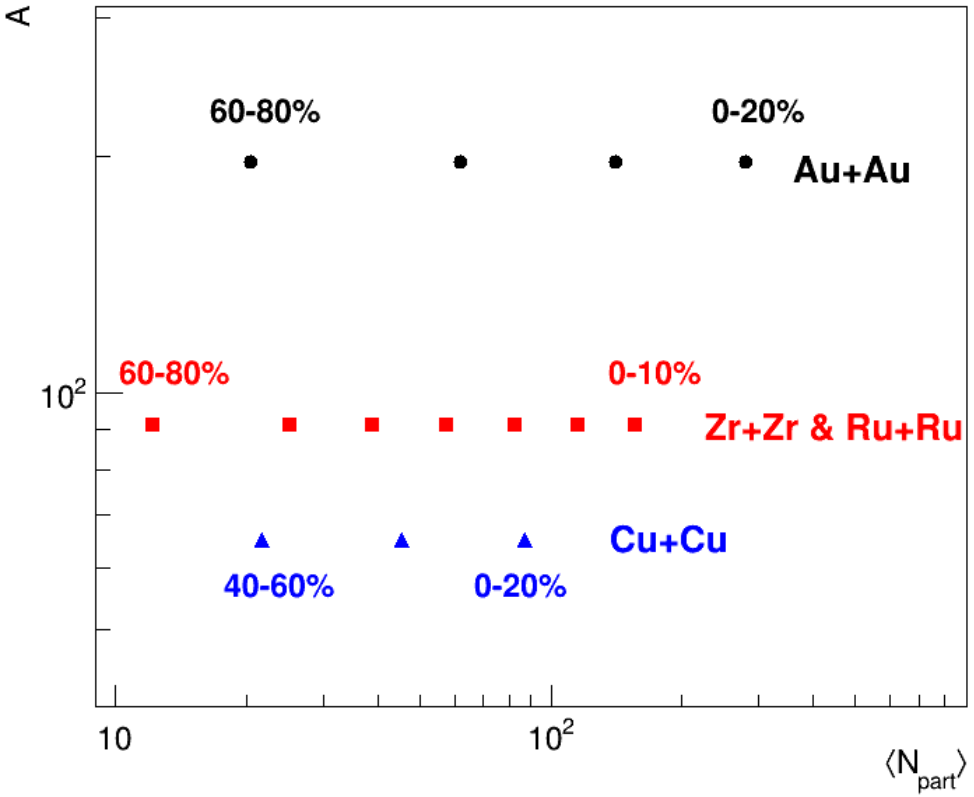
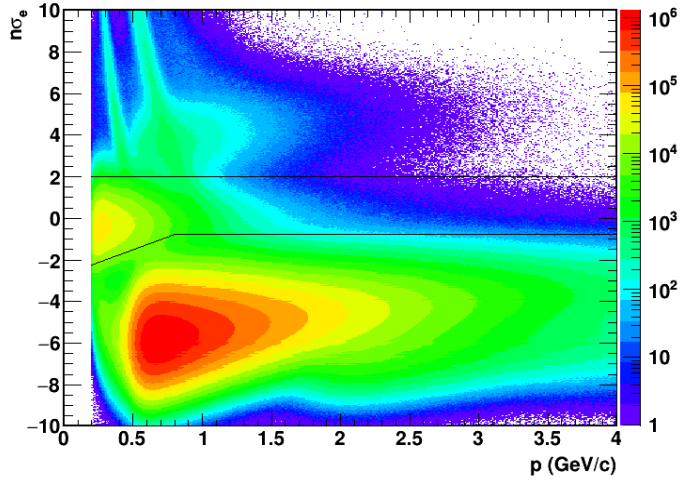
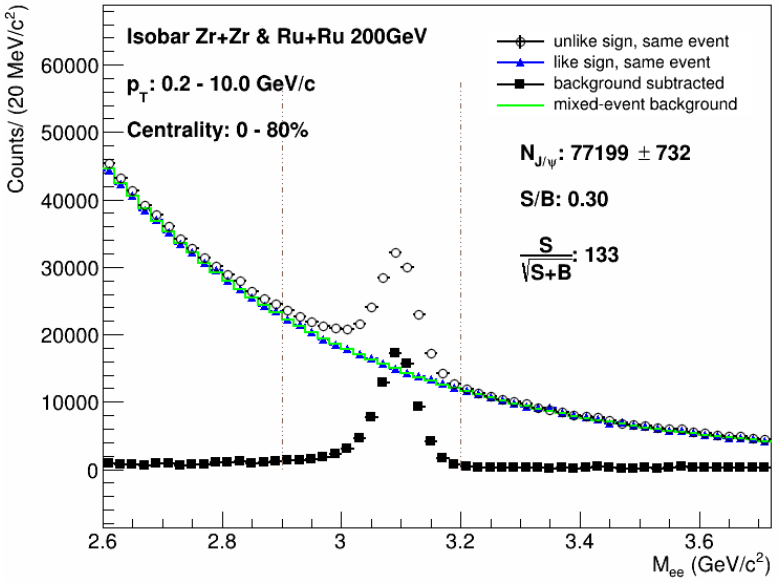
# Motivation




- Measurements of J/ψ production and its modification in heavy-ion collisions provide important information about properties of the Quark-Gluon Plasma (QGP)
- Competing effects of in-medium melting and regeneration
  - both effects strongly depend on system size and $p_T$
- STAR has collected ~4B good minimum bias $^{92}_{44}\mathrm{Ru} + {}^{92}_{44}\mathrm{Ru}$ and $^{92}_{40}\mathrm{Zr} + {}^{92}_{40}\mathrm{Zr}$ events in 2018
  - unique opportunity to perform precise $p_T$ differential study of J/ψ production for various collision centralities
- The isobaric collisions cover $\langle N_{part} \rangle$ about 10-160

# Signal reconstruction and $p_T$ spectra

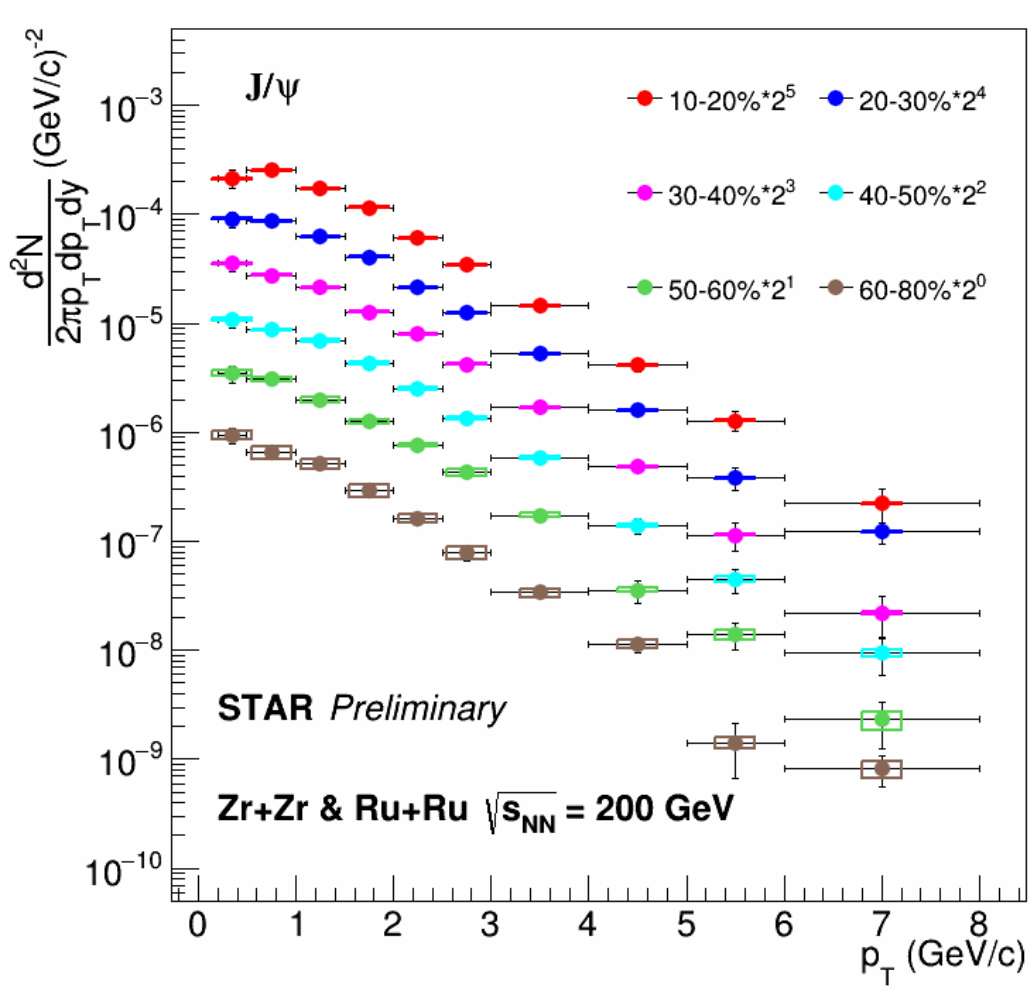


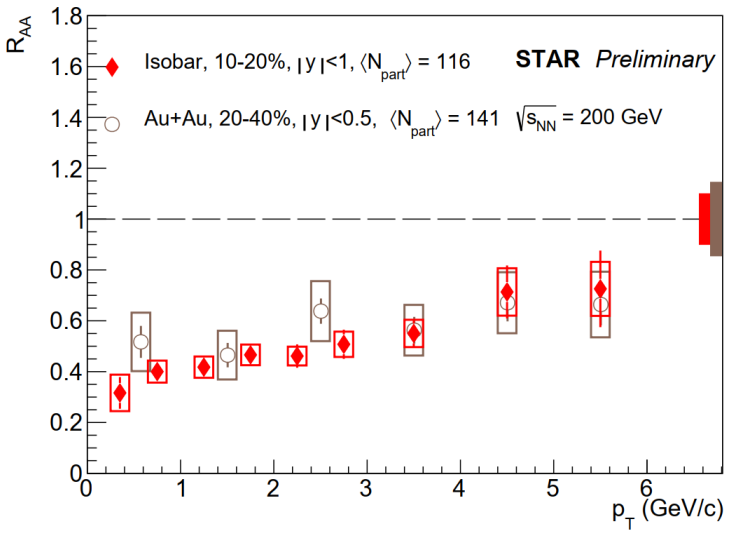

Electron identified by combining dE/dx, time-of-flight and energy deposition in calorimeter

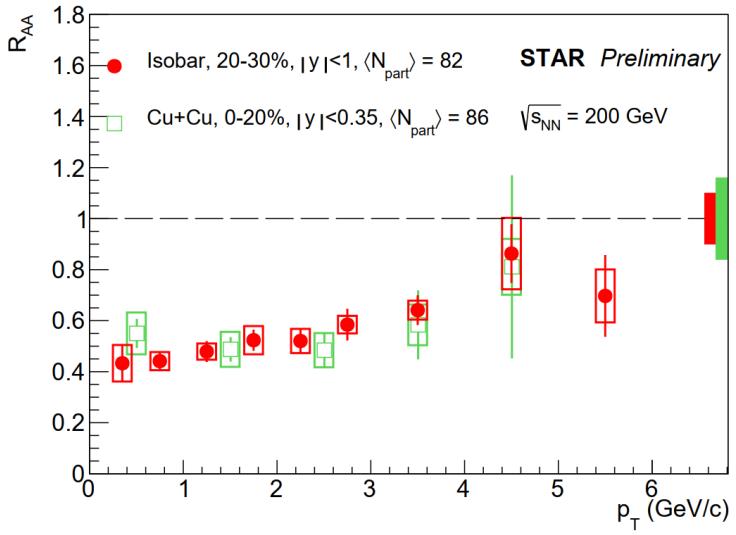
Mixed-event background subtracted

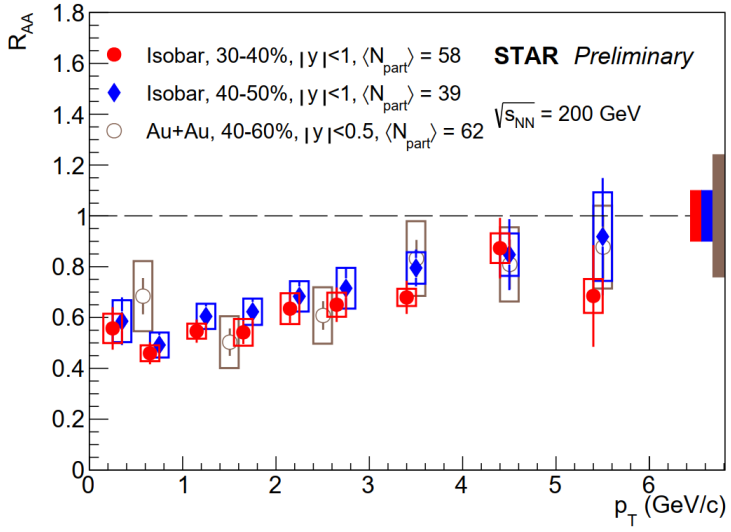
Excellent J/$\psi$ signal

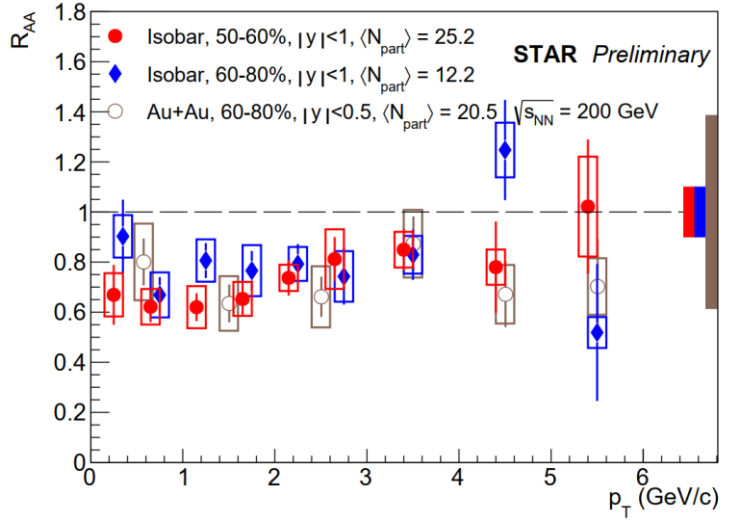


# Nuclear modification factors



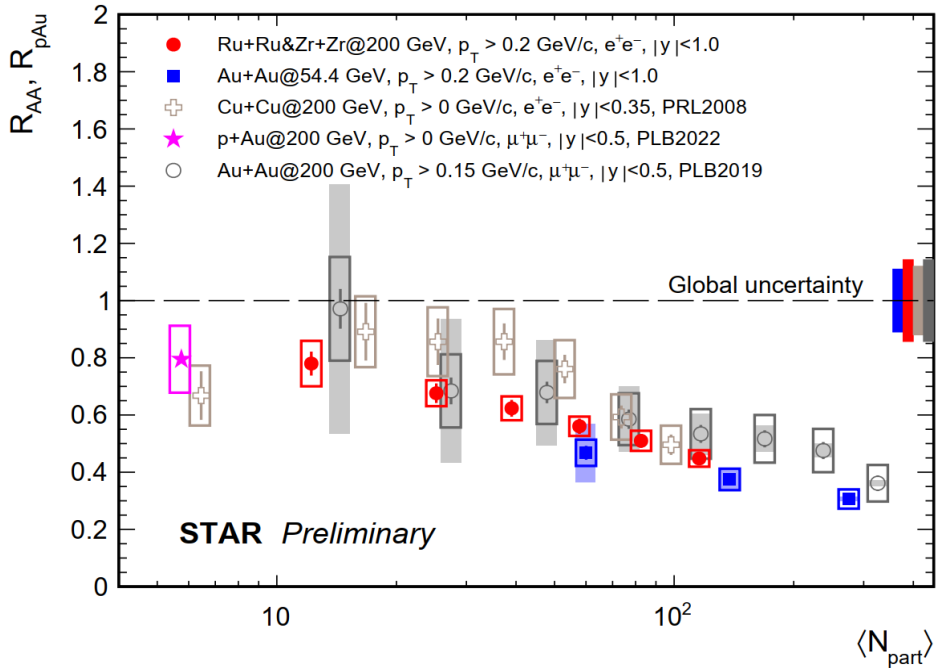




- The $R_{AA}$ as a function of $p_T$ measured in 6 centralities of isobaric collision
- Highest precision measurement at RHIC to date
- Significant suppression observed
- Consistent with Au+Au and Cu+Cu results for similar system size

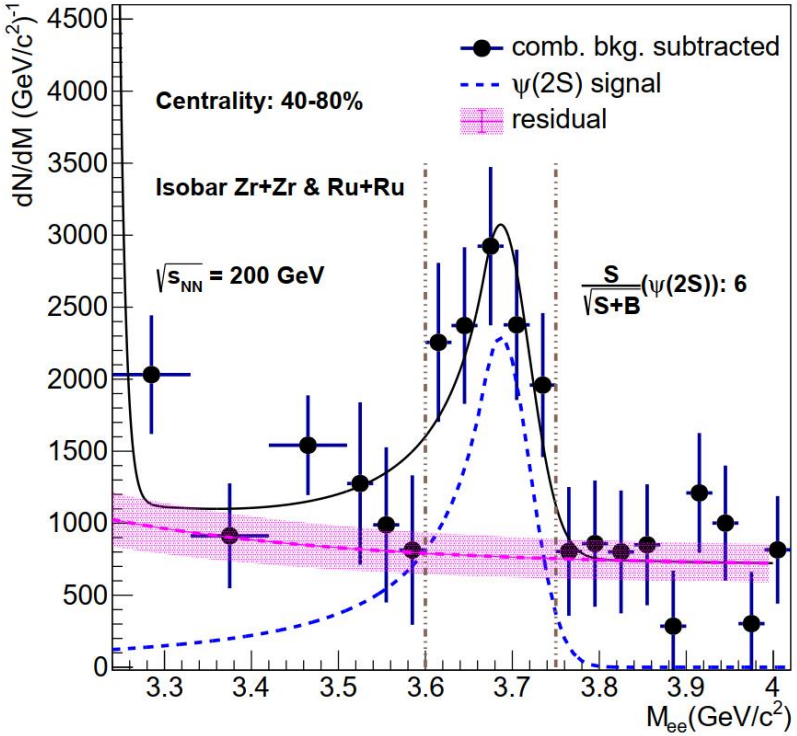
Au+Au: STAR, PLB 797, 134917,2019  Cu+Cu: PHENIX,PRL101, 122301 ,2008

# System size dependence




$R_{AA}$ as of a function of $\langle N_{\mathrm{part}} \rangle$

No obvious system and energy dependence at RHIC




Good $\psi(2S)$ signal

**Summary:** $J/\psi$ production measured in isobaric collisions with great precision
Call for theoretical calculations

**Outlook:** Centrality dependence of relative suppression of $\psi(2S)$ and $J/\psi$
Mean $p_T^2$ as a function of $\langle N_{\mathrm{part}} \rangle$ for $J/\psi$ will be calculated